



2023 Grand Tower Energy Center Annual Groundwater Monitoring Report

PREPARED FOR
Rockland Capital, LLC

DATE
31 January 2024

REFERENCE
0599247



2023 Grand Tower Energy Center Annual Groundwater Monitoring Report

31 January 2024



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CLIENT: Rockland Capital, LLC
PROJECT NO: 0599247

DATE: 31 January 2024 VERSION: 01

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EXECUTIVE SUMMARY

In accordance with 35 Illinois Administrative Code (IAC) Section 845.610(e)(4), the following section provides a summary overview of groundwater monitoring activity at the Site during 2023:

- Eight episodes of groundwater sampling were conducted from September 2017 through February 2018 to establish background concentrations at the Site utilizing data from background wells APW-1R and APW-09. The final Groundwater Protection Standards (GWPS) are the higher of the values between those provided in 35 IAC Section 845.600(a) and the calculated background concentrations.
- Assessment of corrective measures began on 16 June 2022, with the commencement of the initial post-closure groundwater sampling event. Groundwater monitoring, monitoring well inspection and monitoring well gauging events were conducted during the first, second, third, and fourth quarters of 2023. Figures 3, 4, 5 and 6 provide a visual delineation of monitoring well locations with exceedances of the GWPS in accordance with 35 IAC Section 845.600(a)1 and 35 IAC Section 845.600(a)2 during all four quarters of 2023, respectively.
- During 2023 there were exceedances of the GWPS during one or more quarters. These exceedances are summarized as follows:
 - Sulfate: APW-02
 - Arsenic: APW-02, APW-06D, APW-10S
 - Boron: APW-02, APW-03, APW-05 (Q1), APW-05R (Q2, Q3, and Q4), APW-06D, APW-06S
 - Calcium: APW-02, APW-03, APW-05 (Q1), APW-05R (Q2, Q3, and Q4), APW-06D, APW-06S, APW-07, APW-09¹, APW-10D, APW-10S
 - Cobalt: APW-10D
 - Turbidity: APW-01R, APW-02, APW-03, APW-04, APW-05R (Q2, Q3, and Q4), APW-06D, APW-07, APW-08, APW-09, APW-10D, APW-10S
 - Lithium: APW-02, APW-03, APW-04, APW-05 (Q1), APW-05R (Q2, Q3, and Q4), APW-06S, APW-10S
 - Molybdenum: APW-02, APW-05 (Q1), APW-05R (Q2, Q3, and Q4), APW-06S
- The GTEC coal combustion residuals (CCR) impoundment is currently in Corrective Action Monitoring (CAM). After seven quarterly CAM events have been completed, the groundwater sampling results will be evaluated to determine if statistically significant increases or decreases have occurred after cap and closure occurred in 2020 in accordance with 35 IAC Section 845.640(f). The statistical evaluation of the first seven CAM groundwater sampling events is anticipated to be completed during the first quarter of 2024. In accordance with 35 IAC Section 845.550(a) an Annual Groundwater Monitoring and Corrective Action Report will also be submitted for the preceding calendar year no later than 31 January 2024.
- A potentiometric surface map for all quarters of 2023, as required by 35 IAC Section 845.650(b)(2), are included as Figures 7, 8, 9, and 10.

¹During Q4, the duplicate sample collected at APW-09 (DUP-02) exceeded the GWPS for calcium; however, the normal sample at APW-09 was below the GWPS during the fourth quarter 2024 sampling event.



- The well screen of APW-05 was found to be damaged during 2022, which had allowed the sand pack to enter the monitoring well. An Illinois licensed well driller abandoned and replaced APW-05 during the first quarter of 2023.

1. INTRODUCTION

Environmental Resources Management (ERM) Inc. is submitting the 2023 Annual Groundwater Monitoring Report in accordance with 35 Illinois Administrative Code (IAC) Section 845.550(a)(3) and 35 IAC Section 845.610(e) for the Grand Tower Energy Center (GTEC) facility located at 1820 Power Plant Rd, Grand Tower, Illinois (the "Site"). A site location map is provided as Figure 1. The location of all Site monitoring wells is provided as Figure 2. This report summarizes the results and findings of the GTEC quarterly post-closure groundwater sampling events conducted during 2023.

2. BACKGROUND

GTEC historically operated as a merchant facility, which sold energy into the Midcontinent Independent System Operator (MISO) distribution system and has been idled since late 2020. The immediate project site, south of the idled power generation facility, consists of an approximately 21-acre area consisting of an impoundment and associated drainage basin. The GTEC CCR impoundment was capped and closed in 2020 and is subject to USEPA 40 CFR 257 and IEPA 35 IAC 845, as applicable. Approximately 235,000 cubic yards of CCR materials are present in the closed impoundment. These materials have been excavated, consolidated, and covered by a 40-mil LLDPE liner, cover soil, and geotextile liner which covers a 14-acre footprint within the Site.

The 2023 groundwater sampling activities were performed in accordance with the post-closure groundwater monitoring program presented within the Grand Tower Operating Permit Application submitted to the IEPA on 28 October 2021 and further modified according to the Consolidated IEPA Comments dated 17 March 2022 received via email. The purpose of the sampling was to initiate the five-year period of quarterly groundwater monitoring for the evaluation of the concentration and areal distribution of impacts related to the closed CCR impoundment in Site groundwater.

The parameters detected in the groundwater are associated with the closed CCR impoundment. This report provides a comprehensive overview of field activities, laboratory analysis, and documentation of any other site-related activities as required throughout the 2023 sampling events.

3. KEY ACTIONS COMPLETED DURING 2023

The following Site activities were completed quarterly during 2023 and performed in accordance with the post-closure groundwater monitoring program:

- Abandonment, redrill, and development of APW-05/APW-05R (During Q1).
- Quarterly inspection of the final cover system of the CCR Impoundment.
- Quarterly inspection of the Site groundwater monitoring wells; and
- Quarterly groundwater monitoring.



3.1 MONITORING WELL INSPECTION AND GAUGING

During the first, second, third, and fourth quarters of 2023, monitoring well inspections and gauging events were conducted. The monitoring well inspection forms can be found within Appendix A of this report. The monitoring well protectors and casings were also inspected for damage and/or signs of settling that might impact the integrity of the surface seals. The inspection tasks included gauging total depths as well as static groundwater elevations. Both measurements were referenced from the top of casing (TOC) at each of the Site monitoring wells. Total depth and groundwater level measurements were obtained from the monitoring wells using a water level meter with an accuracy of 0.01 foot. Based upon these measurements, a shallow groundwater contour map for the Site was developed for each quarter of 2023. Figure 2 shows the layout of the site and the monitoring well locations, and Figures 7, 8, 9 and 10 show the quarterly groundwater contours and groundwater flow direction arrows, groundwater elevations at each monitoring well, and the Mississippi River elevation at the time of groundwater level gauging. The groundwater gradient is primarily from east to west towards the Mississippi River except for during times of flooding events that may cause a reverse flow from west to east for a short period of time (Natural Resource Technology, Phase 1 Hydrogeologic Assessment Report, March 2013). During the 2023 quarterly groundwater sampling events, no reverse flow conditions were noted.

During the first quarter of 2023 inspection and sampling event, the well screen of monitoring well APW-05 was still found to be occluded > 40% due to infiltration of filter pack sand into the well casing from a compromised well screen. Between 6 and 7 February, APW-05 was abandoned per Illinois Department of Public Health (IDPH) regulations, and a new well, APW-05R, was drilled by Bulldog Drilling of Dupon, IL, an Illinois licensed well driller. APW-05R was subsequently developed according to USEPA guidelines. Copies of the IDPH abandonment log for APW-05, the well construction log for APW-05R, and the well development log for APW-05R are included as Appendix B.

3.2 GROUNDWATER MONITORING

The Groundwater Protection Standards (GWPS) for the Site are those provided in 35 IAC Section 845.600(a). Assessment of corrective measures began on 16 June 2022 with the commencement of the initial post-closure groundwater sampling event. The groundwater monitoring well network surrounding the closed CCR impoundment includes APW-01R, APW-02, APW-03, APW-04, APW-05R, APW-06D, APW-06S, APW-07, APW-08, APW-09, APW-10D, and APW-10S. APW-01R and APW-09 serve as background wells.

As mentioned in the preceding section, APW-05 was abandoned and replaced by APW-05R during the first quarter. APW-05 was sampled only for the first quarter of 2023. After the replacement of APW-05 with APW-05R, APW-05R was sampled for the second, third and fourth quarters of 2023. The remaining 11 groundwater monitoring wells were sampled during all quarters of sampling in 2023.

Monitoring Event	Sampling Dates	Number of Wells Sampled
First Quarter 2023	1/30/2023 – 2/2/2023	12
Second Quarter 2023	6/26/2023 - 6/27/2023	12
Third Quarter 2023	9/19/2023 - 9/20/2023	12
Fourth Quarter 2023	11/27/2023 - 11/29/2023	12

The monitoring wells were purged prior to sampling using a submersible pump according to USEPA low flow purging and sampling procedures (“Low Stress Purging and Sampling Procedure for the Collection of Groundwater Samples from Monitoring Wells” revised September 19, 2017). The pump intake was placed within the screened interval of each monitoring well sampled and stabilization measurements were collected using a calibrated YSI Professional Plus meter for the first, second, and third quarter and a YSI ProDSS meter for the fourth quarter. These meters obtained measurements for the collection of pH, specific conductivity, temperature, dissolved oxygen, and oxidation reduction potential (ORP) readings. Turbidity readings were also collected from each monitoring well using a Hach 2100Q Turbidimeter. Well purging continued until stabilization of each field parameter was achieved according to USEPA guidelines for low-flow sampling. Once the field parameters stabilized, the YSI meter was disconnected, and groundwater samples were collected for analysis using the same dedicated polyethylene tubing that was used to purge the well. Field parameter measurements collected during each sampling event were recorded on field data forms. Copies of the field data forms are included in Appendix C.

The groundwater samples collected were placed in laboratory-provided sample containers for analysis by Teklab, Inc. located in Collinsville, IL which is an IEPA-approved laboratory. Samples were transported under chain-of-custody procedures in laboratory-provided coolers containing ice to the laboratory for analytical testing. The laboratory analytical reporting for all four sampling events conducted in 2023 are included in Appendix D.

The IEPA on 28 October 2021, the IEPA evaluates the efficacy of corrective actions for closed CCR impoundments through the comparison of the groundwater analytical results to the GWPS contained in the 35 IAC Section 845.600. As required by 35 IAC Section 845.600, the following groundwater contaminants of concern (COCs) were monitored during 2023:

• Antimony	• Chloride	• Mercury	• TDS
• Arsenic	• Chromium	• Molybdenum	• Radium 226/228
• Barium	• Cobalt	• pH	• Calcium
• Beryllium	• Fluoride	• Selenium	• Turbidity
• Boron	• Lead	• Sulfate	
• Cadmium	• Lithium	• Thallium	

3.2.1 GROUNDWATER ANALYTICAL RESULTS

The analytical results for the four post-closure groundwater sampling events conducted during 2023 are presented within the attached Table 1.

During 2023 there were exceedances of the GWPS during one or more quarters. These exceedances are summarized as follows:

GWPS COC	Exceedance Location			
	Q1 2023	Q2 2023	Q3 2023	Q4 2023
Sulfate	APW-02	APW-02	APW-02	APW-02
Arsenic	APW-02, APW-06D, APW-10S	APW-02, APW-06D, APW-10S	APW-06D, APW-10S	APW-02, APW-06D, APW-10S
Boron	APW-02, APW-03, APW-05, APW-06D, APW-06S	APW-02, APW-03, APW-05R, APW-06D, APW-06S	APW-02, APW-03, APW-05R, APW-06D, APW-06S	APW-02, APW-03, APW-05R, APW-06D, APW-06S
Calcium	APW-02, APW-03, APW-05, APW-06D, APW-07, APW-10D, APW-10S	APW-02, APW-03, APW-05R, APW-06D, APW-06S, APW-07, APW-10D, APW-10S	APW-02, APW-03, APW-05R, APW-06D, APW-06S, APW-07, APW-10D, APW-10S	APW-02, APW-03, APW-05R, APW-07, APW-09 ¹ , APW-10D, APW-10S
Cobalt	-	APW-10D	-	-
Turbidity	APW-01R, APW-02, APW-03, APW-04, APW-06D, APW-07, APW-08, APW-09, APW-10D, APW-10S	APW-01R, APW-02, APW-04, APW-05R, APW-06D, APW-08, APW-09, APW-10D, APW-10S	APW-01R, APW-02, APW-04, APW-05R, APW-06D, APW-07, APW-08, APW-10D, APW-10S	APW-01R, APW-02, APW-04, APW-05R, APW-06D, APW-07, APW-08, APW-10D
Lithium	APW-02, APW-05, APW-06S	APW-02, APW-05R, APW-06S	APW-02, APW-03, APW-04, APW-05R, APW-06S	APW-02, APW-04, APW-05R, APW-06S, APW-10S
Molybdenum	APW-02, APW-05, APW-06S	APW-02, APW-05R, APW-06S	APW-02, APW-05R, APW-06S	APW-02, APW-05R, APW-06S

¹During Q4, the duplicate sample collected at APW-09 (DUP-02) exceeded the GWPS for calcium; however, the normal sample at APW-09 was below the GWPS during the fourth quarter 2024 sampling event.

APW-10S, located approximately one-half mile south of the closed CCR impoundment historically has exhibited elevated arsenic concentrations. However, the occurrence of arsenic in this well is not considered to be related to the closed CCR impoundment due to its distance and location hydraulically cross-gradient in relation to the Site. Additionally, the monitoring wells located between the closed CCR impoundment (APW-03, APW-07, APW-08, and APW-09) and APW-10D have not historically exhibited arsenic concentrations above the GWPS.

4. STATISTICAL ANALYSIS

This report documents the calculation of site-specific background concentrations for groundwater at the GTEC property located in Grand Tower, Illinois pursuant to Title 35, Section 845.640(f) of the IAC. Site-specific background concentrations were calculated in accordance with United States Environmental Protection Agency Unified Guidance (USEPA, 2009) and the Interstate Technology & Regulatory Council guidance on Groundwater Statistics for Monitoring and Compliance (ITRC, 2013).

Twenty-five analytes were evaluated in this report: antimony, arsenic, barium, beryllium, boron, cadmium, calcium, chloride, chromium, cobalt, dissolved solids, fluoride, iron, lead, lithium, manganese, mercury, molybdenum, nickel, pH, radium-226/228, selenium, sulfate, thallium, and turbidity. The background dataset contains a total of 48 samples collected from 3 wells (APW-01R, APW-04, and APW-09), which are hydraulically upgradient from the coal combustion waste ash basin. Concentrations from the 9 downgradient wells (APW-02, APW-03, APW-05/05R, APW-06D,

APW-06S, APW-07, APW-08, APW-10D, and APW-10S) were compared against the calculated background concentrations to identify potential exceedances.

4.1 DATA PROCESSING STEPS

Several steps were taken when preparing the dataset to ensure that it was appropriate for statistical analysis. The dataset was first reviewed to identify any potential errors or omissions. No duplicate samples were present in the dataset, so duplicate processing steps were not required for this analysis. Since metals in the earliest background samples were only measured for the “total” fraction, “dissolved” fraction results were excluded from the analysis.

Non-detect (ND) samples were handled in accordance with the “15% and 50% Non-Detect Rule” described in USEPA Unified Guidance (USEPA, 2009, p. 15-24). Simple substitution (i.e., replacing NDs with the reporting limit) was limited to well/constituent groups where $\leq 15\%$ of samples were NDs. In cases where $> 15\%$ but $< 50\%$ of results were NDs, the Kaplan-Meier censored estimation method was used to calculate adjusted background mean and standard deviation estimates. Non-parametric techniques were used for groups with greater than 50% NDs. Figure E1 shows a summary of analyte detections by location.

Data processing and exploratory data analysis were performed using the R programming language (R Core Team, 2023). Data were transformed into a format that is compatible with ProUCL Version 5.2 (USEPA, 2022) for subsequent analysis. Input and output files from the ProUCL analysis are included in Appendix E3.

4.2 EXPLORATORY DATA ANALYSIS

When calculating background groundwater concentrations, assumptions are made about the underlying dataset. For example, some statistical methods assume that a dataset is normally distributed or that concentrations are stationary with respect to time and space. It is important to verify whether these assumptions are valid by examining the dataset through exploratory data analysis (EDA). The EDA process commonly involves inspecting the dataset in a variety of ways, including the generation of figures and tables to summarize data properties. The following analyses were performed for this evaluation prior to the calculation of background concentrations: generation of summary statistics, outlier identification, goodness-of-fit testing, temporal trend analysis, and spatial variability testing. These EDA steps were performed on both the upgradient/background and downgradient wells.

4.2.1 DESCRIPTIVE STATISTICS

Descriptive statistics provide a high-level overview of the dataset properties. A summary table showing sample counts as well as minimum, maximum, median, mean, and standard deviation values for each well/constituent pair and for the pooled upgradient dataset is presented in Table E1. Kaplan-Meier estimates for the mean and standard deviation are provided for groups with 50-85% detected values.

Three analytes were not detected in any of the upgradient wells: beryllium, cadmium, and mercury. One analyte was not detected in any of the downgradient wells: thallium. Ten analytes

were detected in 100% of upgradient and downgradient samples: barium, boron, calcium, dissolved solids, iron, lithium, manganese, pH, radium-226/228, and turbidity.

4.2.2 OUTLIER EVALUATION

The presence of outliers may lead to biased background concentrations since outliers can influence the mean concentration and/or increase the amount of variance in the background dataset. Three different methods were used to identify potential outliers in the dataset, including visual methods (probability plots [Figure E2] and box plots [Figure E3]) and statistical tests (Tukey's outlier test¹). Outlier tests were only run on detected values for well/constituent pairs with at least 4 detected values. Upgradient wells were also combined into a single dataset for each constituent and outlier testing was performed on detected values from the pooled dataset. Table E2 shows samples that were identified as potential statistical outliers by these tests.

USEPA recommends that outliers not be excluded from the dataset unless there is compelling evidence to do so, per the following excerpt from the Unified Guidance (USEPA, 2009, p. 5-5):

"The Unified Guidance recommends that testing of outliers be performed on background data, but they generally not be removed unless some basis for a likely error or discrepancy can be identified. Such possible errors or discrepancies could include data recording errors, unusual sampling and laboratory procedures or conditions, inconsistent sample turbidity, and values significantly outside the historical ranges of background data."

One sample from well APW-09 collected on February 8th, 2018, was notably different from other samples in the dataset. The laboratory report for this sample indicates that the sample was contaminated during analysis, so this sample was excluded from further statistical evaluations. All other samples flagged by Tukey's outlier test were determined to be indicative of natural variability that is observable in most environmental datasets. Therefore, these samples were included in subsequent analyses.

4.2.3 GOODNESS-OF-FIT DISTRIBUTION TESTING

Goodness-of-fit testing was performed on detected values using ProUCL V5.2 for all groups with at least three detections (see Appendix E3). Four different goodness-of-fit tests were employed when identifying data distributions: Shapiro-Wilk and Lilliefors (performed with $\alpha = 0.01$ for normal or $\alpha = 0.10$ for lognormal distributions), or Anderson-Darling and Kolmogorov-Smirnov (performed with $\alpha = 0.05$ for gamma distributions). Results from goodness-of-fit distribution testing are shown in Tables E3 and E4.

4.2.4 TREND ANALYSIS

Mann-Kendall trend tests were performed for each well/constituent pair with at least 5 detected values and 50% detections to check for temporal stability in the dataset. Trend tests were performed with a 95% confidence level. Non-detect values were replaced with half of the minimum reporting limit for each group for trend analyses. Time series figures are presented in Figure E4. Trend analysis results are summarized in Figure E5. Background concentrations were

¹ Tukey's outlier test was performed using a fence value of $>3x$ the interquartile range (IQR).

calculated with de-trended data for groups with statistically significant trends to address any potential influence from temporal trends (Appendix E3²).

4.2.5 EVALUATION OF SPATIAL VARIABILITY

Upgradient datasets were evaluated to determine whether significant spatial variability was present in background locations. Only upgradient wells were included in the spatial variability analysis. Analysis of Variance (ANOVA) is a common method for assessing differences between groups (e.g., concentrations for a specific constituent at different wells). Two key assumptions of ANOVA are that data are normally distributed and variance among the groups is approximately equal. In cases where these assumptions are not valid, the non-parametric Kruskal-Wallis test can be used instead of ANOVA.

Based on ANOVA or Kruskal-Wallis testing, fourteen of the twenty-five analytes in the background dataset had statistically significant different concentrations amongst the three upgradient wells: arsenic, barium, boron, calcium, chloride, dissolved solids, fluoride, lithium, molybdenum, nickel, pH, selenium, sulfate, and turbidity. However, concentrations for these analytes fell within the same range for each of the upgradient wells. Therefore, data from the three upgradient wells were pooled into a single background dataset when calculating interwell background statistics (Section 4.3).

4.3 ESTABLISHING BACKGROUND CONCENTRATIONS

Upper tolerance limits (UTLs) were calculated for each analyte to define the background concentrations. A confidence level of 95% and coverage of 95% was used for all parametric calculations. The maximum reporting limit was set as the background concentration for analytes with 100% NDs. Final background concentrations are summarized in Table E3.

4.4 DOWNGRADIENT WELL SCREENING

Downgradient wells were compared against background concentrations to identify potential exceedances. For this comparison, a 95% confidence interval around the mean was calculated for each analyte at each downgradient well (Table E4). The resulting lower confidence limit was then compared to the background concentrations (Table E3) and the Groundwater Protection Standards (GWPS) established in 35 IAC Section 845.600 of the Illinois Administrative Code. An exceedance was noted for groups where the LCL exceeded background concentrations and/or GWPS. This approach is consistent with USEPA Unified Guidance (USEPA, 2009, p. 7-25). Results from this comparison are shown in Figure E6, and are summarized below:

² De-trending was performed by calculating an ordinary least squares regression model on the time series data for each well where significant trends were observed, predicting the modeled value at the latest time point, then adding the regression residuals to the latest predicted point.

COCs that Exceed Background, No IEPA GWPS	
COCs	Monitoring Well(s)
Calcium	APW-02, APW-07, APW-10S
Nickel	APW-02
COCs that Exceed Background and IEPA GWPS	
COCs	Monitoring Well(s)
Arsenic	APW-02, APW-10S
Boron	APW-02, APW-03, APW-05/05R, APW-06D, APW-06S
Lithium	APW-02
Molybdenum	APW-02, APW-05/05R, APW-06S
Sulfate	APW-02

5. CONCLUSION

Based upon the results of 2023 groundwater sampling events and monitoring well inspections, the following observations and conclusions have been made:

- Similar to the groundwater sampling results obtained during the eight pre-closure sampling events in 2017 to 2018, arsenic and sulfate continue to be detected at well locations downgradient of the closed CCR impoundment.
- Boron has historically been the key indicator for corrective action and continued monitoring of groundwater at the Site. Incorporating data from the eight rounds of pre-closure groundwater sampling conducted during 2017 and 2018, as well as the seven post groundwater monitoring events, boron continues to demonstrate a decreasing trend at APW-05R and has been below the GWPS of 2 mg/L at APW-04 since post-closure groundwater monitoring began in second quarter 2022.
- APW-05, found to be damaged during 2022, was abandoned, re-drilled, and replaced by an Illinois licensed well driller during the first quarter of 2023 due to a rupture in the well screen which had allowed the sand pack to enter the monitoring well.
- Woody vegetation (up to 1" diameter) has been noted on the impoundment cap and treated with herbicide. Live woody vegetation growth is limited in the impoundment riprap. During Q4, erosion noted above the riprap has increased from 9" to 10" in the deepest locations as compared to prior inspections dating back to the past quarters and 2022. ERM will continue to monitor and address woody vegetation and erosion on the impoundment cap and notify facility personnel so they can manage these issues appropriately. No significant degradation or issues were noted associated with the overall CCR impoundment cover system.
- Statistical analysis indicates that arsenic, boron, lithium, molybdenum, and sulfate exceed the calculated background concentrations and the IEPA GWPS established in 35 IAC Section 845.600 in monitoring wells on the site.
- Groundwater monitoring wells will be sampled on a quarterly basis during the 2024 calendar year.
- At the end of the current five-year monitoring and reporting post-closure time frame, a groundwater performance monitoring report will be submitted to IEPA to either demonstrate restoration of groundwater quality to Class I standards or present a continued groundwater monitoring plan for an additional five years. In addition, the results will be compared to the modelled concentrations to evaluate if a decreasing trend, as defined through modelling, is

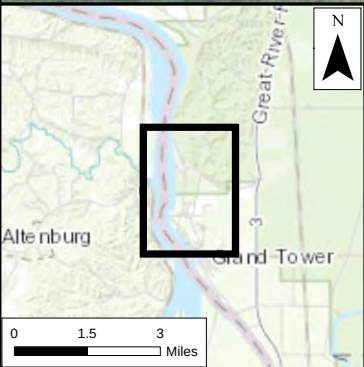
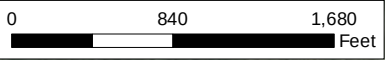
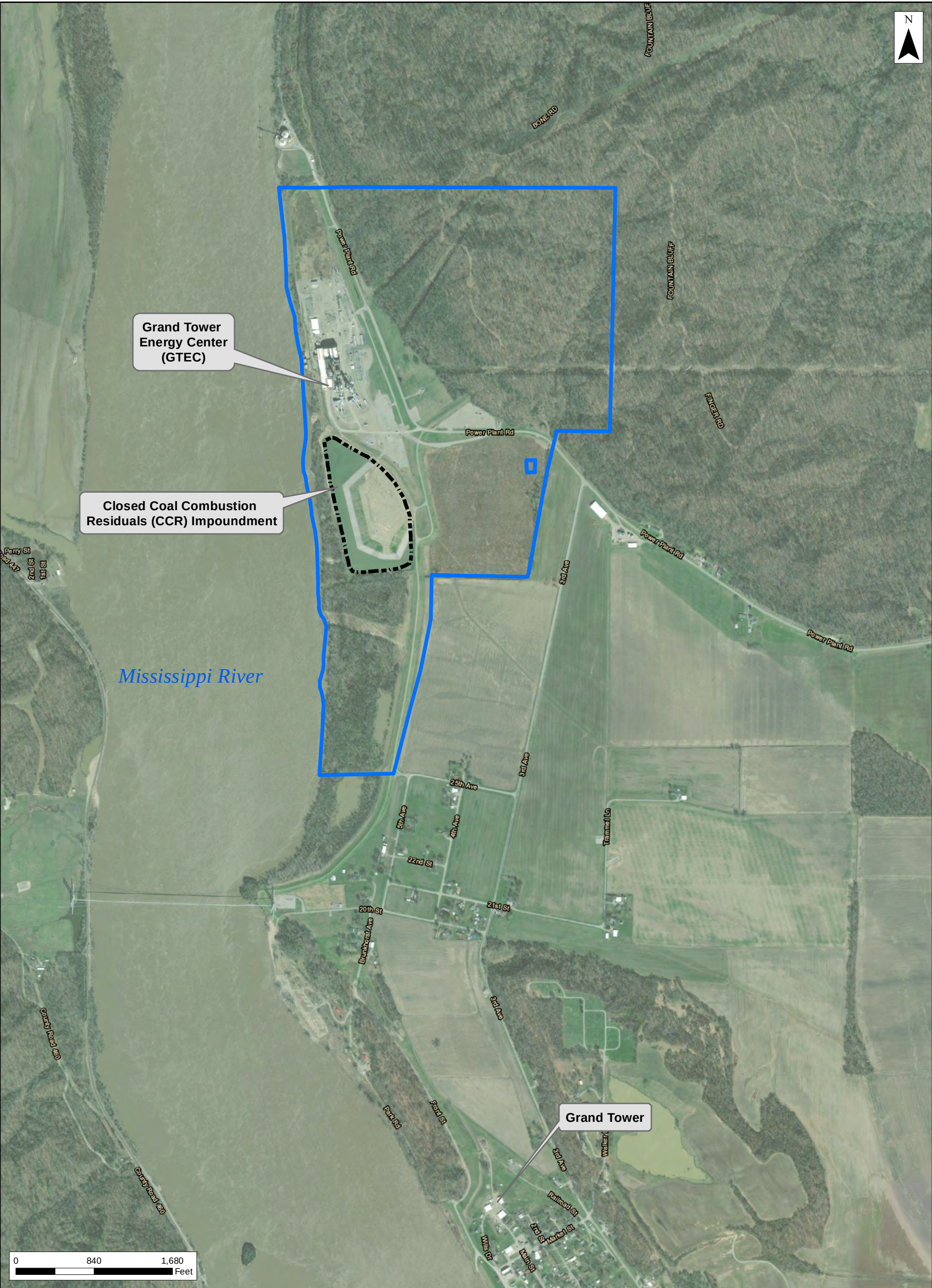
occurring at the predicted rate. Significant changes from the model results will lead to additional calibration and assessment of future expected rates of decrease for the COCs.

6. REFERENCES

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FIGURES

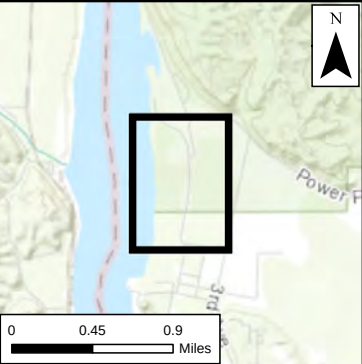


Legend

- Closed Coal Combustion Residuals (CCR) Impoundment
- Approximate Parcel Boundary

Notes:
1. CCR Surface Impoundment Closed Prior to July 31, 2021
2. World Imagery (3/24/2021)

Figure 1
Site Location Map
Grand Tower Energy Center, LLC
Grand Tower, Illinois
Jackson County



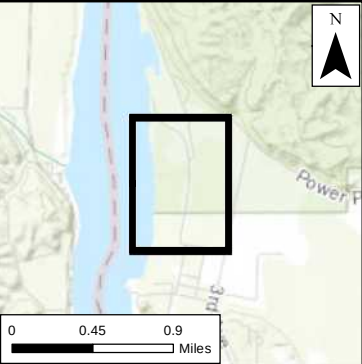
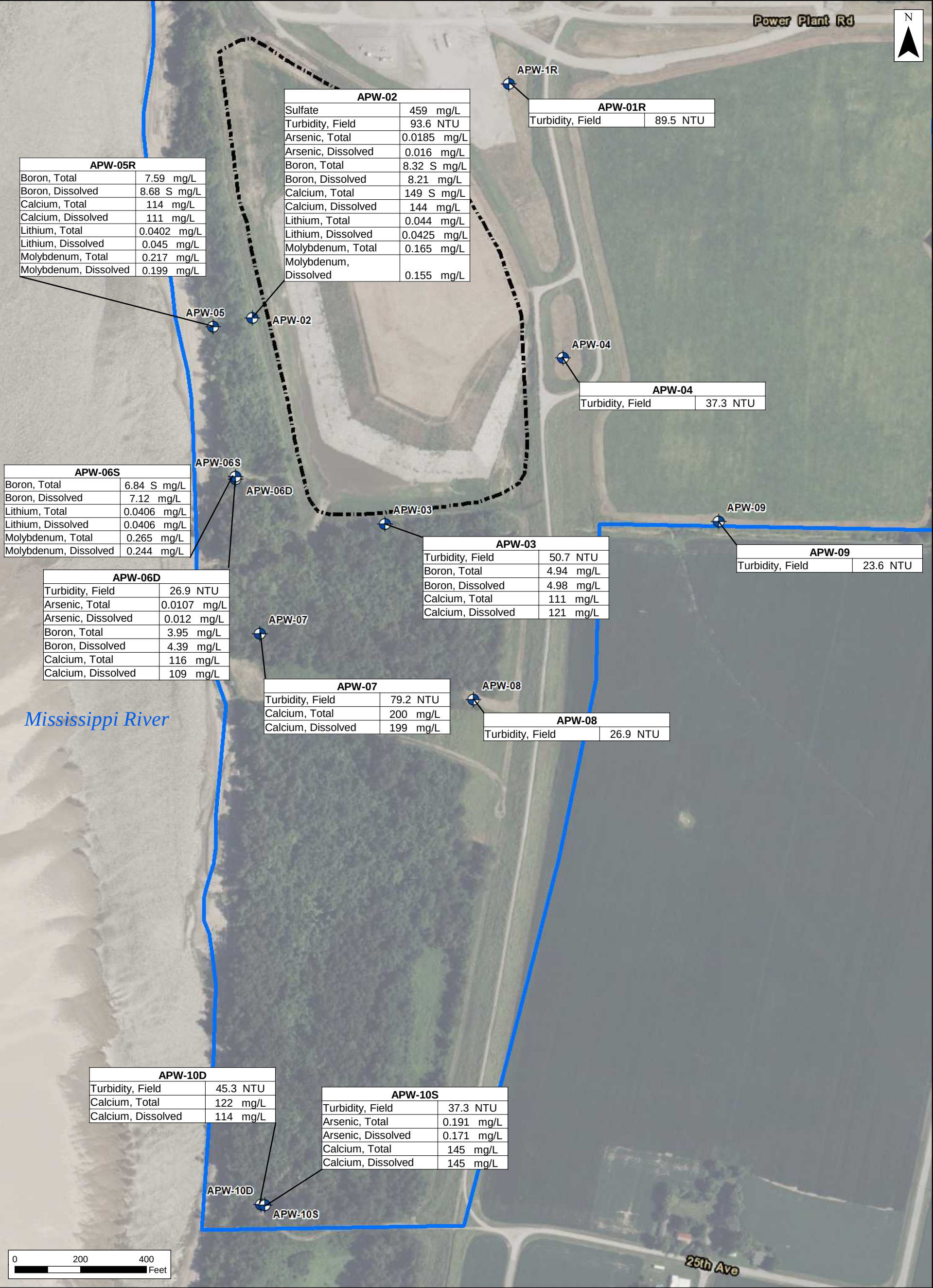
- Legend**
- Monitoring Well Location
 - Closed Coal Combustion Residuals (CCR) Impoundment
 - Approximate Parcel Boundary

Notes:
1. CCR Surface Impoundment Closed Prior to July 31, 2021

Figure 2
Monitoring Well Network
Grand Tower Energy Center, LLC
Grand Tower, Illinois
Jackson County

DRAWN BY: E.WORKMAN

FILE: M:\US\Projects\G-L\Grand Tower Energy Center\GrandTower_ILL_MXD\Analytical Exceedances\FIGUREX 01_ANALYTICAL EXCEEDANCES 2024\0119.mxd | SCALE: 1:3,400 when printed at 11x17



Legend

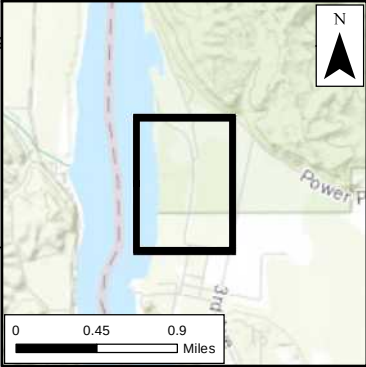
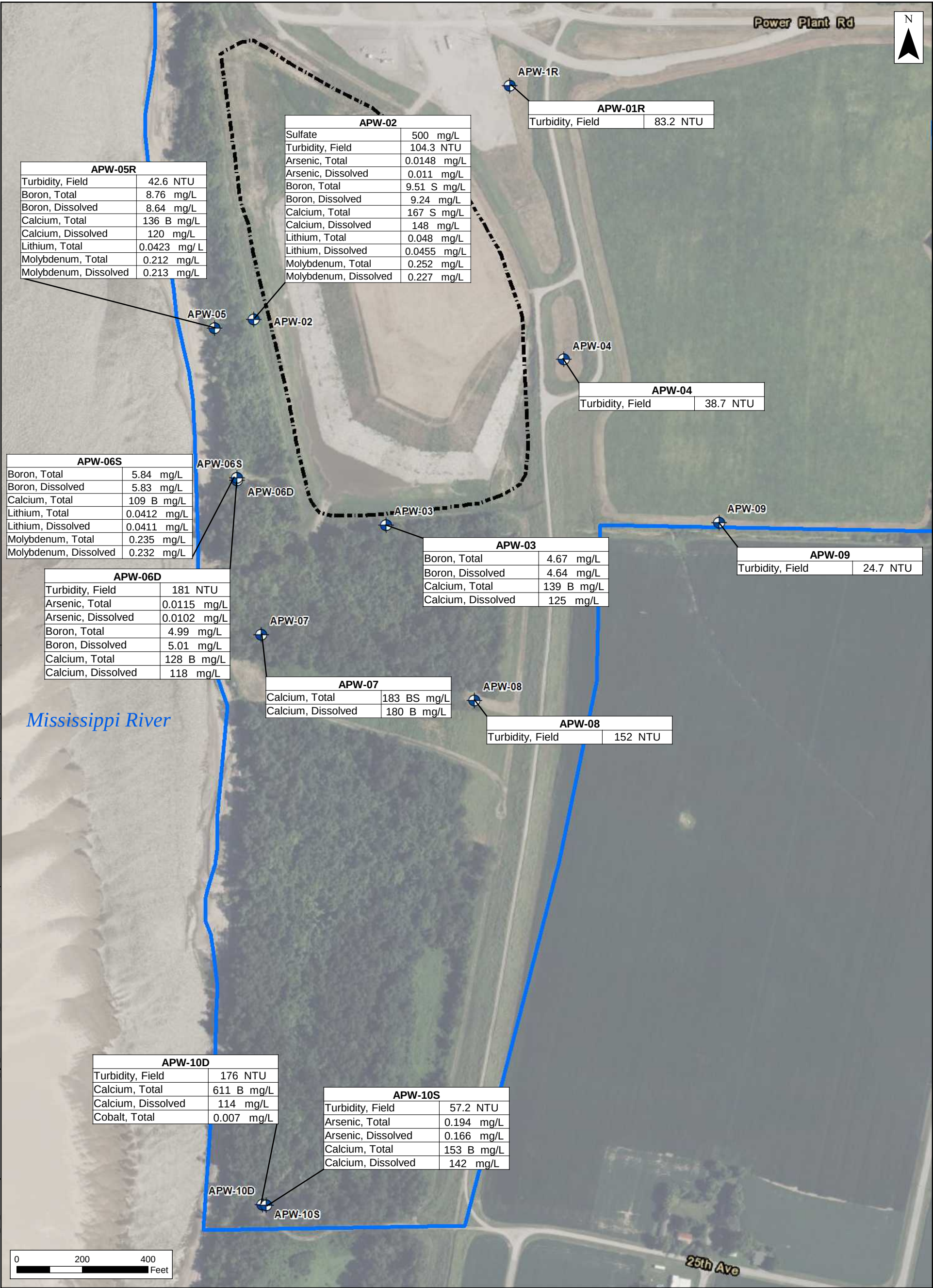
- Monitoring Well Location
- Closed Coal Combustion Residuals (CCR) Impoundment
- Approximate Parcel Boundary

Notes:

- CCR Surface Impoundment Closed Prior to July 31, 2021
- S = Spike Recovery outside recovery limits
- APW-06D was not sampled during 2nd Quarter 2022 due to a damaged casing.
- Eight episodes of groundwater sampling were conducted from September 2017 through February 2018 to establish background concentrations for the Site utilizing data from background wells APW-1R and APW-09. The final Groundwater Protection Standards (GWPS) are the higher of the values provided in 35 IAC 845.600(a) and the final background concentrations as found in Table 6 of the 07/25/2019 GMZ Application with the exception of turbidity and pH.

Figure 3: First Quarter 2023 Groundwater Exceedances
Grand Tower Energy Center, LLC
Grand Tower, Illinois
Jackson County





Legend

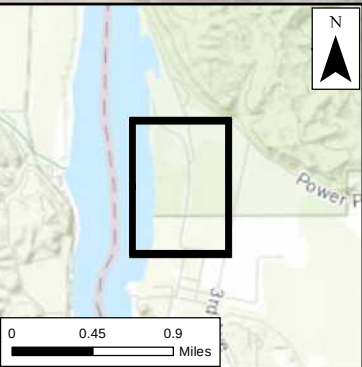
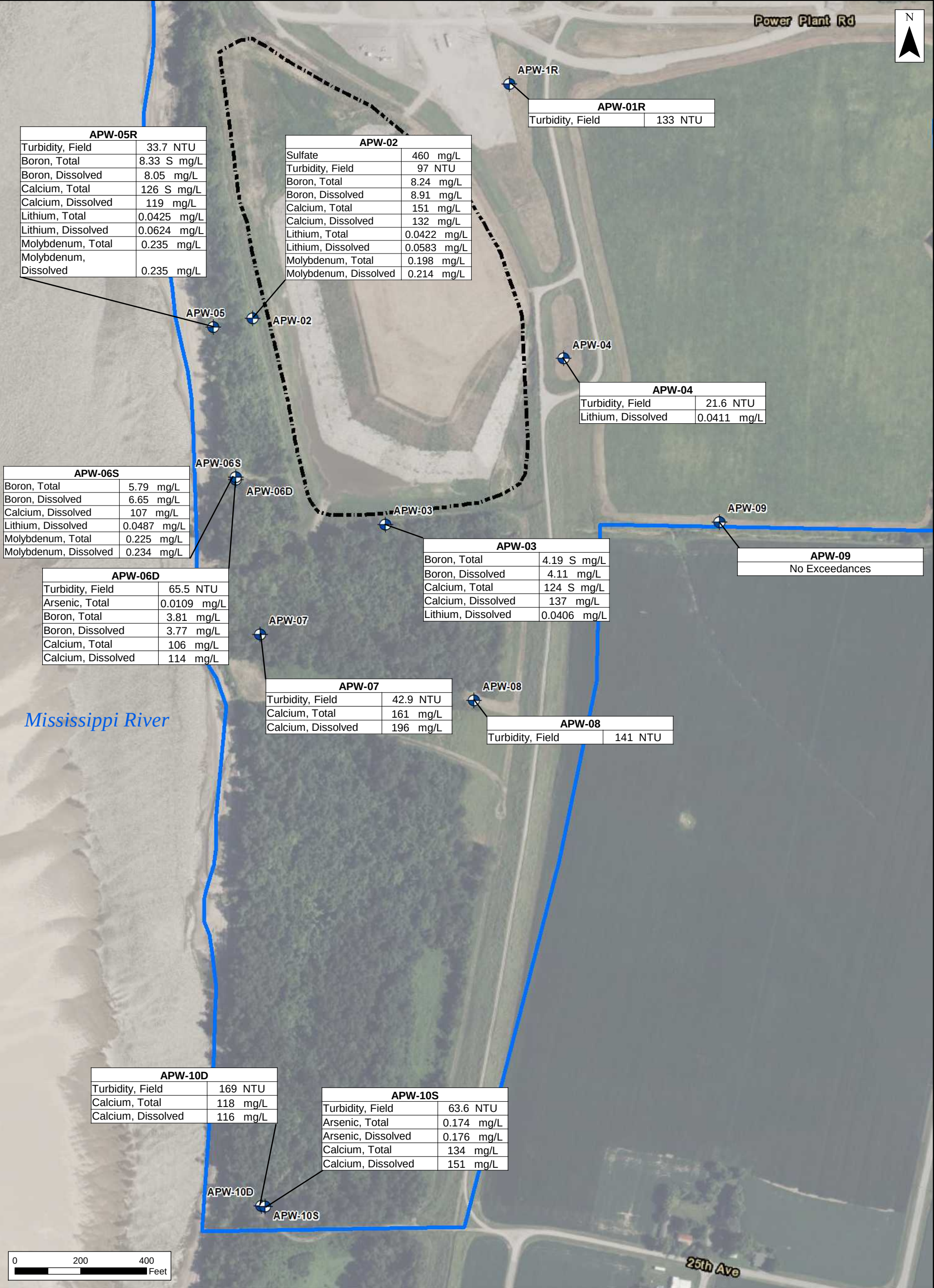
- Monitoring Well Location
- Closed Coal Combustion Residuals (CCR) Impoundment
- Approximate Parcel Boundary

Notes:

1. CCR Surface Impoundment Closed Prior to July 31, 2021
2. S = Spike Recovery outside recovery limits
3. B = Analyte detected in associated Method Blank
4. APW-06D was not sampled during 2nd Quarter 2022 due to a damaged casing.
5. Eight episodes of groundwater sampling were conducted from September 2017 through February 2018 to establish background concentrations for the Site utilizing data from background wells APW-1R and APW-09. The final Groundwater Protection Standards (GWPS) are the higher of the values provided in 35 IAC 845.600(a) and the final background concentrations as found in Table 6 of the 07/25/2019 GMZ Application with the exception of turbidity and pH.

Figure 4: Second Quarter 2023 Groundwater Exceedances
Grand Tower Energy Center, LLC
Grand Tower, Illinois
Jackson County





Legend

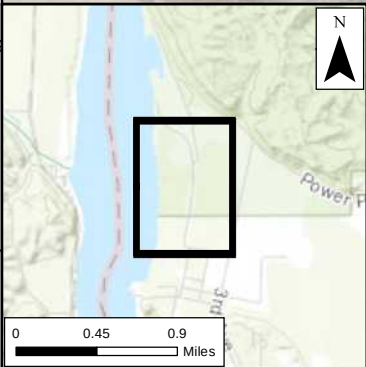
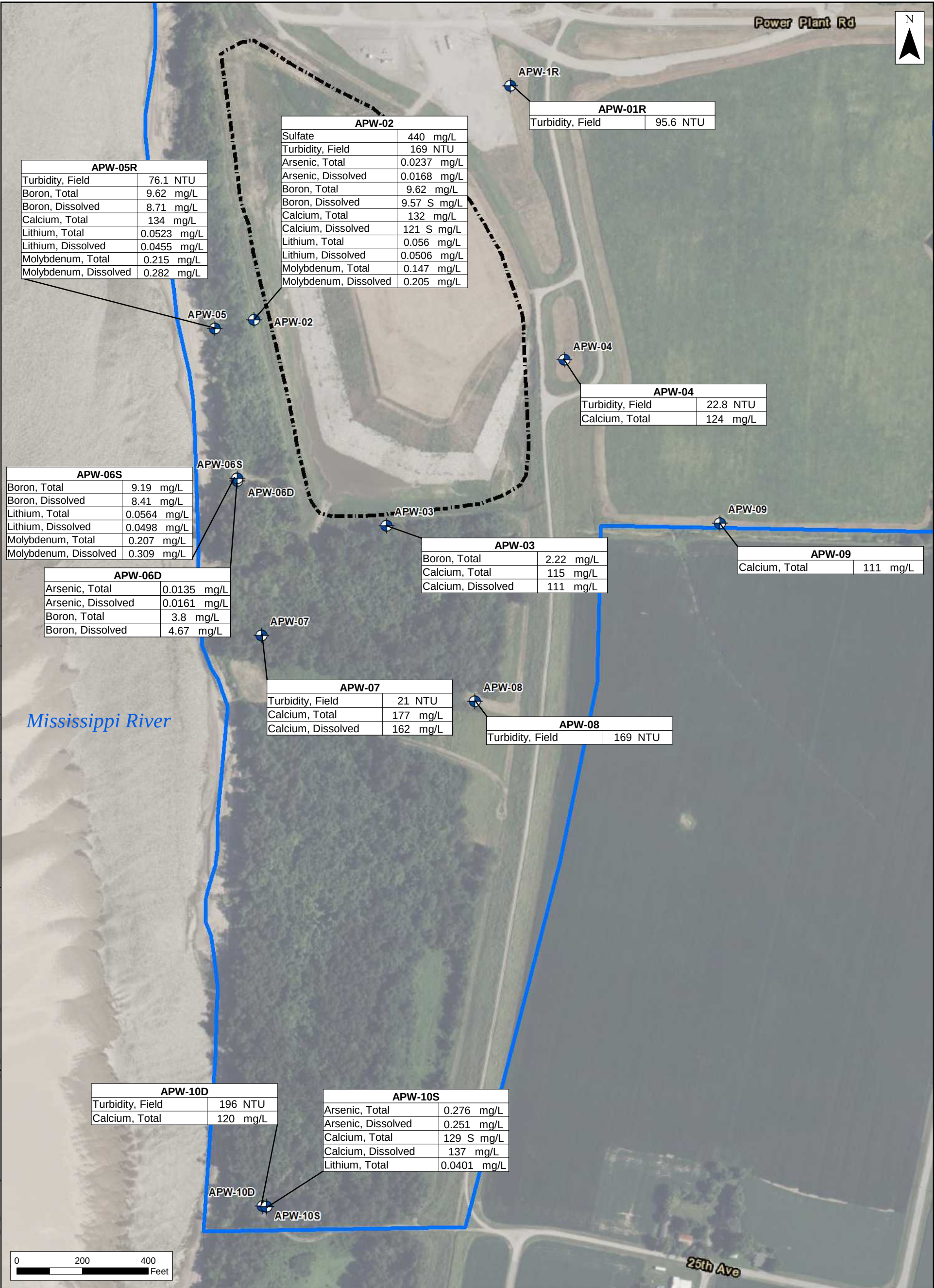
- Monitoring Well Location
- Closed Coal Combustion Residuals (CCR) Impoundment
- Approximate Parcel Boundary

Notes:
1. CCR Surface Impoundment Closed Prior to July 31, 2021
2. S = Spike Recovery outside recovery limits
3. APW-06D was not sampled during 2nd Quarter 2022 due to a damaged casing.
4. Eight episodes of groundwater sampling were conducted from September 2017 through February 2018 to establish background concentrations for the Site utilizing data from background wells APW-1R and APW-09. The final Groundwater Protection Standards (GWPS) are the higher of the values provided in 35 IAC 845.600(a) and the final background concentrations as found in Table 6 of the 07/25/2019 GMZ Application with the exception of turbidity and pH.

Figure 5: Third Quarter 2023 Groundwater Exceedances
Grand Tower Energy Center, LLC
Grand Tower, Illinois
Jackson County



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Legend

- Monitoring Well Location
- Closed Coal Combustion Residuals (CCR) Impoundment
- Approximate Parcel Boundary

Notes:

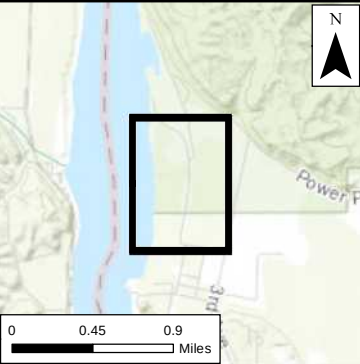
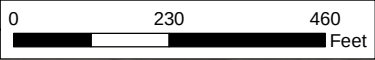
1. CCR Surface Impoundment Closed Prior to July 31, 2021
2. S = Spike Recovery outside recovery limits
3. APW-06D was not sampled during 2nd Quarter 2022 due to a damaged casing.
4. Eight episodes of groundwater sampling were conducted from September 2017 through February 2018 to establish background concentrations for the Site utilizing data from background wells APW-1R and APW-09. The final Groundwater Protection Standards (GWPS) are the higher of the values provided in 35 IAC 845.600(a) and the final background concentrations as found in Table 6 of the 07/25/2019 GMZ Application with the exception of turbidity and pH.

Figure 6: Fourth Quarter 2023 Groundwater Exceedances
Grand Tower Energy Center, LLC
Grand Tower, Illinois
Jackson County





*Mississippi River
Elevation = 332.97



Legend

- Monitoring Well Location
- Groundwater Contour (0.2 Ft. Interval)
- Inferred Groundwater Contour (0.2 Ft. Interval)
- Groundwater Flow Direction
- 348.37 Groundwater Elevation

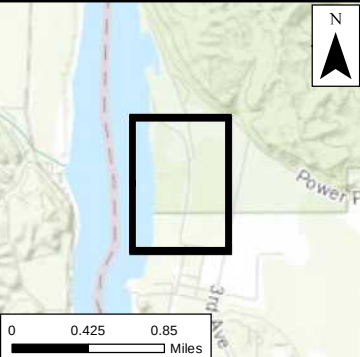
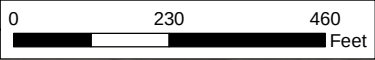
- Notes:
1. CCR Surface Impoundment Closed Prior to July 31, 2021
 2. Date of gauging January 30, 2023
 3. Ft AMSL - Feet Above Mean Sea Level
 4. (D) - Designated Wells not used in contouring
 5. * River stage at Mississippi River Gauge at Grand Tower, IL (NGVD29) (<https://rivergages.mvr.usace.army.mil/WaterControl/shefdata2.cfm?sid=CE358576&d=31&dt=E>)
 6. Contours are dashed where inferred
 7. World Imagery (3/24/2021)

**Figure 7: First Quarter 2023
Groundwater Contour Map**
Grand Tower Energy Center, LLC
Grand Tower, Illinois
Jackson County





*Mississippi River
Elevation = 330.97



Legend

- Monitoring Well Location
- Groundwater Contour (0.25 Ft. Interval)
- Inferred Groundwater Contour (0.25 Ft. Interval)
- Groundwater Flow Direction

348.37 Groundwater Elevation

- Notes:
- CCR Surface Impoundment Closed Prior to July 31, 2021
 - Date of gauging June 26, 2023
 - Ft AMSL - Feet Above Mean Sea Level
 - (D) - Designated Wells not used in contouring
 - * River stage at Mississippi River Gauge at Grand Tower, IL (NGVD29) (<https://rivergages.mvr.usace.army.mil/WaterControl/shefdata2.cfm?sid=CE358576&d=31&dt=E>)
 - Contours are dashed where inferred
 - BING Imagery, 2022

**Figure 8: Second Quarter 2023
Groundwater Contour Map**
Grand Tower Energy Center, LLC
Grand Tower, Illinois
Jackson County



FILE: M:\US\Projects\G\Grand Tower Energy Center\GrandTower_IL\MXD\BRO\GroundwaterContour_SEPT2023.aprx | REVISED: 01/25/2024 | SCALE: 1:3,400 when printed at 11x17



- Legend**
- Monitoring Well Location
 - Groundwater Contour (0.25 Ft. Interval) - Dashed where inferred
 - Groundwater Flow Direction
 - Groundwater Elevation

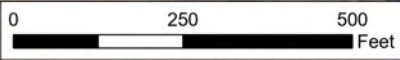
- Notes:**
- CCR Surface Impoundment Closed Prior to July 31, 2021
 - Date of gauging September 19, 2023
 - Ft AMSL - Feet Above Mean Sea Level
 - (D) - Designated Wells not used in contouring
 - * River stage at Mississippi River Gauge at Grand Tower, IL (NGVD29) (<https://rivergages.mvr.usace.army.mil/WaterControl/shefdata2.cfm?sid=CE358576&d=31&dt=E>)
 - Contours are dashed where inferred
 - BING Imagery, 2022

Figure 9: Third Quarter 2023 Groundwater Contour Map
Grand Tower Energy Center, LLC
Grand Tower, Illinois
Jackson County

FILE: M:\US\Projects\G1\Grand Tower Energy Center\Grand Tower Energy GWC NOV 2022.aprx REVISED: 01/25/2024 SCALE: 1:3,400 when printed at 11x17



*Mississippi River
Elevation = 328.84



- Legend**
- Monitoring Well Location
 - Groundwater Contour (0.25 Ft. Interval) - Dashed where inferred
 - Groundwater Flow Direction
 - 328.84 Groundwater Elevation

- Notes:**
- CCR Surface Impoundment Closed Prior to July 31, 2021
 - Date of gauging November 27, 2023
 - Ft AMSL - Feet Above Mean Sea Level
 - (D) - Designated Wells not used in contouring
 - * River stage at Mississippi River Gauge at Grand Tower, IL (NGVD29) (<https://rivergages.mvr.usace.army.mil/WaterControl/shefdata2.cfm?sid=CE358576&d=31&dt=E>)
 - Contours are dashed where inferred
 - BING Imagery, 2022

**Figure 10: Fourth Quarter 2023
Groundwater Contour Map**
Grand Tower Energy Center, LLC
Grand Tower, Illinois
Jackson County





ERM

TABLE

Grand Tower, US-1

[illegible]

Empty cells = not analyzed
N = Normal Environmental Sample
FD = Field Duplicate Sample
NA = not applicable
T = total
D = dissolved
mg/L = milligrams per liter
pCi/L = picocuries per liter
NTU = nephelometric turbidity units
H = Holding times exceeded
23 = Analyte detected below quantitation limits
23 = The associated batch QC was outside the established quality control range for precision
S = Spike Recovery outside recovery limits
R = RPD outside accepted recovery limits

1 Protection Standard is from Title 35 Section 345.600 unless otherwise noted
2 Standard is from the Upper Tolerance Limit (UTL) calculated from background well APW-Q1R concentrations from 8 quarterly sampling events from 2017-2018
3 Standard value 6.22 is from the Lower Tolerance Limit (LT) calculated from background well APW-Q1R concentrations from 8 quarterly sampling events from 2017-2018 and 9.0 is the regulatory standard
Highlighted values exceed action level
NS = No standard

Notes:

- Empty cells = not analyzed
- IE = Internal Environmental Sample
- FE = Field Duplicate Sample
- NA = not applicable
- Y = total
- D = dissolved
- mg/L = milligrams per liter
- µg/L = micrograms per liter
- NTU = nephelometric turbidity units
- H = Hiding lines exceeded
- J = Analyte exceeded testing quantitation limits
- K = The analytical result QC value is outside the established quality control range for precision
- S = Spike Recovery outside recovery limits
- R = RPT exceeds accepted recovery limits
- U = Not Detected at the Reporting Limit

*Detection Standard is from Title 25 Section 845.020 unless otherwise noted

1 Standard is from the Upper Tolerance Limit (U.T.L.) calculated from background soil AP40-GSR concentrations from 8 quarterly sampling events from 2017-2018

2 Standard is from the Lower Tolerance Limit (L.T.L.) calculated from background soil AP40-GSR concentrations from 8 quarterly sampling events from 2017-2018 and 9.0 is the regulatory standard

3 Highlighted values exceed action level

4 No Data

Table 1
Groundwater Summary Table
Grand Tower Energy Center (GTCC)

Grand Tower, US-IL			Sampled prior to closure of CFR Impoundment												Post-Closure Sampling			
			APW-3-20170907 APW-03 09/06/2017 N	APW-3-20170929 APW-03 09/29/2017 N	APW-3-20171020 APW-03 10/20/2017 N	APW-3-20171105 APW-03 11/05/2017 N	APW-3-20171128 APW-03 11/28/2017 N	APW-3-20180119 APW-03 01/19/2018 N	APW-3-20180208 APW-03 02/08/2018 N	APW-03-WG-20220616 APW-03 06/16/2022 N	APW-03-WG-20220815 APW-03 08/15/2022 N	APW-03-WG-20221130 APW-03 11/30/2022 N	APW-03-WG-20230130 APW-03 01/30/2023 N	APW-03-WG-20230626 APW-03 06/26/2023 N	APW-03-WG-20230919 APW-03 09/19/2023 N	APW-03-WG-20231127 APW-03 11/27/2023 N		
Parameter/Analyte	Total or Dissolved	Units	35 IAC 845,600															
UNSPECIFIED																		
Fluoride	N	mg/L	4	0.28	0.29	0.29	0.31	0.27	0.29	0.29	0.31	0.34	0.26	0.23	0.23	0.25	0.24	
Indium-226	N	pCi/L	NS	0.53 ± 0.18 U	0.04 ± 0.09 U	0.409 ± 0.426	0.18 ± 0.11 U	0.33 ± 0.17 U	0.2 ± 0.1 U	0.31 ± 0.15 U	0.201 ± 0.105	0.56 ± 0.10 U	0.19 ± 0.1 U	0.29 ± 0.232	0.23 ± 0.11 U	0.2 ± 0.09 U	0.11 ± 0.05 U	
Radium-228	N	pCi/L	NS	7.05 ± 0.97	1.01 ± 0.57	0.492 ± 0.973	0.72 ± 0.97 J	0.37 ± 0.49 U	1.32 ± 0.68	0.08 ± 0.36 U	1.89 ± 0.26 J	0.4 ± 0.150CH	0.67 ± 0.59 U	0.118 ± 0.502 U	0.61 ± 0.54 U	0.6 ± 0.53 J	0.66 ± 0.50CH	
Sulfate	N	mg/L	400	175	222	201	207	204	186	303	300	290	290	322	290	290	133	
CALC	N	pCi/L	6							2.09 ± 0.303	0.96 ± 0.63 U	0.86 ± 0.63 U	0.432 ± 0.479 J	0.84 ± 0.66 U	1.05 ± 0.61 U	0.77 ± 0.63 U		
FIELD PARAM																		
Temperature, Field	N	NTU	17.9F							40.3	36.1	103	50.7	6.04	2.72	4		
GEN CHEM																		
Chloride	N	mg/L	200	20	21	21	22	19	20	18	18	20	21	17	16	13		
Dissolved Solids, Total	N	mg/L	1200	464	514	485	454	424	495	424	704	607 H	610	524	434	426		
pH, Lab	N	pH units	6.92-9.07	7.46	7.46	7.65	7.93	7.5	7.46	7.26	7.85	7.46	7.21	7.45	7.77 H	7.84 H		
METALS																		
Antimony	D	mg/L	0.006	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.0018		
Antimony	T	mg/L	0.006	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.0018		
Arsenic	D	mg/L	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.0013		
Arsenic	T	mg/L	0.01	0.0022	0.0029	0.0021	0.0018	0.0023	0.0024	0.0028	0.0018	0.002	0.002	0.002	0.002	0.002		
Barium	D	mg/L	2	0.113	0.146	0.104	0.0814	0.123	0.15	0.0806	0.139	0.124	0.139	0.12	0.12	0.122		
Barium	T	mg/L	2	0.113	0.146	0.104	0.0814	0.123	0.15	0.0806	0.139	0.124	0.139	0.12	0.12	0.122		
Beryllium	D	mg/L	0.004	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U		
Beryllium	T	mg/L	0.004	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U		
Boron	D	mg/L	2	4.16	4.31 S	4.7	4.67	4.44 S	4.52	4.08	4.35	4.27	4.84	4.39	4.67	4.19 S		
Boron	T	mg/L	2	4.16	4.31 S	4.7	4.67	4.44 S	4.52	4.08	4.35	4.27	4.84	4.39	4.67	4.19 S		
Cadmium	D	mg/L	0.005	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U		
Cadmium	T	mg/L	0.005	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U		
Calcium	D	mg/L	100.2'	86.3	104 S	88.1	74.9	116 S	95	101	77.1	120	145	115	119 S	124 S		
Calcium	T	mg/L	100.2'	86.3	104 S	88.1	74.9	116 S	95	101	77.1	120	145	115	119 S	124 S		
Chromium	D	mg/L	0.1	0.0061	0.0053	0.0056	0.001 U	0.001 U	0.005	0.0025	0.0011 J	0.0015 U	0.0015 U	0.0015 U	0.0015 U	0.0015 U		
Chromium	T	mg/L	0.1	0.0061	0.0053	0.0056	0.001 U	0.001 U	0.005	0.0025	0.0011 J	0.0015 U	0.0015 U	0.0015 U	0.0015 U	0.0015 U		
Cobalt	D	mg/L	0.006	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U		
Cobalt	T	mg/L	0.006	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U		
Copper	D	mg/L	NS	0.0015	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U		
Copper	T	mg/L	NS	0.0015	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U		
Lead	D	mg/L	0.0075	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U		
Lead	T	mg/L	0.0075	0.0021	0.0042	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.0044	0.0044	0.001 U		
Lithium	D	mg/L	0.04	0.0058	0.0061	0.0058	0.0058	0.0058	0.0058	0.0058	0.0058	0.0058	0.0058	0.0058	0.0058	0.0058		
Lithium	T	mg/L	0.04	0.0058	0.0061	0.0058	0.0058	0.0058	0.0058	0.0058	0.0058	0.0058	0.0058	0.0058	0.0058	0.0058		
Manganese	D	mg/L	NS	0.002	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U		
Manganese	T	mg/L	NS	0.002	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U		
Mercury	D	mg/L	0.002	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U		
Mercury	T	mg/L	0.002	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U		
Molybdenum	D	mg/L	0.1	0.0778	0.0754	0.0761	0.0713	0.0684	0.0746	0.0624	0.0649	0.0601	0.0613	0.0623	0.0623	0.0619		
Molybdenum	T	mg/L	0.1	0.0778	0.0754	0.0761	0.0713	0.0684	0.0746	0.0624	0.0649	0.0601	0.0613	0.0623	0.0623	0.0619		
Nickel	D	mg/L	NS	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005		
Nickel	T	mg/L	NS	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005		
Selenium	D	mg/L	0.06	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U		
Selenium	T	mg/L	0.06	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U		
Thallium	D	mg/L	0.002	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U		
Thallium	T	mg/L	0.002	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U		

Notes:
Empty cells = not analyzed
N = Normal Environmental Sample
FD = Field Duplicate Sample
NA = not applicable
T = total
D = dissolved
mg/L = milligrams per liter
pCi/L = picocuries per liter
NTU = nephelometric turbidity units
N = holding time exceeded
J = Analyte detected below quantitation limits
J ± = The associated batch QC was outside the established quality control range for precision
S = Spike Recovery outside recovery limits
R = RPD outside accepted recovery limits
U = Not Detected at the Reporting Limit

*Precision Standard is from Title 35 Section 845.600 unless otherwise noted
1 Standard is from the Upper Tolerance Limit (UTL) calculated from background well APW-GIR concentrations from 8 quarterly sampling events from 2017-2018
2 Standard value 6.22 is from the Lower Tolerance Limit (LTU) calculated from background well APW-GIR concentrations from 8 quarterly sampling events from 2017-2018 and 9.0 is the regulatory standard
Highlighted values exceed action level
NS = No standard

Table 1
Groundwater Summary Table
Grand Tower Energy Center (GTCE)
Grand Tower, US-IL

Grand Tower, US-IL																				
			Sample ID Location ID Sample Date Sample Type	Sampled prior to closure of CCR Impoundment												Post-Closure Sampling				
				APW-4-20170907 APW-04 09/08/2017 N	APW-4-20170929 APW-04 09/29/2017 N	APW-4-20171010 APW-04 10/10/2017 N	APW-4-20171110 APW-04 11/08/2017 N	APW-4-20171228 APW-04 12/08/2017 N	APW-4-20180119 APW-04 01/19/2018 N	APW-4-20180208 APW-04 02/08/2018 N	APW-04-WG-20220615 APW-04 06/15/2022 N	APW-04-WG-20220815 APW-04 08/15/2022 N	APW-04-WG-20221128 APW-04 11/28/2022 N	APW-04-WG-20230202 APW-04 02/02/2023 N	APW-04-WG-20230627 APW-04 06/27/2023 N	APW-04-WG-20230920 APW-04 09/20/2023 N	APW-04-WG-20231129 APW-04 11/29/2023 N			
Parameter/Analyte	Total or Dissolved	Units	30 IAC 845.600																	
UNSPECIFIED																				
Fluoride	N	mg/L	4	0.18	0.19	0.18	0.17	0.18	0.17	0.17	0.16	0.17	0.17	0.15	0.17	0.15	0.18	0.18		
Radium-226	N	pg/L	NS	0.38 ± 0.15 U	0.02 ± 0.08 U	0.272 ± 0.328	0.15 ± 0.09 U	0.59 ± 0.13 U	0.17 ± 0.09 U	0.16 ± 0.08 U	0.13 ± 0.11 U	0.101 ± 0.144 U	0.5 ± 0.13 U	0.11 ± 0.08 U	0.392 ± 0.232	0.29 ± 0.12 U	0.59 ± 0.07 U	0.19 ± 0.07 U		
Radium-228	N	pg/L	NS	0.91 ± 0.64 J	0.41 ± 0.68 U	0.53 ± 0.382	0.64 ± 0.31 U	0.88 ± 0.64 J	0.72 ± 0.36 J	0.84 ± 0.48 U	0.245 ± 0.230 J	0.245 ± 0.230 J	2.15 ± 0.578	1.47 ± 0.67	0.961 ± 0.295	0.92 ± 0.68 J	1.18 ± 0.67	0.66 ± 0.64 J		
Sulfate	N	mg/L	400	125	116	120	107	107	105	99			62	60	62	66	66	52		
CALC																				
Radium-226/228	N	pg/L	6								0.348 ± 0.287 J	0.65 ± 0.301	1.58 ± 0.75 U	1.58 ± 0.75 U	1.58 ± 0.75 U	1.25 ± 0.8 U	1.27 ± 0.74 U	0.86 ± 0.74 J		
FIELD PARAM																				
Temperature, Field	N	NTU	17.90°												18.3	18.3	18.3	17.3		
GEN CHEM																				
Chloride	N	mg/L	200	12	11	11	11	11	11	10	11	10	11	10	11	11	10	11		
Dissolved Solids, Total	N	mg/L	1200	480	464	482	472	482	474	426	426	426	426	426	446	426	426	426		
pH, Lab	N	pH units	6.92-9.07	7.31	7.33	7.31	7.42	7.32	7.35	7.25	7.2	7.41	7.31	7.34	7.21	7.39 H	7.56 H	7.51 H		
METALS																				
Antimony	D	mg/L	0.006											0.001 U	0.001 U	0.001 U	0.001 U	0.001 U		
Antimony	T	mg/L	0.006	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U		
Arsenic	D	mg/L	0.01											0.0013	0.0013	0.0013	0.0013	0.0014		
Arsenic	T	mg/L	0.01	0.0025	0.0018	0.0016	0.0018	0.0016	0.0014	0.0016	0.0015	0.0015	0.0015	0.0015	0.0016	0.0017	0.002	0.0019		
Barium	D	mg/L	2											0.116	0.116	0.116	0.116	0.116		
Barium	T	mg/L	2	0.145	0.139	0.133	0.13	0.128	0.141	0.135	0.144	0.135	0.135	0.135	0.135	0.135	0.135	0.135		
Beryllium	D	mg/L	0.004											0.001 U	0.001 U	0.001 U	0.001 U	0.001 U		
Beryllium	T	mg/L	0.004	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U		
Boron	D	mg/L	2											1.41	0.875	7.83	0.419	0.908		
Boron	T	mg/L	2	7.37	7.16	7.13	7.31	7.63	1.7	1.33	1.18	1.48	0.875	0.875	0.875	0.875	0.875	0.875		
Cadmium	D	mg/L	0.005											0.001 U	0.001 U	0.001 U	0.001 U	0.001 U		
Cadmium	T	mg/L	0.005	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U		
Calcium	D	mg/L	100.2°											111	106	106	101.3	101.3		
Calcium	T	mg/L	100.2°	101.5	106	89.4	97.5	107	107	113	113	97.8	108.5	107	107	107	97.5	87.5		
Chromium	D	mg/L	0.1											0.0015 U	0.0015 U	0.0015 U	0.0015 U	0.0015 U		
Chromium	T	mg/L	0.1	0.0041	0.0025	0.0017	0.001 U	0.0027	0.0027	0.0015 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U		
Cobalt	D	mg/L	0.006											0.001 U	0.001 U	0.001 U	0.001 U	0.001 U		
Cobalt	T	mg/L	0.006	0.0013	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U		
Copper	D	mg/L	NS											0.585	0.001 U	0.001 U	0.001 U	0.001 U		
Copper	T	mg/L	0.0075	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U		
Lead	D	mg/L	0.0075	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U		
Lead	T	mg/L	0.0075	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U		
Lithium	D	mg/L	0.04											0.0054	0.0054	0.0054	0.0054	0.0054		
Lithium	T	mg/L	0.04	0.0404	0.0403	0.0403	0.0406	0.0406	0.0406	0.0406	0.0406	0.0406	0.0406	0.0406	0.0406	0.0406	0.0406	0.0406		
Manganese	D	mg/L	NS											0.0027	0.0026	0.0026	0.0026	0.0026		
Manganese	T	mg/L	0.002											0.192	0.0027	0.0027	0.0027	0.0027		
Mercury	D	mg/L	0.002											0.0002 U						
Mercury	T	mg/L	0.002	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U		
Molybdenum	D	mg/L	0.1											0.0003	0.0003	0.0003	0.0003	0.0003		
Molybdenum	T	mg/L	0.1	0.0891	0.084	0.0793	0.0812	0.0748	0.0714	0.0692	0.0657	0.0788	0.0684	0.0684	0.0684	0.0684	0.0684	0.0684		
Nickel	D	mg/L	NS											0.0019	0.0019	0.0019	0.0019	0.0019		
Nickel	T	mg/L	NS	0.0005	0.0004	0.0009	0.0034	0.0029	0.0012	0.0006	0.0034	0.0039	0.003	0.0045	0.005	0.005	0.005	0.005		
Selenium	D	mg/L	0.06											0.0134	0.0113	0.0101	0.009	0.0165		
Selenium	T	mg/L	0.06	0.0158	0.015	0.0149	0.0161	0.0154	0.013	0.0101	0.0102	0.0102	0.0102	0.0102	0.0102	0.0102	0.0102	0.0102		
Thallium	D	mg/L	0.002											0.002 U	0.002 U	0.002 U	0.002 U	0.002 U		
Thallium	T	mg/L	0.002	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U		

Notes:
Empty cells = not analyzed
N = Normal Environmental Sample
FD = Field Duplicate Sample
NA = not applicable
T = total
D = dissolved
mg/L = milligrams per liter
pg/L = picograms per liter
NTU = nephelometric turbidity units
N = holding time exceeded
J = Analyte detected below quantitation limits
J ± = The associated batch QC was outside the established quality control range for precision
S = Spike Recovery outside recovery limits
R = RPD outside accepted recovery limits
U = Not Detected at the Reporting Limit

*Protection Standard is from Title 35 Section 845.600 unless otherwise noted
1 Standard is from the Upper Tolerance Limit (UTL) calculated from background well APW-G1R concentrations from 8 quarterly sampling events from 2017-2018
2 Standard value 6.22 is from the Lower Tolerance Limit (LTL) calculated from background well APW-G1R concentrations from 8 quarterly sampling events from 2017-2018 and 9.0 is the regulatory standard
Highlighted values exceed action level
NS = No standard

Grand Tower, US-IL

[illegible]

Notes:

- Empty cells = not analysed
- N = Normal Environmental Sample
- ES = First Outbreak Sample
- NA = not applicable
- T = total
- mg/L = milligrams per liter
- µS/cm = micromhos per centimeter
- A = approximate locality only
- S = sampling time exceeded
- J = Analyte determined below quantitation limits
- C = The associated health CQL was outside the established quality control range for precision
- B = Sample bottle(s) returned empty
- R = CQLs outside acceptable recovery limits
- N = Not covered in the Reporting Unit

• *Percentile Standard is from Table 30, Section 605.600, unless otherwise noted

1 Standard is from the Utah Tolerance Limit (UTL) calculated from background and #700 GSC concentrations from 8 quarterly sampling events from 2017-2018

2 Standard is from the Utah Tolerance Limit (UTL) calculated from background and #700 GSC concentrations from 8 quarterly sampling events from 2017-2018 and 5 of the regulatory standard

3 Sampling time exceeded value

Table 1
Groundwater Summary Table
Grand Tower Energy Center (GTEC)
Grand Tower, US-IL

Parameter/Analyte			Sample ID Location ID Sample Date Sample Type	Sampled prior to closure of CCR Impoundment										Post-Closure Sampling				
				APW-60-20170907 APW-060 09/06/2017 N	APW-60-20170927 APW-060 09/28/2017 N	APW-60-20171009 APW-060 10/18/2017 N	APW-60-20171109 APW-060 11/09/2017 N	APW-60-20171128 APW-060 11/28/2017 N	APW-60-20171227 APW-060 12/07/2017 N	APW-60-20180118 APW-060 01/18/2018 N	APW-60-20180208 APW-060 02/08/2018 N	N/A APW-060 6/16/2022	APW-60-WC-20220913 APW-060 09/13/2022 N	APW-60-WC-20221128 APW-060 11/28/2022 N	APW-60-WC-20230201 APW-060 02/01/2023 N	APW-60-WC-20230627 APW-060 06/27/2023 N	APW-60-WC-20230920 APW-060 09/20/2023 N	APW-60-WC-20231128 APW-060 11/28/2023 N
Total or Dissolved			Units	35 IAC 845.600								Casing detected, no sample collected during Q1 2021						
UNSPECIFIED																		
Fluoride	N	mg/L	4	0.22	0.28	0.21	0.22	0.21	0.22	0.28	0.21	N/A	0.2	0.24	0.21	0.2	0.22	0.24
Mercury-226	N	pCi/L	MS	0.62 ± 0.17 U	0.37 ± 0.11 U	1.22 ± 0.744	0.39 ± 0.15 U	0.38 ± 0.15 U	0.3 ± 0.13 U	0.59 ± 0.08 U	0.2 ± 0.13 U	N/A	0.33 ± 0.1 U	0.62 ± 0.15 U	0.388 ± 0.275	0.3 ± 0.12 U	0.18 ± 0.09 U	0.11 ± 0.05 U
Radium-228	N	pCi/L	MS	1.07 ± 0.59	0.61 ± 0.33 U	0.549 ± 0.377	0.86 ± 0.37 J	1.4 ± 0.71	0.78 ± 0.49 J	0.74 ± 0.57 J	0.24 ± 0.34 U	N/A	1.46 ± 0.571	0.28 ± 0.43 U	1.62 ± 0.451	0.74 ± 0.34 J	2.62 ± 0.76	0.76 ± 0.3 J
Sulfate	N	mg/L	400	225	228	226	222	228	228	211	189	N/A	272	254	209	229	223	184
CALC																		
Radium-226/228	N	pCi/L	8									N/A	1.77 ± 0.88 U	0.8 ± 0.58 U	1.38 ± 0.528	1.04 ± 0.46 U	2.8 ± 0.85	0.87 ± 0.49 U
FIELD PARAM																		
Temperature, Field	N	NTU	17.99°									N/A	18.5	14.4	20.9	181		3.02
GEN CHEM																		
Chloride	N	mg/L	200	17	17	18	16	16	17	17	17	N/A	14	17	16	16	16	28
Dissolved Solids, Total	N	mg/L	1200	958	950	962	954	959	952	954	954	N/A	831 H	940	795	965	960	960
pH, Lab	N	pH units	6.92-9.07	7.23	7.25	7.22	7.19	7.22	7.21	7.2	7.2	N/A	7.42	7.25	7.39 H	7.3 H	7.3 H	7.36 H
METALS																		
Antimony	D	mg/L	0.006	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	N/A	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Arsenic	T	mg/L	0.008	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	N/A	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Cadmium	D	mg/L	0.01	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	N/A	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Chromium	T	mg/L	0.01	0.0008	0.0101	0.0075	0.0074	0.009	0.0095	0.0106	0.0096	N/A	0.0094	0.0111	0.0107	0.0115	0.0109	0.0136
Barium	D	mg/L	5	0.175	0.172	0.142	0.153	0.155	0.163	0.156	0.148	N/A	0.129	0.118 H	0.132	0.121	0.121	0.135
Beryllium	D	mg/L	0.004	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	N/A	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Bismuth	T	mg/L	0.004	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	N/A	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Boron	D	mg/L	2	3.75	3.87	3.56	3.58	3.9	3.84	3.3	3.26	N/A	4.32	4.14	4.19	4.05	3.77	4.67
Bromine	T	mg/L	2									N/A	1.15	1.29	1.35	1.31	1.31	1.3
Cadmium	D	mg/L	0.005	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	N/A	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Calcium	T	mg/L	0.005	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	N/A	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Calcium	D	mg/L	100.2°	99.9	110	96.7	100	110	107	106.5	106	N/A	118	110	109	114	114	80.3
Chromium	T	mg/L	100.2°	99.9	110	96.7	100	110	107	106.5	106	N/A	118	110	109	114	114	80.3
Chromium	D	mg/L	0.1	0.001 U	0.0013	0.001 U	0.001 U	0.001 U	0.0017	0.0014	0.0014	N/A	0.0015 U	0.0015 U	0.0015 U	0.0015 U	0.0015 U	0.0015 U
Cobalt	D	mg/L	0.006	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	N/A	0.0012	0.0012	0.001	0.001 U	0.001 U	0.0012
Cobalt	T	mg/L	0.006	0.0012	0.001	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	N/A	0.0012	0.0012	0.001	0.001 U	0.001 U	0.0012
Copper	D	mg/L	0.0075	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	N/A	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Lead	T	mg/L	0.0075	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	N/A	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Lithium	D	mg/L	0.04	0.005	0.0176	0.0065	0.0065	0.0176	0.0185	0.0185	0.0185	N/A	0.0179	0.0155	0.0194	0.016	0.0197	0.0241
Lithium	T	mg/L	0.04	0.005	0.0176	0.0065	0.0065	0.0176	0.0185	0.0185	0.0185	N/A	0.0179	0.0155	0.0194	0.016	0.0197	0.0241
Mercury	D	mg/L	0.002	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	N/A	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U
Mercury	T	mg/L	0.002	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	N/A	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U
Molybdenum	D	mg/L	0.1	0.0046	0.006	0.0062	0.0069	0.06	0.0584	0.0469	0.0463	N/A	0.0718	0.0605	0.0669	0.0669	0.0672	0.0697
Molybdenum	T	mg/L	0.1	0.0046	0.006	0.0062	0.0069	0.06	0.0584	0.0469	0.0463	N/A	0.0718	0.0605	0.0669	0.0669	0.0672	0.0697
Nickel	D	mg/L	MS	0.0032	0.0028	0.0018	0.002	0.0017	0.0022	0.0022	0.0025	N/A	0.002	0.003	0.003	0.003 U	0.003 U	0.003 U
Nickel	T	mg/L	MS	0.0032	0.0028	0.0018	0.002	0.0017	0.0022	0.0022	0.0025	N/A	0.002	0.003	0.003	0.003 U	0.003 U	0.003 U
Selenium	D	mg/L	0.05	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	N/A	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Selenium	T	mg/L	0.05	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	N/A	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Thallium	D	mg/L	0.002	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	N/A	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
Thallium	T	mg/L	0.002	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	N/A	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U

Notes:
Empty cells = not analyzed
N = Normal Environmental Sample
FD = Field Duplicate Sample
NA = not applicable
T = total
D = dissolved
mg/L = milligrams per liter
pCi/L = picocuries per liter
NTU = nephelometric turbidity units
H = Holding times exceeded
J = Analyte detected below quantitation limits
23° = The associated batch QC was outside the established quality control range for precision
S = Spike Recovery outside recovery limits
R = RPD outside accepted recovery limits
U = Not Detected at the Reporting Limit

*Protection Standard is from Title 35, Section 845.600 unless otherwise noted
1 Standard is from the Upper Tolerance Limit (UTL) calculated from background well APW-GLR concentrations from 8 quarterly sampling events from 2017-2018
2 Standard value 0.22 is from the Lower Tolerance Limit (LTU) calculated from background well APW-GLR concentrations from 8 quarterly sampling events from 2017-2018 and 9.0 is the regulatory standard
Highlighting values exceed action level
N/A = No standard

Grand Tower, US-I

Notes:	
Empty cells = not analyzed	
N = Normal Environmental Sample	
FD = Field Duplicate Sample	
NA = not applicable	
T = total	
D = dissolved	
mg/L = milligrams per liter	
pg/L = picograms per liter	
NTU = nephelometric turbidity units	
H = Holding time exceeded	
J = Analyte detected below quantitation limits	
J3 = The associated batch QC was outside the established quality control range for precision	
S = Spike Recovery outside recovery limits	
R = RPD outside accepted recovery limits	
U = Not Detected at the Reporting Limit	
*Protection Standard is from Title 35 Section 845.600 unless otherwise noted	
1 Standard is from the Upper Tolerance Limit (UTL) calculated from background well APW GUR concentrations from 2017-2018	
2 Standard value 6.22 is from the Lower Tolerance Limit (LL) calculated from background well APW GUR concentrations from 2017-2018 and 9.0 is the regulatory standard	
Highlighted values exceed action level	
NS = No standard	

Notes:
Empty cells = not analyzed
N = Normal Environmental Sample
FD = Field Duplicate Sample
NA = not applicable
T = total
D = dissolved
mg/L = milligrams per liter
µC/L = microcuries per liter
NTU = nephelometric turbidity units
H = Holding time exceeded
J = Analysis detected below quantitation limits
±3 = The associated batch QC was outside the established quality control range for precision
S = Spike Recovery outside recovery limits
R = RPD outside accepted recovery limits

*Protection Standard is from Title 35 Section 845.600 unless otherwise noted
 1 Standard is from the Upper Tolerance Limit (UTL) calculated from background well APW-Q1R concentrations from 8 quarterly sampling events from 2017-2018
 2 Standard value 6.22 is from the Lower Tolerance Limit (LTl) calculated from background well APW-Q1R concentrations from 8 quarterly sampling events from 2017-2018 and 9.0 is the regulatory standard
 Highlighted values exceed action level
 NS = No standard

Table 1
Groundwater Summary Table
Grand Tower Energy Center (GTEC)

Grand Tower, US-IL

			Sample ID Location ID Sample Date Sample Type	Sampled prior to closure of CFR Impoundment																Post-Closure Sampling			
				APW-8-20170907 APW-08 09/07/2017 N	APW-8-20170928 APW-08 09/28/2017 N	APW-8-20171018 APW-08 10/18/2017 N	APW-8-20171108 APW-08 11/08/2017 N		APW-8-20171127 APW-08 11/27/2017 N	APW-8-20180117 APW-08 01/17/2018 N	APW-8-20180208 APW-08 02/08/2018 N	APW-08-WC-20220616 APW-08 06/16/2022 N	APW-08-WC-20220915 APW-08 09/15/2022 N	APW-08-WC-20221130 APW-08 11/30/2022 N	APW-08-WC-20230202 APW-08 02/02/2023 N		APW-08-WC-20230626 APW-08 06/26/2023 N	APW-08-WC-20230915 APW-08 09/15/2023 N	APW-08-WC-20231128 APW-08 11/28/2023 N				
Parameter/Analyte	Total or Dissolved	Units	35 IAC 845.600																				
UNSPECIFIED																							
Fluoride	N	mg/L	4	0.3	0.3	0.29	0.29	0.28	0.3	0.28	0.3	0.26	0.38	0.36	0.36	0.38	0.38	0.38	0.38	0.38			
Ironium-226	N	pCi/L	NS	0.12 ± 0.12 U	0.12 ± 0.12 U	0.11 ± 0.11 U	0.11 ± 0.11 U	0.14 ± 0.06 U	0.21 ± 0.11 U	0.39 ± 0.15 U	0.208 ± 0.236 J	0.27 ± 0.1 U	0.4 ± 0.13 U	0.247 ± 0.244 J	0.34 ± 0.12 U	0.29 ± 0.09 U	0.1 ± 0.05 U	0.1 ± 0.05 U	0.1 ± 0.05 U	0.1 ± 0.05 U			
Radium-228	N	pCi/L	NS	1.13 ± 0.63	0.88 ± 0.48 J	1.3 ± 0.545	0.37 ± 0.55 J	0.77 ± 0.55 J	1.31 ± 0.58	0.64 ± 0.49 U	0.525 ± 0.224	0.89 ± 0.62 J	1.68 ± 0.77	0.157 ± 0.282 U	0.45 ± 0.2 U	0.81 ± 0.49 J	0.25 ± 0.25 J	0.25 ± 0.25 J	0.25 ± 0.25 J	0.25 ± 0.25 J			
Sulfate	N	mg/L	400	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40			
CALC																							
Radium-226/228	N	pCi/L	8									0.795 ± 0.305	1.13 ± 0.72 U	2.08 ± 0.9	0.347 ± 0.372 J	0.45 ± 0.72 U	1.04 ± 0.58 U	0.25 ± 0.19 U	0.25 ± 0.19 U	0.25 ± 0.19 U			
FIELD PARAM																							
Temperature, Field	N	NTU	17.90°									139	139	305	26.9	152	141	158	158	158			
GEN CHEM																							
Chloride	N	mg/L	200	8	10	10	10	10	11	12	11	8	11	12	13	15	16	16	16	16			
Dissolved Solids, Total	N	mg/L	1200	455	455	445	445	445	445	445	445	382	377 H	370	378	420	440	440	440	440			
pH, Lab	N	pH units	6.92-9.07	7.04	7.07	7	7.12	7.25	7.11	7.04	7.04	7.34	7.47	7.25	7.31	7.18 H	7.16 H	7.22 H	7.22 H	7.22 H			
METALS																							
Antimony	D	mg/L	0.006	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U			
Artenic	D	mg/L	0.01	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U			
Barium	D	mg/L	2	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U			
Beryllium	D	mg/L	0.004	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U			
Bismuth	D	mg/L	2	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U			
Boron	D	mg/L	2	0.132	0.154	0.136	0.138	0.141	0.146	0.151	0.132	0.115	0.11	0.105	0.105	0.105	0.105	0.105	0.105	0.105			
Cadmium	D	mg/L	0.005	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U			
Calcium	D	mg/L	100.2°	100.2°	100.2°	100.2°	100.2°	100.2°	100.2°	100.2°	100.2°	100.2°	100.2°	100.2°	100.2°	100.2°	100.2°	100.2°	100.2°	100.2°			
Calcium	T	mg/L	100.2°	97.4	106	92.6	101	102	98.6	95	97.8	93.3	91.1	92.8	94.4	94.4	94.4	94.4	94.4	94.4			
Chromium	D	mg/L	0.1	0.0018	0.0023	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U			
Chromium	T	mg/L	0.1	0.0018	0.0023	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U			
Cobalt	D	mg/L	0.006	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U			
Cobalt	T	mg/L	0.006	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U			
Copper	D	mg/L	NS	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U			
Lead	D	mg/L	0.0075	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U			
Lead	T	mg/L	0.0075	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U			
Lithium	D	mg/L	0.04	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U			
Lithium	T	mg/L	0.04	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U			
Manganese	D	mg/L	NS	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U			
Manganese	T	mg/L	0.002	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U			
Mercury	D	mg/L	0.002	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U			
Mercury	T	mg/L	0.002	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U			
Molybdenum	D	mg/L	0.1	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U			
Molybdenum	T	mg/L	0.1	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U			
Nickel	D	mg/L	NS	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U			
Nickel	T	mg/L	NS	0.0009	0.0043	0.0009	0.0002	0.0006	0.0007	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006			
Selenium	D	mg/L	0.06	0.006	0.0141	0.0132	0.0149	0.0136	0.0141	0.0149	0.0149	0.0149	0.0149	0.0149	0.0149	0.0149	0.0149	0.0149	0.0149	0.0149			
Selenium	T	mg/L	0.06	0.006	0.0141	0.0132	0.0149	0.0136	0.0141	0.0149	0.0149	0.0149	0.0149	0.0149	0.0149	0.0149	0.0149	0.0149	0.0149	0.0149			
Thallium	D	mg/L	0.002	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U			
Thallium	T	mg/L	0.002	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U			

Notes:
Empty cells = not analyzed
N = Normal Environmental Sample
FD = Field Duplicate Sample
NA = not applicable
T = total
D = dissolved
mg/L = milligrams per liter
pCi/L = picocuries per liter
NTU = nephelometric turbidity units
N = holding time exceeded
J = Analyte detected below quantitation limits
2J = The associated batch QC was outside the established quality control range for precision
S = Spike Recovery outside recovery limits
R = RPD outside accepted recovery limits
U = Not Detected at the Reporting Limit

*Precision Standard is from Title 35 Section 845.600 unless otherwise noted
1 Standard is from the Upper Tolerance Limit (UTL) calculated from background well APW-GIR concentrations from 8 quarterly sampling events from 2017-2018
2 Standard value 6.22 is from the Lower Tolerance Limit (LTL) calculated from background well APW-GIR concentrations from 8 quarterly sampling events from 2017-2018 and 9.0 is the regulatory standard
Highlighted values exceed action level
NS = No standard

Table 1
Groundwater Summary Table
Grand Tower Energy Center (GTEC)
Grand Tower, US-IL

Grand Total, US-11			Standard prior to closure of CCR treatment												Post-Closure Sampling									
Parameter/Analyte	Total or Dissolved	Units	Sample ID Location ID Sample Date Sample Type	APW-9-20170907	APW-9-20170927	APW-9-20171028	APW-9-20171108	APW-9-20171207	APW-9-20171228	APW-9-20180117	APW-9-20180208	APW-9-20180615	APW-9-20180913	APW-9-20181130	APW-9-20190201	APW-9-20190627	APW-9-20190920	DUP-02-WG-20230920	APW-9-20231129	DUP-02-WG-20231129				
				APW-09 09/05/2017	APW-09 09/27/2017	APW-09 10/18/2017	APW-09 11/08/2017	APW-09 12/07/2017	APW-09 12/28/2017	APW-09 01/17/2018	APW-09 02/08/2018	APW-09 06/15/2018	APW-09 09/13/2018	APW-09 11/30/2018	APW-09 02/01/2019	APW-09 06/27/2019	APW-09 09/20/2019	N	APW-09 11/19/2023	APW-09 11/19/2023				
UNDETECTED																								
Fluoride	N	mg/L	-	0.19	0.22	0.21	0.2	0.2	0.2	0.22	0.19	0.23	0.19	0.2	0.19	0.19	0.2	0.19	0.2	0.21				
Radon-222	N	pCi/L	NS	0.17 ± 0.07 U	0.19 ± 0.07 U	0.22 ± 0.09 U	0.14 ± 0.08 U	0.09 ± 0.08 U	0.14 ± 0.08 U	0.09 ± 0.08 U	0.13 ± 0.11 U	0.26 ± 0.09 U	0.24 ± 0.09 U	0.08 ± 0.06 U	0.09 ± 0.156 U	0.13 ± 0.09 U	0.1 ± 0.06 U	0.12 ± 0.06 U	0 ± 0.02 U	0.03 ± 0.02 U				
Radon-220	N	pCi/L	NS	0.01 ± 0.01 U	0.07 ± 0.06 U	0.25 ± 0.10 U	0.49 ± 0.20 U	1.07 ± 0.48 U	1.08 ± 0.51	0.46 ± 0.48 U	0.23 ± 0.37 U	-0.23 ± 1.5144 U	0.22 ± 0.49 U	0.77 ± 0.58 U	0.003 ± 0.221 U	0.36 ± 0.88 U	1.11 ± 0.5	0.8 ± 0.6 U	0.8 ± 0.6 U	0.1 ± 0.08 U				
Calcium	N	mg/L	400	85	47	53	65	50	42	28	25	104	39	36	38	47	37	31	34	35				
CALC																								
Radon-222/220	N	pCi/L	5									0.267 ± 0.315 U	0.46 ± 0.58 U	0.83 ± 0.81 U	0.12 ± 0.289 U	0.53 ± 0.74 U	1.17 ± 0.46 U	0.22 ± 0.46 U	0.8 ± 0.67 U	0.23 ± 0.48 U				
FIELD PARAM																								
Turbidity, Field	N	NTU	17.89 ¹									34.2	7.3	7.39	23.6	24.7	5.64		3.62					
SPIN CHEM																								
Chloride	N	mg/L	260	13	13	13	13	13	13	13	13	768	13	12	12	13	12	11	11	12				
Dissolved Solids, Total	N	mg/L	1200	354 U	221	324	366	380	278	265	298	434	389 U	272	360	386	272	266	386	276				
pH, Lab	N	pH units	6.22-9.07 ²	7.31	7.36	7.36	7.39	7.52	7.42	7.57	7.53	7.48	7.59	7.35	7.72	7.50 H	7.56 H	7.65 H	7.5 H	7.45 H				
METALS																								
Antimony	D	mg/L	0.006	0.001 U								0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U				
Arsenic	T	mg/L	0.006	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U				
Boron	D	mg/L	0.01	0.003	0.004	0.004	0.003	0.002	0.002	0.002	0.003	0.003	0.003	0.003	0.002	0.002	0.002	0.002	0.002	0.002				
Cadmium	T	mg/L	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001				
Calcium	D	mg/L	103.2 ¹	85.9	76.5	76.5	81.9	85.6	81.5	85.3	80.3	120	76.5	76.3	82.4	81	86.1	81.5	77.6	111				
Chromium	T	mg/L	0.1	0.0148	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U				
Cobalt	D	mg/L	0.006	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001				
Copper	T	mg/L	0.005	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U				
Iron	T	mg/L	NS	0.003	0.004	0.005 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U				
Lead	D	mg/L	0.005	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U				
Lithium	T	mg/L	0.04	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001				
Manganese	T	mg/L	NS	0.0178	0.0174	0.0174	0.018	0.0207	0.0173	0.0156	0.0148	0.0148	0.0148	0.0148	0.0148	0.0148	0.0148	0.0148	0.0148	0.0148				
Mercury	D	mg/L	0.002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002				
Mercury	T	mg/L	0.002	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U				
Molybdenum	D	mg/L	0.1	0.0223	0.0252	0.0227	0.0203	0.0247	0.0246	0.0223	0.0224	0.0261	0.0139	0.0165	0.0167	0.0167	0.0167	0.0167	0.0167	0.0167				
Molybdenum	T	mg/L	0.1	0.0223	0.0252	0.0227	0.0203	0.0247	0.0246	0.0223	0.0224	0.0261	0.0139	0.0165	0.0167	0.0167	0.0167	0.0167	0.0167	0.0167				
Nickel	D	mg/L	NS	0.012	0.0032	0.001 U	0.001	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U				
Nickel	T	mg/L	NS	0.012	0.0032	0.001 U	0.001	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U				
Selenium	T	mg/L	0.05	0.0126	0.0139	0.017	0.0186	0.0136	0.0143	0.0147	0.0134	0.0123	0.0131	0.0138	0.0136	0.0136	0.0131	0.0132	0.0134	0.0134				
Thallium	D	mg/L	0.002	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U				
Thallium	T	mg/L	0.002	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U				

Notes:
Empty cells = not analyzed
N = Normal Environmental Sample
FD = Field Duplicate Sample
NA = not applicable
T = Total
D = dissolved
mg/L = milligrams per liter
pCi/L = picocuries per liter
NTU = nephelometric turbidity units
J = Analyte times exceeded
J = Analyte detected below quantitation limits
Z = The associated batch QC was outside the established quality control range for precision
S = Spike Recovery outside recovery limits
R = RPD outside accepted recovery limits
U = Not Detected at the Reporting Limit

*Protection Standard is from Title 35 Section 845.600 unless otherwise noted
1 Standard is from the Upper Tolerance Limit (UTL) calculated from background well APW-02R concentrations from 8 quarterly sampling events from 2017-2018
2 Standard value 0.25 is from the Lower Tolerance Limit (LL) calculated from background well APW-02R concentrations from 8 quarterly sampling events from 2017-2018 and 0.0 is the regulatory standard
Highlighted values exceed action level
NS = No standard

Table 1
Groundwater Summary Table
Grand Tower Energy Center (GTEC)
Grand Tower, US-IL

			Sample ID Location ID Sample Date Sample Type	APW-100-20170907 APW-100 09/07/2017 N	APW-100-20170927 APW-100 09/27/2017 N	APW-100-20171019 APW-100 10/19/2017 N	Sampled prior to closure of CCR Impoundment		APW-100-20171128 APW-100 11/28/2017 N	APW-100-20171228 APW-100 12/28/2017 N	APW-100-20180116 APW-100 01/16/2018 N	APW-100-20180209 APW-100 02/09/2018 N	APW-100-WG-20200615 APW-100 06/15/2022 N	APW-100-WG-20200916 APW-100 09/16/2022 N	APW-100-WG-20211219 APW-100 11/26/2022 N	Post-Closure Sampling		APW-100-WG-20230626 APW-100 06/26/2023 N	APW-100-WG-20230919 APW-100 09/19/2023 N	APW-100-WG-20231127 APW-100 11/27/2023 N
Parameter/Analyte	Total or Dissolved	Units	30 IAC 845.600																	
UNSPECIFIED																				
Fluoride	N	mg/L	4	0.1	0.12		0.1 U	0.11		0.1	0.11	0.1 U	0.12	0.12	0.1	0.12	0.12	0.1	0.11	0.14
Indium-226	N	pCi/L	NS	0.34 ± 0.12 U		0.11 ± 0.1 U	0.121 ± 0.037	0.10 ± 0.12 U	0.23 ± 0.1 U	0.08 ± 0.1 U	0.1 ± 0.07 U	0.249 ± 0.207	0.22 ± 0.08 U	0.31 ± 0.11 U	0.186 ± 0.107	0.31 ± 0.12 U	0.21 ± 0.09 U	0.14 ± 0.06 U		
Radium-228	N	pCi/L	NS	1.16 ± 0.52	1.72 ± 0.64	0.633 ± 0.366	0.96 ± 0.33 J	0.47 ± 0.35 U	0.34 ± 0.37 U	0.81 ± 0.6 J	0.59 ± 0.43 U	1.19 ± 0.31	0.56 ± 0.38 U	0.28 ± 0.43 U	0.84 ± 0.375	1.40 ± 0.78	0.61 ± 0.49 U	1.36 ± 0.77		
Sulfate	N	mg/L	400	44	41	41	42	44	42	44	42	42	43	42	39	44	44	35		
CALC																				
Radium-226/228	N	pCi/L	6									1.44 ± 0.374	0.79 ± 0.67 U	0.59 ± 0.54 U	1.02 ± 0.402	1.7 ± 0.98 U	0.62 ± 0.58 U	1.5 ± 0.83 U		
FIELD PARAM																				
Temperature, Field	N	NTU	17.90°									46.9	21.9	36.4	45.3	176	359	136		
GEN CHEM																				
Chloride	N	mg/L	200	24	17	17	15	16	14	16	16	18	14	13	14	14	10	10		
Dissolved Solids, Total	N	mg/L	1200	465	474	442	445	452	445	452	452	460 H	460	454	465	465	445	445		
pH, Lab	N	pH units	6.92-9.07	7.42	7.11	7.05	7.11	7.12	7.15	7.03	7.03	7.29	7.04	7.04	7.57	6.98 H	7.22 H	7.08 H		
METALS																				
Antimony	D	mg/L	0.006	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.0013	
Antimony	T	mg/L	0.006	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.0013	
Arsenic	D	mg/L	0.01	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.0018	
Arsenic	T	mg/L	0.01	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.0018	
Barium	D	mg/L	2	0.437	0.304	0.363	0.325	0.384	0.326	0.391	0.387	0.342	0.351	0.348	0.346	0.348	0.339	0.338	0.446	
Barium	T	mg/L	2	0.437	0.304	0.363	0.325	0.384	0.326	0.391	0.387	0.342	0.351	0.348	0.346	0.348	0.339	0.338	0.446	
Beryllium	D	mg/L	0.004	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	
Beryllium	T	mg/L	0.004	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	
Boron	D	mg/L	2	0.5999	0.101	0.0843	0.0713	0.0885	0.0822	0.0823	0.0856	0.0786	0.0713	0.0843	0.0679	0.0704	0.0639	0.0629	0.0747	
Boron	T	mg/L	2	0.5999	0.101	0.0843	0.0713	0.0885	0.0822	0.0823	0.0856	0.0786	0.0713	0.0843	0.0679	0.0704	0.0639	0.0629	0.0747	
Cadmium	D	mg/L	0.005	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	
Cadmium	T	mg/L	0.005	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	
Calcium	D	mg/L	100.2°	128	136	130	121	125	125	146 S	124 S	124	114	114	114	114	114	81.4		
Calcium	T	mg/L	100.2°	128	136	130	121	125	125	146 S	124 S	124	114	114	114	114	114	81.4		
Chromium	D	mg/L	0.1	0.0036	0.0078	0.0022	0.0014	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	
Chromium	T	mg/L	0.1	0.0036	0.0078	0.0022	0.0014	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	
Cobalt	D	mg/L	0.006	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	
Cobalt	T	mg/L	0.006	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	
Copper	D	mg/L	NS	0.0024	0.0024	0.0024	0.0024	0.0024	0.0024	0.0024	0.0024	0.0024	0.0024	0.0024	0.0024	0.0024	0.0024	0.0024	0.0024	
Copper	T	mg/L	NS	0.0024	0.0024	0.0024	0.0024	0.0024	0.0024	0.0024	0.0024	0.0024	0.0024	0.0024	0.0024	0.0024	0.0024	0.0024	0.0024	
Iron	D	mg/L	0.0075	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	
Iron	T	mg/L	0.0075	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	
Lead	D	mg/L	0.004	0.0147	0.0145	0.0145	0.0145	0.0145	0.0145	0.0145	0.0145	0.0145	0.0145	0.0145	0.0145	0.0145	0.0145	0.0145	0.0145	
Lead	T	mg/L	0.004	0.0147	0.0145	0.0145	0.0145	0.0145	0.0145	0.0145	0.0145	0.0145	0.0145	0.0145	0.0145	0.0145	0.0145	0.0145	0.0145	
Manganese	D	mg/L	NS	0.0024	0.0024	0.0024	0.0024	0.0024	0.0024	0.0024	0.0024	0.0024	0.0024	0.0024	0.0024	0.0024	0.0024	0.0024	0.0024	
Manganese	T	mg/L	NS	0.0024	0.0024	0.0024	0.0024	0.0024	0.0024	0.0024	0.0024	0.0024	0.0024	0.0024	0.0024	0.0024	0.0024	0.0024	0.0024	
Mercury	D	mg/L	0.002	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	
Mercury	T	mg/L	0.002	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	
Molybdenum	D	mg/L	0.1	0.0013 U	0.0013 U	0.0013 U	0.0013 U	0.0013 U	0.0013 U	0.0013 U	0.0013 U	0.0013 U	0.0013 U	0.0013 U	0.0013 U	0.0013 U	0.0013 U	0.0013 U	0.0013 U	
Molybdenum	T	mg/L	0.1	0.0013 U	0.0013 U	0.0013 U	0.0013 U	0.0013 U	0.0013 U	0.0013 U	0.0013 U	0.0013 U	0.0013 U	0.0013 U	0.0013 U	0.0013 U	0.0013 U	0.0013 U	0.0013 U	
Nickel	D	mg/L	NS	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	
Nickel	T	mg/L	NS	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	
Selenium	D	mg/L	0.05	0.001 U	0.0011	0.0012	0.0013	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	
Selenium	T	mg/L	0.05	0.001 U	0.0011	0.0012	0.0013	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	
Thallium	D	mg/L	0.002	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	
Thallium	T	mg/L	0.002	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	

Notes:
Empty cells = not analyzed
N = Normal Environmental Sample
FD = Field Duplicate Sample
NA = not applicable
T = total
D = dissolved
mg/L = milligrams per liter
pCi/L = picocuries per liter
NTU = nephelometric turbidity units
N = Holding time exceeded
J = Analyte detected below quantitation limits
Z = The associated batch QC was outside the established quality control range for precision
S = Spike Recovery outside recovery limits
R = RPD outside accepted recovery limits
U = Not Detected at the Reporting Limit
NS = No standard

*Precision Standard is from Title 35 Section 845.600 unless otherwise noted
1 Standard is from the Upper Tolerance Limit (UTL) calculated from background well APW-GIR concentrations from 8 quarterly sampling events from 2017-2018
2 Standard value 6.22 is from the Lower Tolerance Limit (LTU) calculated from background well APW-GIR concentrations from 8 quarterly sampling events from 2017-2018 and 9.0 is the regulatory standard
Highlighted values exceed action level
NS = No standard

Table 1
Groundwater Summary Table
Grand Tower Energy Center (GTEC)
Grand Tower, US-IL

Grand Tower, US-8				Sampled prior to closure of CCR Impoundment												Post-Closure Sampling			
Location ID		APW-105-20170907	APW-105-20170907	APW-105-20171019	APW-105-20171109	APW-105-20171128	APW-105-20171228	APW-105-20180116	APW-105-20180209	APW-105-WC-20200615	APW-105-WC-20200915	APW-105-WC-20211129	APW-105-WC-20220202	APW-105-WC-20220626	APW-105-WC-20230919	APW-105-WC-20231127			
Sample Date		09/07/2017	09/07/2017	10/19/2017	11/09/2017	11/28/2017	12/28/2017	01/16/2018	02/09/2018	06/15/2022	09/15/2022	11/29/2022	02/02/2023	06/26/2023	09/19/2023	11/27/2023			
Sample Type		N	N	N	N	N	N	N	N	N	N	N	N	N	N	N			
Parameter/Analyte	Total or Dissolved	Units	30 IAC 845.600																
UNSPECIFIED																			
Fluoride	N	mg/L	4	0.19	0.21	0.16	0.16	0.17	0.17	0.16	0.17	0.16	0.17	0.16	0.16	0.16			
Strontium-226	N	pCi/L	NS	0.4 ± 0.14 U	0.19 ± 0.11 U	0.774 ± 0.430	0.16 ± 0.11 U	0.16 ± 0.11 U	0.23 ± 0.12 U	0.24 ± 0.13 U	0.778 ± 0.324	0.3 ± 0.13 U	0.31 ± 0.11 U	0.31 ± 0.11 U	1.68 ± 0.396	0.37 ± 0.13 U			
Radium-228	N	pCi/L	NS	0.38 ± 0.47 U	0.88 ± 0.72	0.856 ± 0.391	0.36 ± 0.33 U	0.36 ± 0.33 U	2.71 ± 0.78	0.83 ± 0.52 U	0.479 ± 0.208 U	2.52 ± 0.81	1.64 ± 0.68	0.184 ± 0.371 U	0.18 ± 0.47 U	4.24 ± 0.93			
Sulfate	N	mg/L	400	32	10 U	32 U	32 U	32 U	32 U	32 U	32 U	32 U	32 U	32 U	32 U	32 U			
CALC	N	pCi/L	6									1.25 ± 0.42	1.95 ± 1.01	1.95 ± 0.79 U	1.24 ± 0.542	0.37 ± 0.6 U			
Radium-226/228	N	pCi/L	6									2.82 ± 0.62	2.82 ± 0.62	2.82 ± 0.62	4.88 ± 1.06	1.27 ± 0.75 U			
FIELD PARAM																			
Temperature, Field	N	NTU	17.99°									81.5	34.3	52.8	37.3	66.6			
GEN CHEM																			
Chloride	N	mg/L	200	30	7	6	6	6	6	6	6	32	15	18	21	20			
Dissolved Solids, Total	N	mg/L	1200	706	70	676	706	734	776	685 R	765	725	729 H	760	766	725			
pH, Lab	N	pH units	6.92-9.07	6.99	6.96	6.95	6.96	6.97	6.96	7.06	6.91	6.97	7.2	6.95	7.01 H	7.01 H			
METALS																			
Antimony	D	mg/L	0.006	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U			
Antimony	T	mg/L	0.006	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U			
Arsenic	D	mg/L	0.01	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U			
Arsenic	T	mg/L	0.01	0.186	0.189	0.18	0.209	0.189	0.193	0.196	0.196	0.196	0.187	0.182	0.189	0.174			
Barium	D	mg/L	2	0.113	0.143	0.143	0.143	0.143	0.143	0.143	0.143	0.143	0.143	0.143	0.143	0.143			
Barium	T	mg/L	2	0.113	0.143	0.143	0.143	0.143	0.143	0.143	0.143	0.143	0.143	0.143	0.143	0.143			
Beryllium	D	mg/L	0.004	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U			
Beryllium	T	mg/L	0.004	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U			
Boron	D	mg/L	2	0.126	0.144	0.144	0.144	0.144	0.144	0.144	0.144	0.144	0.144	0.144	0.144	0.144			
Boron	T	mg/L	2	0.126	0.144	0.144	0.144	0.144	0.144	0.144	0.144	0.144	0.144	0.144	0.144	0.144			
Cadmium	D	mg/L	0.005	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U			
Cadmium	T	mg/L	0.005	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U			
Calcium	D	mg/L	100.2°	136	144	136	144	144	144	144	144	144	144	144	144	144			
Calcium	T	mg/L	100.2°	136	144	136	144	144	144	144	144	144	144	144	144	144			
Chromium	D	mg/L	0.1	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001			
Chromium	T	mg/L	0.1	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001			
Cobalt	D	mg/L	0.006	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U			
Cobalt	T	mg/L	0.006	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U			
Copper	D	mg/L	NS	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001			
Copper	T	mg/L	NS	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001			
Lead	D	mg/L	0.0075	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U			
Lead	T	mg/L	0.0075	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U			
Lithium	D	mg/L	0.04	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003			
Lithium	T	mg/L	0.04	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003			
Manganese	D	mg/L	NS	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002			
Manganese	T	mg/L	NS	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002			
Mercury	D	mg/L	0.002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002			
Mercury	T	mg/L	0.002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002			
Molybdenum	D	mg/L	0.1	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001			
Molybdenum	T	mg/L	0.1	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001			
Nickel	D	mg/L	NS	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001			
Nickel	T	mg/L	NS	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001			
Selenium	D	mg/L	0.06	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U			
Selenium	T	mg/L	0.06	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U			
Thallium	D	mg/L	0.002	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U			
Thallium	T	mg/L	0.002	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U			

Notes:
Empty cells = not analyzed
N = Normal Environmental Sample
FD = Field Duplicate Sample
NA = not applicable
T = total
D = dissolved
mg/L = milligrams per liter
pCi/L = picocuries per liter
NTU = nephelometric turbidity units
N = holding time exceeded
J = Analyte detected below quantitation limits
J ± = The associated batch QC was outside the established quality control range for precision
S = Spike Recovery outside recovery limits
R = RPD outside accepted recovery limits
U = Not Detected at the Reporting Limit

*Fraction Standard is from Title 35 Section 845.600 unless otherwise noted
1 Standard is from the Upper Tolerance Limit (UTL) calculated from background well APW-GIR concentrations from 8 quarterly sampling events from 2017-2018
2 Standard value 6.22 is from the Lower Tolerance Limit (LTU) calculated from background well APW-GIR concentrations from 8 quarterly sampling events from 2017-2018 and 9.0 is the regulatory standard
Highlighted values exceed action level
NS = No standard



APPENDIX A

2023 MONITORING WELL INSPECTION
FORMS

Well Inspection Worksheet

Grand Tower Energy Center

Grand Tower, IL

Well ID: APW-01R Date: 1/30/2023
Total Depth (Actual): 58.38 (BTOC) Time: 12:15
Total Depth (Measured): 58.23 (BTOC)
Depth to Water (Measured): 33.8 (BTOC)

Is well screen occluded more than 10%? NO
If Yes, list steps for redevelopment: _____

LNAPL Present: NO
If Yes, measured thickness = _____
DNAPL Present: NO
If Yes, measured thickness = _____

Well Completion Type:

Condition of protector: INTACT YES
Well ID present and readable: YES
Locks intact: YES
Weep hole present: YES
Water present in protector: NO
Are well "markers" (i.e.bumper posts) needed at this location: NO
If yes, are current well "markers" adequate around well: _____
Comments: _____

Well Surface Seal: INTACT

Is surrounding area sloped away from well: NO
Any observed ponding: NO
Is surface run-off flow evident around well: NO

Well Casing Condition: INTACT

Size of well (diameter) = 2 inches
Marking point present: YES
Well cap in place: YES
Comments: _____

General Comments:

Well Inspection Worksheet

Grand Tower Energy Center

Grand Tower, IL

Well ID: APW-02 Date: 1/30/2023
Total Depth (Actual): 58.75 (BTOC) Time: 10:15
Total Depth (Measured): 58.55 (BTOC)
Depth to Water (Measured): 33.19 (BTOC)

Is well screen occluded more than 10%? NO
If Yes, list steps for redevelopment: _____

LNAPL Present: NO
If Yes, measured thickness = _____
DNAPL Present: NO
If Yes, measured thickness = _____

Well Completion Type:

Condition of protector: INTACT YES
Well ID present and readable: YES
Locks intact: YES
Weep hole present: NO
Water present in protector: YES
Are well "markers" (i.e.bumper posts) needed at this location: NO
If yes, are current well "markers" adequate around well: _____
Comments: _____

Well Surface Seal: INTACT

Is surrounding area sloped away from well: YES
Any observed ponding: NO
Is surface run-off flow evident around well: NO

Well Casing Condition: INTACT

Size of well (diameter) = 2 inches
Marking point present: YES
Well cap in place: YES
Comments: _____

General Comments:

Well Inspection Worksheet

Grand Tower Energy Center

Grand Tower, IL

Well ID: APW-03 Date: 1/30/2023
Total Depth (Actual): 59.65 (BTOC) Time: 11:45
Total Depth (Measured): 59.42 (BTOC)
Depth to Water (Measured): 32.95 (BTOC)

Is well screen occluded more than 10%? NO
If Yes, list steps for redevelopment: _____

LNAPL Present: NO
If Yes, measured thickness = _____
DNAPL Present: NO
If Yes, measured thickness = _____

Well Completion Type:

Condition of protector: INTACT YES
Well ID present and readable: YES
Locks intact: YES
Weep hole present: NO
Water present in protector: YES
Are well "markers" (i.e.bumper posts) needed at this location: NO
If yes, are current well "markers" adequate around well: _____
Comments: _____

Well Surface Seal: INTACT

Is surrounding area sloped away from well: NO
Any observed ponding: NO
Is surface run-off flow evident around well: NO

Well Casing Condition: INTACT

Size of well (diameter) = 2 inches
Marking point present: YES
Well cap in place: YES
Comments: _____

General Comments:

Well Inspection Worksheet

Grand Tower Energy Center

Grand Tower, IL

Well ID: APW-04 Date: 1/30/2023
Total Depth (Actual): 60.4 (BTOC) Time: 12:00
Total Depth (Measured): 60.35 (BTOC)
Depth to Water (Measured): 34.75 (BTOC)

Is well screen occluded more than 10%? NO
If Yes, list steps for redevelopment: _____

LNAPL Present: NO
If Yes, measured thickness = _____
DNAPL Present: NO
If Yes, measured thickness = _____

Well Completion Type:

Condition of protector: INTACT YES
Well ID present and readable: YES
Locks intact: YES
Weep hole present: YES
Water present in protector: NO
Are well "markers" (i.e.bumper posts) needed at this location: NO
If yes, are current well "markers" adequate around well: _____
Comments: _____

Well Surface Seal: INTACT

Is surrounding area sloped away from well: NO
Any observed ponding: NO
Is surface run-off flow evident around well: NO

Well Casing Condition: INTACT

Size of well (diameter) = 2 inches
Marking point present: YES
Well cap in place: YES
Comments: _____

General Comments:

Well Inspection Worksheet

Grand Tower Energy Center

Grand Tower, IL

Well ID: APW-05 Date: 1/30/2023
Total Depth (Actual): 56.9 (BTOC) Time: 10:00
Total Depth (Measured): 57.5 (BTOC)
Depth to Water (Measured): 31.33 (BTOC)

Is well screen occluded more than 10%? YES
If Yes, list steps for redevelopment: NA

LNAPL Present: NO
If Yes, measured thickness = _____
DNAPL Present: NO
If Yes, measured thickness = _____

Well Completion Type:

Condition of protector: INTACT YES
Well ID present and readable: YES
Locks intact: YES
Weep hole present: YES
Water present in protector: NO
Are well "markers" (i.e.bumper posts) needed at this location: NO
If yes, are current well "markers" adequate around well: _____
Comments: _____

Well Surface Seal: INTACT

Is surrounding area sloped away from well: NO
Any observed ponding: NO
Is surface run-off flow evident around well: NO

Well Casing Condition: INTACT

Size of well (diameter) = 2 inches
Marking point present: YES
Well cap in place: YES
Comments: _____

General Comments:

Well screen occluded by more than 40%. APW-05 is scheduled for abandonment
and redrilling scheduled before Q2 2023.

Well Inspection Worksheet

Grand Tower Energy Center

Grand Tower, IL

Well ID: APW-06S Date: 1/30/2023
Total Depth (Actual): 63.98 (BTOC) Time: 9:45
Total Depth (Measured): 64.43 (BTOC)
Depth to Water (Measured): 30.78 (BTOC)

Is well screen occluded more than 10%? NO
If Yes, list steps for redevelopment: _____

LNAPL Present: NO
If Yes, measured thickness = _____
DNAPL Present: NO
If Yes, measured thickness = _____

Well Completion Type:

Condition of protector: INTACT YES
Well ID present and readable: YES
Locks intact: YES
Weep hole present: YES
Water present in protector: NO
Are well "markers" (i.e.bumper posts) needed at this location: NO
If yes, are current well "markers" adequate around well: _____
Comments: _____

Well Surface Seal: INTACT

Is surrounding area sloped away from well: NO
Any observed ponding: NO
Is surface run-off flow evident around well: NO

Well Casing Condition: INTACT

Size of well (diameter) = 2 inches
Marking point present: YES
Well cap in place: YES
Comments: _____

General Comments:

Sand surrounding the well and marking points.

Well Inspection Worksheet

Grand Tower Energy Center

Grand Tower, IL

Well ID: APW-06D Date: 1/30/2023
Total Depth (Actual): 152.57 (BTOC) Time: 9:30
Total Depth (Measured): 156.71 (BTOC)
Depth to Water (Measured): 30.86 (BTOC)

Is well screen occluded more than 10%? 9:30
If Yes, list steps for redevelopment: _____

LNAPL Present: _____
If Yes, measured thickness = _____
DNAPL Present: _____
If Yes, measured thickness = _____

Well Completion Type:

Condition of protector: INTACT YES
Well ID present and readable: YES
Locks intact: NO
Weep hole present: YES
Water present in protector: NO
Are well "markers" (i.e.bumper posts) needed at this location: YES
If yes, are current well "markers" adequate around well: _____
Comments: _____

Well Surface Seal: INTACT

Is surrounding area sloped away from well: NO
Any observed ponding: NO
Is surface run-off flow evident around well: NO

Well Casing Condition: INTACT

Size of well (diameter) = 2 inches
Marking point present: YES
Well cap in place: YES
Comments: _____

General Comments:

Sand surrounding the well and marking points.

Well Inspection Worksheet

Grand Tower Energy Center

Grand Tower, IL

Well ID: APW-07 Date: 1/30/2023
Total Depth (Actual): 63.35 (BTOC) Time: 11:30
Total Depth (Measured): 63.18 (BTOC)
Depth to Water (Measured): 28.02 (BTOC)

Is well screen occluded more than 10%? NO
If Yes, list steps for redevelopment: _____

LNAPL Present: NO
If Yes, measured thickness = _____
DNAPL Present: NO
If Yes, measured thickness = _____

Well Completion Type:

Condition of protector: INTACT YES
Well ID present and readable: YES
Locks intact: YES
Weep hole present: YES
Water present in protector: NO
Are well "markers" (i.e.bumper posts) needed at this location: NO
If yes, are current well "markers" adequate around well: _____
Comments: _____

Well Surface Seal: INTACT

Is surrounding area sloped away from well: NO
Any observed ponding: NO
Is surface run-off flow evident around well: NO

Well Casing Condition: INTACT

Size of well (diameter) = 2 inches
Marking point present: YES
Well cap in place: YES
Comments: _____

General Comments:

Well Inspection Worksheet

Grand Tower Energy Center

Grand Tower, IL

Well ID: APW-08 Date: 1/30/2023
Total Depth (Actual): 61.89 (BTOC) Time: 11:15
Total Depth (Measured): 61.75 (BTOC)
Depth to Water (Measured): 29.95 (BTOC)

Is well screen occluded more than 10%? NO
If Yes, list steps for redevelopment: _____

LNAPL Present: NO
If Yes, measured thickness = _____
DNAPL Present: NO
If Yes, measured thickness = _____

Well Completion Type:

Condition of protector: INTACT YES
Well ID present and readable: YES
Locks intact: YES
Weep hole present: YES
Water present in protector: NO
Are well "markers" (i.e.bumper posts) needed at this location: NO
If yes, are current well "markers" adequate around well: _____
Comments: _____

Well Surface Seal: INTACT

Is surrounding area sloped away from well: NO
Any observed ponding: NO
Is surface run-off flow evident around well: NO

Well Casing Condition: INTACT

Size of well (diameter) = 2 inches
Marking point present: YES
Well cap in place: YES
Comments: _____

General Comments:

Well Inspection Worksheet

Grand Tower Energy Center

Grand Tower, IL

Well ID: APW-09 Date: 1/30/2023
Total Depth (Actual): 63.4 (BTOC) Time: 10:30
Total Depth (Measured): 63.18 (BTOC)
Depth to Water (Measured): 34.09 (BTOC)

Is well screen occluded more than 10%? NO
If Yes, list steps for redevelopment: _____

LNAPL Present: NO
If Yes, measured thickness = _____
DNAPL Present: NO
If Yes, measured thickness = _____

Well Completion Type:

Condition of protector: INTACT YES
Well ID present and readable: YES
Locks intact: YES
Weep hole present: YES
Water present in protector: NO
Are well "markers" (i.e.bumper posts) needed at this location: NO
If yes, are current well "markers" adequate around well: _____
Comments: _____

Well Surface Seal: INTACT

Is surrounding area sloped away from well: NO
Any observed ponding: NO
Is surface run-off flow evident around well: NO

Well Casing Condition: INTACT

Size of well (diameter) = 2 inches
Marking point present: YES
Well cap in place: YES
Comments: _____

General Comments:

Well Inspection Worksheet

Grand Tower Energy Center

Grand Tower, IL

Well ID: APW-10S Date: 1/30/2023
Total Depth (Actual): 62.84 (BTOC) Time: 10:45
Total Depth (Measured): 62.78 (BTOC)
Depth to Water (Measured): 27.08 (BTOC)

Is well screen occluded more than 10%? NO
If Yes, list steps for redevelopment: _____

LNAPL Present: NO
If Yes, measured thickness = _____
DNAPL Present: NO
If Yes, measured thickness = _____

Well Completion Type:

Condition of protector: INTACT YES
Well ID present and readable: YES
Locks intact: YES
Weep hole present: YES
Water present in protector: NO
Are well "markers" (i.e.bumper posts) needed at this location: NO
If yes, are current well "markers" adequate around well: _____
Comments: _____

Well Surface Seal: INTACT

Is surrounding area sloped away from well: NO
Any observed ponding: NO
Is surface run-off flow evident around well: NO

Well Casing Condition: INTACT

Size of well (diameter) = 2 inches
Marking point present: YES
Well cap in place: YES
Comments: _____

General Comments:

Well Inspection Worksheet

Grand Tower Energy Center

Grand Tower, IL

Well ID: APW-10D Date: 1/30/2023
Total Depth (Actual): 98.19 (BTOC) Time: 11:00
Total Depth (Measured): 98.15 (BTOC)
Depth to Water (Measured): 26.72 (BTOC)

Is well screen occluded more than 10%? NO
If Yes, list steps for redevelopment: _____

LNAPL Present: NO
If Yes, measured thickness = _____
DNAPL Present: NO
If Yes, measured thickness = _____

Well Completion Type:

Condition of protector: INTACT YES
Well ID present and readable: YES
Locks intact: YES
Weep hole present: YES
Water present in protector: NO
Are well "markers" (i.e.bumper posts) needed at this location: NO
If yes, are current well "markers" adequate around well: _____
Comments: _____

Well Surface Seal: INTACT

Is surrounding area sloped away from well: NO
Any observed ponding: NO
Is surface run-off flow evident around well: NO

Well Casing Condition: INTACT

Size of well (diameter) = 2 inches
Marking point present: YES
Well cap in place: YES
Comments: _____

General Comments:

Well Inspection Worksheet

Grand Tower Energy Center

Grand Tower, IL

Well ID: APW-05R Date: 6/26/2023
Total Depth (Actual): 62.98 (BTOC) Time: 10:05
Total Depth (Measured): 62.89 (BTOC)
Depth to Water (Measured): 32.63 (BTOC)

Is well screen occluded more than 10%? NO
If Yes, list steps for redevelopment: _____

LNAPL Present: NO
If Yes, measured thickness = _____
DNAPL Present: NO
If Yes, measured thickness = _____

Well Completion Type:

Condition of protector: INTACT YES
Well ID present and readable: YES
Locks intact: YES
Weep hole present: YES
Water present in protector: NO
Are well "markers" (i.e.bumper posts) needed at this location: YES
If yes, are current well "markers" adequate around well: _____
Comments: No well markers present.

Well Surface Seal: INTACT

Is surrounding area sloped away from well: YES
Any observed ponding: NO
Is surface run-off flow evident around well: NO

Well Casing Condition: INTACT

Size of well (diameter) = 2 inches
Marking point present: YES
Well cap in place: YES
Comments: _____

General Comments:

APW-05 was redrilled as APW-05R following
the Q1 2023 groundwater sampling event.

Well Inspection Worksheet

Grand Tower Energy Center

Grand Tower, IL

Well ID: APW-01R Date: 6/26/2023
Total Depth (Actual): 58.38 (BTOC) Time: 10:25
Total Depth (Measured): 56.22 (BTOC)
Depth to Water (Measured): 32.92 (BTOC)

Is well screen occluded more than 10%? NO
If Yes, list steps for redevelopment: _____

LNAPL Present: NO
If Yes, measured thickness = _____
DNAPL Present: NO
If Yes, measured thickness = _____

Well Completion Type:

Condition of protector: INTACT YES
Well ID present and readable: YES
Locks intact: YES
Weep hole present: YES
Water present in protector: NO
Are well "markers" (i.e.bumper posts) needed at this location: NO
If yes, are current well "markers" adequate around well: _____
Comments: _____

Well Surface Seal: INTACT

Is surrounding area sloped away from well: YES
Any observed ponding: NO
Is surface run-off flow evident around well: NO

Well Casing Condition: INTACT

Size of well (diameter) = 2 inches
Marking point present: YES
Well cap in place: YES
Comments: _____

General Comments:

Hole in the ground around ballards.

Well Inspection Worksheet

Grand Tower Energy Center

Grand Tower, IL

Well ID: APW-02 Date: 6/26/2023
Total Depth (Actual): 58.75 (BTOC) Time: 10:10
Total Depth (Measured): 58.43 (BTOC)
Depth to Water (Measured): 32.24 (BTOC)

Is well screen occluded more than 10%? NO
If Yes, list steps for redevelopment: _____

LNAPL Present: NO
If Yes, measured thickness = _____
DNAPL Present: NO
If Yes, measured thickness = _____

Well Completion Type:

Condition of protector: INTACT YES
Well ID present and readable: YES
Locks intact: YES
Weep hole present: YES
Water present in protector: NO
Are well "markers" (i.e.bumper posts) needed at this location: NO
If yes, are current well "markers" adequate around well: _____
Comments: _____

Well Surface Seal: INTACT

Is surrounding area sloped away from well: YES
Any observed ponding: NO
Is surface run-off flow evident around well: NO

Well Casing Condition: INTACT

Size of well (diameter) = 2 inches
Marking point present: YES
Well cap in place: YES
Comments: _____

General Comments:

Well Inspection Worksheet

Grand Tower Energy Center

Grand Tower, IL

Well ID: APW-03 Date: 6/26/2023
Total Depth (Actual): 59.65 (BTOC) Time: 11:05
Total Depth (Measured): 59.42 (BTOC)
Depth to Water (Measured): 32.01 (BTOC)

Is well screen occluded more than 10%? NO
If Yes, list steps for redevelopment: _____

LNAPL Present: NO
If Yes, measured thickness = _____
DNAPL Present: NO
If Yes, measured thickness = _____

Well Completion Type:

Condition of protector: INTACT YES
Well ID present and readable: YES
Locks intact: YES
Weep hole present: YES
Water present in protector: YES
Are well "markers" (i.e.bumper posts) needed at this location: NO
If yes, are current well "markers" adequate around well: _____
Comments: _____

Well Surface Seal: INTACT

Is surrounding area sloped away from well: YES
Any observed ponding: NO
Is surface run-off flow evident around well: NO

Well Casing Condition: INTACT

Size of well (diameter) = 2 inches
Marking point present: YES
Well cap in place: YES
Comments: _____

General Comments:

Water present in protector. _____

Well Inspection Worksheet

Grand Tower Energy Center

Grand Tower, IL

Well ID: APW-04 Date: 6/26/2023
Total Depth (Actual): 60.4 (BTOC) Time: 10:35
Total Depth (Measured): 60.28 (BTOC)
Depth to Water (Measured): 33.55 (BTOC)

Is well screen occluded more than 10%? NO
If Yes, list steps for redevelopment: _____

LNAPL Present: NO
If Yes, measured thickness = _____
DNAPL Present: NO
If Yes, measured thickness = _____

Well Completion Type:

Condition of protector: INTACT YES
Well ID present and readable: YES
Locks intact: YES
Weep hole present: YES
Water present in protector: NO
Are well "markers" (i.e.bumper posts) needed at this location: YES
If yes, are current well "markers" adequate around well: NO
Comments: Only 2 well markers - both in bad condition.

Well Surface Seal: INTACT

Is surrounding area sloped away from well: YES
Any observed ponding: NO
Is surface run-off flow evident around well: NO

Well Casing Condition: INTACT

Size of well (diameter) = 2 inches
Marking point present: YES
Well cap in place: YES
Comments: _____

General Comments:

Well Inspection Worksheet

Grand Tower Energy Center

Grand Tower, IL

Well ID: APW-06S Date: 6/26/2023
Total Depth (Actual): 63.98 (BTOC) Time: 10:00
Total Depth (Measured): 63.83 (BTOC)
Depth to Water (Measured): 31.09 (BTOC)

Is well screen occluded more than 10%? NO
If Yes, list steps for redevelopment: _____

LNAPL Present: NO
If Yes, measured thickness = _____
DNAPL Present: NO
If Yes, measured thickness = _____

Well Completion Type:

Condition of protector: INTACT YES
Well ID present and readable: YES
Locks intact: YES
Weep hole present: YES
Water present in protector: NO
Are well "markers" (i.e.bumper posts) needed at this location: NO
If yes, are current well "markers" adequate around well: _____
Comments: _____

Well Surface Seal: INTACT

Is surrounding area sloped away from well: YES
Any observed ponding: NO
Is surface run-off flow evident around well: NO

Well Casing Condition: INTACT

Size of well (diameter) = 2 inches
Marking point present: YES
Well cap in place: YES
Comments: _____

General Comments:

Sand surrounding the well and marking points.

Well Inspection Worksheet

Grand Tower Energy Center

Grand Tower, IL

Well ID: APW-06D Date: 6/27/2023
Total Depth (Actual): 152.57 (BTOC) Time: 9:45
Total Depth (Measured): 156.62 (BTOC)
Depth to Water (Measured): 30.77 (BTOC)

Is well screen occluded more than 10%? NO
If Yes, list steps for redevelopment: _____

LNAPL Present: NO
If Yes, measured thickness = _____
DNAPL Present: NO
If Yes, measured thickness = _____

Well Completion Type:

Condition of protector: INTACT YES
Well ID present and readable: YES
Locks intact: YES
Weep hole present: YES
Water present in protector: NO
Are well "markers" (i.e.bumper posts) needed at this location: NO
If yes, are current well "markers" adequate around well: _____
Comments: _____

Well Surface Seal: INTACT

Is surrounding area sloped away from well: YES
Any observed ponding: NO
Is surface run-off flow evident around well: NO

Well Casing Condition: INTACT

Size of well (diameter) = 2 inches
Marking point present: YES
Well cap in place: YES
Comments: _____

General Comments:

Sand surrounding the well and marking points. Had to do well inspection on
6/27 due to wasp nest in well protector.

Well Inspection Worksheet

Grand Tower Energy Center

Grand Tower, IL

Well ID: APW-07 Date: 6/26/2023
Total Depth (Actual): 63.35 (BTOC) Time: 11:00
Total Depth (Measured): 63.19 (BTOC)
Depth to Water (Measured): 27.69 (BTOC)

Is well screen occluded more than 10%? NO
If Yes, list steps for redevelopment: _____

LNAPL Present: NO
If Yes, measured thickness = _____
DNAPL Present: NO
If Yes, measured thickness = _____

Well Completion Type:

Condition of protector: INTACT YES
Well ID present and readable: YES
Locks intact: YES
Weep hole present: YES
Water present in protector: NO
Are well "markers" (i.e.bumper posts) needed at this location: NO
If yes, are current well "markers" adequate around well: _____
Comments: _____

Well Surface Seal: INTACT

Is surrounding area sloped away from well: YES
Any observed ponding: NO
Is surface run-off flow evident around well: NO

Well Casing Condition: INTACT

Size of well (diameter) = 2 inches
Marking point present: YES
Well cap in place: YES
Comments: _____

General Comments:

Well Inspection Worksheet

Grand Tower Energy Center

Grand Tower, IL

Well ID: APW-08 Date: 6/26/2023
Total Depth (Actual): 61.89 (BTOC) Time: 10:55
Total Depth (Measured): 61.85 (BTOC)
Depth to Water (Measured): 28.52 (BTOC)

Is well screen occluded more than 10%? NO
If Yes, list steps for redevelopment: _____

LNAPL Present: NO
If Yes, measured thickness = _____
DNAPL Present: NO
If Yes, measured thickness = _____

Well Completion Type:

Condition of protector: INTACT YES
Well ID present and readable: YES
Locks intact: YES
Weep hole present: YES
Water present in protector: NO
Are well "markers" (i.e.bumper posts) needed at this location: NO
If yes, are current well "markers" adequate around well: _____
Comments: _____

Well Surface Seal: INTACT

Is surrounding area sloped away from well: YES
Any observed ponding: NO
Is surface run-off flow evident around well: NO

Well Casing Condition: INTACT

Size of well (diameter) = 2 inches
Marking point present: YES
Well cap in place: YES
Comments: _____

General Comments:

Well Inspection Worksheet

Grand Tower Energy Center

Grand Tower, IL

Well ID: APW-09 Date: 6/26/2023
Total Depth (Actual): 63.4 (BTOC) Time: 10:30
Total Depth (Measured): 63.14 (BTOC)
Depth to Water (Measured): 32.44 (BTOC)

Is well screen occluded more than 10%? NO
If Yes, list steps for redevelopment: _____

LNAPL Present: NO
If Yes, measured thickness = _____
DNAPL Present: NO
If Yes, measured thickness = _____

Well Completion Type:

Condition of protector: INTACT YES
Well ID present and readable: YES
Locks intact: YES
Weep hole present: YES
Water present in protector: NO
Are well "markers" (i.e.bumper posts) needed at this location: NO
If yes, are current well "markers" adequate around well: _____
Comments: _____

Well Surface Seal: INTACT

Is surrounding area sloped away from well: YES
Any observed ponding: NO
Is surface run-off flow evident around well: NO

Well Casing Condition: INTACT

Size of well (diameter) = 2 inches
Marking point present: YES
Well cap in place: YES
Comments: _____

General Comments:

Well Inspection Worksheet

Grand Tower Energy Center

Grand Tower, IL

Well ID: APW-10S Date: 6/26/2023
Total Depth (Actual): 62.84 (BTOC) Time: 10:42
Total Depth (Measured): 62.75 (BTOC)
Depth to Water (Measured): 26.75 (BTOC)

Is well screen occluded more than 10%? NO
If Yes, list steps for redevelopment: _____

LNAPL Present: NO
If Yes, measured thickness = _____
DNAPL Present: NO
If Yes, measured thickness = _____

Well Completion Type:

Condition of protector: INTACT YES
Well ID present and readable: YES
Locks intact: YES
Weep hole present: YES
Water present in protector: NO
Are well "markers" (i.e.bumper posts) needed at this location: NO
If yes, are current well "markers" adequate around well: _____
Comments: _____

Well Surface Seal: INTACT

Is surrounding area sloped away from well: YES
Any observed ponding: NO
Is surface run-off flow evident around well: NO

Well Casing Condition: INTACT

Size of well (diameter) = 2 inches
Marking point present: YES
Well cap in place: YES
Comments: _____

General Comments:

Well Inspection Worksheet

Grand Tower Energy Center

Grand Tower, IL

Well ID: APW-10D Date: 6/26/2023
Total Depth (Actual): 98.19 (BTOC) Time: 10:40
Total Depth (Measured): 98.07 (BTOC)
Depth to Water (Measured): 24.64 (BTOC)

Is well screen occluded more than 10%? NO
If Yes, list steps for redevelopment: _____

LNAPL Present: NO
If Yes, measured thickness = _____
DNAPL Present: NO
If Yes, measured thickness = _____

Well Completion Type:

Condition of protector: INTACT YES
Well ID present and readable: YES
Locks intact: YES
Weep hole present: YES
Water present in protector: NO
Are well "markers" (i.e.bumper posts) needed at this location: NO
If yes, are current well "markers" adequate around well: _____
Comments: _____

Well Surface Seal: INTACT

Is surrounding area sloped away from well: YES
Any observed ponding: NO
Is surface run-off flow evident around well: NO

Well Casing Condition: INTACT

Size of well (diameter) = 2 inches
Marking point present: YES
Well cap in place: YES
Comments: _____

General Comments:

Well Inspection Worksheet

Grand Tower Energy Center

Grand Tower, IL

Well ID: APW-01R Date: 9/19/2023
Total Depth (Actual): 58.38 ft (BTOC) Time: 9:38
Total Depth (Measured): 58.21 ft (BTOC) Collection Order: 6th
Depth to Water (Measured): 37.41 ft

Is well screen occluded more than 10%? NO
If Yes, list steps for redevelopment: _____

LNAPL Present: NO
If Yes, measured thickness = _____
DNAPL Present: NO
If Yes, measured thickness = _____

Well Completion Type:
Condition of protector: INTACT YES
Well ID present and readable: YES
Locks intact: YES
Weep hole present: YES
Water present in protector: NO
Are well "markers" (i.e.bumper posts) needed at this location: NO
If yes, are current well "markers" adequate around well: _____
Comments: _____

Well Surface Seal: INTACT
Is surrounding area sloped away from well: YES
Any observed ponding: NO
Is surface run-off flow evident around well: NO

Well Casing Condition: INTACT
Size of well (diameter) = 2 inches
Marking point present: YES
Well cap in place: YES
Comments: _____

General Comments:
Hole in the ground around ballards.

Well Inspection Worksheet

Grand Tower Energy Center

Grand Tower, IL

Well ID: APW-02 Date: 9/19/2023
Total Depth (Actual): 58.75 ft (BTOC) Time: 9:12
Total Depth (Measured): 58.40 ft (BTOC) Collection Order: 4th
Depth to Water (Measured): 36.81 ft (BTOC)

Is well screen occluded more than 10%? NO
If Yes, list steps for redevelopment: _____

LNAPL Present: NO
If Yes, measured thickness = _____
DNAPL Present: NO
If Yes, measured thickness = _____

Well Completion Type:
Condition of protector: INTACT YES
Well ID present and readable: YES
Locks intact: YES
Weep hole present: NO
Water present in protector: YES
Are well "markers" (i.e.bumper posts) needed at this location: NO
If yes, are current well "markers" adequate around well: _____
Comments: _____

Well Surface Seal: INTACT
Is surrounding area sloped away from well: YES
Any observed ponding: NO
Is surface run-off flow evident around well: NO

Well Casing Condition: INTACT
Size of well (diameter) = 2 inches
Marking point present: YES
Well cap in place: YES
Comments: _____

General Comments:

Well Inspection Worksheet

Grand Tower Energy Center

Grand Tower, IL

Well ID: APW-03 Date: 9/19/2023
Total Depth (Actual): 59.65 ft (BTOC) Time: 10:37
Total Depth (Measured): 59.42 ft (BTOC) Collection Order: 12th
Depth to Water (Measured): 36.45 ft (BTOC)

Is well screen occluded more than 10%? NO
If Yes, list steps for redevelopment: _____

LNAPL Present: NO
If Yes, measured thickness = _____
DNAPL Present: NO
If Yes, measured thickness = _____

Well Completion Type:
Condition of protector: INTACT YES
Well ID present and readable: YES
Locks intact: YES
Weep hole present: NO
Water present in protector: YES
Are well "markers" (i.e.bumper posts) needed at this location: NO
If yes, are current well "markers" adequate around well: _____
Comments: _____

Well Surface Seal: INTACT
Is surrounding area sloped away from well: YES
Any observed ponding: NO
Is surface run-off flow evident around well: NO

Well Casing Condition: INTACT
Size of well (diameter) = 2 inches
Marking point present: YES
Well cap in place: YES
Comments: _____

General Comments:

Well Inspection Worksheet

Grand Tower Energy Center

Grand Tower, IL

Well ID: APW-04 Date: 9/19/2023
Total Depth (Actual): 60.40 ft (BTOC) Time: 9:51
Total Depth (Measured): 60.25 ft (BTOC) Collection Order: 7th
Depth to Water (Measured): 38.03 ft (BTOC)

Is well screen occluded more than 10%? NO
If Yes, list steps for redevelopment: _____

LNAPL Present: NO
If Yes, measured thickness = _____
DNAPL Present: NO
If Yes, measured thickness = _____

Well Completion Type:
Condition of protector: INTACT YES
Well ID present and readable: YES
Locks intact: YES
Weep hole present: YES
Water present in protector: NO
Are well "markers" (i.e.bumper posts) needed at this location: YES
If yes, are current well "markers" adequate around well: NO
Comments: Only 2 well markers - both in bad condition

Well Surface Seal: INTACT
Is surrounding area sloped away from well: YES
Any observed ponding: NO
Is surface run-off flow evident around well: NO

Well Casing Condition: INTACT
Size of well (diameter) = 2 inches
Marking point present: YES
Well cap in place: YES
Comments: _____

General Comments:

Well Inspection Worksheet

Grand Tower Energy Center

Grand Tower, IL

Well ID: APW-05R Date: 9/19/2023
Total Depth (Actual): 62.98 ft (BTOC) Time: 9:03
Total Depth (Measured): 62.93 ft (BTOC) Collection Order: 3rd
Depth to Water (Measured): 36.11 ft (BTOC)

Is well screen occluded more than 10%? NO
If Yes, list steps for redevelopment: _____

LNAPL Present: NO
If Yes, measured thickness = _____
DNAPL Present: NO
If Yes, measured thickness = _____

Well Completion Type:
Condition of protector: INTACT YES
Well ID present and readable: YES
Locks intact: YES
Weep hole present: YES
Water present in protector: NO
Are well "markers" (i.e.bumper posts) needed at this location: YES
If yes, are current well "markers" adequate around well: NO
Comments: No well markers present

Well Surface Seal: INTACT
Is surrounding area sloped away from well: YES
Any observed ponding: NO
Is surface run-off flow evident around well: NO

Well Casing Condition: INTACT
Size of well (diameter) = 2 inches
Marking point present: YES
Well cap in place: YES
Comments: _____

General Comments:

Well Inspection Worksheet

Grand Tower Energy Center

Grand Tower, IL

Well ID: APW-06D Date: 9/19/2023
Total Depth (Actual): 152.57 ft (BTOC) Time: 8:49
Total Depth (Measured): 154.80 ft (BTOC) Collection Order: 1st
Depth to Water (Measured): 34.97 ft (BTOC)

Is well screen occluded more than 10%? NO

If Yes, list steps for redevelopment: _____

LNAPL Present: NO

If Yes, measured thickness = _____

DNAPL Present: NO

If Yes, measured thickness = _____

Well Completion Type:

Condition of protector: INTACT YES

Well ID present and readable: NO

Locks intact: YES

Weep hole present: NO

Water present in protector: NO

Are well "markers" (i.e.bumper posts) needed at this location: NO

If yes, are current well "markers" adequate around well: _____

Comments: _____

Well Surface Seal: INTACT

Is surrounding area sloped away from well: YES

Any observed ponding: NO

Is surface run-off flow evident around well: NO

Well Casing Condition: INTACT

Size of well (diameter) = 2 inches

Marking point present: YES

Well cap in place: YES

Comments: _____

General Comments:

Sand surrounding the well and bumper posts

Well Inspection Worksheet

Grand Tower Energy Center

Grand Tower, IL

Well ID: APW-06S Date: 9/19/2023
Total Depth (Actual): 63.98 ft (BTOC) Time: 8:53
Total Depth (Measured): 63.80 ft (BTOC) Collection Order: 2nd
Depth to Water (Measured): 35.31 ft (BTOC)

Is well screen occluded more than 10%? NO
If Yes, list steps for redevelopment: _____

LNAPL Present: NO
If Yes, measured thickness = _____
DNAPL Present: NO
If Yes, measured thickness = _____

Well Completion Type:
Condition of protector: INTACT YES
Well ID present and readable: NO
Locks intact: YES
Weep hole present: NO
Water present in protector: NO
Are well "markers" (i.e.bumper posts) needed at this location: NO
If yes, are current well "markers" adequate around well: _____
Comments: _____

Well Surface Seal: INTACT
Is surrounding area sloped away from well: YES
Any observed ponding: NO
Is surface run-off flow evident around well: NO

Well Casing Condition: INTACT
Size of well (diameter) = 2 inches
Marking point present: YES
Well cap in place: YES
Comments: _____

General Comments:
Sand surrounding the well and bumper posts

Well Inspection Worksheet

Grand Tower Energy Center

Grand Tower, IL

Well ID: APW-07 Date: 9/19/2023
Total Depth (Actual): 63.35 ft (BTOC) Time: 10:21
Total Depth (Measured): 63.17 ft (BTOC) Collection Order: 10th
Depth to Water (Measured): 32.09 ft (BTOC)

Is well screen occluded more than 10%? NO
If Yes, list steps for redevelopment: _____

LNAPL Present: NO
If Yes, measured thickness = _____
DNAPL Present: NO
If Yes, measured thickness = _____

Well Completion Type:
Condition of protector: INTACT YES
Well ID present and readable: YES
Locks intact: YES
Weep hole present: YES
Water present in protector: NO
Are well "markers" (i.e.bumper posts) needed at this location: NO
If yes, are current well "markers" adequate around well: _____
Comments: _____

Well Surface Seal: INTACT
Is surrounding area sloped away from well: YES
Any observed ponding: NO
Is surface run-off flow evident around well: NO

Well Casing Condition: INTACT
Size of well (diameter) = 2 inches
Marking point present: YES
Well cap in place: YES
Comments: _____

General Comments:

Well Inspection Worksheet

Grand Tower Energy Center

Grand Tower, IL

Well ID: APW-08 Date: 9/19/2023
Total Depth (Actual): 61.89 ft (BTOC) Time: 10:29
Total Depth (Measured): 61.96 ft (BTOC) Collection Order: 11th
Depth to Water (Measured): 33.09 ft (BTOC)

Is well screen occluded more than 10%? NO
If Yes, list steps for redevelopment: _____

LNAPL Present: NO
If Yes, measured thickness = _____
DNAPL Present: NO
If Yes, measured thickness = _____

Well Completion Type:
Condition of protector: INTACT YES
Well ID present and readable: YES
Locks intact: YES
Weep hole present: YES
Water present in protector: NO
Are well "markers" (i.e.bumper posts) needed at this location: NO
If yes, are current well "markers" adequate around well: _____
Comments: _____

Well Surface Seal: INTACT
Is surrounding area sloped away from well: YES
Any observed ponding: NO
Is surface run-off flow evident around well: NO

Well Casing Condition: INTACT
Size of well (diameter) = 2 inches
Marking point present: YES
Well cap in place: YES
Comments: _____

General Comments:

Well Inspection Worksheet

Grand Tower Energy Center

Grand Tower, IL

Well ID: APW-09 Date: 9/19/2023
Total Depth (Actual): 63.40 ft (BTOC) Time: 9:31
Total Depth (Measured): 63.15 ft (BTOC) Collection Order: 5th
Depth to Water (Measured): 37.00 ft (BTOC)

Is well screen occluded more than 10%? NO
If Yes, list steps for redevelopment: _____

LNAPL Present: NO
If Yes, measured thickness = _____
DNAPL Present: NO
If Yes, measured thickness = _____

Well Completion Type:
Condition of protector: INTACT YES
Well ID present and readable: YES
Locks intact: YES
Weep hole present: YES
Water present in protector: NO
Are well "markers" (i.e.bumper posts) needed at this location: NO
If yes, are current well "markers" adequate around well: _____
Comments: _____

Well Surface Seal: INTACT
Is surrounding area sloped away from well: YES
Any observed ponding: NO
Is surface run-off flow evident around well: NO

Well Casing Condition: INTACT
Size of well (diameter) = 2 inches
Marking point present: YES
Well cap in place: YES
Comments: _____

General Comments:

Well Inspection Worksheet

Grand Tower Energy Center

Grand Tower, IL

Well ID: APW-10D Date: 9/19/2023
Total Depth (Actual): 98.19 ft (BTOC) Time: 10:11
Total Depth (Measured): 98.08 ft (BTOC) Collection Order: 9th
Depth to Water (Measured): 29.45 ft (BTOC)

Is well screen occluded more than 10%? NO
If Yes, list steps for redevelopment: _____

LNAPL Present: NO
If Yes, measured thickness = _____
DNAPL Present: NO
If Yes, measured thickness = _____

Well Completion Type:
Condition of protector: INTACT YES
Well ID present and readable: YES
Locks intact: YES
Weep hole present: YES
Water present in protector: NO
Are well "markers" (i.e.bumper posts) needed at this location: NO
If yes, are current well "markers" adequate around well: _____
Comments: _____

Well Surface Seal: INTACT
Is surrounding area sloped away from well: YES
Any observed ponding: NO
Is surface run-off flow evident around well: NO

Well Casing Condition: INTACT
Size of well (diameter) = 2 inches
Marking point present: YES
Well cap in place: YES
Comments: _____

General Comments:

Well Inspection Worksheet

Grand Tower Energy Center

Grand Tower, IL

Well ID: APW-10S Date: 9/19/2023
Total Depth (Actual): 62.84 ft (BTOC) Time: 10:03
Total Depth (Measured): 62.75 ft (BTOC) Collection Order: 8th
Depth to Water (Measured): 31.18 ft (BTOC)

Is well screen occluded more than 10%? NO
If Yes, list steps for redevelopment: _____

LNAPL Present: NO
If Yes, measured thickness = _____
DNAPL Present: NO
If Yes, measured thickness = _____

Well Completion Type:
Condition of protector: INTACT YES
Well ID present and readable: YES
Locks intact: YES
Weep hole present: YES
Water present in protector: NO
Are well "markers" (i.e.bumper posts) needed at this location: NO
If yes, are current well "markers" adequate around well: _____
Comments: _____

Well Surface Seal: INTACT
Is surrounding area sloped away from well: YES
Any observed ponding: NO
Is surface run-off flow evident around well: NO

Well Casing Condition: INTACT
Size of well (diameter) = 2 inches
Marking point present: YES
Well cap in place: YES
Comments: _____

General Comments:

Well Inspection Worksheet

Grand Tower Energy Center

Grand Tower, IL

Well ID: APW-02 Date: 11/27/2023
Total Depth (Actual): 58.30 (BTOC) Time: 11:44 AM
Total Depth (Measured): 59.05 (BTOC) Collection Order: 4
Depth to Water (Measured): 35.71 (BTOC)

Is well screen occluded more than 10%? No
If Yes, list steps for redevelopment: _____

LNAPL Present: No
If Yes, measured thickness = _____
DNAPL Present: No
If Yes, measured thickness = _____

Well Completion Type:
Condition of protector: INTACT Yes
Well ID present and readable: Yes
Locks intact: Yes
Weep hole present: No
Water present in protector: Yes
Are well "markers" (i.e.bumper posts) needed at this location: No
If yes, are current well "markers" adequate around well: _____
Comments: _____

Well Surface Seal: INTACT
Is surrounding area sloped away from well: Yes
Any observed ponding: No
Is surface run-off flow evident around well: No

Well Casing Condition: INTACT
Size of well (diameter) = 2 inches
Marking point present: Yes
Well cap in place: Yes
Comments: _____

General Comments:

Well Inspection Worksheet

Grand Tower Energy Center

Grand Tower, IL

Well ID: APW-03 Date: 11/27/2023
Total Depth (Actual): 59.90 (BTOC) Time: 1:00 PM
Total Depth (Measured): 60.15 (BTOC) Collection Order: 12
Depth to Water (Measured): 35.80 (BTOC)

Is well screen occluded more than 10%? No
If Yes, list steps for redevelopment: _____

LNAPL Present: No
If Yes, measured thickness = _____
DNAPL Present: No
If Yes, measured thickness = _____

Well Completion Type:
Condition of protector: INTACT Yes
Well ID present and readable: Yes
Locks intact: Yes
Weep hole present: No
Water present in protector: No
Are well "markers" (i.e.bumper posts) needed at this location: No
If yes, are current well "markers" adequate around well: _____
Comments: _____

Well Surface Seal: INTACT
Is surrounding area sloped away from well: Yes
Any observed ponding: No
Is surface run-off flow evident around well: No

Well Casing Condition: INTACT
Size of well (diameter) = 2 inches
Marking point present: Yes
Well cap in place: Yes
Comments: _____

General Comments:

Well Inspection Worksheet

Grand Tower Energy Center

Grand Tower, IL

Well ID: APW-04 Date: 11/27/2023
Total Depth (Actual): 60.27 (BTOC) Time: 12:15 PM
Total Depth (Measured): 60.45 (BTOC) Collection Order: 7
Depth to Water (Measured): 37.25 (BTOC)

Is well screen occluded more than 10%? No
If Yes, list steps for redevelopment: _____

LNAPL Present: No
If Yes, measured thickness = _____
DNAPL Present: No
If Yes, measured thickness = _____

Well Completion Type:

Condition of protector: INTACT Yes
Well ID present and readable: Yes
Locks intact: Yes
Weep hole present: No
Water present in protector: No
Are well "markers" (i.e.bumper posts) needed at this location: No
If yes, are current well "markers" adequate around well: _____
Comments: _____

Well Surface Seal: INTACT

Is surrounding area sloped away from well: No
Any observed ponding: No
Is surface run-off flow evident around well: No

Well Casing Condition: INTACT

Size of well (diameter) = 2 inches
Marking point present: Yes
Well cap in place: Yes
Comments: _____

General Comments:

Well Inspection Worksheet

Grand Tower Energy Center

Grand Tower, IL

Well ID: APW-05R Date: 11/27/2023
Total Depth (Actual): 62.98 (BTOC) Time: 11:40 AM
Total Depth (Measured): 63.70 (BTOC) Collection Order: 3
Depth to Water (Measured): 34.76 (BTOC)

Is well screen occluded more than 10%? No
If Yes, list steps for redevelopment: _____

LNAPL Present: No
If Yes, measured thickness = _____
DNAPL Present: No
If Yes, measured thickness = _____

Well Completion Type:
Condition of protector: INTACT Yes
Well ID present and readable: Yes
Locks intact: Yes
Weep hole present: No
Water present in protector: No
Are well "markers" (i.e.bumper posts) needed at this location: No
If yes, are current well "markers" adequate around well: _____
Comments: _____

Well Surface Seal: INTACT
Is surrounding area sloped away from well: No
Any observed ponding: No
Is surface run-off flow evident around well: No

Well Casing Condition: INTACT
Size of well (diameter) = 2 inches
Marking point present: Yes
Well cap in place: Yes
Comments: _____

General Comments:

Well Inspection Worksheet

Grand Tower Energy Center

Grand Tower, IL

Well ID: APW-06D Date: 11/27/2023
Total Depth (Actual): 155.10 (BTOC) Time: 11:30 AM
Total Depth (Measured): 156.95 (BTOC) Collection Order: 2
Depth to Water (Measured): 33.70 (BTOC)

Is well screen occluded more than 10%? No
If Yes, list steps for redevelopment: _____

LNAPL Present: No
If Yes, measured thickness = _____
DNAPL Present: No
If Yes, measured thickness = _____

Well Completion Type:
Condition of protector: INTACT Yes
Well ID present and readable: Yes
Locks intact: Yes
Weep hole present: No
Water present in protector: No
Are well "markers" (i.e.bumper posts) needed at this location: No
If yes, are current well "markers" adequate around well: _____
Comments: _____

Well Surface Seal: INTACT
Is surrounding area sloped away from well: Yes
Any observed ponding: No
Is surface run-off flow evident around well: No

Well Casing Condition: INTACT
Size of well (diameter) = 2 inches
Marking point present: Yes
Well cap in place: Yes
Comments: _____

General Comments:
Well protector surrounded by sand.

Well Inspection Worksheet

Grand Tower Energy Center

Grand Tower, IL

Well ID: APW-06S Date: 11/27/2023
Total Depth (Actual): 63.88 (BTOC) Time: 11:25 AM
Total Depth (Measured): 64.98 (BTOC) Collection Order: 1
Depth to Water (Measured): 34.01 (BTOC)

Is well screen occluded more than 10%? No
If Yes, list steps for redevelopment: _____

LNAPL Present: No
If Yes, measured thickness = _____
DNAPL Present: No
If Yes, measured thickness = _____

Well Completion Type:
Condition of protector: INTACT Yes
Well ID present and readable: Yes
Locks intact: Yes
Weep hole present: No
Water present in protector: No
Are well "markers" (i.e.bumper posts) needed at this location: No
If yes, are current well "markers" adequate around well: _____
Comments: _____

Well Surface Seal: INTACT
Is surrounding area sloped away from well: Yes
Any observed ponding: No
Is surface run-off flow evident around well: No

Well Casing Condition: INTACT
Size of well (diameter) = 2 inches
Marking point present: Yes
Well cap in place: Yes
Comments: _____

General Comments:
Well protector surrounded by sand.

Well Inspection Worksheet

Grand Tower Energy Center

Grand Tower, IL

Well ID: APW-07 Date: 11/27/2023
Total Depth (Actual): 62.39 (BTOC) Time: 12:45 PM
Total Depth (Measured): 63.84 (BTOC) Collection Order: 10
Depth to Water (Measured): 31.00 (BTOC)

Is well screen occluded more than 10%? No
If Yes, list steps for redevelopment: _____

LNAPL Present: No
If Yes, measured thickness = _____
DNAPL Present: No
If Yes, measured thickness = _____

Well Completion Type:
Condition of protector: INTACT Yes
Well ID present and readable: Yes
Locks intact: Yes
Weep hole present: No
Water present in protector: No
Are well "markers" (i.e.bumper posts) needed at this location: No
If yes, are current well "markers" adequate around well: _____
Comments: _____

Well Surface Seal: INTACT
Is surrounding area sloped away from well: No
Any observed ponding: No
Is surface run-off flow evident around well: No

Well Casing Condition: INTACT
Size of well (diameter) = 2 inches
Marking point present: Yes
Well cap in place: Yes
Comments: _____

General Comments:

Well Inspection Worksheet

Grand Tower Energy Center

Grand Tower, IL

Well ID: APW-08 Date: 11/27/2023
Total Depth (Actual): 62.36 (BTOC) Time: 12:50 PM
Total Depth (Measured): 62.50 (BTOC) Collection Order: 11
Depth to Water (Measured): 32.43 (BTOC)

Is well screen occluded more than 10%? No
If Yes, list steps for redevelopment: _____

LNAPL Present: No
If Yes, measured thickness = _____
DNAPL Present: No
If Yes, measured thickness = _____

Well Completion Type:
Condition of protector: INTACT Yes
Well ID present and readable: Yes
Locks intact: Yes
Weep hole present: No
Water present in protector: No
Are well "markers" (i.e.bumper posts) needed at this location: No
If yes, are current well "markers" adequate around well: _____
Comments: _____

Well Surface Seal: INTACT
Is surrounding area sloped away from well: No
Any observed ponding: No
Is surface run-off flow evident around well: No

Well Casing Condition: INTACT
Size of well (diameter) = 2 inches
Marking point present: Yes
Well cap in place: Yes
Comments: _____

General Comments:

Well Inspection Worksheet

Grand Tower Energy Center

Grand Tower, IL

Well ID: APW-09 Date: 11/27/2023
Total Depth (Actual): 63.18 (BTOC) Time: 12:00 PM
Total Depth (Measured): 63.55 (BTOC) Collection Order: 5
Depth to Water (Measured): 36.81 (BTOC)

Is well screen occluded more than 10%? No
If Yes, list steps for redevelopment: _____

LNAPL Present: No
If Yes, measured thickness = _____
DNAPL Present: No
If Yes, measured thickness = _____

Well Completion Type:
Condition of protector: INTACT Yes
Well ID present and readable: Yes
Locks intact: Yes
Weep hole present: No
Water present in protector: No
Are well "markers" (i.e.bumper posts) needed at this location: No
If yes, are current well "markers" adequate around well: _____
Comments: _____

Well Surface Seal: INTACT
Is surrounding area sloped away from well: No
Any observed ponding: No
Is surface run-off flow evident around well: No

Well Casing Condition: INTACT
Size of well (diameter) = 2 inches
Marking point present: Yes
Well cap in place: Yes
Comments: _____

General Comments:

Well Inspection Worksheet

Grand Tower Energy Center

Grand Tower, IL

Well ID: APW-10D Date: 11/27/2023
Total Depth (Actual): 98.09 (BTOC) Time: 12:35 PM
Total Depth (Measured): 99.25 (BTOC) Collection Order: 8
Depth to Water (Measured): 29.05 (BTOC)

Is well screen occluded more than 10%? No
If Yes, list steps for redevelopment: _____

LNAPL Present: No
If Yes, measured thickness = _____
DNAPL Present: No
If Yes, measured thickness = _____

Well Completion Type:
Condition of protector: INTACT Yes
Well ID present and readable: Yes
Locks intact: Yes
Weep hole present: No
Water present in protector: No
Are well "markers" (i.e.bumper posts) needed at this location: No
If yes, are current well "markers" adequate around well: _____
Comments: _____

Well Surface Seal: INTACT
Is surrounding area sloped away from well: No
Any observed ponding: No
Is surface run-off flow evident around well: No

Well Casing Condition: INTACT
Size of well (diameter) = 2 inches
Marking point present: Yes
Well cap in place: Yes
Comments: _____

General Comments:

Well Inspection Worksheet

Grand Tower Energy Center

Grand Tower, IL

Well ID: APW-10S Date: 11/27/2023
Total Depth (Actual): 62.55 (BTOC) Time: 12:40 PM
Total Depth (Measured): 63.29 (BTOC) Collection Order: 9
Depth to Water (Measured): 30.00 (BTOC)

Is well screen occluded more than 10%? No
If Yes, list steps for redevelopment: _____

LNAPL Present: No
If Yes, measured thickness = _____
DNAPL Present: No
If Yes, measured thickness = _____

Well Completion Type:
Condition of protector: INTACT Yes
Well ID present and readable: Yes
Locks intact: Yes
Weep hole present: No
Water present in protector: No
Are well "markers" (i.e.bumper posts) needed at this location: No
If yes, are current well "markers" adequate around well: _____
Comments: _____

Well Surface Seal: INTACT
Is surrounding area sloped away from well: No
Any observed ponding: No
Is surface run-off flow evident around well: No

Well Casing Condition: INTACT
Size of well (diameter) = 2 inches
Marking point present: Yes
Well cap in place: Yes
Comments: _____

General Comments:



APPENDIX B

IDPH ABANDONMENT INFORMATION FOR
APW-05



WATER WELL SEALING FORM

PDF FILLABLE/SAVABLE

RETURN ALL COPIES TO IDPH OR
LOCAL HEALTH DEPARTMENT

This form shall be submitted to this Department or the local health department not more than 30 days after a water well, boring or monitoring well is sealed. Such wells are to be sealed not more than 30 days after they are abandoned in accordance with the sealing requirements in the Illinois Water Well Construction Code. THE LOCAL HEALTH DEPARTMENT OR REGIONAL PUBLIC HEALTH DEPARTMENT MUST BE NOTIFIED AT LEAST 48 HOURS PRIOR TO SEALING.

1. Ownership (Name of Controlling Party)

2. Well Location: Well Site Address City Zip

Lot # Land I.D.# County Township

Range Section Quarter of the Quarter of the Quarter

GPS: North Degrees Minutes Seconds West Degrees Minutes Seconds

Report decimal minutes to minutes and seconds by multiplying the decimal part of the minutes by 60, e.g. latitude 38 degrees 46.07 minutes N would be latitude 38 degrees 46 minutes 4.2 seconds (0.07 x 60 = 4.2) N. Report GPS coordinates to the nearest 0.1 second.

3. Year Drilled 4. Drilling Permit Number (and date, if known)

5. Type of Well 6. Total Depth (ft.) Diameter (in.)

7. Formation clear of obstruction

8. Details of Plugging (bentonite, neat cement or other materials)

Filled with	Bentonite Chips	From (ft.)	60	to (ft.)	0
Kind of plug		From (ft.)		to (ft.)	
Filled with		From (ft.)		to (ft.)	
Kind of plug		From (ft.)		to (ft.)	
Filled with		From (ft.)		to (ft.)	
Kind of plug		From (ft.)		to (ft.)	

9. CASING RECORD Upper 2 feet of casing removed 10. Date well was sealed

11. Licensed water well driller or other person approved by the Department performing well sealing

Name Complete License Number

Address City State Zip Code

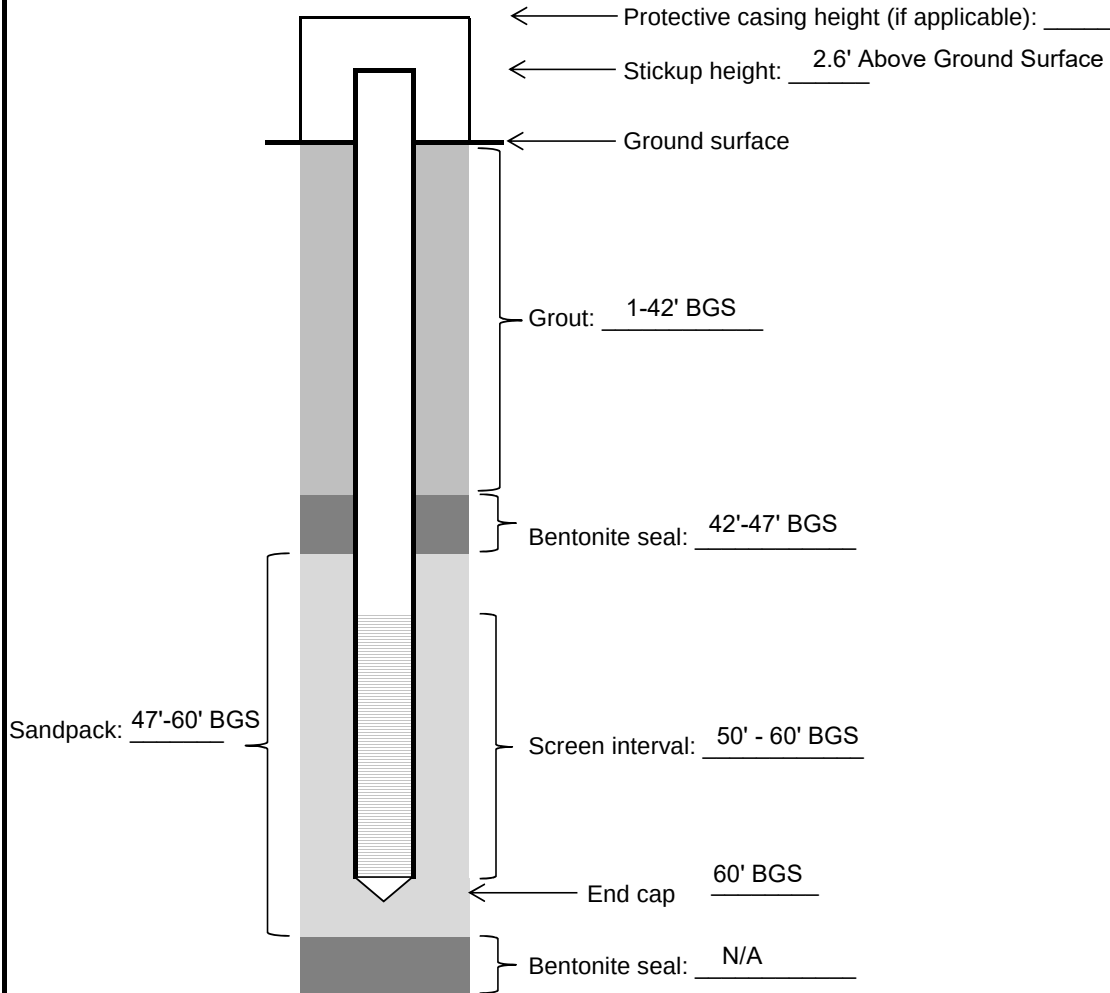
This state agency is requesting disclosure of information that is necessary to accomplish the statutory purpose as outlined under Public Act-0863. Disclosure of this information is mandatory. This form has been approved by the Forms Management Center. IL 482-0631- Revised 5/09

Questions regarding the completion of this form should be directed to the local health department or the Illinois Department of Public Health 217-782-5830, TTY (for hearing impaired only) 800-547-0466.

MONITORING WELL CONSTRUCTION LOG (SINGLE SCREEN)

Location: **APW-05R**

Project Name:	Grand Tower Energy Center	Logged By:	M Abegg
Start Date and Time:	2/6/2023	Contractor:	Bulldog Drilling
End Date and Time:	2/6/2023	Driller:	R. Scharringhausen
Weather:	30 F, Sunny	Drilling Method:	Hollow Stem Auger
Depth to Water:	33.87'	Drill Rig Model:	CME
Boring Depth:	60 ft.	Boring Diameter:	6.25"



RISER & SCREEN

Type: PVC
Schedule: Schedule 40
Diameter: 2"
Screen Slot Size (in): 0.01"
Centralizer Information: N/A

SANDPACK

Type: #11 sand

GROUND SURFACE COMPLETION

Type: Stickup w/ 1' concrete pad
Other info (padlock added, etc): _____

GROUT & BENTONITE

Grout Type: "Quik-Grout"
Hydration Details: 20% Solids
Bentonite Type: "Pel-Plug" 3/8" pellets
Hydration Details: _____

WATER USED DURING DRILLING

Water used in alluvium (gals): NA
Overdrilling (gals): NA
Water used in bedrock (gals): NA
Water recovered (gals): NA

Well Development/Purging Data Sheet

Well/Piezometer Number: APW-05R

☒ Development
☐ Purging

Date: 2/7/2023 Time Start: 1040 Page 1 of 1

Project Name: GTEC Post Closure Monitoring Project Manager/Samplers M. Abegg Project No. 0599247

Client Company: Grand Tower Energy Center Project/Task No. _____

Site Name: GTEC Landfill Site Address _____

Development Criteria

☐ 3 Casing Volumes of Water Removal
☐ Stabilization of Indicator Parameters
☒ Other Visual turbidity and volume

Water Volume Calculation

(2"-.1632 4"-.6524 6"-1.5)

Total Depth of Well (feet) 62.98 (TOC) 60.00 (BGS)
Screen Interval _____ to _____
Initial Depth to Water (feet) 33.87 (TOC)
Height (h) of Water Column in Well (feet) _____
Diameter (inches): Well 2" Gravel Pack _____

Water Quality Instrument

Calibration

☒ YSI Pro Plus
☒ Solinst Water Level Meter
☐ Other: _____

Method of Purge/Development

Pump Bailer
☐ Submersible (s) ☐ Bottom Valve
☐ Peristaltic (p) ☐ Double Check Valve
☒ Whale Pump (w) ☐ Teflon
☐ Other _____ ☐ Disposable

Water Management

☒ Surface Discharge ☐ Containerize

Sample Information:

ID: _____ Date/Time: _____

Analysis: _____

QA/QC Samples: _____

Stabilization Data

Time	Purge Rate		Removal Rate (mL/min)	Intake Depth (feet)	Water Depth (feet)	Water Volume Removed (gallons)		pH	Sp. Cond (µS/cm)	Temp (°C)	DO (mg/L)	ORP (mV)	Turbidity	Comments
	Vol (ml)	Time(sec)	v/t*60			Increment	Cumulative							
1117					34.10		Initial	6.90	1469	15.5	1.12	128.4	NM	Turbid dark brown
1121					34.10		10.0	7.13	915.000	15.6	0.73	33.40	NM	Slightly turbid brown
1130					34.10		20.0	7.21	940.000	15.3	0.75	-20.40	NM	Slightly turbid brown
1137					34.10		30.0	7.25	958.000	15.3	0.47	-50.70	NM	Clear
1145					34.10		40.0	7.26	970.000	15.1	0.52	-66.10	NM	Clear

Comments/Well Condition: Surged well with slug for approximately 15 minutes prior to pumping. Stick up height from ground surface is ~2.6 ft.

Signature (s)  Date 2/7/2023 Reviewer _____ Date _____



APPENDIX C FIELD DATA FORMS



Low Flow Groundwater Sampling Field Data Form

Well ID: APW-01R
Well Permit No:

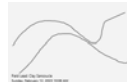
Date: 2023/02/02
Cloudy 40 deg F

Site ID GTEC-GRAND-TOWER	Purge Method / Pump Intake Depth Low Flow / 53.23 (ft)	Reference Elevation 366.82 (ft)
Site Address 1820 Power Plant Road, Grand Tower, US-IL	Purge Equipment NA	Depth to Water / Free Product 35.45 (ft) / None
Project Number 0599247	Sample Equipment NA	Total Well Depth 58.23 (ft)
Project Name 20230130-GWMonitor	Average Purge Rate 428.6 (mL/min)	Well Diameter / Well Screen Interval 2 (in) / 48.3 - 58.3 (ft)
Sampler Clay Sansoucie/ Marshall Arendell	Volume of Water in Well / Total Volume Purged 12.2 (gal) / 3 (gal)	Well Construction PVC

Well Head Vapor Measurements

NA

Time	DTW (ft)	Flow Rate (mL/min)	Purge Volume (gal)	Temperature (C) ±3%	pH ±0.1pH units	Specific Conductivity (uS/cm) ±3%	Total Conductivity (uS/cm) ±3%	Dissolved Oxygen (mg/L) ±10%	ORP (mV) ±10 mV	Turbidity (NTU) ±10%	Total Dissolved Solids(ppm) ±10%	Comments
14:31	35.47	500	0	11.3	6.95	332.9	NM	1.97	107.5	581	NM	Turbid brown, no odor
14:36	35.47	450	0.5	12.9	6.17	396.8	NM	1.24	120.2	444	NM	Turbid brown, no odor
14:41	35.47	450	1	13.1	6.15	445.9	NM	1.33	112.9	403	NM	Turbid brown, no odor
14:46	35.47	400	1.5	13	6.19	471.4	NM	1.13	97.1	196	NM	Sl. turbid brown, no odor
14:51	35.47	400	2	13.3	6.23	482.9	NM	1.08	91.2	93.6	NM	Cloudy, no odor
14:56	35.47	400	2.5	13.4	6.25	498.2	NM	1.08	89	91.7	NM	Cloudy, no odor
15:01	35.47	400	3	13.3	6.29	507.2	NM	1.09	89.9	89.5	NM	Cloudy, no odor

Sample ID(s): APW-01R-WG-20230202	Additional Comments	SAMPLER NAME AND SIGNATURE Clay Sansoucie 	Date Time 02/12/2023 16:06
Analysis: IAC Title 34 Section 845.600 groundwater parameters			



Low Flow Groundwater Sampling Field Data Form

Well ID: APW-02
Well Permit No:

Date: 2023/02/01
Partly cloudy 25 deg F

Site ID GTEC-GRAND-TOWER	Purge Method / Pump Intake Depth Low Flow / 53.55 (ft)	Reference Elevation 364.61 (ft)
Site Address 1820 Power Plant Road, Grand Tower, US-IL	Purge Equipment NA	Depth to Water / Free Product 32.15 (ft) / None
Project Number 0599247	Sample Equipment NA	Total Well Depth 58.55 (ft)
Project Name 20230130-GWMonitor	Average Purge Rate 250 (mL/min)	Well Diameter / Well Screen Interval 2 (in) / 47.2 - 57.2 (ft)
Sampler Clay Sansoucie/ Marshall Arendell	Volume of Water in Well / Total Volume Purged 14.14 (gal) / 2 (gal)	Well Construction PVC

Well Head Vapor Measurements

NA

Time	DTW (ft)	Flow Rate (mL/min)	Purge Volume (gal)	Temperature (C) ±3%	pH ±0.1pH units	Specific Conductivity (uS/cm) ±3%	Total Conductivity (uS/cm) ±3%	Dissolved Oxygen (mg/L) ±10%	ORP (mV) ±10 mV	Turbidity (NTU) ±10%	Total Dissolved Solids(ppm) ±10%	Comments
13:08	33.67	250	0	12.6	7.2	1131	NM	0.54	-79.6	130	NM	Cloudy, rotten egg like odor
13:13	34.93	250	0.25	12.7	7.11	1143	NM	0.16	-98.6	336	NM	Sl. Turbid, rotten egg like odor
13:18	36.47	250	0.5	13.3	7.32	1139	NM	0.14	-104	191	NM	Sl. Turbid, rotten egg like odor
13:23	37.79	250	1	13.6	7.1	1132	NM	0.12	-108	133	NM	Sl. Turbid, rotten egg like odor
13:28	38.84	250	1.25	13.6	7.15	1130	NM	0.11	-110.1	111	NM	Cloudy, rotten egg like odor
13:33	39.76	250	1.5	13.5	7.16	1126	NM	0.1	-110.2	96.9	NM	Cloudy, rotten egg like odor
13:38	40.63	250	1.75	13.6	7.14	1124	NM	0.11	-109.7	94.7	NM	Cloudy, rotten egg like odor
13:43	41.26	250	2	13.6	7.15	1124	NM	0.12	-109.6	93.6	NM	Cloudy, rotten egg like odor

Sample ID(s):

APW-02-WG-20230201,DUP-02-WG-20230201

Analysis: IAC Title 34 Section 845.600 groundwater parameters

Additional Comments

SAMPLER NAME AND SIGNATURE

Date Time

Clay Sansoucie



02/12/2023
16:08



Low Flow Groundwater Sampling Field Data Form

Well ID: APW-03
Well Permit No:

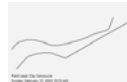
Date: 2023/01/30
Cloudy 23 Deg F

Site ID GTEC-GRAND-TOWER	Purge Method / Pump Intake Depth Low Flow / 54.42 (ft)	Reference Elevation 365.79 (ft)
Site Address 1820 Power Plant Road, Grand Tower, US-IL	Purge Equipment NA	Depth to Water / Free Product 32.95 (ft) / None
Project Number 0599247	Sample Equipment NA	Total Well Depth 59.42 (ft)
Project Name 20230130-GWMonitor	Average Purge Rate 463.5 (mL/min)	Well Diameter / Well Screen Interval 2 (in) / 45.7 - 55.7ft ()
Sampler Clay Sansoucie/ Marshall Arendell	Volume of Water in Well / Total Volume Purged 14.17 (gal) / 5.75 (gal)	Well Construction PVC

Well Head Vapor Measurements

NA

Time	DTW (ft)	Flow Rate (mL/min)	Purge Volume (gal)	Temperature (C) ±3%	pH ±0.1pH units	Specific Conductivity (uS/cm) ±3%	Total Conductivity (uS/cm) ±3%	Dissolved Oxygen (mg/L) ±10%	ORP (mV) ±10 mV	Turbidity (NTU) ±10%	Total Dissolved Solids(ppm) ±10%	Comments
12:15	32.91	575	0	11.8	6.24	798	NM	1.06	87.3	217	NM	Sl. Turbid, no odor
12:20	32.91	200	0.5	10.5	6.67	801	NM	0.98	44.9	300	NM	Sl. Turbid, no odor
12:25	32.92	350	1	12.5	6.99	808	NM	0.5	-16.9	213	NM	Sl. Turbid, no odor
12:30	32.92	400	1.5	12	7.18	813	NM	0.39	-41.4	230	NM	Sl. Turbid, no odor
12:40	32.92	500	1.75	12	7.27	818	NM	0.5	-26.5	176	NM	Sl. Turbid, no odor
12:45	32.92	500	2.25	12.6	7.36	818	NM	0.34	-53.9	288	NM	Sl. Turbid, no odor
12:50	32.92	500	2.75	12.7	7.4	827	NM	0.29	-63.3	204	NM	Sl. Turbid, no odor
12:55	32.92	500	3.25	12.8	7.4	829	NM	0.23	-67	142	NM	Cloudy, no odor
13:00	32.92	500	3.75	12.8	7.4	829	NM	0.2	-69.1	112	NM	Cloudy, no odor
13:05	32.92	500	4.25	12.8	7.4	827	NM	0.18	-69.6	67.4	NM	Clear, no odor
13:10	32.92	500	4.75	12.6	7.4	827	NM	0.15	-69.9	49.5	NM	Clear, no odor
13:15	32.92	500	5.25	12.6	7.4	825	NM	0.14	-69.7	52.1	NM	Clear, no odor
13:20	32.92	500	5.75	12.7	7.39	824	NM	0.14	-69.6	50.7	NM	Clear, no odor

Sample ID(s): APW-03-WG-20230130	Additional Comments Had pump problems at 1233. Had to switch to our backup pump and started pumping again at 1240	SAMPLER NAME AND SIGNATURE Clay Sansoucie	Date Time 02/12/2023 16:10
Analysis: IAC Title 34 Section 845.600 groundwater parameters			



Low Flow Groundwater Sampling Field Data Form

Well ID: APW-04
Well Permit No:

Date: 2023/02/02
Sunny 40 deg F

Site ID GTEC-GRAND-TOWER	Purge Method / Pump Intake Depth Low Flow / 55.35 (ft)	Reference Elevation 367.44 (ft)
Site Address 1820 Power Plant Road, Grand Tower, US-IL	Purge Equipment NA	Depth to Water / Free Product 36.19 (ft) / None
Project Number 0599247	Sample Equipment NA	Total Well Depth 60.35 (ft)
Project Name 20230130-GWMonitor	Average Purge Rate 450 (mL/min)	Well Diameter / Well Screen Interval 2 (in) / 45.7 - 55.7 ft()
Sampler Clay Sansoucie/ Marshall Arendell	Volume of Water in Well / Total Volume Purged 12.94 (gal) / 2.5 (gal)	Well Construction PVC

Well Head Vapor Measurements

NA

Time	DTW (ft)	Flow Rate (mL/min)	Purge Volume (gal)	Temperature (C) ±3%	pH ±0.1pH units	Specific Conductivity (uS/cm) ±3%	Total Conductivity (uS/cm) ±3%	Dissolved Oxygen (mg/L) ±10%	ORP (mV) ±10 mV	Turbidity (NTU) ±10%	Total Dissolved Solids(ppm) ±10%	Comments
13:35	36.19	450	0	10.8	7.46	576.3	NM	4.82	71.8	156	NM	Sl. Turbid brown, no odor
13:40	36.19	450	0.5	13.1	7.15	631.4	NM	0.5	65.1	128	NM	Sl. Turbid brown, no odor
13:45	36.19	450	1	13.2	7.12	636.7	NM	0.22	59.2	62.5	NM	Cloudy, no odor
13:50	36.19	450	1.5	13.3	7.12	635.7	NM	0.25	56.9	38.9	NM	Clear, no odor
13:55	36.19	450	2	13.6	7.12	634.9	NM	0.25	54.6	37.8	NM	Clear, no odor
14:00	36.19	450	2.5	13.4	7.12	634.7	NM	0.24	54.2	37.3	NM	Clear, no odor

Sample ID(s):
APW-04-WG-20230202

Analysis: IAC Title 34 Section 845.600 groundwater parameters

Additional Comments

SAMPLER NAME AND SIGNATURE

Date Time

Clay Sansoucie

02/12/2023
16:11



Low Flow Groundwater Sampling Field Data Form

Well ID: APW-05
Well Permit No:

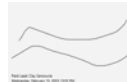
Date: 2023/02/01
Partly cloudy 25 deg F

Site ID GTEC-GRAND-TOWER	Purge Method / Pump Intake Depth Low Flow / 52.5 (ft)	Reference Elevation 363.8 (ft)
Site Address 1820 Power Plant Road, Grand Tower, US-IL	Purge Equipment NA	Depth to Water / Free Product 32.07 (ft) / None
Project Number 0599247	Sample Equipment NA	Total Well Depth 57.5 (ft)
Project Name 20230130-GWMonitor	Average Purge Rate 385.7 (mL/min)	Well Diameter / Well Screen Interval 2 (in) / 50 - 60 (ft)
Sampler Clay Sansoucie/ Marshall Arendell	Volume of Water in Well / Total Volume Purged 13.62 (gal) / 3 (gal)	Well Construction PVC

Well Head Vapor Measurements

NA

Time	DTW (ft)	Flow Rate (mL/min)	Purge Volume (gal)	Temperature (C) ±3%	pH ±0.1pH units	Specific Conductivity (uS/cm) ±3%	Total Conductivity (uS/cm) ±3%	Dissolved Oxygen (mg/L) ±10%	ORP (mV) ±10 mV	Turbidity (NTU) ±10%	Total Dissolved Solids(ppm) ±10%	Comments
11:50	32.13	600	0	12	7.17	932	NM	0.77	8.6	21	NM	Clear, no odor
11:55	32.13	250	0.5	12.5	7.21	941	NM	0.2	-40.4	20.3	NM	Clear, no odor
12:00	32.13	250	1	10.9	7.24	943	NM	0.13	-47.2	10.3	NM	Clear, no odor
12:05	32.13	400	1.5	11.1	7.18	943	NM	0.11	-51.3	12	NM	Clear, no odor
12:10	32.13	400	2	13.1	7.21	943	NM	0.09	-58	8.53	NM	Clear, no odor
12:15	32.13	400	2.5	13.1	7.23	944	NM	0.08	-61.6	8.8	NM	Clear, no odor
12:20	32.13	400	3	13	7.22	942	NM	0.09	-62.7	8.21	NM	Clear, no odor

Sample ID(s): APW-05-WG-20230201,DUP-01-WG-20230201	Additional Comments	SAMPLER NAME AND SIGNATURE Clay Sansoucie	 02/15/2023 19:02
Analysis: IAC Title 34 Section 845.600 groundwater parameters			



Low Flow Groundwater Sampling Field Data Form

Well ID: APW-06D
Well Permit No:

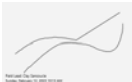
Date: 2023/02/01
Cloudy 25 deg F

Site ID GTEC-GRAND-TOWER	Purge Method / Pump Intake Depth Low Flow / 151.71 (ft)	Reference Elevation 363.69 (ft)
Site Address 1820 Power Plant Road, Grand Tower, US-IL	Purge Equipment NA	Depth to Water / Free Product 31.57 (ft) / None
Project Number 0599247	Sample Equipment NA	Total Well Depth 156.71 (ft)
Project Name 20230130-GWMonitor	Average Purge Rate 352.8 (mL/min)	Well Diameter / Well Screen Interval 2 (in) / 140 - 150 (ft)
Sampler Clay Sansoucie/ Marshall Arendell	Volume of Water in Well / Total Volume Purged 67 (gal) / 8.5 (gal)	Well Construction PVC

Well Head Vapor Measurements

NA

Time	DTW (ft)	Flow Rate (mL/min)	Purge Volume (gal)	Temperature (C) ±3%	pH ±0.1pH units	Specific Conductivity (uS/cm) ±3%	Total Conductivity (uS/cm) ±3%	Dissolved Oxygen (mg/L) ±10%	ORP (mV) ±10 mV	Turbidity (NTU) ±10%	Total Dissolved Solids(ppm) ±10%	Comments
09:27	31.6	300	0	9.7	7.82	790	NM	1.77	-62.3	134	NM	Cloudy, no odor
09:32	31.6	300	0.5	10.7	7.24	813	NM	10.5	-72.3	1000	NM	Turbid black, no odor
09:37	31.6	500	1	9.8	7.18	808	NM	9.58	-69.9	928	NM	Turbid black, no odor
09:42	31.6	350	1.5	11	7.23	807	NM	8.58	-69.2	584	NM	Turbid gray, no odor
09:47	31.6	350	2	12.1	7.21	806	NM	8.1	-69.6	225	NM	Turbid gray, no odor
09:52	31.6	350	2.5	11.4	7.28	808	NM	8.15	-69.8	203	NM	Cloudy, no odor
09:57	31.6	350	3	12.5	7.2	808	NM	7.03	-71.2	163	NM	Cloudy, no odor
10:02	31.6	350	3.5	12.2	7.23	809	NM	6.76	-70.8	155	NM	Cloudy, no odor
10:07	31.6	350	4	11.7	7.33	809	NM	6.47	-70.8	125	NM	Cloudy, no odor
10:12	31.6	350	4.5	12.1	7.24	811	NM	5.97	-71.9	104	NM	Cloudy, no odor
10:17	31.6	350	5	11.5	7.22	810	NM	5.89	-71.9	94.1	NM	Cloudy, no odor
10:22	31.6	350	5.5	11.4	7.22	810	NM	3.3	-73.4	70	NM	Cloudy, no odor
10:27	31.6	350	6	11.9	7.14	810	NM	2.94	-72.6	54.6	NM	Clear, no odor
10:32	31.6	350	6.5	12.1	7.17	806	NM	2.95	-72.6	46.6	NM	Clear, no odor
10:37	31.6	350	7	12.2	7.17	807	NM	2.91	-73.2	37.4	NM	Clear, no odor
10:42	31.6	350	7.5	11.5	7.19	809	NM	2.94	-73.1	27.9	NM	Clear, no odor
10:47	31.6	350	8	12	7.21	808	NM	2.89	-72.9	27.7	NM	Clear, no odor
10:52	31.6	350	8.5	12	7.22	810	NM	2.88	-72.9	26.9	NM	Clear, no odor

Sample ID(s): APW-06D-WG-20230201	Additional Comments	SAMPLER NAME AND SIGNATURE Clay Sansoucie 	Date Time 02/12/2023 16:13
Analysis: IAC Title 34 Section 845.600 groundwater parameters			



Low Flow Groundwater Sampling Field Data Form

Well ID: APW-06S
Well Permit No:

Date: 2023/02/01
Cloudy 25 deg F

Site ID GTEC-GRAND-TOWER	Purge Method / Pump Intake Depth Low Flow / 59.43 (ft)	Reference Elevation 363.51 (ft)										
Site Address 1820 Power Plant Road, Grand Tower, US-IL	Purge Equipment NA	Depth to Water / Free Product 31.15 (ft) / None										
Project Number 0599247	Sample Equipment NA	Total Well Depth 64.43 (ft)										
Project Name 20230130-GWMonitor	Average Purge Rate 472.2 (mL/min)	Well Diameter / Well Screen Interval 2 (in) / 50 - 60 (ft)										
Sampler Clay Sansoucie/ Marshall Arendell	Volume of Water in Well / Total Volume Purged 17.82 (gal) / 4 (gal)	Well Construction PVC										
Well Head Vapor Measurements NA												
Time	DTW (ft)	Flow Rate (mL/min)	Purge Volume (gal)	Temperature (C) ±3%	pH ±0.1pH units	Specific Conductivity (uS/cm) ±3%	Total Conductivity (uS/cm) ±3%	Dissolved Oxygen (mg/L) ±10%	ORP (mV) ±10 mV	Turbidity (NTU) ±10%	Total Dissolved Solids(ppm) ±10%	Comments
08:22	31.2	500	0	7.8	7.7	888	NM	3.35	-96	203	NM	Sl. Turbid, rotten egg like odor
08:27	31.22	500	0.5	12.5	7.27	891	NM	0.52	-109.8	91.3	NM	Cloudy, rotten egg like odor
08:32	31.22	500	1	13.3	7.19	888	NM	0.33	-116.7	44	NM	Clear, rotten egg like odor
08:37	31.22	500	1.5	13.4	7.19	886	NM	0.24	-116.9	21.4	NM	Clear, rotten egg like odor
08:42	31.22	450	2	13	7.17	880	NM	0.22	-116.8	11	NM	Clear, rotten egg like odor
08:47	31.22	450	2.5	13.3	7.17	882	NM	0.14	-117.6	9.12	NM	Clear, no odor
08:52	31.22	450	3	13.3	7.16	879	NM	0.12	-118.3	6.86	NM	Clear, no odor
08:57	31.22	450	3.5	13	7.16	877	NM	0.12	-118.7	6.31	NM	Clear, no odor
09:02	31.22	450	4	13.1	7.15	876	NM	0.12	-118.4	6.67	NM	Clear, no odor

Sample ID(s): APW-06S-WG-20230201	Additional Comments	SAMPLER NAME AND SIGNATURE Clay Sansoucie 	Date Time 02/12/2023 16:14
Analysis: IAC Title 34 Section 845.600 groundwater parameters			



Low Flow Groundwater Sampling Field Data Form

Well ID: APW-07
Well Permit No:

Date: 2023/01/30
Cloudy 25 deg F

Site ID GTEC-GRAND-TOWER	Purge Method / Pump Intake Depth Low Flow / 58.18 (ft)	Reference Elevation 360.61 (ft)
Site Address 1820 Power Plant Road, Grand Tower, US-IL	Purge Equipment NA	Depth to Water / Free Product 28 (ft) / None
Project Number 0599247	Sample Equipment NA	Total Well Depth 63.18 (ft)
Project Name 20230130-GWMonitor	Average Purge Rate 371.4 (mL/min)	Well Diameter / Well Screen Interval 2 (in) / 50 - 60 (ft)
Sampler Clay Sansoucie/ Marshall Arendell	Volume of Water in Well / Total Volume Purged 18.84 (gal) / 3 (gal)	Well Construction PVC

Well Head Vapor Measurements

NA

Time	DTW (ft)	Flow Rate (mL/min)	Purge Volume (gal)	Temperature (C) ±3%	pH ±0.1pH units	Specific Conductivity (uS/cm) ±3%	Total Conductivity (uS/cm) ±3%	Dissolved Oxygen (mg/L) ±10%	ORP (mV) ±10 mV	Turbidity (NTU) ±10%	Total Dissolved Solids(ppm) ±10%	Comments
14:05	28.03	300	0	10.4	6.73	1213	NM	0.76	-37.6	131	NM	Cloudy, no odor
14:10	28.03	300	0.5	8.5	6.73	1227	NM	0.7	-50	160	NM	Cloudy, no odor
14:15	28.03	400	1	11.1	6.73	1220	NM	0.49	-56.5	107	NM	Clear, no odor
14:20	28.03	400	1.5	11.4	6.77	1223	NM	0.32	-62.9	98.1	NM	Clear, no odor
14:25	28.03	400	2	11	6.76	1222	NM	0.33	-65.3	85.3	NM	Clear, no odor
14:30	28.03	400	2.5	11.3	6.77	1221	NM	0.24	-67.5	81.7	NM	Clear, no odor
14:35	28.03	400	3	10.9	6.77	1223	NM	0.2	-68.8	79.2	NM	Clear, no odor

Sample ID(s):
APW-07-WG-20230130

Analysis: IAC Title 34 Section 845.600 groundwater parameters

Additional Comments

SAMPLER NAME AND SIGNATURE

Date Time

Clay Sansoucie

02/15/2023
18:47



Low Flow Groundwater Sampling Field Data Form

Well ID: APW-08
Well Permit No:

Date: 2023/02/02
Cloudy 20 deg F

Site ID GTEC-GRAND-TOWER	Purge Method / Pump Intake Depth Low Flow / 56.75 (ft)	Reference Elevation 362.71 (ft)
Site Address 1820 Power Plant Road, Grand Tower, US-IL	Purge Equipment NA	Depth to Water / Free Product 31.07 (ft) / None
Project Number 0599247	Sample Equipment NA	Total Well Depth 61.75 (ft)
Project Name 20230130-GWMonitor	Average Purge Rate 359.4 (mL/min)	Well Diameter / Well Screen Interval 2 (in) / 50 - 60 (ft)
Sampler Clay Sansoucie/ Marshall Arendell	Volume of Water in Well / Total Volume Purged 16.43 (gal) / 7.5 (gal)	Well Construction PVC

Well Head Vapor Measurements

NA

Time	DTW (ft)	Flow Rate (mL/min)	Purge Volume (gal)	Temperature (C) ±3%	pH ±0.1pH units	Specific Conductivity (uS/cm) ±3%	Total Conductivity (uS/cm) ±3%	Dissolved Oxygen (mg/L) ±10%	ORP (mV) ±10 mV	Turbidity (NTU) ±10%	Total Dissolved Solids(ppm) ±10%	Comments
08:30	31.07	400	0	13.3	7.55	424.5	NM	0.33	-54.6	1000	NM	Very turbid brown, no odor
08:35	31.07	400	0.5	12.6	7.3	436.5	NM	0.18	-46.6	1000	NM	Very turbid brown, no odor
08:40	31.07	400	1	12.4	7.13	433.4	NM	0.19	-35.1	675	NM	Very turbid brown, no odor
08:45	31.07	350	1.5	13	7.14	423.9	NM	0.18	-29.1	382	NM	Turbid lt. brown, no odor
08:50	31.07	350	2	12.7	7.13	422.9	NM	0.22	-24	256	NM	Turbid lt. brown, no odor
08:55	31.07	350	2.5	12.4	7.13	422.1	NM	0.26	-19.6	176	NM	Turbid lt. brown, no odor
09:00	31.07	350	3	12.4	7.13	423.3	NM	0.21	-16.2	103	NM	Cloudy, no odor
09:05	31.07	350	3.5	12.4	7.12	421.4	NM	0.18	-13.4	71.3	NM	Cloudy, no odor
09:10	31.07	350	4	12.2	7.12	420	NM	0.17	-10.8	62.1	NM	Cloudy, no odor
09:15	31.07	350	4.5	12.6	7.13	421.1	NM	0.16	-9.2	49.5	NM	Cloudy, no odor
09:20	31.07	350	5	12.2	7.12	421.5	NM	0.16	-6.6	42.2	NM	Clear, no odor
09:25	31.07	350	5.5	11.9	7.11	420.8	NM	0.16	-3.6	39	NM	Clear, no odor
09:30	31.07	350	6	12.7	7.13	544.5	NM	0.13	-1.3	32.2	NM	Clear, no odor
09:35	31.07	350	6.5	12.7	7.11	543.4	NM	0.14	3.1	28.3	NM	Clear, no odor
09:40	31.07	350	7	12.8	7.11	541.7	NM	0.13	3.4	26.6	NM	Clear, no odor
09:45	31.07	350	7.5	12.8	7.11	542.4	NM	0.13	3.8	26.9	NM	Clear, no odor

Sample ID(s): APW-08-WG-20230202	Additional Comments	SAMPLER NAME AND SIGNATURE Clay Sansoucie	 02/15/2023 18:49
Analysis: IAC Title 34 Section 845.600 groundwater parameters			



Low Flow Groundwater Sampling Field Data Form

Well ID: APW-09
Well Permit No:

Date: 2023/02/01
Cloudy 25 deg F

Site ID GTEC-GRAND-TOWER	Purge Method / Pump Intake Depth Low Flow / 58.18 (ft)	Reference Elevation 366.84 (ft)
Site Address 1820 Power Plant Road, Grand Tower, US-IL	Purge Equipment NA	Depth to Water / Free Product 34.66 (ft) / None
Project Number 0599247	Sample Equipment NA	Total Well Depth 63.18 (ft)
Project Name 20230130-GWMonitor	Average Purge Rate 394.4 (mL/min)	Well Diameter / Well Screen Interval 2 (in) / 50 - 60 (ft)
Sampler Clay Sansoucie/ Marshall Arendell	Volume of Water in Well / Total Volume Purged 15.27 (gal) / 4 (gal)	Well Construction PVC

Well Head Vapor Measurements

NA

Time	DTW (ft)	Flow Rate (mL/min)	Purge Volume (gal)	Temperature (C) ±3%	pH ±0.1pH units	Specific Conductivity (uS/cm) ±3%	Total Conductivity (uS/cm) ±3%	Dissolved Oxygen (mg/L) ±10%	ORP (mV) ±10 mV	Turbidity (NTU) ±10%	Total Dissolved Solids(ppm) ±10%	Comments
15:02	34.67	400	0	10.5	7.41	513	NM	1.24	-20.8	250	NM	Sl. turbid, no odor
15:07	34.67	300	0.5	12.3	7.3	545.6	NM	0.85	18.7	230	NM	Sl. turbid, no odor
15:12	34.67	450	1	13.3	7.29	544.1	NM	0.67	27.6	118	NM	Cloudy, no odor
15:17	34.67	400	1.5	13.2	7.28	545.5	NM	0.58	32.3	64.8	NM	Clear, no odor
15:22	34.67	400	2	13.4	7.28	544.8	NM	0.57	32.4	55.4	NM	Clear, no odor
15:27	34.67	400	2.5	13.2	7.27	545.1	NM	0.55	33.1	33.8	NM	Clear, no odor
15:32	34.67	400	3	13.2	7.28	545.4	NM	0.54	32.4	24.1	NM	Clear, no odor
15:37	34.67	400	3.5	13.5	7.28	545.3	NM	0.52	31.4	22	NM	Clear, no odor
15:42	34.67	400	4	13.4	7.29	545.5	NM	0.51	31.6	23.6	NM	Clear, no odor

Sample ID(s):
APW-09-WG-20230201

Analysis: IAC Title 34 Section 845.600 groundwater parameters

Additional Comments

SAMPLER NAME AND SIGNATURE

Date Time

Clay Sansoucie

02/15/2023
18:51



Low Flow Groundwater Sampling Field Data Form

Well ID: APW-10D
Well Permit No:

Date: 2023/02/02
Sunny 30 deg F

Site ID GTEC-GRAND-TOWER	Purge Method / Pump Intake Depth Low Flow / 93.15 (ft)	Reference Elevation 359.41 (ft)
Site Address 1820 Power Plant Road, Grand Tower, US-IL	Purge Equipment NA	Depth to Water / Free Product 27.31 (ft) / None
Project Number 0599247	Sample Equipment NA	Total Well Depth 98.15 (ft)
Project Name 20230130-GWMonitor	Average Purge Rate 441.7 (mL/min)	Well Diameter / Well Screen Interval 2 (in) / 86 - 96 (ft)
Sampler Clay Sansoucie/ Marshall Arendell	Volume of Water in Well / Total Volume Purged 37.93 (gal) / 5.25 (gal)	Well Construction PVC

Well Head Vapor Measurements

NA

Time	DTW (ft)	Flow Rate (mL/min)	Purge Volume (gal)	Temperature (C) ±3%	pH ±0.1pH units	Specific Conductivity (uS/cm) ±3%	Total Conductivity (uS/cm) ±3%	Dissolved Oxygen (mg/L) ±10%	ORP (mV) ±10 mV	Turbidity (NTU) ±10%	Total Dissolved Solids(ppm) ±10%	Comments
11:31	27.35	450	0	7.7	7.17	818	NM	4.84	-80.2	65.4	NM	Clear, no odor
11:36	27.35	250	0.5	11.9	6.98	695	NM	0.53	-55.4	1000	NM	Turbid gray, no odor
11:41	27.35	400	1	12.5	6.95	695	NM	0.18	-46.5	1000	NM	Turbid gray, no odor
11:46	27.35	200	1.5	12.1	6.96	694	NM	0.16	-38.6	935	NM	Turbid gray, no odor
11:51	27.35	500	1.75	13.5	6.94	692	NM	0.15	-30.9	608	NM	Turbid gray, no odor
11:56	27.35	500	2.25	13.2	6.96	691	NM	0.16	-25.1	389	NM	Turbid gray, no odor
12:01	27.35	500	2.75	13.5	6.95	686	NM	0.1	-20.9	240	NM	Turbid gray, no odor
12:06	27.35	500	3.25	13.5	6.95	688	NM	0.08	-14.7	176	NM	Cloudy, no odor
12:11	27.35	500	3.75	13.5	6.95	689	NM	0.07	-14.5	73.7	NM	Cloudy, no odor
12:16	27.35	500	4.25	13.6	6.95	691	NM	0.06	-11.4	48.9	NM	Clear, no odor
12:21	27.35	500	4.75	13.7	6.95	691	NM	0.06	-10.1	46.8	NM	Clear, no odor
12:26	27.35	500	5.25	13.7	6.95	692	NM	0.05	-10.5	45.3	NM	Clear, no odor

Sample ID(s):
APW-10D-WG-20230202

Analysis: IAC Title 34 Section 845.600 groundwater parameters

Additional Comments

SAMPLER NAME AND SIGNATURE

Date Time

Clay Sansoucie

03/08/2023
18:29



Low Flow Groundwater Sampling Field Data Form

Well ID: APW-10S
Well Permit No:

Date: 2023/02/02
Sunny 25 deg F

Site ID GTEC-GRAND-TOWER	Purge Method / Pump Intake Depth Low Flow / 57.78 (ft)	Reference Elevation 359.47 (ft)
Site Address 1820 Power Plant Road, Grand Tower, US-IL	Purge Equipment NA	Depth to Water / Free Product 27.43 (ft) / None
Project Number 0599247	Sample Equipment NA	Total Well Depth 62.78 (ft)
Project Name 20230130-GWMonitor	Average Purge Rate 411.1 (mL/min)	Well Diameter / Well Screen Interval 2 (in) / 50 - 60 (ft)
Sampler Clay Sansoucie/ Marshall Arendell	Volume of Water in Well / Total Volume Purged 18.93 (gal) / 4 (gal)	Well Construction PVC

Well Head Vapor Measurements

NA

Time	DTW (ft)	Flow Rate (mL/min)	Purge Volume (gal)	Temperature (C) ±3%	pH ±0.1pH units	Specific Conductivity (uS/cm) ±3%	Total Conductivity (uS/cm) ±3%	Dissolved Oxygen (mg/L) ±10%	ORP (mV) ±10 mV	Turbidity (NTU) ±10%	Total Dissolved Solids(ppm) ±10%	Comments
10:22	27.6	450	0	10.9	6.9	1141	NM	1.07	-76.8	64.4	NM	Cloudy, no odor
10:27	27.6	500	0.5	11.5	6.97	1141	NM	0.26	-101.9	1000	NM	Very turbid black, rotten egg like odor
10:32	27.6	350	1	12.9	6.98	1136	NM	0.2	-111.3	1000	NM	Very turbid black, rotten egg like odor
10:37	27.6	400	1.5	12.8	6.98	1076	NM	0.16	-112.9	305	NM	Turbid dark gray, rotten egg like odor
10:42	27.6	400	2	13.8	6.98	1035	NM	0.13	-115.8	186	NM	Cloudy, rotten egg like odor
10:47	27.6	400	2.5	13.9	6.98	1021	NM	0.12	-115.9	105	NM	Cloudy, rotten egg like odor
10:52	27.6	400	3	13.7	6.98	997	NM	0.1	-117	38.2	NM	Clear, rotten egg like odor
10:57	27.6	400	3.5	13.8	6.99	996	NM	0.11	-117.8	35.2	NM	Clear, rotten egg like odor
11:02	27.6	400	4	13.7	6.99	996	NM	0.1	-118.2	37.3	NM	Clear, rotten egg like odor

Sample ID(s):
APW-10S-WG-20230202

Analysis: IAC Title 34 Section 845.600 groundwater parameters

Additional Comments

SAMPLER NAME AND SIGNATURE

Date Time

Clay Sansoucie



02/15/2023
18:53



Low Flow Groundwater Sampling Field Data Form

Well ID: APW-02
Well Permit No:

Date: 2023/06/27
sunny

Site ID GTEC-GRAND-TOWER	Purge Method / Pump Intake Depth Low Flow / 53.43 (ft)	Reference Elevation 364.61 (ft)
Site Address 1820 Power Plant Road, Grand Tower, US-IL	Purge Equipment NA	Depth to Water / Free Product 32.77 (ft) / None
Project Number 0599247	Sample Equipment NA	Total Well Depth 58.43 (ft)
Project Name 20230626-GWMonitor	Average Purge Rate 159.1 (mL/min)	Well Diameter / Well Screen Interval 2 (in) / 47.2 - 57.2(ft)
Sampler Marshall Arendell	Volume of Water in Well / Total Volume Purged 4.19 (gal) / 1.4 (gal)	Well Construction PVC

Well Head Vapor Measurements

PID: NA; FID: NA; CO: NA; CO2: NA; O2: NA; CH4: NA; H2S: NA

Time	DTW (ft)	Flow Rate (mL/min)	Purge Volume (gal)	Temperature (C) ±3%	pH ±0.1pH units	Specific Conductivity (uS/cm) ±3%	Total Conductivity (NA)	Dissolved Oxygen (mg/L) ±10%	ORP (mV) ±10 mV	Turbidity (NTU) ±10%	Total Dissolved Solids(NA)	Comments
11:20	33.96	250	0	24.1	7.04	1050	NM	4.97	279.6	1000	NM	OPAQUE BROWN & NO ODOR
11:25	35.37	150	0.5	24.1	6.77	1050	NM	4.97	279.6	1000	NM	OPAQUE BROWN & NO ODOR
11:30	36.09	150	0.6	22.6	6.74	1030	NM	1.69	255.2	1000	NM	OPAQUE BROWN & NO ODOR
11:35	36.91	150	0.7	21.2	6.68	1015	NM	1.92	245.6	517	NM	OPAQUE BROWN & NO ODOR
11:40	37.34	150	0.8	22.4	6.69	1007	NM	2.29	241.4	275	NM	TURBID BROWN & NO ODOR
11:45	37.68	150	0.9	23.2	6.69	1008	NM	2.23	241.3	219	NM	TURBID BROWN & NO ODOR
11:50	38.01	150	1	23.2	6.69	1009	NM	2.22	241.3	168	NM	TURBID BROWN & NO ODOR
11:55	38.62	150	1.1	22.6	6.69	1011	NM	2.08	239.9	141	NM	TURBID BROWN & NO ODOR
12:00	39	150	1.2	22.8	6.86	1013	NM	1.93	235.1	114	NM	CLOUDY & NO ODOR
12:05	39.41	150	1.3	22.9	6.84	1008	NM	1.9	231	112.6	NM	CLOUDY & NO ODOR
12:10	39.73	150	1.4	23.1	6.82	1012	NM	1.87	229	104.3	NM	CLOUDY & NO ODOR

Sample ID(s): APW-02-WG-20230627,DUP-02-WG-20230627	Additional Comments	SAMPLER NAME AND SIGNATURE	Date Time
Analysis:		Marshall Arendell 	07/05/2023 16:24



Low Flow Groundwater Sampling Field Data Form

Well ID: APW-03
Well Permit No:

Date: 2023/06/26
sunny

Site ID GTEC-GRAND-TOWER	Purge Method / Pump Intake Depth Low Flow / 54.42 (ft)	Reference Elevation 365.79 (ft)
Site Address 1820 Power Plant Road, Grand Tower, US-IL	Purge Equipment NA	Depth to Water / Free Product 32.01 (ft) / None
Project Number 0599247	Sample Equipment NA	Total Well Depth 59.42 (ft)
Project Name 20230626-GWMonitor	Average Purge Rate 233.3 (mL/min)	Well Diameter / Well Screen Interval 2 (in) / 45.7 - 55.7 (ft)
Sampler Marshall Arendell	Volume of Water in Well / Total Volume Purged 4.47 (gal) / 2.75 (gal)	Well Construction PVC

Well Head Vapor Measurements

PID: NA; FID: NA; CO: NA; CO2: NA; O2: NA; CH4: NA; H2S: NA

Time	DTW (ft)	Flow Rate (mL/min)	Purge Volume (gal)	Temperature (C) ±3%	pH ±0.1pH units	Specific Conductivity (uS/cm) ±3%	Total Conductivity (NA)	Dissolved Oxygen (mg/L) ±10%	ORP (mV) ±10 mV	Turbidity (NTU) ±10%	Total Dissolved Solids(NA)	Comments
11:10	32.07	150	0	16.7	8.11	764	NM	1.22	142.4	200	NM	CLOUDY GRAY & NO ODOR
11:15	32.07	200	0.25	17.1	8.16	756	NM	0.54	138.9	174	NM	CLOUDY GRAY & NO ODOR
11:20	32.07	200	0.5	16.8	8.19	757	NM	0.38	129.3	115	NM	TURBID & NO ODOR
11:25	32.07	250	0.75	16.8	8.2	756	NM	0.3	122.2	78.1	NM	TURBID & NO ODOR
11:30	32.07	250	1	16.8	8.31	756	NM	0.25	100.9	46.7	NM	CLEAR & NO ODOR
11:35	32.07	250	1.25	16.8	8.32	753	NM	0.2	85.2	26.5	NM	CLEAR & SLIGHT ROTTEN-EGG LIKE ODOR
11:40	32.07	250	1.5	16.6	8.35	753	NM	0.18	74.4	17.7	NM	CLEAR & NO ODOR
11:45	32.07	250	1.75	16.5	8.37	754	NM	0.17	64.6	10.2	NM	CLEAR & NO ODOR
11:50	32.07	250	2	16.6	8.41	753	NM	0.15	54.2	6.05	NM	CLEAR & NO ODOR
11:55	32.07	250	2.25	16.6	8.42	752	NM	0.13	68.7	6.64	NM	CLEAR & NO ODOR
12:00	32.07	250	2.5	16.5	8.41	753	NM	0.13	73.5	6.22	NM	CLEAR & NO ODOR
12:05	32.07	250	2.75	16.5	8.39	754	NM	0.13	72.3	6.04	NM	CLEAR & NO ODOR

Sample ID(s): APW-03-WG-20230626	Additional Comments	SAMPLER NAME AND SIGNATURE Marshall Arendell 	Date Time 06/30/2023 14:33
Analysis:			



Low Flow Groundwater Sampling Field Data Form

Well ID: APW-04
Well Permit No:

Date: 2023/06/27
sunny

Site ID GTEC-GRAND-TOWER	Purge Method / Pump Intake Depth Low Flow / 55.28 (ft)	Reference Elevation 367.44 (ft)
Site Address 1820 Power Plant Road, Grand Tower, US-IL	Purge Equipment NA	Depth to Water / Free Product 33.76 (ft) / None
Project Number 0599247	Sample Equipment NA	Total Well Depth 60.28 (ft)
Project Name 20230626-GWMonitor	Average Purge Rate 421.4 (mL/min)	Well Diameter / Well Screen Interval 2 (in) / 45.7 - 55.7 (ft)
Sampler Marshall Arendell	Volume of Water in Well / Total Volume Purged 4.33 (gal) / 3 (gal)	Well Construction PVC

Well Head Vapor Measurements

PID: NA; FID: NA; CO: NA; CO2: NA; O2: NA; CH4: NA; H2S: NA

Time	DTW (ft)	Flow Rate (mL/min)	Purge Volume (gal)	Temperature (C) ±3%	pH ±0.1pH units	Specific Conductivity (uS/cm) ±3%	Total Conductivity (NA)	Dissolved Oxygen (mg/L) ±10%	ORP (mV) ±10 mV	Turbidity (NTU) ±10%	Total Dissolved Solids(NA)	Comments
17:00	33.76	350	0	23.8	6.7	415.1	NM	6.66	330.9	351	NM	TURBID BROWN & NO ODOR
17:05	33.76	400	0.5	18.7	6.49	529.5	NM	2.26	296.9	86.6	NM	CLOUDY & NO ODOR
17:10	33.76	400	1	18.4	6.59	545.8	NM	1.05	288.5	52.8	NM	CLEAR & NO ODOR
17:15	33.76	450	1.5	18.3	6.68	548.1	NM	0.9	276.9	47.5	NM	CLEAR & NO ODOR
17:20	33.76	450	2	18.5	7.05	548.9	NM	0.73	289.2	41.5	NM	CLEAR & NO ODOR
17:25	33.76	450	2.5	18.5	7.04	549.8	NM	0.72	276.6	39.2	NM	CLEAR & NO ODOR
17:30	33.76	450	3	18.4	7.04	549.7	NM	0.72	276	38.7	NM	CLEAR & NO ODOR

Sample ID(s): APW-04-WG-20230627	Additional Comments	SAMPLER NAME AND SIGNATURE Marshall Arendell 	Date Time 06/30/2023 14:47
Analysis:			



Low Flow Groundwater Sampling Field Data Form

Well ID: APW-05
Well Permit No:

Date: 2023/06/27
sunny

Site ID GTEC-GRAND-TOWER	Purge Method / Pump Intake Depth Low Flow / 57.89 (ft)	Reference Elevation 363.8 (ft)
Site Address 1820 Power Plant Road, Grand Tower, US-IL	Purge Equipment NA	Depth to Water / Free Product 32.72 (ft) / None
Project Number 0599247	Sample Equipment NA	Total Well Depth 62.89 (ft)
Project Name 20230626-GWMonitor	Average Purge Rate 472.5 (mL/min)	Well Diameter / Well Screen Interval 2 (in) / 50 - 60 (ft)
Sampler Marshall Arendell	Volume of Water in Well / Total Volume Purged 4.92 (gal) / 4.5 (gal)	Well Construction PVC

Well Head Vapor Measurements

PID: NA; FID: NA; CO: NA; CO2: NA; O2: NA; CH4: NA; H2S: NA

Time	DTW (ft)	Flow Rate (mL/min)	Purge Volume (gal)	Temperature (C) ±3%	pH ±0.1pH units	Specific Conductivity (uS/cm) ±3%	Total Conductivity (NA)	Dissolved Oxygen (mg/L) ±10%	ORP (mV) ±10 mV	Turbidity (NTU) ±10%	Total Dissolved Solids(NA)	Comments
13:22	32.74	275	0	18	7.28	868	NM	2.85	188.9	360	NM	TURBID GREY & NO ODOR
13:27	32.74	450	0.5	18.1	7.31	871	NM	1.66	188.8	375	NM	TURBID GREY & ROTTEN-EGG LIKE ODOR
13:32	32.74	500	1	17.9	7.39	866	NM	0.91	182.3	335	NM	TURBID GREY & ROTTEN-EGG LIKE ODOR
13:37	32.74	500	1.5	18	7.48	865	NM	0.53	171.9	200	NM	TURBID GREY & ROTTEN-EGG LIKE ODOR
13:42	32.74	500	2	18	7.16	869	NM	0.34	175.3	131	NM	CLOUDY & NO ODOR
13:47	32.74	500	2.5	17.7	7.12	869	NM	0.29	173.3	92.9	NM	CLOUDY & NO ODOR
13:52	32.74	500	3	17.7	7.14	869	NM	0.2	170	60	NM	CLOUDY & NO ODOR
13:57	32.74	500	3.5	17.6	7.17	869	NM	0.16	169.4	41.1	NM	CLEAR & NO ODOR
14:02	32.74	500	4	17.6	7.17	872	NM	0.13	166.7	39.9	NM	CLEAR & NO ODOR
14:07	32.74	500	4.5	17.7	7.17	871	NM	0.13	166.3	42.6	NM	CLEAR & NO ODOR

Sample ID(s): APW-05-WG-20230627,DUP-01-WG-20230627	Additional Comments	SAMPLER NAME AND SIGNATURE Marshall Arendell 	Date Time 06/30/2023 15:51
Analysis:			



Low Flow Groundwater Sampling Field Data Form

Well ID: APW-06D
Well Permit No:

Date: 2023/06/27
sunny

Site ID GTEC-GRAND-TOWER	Purge Method / Pump Intake Depth Low Flow / 151.62 (ft)	Reference Elevation 363.69 (ft)
Site Address 1820 Power Plant Road, Grand Tower, US-IL	Purge Equipment NA	Depth to Water / Free Product 30.77 (ft) / None
Project Number 0599247	Sample Equipment NA	Total Well Depth 156.62 (ft)
Project Name 20230626-GWMonitor	Average Purge Rate 344.4 (mL/min)	Well Diameter / Well Screen Interval 2 (in) / 140 - 150 (ft)
Sampler Marshall Arendell	Volume of Water in Well / Total Volume Purged 20.54 (gal) / 3.5 (gal)	Well Construction PVC

Well Head Vapor Measurements

PID: NA; FID: NA; CO: NA; CO2: NA; O2: NA; CH4: NA; H2S: NA

Time	DTW (ft)	Flow Rate (mL/min)	Purge Volume (gal)	Temperature (C) ±3%	pH ±0.1pH units	Specific Conductivity (uS/cm) ±3%	Total Conductivity (NA)	Dissolved Oxygen (mg/L) ±10%	ORP (mV) ±10 mV	Turbidity (NTU) ±10%	Total Dissolved Solids(NA)	Comments
09:50	30.82	350	0	17.3	7.47	699	NM	1.97	223.7	168	NM	TURBID GREY & ORGANIC LIKE ODOR
09:55	30.82	300	0.5	18.9	7.5	747	NM	0.67	213.9	1000	NM	OPAQUE DARK GREY & ORGANIC LIKE ODOR
10:00	30.82	350	0.75	18.4	7.76	752	NM	0.27	206.7	551	NM	OPAQUE DARK GREY & ORGANIC LIKE ODOR
10:05	30.82	350	1.25	18.1	7.87	762	NM	0.14	192.2	438	NM	OPAQUE DARK GREY & ORGANIC LIKE ODOR
10:10	30.82	350	1.75	18	8.03	762	NM	0.11	178.8	602	NM	OPAQUE DARK GREY & ORGANIC LIKE ODOR
10:15	30.82	350	2.25	17.8	8.01	765	NM	0.09	175	225	NM	TURBID GREY & ORGANIC LIKE ODOR
10:20	30.82	350	2.75	18.1	7.73	764	NM	0.08	171.9	177	NM	TURBID GREY & ORGANIC LIKE ODOR
10:25	30.82	350	3.25	18.9	7.73	768	NM	0.08	170	165	NM	TURBID GREY & ORGANIC LIKE ODOR
10:30	30.82	350	3.5	18.8	7.71	769	NM	0.08	170.6	181	NM	TURBID GREY & ORGANIC LIKE ODOR

Sample ID(s): APW-06D-WG-20230627	Additional Comments	SAMPLER NAME AND SIGNATURE Marshall Arendell 	Date Time 06/30/2023 17:35
Analysis:			



Low Flow Groundwater Sampling Field Data Form

Well ID: APW-06S
Well Permit No:

Date: 2023/06/27
sunny

Site ID GTEC-GRAND-TOWER	Purge Method / Pump Intake Depth Low Flow / 58.83 (ft)	Reference Elevation 363.51 (ft)
Site Address 1820 Power Plant Road, Grand Tower, US-IL	Purge Equipment NA	Depth to Water / Free Product 31.23 (ft) / None
Project Number 0599247	Sample Equipment NA	Total Well Depth 63.83 (ft)
Project Name 20230626-GWMonitor	Average Purge Rate 279.2 (mL/min)	Well Diameter / Well Screen Interval 2 (in) / 50 - 60 (ft)
Sampler Marshall Arendell	Volume of Water in Well / Total Volume Purged 5.32 (gal) / 3 (gal)	Well Construction PVC

Well Head Vapor Measurements

PID: NA; FID: NA; CO: NA; CO2: NA; O2: NA; CH4: NA; H2S: NA

Time	DTW (ft)	Flow Rate (mL/min)	Purge Volume (gal)	Temperature (C) ±3%	pH ±0.1pH units	Specific Conductivity (uS/cm) ±3%	Total Conductivity (NA)	Dissolved Oxygen (mg/L) ±10%	ORP (mV) ±10 mV	Turbidity (NTU) ±10%	Total Dissolved Solids(NA)	Comments
08:12	31.25	300	0	17.5	6.63	585	NM	6.12	380.2	139	NM	TURBID & NO ODOR
08:17	31.26	300	0.5	16.9	6.61	610	NM	1.45	345	96.8	NM	CLOUDY & NO ODOR
08:22	31.26	300	0.75	17.3	6.64	612	NM	0.84	322	61.8	NM	CLOUDY & NO ODOR
08:27	31.26	275	1	17.5	6.7	610	NM	0.63	306	29.6	NM	CLEAR & NO ODOR
08:32	31.26	250	1.25	17.5	6.73	621	NM	0.47	285.6	25	NM	CLEAR & NO ODOR
08:37	31.26	275	1.5	17.6	6.72	623	NM	0.34	268	20.1	NM	CLEAR & SLIGHT ROTTEN-EGG LIKE ODOR
08:42	31.26	275	1.75	17.7	6.97	622	NM	0.26	255.3	16	NM	CLEAR & SLIGHT ROTTEN-EGG LIKE ODOR
08:47	31.26	275	2	17.9	7.29	619	NM	0.21	242.8	14.1	NM	CLEAR & NO ODOR
08:52	31.26	275	2.25	18	7.49	620	NM	0.17	228	14.3	NM	CLEAR & NO ODOR
08:57	31.26	275	2.5	17.9	7.54	621	NM	0.15	213.2	9.19	NM	CLEAR & NO ODOR
09:02	31.26	275	2.75	18.1	7.61	619	NM	0.13	207.8	9.02	NM	CLEAR & NO ODOR
09:07	31.26	275	3	18.1	7.6	619	NM	0.14	206.3	9.06	NM	CLEAR & NO ODOR

Sample ID(s): APW-06S-WG-20230627	Additional Comments	SAMPLER NAME AND SIGNATURE Marshall Arendell 	Date Time 06/30/2023 16:44
Analysis:			



Low Flow Groundwater Sampling Field Data Form

Well ID: APW-07
Well Permit No:

Date: 2023/06/26
sunny

Site ID GTEC-GRAND-TOWER	Purge Method / Pump Intake Depth Low Flow / 58.19 (ft)	Reference Elevation 360.61 (ft)
Site Address 1820 Power Plant Road, Grand Tower, US-IL	Purge Equipment NA	Depth to Water / Free Product 27.73 (ft) / None
Project Number 0599247	Sample Equipment NA	Total Well Depth 63.19 (ft)
Project Name 20230626-GWMonitor	Average Purge Rate 371.4 (mL/min)	Well Diameter / Well Screen Interval 2 (in) / 50 - 60 (ft)
Sampler Marshall Arendell	Volume of Water in Well / Total Volume Purged 5.79 (gal) / 3.25 (gal)	Well Construction PVC

Well Head Vapor Measurements

PID: NA; FID: NA; CO: NA; CO2: NA; O2: NA; CH4: NA; H2S: NA

Time	DTW (ft)	Flow Rate (mL/min)	Purge Volume (gal)	Temperature (C) ±3%	pH ±0.1pH units	Specific Conductivity (uS/cm) ±3%	Total Conductivity (NA)	Dissolved Oxygen (mg/L) ±10%	ORP (mV) ±10 mV	Turbidity (NTU) ±10%	Total Dissolved Solids(NA)	Comments
14:45	27.82	500	0	19.2	7.77	819	NM	2.72	129	45.9	NM	CLEAR & NO ODOR
14:50	27.82	350	0.75	21.1	7.58	875	NM	0.41	113.5	37.9	NM	CLEAR & NO ODOR
14:55	27.82	350	1.25	20.6	7.88	886	NM	0.21	110	25.9	NM	CLEAR & NO ODOR
15:00	27.82	350	1.75	19.9	7.71	912	NM	0.16	109.8	18	NM	CLEAR & NO ODOR
15:05	27.82	350	2.25	20	7.62	917	NM	0.13	109	15.4	NM	CLEAR & NO ODOR
15:10	27.82	350	2.75	19.6	7.61	921	NM	0.11	107.1	15.2	NM	CLEAR & NO ODOR
15:15	27.82	350	3.25	20.1	7.59	923	NM	0.11	110.3	14.8	NM	CLEAR & NO ODOR

Sample ID(s): APW-07-WG-20230626	Additional Comments	SAMPLER NAME AND SIGNATURE		Date Time
Analysis:		Marshall Arendell		



Low Flow Groundwater Sampling Field Data Form

Well ID: APW-08
Well Permit No:

Date: 2023/06/26
sunny

Site ID GTEC-GRAND-TOWER	Purge Method / Pump Intake Depth Low Flow / 56.85 (ft)	Reference Elevation 362.71 (ft)
Site Address 1820 Power Plant Road, Grand Tower, US-IL	Purge Equipment NA	Depth to Water / Free Product 28.52 (ft) / None
Project Number 0599247	Sample Equipment NA	Total Well Depth 61.85 (ft)
Project Name 20230626-GWMonitor	Average Purge Rate 336.2 (mL/min)	Well Diameter / Well Screen Interval 2 (in) / 50 - 60 (ft)
Sampler Marshall Arendell	Volume of Water in Well / Total Volume Purged 5.44 (gal) / 5.25 (gal)	Well Construction PVC

Well Head Vapor Measurements

PID: NA; FID: NA; CO: NA; CO2: NA; O2: NA; CH4: NA; H2S: NA

Time	DTW (ft)	Flow Rate (mL/min)	Purge Volume (gal)	Temperature (C) ±3%	pH ±0.1pH units	Specific Conductivity (uS/cm) ±3%	Total Conductivity (NA)	Dissolved Oxygen (mg/L) ±10%	ORP (mV) ±10 mV	Turbidity (NTU) ±10%	Total Dissolved Solids(NA)	Comments
13:13	28.54	150	0	27.1	7.59	565	NM	4.9	195.3	1000	NM	OPAQUE GREY & NO ODOR
13:18	28.54	150	0.5	20.7	7.63	567	NM	1.09	200.5	1000	NM	OPAQUE GREY & NO ODOR
13:23	28.54	200	0.75	25.8	7.35	587	NM	0.29	205.6	1000	NM	OPAQUE GREY & NO ODOR
13:28	28.54	420	1.25	22.1	7.45	571	NM	0.13	201.4	1000	NM	OPAQUE GREY & NO ODOR
13:33	28.54	350	1.5	22.3	7.43	579	NM	0.13	209.7	1000	NM	OPAQUE GREY & NO ODOR
13:38	28.54	375	1.75	23.7	7.29	576	NM	0.12	212.3	891	NM	OPAQUE GREY & NO ODOR
13:43	28.54	375	2.25	23.6	7.36	577	NM	0.12	205.6	580	NM	OPAQUE GREY & NO ODOR
13:48	28.54	350	2.75	24	7.45	573	NM	0.13	198.7	366	NM	OPAQUE GREY & NO ODOR
13:53	28.54	400	3.25	571	7.6	23.4	NM	0.19	197.9	249	NM	TURBID & NO ODOR
13:58	28.54	400	3.75	24.2	7.71	574	NM	0.19	180.9	190	NM	TURBID & NO ODOR
14:03	28.54	400	4.25	24	7.7	565	NM	0.2	181.2	159	NM	TURBID & NO ODOR
14:08	28.54	400	4.75	24.3	7.72	568	NM	0.2	182.6	151	NM	TURBID & NO ODOR
14:13	28.54	400	5.25	24.2	7.72	568	NM	0.2	183.2	152	NM	TURBID & NO ODOR

Sample ID(s): APW-08-WG-20230626	Additional Comments	SAMPLER NAME AND SIGNATURE Marshall Arendell 	Date Time 06/30/2023 18:38
Analysis:			



Low Flow Groundwater Sampling Field Data Form

Well ID: APW-09
Well Permit No:

Date: 2023/06/27
sunny

Site ID GTEC-GRAND-TOWER	Purge Method / Pump Intake Depth Low Flow / 58.14 (ft)	Reference Elevation 366.84 (ft)
Site Address 1820 Power Plant Road, Grand Tower, US-IL	Purge Equipment NA	Depth to Water / Free Product 32.66 (ft) / None
Project Number 0599247	Sample Equipment NA	Total Well Depth 63.14 (ft)
Project Name 20230626-GWMonitor	Average Purge Rate 425 (mL/min)	Well Diameter / Well Screen Interval 2 (in) / 50 - 60 (ft)
Sampler Marshall Arendell	Volume of Water in Well / Total Volume Purged 4.97 (gal) / 2.75 (gal)	Well Construction PVC

Well Head Vapor Measurements

PID: NA; FID: NA; CO: NA; CO2: NA; O2: NA; CH4: NA; H2S: NA

Time	DTW (ft)	Flow Rate (mL/min)	Purge Volume (gal)	Temperature (C) ±3%	pH ±0.1pH units	Specific Conductivity (uS/cm) ±3%	Total Conductivity (NA)	Dissolved Oxygen (mg/L) ±10%	ORP (mV) ±10 mV	Turbidity (NTU) ±10%	Total Dissolved Solids(NA)	Comments
14:51	32.67	450	0	19.1	6.9	298	NM	4.79	332.1	114	NM	CLOUDY & NO ODOR
14:56	32.67	450	0.75	18.2	6.9	404.1	NM	1.04	297	69.4	NM	CLOUDY & NO ODOR
15:01	32.67	450	1.25	17.9	6.92	506.6	NM	0.76	285.1	33.4	NM	CLEAR & NO ODOR
15:06	32.67	400	1.75	17.9	6.89	509.6	NM	0.67	277.8	26.4	NM	CLEAR & NO ODOR
15:11	32.67	400	2.25	17.6	6.88	513.1	NM	0.67	277.7	25.9	NM	CLEAR & NO ODOR
15:16	32.67	400	2.75	17.6	6.86	510.8	NM	0.66	277.8	24.7	NM	CLEAR & NO ODOR

Sample ID(s): APW-09-WG-20230627	Additional Comments	SAMPLER NAME AND SIGNATURE		Date Time
Analysis:		Marshall Arendell		



Low Flow Groundwater Sampling Field Data Form

Well ID: APW-10D
Well Permit No:

Date: 2023/06/26
sunny

Site ID GTEC-GRAND-TOWER	Purge Method / Pump Intake Depth Low Flow / 93.07 (ft)	Reference Elevation 359.41 (ft)
Site Address 1820 Power Plant Road, Grand Tower, US-IL	Purge Equipment NA	Depth to Water / Free Product 24.6 (ft) / None
Project Number 0599247	Sample Equipment NA	Total Well Depth 98.07 (ft)
Project Name 20230626-GWMonitor	Average Purge Rate 347.9 (mL/min)	Well Diameter / Well Screen Interval 2 (in) / 86 - 96 (ft)
Sampler Marshall Arendell	Volume of Water in Well / Total Volume Purged 11.99 (gal) / 4.5 (gal)	Well Construction PVC

Well Head Vapor Measurements

PID: NA; FID: NA; CO: NA; CO2: NA; O2: NA; CH4: NA; H2S: NA

Time	DTW (ft)	Flow Rate (mL/min)	Purge Volume (gal)	Temperature (C) ±3%	pH ±0.1pH units	Specific Conductivity (uS/cm) ±3%	Total Conductivity (NA)	Dissolved Oxygen (mg/L) ±10%	ORP (mV) ±10 mV	Turbidity (NTU) ±10%	Total Dissolved Solids(NA)	Comments
17:45	24.65	175	0	19	7.68	553.7	NM	2.67	122.8	117	NM	TURBID & NO ODOR
17:50	24.65	350	0.25	19.6	7.54	631	NM	1.49	131.5	699	NM	OPAQUE BROWN & NO ODOR
17:55	24.65	200	0.5	18.1	7.49	639	NM	0.69	138.4	1000	NM	OPAQUE BROWN & NO ODOR
18:00	24.65	150	0.75	18.8	7.4	643	NM	0.69	141.8	1000	NM	OPAQUE BROWN & NO ODOR
18:05	24.65	275	1	17.7	7.44	643	NM	0.49	145.3	1000	NM	OPAQUE BROWN & NO ODOR
18:10	24.65	375	1.25	17.1	7.47	641	NM	0.34	146.6	816	NM	OPAQUE BROWN & NO ODOR
18:15	24.65	450	2	17.1	7.45	640	NM	0.24	149	492	NM	OPAQUE BROWN & NO ODOR
18:20	24.65	400	2.5	17.1	7.5	637	NM	0.2	148.6	334	NM	OPAQUE BROWN & NO ODOR
18:25	24.65	450	3	17.1	7.49	636	NM	0.16	147.8	250	NM	TURBID & NO ODOR
18:30	24.65	450	3.5	16.9	7.43	635	NM	0.13	151.1	188	NM	TURBID & NO ODOR
18:35	24.65	450	4	16.9	7.43	634	NM	0.13	151.5	180	NM	TURBID & NO ODOR
18:40	24.65	450	4.5	16.9	7.41	634	NM	0.13	152.5	176	NM	TURBID & NO ODOR

Sample ID(s): APW-10D-WG-20230626	Additional Comments	SAMPLER NAME AND SIGNATURE Marshall Arendell 	Date Time 06/30/2023 19:19
Analysis:			



Low Flow Groundwater Sampling Field Data Form

Well ID: APW-10S
Well Permit No:

Date: 2023/06/26
sunny

Site ID GTEC-GRAND-TOWER	Purge Method / Pump Intake Depth Low Flow / 57.75 (ft)	Reference Elevation 359.47 (ft)
Site Address 1820 Power Plant Road, Grand Tower, US-IL	Purge Equipment NA	Depth to Water / Free Product 26.75 (ft) / None
Project Number 0599247	Sample Equipment NA	Total Well Depth 62.75 (ft)
Project Name 20230626-GWMonitor	Average Purge Rate 305 (mL/min)	Well Diameter / Well Screen Interval 2 (in) / 50 - 60 (ft)
Sampler Marshall Arendell	Volume of Water in Well / Total Volume Purged 5.88 (gal) / 3 (gal)	Well Construction PVC

Well Head Vapor Measurements

PID: NA; FID: NA; CO: NA; CO2: NA; O2: NA; CH4: NA; H2S: NA

Time	DTW (ft)	Flow Rate (mL/min)	Purge Volume (gal)	Temperature (C) ±3%	pH ±0.1pH units	Specific Conductivity (uS/cm) ±3%	Total Conductivity (NA)	Dissolved Oxygen (mg/L) ±10%	ORP (mV) ±10 mV	Turbidity (NTU) ±10%	Total Dissolved Solids(NA)	Comments
16:10	26.87	250	0	24.7	7.01	1171	NM	5.01	241	1000	NM	OPAQUE DARK GREY & NO ODOR
16:15	26.88	300	0.25	18.4	6.94	1176	NM	2.55	216.4	1000	NM	OPAQUE DARK GREY & NO ODOR
16:20	26.91	250	0.5	21.7	7.47	1164	NM	1.68	186	1000	NM	OPAQUE DARK GREY & NO ODOR
16:25	26.98	350	1	20.7	7.51	1170	NM	1.12	152.1	422	NM	OPAQUE DARK GREY & ROTTEN-EGG LIKE ODOR
16:30	26.98	300	1.25	20.1	7.56	1173	NM	0.95	131.3	174	NM	TURBID GREY & ROTTEN-EGG LIKE ODOR
16:35	26.98	400	1.75	20	7.56	1173	NM	0.76	118	91.1	NM	TURBID GREY & ROTTEN-EGG LIKE ODOR
16:40	26.98	300	2.25	20.3	7.57	1172	NM	0.87	106.2	316	NM	TURBID GREY & ROTTEN-EGG LIKE ODOR
16:45	26.98	300	2.5	20.5	7.66	1174	NM	0.5	93.3	56.7	NM	CLOUDY & ROTTEN-EGG LIKE ODOR
16:50	26.98	300	2.75	20.9	7.65	1173	NM	0.49	86.5	60.2	NM	CLOUDY & ROTTEN-EGG LIKE ODOR
16:55	26.98	300	3	20.8	7.64	1173	NM	0.48	87.3	57.2	NM	CLOUDY & ROTTEN-EGG LIKE ODOR

Sample ID(s): APW-10S-WG-20230626	Additional Comments	SAMPLER NAME AND SIGNATURE		Date Time 06/30/2023 19:36
Analysis:		Marshall Arendell		



Low Flow Groundwater Sampling Field Data Form

Well ID: APW-01R
Well Permit No:

Date: 2023/06/27
sunny

Site ID GTEC-GRAND-TOWER	Purge Method / Pump Intake Depth Low Flow / 51.22 (ft)	Reference Elevation 366.82 (ft)
Site Address 1820 Power Plant Road, Grand Tower, US-IL	Purge Equipment NA	Depth to Water / Free Product 33.22 (ft) / None
Project Number 0599247	Sample Equipment NA	Total Well Depth 56.22 (ft)
Project Name 20230626-GWMonitor	Average Purge Rate 375 (mL/min)	Well Diameter / Well Screen Interval 2 (in) / 48.3 - 58.3 (ft)
Sampler Marshall Arendell	Volume of Water in Well / Total Volume Purged 3.75 (gal) / 3.75 (gal)	Well Construction PVC

Well Head Vapor Measurements

PID: NA; FID: NA; CO: NA; CO2: NA; O2: NA; CH4: NA; H2S: NA

Time	DTW (ft)	Flow Rate (mL/min)	Purge Volume (gal)	Temperature (C) ±3%	pH ±0.1pH units	Specific Conductivity (uS/cm) ±3%	Total Conductivity (NA)	Dissolved Oxygen (mg/L) ±10%	ORP (mV) ±10 mV	Turbidity (NTU) ±10%	Total Dissolved Solids(NA)	Comments
15:39	33.22	350	0	20	6.27	291.2	NM	5.76	389.4	223	NM	TURBID BROWN & NO ODOR
15:44	33.22	350	0.25	20.2	5.93	329.3	NM	2.47	334.1	732	NM	OPAQUE BROWN & NO ODOR
15:49	33.22	325	0.5	19.9	5.88	310.9	NM	2.08	344.7	562	NM	OPAQUE BROWN & NO ODOR
15:54	33.22	350	0.75	19.6	5.85	359.5	NM	1.9	301.4	446	NM	OPAQUE BROWN & NO ODOR
15:59	33.22	350	1	19.5	5.87	380.2	NM	1.66	294.1	255	NM	TURBID BROWN & NO ODOR
16:04	33.22	300	1.25	19	5.86	390.2	NM	1.53	290.9	195	NM	TURBID BROWN & NO ODOR
16:09	33.22	300	1.75	19.9	5.89	403.2	NM	1.41	288	143	NM	TURBID BROWN & NO ODOR
16:14	33.22	400	2.25	20.4	5.93	410.7	NM	1.41	284.5	99.1	NM	CLOUDY & NO ODOR
16:19	33.22	400	2.75	18.8	5.9	418.6	NM	1.34	281.3	91.2	NM	CLOUDY & NO ODOR
16:24	33.22	400	3.25	18.7	5.89	421.3	NM	1.33	280.2	89.6	NM	CLOUDY & NO ODOR
16:29	33.22	400	3.75	18.9	5.9	424.7	NM	1.33	279.5	83.2	NM	CLOUDY & NO ODOR

Sample ID(s): APW-01R-WG-20230627	Additional Comments	SAMPLER NAME AND SIGNATURE		Date Time
Analysis:		Marshall Arendell		



Low Flow Groundwater Sampling Field Data Form

Well ID: APW-01R
Well Permit No:

Date: 2023/09/20
78 deg F Cloudy

Site ID GTEC-GRAND-TOWER	Purge Method / Pump Intake Depth Low_Flow / 53.21 (ft)	Reference Elevation 366.82 (ft)
Site Address 1820 Power Plant Road, Grand Tower, US-IL	Purge Equipment NA	Depth to Water / Free Product 37.43 (ft) / None
Project Number 0599247	Sample Equipment NA	Total Well Depth 58.21 (ft)
Project Name 20230906-GWMonitor	Average Purge Rate 318.8 (mL/min)	Well Diameter / Well Screen Interval 2 (in) / 48.3 - 58.3 (ft)
Sampler Clay Sansoucie/ Marshall Arendell	Volume of Water in Well / Total Volume Purged 11.13 (gal) / 3 (gal)	Well Construction

Well Head Vapor Measurements

PID: NA; FID: NA; CO: NA; CO2: NA; O2: NA; CH4: NA; H2S: NA

Time	DTW (ft)	Flow Rate (mL/min)	Purge Volume (gal)	Temperature (C) ±3%	pH ±0.1pH units	Specific Conductivity (uS/cm) ±3%	Total Conductivity (uS/cm) ±3%	Dissolved Oxygen (mg/L) ±10%	ORP (mV) ±10 mV	Turbidity (NTU) ±10%	Total Dissolved Solids(ppm) ±10%	Comments
14:30	37.45	350	0	20.3	6.88	339	NM	6.86	142	314	NM	Turbid brown, no odor
14:35	37.45	350	0.5	17.9	6.16	452	NM	2.01	147.7	388	NM	Turbid brown, no odor
14:40	37.45	350	1	17.9	6.26	477	NM	0.89	135	297	NM	Turbid brown, no odor
14:45	37.45	300	1.25	17.9	6.33	489	NM	0.8	127.3	234	NM	Cloudy, no odor
14:50	37.45	300	1.75	17.9	6.34	502	NM	0.76	122.9	164	NM	Cloudy, no odor
14:55	37.45	300	2	17.9	6.36	509	NM	0.76	119.6	138	NM	Cloudy, no odor
15:00	37.45	300	2.5	17.7	6.36	517	NM	0.75	118.2	129	NM	Cloudy, no odor
15:05	37.45	300	3	17.7	6.35	517	NM	0.76	117.4	133	NM	Cloudy, no odor

Sample ID(s): APW-01R-WG-20230920	Additional Comments	SAMPLER NAME AND SIGNATURE		Date Time 09/22/2023 14:45
Analysis:		Clay Sansoucie		



Low Flow Groundwater Sampling Field Data Form

Well ID: APW-02
Well Permit No:

Date: 2023/09/20
75 deg F Cloudy

Site ID GTEC-GRAND-TOWER	Purge Method / Pump Intake Depth Low_Flow / 53.4 (ft)	Reference Elevation 364.61 (ft)
Site Address 1820 Power Plant Road, Grand Tower, US-IL	Purge Equipment NA	Depth to Water / Free Product 34.92 (ft) / None
Project Number 0599247	Sample Equipment NA	Total Well Depth 58.4 (ft)
Project Name 20230906-GWMonitor	Average Purge Rate 193.8 (mL/min)	Well Diameter / Well Screen Interval 2 (in) / 47.2 - 57.2 (ft)
Sampler Clay Sansoucic/ Marshall Arendell	Volume of Water in Well / Total Volume Purged 12.57 (gal) / 1.75 (gal)	Well Construction

Well Head Vapor Measurements

PID: NA; FID: NA; CO: NA; CO2: NA; O2: NA; CH4: NA; H2S: NA

Time	DTW (ft)	Flow Rate (mL/min)	Purge Volume (gal)	Temperature (C) ±3%	pH ±0.1pH units	Specific Conductivity (uS/cm) ±3%	Total Conductivity (uS/cm) ±3%	Dissolved Oxygen (mg/L) ±10%	ORP (mV) ±10 mV	Turbidity (NTU) ±10%	Total Dissolved Solids(ppm) ±10%	Comments
11:52	37	250	0	25.5	7.17	1113	NM	3.6	57.3	123	NM	Clear, no odor
11:57	38.19	100	0.25	20	7.03	1114	NM	1.89	61.6	379	NM	Cloudy, no odor
12:02	38.96	200	0.5	19.2	7.07	1118	NM	1.23	40.9	299	NM	Cloudy, no odor
12:07	39.61	200	0.75	19.7	7.1	1107	NM	1.11	25	173	NM	Cloudy, no odor
12:12	40.45	200	1	19.5	7.1	1108	NM	1.01	15.3	113	NM	Cloudy, no odor
12:17	40.98	200	1.25	20	7.09	1099	NM	0.95	8.4	105	NM	Cloudy, no odor
12:22	41.51	200	1.5	20.3	7.08	1101	NM	0.99	7.4	103.4	NM	Cloudy, no odor
12:27	41.8	200	1.75	20.3	7.08	1100	NM	0.96	7.3	97	NM	Cloudy, no odor

Sample ID(s): APW-02-WG-20230920	Additional Comments	SAMPLER NAME AND SIGNATURE		Date Time 09/22/2023 15:11
Analysis:		Clay Sansoucic 		



Low Flow Groundwater Sampling Field Data Form

Well ID: APW-03
Well Permit No:

Date: 2023/09/19
75 deg F Sunny

Site ID GTEC-GRAND-TOWER	Purge Method / Pump Intake Depth Low Flow / 54.42 (ft)	Reference Elevation 365.79 (ft)
Site Address 1820 Power Plant Road, Grand Tower, US-IL	Purge Equipment NA	Depth to Water / Free Product 36.45 (ft) / None
Project Number 0599247	Sample Equipment NA	Total Well Depth 59.42 (ft)
Project Name 20230906-GWMonitor	Average Purge Rate 350 (mL/min)	Well Diameter / Well Screen Interval 2 (in) / 45.7 - 55.7 (ft)
Sampler Clay Sansoucie/ Marshall Arendell	Volume of Water in Well / Total Volume Purged 12.3 (gal) / 3.25 (gal)	Well Construction

Well Head Vapor Measurements

PID: NA; FID: NA; CO: NA; CO2: NA; O2: NA; CH4: NA; H2S: NA

Time	DTW (ft)	Flow Rate (mL/min)	Purge Volume (gal)	Temperature (C) ±3%	pH ±0.1pH units	Specific Conductivity (uS/cm) ±3%	Total Conductivity (uS/cm) ±3%	Dissolved Oxygen (mg/L) ±10%	ORP (mV) ±10 mV	Turbidity (NTU) ±10%	Total Dissolved Solids(ppm) ±10%	Comments
10:56	36.45	350	0	16.5	6.33	812	NM	4.51	319.3	66.9	NM	Cloudy, Sl. Rotten Egg Like Odor
11:01	36.45	350	0.5	15.5	7.07	827	NM	0.19	255.2	75.9	NM	Cloudy, No odor
11:06	36.45	350	0.75	15.5	7.51	842	NM	0.13	224.5	41.9	NM	Cloudy, No odor
11:11	36.45	350	1.25	15.5	7.74	843	NM	0.1	208.5	16.1	NM	Cloudy, No odor
11:16	36.45	350	1.75	15.4	7.83	845	NM	0.09	197.7	8.38	NM	Clear, No odor
11:21	36.45	350	2.25	15.4	7.85	845	NM	0.09	186.7	4.69	NM	Clear, No odor
11:26	36.45	350	2.75	15.5	7.8	845	NM	0.09	183.9	3.12	NM	Clear, No odor
11:31	36.45	350	3.25	15.5	7.8	846	NM	0.09	181.6	2.72	NM	Clear, No odor

Sample ID(s):
APW-03-WG-20230919

Analysis:

Additional Comments

SAMPLER NAME AND SIGNATURE

Date Time

Clay Sansoucie



09/22/2023
15:28



Low Flow Groundwater Sampling Field Data Form

Well ID: APW-04
Well Permit No:

Date: 2023/09/20
78 deg F Cloudy

Site ID GTEC-GRAND-TOWER	Purge Method / Pump Intake Depth Low_Flow / 55.25 (ft)	Reference Elevation 367.44 (ft)
Site Address 1820 Power Plant Road, Grand Tower, US-IL	Purge Equipment NA	Depth to Water / Free Product 38.07 (ft) / None
Project Number 0599247	Sample Equipment NA	Total Well Depth 60.25 (ft)
Project Name 20230906-GWMonitor	Average Purge Rate 378.1 (mL/min)	Well Diameter / Well Screen Interval 2 (in) / 45.7 - 55.7 (ft)
Sampler Clay Sansoucie/ Marshall Arendell	Volume of Water in Well / Total Volume Purged 11.88 (gal) / 3.5 (gal)	Well Construction

Well Head Vapor Measurements

PID: NA; FID: NA; CO: NA; CO2: NA; O2: NA; CH4: NA; H2S: NA

Time	DTW (ft)	Flow Rate (mL/min)	Purge Volume (gal)	Temperature (C) ±3%	pH ±0.1pH units	Specific Conductivity (uS/cm) ±3%	Total Conductivity (uS/cm) ±3%	Dissolved Oxygen (mg/L) ±10%	ORP (mV) ±10 mV	Turbidity (NTU) ±10%	Total Dissolved Solids(ppm) ±10%	Comments
15:30	38.07	400	0	18	7.05	512	NM	4.23	149.7	363	NM	Turbid brown, no odor
15:35	38.07	375	0.5	17	7.02	612	NM	0.43	137	147	NM	Cloudy, no odor
15:40	38.07	250	1	17.5	7.11	630	NM	0.26	122.7	50.6	NM	Cloudy, no odor
15:45	38.07	400	1.5	16.9	7.1	649	NM	0.14	116.5	25.3	NM	Clear, No odor
15:50	38.07	400	2	16.8	7.13	657	NM	0.11	110.6	33.6	NM	Clear, No odor
15:55	38.07	400	2.5	16.8	7.12	658	NM	0.08	106.4	23.8	NM	Clear, No odor
16:00	38.07	400	3	16.8	7.13	659	NM	0.08	104.1	22.7	NM	Clear, No odor
16:05	38.07	400	3.5	16.8	7.13	659	NM	0.08	101	21.6	NM	Clear, No odor

Sample ID(s): APW-04-WG-20230920	Additional Comments	SAMPLER NAME AND SIGNATURE		Date Time 09/22/2023 16:13
Analysis:		Clay Sansoucie 		



Low Flow Groundwater Sampling Field Data Form

Well ID: APW-05R
Well Permit No:

Date: 2023/09/20
68 deg F Cloudy

Site ID GTEC-GRAND-TOWER	Purge Method / Pump Intake Depth Low Flow / 57.93 (ft)	Reference Elevation 363.8 (ft)
Site Address 1820 Power Plant Road, Grand Tower, US-IL	Purge Equipment NA	Depth to Water / Free Product 36.19 (ft) / None
Project Number 0599247	Sample Equipment NA	Total Well Depth 62.93 (ft)
Project Name 20230906-GWMonitor	Average Purge Rate 400 (mL/min)	Well Diameter / Well Screen Interval 2 (in) / 50 - 60 (ft)
Sampler Clay Sansoucie/ Marshall Arendell	Volume of Water in Well / Total Volume Purged 14.32 (gal) / 5.5 (gal)	Well Construction

Well Head Vapor Measurements

PID: NA; FID: NA; CO: NA; CO2: NA; O2: NA; CH4: NA; H2S: NA

Time	DTW (ft)	Flow Rate (mL/min)	Purge Volume (gal)	Temperature (C) ±3%	pH ±0.1pH units	Specific Conductivity (uS/cm) ±3%	Total Conductivity (uS/cm) ±3%	Dissolved Oxygen (mg/L) ±10%	ORP (mV) ±10 mV	Turbidity (NTU) ±10%	Total Dissolved Solids(ppm) ±10%	Comments
10:26	36.2	400	0	18	7.37	946	NM	4.16	66.6	861	NM	Turbid grey, No odor
10:31	36.2	400	0.5	17	7.29	954	NM	2.56	61.8	875	NM	Turbid grey, No odor
10:36	36.2	400	1	17.2	7.36	951	NM	1.28	45.3	858	NM	Turbid grey, No odor
10:41	36.2	400	1.5	17	7.35	951	NM	0.87	32.4	466	NM	Turbid grey, No odor
10:46	36.2	400	2	17	6.9	955	NM	0.7	17.6	225	NM	Cloudy Grey, Organic like odor
10:51	36.2	400	2.5	17.1	7.37	958	NM	0.63	8.6	138	NM	Cloudy Grey, Organic like odor
10:56	36.2	400	3	17.1	7.36	959	NM	0.54	-0.3	89.3	NM	Cloudy Grey, Organic like odor
11:01	36.2	400	3.5	17.2	7.37	960	NM	0.45	-8.1	57.5	NM	Clear, Organic like odor
11:06	36.2	400	4	17.3	7.36	961	NM	0.37	-14.9	46	NM	Clear, Organic like odor
11:11	36.2	400	4.5	17.4	7.37	961	NM	0.3	-20.4	35.9	NM	Clear, Organic like odor
11:16	36.2	400	5	17.4	7.37	962	NM	0.29	-21.5	34.2	NM	Clear, Organic like odor
11:21	36.2	400	5.5	17.4	7.36	962	NM	0.29	-20.9	33.7	NM	Clear, Organic like odor

Sample ID(s): APW-05R-WG-20230920,DUP-01-WG-20230920	Additional Comments	SAMPLER NAME AND SIGNATURE Clay Sansoucie 	Date Time 09/22/2023 17:34
Analysis:			



Low Flow Groundwater Sampling Field Data Form

Well ID: APW-06D
Well Permit No:

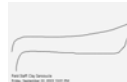
Date: 2023/09/20
60 deg F Cloudy

Site ID GTEC-GRAND-TOWER	Purge Method / Pump Intake Depth Low Flow / 149.8 (ft)	Reference Elevation 363.69 (ft)
Site Address 1820 Power Plant Road, Grand Tower, US-IL	Purge Equipment NA	Depth to Water / Free Product 35.03 (ft) / None
Project Number 0599247	Sample Equipment NA	Total Well Depth 154.8 (ft)
Project Name 20230906-GWMonitor	Average Purge Rate 454.5 (mL/min)	Well Diameter / Well Screen Interval 2 (in) / 140 - 150 (ft)
Sampler Clay Sansoucie/ Marshall Arendell	Volume of Water in Well / Total Volume Purged 64.13 (gal) / 5 (gal)	Well Construction

Well Head Vapor Measurements

PID: NA; FID: NA; CO: NA; CO2: NA; O2: NA; CH4: NA; H2S: NA

Time	DTW (ft)	Flow Rate (mL/min)	Purge Volume (gal)	Temperature (C) ±3%	pH ±0.1pH units	Specific Conductivity (uS/cm) ±3%	Total Conductivity (uS/cm) ±3%	Dissolved Oxygen (mg/L) ±10%	ORP (mV) ±10 mV	Turbidity (NTU) ±10%	Total Dissolved Solids(ppm) ±10%	Comments
09:10	35.03	500	0	18	7.42	772	NM	4.57	47.3	7.01	NM	Clear, Organic Like Odor
09:15	35.03	450	0.5	16.1	7.24	793	NM	1.52	36.9	611	NM	Turbid grey, Organic Like Odor
09:20	35.03	450	1	16	7.28	800	NM	0.62	28.8	311	NM	Turbid grey, Organic Like Odor
09:25	35.03	450	1.5	16	7.31	804	NM	0.49	22.3	202	NM	Turbid grey, Organic Like Odor
09:30	35.03	450	2	15.9	7.3	805	NM	0.4	17.8	164	NM	Cloudy, Organic Like Odor
09:35	35.03	450	2.5	15.9	7.3	805	NM	0.33	13.4	120	NM	Cloudy, Organic Like Odor
09:40	35.03	450	3	15.9	7.3	804	NM	0.29	8.8	80.3	NM	Cloudy, Organic Like Odor
09:45	35.03	450	3.5	15.9	7.3	803	NM	0.26	4.3	57.8	NM	Clear, Sl. Organic Like Odor
09:50	35.03	450	4	16	7.3	802	NM	0.23	4.1	69.44	NM	Clear, Sl. Organic Like Odor
09:55	35.03	450	4.5	16	7.29	802	NM	0.23	3.9	67.1	NM	Clear, Sl. Organic Like Odor
10:00	35.03	450	5	16	7.3	802	NM	0.23	4.3	65.5	NM	Clear, Sl. Organic Like Odor

Sample ID(s): APW-06D-WG-20230920	Additional Comments	SAMPLER NAME AND SIGNATURE Clay Sansoucie 	Date Time 09/22/2023 18:01
Analysis:			



Low Flow Groundwater Sampling Field Data Form

Well ID: APW-07
Well Permit No:

Date: 2023/09/19
75 deg F Sunny

Site ID GTEC-GRAND-TOWER	Purge Method / Pump Intake Depth Low Flow / 58.17 (ft)	Reference Elevation 360.61 (ft)
Site Address 1820 Power Plant Road, Grand Tower, US-IL	Purge Equipment NA	Depth to Water / Free Product 32.12 (ft) / None
Project Number 0599247	Sample Equipment NA	Total Well Depth 63.17 (ft)
Project Name 20230906-GWMonitor	Average Purge Rate 403.6 (mL/min)	Well Diameter / Well Screen Interval 2 (in) / 50 - 60 (ft)
Sampler Clay Sansoucie/ Marshall Arendell	Volume of Water in Well / Total Volume Purged 16.63 (gal) / 3 (gal)	Well Construction

Well Head Vapor Measurements

PID: NA; FID: NA; CO: NA; CO2: NA; O2: NA; CH4: NA; H2S: NA

Time	DTW (ft)	Flow Rate (mL/min)	Purge Volume (gal)	Temperature (C) ±3%	pH ±0.1pH units	Specific Conductivity (uS/cm) ±3%	Total Conductivity (uS/cm) ±3%	Dissolved Oxygen (mg/L) ±10%	ORP (mV) ±10 mV	Turbidity (NTU) ±10%	Total Dissolved Solids(ppm) ±10%	Comments
13:16	32.12	425	0	20.1	6.93	1029	NM	5.49	206.7	61.8	NM	Cloudy, no odor
13:21	32.12	400	0.5	17.9	6.7	1155	NM	0.38	170.8	109	NM	Cloudy, no odor
13:26	32.12	400	1	17.8	6.74	1158	NM	0.27	139.9	76	NM	Cloudy, no odor
13:31	32.12	400	1.5	17.4	6.77	1165	NM	0.18	115.4	68.8	NM	Cloudy, no odor
13:36	32.12	400	2	17.3	6.78	1167	NM	0.13	98	45.2	NM	Clear, no odor
13:41	32.12	400	2.5	17.3	6.78	1167	NM	0.13	89.3	43.3	NM	Clear, no odor
13:46	32.12	400	3	17.3	6.78	1166	NM	0.13	91.5	42.9	NM	Clear, no odor

Sample ID(s): APW-07-WG-20230919	Additional Comments	SAMPLER NAME AND SIGNATURE		Date Time 09/22/2023 18:38
Analysis:		Clay Sansoucie		



Low Flow Groundwater Sampling Field Data Form

Well ID: APW-08
Well Permit No:

Date: 2023/09/19
75 deg F Sunny

Site ID GTEC-GRAND-TOWER	Purge Method / Pump Intake Depth Low Flow / 56.96 (ft)	Reference Elevation 362.71 (ft)
Site Address 1820 Power Plant Road, Grand Tower, US-IL	Purge Equipment NA	Depth to Water / Free Product 33.08 (ft) / None
Project Number 0599247	Sample Equipment NA	Total Well Depth 61.96 (ft)
Project Name 20230906-GWMonitor	Average Purge Rate 339.6 (mL/min)	Well Diameter / Well Screen Interval 2 (in) / 50 - 60 (ft)
Sampler Clay Sansoucie/ Marshall Arendell	Volume of Water in Well / Total Volume Purged 15.46 (gal) / 5.25 (gal)	Well Construction

Well Head Vapor Measurements

PID: NA; FID: NA; CO: NA; CO2: NA; O2: NA; CH4: NA; H2S: NA

Time	DTW (ft)	Flow Rate (mL/min)	Purge Volume (gal)	Temperature (C) ±3%	pH ±0.1pH units	Specific Conductivity (uS/cm) ±3%	Total Conductivity (uS/cm) ±3%	Dissolved Oxygen (mg/L) ±10%	ORP (mV) ±10 mV	Turbidity (NTU) ±10%	Total Dissolved Solids(ppm) ±10%	Comments
11:58	33.08	300	0	22.2	6.03	327	NM	4.52	190.4	1000	NM	Turbid Dark Grey, No odor
12:03	33.08	275	0.5	21.7	5.59	344.6	NM	1.6	185.6	1000	NM	Turbid Dark Grey, No odor
12:08	33.08	350	1	20.3	5.32	359.5	NM	2.57	179.4	1000	NM	Turbid Dark Grey, No odor
12:13	33.08	350	1.5	20.6	4.99	355.7	NM	1.99	172.6	638	NM	Turbid Dark Grey, No odor
12:18	33.08	350	1.75	21.2	4.74	354.9	NM	2.67	165.8	451	NM	Turbid Dark Grey, No odor
12:23	33.08	350	2.25	21.5	4.56	348	NM	2.87	155.6	313	NM	Turbid Dark Grey, No odor
12:28	33.08	350	2.75	21.5	4.5	345.4	NM	3.05	144.7	234	NM	Opaque Grey, No odor
12:33	33.08	350	3.25	21.3	4.48	342.1	NM	3.22	135.6	171	NM	Opaque Grey, No odor
12:38	33.08	350	3.75	22	4.47	267.8	NM	3.55	126.6	129	NM	Opaque Grey, No odor
12:43	33.08	350	4.25	19.6	6.89	660	NM	0.16	146.1	137	NM	Opaque Grey, No odor
12:48	33.08	350	4.75	19.6	6.89	656	NM	0.16	140.2	135	NM	Opaque Grey, No odor
12:53	33.08	350	5.25	19.5	6.91	653	NM	0.16	137.5	141	NM	Cloudy, No odor

Sample ID(s): APW-08-WG-20230919	Additional Comments	SAMPLER NAME AND SIGNATURE Clay Sansoucie 	Date Time 09/22/2023 19:02
Analysis:			



Low Flow Groundwater Sampling Field Data Form

Well ID: APW-09
Well Permit No:

Date: 2023/09/20
75 deg F Cloudy

Site ID GTEC-GRAND-TOWER	Purge Method / Pump Intake Depth Low Flow / 58.15 (ft)	Reference Elevation 366.84 (ft)
Site Address 1820 Power Plant Road, Grand Tower, US-IL	Purge Equipment NA	Depth to Water / Free Product 37.04 (ft) / None
Project Number 0599247	Sample Equipment NA	Total Well Depth 63.15 (ft)
Project Name 20230906-GWMonitor	Average Purge Rate 500 (mL/min)	Well Diameter / Well Screen Interval 2 (in) / 50 - 60 (ft)
Sampler Clay Sansoucie/ Marshall Arendell	Volume of Water in Well / Total Volume Purged 13.98 (gal) / 3.5 (gal)	Well Construction

Well Head Vapor Measurements

PID: NA; FID: NA; CO: NA; CO2: NA; O2: NA; CH4: NA; H2S: NA

Time	DTW (ft)	Flow Rate (mL/min)	Purge Volume (gal)	Temperature (C) ±3%	pH ±0.1pH units	Specific Conductivity (uS/cm) ±3%	Total Conductivity (uS/cm) ±3%	Dissolved Oxygen (mg/L) ±10%	ORP (mV) ±10 mV	Turbidity (NTU) ±10%	Total Dissolved Solids(ppm) ±10%	Comments
13:19	37.04	500	0	18.1	7.23	553	NM	4.76	101.3	207	NM	Turbid Lt Brown, No odor
13:24	37.04	500	0.5	16.5	7.3	551	NM	3.18	94.1	108	NM	Cloudy, No odor
13:29	37.04	500	1	16.4	7.36	556	NM	1.79	88.5	39.3	NM	Clear, No odor
13:34	37.04	500	1.5	16.2	7.36	558	NM	0.78	83.2	18	NM	Clear, No odor
13:39	37.04	500	2	16.3	7.4	559	NM	0.52	78.6	13.3	NM	Clear, No odor
13:44	37.04	500	2.5	16.3	7.38	559	NM	0.46	76.1	6.94	NM	Clear, No odor
13:49	37.04	500	3	16.3	7.38	559	NM	0.45	74.7	5.81	NM	Clear, No odor
13:54	37.04	500	3.5	16.3	7.38	558	NM	0.45	73.3	5.64	NM	Clear, No odor

Sample ID(s): APW-09-WG-20230920,DUP-02-WG-20230920	Additional Comments	SAMPLER NAME AND SIGNATURE		Date Time
Analysis:		Clay Sansoucie		



Low Flow Groundwater Sampling Field Data Form

Well ID: APW-10D
Well Permit No:

Date: 2023/09/19
78 deg F Sunny

Site ID GTEC-GRAND-TOWER	Purge Method / Pump Intake Depth Low_Flow / 93.08 (ft)	Reference Elevation 359.41 (ft)
Site Address 1820 Power Plant Road, Grand Tower, US-IL	Purge Equipment NA	Depth to Water / Free Product 29.5 (ft) / None
Project Number 0599247	Sample Equipment NA	Total Well Depth 98.08 (ft)
Project Name 20230906-GWMonitor	Average Purge Rate 395 (mL/min)	Well Diameter / Well Screen Interval 2 (in) / 86 - 96 (ft)
Sampler Clay Sansoucie/ Marshall Arendell	Volume of Water in Well / Total Volume Purged 36.72 (gal) / 4.5 (gal)	Well Construction

Well Head Vapor Measurements

PID: NA; FID: NA; CO: NA; CO2: NA; O2: NA; CH4: NA; H2S: NA

Time	DTW (ft)	Flow Rate (mL/min)	Purge Volume (gal)	Temperature (C) ±3%	pH ±0.1pH units	Specific Conductivity (uS/cm) ±3%	Total Conductivity (uS/cm) ±3%	Dissolved Oxygen (mg/L) ±10%	ORP (mV) ±10 mV	Turbidity (NTU) ±10%	Total Dissolved Solids(ppm) ±10%	Comments
15:09	29.5	200	0	19.2	7.37	695	NM	2.86	41	42.8	NM	Clear, no odor
15:14	29.5	350	0.5	17.3	6.96	691	NM	0.96	57.8	1000	NM	Turbid Grey, No odor
15:19	29.5	250	1	17.5	7	689	NM	0.89	58.2	1000	NM	Turbid Grey, No odor
15:24	29.5	450	1.5	16.6	7	688	NM	0.65	59.8	721	NM	Turbid Grey, No odor
15:29	29.5	450	2	16.4	7.01	687	NM	0.49	59.1	389	NM	Turbid Grey, No odor
15:34	29.5	450	2.5	16.3	7	686	NM	0.36	58.2	277	NM	Turbid Grey, No odor
15:39	29.5	450	3	16.5	7.01	686	NM	0.3	57.3	199	NM	Turbid Grey, No odor
15:44	29.5	450	3.5	16.6	7.01	686	NM	0.24	56.1	171	NM	Cloudy, No odor
15:49	29.5	450	4	16.6	7	686	NM	0.24	55.6	175	NM	Cloudy, No odor
15:54	29.5	450	4.5	16.4	7	686	NM	0.24	55.7	169	NM	Cloudy, No odor

Sample ID(s):
APW-10D-WG-20230919

Analysis:

Additional Comments

SAMPLER NAME AND SIGNATURE

Date Time

Clay Sansoucie



09/22/2023
19:46



Low Flow Groundwater Sampling Field Data Form

Well ID: APW-10S
Well Permit No:

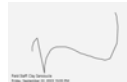
Date: 2023/09/19
78 deg F Sunny

Site ID GTEC-GRAND-TOWER	Purge Method / Pump Intake Depth Low Flow / 56.75 (ft)	Reference Elevation 359.47 (ft)
Site Address 1820 Power Plant Road, Grand Tower, US-IL	Purge Equipment NA	Depth to Water / Free Product 31.1 (ft) / None
Project Number 0599247	Sample Equipment NA	Total Well Depth 62.75 (ft)
Project Name 20230906-GWMonitor	Average Purge Rate 356.3 (mL/min)	Well Diameter / Well Screen Interval 2 (in) / 50 - 60 (ft)
Sampler Clay Sansoucie/ Marshall Arendell	Volume of Water in Well / Total Volume Purged 16.95 (gal) / 3.5 (gal)	Well Construction

Well Head Vapor Measurements

PID: NA; FID: NA; CO: NA; CO2: NA; O2: NA; CH4: NA; H2S: NA

Time	DTW (ft)	Flow Rate (mL/min)	Purge Volume (gal)	Temperature (C) ±3%	pH ±0.1pH units	Specific Conductivity (uS/cm) ±3%	Total Conductivity (uS/cm) ±3%	Dissolved Oxygen (mg/L) ±10%	ORP (mV) ±10 mV	Turbidity (NTU) ±10%	Total Dissolved Solids(ppm) ±10%	Comments
14:13	31.34	400	0	19.4	6.85	1283	NM	2.24	166.9	1000	NM	Turbid Grey, Sl. Rotten Egg Like Odor
14:18	31.3	350	0.5	17.1	6.96	1273	NM	0.19	127.4	1000	NM	Turbid Grey, Sl. Rotten Egg Like Odor
14:23	31.3	350	1	17.4	7	1274	NM	0.14	81	595	NM	Turbid Grey, Sl. Rotten Egg Like Odor
14:28	31.3	350	1.5	17	7	1273	NM	0.11	52.7	250	NM	Turbid Grey, Sl. Rotten Egg Like Odor
14:33	31.3	350	2	17.1	7	1275	NM	0.09	26.3	114	NM	Cloudy, Sl. Rotten Egg Like Odor
14:38	31.3	350	2.5	17.4	7	1274	NM	0.07	10.5	68.5	NM	Cloudy, Sl. Rotten Egg Like Odor
14:43	31.3	350	3	17	6.99	1275	NM	0.07	9.7	65.7	NM	Clear, Sl. Rotten Egg Like Odor
14:48	31.3	350	3.5	17	6.99	1274	NM	0.07	7.4	63.6	NM	Clear, Sl. Rotten Egg Like Odor

Sample ID(s): APW-10S-WG-20230919	Additional Comments	SAMPLER NAME AND SIGNATURE Clay Sansoucie 	Date Time 09/22/2023 20:03
Analysis:			



Low Flow Groundwater Sampling Field Data Form

Well ID: APW-06S
Well Permit No:

Date: 2023/09/20
60 deg F Cloudy

Site ID GTEC-GRAND-TOWER	Purge Method / Pump Intake Depth Low Flow / 58.8 (ft)	Reference Elevation 363.51 (ft)
Site Address 1820 Power Plant Road, Grand Tower, US-IL	Purge Equipment NA	Depth to Water / Free Product 35.32 (ft) / None
Project Number 0599247	Sample Equipment NA	Total Well Depth 63.8 (ft)
Project Name 20230906-GWMonitor	Average Purge Rate 375 (mL/min)	Well Diameter / Well Screen Interval 2 (in) / 50 - 60 (ft)
Sampler Clay Sansoucie/ Marshall Arendell	Volume of Water in Well / Total Volume Purged 15.25 (gal) / 4.5 (gal)	Well Construction

Well Head Vapor Measurements

PID: NA; FID: NA; CO: NA; CO2: NA; O2: NA; CH4: NA; H2S: NA

Time	DTW (ft)	Flow Rate (mL/min)	Purge Volume (gal)	Temperature (C) ±3%	pH ±0.1pH units	Specific Conductivity (uS/cm) ±3%	Total Conductivity (uS/cm) ±3%	Dissolved Oxygen (mg/L) ±10%	ORP (mV) ±10 mV	Turbidity (NTU) ±10%	Total Dissolved Solids(ppm) ±10%	Comments
08:02	35.4	375	0	15.7	7.34	838	NM	3	164.9	391	NM	Turbid Grey, No odor
08:07	35.4	375	0.5	15.7	7.23	886	NM	0.43	151.8	333	NM	Turbid Grey, Organic like odor
08:12	35.4	375	1	15.9	7.2	889	NM	0.31	126.6	175	NM	Turbid Grey, Organic like odor
08:17	35.4	375	1.5	16	7.2	889	NM	0.25	101.9	73.3	NM	Cloudy, Organic like odor
08:22	35.4	375	2	16.1	7.19	890	NM	0.22	78.9	38.2	NM	Clear, Organic like odor
08:27	35.4	375	2.5	16.1	7.19	891	NM	0.18	57	22.9	NM	Clear, Organic like odor
08:32	35.4	375	3	16.1	7.19	890	NM	0.15	41.1	16.2	NM	Clear, Organic like odor
08:37	35.4	375	3.5	16.2	7.2	890	NM	0.14	24.4	9.04	NM	Clear, Organic like odor
08:42	35.4	375	4	16.2	7.2	890	NM	0.14	23.8	9.78	NM	Clear, Organic like odor
08:47	35.4	375	4.5	16.2	7.2	890	NM	0.14	21.7	8.99	NM	Clear, Organic like odor

Sample ID(s): APW-06S-WG-20230920	Additional Comments	SAMPLER NAME AND SIGNATURE Clay Sansoucie	Date Time 09/22/2023 18:24
Analysis:			



Low Flow Groundwater Sampling Field Data Form

Well ID: APW-01R
Well Permit No:

Date: 2023/11/29
sunny, cold

Site ID GTEC-GRAND-TOWER	Purge Method / Pump Intake Depth Low Flow / 53.37 (ft)	Reference Elevation 366.82 (ft)
Site Address 1820 Power Plant Road, Grand Tower, US-IL	Purge Equipment NA	Depth to Water / Free Product 36.55 (ft) / None
Project Number 0599247	Sample Equipment NA	Total Well Depth 58.37 (ft)
Project Name 20231130-GWMonitor	Average Purge Rate 250 (mL/min)	Well Diameter / Well Screen Interval 2 (in) / 48.3 - 58.3 ()
Sampler marshall arendell and nolan legg	Volume of Water in Well / Total Volume Purged 3.56 (gal) / 3 (gal)	Well Construction PVC

Well Head Vapor Measurements

PID: NA; FID: NA; CO: NA; CO2: NA; O2: NA; CH4: NA; H2S: NA

Time	DTW (ft)	Flow Rate (mL/min)	Purge Volume (gal)	Temperature (C) ±3%	pH ±0.1pH units	Specific Conductivity (uS/cm) ±3%	Total Conductivity (NA)	Dissolved Oxygen (mg/L) ±10%	ORP (mV) ±10 mV	Turbidity (NTU) ±10%	Total Dissolved Solids(NA)	Comments
09:00	36.55	250	0	10.7	6.45	442	NM	2.25	90.4	631	NM	TURBID, NO ODOR
09:05	36.55	250	0.5	12.3	6.1	458	NM	1.9	90.9	874	NM	TURBID, NO ODOR
09:10	36.55	250	0.75	13.2	6.07	473	NM	1.75	90.6	528	NM	TURBID, NO ODOR
09:15	36.55	250	1	13.8	6.08	484	NM	1.54	90.9	332	NM	TURBID, NO ODOR
09:20	36.55	250	1.25	14	6.1	492	NM	1.49	91.3	246	NM	TURBID, NO ODOR
09:25	36.55	250	1.5	14.3	6.11	500	NM	1.43	91.6	188	NM	TURBID, NO ODOR
09:30	36.55	250	1.75	14.1	6.13	507	NM	1.43	92.2	151	NM	TURBID, NO ODOR
09:35	36.55	250	2	14.5	6.16	516	NM	1.37	92.7	117	NM	TURBID, NO ODOR
09:40	36.55	250	2.25	14.7	6.17	518	NM	1.36	92.8	104	NM	TURBID, NO ODOR
09:45	36.55	250	2.5	14.8	6.18	524	NM	1.32	92.8	95	NM	TURBID, NO ODOR
09:50	36.55	250	2.75	15.1	6.19	528	NM	1.29	93.3	97.3	NM	TURBID, NO ODOR
09:55	36.55	250	3	15.2	6.2	530	NM	1.28	93.5	95.6	NM	TURBID, NO ODOR

Sample ID(s): APW-01R-WG-20231129	Additional Comments	SAMPLER NAME AND SIGNATURE	Date Time
Analysis:		Marshall Arendell 	11/30/2023 22:09



Low Flow Groundwater Sampling Field Data Form

Well ID: APW-02
Well Permit No:

Date: 2023/11/28
sunny, cold

Site ID GTEC-GRAND-TOWER	Purge Method / Pump Intake Depth Low Flow / 54.05 (ft)	Reference Elevation 364.61 (ft)
Site Address 1820 Power Plant Road, Grand Tower, US-IL	Purge Equipment NA	Depth to Water / Free Product 33.7 (ft) / None
Project Number 0599247	Sample Equipment NA	Total Well Depth 59.05 (ft)
Project Name 20231130-GWMonitor	Average Purge Rate 300 (mL/min)	Well Diameter / Well Screen Interval 2 (in) / 47.2 - 57.2 (in)
Sampler marshall Arendell and Nolan legg	Volume of Water in Well / Total Volume Purged 4.14 (gal) / 2 (gal)	Well Construction PVC

Well Head Vapor Measurements

PID: NA; FID: NA; CO: NA; CO2: NA; O2: NA; CH4: NA; H2S: NA

Time	DTW (ft)	Flow Rate (mL/min)	Purge Volume (gal)	Temperature (C) ±3%	pH ±0.1pH units	Specific Conductivity (uS/cm) ±3%	Total Conductivity (NA)	Dissolved Oxygen (mg/L) ±10%	ORP (mV) ±10 mV	Turbidity (NTU) ±10%	Total Dissolved Solids(NA)	Comments
12:45	36.05	300	0	13	6.95	1057	NM	3.51	42.3	226	NM	TURBID, NO ODOR
12:50	37.76	300	0.5	14.2	6.86	1060	NM	1.87	53	564	NM	TURBID, NO ODOR
12:55	39.75	300	1	14.7	6.86	1060	NM	1.7	53.3	198	NM	TURBID, NO ODOR
13:00	40.71	300	1.25	14.5	6.87	1068	NM	1.53	53.5	178	NM	TURBID, NO ODOR
13:05	41.72	300	1.5	14.2	6.89	1066	NM	1.31	53	183	NM	TURBID, NO ODOR
13:10	42.43	300	1.75	14.2	6.9	1067	NM	1.3	52.1	173	NM	TURBID, NO ODOR
13:15	43.55	300	2	14	6.9	1066	NM	1.28	51.3	169	NM	TURBID, NO ODOR

Sample ID(s): APW-02-WG-20231128	Additional Comments	SAMPLER NAME AND SIGNATURE		Date Time
Analysis:		Marshall Arendell		12/14/2023 22:07



Low Flow Groundwater Sampling Field Data Form

Well ID: APW-03
Well Permit No:

Date: 2023/11/27
sunny, cold

Site ID GTEC-GRAND-TOWER	Purge Method / Pump Intake Depth Low Flow / 55.15 (ft)	Reference Elevation 365.79 (ft)
Site Address 1820 Power Plant Road, Grand Tower, US-IL	Purge Equipment NA	Depth to Water / Free Product 35.55 (ft) / None
Project Number 0599247	Sample Equipment NA	Total Well Depth 60.15 (ft)
Project Name 20231130-GWMonitor	Average Purge Rate 337.5 (mL/min)	Well Diameter / Well Screen Interval 2 (in) / 45.7 - 55.7 ()
Sampler marshall Arendell and Nolan legg	Volume of Water in Well / Total Volume Purged 4.01 (gal) / 3.25 (gal)	Well Construction PVC

Well Head Vapor Measurements

PID: NA; FID: NA; CO: NA; CO2: NA; O2: NA; CH4: NA; H2S: NA

Time	DTW (ft)	Flow Rate (mL/min)	Purge Volume (gal)	Temperature (C) ±3%	pH ±0.1pH units	Specific Conductivity (uS/cm) ±3%	Total Conductivity (NA)	Dissolved Oxygen (mg/L) ±10%	ORP (mV) ±10 mV	Turbidity (NTU) ±10%	Total Dissolved Solids(NA)	Comments
13:30	35.55	250	0	12.8	6.83	861	NM	1.21	110.8	156	NM	CLOUDY, NO ODOR
13:35	35.55	350	0.25	13	6.84	840	NM	0.64	113.3	119	NM	CLOUDY, NO ODOR
13:40	35.55	350	0.75	13.4	6.85	835	NM	0.37	113.9	78.7	NM	CLOUDY, NO ODOR
13:45	35.55	350	1.25	13.4	6.88	820	NM	0.28	112.3	49.5	NM	CLOUDY, NO ODOR
13:50	35.55	350	1.75	13.2	6.89	819	NM	0.24	111.4	22.2	NM	CLEAR, NO ODOR
13:55	35.55	350	2.25	13.5	6.9	814	NM	0.19	109.2	9.79	NM	CLEAR, NO ODOR
14:00	35.55	350	2.75	13.5	6.9	814	NM	0.18	108.6	7.6	NM	CLEAR, NO ODOR
14:05	35.55	350	3.25	13.5	6.9	814	NM	0.16	107	4	NM	CLEAR, NO ODOR

Sample ID(s):
APW-03-WG-20231127

Analysis:

Additional Comments

SAMPLER NAME AND SIGNATURE

Date Time

Marshall Arendell

11/30/2023
22:07



Low Flow Groundwater Sampling Field Data Form

Well ID: APW-04
Well Permit No:

Date: 2023/11/29
sunny, cold

Site ID GTEC-GRAND-TOWER	Purge Method / Pump Intake Depth Low Flow / 55.45 (ft)	Reference Elevation 367.44 (ft)
Site Address 1820 Power Plant Road, Grand Tower, US-IL	Purge Equipment NA	Depth to Water / Free Product 37.45 (ft) / None
Project Number 0599247	Sample Equipment NA	Total Well Depth 60.45 (ft)
Project Name 20231130-GWMonitor	Average Purge Rate 328.6 (mL/min)	Well Diameter / Well Screen Interval 2 (in) / 45.7 - 55.7 (in)
Sampler marshall Arendell and Nolan legg	Volume of Water in Well / Total Volume Purged 3.7 (gal) / 3 (gal)	Well Construction PVC

Well Head Vapor Measurements

PID: NA; FID: NA; CO: NA; CO2: NA; O2: NA; CH4: NA; H2S: NA

Time	DTW (ft)	Flow Rate (mL/min)	Purge Volume (gal)	Temperature (C) ±3%	pH ±0.1pH units	Specific Conductivity (uS/cm) ±3%	Total Conductivity (NA)	Dissolved Oxygen (mg/L) ±10%	ORP (mV) ±10 mV	Turbidity (NTU) ±10%	Total Dissolved Solids(NA)	Comments
07:55	37.45	500	0	13	7.49	614	NM	1.97	89	115	NM	CLOUDY, NO ODOR
08:00	37.45	300	0.5	14	7.21	633	NM	0.51	84.1	150	NM	CLOUDY, NO ODOR
08:05	37.45	300	1	13.6	7.16	638	NM	0.39	79.2	77.6	NM	CLOUDY, NO ODOR
08:10	37.45	300	1.5	13.4	7.14	642	NM	0.3	75.8	33.3	NM	CLOUDY, NO ODOR
08:15	37.45	300	2	13.9	7.13	637	NM	0.32	73.8	22	NM	CLOUDY, NO ODOR
08:20	37.45	300	2.5	14.2	7.12	636	NM	0.32	72.2	21.5	NM	CLOUDY, NO ODOR
08:25	37.45	300	3	14.3	7.11	635	NM	0.31	71	22.8	NM	CLOUDY, NO ODOR

Sample ID(s): APW-04-WG-20231130	Additional Comments	SAMPLER NAME AND SIGNATURE		Date Time
Analysis:		Marshall Arendell		



Low Flow Groundwater Sampling Field Data Form

Well ID: APW-05R
Well Permit No:

Date: 2023/11/28
sunny, cold

Site ID GTEC-GRAND-TOWER	Purge Method / Pump Intake Depth Low Flow / 58.7 (ft)	Reference Elevation ()
Site Address 1820 Power Plant Road, Grand Tower, US-IL	Purge Equipment NA	Depth to Water / Free Product 34.71 (ft) / None
Project Number 0599247	Sample Equipment NA	Total Well Depth 63.7 (ft)
Project Name 20231130-GWMonitor	Average Purge Rate 300 (mL/min)	Well Diameter / Well Screen Interval 2 (in) / - ()
Sampler marshall Arendell and Nolan legg	Volume of Water in Well / Total Volume Purged 4.73 (gal) / 3.25 (gal)	Well Construction PVC

Well Head Vapor Measurements

PID: NA; FID: NA; CO: NA; CO2: NA; O2: NA; CH4: NA; H2S: NA

Time	DTW (ft)	Flow Rate (mL/min)	Purge Volume (gal)	Temperature (C) ±3%	pH ±0.1pH units	Specific Conductivity (uS/cm) ±3%	Total Conductivity (NA)	Dissolved Oxygen (mg/L) ±10%	ORP (mV) ±10 mV	Turbidity (NTU) ±10%	Total Dissolved Solids(NA)	Comments
11:05	34.75	300	0	11.7	7.23	879	NM	2.8	60.1	85.1	NM	CLEAR, SLIGHT ROTTEN-EGG LIKE ODOR
11:10	34.75	300	0.5	13.9	7.1	915	NM	1.75	57.1	901	NM	TURBID, SLIGHT ROTTEN-EGG LIKE ODOR
11:15	34.75	300	1	14.2	7.1	916	NM	1.45	53.9	597	NM	TURBID, SLIGHT ROTTEN-EGG LIKE ODOR
11:20	34.75	300	1.25	14.6	7.1	919	NM	1.06	47.3	414	NM	TURBID, SLIGHT ROTTEN-EGG LIKE ODOR
11:25	34.75	300	1.5	14.9	7.11	921	NM	0.75	38.8	268	NM	TURBID, SLIGHT ROTTEN-EGG LIKE ODOR
11:30	34.75	300	1.75	15	7.11	921	NM	0.65	31.8	199	NM	TURBID, SLIGHT ROTTEN-EGG LIKE ODOR
11:35	34.75	300	2	15.2	7.11	921	NM	0.53	24.5	152	NM	TURBID, SLIGHT ROTTEN-EGG LIKE ODOR
11:40	34.75	300	2.25	15.1	7.12	921	NM	0.43	14.3	134	NM	TURBID, SLIGHT ROTTEN-EGG LIKE ODOR
11:45	34.75	300	2.5	15.1	7.13	922	NM	0.29	-3.3	98.4	NM	TURBID, SLIGHT ROTTEN-EGG LIKE ODOR
11:50	34.75	300	2.75	15.2	7.13	922	NM	0.26	-7.1	83.8	NM	TURBID, SLIGHT ROTTEN-EGG LIKE ODOR
11:55	34.75	300	3	15.2	7.13	920	NM	0.23	-12.5	82.5	NM	TURBID, SLIGHT ROTTEN-EGG LIKE ODOR
12:00	34.75	300	3.25	15.3	7.13	921	NM	0.21	-16.4	76.1	NM	TURBID, SLIGHT ROTTEN-EGG LIKE ODOR

Sample ID(s):
APW-05R-WG-20231128,DUP-01-WG-20231128

Analysis:

Additional Comments

SAMPLER NAME AND SIGNATURE

Date Time

Marshall Arendell

12/01/2023
18:44



Low Flow Groundwater Sampling Field Data Form

Well ID: APW-06D
Well Permit No:

Date: 2023/11/28
sunny, cold

Site ID GTEC-GRAND-TOWER	Purge Method / Pump Intake Depth Low Flow / 151.95 (ft)	Reference Elevation 363.69 (ft)
Site Address 1820 Power Plant Road, Grand Tower, US-IL	Purge Equipment NA	Depth to Water / Free Product 33.76 (ft) / None
Project Number 0599247	Sample Equipment NA	Total Well Depth 156.95 (ft)
Project Name 20231130-GWMonitor	Average Purge Rate 300 (mL/min)	Well Diameter / Well Screen Interval 2 (in) / 140 - 150 (ft)
Sampler marshall arendell and Nolan legg	Volume of Water in Well / Total Volume Purged 20.1 (gal) / 4.5 (gal)	Well Construction PVC

Well Head Vapor Measurements

PID: NA; FID: NA; CO: NA; CO2: NA; O2: NA; CH4: NA; H2S: NA

Time	DTW (ft)	Flow Rate (mL/min)	Purge Volume (gal)	Temperature (C) ±3%	pH ±0.1pH units	Specific Conductivity (uS/cm) ±3%	Total Conductivity (NA)	Dissolved Oxygen (mg/L) ±10%	ORP (mV) ±10 mV	Turbidity (NTU) ±10%	Total Dissolved Solids(NA)	Comments
09:45	33.75	300	0	12.7	7.14	769	NM	1.81	36.1	30	NM	CLEAR, NO ODOR
09:50	33.75	250	0.5	12.7	7.09	767	NM	1.02	25.6	250	NM	TURBID, NO ODOR
09:55	33.75	250	1	13.4	7.08	770	NM	0.83	19.8	131	NM	CLOUDY, NO ODOR
10:00	33.75	250	1.5	13.6	7.08	770	NM	0.74	16.9	116	NM	CLOUDY, NO ODOR
10:05	33.75	250	2	13.7	7.08	770	NM	0.58	12.7	73.9	NM	CLOUDY, NO ODOR
10:10	33.75	250	2.5	13.7	7.08	769	NM	0.41	5.5	48.2	NM	CLOUDY, NO ODOR
10:15	33.75	250	3	14	7.08	768	NM	0.38	3.9	19.5	NM	CLEAR, NO ODOR
10:20	33.75	250	3.5	13.8	7.08	769	NM	0.34	2.1	5.85	NM	CLEAR, NO ODOR
10:25	33.75	250	4	13.7	7.08	769	NM	0.3	0.4	4.49	NM	CLEAR, NO ODOR
10:30	33.75	250	4.5	13.9	7.08	769	NM	0.26	-2.7	3.02	NM	CLEAR, NO ODOR

Sample ID(s): APW-06D-WG-20231128	Additional Comments	SAMPLER NAME AND SIGNATURE		Date Time 12/14/2023 22:17
Analysis:		Marshall Arendell		



Low Flow Groundwater Sampling Field Data Form

Well ID: APW-07
Well Permit No:

Date: 2023/11/28
sunny, cold

Site ID GTEC-GRAND-TOWER	Purge Method / Pump Intake Depth Low Flow / 58.84 (ft)	Reference Elevation 360.61 (ft)
Site Address 1820 Power Plant Road, Grand Tower, US-IL	Purge Equipment NA	Depth to Water / Free Product 31 (ft) / None
Project Number 0599247	Sample Equipment NA	Total Well Depth 63.84 (ft)
Project Name 20231130-GWMonitor	Average Purge Rate 400 (mL/min)	Well Diameter / Well Screen Interval 2 (in) / 50 - 60 (ft)
Sampler marshall Arendell and Nolan legg	Volume of Water in Well / Total Volume Purged 5.36 (gal) / 5 (gal)	Well Construction PVC

Well Head Vapor Measurements

PID: NA; FID: NA; CO: NA; CO2: NA; O2: NA; CH4: NA; H2S: NA

Time	DTW (ft)	Flow Rate (mL/min)	Purge Volume (gal)	Temperature (C) ±3%	pH ±0.1pH units	Specific Conductivity (uS/cm) ±3%	Total Conductivity (NA)	Dissolved Oxygen (mg/L) ±10%	ORP (mV) ±10 mV	Turbidity (NTU) ±10%	Total Dissolved Solids(NA)	Comments
14:15	31	400	0	12.4	6.62	1148	NM	1.8	64.9	181	NM	CLOUDY, SLIGHTLY ROTTEN-EGG LIKE ODOR
14:20	31	400	0.5	12.6	6.6	1166	NM	1.04	59.4	182	NM	CLOUDY, SLIGHTLY ROTTEN-EGG LIKE ODOR
14:25	31	400	1	12.9	6.6	1173	NM	0.87	55.1	105	NM	CLOUDY, SLIGHTLY ROTTEN-EGG LIKE ODOR
14:30	31	400	1.5	13	6.61	1178	NM	0.57	49.4	78.4	NM	CLOUDY, SLIGHTLY ROTTEN-EGG LIKE ODOR
14:35	31	400	2	13	6.61	1179	NM	0.53	45.5	66.9	NM	CLOUDY, SLIGHTLY ROTTEN-EGG LIKE ODOR
14:40	31	400	2.5	13	6.61	1181	NM	0.44	42.6	57.3	NM	CLOUDY, SLIGHTLY ROTTEN-EGG LIKE ODOR
14:45	31	400	3	13.2	6.62	1182	NM	0.34	38.3	51.2	NM	CLOUDY, SLIGHTLY ROTTEN-EGG LIKE ODOR
14:50	31	400	3.5	13.2	6.62	1183	NM	0.31	33.3	43.4	NM	CLOUDY, SLIGHTLY ROTTEN-EGG LIKE ODOR
14:55	31	400	4	13.3	6.62	1183	NM	0.22	27	23.1	NM	CLOUDY, SLIGHTLY ROTTEN-EGG LIKE ODOR
15:00	31	400	4.5	13.5	6.62	1183	NM	0.22	24.5	22.6	NM	CLOUDY, SLIGHTLY ROTTEN-EGG LIKE ODOR
15:05	31	400	5	13.5	6.62	1181	NM	0.19	21.9	21	NM	CLOUDY, SLIGHTLY ROTTEN-EGG LIKE ODOR

Sample ID(s): APW-07-WG-20231128	Additional Comments	SAMPLER NAME AND SIGNATURE Marshall Arendell	Date Time 12/01/2023 16:16
Analysis:			



Low Flow Groundwater Sampling Field Data Form

Well ID: APW-08
Well Permit No:

Date: 2023/11/28
sunny, cold

Site ID GTEC-GRAND-TOWER	Purge Method / Pump Intake Depth Low Flow / 57.5 (ft)	Reference Elevation 362.71 (ft)
Site Address 1820 Power Plant Road, Grand Tower, US-IL	Purge Equipment NA	Depth to Water / Free Product 32.4 (ft) / None
Project Number 0599247	Sample Equipment NA	Total Well Depth 62.5 (ft)
Project Name 20231130-GWMonitor	Average Purge Rate 400 (mL/min)	Well Diameter / Well Screen Interval 2 (in) / 50 - 60 (ft)
Sampler marshall Arendell and Nolan legg	Volume of Water in Well / Total Volume Purged 4.91 (gal) / 4.5 (gal)	Well Construction PVC

Well Head Vapor Measurements

PID: NA; FID: NA; CO: NA; CO2: NA; O2: NA; CH4: NA; H2S: NA

Time	DTW (ft)	Flow Rate (mL/min)	Purge Volume (gal)	Temperature (C) ±3%	pH ±0.1pH units	Specific Conductivity (uS/cm) ±3%	Total Conductivity (NA)	Dissolved Oxygen (mg/L) ±10%	ORP (mV) ±10 mV	Turbidity (NTU) ±10%	Total Dissolved Solids(NA)	Comments
15:40	32.4	400	0	10.7	7.18	627	NM	2.37	38.9	124	NM	CLOUDY, NO ODOR
15:45	32.4	400	0.5	12.7	6.96	646	NM	1.17	34	1000	NM	OVERRANGE, TURBID, NO ODOR
15:50	32.4	400	1	13.8	6.93	645	NM	0.8	26.5	1000	NM	OVERRANGE, TURBID, NO ODOR
15:55	32.4	400	1.5	13.7	6.92	643	NM	0.62	24.4	680	NM	TURBID, NO ODOR
16:00	32.4	400	2	13.8	6.92	641	NM	0.45	22.6	439	NM	TURBID, NO ODOR
16:05	32.4	400	2.5	13.9	6.92	640	NM	0.39	21.6	326	NM	TURBID, NO ODOR
16:10	32.4	400	3	13.7	6.93	637	NM	0.35	20.1	234	NM	TURBID, NO ODOR
16:15	32.4	400	3.5	13.8	6.93	635	NM	0.28	19	179	NM	TURBID, NO ODOR
16:20	32.4	400	4	13.8	6.94	631	NM	0.24	18.2	162	NM	TURBID, NO ODOR
16:25	32.4	400	4.5	13.8	6.94	629	NM	0.21	17.7	169	NM	TURBID, NO ODOR

Sample ID(s): APW-08-WG-20231128	Additional Comments	SAMPLER NAME AND SIGNATURE	Date Time
Analysis:		Marshall Arendell 	12/01/2023 16:39



Low Flow Groundwater Sampling Field Data Form

Well ID: APW-09
Well Permit No:

Date: 2023/11/29
sunny, cold

Site ID GTEC-GRAND-TOWER	Purge Method / Pump Intake Depth Low Flow / 58.55 (ft)	Reference Elevation 366.84 (ft)
Site Address 1820 Power Plant Road, Grand Tower, US-IL	Purge Equipment NA	Depth to Water / Free Product 36.56 (ft) / None
Project Number 0599247	Sample Equipment NA	Total Well Depth 63.55 (ft)
Project Name 20231130-GWMonitor	Average Purge Rate 327.8 (mL/min)	Well Diameter / Well Screen Interval 2 (in) / 50 - 60 (ft)
Sampler marshall arendell and Nolan legg	Volume of Water in Well / Total Volume Purged 4.4 (gal) / 3 (gal)	Well Construction PVC

Well Head Vapor Measurements

PID: NA; FID: NA; CO: NA; CO2: NA; O2: NA; CH4: NA; H2S: NA

Time	DTW (ft)	Flow Rate (mL/min)	Purge Volume (gal)	Temperature (C) ±3%	pH ±0.1pH units	Specific Conductivity (uS/cm) ±3%	Total Conductivity (NA)	Dissolved Oxygen (mg/L) ±10%	ORP (mV) ±10 mV	Turbidity (NTU) ±10%	Total Dissolved Solids(NA)	Comments
10:35	36.6	150	0	14.1	7.44	545	NM	4.77	89.5	44.6	NM	CLOUDY, NO ODOR
10:40	36.6	350	0.5	15	7.22	574	NM	2.6	84.5	71.3	NM	CLOUDY, NO ODOR
10:45	36.6	350	0.75	15	7.2	577	NM	1.37	80.8	49.9	NM	CLOUDY, NO ODOR
10:50	36.6	350	1.25	15.2	7.2	575	NM	1.11	79.2	22.8	NM	CLOUDY, NO ODOR
10:55	36.6	350	1.75	15.3	7.2	574	NM	1.05	78.9	19	NM	CLOUDY, NO ODOR
11:00	36.6	350	2.25	15.2	7.2	573	NM	0.94	78.3	12.2	NM	CLEAR, NO ODOR
11:05	36.6	350	2.5	15.3	7.2	572	NM	0.84	77.9	6.57	NM	CLEAR, NO ODOR
11:10	36.6	350	2.75	15.3	7.2	572	NM	0.83	77.8	4.4	NM	CLEAR, NO ODOR
11:15	36.6	350	3	15.3	7.2	571	NM	0.78	77.7	3.82	NM	CLEAR, NO ODOR

Sample ID(s): APW-09-WG-20231129,DUP-02-WG-20231129	Additional Comments	SAMPLER NAME AND SIGNATURE	Date Time
Analysis:		Marshall Arendell 	12/01/2023 18:41



Low Flow Groundwater Sampling Field Data Form

Well ID: APW-10D
Well Permit No:

Date: 2023/11/27
sunny, cold

Site ID GTEC-GRAND-TOWER	Purge Method / Pump Intake Depth Low Flow / 94.25 (ft)	Reference Elevation 359.41 (ft)
Site Address 1820 Power Plant Road, Grand Tower, US-IL	Purge Equipment NA	Depth to Water / Free Product 29.1 (ft) / None
Project Number 0599247	Sample Equipment NA	Total Well Depth 99.25 (ft)
Project Name 20231130-GWMonitor	Average Purge Rate 355 (mL/min)	Well Diameter / Well Screen Interval 2 (in) / 86 - 96 (ft)
Sampler marshall arendell and Nolan legg	Volume of Water in Well / Total Volume Purged 11.45 (gal) / 4.5 (gal)	Well Construction PVC

Well Head Vapor Measurements

PID: NA; FID: NA; CO: NA; CO2: NA; O2: NA; CH4: NA; H2S: NA

Time	DTW (ft)	Flow Rate (mL/min)	Purge Volume (gal)	Temperature (C) ±3%	pH ±0.1pH units	Specific Conductivity (uS/cm) ±3%	Total Conductivity (NA)	Dissolved Oxygen (mg/L) ±10%	ORP (mV) ±10 mV	Turbidity (NTU) ±10%	Total Dissolved Solids(NA)	Comments
14:40	29.1	450	0	13.2	6.97	668	NM	3.38	113.2	194	NM	CLOUDY, NO ODOR
14:45	29.1	300	0.5	12.4	6.82	665	NM	1.13	111.7	1000	NM	OVERRANGE, TURBID, NO ODOR
14:50	29.1	200	1	12.8	6.83	670	NM	0.59	108.6	1000	NM	OVERRANGE, TURBID, NO ODOR
14:55	29.1	500	1.5	12.7	6.83	667	NM	0.53	107.4	1000	NM	OVERRANGE, TURBID, NO ODOR
15:00	29.1	350	2	13.8	6.83	670	NM	0.43	105.7	801	NM	TURBID, NO ODOR
15:05	29.1	350	2.5	13.7	6.83	671	NM	0.36	104.3	433	NM	TURBID, NO ODOR
15:10	29.1	350	3	13.6	6.83	671	NM	0.34	103.4	300	NM	TURBID, NO ODOR
15:15	29.1	350	3.5	13.5	6.82	670	NM	0.32	102.4	211	NM	TURBID, NO ODOR
15:20	29.1	350	4	13.4	6.82	671	NM	0.3	102.1	203	NM	CLOUDY, NO ODOR
15:25	29.1	350	4.5	13.3	6.82	671	NM	0.28	101.9	196	NM	CLOUDY, NO ODOR

Sample ID(s): APW-10D-WG-20231127	Additional Comments	SAMPLER NAME AND SIGNATURE	Date Time
Analysis:		Marshall Arendell 	12/01/2023 18:56



Low Flow Groundwater Sampling Field Data Form

Well ID: APW-10S
Well Permit No:

Date: 2023/11/27
sunny, cold

Site ID GTEC-GRAND-TOWER	Purge Method / Pump Intake Depth Low Flow / 58.29 (ft)	Reference Elevation 359.47 (ft)
Site Address 1820 Power Plant Road, Grand Tower, US-IL	Purge Equipment NA	Depth to Water / Free Product 30 (ft) / None
Project Number 0599247	Sample Equipment NA	Total Well Depth 63.29 (ft)
Project Name 20231130-GWMonitor	Average Purge Rate 363.6 (mL/min)	Well Diameter / Well Screen Interval 2 (in) / 50 - 60 (ft)
Sampler marshall Arendell and Nolan legg	Volume of Water in Well / Total Volume Purged 5.43 (gal) / 5 (gal)	Well Construction PVC

Well Head Vapor Measurements

PID: NA; FID: NA; CO: NA; CO2: NA; O2: NA; CH4: NA; H2S: NA

Time	DTW (ft)	Flow Rate (mL/min)	Purge Volume (gal)	Temperature (C) ±3%	pH ±0.1pH units	Specific Conductivity (uS/cm) ±3%	Total Conductivity (NA)	Dissolved Oxygen (mg/L) ±10%	ORP (mV) ±10 mV	Turbidity (NTU) ±10%	Total Dissolved Solids(NA)	Comments
15:40	30.3	400	0	13.4	6.66	1247	NM	1.26	137.7	37.5	NM	CLEAR, SLIGHT ROTTEN-EGG LIKE ODOR
15:45	30.3	450	0.5	12.9	6.73	1256	NM	0.26	119.2	47.9	NM	CLEAR, SLIGHT ROTTEN-EGG LIKE ODOR
15:50	30.3	350	1	13.4	6.74	1258	NM	0.17	87.1	41.3	NM	CLEAR, SLIGHT ROTTEN-EGG LIKE ODOR
15:55	30.3	350	1.5	13.4	6.75	1260	NM	0.14	71.7	33.2	NM	CLEAR, SLIGHT ROTTEN-EGG LIKE ODOR
16:00	30.3	350	2	13.4	6.74	1259	NM	0.11	43.9	21.4	NM	CLEAR, SLIGHT ROTTEN-EGG LIKE ODOR
16:05	30.3	350	2.5	13.6	6.74	1261	NM	0.1	27.7	22.3	NM	CLEAR, SLIGHT ROTTEN-EGG LIKE ODOR
16:10	30.3	350	3	13.7	6.74	1261	NM	0.09	9.4	24.8	NM	CLEAR, SLIGHT ROTTEN-EGG LIKE ODOR
16:15	30.3	350	3.5	13.6	6.74	1261	NM	0.09	-5.6	21.7	NM	CLEAR, SLIGHT ROTTEN-EGG LIKE ODOR
16:20	30.3	350	4	13.4	6.74	1262	NM	0.08	-19.2	13.5	NM	CLEAR, SLIGHT ROTTEN-EGG LIKE ODOR
16:25	30.3	350	4.5	13.3	6.74	1261	NM	0.07	-23.9	14	NM	CLEAR, SLIGHT ROTTEN-EGG LIKE ODOR
16:30	30.3	350	5	13.2	6.74	1261	NM	0.07	-26.2	13.1	NM	CLEAR, SLIGHT ROTTEN-EGG LIKE ODOR

Sample ID(s):
APW-10S-WG-20231127

Analysis:

Additional Comments

SAMPLER NAME AND SIGNATURE

Date Time

Marshall Arendell

12/01/2023
19:14



Low Flow Groundwater Sampling Field Data Form

Well ID: APW-06S
Well Permit No:

Date: 2023/11/28
sunny, cold

Site ID GTEC-GRAND-TOWER	Purge Method / Pump Intake Depth Low Flow / 59.95 (ft)	Reference Elevation 363.51 (ft)
Site Address 1820 Power Plant Road, Grand Tower, US-IL	Purge Equipment NA	Depth to Water / Free Product 33.95 (ft) / None
Project Number 0599247	Sample Equipment NA	Total Well Depth 64.98 (ft)
Project Name 20231130-GWMonitor	Average Purge Rate 250 (mL/min)	Well Diameter / Well Screen Interval 2 (in) / 50 - 60 (ft)
Sampler marshall Arendell and Nolan Legg	Volume of Water in Well / Total Volume Purged 5.06 (gal) / 5.5 (gal)	Well Construction

Well Head Vapor Measurements

PID: NA; FID: NA; CO: NA; CO2: NA; O2: NA; CH4: NA; H2S: NA

Time	DTW (ft)	Flow Rate (mL/min)	Purge Volume (gal)	Temperature (C) ±3%	pH ±0.1pH units	Specific Conductivity (uS/cm) ±3%	Total Conductivity (NA)	Dissolved Oxygen (mg/L) ±10%	ORP (mV) ±10 mV	Turbidity (NTU) ±10%	Total Dissolved Solids(NA)	Comments
08:00	34.3	250	0	13.9	7.17	889	NM	0.57	72.6	83.3	NM	CLEAR, NO ODOR
08:05	34.3	250	0.5	12.5	7.12	880	NM	0.35	56.3	16	NM	CLEAR, NO ODOR
08:10	34.3	250	1	13	7.09	879	NM	0.24	33.8	8.06	NM	CLEAR, NO ODOR
08:15	34.3	250	1.5	13	7.1	880	NM	0.2	22.7	5.63	NM	CLEAR, NO ODOR
08:20	34.3	250	2	13.3	7.1	882	NM	0.17	10.5	4.51	NM	CLEAR, NO ODOR
08:25	34.3	250	2.5	13.2	7.1	882	NM	0.15	1.5	2.6	NM	CLEAR, NO ODOR
08:30	34.3	250	3	13.5	7.1	880	NM	0.14	-5.5	1.35	NM	CLEAR, NO ODOR
08:35	34.3	250	3.5	13.1	7.09	880	NM	0.12	-17	2.26	NM	CLEAR, NO ODOR
08:40	34.3	250	4	13.1	7.09	882	NM	0.12	-24.6	1.57	NM	CLEAR, NO ODOR
08:45	34.3	250	4.5	13	7.09	881	NM	0.11	-37.3	2.49	NM	CLEAR, NO ODOR
08:50	34.3	250	5	13.1	7.08	880	NM	0.1	-40.7	1.75	NM	CLEAR, NO ODOR
08:55	34.3	250	5.5	13.1	7.08	880	NM	0.09	-44.8	1.26	NM	CLEAR, NO ODOR

Sample ID(s): APW-06S-WG-20231128	Additional Comments	SAMPLER NAME AND SIGNATURE	Date Time
Analysis:		Marshall Arendell 	12/14/2023 22:13



APPENDIX D LABORATORY ANALYTICAL

February 28, 2023

Matt Halley
ERM
1968 Craig Road
Suite 100
St. Louis, MO 63146
TEL: (314) 952-2760
FAX:



Illinois	100226
Kansas	E-10374
Louisiana	05002
Louisiana	05003
Oklahoma	9978

RE: GTEC

WorkOrder: 23020169

Dear Matt Halley:

TEKLAB, INC received 15 samples on 2/3/2023 8:45:00 AM for the analysis presented in the following report.

Samples are analyzed on an as received basis unless otherwise requested and documented. The sample results contained in this report relate only to the requested analytes of interest as directed on the chain of custody. NELAP accredited fields of testing are indicated by the letters NELAP under the Certification column. Unless otherwise documented within this report, Teklab Inc. analyzes samples utilizing the most current methods in compliance with 40CFR. All tests are performed in the Collinsville, IL laboratory unless otherwise noted in the Case Narrative.

All quality control criteria applicable to the test methods employed for this project have been satisfactorily met and are in accordance with NELAP except where noted. The following report shall not be reproduced, except in full, without the written approval of Teklab, Inc.

If you have any questions regarding these tests results, please feel free to call.

Sincerely,



Elizabeth A. Hurley
Director of Customer Service
(618)344-1004 ex 33
ehurley@teklabinc.com

Client: ERM

Work Order: 23020169

Client Project: GTEC

Report Date: 28-Feb-23

This reporting package includes the following:

Cover Letter	1
Report Contents	2
Definitions	3
Case Narrative	5
Accreditations	6
Laboratory Results	7
Sample Summary	37
Dates Report	38
Quality Control Results	45
Receiving Check List	73
Chain of Custody	Appended

Client: ERM

Work Order: 23020169

Client Project: GTEC

Report Date: 28-Feb-23

Abbr Definition

* Analytes on report marked with an asterisk are not NELAP accredited

CCV Continuing calibration verification is a check of a standard to determine the state of calibration of an instrument between recalibration.

CRQL A Client Requested Quantitation Limit is a reporting limit that varies according to customer request. The CRQL may not be less than the MDL.

DF Dilution factor is the dilution performed during analysis only and does not take into account any dilutions made during sample preparation. The reported result is final and includes all dilution factors.

DNI Did not ignite

DUP Laboratory duplicate is a replicate aliquot prepared under the same laboratory conditions and independently analyzed to obtain a measure of precision.

ICV Initial calibration verification is a check of a standard to determine the state of calibration of an instrument before sample analysis is initiated.

IDPH IL Dept. of Public Health

LCS Laboratory control sample is a sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes and analyzed exactly like a sample to establish intra-laboratory or analyst specific precision and bias or to assess the performance of all or a portion of the measurement system.

LCSD Laboratory control sample duplicate is a replicate laboratory control sample that is prepared and analyzed in order to determine the precision of the approved test method. The acceptable recovery range is listed in the QC Package (provided upon request).

MBLK Method blank is a sample of a matrix similar to the batch of associated sample (when available) that is free from the analytes of interest and is processed simultaneously with and under the same conditions as samples through all steps of the analytical procedures, and in which no target analytes or interferences should present at concentrations that impact the analytical results for sample analyses.

MDL "The method detection limit is defined as the minimum measured concentration of a substance that can be reported with 99% confidence that the measured concentration is distinguishable from method blank results."

MS Matrix spike is an aliquot of matrix fortified (spiked) with known quantities of specific analytes that is subjected to the entire analytical procedures in order to determine the effect of the matrix on an approved test method's recovery system. The acceptable recovery range is listed in the QC Package (provided upon request).

MSD Matrix spike duplicate means a replicate matrix spike that is prepared and analyzed in order to determine the precision of the approved test method. The acceptable recovery range is listed in the QC Package (provided upon request).

MW Molecular weight

NC Data is not acceptable for compliance purposes

ND Not Detected at the Reporting Limit

NELAP NELAP Accredited

PQL Practical quantitation limit means the lowest level that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operation conditions.

RL The reporting limit the lowest level that the data is displayed in the final report. The reporting limit may vary according to customer request or sample dilution. The reporting limit may not be less than the MDL.

RPD Relative percent difference is a calculated difference between two recoveries (ie. MS/MSD). The acceptable recovery limit is listed in the QC Package (provided upon request).

SPK The spike is a known mass of target analyte added to a blank sample or sub-sample; used to determine recovery deficiency or for other quality control purposes.

Surr Surrogates are compounds which are similar to the analytes of interest in chemical composition and behavior in the analytical process, but which are not normally found in environmental samples.

TIC Tentatively identified compound: Analytes tentatively identified in the sample by using a library search. Only results not in the calibration standard will be reported as tentatively identified compounds. Results for tentatively identified compounds that are not present in the calibration standard, but are assigned a specific chemical name based upon the library search, are calculated using total peak areas from reconstructed ion chromatograms and a response factor of one. The nearest Internal Standard is used for the calculation. The results of any TICs must be considered estimated, and are flagged with a "T". If the estimated result is above the calibration range it is flagged "ET"

TNTC Too numerous to count (> 200 CFU)

Client: ERM

Work Order: 23020169

Client Project: GTEC

Report Date: 28-Feb-23

Qualifiers

# - Unknown hydrocarbon	B - Analyte detected in associated Method Blank
C - RL shown is a Client Requested Quantitation Limit	E - Value above quantitation range
H - Holding times exceeded	I - Associated internal standard was outside method criteria
J - Analyte detected below quantitation limits	M - Manual Integration used to determine area response
ND - Not Detected at the Reporting Limit	R - RPD outside accepted recovery limits
S - Spike Recovery outside recovery limits	T - TIC(Tentatively identified compound)
X - Value exceeds Maximum Contaminant Level	



Case Narrative

<http://www.teklabinc.com/>

Client: ERM

Work Order: 23020169

Client Project: GTEC

Report Date: 28-Feb-23

Cooler Receipt Temp: 1.6 °C

Radium-226 and Radium-228 analysis was performed by Pace Analytical Services, LLC. See attached report for

Locations

Collinsville

Address 5445 Horseshoe Lake Road
Collinsville, IL 62234-7425
Phone (618) 344-1004
Fax (618) 344-1005
Email jhriley@teklabinc.com

Collinsville Air

Address 5445 Horseshoe Lake Road
Collinsville, IL 62234-7425
Phone (618) 344-1004
Fax (618) 344-1005
Email EHurley@teklabinc.com

Springfield

Address 3920 Pintail Dr
Springfield, IL 62711-9415
Phone (217) 698-1004
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Email KKlostermann@teklabinc.com

Chicago

Address 1319 Butterfield Rd.
Downers Grove, IL 60515
Phone (630) 324-6855
Fax
Email arenner@teklabinc.com

Kansas City

Address 8421 Nieman Road
Lenexa, KS 66214
Phone (913) 541-1998
Fax (913) 541-1998
Email jhriley@teklabinc.com

Client: ERM**Work Order:** 23020169**Client Project:** GTEC**Report Date:** 28-Feb-23

State	Dept	Cert #	NELAP	Exp Date	Lab
Illinois	IEPA	100226	NELAP	1/31/2024	Collinsville
Kansas	KDHE	E-10374	NELAP	4/30/2023	Collinsville
Louisiana	LDEQ	05002	NELAP	6/30/2023	Collinsville
Louisiana	LDEQ	05003	NELAP	6/30/2023	Collinsville
Oklahoma	ODEQ	9978	NELAP	8/31/2023	Collinsville
Arkansas	ADEQ	88-0966		3/14/2023	Collinsville
Illinois	IDPH	17584		5/31/2023	Collinsville
Iowa	IDNR	430		6/1/2024	Collinsville
Kentucky	UST	0073		1/31/2024	Collinsville
Missouri	MDNR	00930		5/31/2023	Collinsville
Missouri	MDNR	930		1/31/2025	Collinsville



Laboratory Results

<http://www.teklabinc.com/>

Client: ERM

Work Order: 23020169

Client Project: GTEC

Report Date: 28-Feb-23

Lab ID: 23020169-001

Client Sample ID: APW-03-WG-20230130

Matrix: GROUNDWATER

Collection Date: 01/30/2023 13:30

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	20		524	mg/L	1	02/03/2023 12:55	R324399
SW-846 9036 (TOTAL)								
Sulfate	NELAP	100		322	mg/L	10	02/10/2023 12:31	R324668
SW-846 9040B, LABORATORY ANALYZED								
Lab pH	NELAP	1.00		7.45		1	02/08/2023 16:00	R324541
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		0.23	mg/L	1	02/09/2023 15:22	R324574
SW-846 9251 (TOTAL)								
Chloride	NELAP	1		21	mg/L	1	02/10/2023 12:26	R324670
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	02/10/2023 20:48	202752
Arsenic	NELAP	0.0010		0.0020	mg/L	5	02/10/2023 20:48	202752
Barium	NELAP	0.0010		0.139	mg/L	5	02/10/2023 20:48	202752
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	02/10/2023 20:48	202752
Boron	NELAP	0.0250		4.98	mg/L	5	02/10/2023 20:48	202752
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	02/10/2023 20:48	202752
Calcium	NELAP	0.125		121	mg/L	5	02/15/2023 8:33	202752
Chromium	NELAP	0.0015		< 0.0015	mg/L	5	02/14/2023 12:51	202752
Cobalt	NELAP	0.0010		< 0.0010	mg/L	5	02/14/2023 12:51	202752
Lead	NELAP	0.0010		< 0.0010	mg/L	5	02/10/2023 20:48	202752
Lithium	*	0.0030		0.0275	mg/L	5	02/10/2023 20:48	202752
Molybdenum	NELAP	0.0015		0.0521	mg/L	5	02/13/2023 13:28	202752
Nickel	NELAP	0.0010		0.0011	mg/L	5	02/14/2023 12:51	202752
Selenium	NELAP	0.0010		< 0.0010	mg/L	5	02/10/2023 20:48	202752
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	02/10/2023 20:48	202752
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	02/09/2023 18:08	202662
Arsenic	NELAP	0.0010		0.0030	mg/L	5	02/13/2023 23:02	202807
Barium	NELAP	0.0010		0.135	mg/L	5	02/09/2023 18:08	202662
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	02/09/2023 18:08	202662
Boron	NELAP	0.0250		4.94	mg/L	5	02/09/2023 18:08	202662
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	02/09/2023 18:08	202662
Calcium	NELAP	0.125		111	mg/L	5	02/10/2023 11:50	202662
Chromium	NELAP	0.0015		0.0019	mg/L	5	02/10/2023 11:50	202662
Cobalt	NELAP	0.0010		< 0.0010	mg/L	5	02/09/2023 18:08	202662
Iron	NELAP	0.0250		2.41	mg/L	5	02/09/2023 18:08	202662
Lead	NELAP	0.0010		< 0.0010	mg/L	5	02/09/2023 18:08	202662
Lithium	*	0.0030		0.0276	mg/L	5	02/09/2023 18:08	202662
Manganese	NELAP	0.0020		0.352	mg/L	5	02/09/2023 18:08	202662
Molybdenum	NELAP	0.0015		0.0528	mg/L	5	02/09/2023 18:08	202662
Nickel	NELAP	0.0010		0.0028	mg/L	5	02/09/2023 18:08	202662
Selenium	NELAP	0.0010		< 0.0010	mg/L	5	02/09/2023 18:08	202662
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	02/09/2023 18:08	202662
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		< 0.00020	mg/L	1	02/07/2023 19:54	202649

Client: ERM **Work Order:** 23020169
Client Project: GTEC **Report Date:** 28-Feb-23
Lab ID: 23020169-001 **Client Sample ID:** APW-03-WG-20230130
Matrix: GROUNDWATER **Collection Date:** 01/30/2023 13:30

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		See Attached	pci/L	1	02/10/2023 0:00	R325261
Radium-228	*	0		See Attached	pci/L	1	02/10/2023 0:00	R325261

Client: ERM

Work Order: 23020169

Client Project: GTEC

Report Date: 28-Feb-23

Lab ID: 23020169-002

Client Sample ID: APW-07-WG-20230130

Matrix: GROUNDWATER

Collection Date: 01/30/2023 14:45

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	20		824	mg/L	1	02/06/2023 12:21	R324475
SW-846 9036 (TOTAL)								
Sulfate	NELAP	10		48	mg/L	1	02/10/2023 12:34	R324668
SW-846 9040B, LABORATORY ANALYZED								
Lab pH	NELAP	1.00		7.23		1	02/08/2023 16:02	R324541
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		0.19	mg/L	1	02/07/2023 12:35	R324472
SW-846 9251 (TOTAL)								
Chloride	NELAP	1		14	mg/L	1	02/10/2023 12:34	R324670
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		0.0015	mg/L	5	02/10/2023 21:39	202752
Arsenic	NELAP	0.0010		< 0.0010	mg/L	5	02/10/2023 21:39	202752
Barium	NELAP	0.0010		0.411	mg/L	5	02/10/2023 21:39	202752
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	02/10/2023 21:39	202752
Boron	NELAP	0.0250		0.267	mg/L	5	02/10/2023 21:39	202752
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	02/10/2023 21:39	202752
Calcium	NELAP	0.125		199	mg/L	5	02/15/2023 8:37	202752
Chromium	NELAP	0.0015		< 0.0015	mg/L	5	02/14/2023 12:56	202752
Cobalt	NELAP	0.0010		< 0.0010	mg/L	5	02/14/2023 12:56	202752
Lead	NELAP	0.0010		< 0.0010	mg/L	5	02/10/2023 21:39	202752
Lithium	*	0.0030		0.0191	mg/L	5	02/10/2023 21:39	202752
Molybdenum	NELAP	0.0015		0.0027	mg/L	5	02/13/2023 13:34	202752
Nickel	NELAP	0.0010		< 0.0010	mg/L	5	02/14/2023 12:56	202752
Selenium	NELAP	0.0010		< 0.0010	mg/L	5	02/10/2023 21:39	202752
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	02/10/2023 21:39	202752
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	02/16/2023 11:26	202915
Arsenic	NELAP	0.0010		0.0014	mg/L	5	02/16/2023 11:26	202915
Barium	NELAP	0.0010		0.371	mg/L	5	02/16/2023 11:26	202915
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	02/16/2023 11:26	202915
Boron	NELAP	0.0250		0.246	mg/L	5	02/16/2023 11:26	202915
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	02/16/2023 11:26	202915
Calcium	NELAP	0.125		200	mg/L	5	02/16/2023 11:26	202915
Chromium	NELAP	0.0015		0.0034	mg/L	5	02/16/2023 11:26	202915
Cobalt	NELAP	0.0010		< 0.0010	mg/L	5	02/16/2023 11:26	202915
Iron	NELAP	0.125		24.4	mg/L	25	02/20/2023 9:42	202915
Lead	NELAP	0.0010		< 0.0010	mg/L	5	02/16/2023 11:26	202915
Lithium	*	0.0030		0.0181	mg/L	5	02/16/2023 11:26	202915
Manganese	NELAP	0.0020		1.19	mg/L	5	02/16/2023 11:26	202915
Molybdenum	NELAP	0.0015		0.0031	mg/L	5	02/16/2023 11:26	202915
Nickel	NELAP	0.0010		0.0021	mg/L	5	02/16/2023 11:26	202915
Selenium	NELAP	0.0010		< 0.0010	mg/L	5	02/16/2023 11:26	202915
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	02/16/2023 11:26	202915
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		< 0.00020	mg/L	1	02/07/2023 19:56	202649

Client: ERM **Work Order:** 23020169
Client Project: GTEC **Report Date:** 28-Feb-23
Lab ID: 23020169-002 **Client Sample ID:** APW-07-WG-20230130
Matrix: GROUNDWATER **Collection Date:** 01/30/2023 14:45

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		See Attached	pci/L	1	02/10/2023 0:00	R325261
Radium-228	*	0		See Attached	pci/L	1	02/10/2023 0:00	R325261

Client: ERM

Work Order: 23020169

Client Project: GTEC

Report Date: 28-Feb-23

Lab ID: 23020169-003

Client Sample ID: APW-06S-WG-20230201

Matrix: GROUNDWATER

Collection Date: 02/01/2023 9:10

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	20		638	mg/L	1	02/03/2023 14:50	R324399
SW-846 9036 (TOTAL)								
Sulfate	NELAP	100		247	mg/L	10	02/10/2023 12:55	R324668
SW-846 9040B, LABORATORY ANALYZED								
Lab pH	NELAP	1.00		7.12		1	02/08/2023 16:03	R324541
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		0.29	mg/L	1	02/09/2023 15:31	R324574
SW-846 9251 (TOTAL)								
Chloride	NELAP	1		24	mg/L	1	02/10/2023 12:45	R324670
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	02/10/2023 21:45	202752
Arsenic	NELAP	0.0010		0.0013	mg/L	5	02/10/2023 21:45	202752
Barium	NELAP	0.0010		0.219	mg/L	5	02/10/2023 21:45	202752
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	02/10/2023 21:45	202752
Boron	NELAP	0.0250		7.12	mg/L	5	02/10/2023 21:45	202752
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	02/10/2023 21:45	202752
Calcium	NELAP	0.125		94.1	mg/L	5	02/15/2023 8:42	202752
Chromium	NELAP	0.0015		< 0.0015	mg/L	5	02/14/2023 13:01	202752
Cobalt	NELAP	0.0010		< 0.0010	mg/L	5	02/14/2023 13:01	202752
Lead	NELAP	0.0010		< 0.0010	mg/L	5	02/10/2023 21:45	202752
Lithium	*	0.0030		0.0406	mg/L	5	02/10/2023 21:45	202752
Molybdenum	NELAP	0.0015		0.244	mg/L	5	02/13/2023 13:41	202752
Nickel	NELAP	0.0010		0.0051	mg/L	5	02/14/2023 13:01	202752
Selenium	NELAP	0.0010		< 0.0010	mg/L	5	02/10/2023 21:45	202752
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	02/10/2023 21:45	202752
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	02/16/2023 11:52	202915
Arsenic	NELAP	0.0010		0.0011	mg/L	5	02/16/2023 11:52	202915
Barium	NELAP	0.0010		0.202	mg/L	5	02/16/2023 11:52	202915
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	02/16/2023 11:52	202915
Boron	NELAP	0.0250	S	6.84	mg/L	5	02/16/2023 11:52	202915
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	02/16/2023 11:52	202915
Calcium	NELAP	0.125	S	97.1	mg/L	5	02/16/2023 11:52	202915
Chromium	NELAP	0.0015		< 0.0015	mg/L	5	02/16/2023 11:52	202915
Cobalt	NELAP	0.0010		< 0.0010	mg/L	5	02/16/2023 11:52	202915
Iron	NELAP	0.0250		9.07	mg/L	5	02/16/2023 11:52	202915
Lead	NELAP	0.0010		< 0.0010	mg/L	5	02/16/2023 11:52	202915
Lithium	*	0.0030		0.0406	mg/L	5	02/16/2023 11:52	202915
Manganese	NELAP	0.0020		0.506	mg/L	5	02/16/2023 11:52	202915
Molybdenum	NELAP	0.0015		0.265	mg/L	5	02/16/2023 11:52	202915
Nickel	NELAP	0.0010		0.0014	mg/L	5	02/16/2023 11:52	202915
Selenium	NELAP	0.0010		< 0.0010	mg/L	5	02/16/2023 11:52	202915
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	02/16/2023 11:52	202915
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		< 0.00020	mg/L	1	02/07/2023 20:03	202649

Matrix spike control limits are not applicable due to high sample/spike ratio.

Client: ERM **Work Order:** 23020169
Client Project: GTEC **Report Date:** 28-Feb-23
Lab ID: 23020169-003 **Client Sample ID:** APW-06S-WG-20230201
Matrix: GROUNDWATER **Collection Date:** 02/01/2023 9:10

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		See Attached	pci/L	1	02/10/2023 0:00	R325261
Radium-228	*	0		See Attached	pci/L	1	02/10/2023 0:00	R325261

Client: ERM

Work Order: 23020169

Client Project: GTEC

Report Date: 28-Feb-23

Lab ID: 23020169-004

Client Sample ID: APW-06D-WG-20230201

Matrix: GROUNDWATER

Collection Date: 02/01/2023 11:00

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	20		582	mg/L	1	02/03/2023 14:50	R324399
SW-846 9036 (TOTAL)								
Sulfate	NELAP	100		269	mg/L	10	02/10/2023 13:25	R324668
SW-846 9040B, LABORATORY ANALYZED								
Lab pH	NELAP	1.00		7.29		1	02/08/2023 16:07	R324541
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		0.21	mg/L	1	02/09/2023 15:33	R324574
SW-846 9251 (TOTAL)								
Chloride	NELAP	1		16	mg/L	1	02/10/2023 13:19	R324670
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	02/10/2023 21:51	202752
Arsenic	NELAP	0.0010		0.0120	mg/L	5	02/10/2023 21:51	202752
Barium	NELAP	0.0010		0.152	mg/L	5	02/10/2023 21:51	202752
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	02/10/2023 21:51	202752
Boron	NELAP	0.0250		4.39	mg/L	5	02/10/2023 21:51	202752
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	02/10/2023 21:51	202752
Calcium	NELAP	0.125		109	mg/L	5	02/15/2023 8:47	202752
Chromium	NELAP	0.0015		< 0.0015	mg/L	5	02/14/2023 13:06	202752
Cobalt	NELAP	0.0010		0.0010	mg/L	5	02/14/2023 13:06	202752
Lead	NELAP	0.0010		< 0.0010	mg/L	5	02/10/2023 21:51	202752
Lithium	*	0.0030		0.0194	mg/L	5	02/10/2023 21:51	202752
Molybdenum	NELAP	0.0015		0.0583	mg/L	5	02/13/2023 13:47	202752
Nickel	NELAP	0.0010		0.0063	mg/L	5	02/14/2023 13:06	202752
Selenium	NELAP	0.0010		< 0.0010	mg/L	5	02/10/2023 21:51	202752
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	02/10/2023 21:51	202752
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	02/16/2023 11:32	202915
Arsenic	NELAP	0.0010		0.0107	mg/L	5	02/16/2023 11:32	202915
Barium	NELAP	0.0010		0.134	mg/L	5	02/16/2023 11:32	202915
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	02/16/2023 11:32	202915
Boron	NELAP	0.0250		3.95	mg/L	5	02/16/2023 11:32	202915
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	02/16/2023 11:32	202915
Calcium	NELAP	0.125		116	mg/L	5	02/16/2023 11:32	202915
Chromium	NELAP	0.0015		< 0.0015	mg/L	5	02/16/2023 11:32	202915
Cobalt	NELAP	0.0010		0.0013	mg/L	5	02/16/2023 11:32	202915
Iron	NELAP	0.0250		3.92	mg/L	5	02/16/2023 11:32	202915
Lead	NELAP	0.0010		< 0.0010	mg/L	5	02/16/2023 11:32	202915
Lithium	*	0.0030		0.0172	mg/L	5	02/16/2023 11:32	202915
Manganese	NELAP	0.0020		0.690	mg/L	5	02/16/2023 11:32	202915
Molybdenum	NELAP	0.0015		0.0683	mg/L	5	02/16/2023 11:32	202915
Nickel	NELAP	0.0010		0.0030	mg/L	5	02/16/2023 11:32	202915
Selenium	NELAP	0.0010		< 0.0010	mg/L	5	02/16/2023 11:32	202915
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	02/16/2023 11:32	202915
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		< 0.00020	mg/L	1	02/10/2023 19:12	202742

Client: ERM **Work Order:** 23020169
Client Project: GTEC **Report Date:** 28-Feb-23
Lab ID: 23020169-004 **Client Sample ID:** APW-06D-WG-20230201
Matrix: GROUNDWATER **Collection Date:** 02/01/2023 11:00

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		See Attached	pci/L	1	02/10/2023 0:00	R325261
Radium-228	*	0		See Attached	pci/L	1	02/10/2023 0:00	R325261

Client: ERM

Work Order: 23020169

Client Project: GTEC

Report Date: 28-Feb-23

Lab ID: 23020169-005

Client Sample ID: APW-05-WG-20230201

Matrix: GROUNDWATER

Collection Date: 02/01/2023 12:25

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	20		696	mg/L	1	02/03/2023 14:50	R324399
SW-846 9036 (TOTAL)								
Sulfate	NELAP	100		325	mg/L	10	02/10/2023 13:33	R324668
SW-846 9040B, LABORATORY ANALYZED								
Lab pH	NELAP	1.00		7.31		1	02/08/2023 16:12	R324541
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		0.33	mg/L	1	02/09/2023 15:35	R324574
SW-846 9251 (TOTAL)								
Chloride	NELAP	1		18	mg/L	1	02/10/2023 13:27	R324670
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	02/10/2023 22:10	202752
Arsenic	NELAP	0.0010		0.0026	mg/L	5	02/10/2023 22:10	202752
Barium	NELAP	0.0010		0.175	mg/L	5	02/10/2023 22:10	202752
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	02/10/2023 22:10	202752
Boron	NELAP	0.0250	S	8.68	mg/L	5	02/10/2023 22:10	202752
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	02/10/2023 22:10	202752
Calcium	NELAP	0.125	S	106	mg/L	5	02/15/2023 18:31	202752
Chromium	NELAP	0.0015		< 0.0015	mg/L	5	02/14/2023 13:26	202752
Cobalt	NELAP	0.0010		< 0.0010	mg/L	5	02/14/2023 13:26	202752
Lead	NELAP	0.0010		< 0.0010	mg/L	5	02/10/2023 22:10	202752
Lithium	*	0.0030		0.0450	mg/L	5	02/10/2023 22:10	202752
Molybdenum	NELAP	0.0015		0.187	mg/L	5	02/13/2023 13:53	202752
Nickel	NELAP	0.0010		0.0017	mg/L	5	02/14/2023 13:26	202752
Selenium	NELAP	0.0010		< 0.0010	mg/L	5	02/10/2023 22:10	202752
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	02/10/2023 22:10	202752
<i>Matrix spike control limits for Ca are not applicable due to high sample/spike ratio.</i>								
<i>Matrix spike control limits for B are not applicable due to high sample/spike ratio.</i>								
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	02/16/2023 11:39	202915
Arsenic	NELAP	0.0010		0.0024	mg/L	5	02/16/2023 11:39	202915
Barium	NELAP	0.0010		0.145	mg/L	5	02/16/2023 11:39	202915
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	02/16/2023 11:39	202915
Boron	NELAP	0.0250		7.35	mg/L	5	02/16/2023 11:39	202915
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	02/16/2023 11:39	202915
Calcium	NELAP	0.125		112	mg/L	5	02/16/2023 11:39	202915
Chromium	NELAP	0.0015		< 0.0015	mg/L	5	02/16/2023 11:39	202915
Cobalt	NELAP	0.0010		< 0.0010	mg/L	5	02/16/2023 11:39	202915
Iron	NELAP	0.0250		1.65	mg/L	5	02/16/2023 11:39	202915
Lead	NELAP	0.0010		< 0.0010	mg/L	5	02/16/2023 11:39	202915
Lithium	*	0.0030		0.0399	mg/L	5	02/16/2023 11:39	202915
Manganese	NELAP	0.0020		0.706	mg/L	5	02/16/2023 11:39	202915
Molybdenum	NELAP	0.0015		0.217	mg/L	5	02/16/2023 11:39	202915
Nickel	NELAP	0.0010		0.0022	mg/L	5	02/16/2023 11:39	202915
Selenium	NELAP	0.0010		< 0.0010	mg/L	5	02/16/2023 11:39	202915
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	02/16/2023 11:39	202915

Client: ERM **Work Order:** 23020169
Client Project: GTEC **Report Date:** 28-Feb-23
Lab ID: 23020169-005 **Client Sample ID:** APW-05-WG-20230201
Matrix: GROUNDWATER **Collection Date:** 02/01/2023 12:25

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		< 0.00020	mg/L	1	02/10/2023 19:14	202742
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		See Attached	pci/L	1	02/10/2023 0:00	R325261
Radium-228	*	0		See Attached	pci/L	1	02/10/2023 0:00	R325261

Client: ERM

Work Order: 23020169

Client Project: GTEC

Report Date: 28-Feb-23

Lab ID: 23020169-006

Client Sample ID: APW-02-WG-20230201

Matrix: GROUNDWATER

Collection Date: 02/01/2023 13:50

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	20		852	mg/L	1	02/03/2023 14:51	R324399
SW-846 9036 (TOTAL)								
Sulfate	NELAP	100		459	mg/L	10	02/10/2023 13:40	R324668
SW-846 9040B, LABORATORY ANALYZED								
Lab pH	NELAP	1.00		6.98		1	02/08/2023 16:16	R324541
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		0.23	mg/L	1	02/09/2023 15:37	R324574
SW-846 9251 (TOTAL)								
Chloride	NELAP	1		10	mg/L	1	02/10/2023 13:35	R324670
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	02/10/2023 21:57	202752
Arsenic	NELAP	0.0010		0.0160	mg/L	5	02/10/2023 21:57	202752
Barium	NELAP	0.0010		0.187	mg/L	5	02/10/2023 21:57	202752
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	02/10/2023 21:57	202752
Boron	NELAP	0.0250		8.21	mg/L	5	02/10/2023 21:57	202752
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	02/10/2023 21:57	202752
Calcium	NELAP	0.125		108	mg/L	5	02/15/2023 8:52	202752
Chromium	NELAP	0.0015		< 0.0015	mg/L	5	02/14/2023 13:11	202752
Cobalt	NELAP	0.0010		< 0.0010	mg/L	5	02/14/2023 13:11	202752
Lead	NELAP	0.0010		< 0.0010	mg/L	5	02/10/2023 21:57	202752
Lithium	*	0.0030		0.0425	mg/L	5	02/10/2023 21:57	202752
Molybdenum	NELAP	0.0015		0.151	mg/L	5	02/13/2023 15:01	202752
Nickel	NELAP	0.0010		< 0.0010	mg/L	5	02/14/2023 13:11	202752
Selenium	NELAP	0.0010		< 0.0010	mg/L	5	02/10/2023 21:57	202752
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	02/10/2023 21:57	202752
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	02/16/2023 11:45	202915
Arsenic	NELAP	0.0010		0.0185	mg/L	5	02/16/2023 11:45	202915
Barium	NELAP	0.0010		0.214	mg/L	5	02/16/2023 11:45	202915
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	02/16/2023 11:45	202915
Boron	NELAP	0.0250		7.75	mg/L	5	02/16/2023 11:45	202915
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	02/16/2023 11:45	202915
Calcium	NELAP	0.125		144	mg/L	5	02/16/2023 11:45	202915
Chromium	NELAP	0.0015		0.0052	mg/L	5	02/16/2023 11:45	202915
Cobalt	NELAP	0.0010		< 0.0010	mg/L	5	02/16/2023 11:45	202915
Iron	NELAP	0.125		18.2	mg/L	25	02/20/2023 9:48	202915
Lead	NELAP	0.0010		0.0027	mg/L	5	02/16/2023 11:45	202915
Lithium	*	0.0030		0.0417	mg/L	5	02/16/2023 11:45	202915
Manganese	NELAP	0.0020		0.719	mg/L	5	02/16/2023 11:45	202915
Molybdenum	NELAP	0.0015		0.165	mg/L	5	02/16/2023 11:45	202915
Nickel	NELAP	0.0010		0.0039	mg/L	5	02/16/2023 11:45	202915
Selenium	NELAP	0.0010		< 0.0010	mg/L	5	02/16/2023 11:45	202915
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	02/16/2023 11:45	202915
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		< 0.00020	mg/L	1	02/10/2023 19:16	202742

Client: ERM **Work Order:** 23020169
Client Project: GTEC **Report Date:** 28-Feb-23
Lab ID: 23020169-006 **Client Sample ID:** APW-02-WG-20230201
Matrix: GROUNDWATER **Collection Date:** 02/01/2023 13:50

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		See Attached	pci/L	1	02/10/2023 0:00	R325261
Radium-228	*	0		See Attached	pci/L	1	02/10/2023 0:00	R325261

Client: ERM

Work Order: 23020169

Client Project: GTEC

Report Date: 28-Feb-23

Lab ID: 23020169-007

Client Sample ID: APW-09-WG-20230201

Matrix: GROUNDWATER

Collection Date: 02/01/2023 15:50

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	20		360	mg/L	1	02/03/2023 14:51	R324399
SW-846 9036 (TOTAL)								
Sulfate	NELAP	10		38	mg/L	1	02/10/2023 13:43	R324668
SW-846 9040B, LABORATORY ANALYZED								
Lab pH	NELAP	1.00		7.72		1	02/08/2023 16:19	R324541
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		0.19	mg/L	1	02/09/2023 15:39	R324574
SW-846 9251 (TOTAL)								
Chloride	NELAP	1		13	mg/L	1	02/10/2023 13:43	R324670
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	02/10/2023 22:04	202752
Arsenic	NELAP	0.0010		0.0019	mg/L	5	02/10/2023 22:04	202752
Barium	NELAP	0.0010		0.107	mg/L	5	02/10/2023 22:04	202752
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	02/10/2023 22:04	202752
Boron	NELAP	0.0250		0.239	mg/L	5	02/10/2023 22:04	202752
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	02/10/2023 22:04	202752
Calcium	NELAP	0.125		76.3	mg/L	5	02/24/2023 10:46	202752
Chromium	NELAP	0.0015		< 0.0015	mg/L	5	02/14/2023 13:16	202752
Cobalt	NELAP	0.0010		< 0.0010	mg/L	5	02/14/2023 13:16	202752
Lead	NELAP	0.0010		< 0.0010	mg/L	5	02/10/2023 22:04	202752
Lithium	*	0.0030		0.0125	mg/L	5	02/10/2023 22:04	202752
Molybdenum	NELAP	0.0015		0.0165	mg/L	5	02/13/2023 15:07	202752
Nickel	NELAP	0.0010		< 0.0010	mg/L	5	02/14/2023 13:16	202752
Selenium	NELAP	0.0010		0.0179	mg/L	5	02/10/2023 22:04	202752
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	02/10/2023 22:04	202752
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	02/16/2023 12:49	202915
Arsenic	NELAP	0.0010		0.0024	mg/L	5	02/16/2023 12:49	202915
Barium	NELAP	0.0010		0.122	mg/L	5	02/16/2023 12:49	202915
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	02/16/2023 12:49	202915
Boron	NELAP	0.0250		0.225	mg/L	5	02/16/2023 12:49	202915
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	02/16/2023 12:49	202915
Calcium	NELAP	0.125		80.3	mg/L	5	02/16/2023 12:49	202915
Chromium	NELAP	0.0015		< 0.0015	mg/L	5	02/16/2023 12:49	202915
Cobalt	NELAP	0.0010		< 0.0010	mg/L	5	02/16/2023 12:49	202915
Iron	NELAP	0.0250		0.149	mg/L	5	02/16/2023 12:49	202915
Lead	NELAP	0.0010		< 0.0010	mg/L	5	02/16/2023 12:49	202915
Lithium	*	0.0030		0.0137	mg/L	5	02/16/2023 12:49	202915
Manganese	NELAP	0.0020		0.0945	mg/L	5	02/16/2023 12:49	202915
Molybdenum	NELAP	0.0015		0.0173	mg/L	5	02/16/2023 12:49	202915
Nickel	NELAP	0.0010		< 0.0010	mg/L	5	02/16/2023 12:49	202915
Selenium	NELAP	0.0010		0.0196	mg/L	5	02/16/2023 12:49	202915
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	02/16/2023 12:49	202915
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		< 0.00020	mg/L	1	02/10/2023 19:19	202742

Client: ERM
Client Project: GTEC
Lab ID: 23020169-007
Matrix: GROUNDWATER

Work Order: 23020169
Report Date: 28-Feb-23
Client Sample ID: APW-09-WG-20230201
Collection Date: 02/01/2023 15:50

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		See Attached	pci/L	1	02/10/2023 0:00	R325261
Radium-228	*	0		See Attached	pci/L	1	02/10/2023 0:00	R325261

Client: ERM

Work Order: 23020169

Client Project: GTEC

Report Date: 28-Feb-23

Lab ID: 23020169-008

Client Sample ID: APW-08-WG-20230202

Matrix: GROUNDWATER

Collection Date: 02/02/2023 9:45

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	20		378	mg/L	1	02/07/2023 12:03	R324544
SW-846 9036 (TOTAL)								
Sulfate	NELAP	10		29	mg/L	1	02/10/2023 13:51	R324668
SW-846 9040B, LABORATORY ANALYZED								
Lab pH	NELAP	1.00		7.31		1	02/08/2023 16:21	R324541
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		0.26	mg/L	1	02/09/2023 15:41	R324574
SW-846 9251 (TOTAL)								
Chloride	NELAP	1		13	mg/L	1	02/10/2023 13:51	R324670
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	02/10/2023 22:54	202752
Arsenic	NELAP	0.0010		0.0010	mg/L	5	02/10/2023 22:54	202752
Barium	NELAP	0.0010		0.150	mg/L	5	02/10/2023 22:54	202752
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	02/10/2023 22:54	202752
Boron	NELAP	0.0250		0.0895	mg/L	5	02/10/2023 22:54	202752
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	02/10/2023 22:54	202752
Calcium	NELAP	0.125		72.1	mg/L	5	02/24/2023 11:05	202752
Chromium	NELAP	0.0015		< 0.0015	mg/L	5	02/14/2023 13:21	202752
Cobalt	NELAP	0.0010		< 0.0010	mg/L	5	02/14/2023 13:21	202752
Lead	NELAP	0.0010		< 0.0010	mg/L	5	02/10/2023 22:54	202752
Lithium	*	0.0030		0.0131	mg/L	5	02/10/2023 22:54	202752
Molybdenum	NELAP	0.0015		< 0.0015	mg/L	5	02/13/2023 15:14	202752
Nickel	NELAP	0.0010		0.0013	mg/L	5	02/10/2023 22:54	202752
Selenium	NELAP	0.0010		0.0128	mg/L	5	02/10/2023 22:54	202752
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	02/10/2023 22:54	202752
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	02/16/2023 12:56	202915
Arsenic	NELAP	0.0010		0.0016	mg/L	5	02/16/2023 12:56	202915
Barium	NELAP	0.0010		0.167	mg/L	5	02/16/2023 12:56	202915
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	02/16/2023 12:56	202915
Boron	NELAP	0.0250		0.0950	mg/L	5	02/16/2023 12:56	202915
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	02/16/2023 12:56	202915
Calcium	NELAP	0.125		79.4	mg/L	5	02/16/2023 12:56	202915
Chromium	NELAP	0.0015		0.0027	mg/L	5	02/16/2023 12:56	202915
Cobalt	NELAP	0.0010		0.0012	mg/L	5	02/16/2023 12:56	202915
Iron	NELAP	0.0250		1.26	mg/L	5	02/16/2023 12:56	202915
Lead	NELAP	0.0010		< 0.0010	mg/L	5	02/16/2023 12:56	202915
Lithium	*	0.0030		0.0155	mg/L	5	02/16/2023 12:56	202915
Manganese	NELAP	0.0020		0.0561	mg/L	5	02/16/2023 12:56	202915
Molybdenum	NELAP	0.0015		< 0.0015	mg/L	5	02/16/2023 12:56	202915
Nickel	NELAP	0.0010		0.0030	mg/L	5	02/16/2023 12:56	202915
Selenium	NELAP	0.0010		0.0148	mg/L	5	02/16/2023 12:56	202915
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	02/16/2023 12:56	202915
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		< 0.00020	mg/L	1	02/10/2023 19:21	202742

Client: ERM
Client Project: GTEC
Lab ID: 23020169-008
Matrix: GROUNDWATER

Work Order: 23020169
Report Date: 28-Feb-23
Client Sample ID: APW-08-WG-20230202
Collection Date: 02/02/2023 9:45

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		See Attached	pci/L	1	02/10/2023 0:00	R325261
Radium-228	*	0		See Attached	pci/L	1	02/10/2023 0:00	R325261

Client: ERM

Work Order: 23020169

Client Project: GTEC

Report Date: 28-Feb-23

Lab ID: 23020169-009

Client Sample ID: APW-10S-WG-20230202

Matrix: GROUNDWATER

Collection Date: 02/02/2023 11:10

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	50		780	mg/L	2.5	02/07/2023 12:04	R324544
SW-846 9036 (TOTAL)								
Sulfate	NELAP	10		< 10	mg/L	1	02/10/2023 14:15	R324668
SW-846 9040B, LABORATORY ANALYZED								
Lab pH	NELAP	1.00		7.20		1	02/08/2023 16:26	R324541
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		0.15	mg/L	1	02/09/2023 15:43	R324574
SW-846 9251 (TOTAL)								
Chloride	NELAP	1		21	mg/L	1	02/10/2023 14:15	R324670
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		0.0016	mg/L	5	02/13/2023 9:52	202753
Arsenic	NELAP	0.0010		0.171	mg/L	5	02/10/2023 15:35	202753
Barium	NELAP	0.0010		0.506	mg/L	5	02/10/2023 15:35	202753
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	02/13/2023 9:52	202753
Boron	NELAP	0.0250		0.497	mg/L	5	02/10/2023 15:35	202753
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	02/13/2023 9:52	202753
Calcium	NELAP	0.125		145	mg/L	5	02/13/2023 9:52	202753
Chromium	NELAP	0.0015		< 0.0015	mg/L	5	02/13/2023 9:52	202753
Cobalt	NELAP	0.0010		< 0.0010	mg/L	5	02/13/2023 9:52	202753
Lead	NELAP	0.0010		< 0.0010	mg/L	5	02/10/2023 15:35	202753
Lithium	*	0.0030		0.0268	mg/L	5	02/10/2023 15:35	202753
Molybdenum	NELAP	0.0015		< 0.0015	mg/L	5	02/13/2023 9:52	202753
Nickel	NELAP	0.0010		< 0.0010	mg/L	5	02/10/2023 15:35	202753
Selenium	NELAP	0.0010		< 0.0010	mg/L	5	02/10/2023 15:35	202753
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	02/10/2023 15:35	202753
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	02/16/2023 13:02	202915
Arsenic	NELAP	0.0010		0.191	mg/L	5	02/16/2023 13:02	202915
Barium	NELAP	0.0010		0.575	mg/L	5	02/16/2023 13:02	202915
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	02/16/2023 13:02	202915
Boron	NELAP	0.0250		0.592	mg/L	5	02/16/2023 13:02	202915
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	02/16/2023 13:02	202915
Calcium	NELAP	0.125		145	mg/L	5	02/16/2023 13:02	202915
Chromium	NELAP	0.0015		0.0023	mg/L	5	02/16/2023 13:02	202915
Cobalt	NELAP	0.0010		< 0.0010	mg/L	5	02/16/2023 13:02	202915
Iron	NELAP	0.125		23.8	mg/L	25	02/20/2023 9:55	202915
Lead	NELAP	0.0010		< 0.0010	mg/L	5	02/16/2023 13:02	202915
Lithium	*	0.0030		0.0323	mg/L	5	02/16/2023 13:02	202915
Manganese	NELAP	0.0020		0.179	mg/L	5	02/16/2023 13:02	202915
Molybdenum	NELAP	0.0015		< 0.0015	mg/L	5	02/16/2023 13:02	202915
Nickel	NELAP	0.0010		0.0013	mg/L	5	02/16/2023 13:02	202915
Selenium	NELAP	0.0010		< 0.0010	mg/L	5	02/16/2023 13:02	202915
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	02/16/2023 13:02	202915
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		< 0.00020	mg/L	1	02/10/2023 19:28	202742

Client: ERM **Work Order:** 23020169
Client Project: GTEC **Report Date:** 28-Feb-23
Lab ID: 23020169-009 **Client Sample ID:** APW-10S-WG-20230202
Matrix: GROUNDWATER **Collection Date:** 02/02/2023 11:10

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		See Attached	pci/L	1	02/10/2023 0:00	R325261
Radium-228	*	0		See Attached	pci/L	1	02/10/2023 0:00	R325261

Client: ERM

Work Order: 23020169

Client Project: GTEC

Report Date: 28-Feb-23

Lab ID: 23020169-010

Client Sample ID: APW-10D-WG-20230202

Matrix: GROUNDWATER

Collection Date: 02/02/2023 12:30

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	20		454	mg/L	1	02/06/2023 12:49	R324475
SW-846 9036 (TOTAL)								
Sulfate	NELAP	10		39	mg/L	1	02/10/2023 14:23	R324668
SW-846 9040B, LABORATORY ANALYZED								
Lab pH	NELAP	1.00		7.57		1	02/08/2023 16:27	R324541
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		0.12	mg/L	1	02/09/2023 15:45	R324574
SW-846 9251 (TOTAL)								
Chloride	NELAP	1		13	mg/L	1	02/10/2023 14:23	R324670
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	02/13/2023 9:59	202753
Arsenic	NELAP	0.0010		0.0011	mg/L	5	02/10/2023 15:41	202753
Barium	NELAP	0.0010		0.304	mg/L	5	02/10/2023 15:41	202753
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	02/13/2023 9:59	202753
Boron	NELAP	0.0250		0.0579	mg/L	5	02/10/2023 15:41	202753
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	02/13/2023 9:59	202753
Calcium	NELAP	0.125		114	mg/L	5	02/13/2023 9:59	202753
Chromium	NELAP	0.0015		< 0.0015	mg/L	5	02/13/2023 9:59	202753
Cobalt	NELAP	0.0010		0.0030	mg/L	5	02/13/2023 9:59	202753
Lead	NELAP	0.0010		< 0.0010	mg/L	5	02/10/2023 15:41	202753
Lithium	*	0.0030		0.0120	mg/L	5	02/10/2023 15:41	202753
Molybdenum	NELAP	0.0015		< 0.0015	mg/L	5	02/13/2023 9:59	202753
Nickel	NELAP	0.0010		0.0051	mg/L	5	02/10/2023 15:41	202753
Selenium	NELAP	0.0010		0.0024	mg/L	5	02/10/2023 15:41	202753
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	02/10/2023 15:41	202753
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	02/16/2023 13:08	202915
Arsenic	NELAP	0.0010		0.0017	mg/L	5	02/16/2023 13:08	202915
Barium	NELAP	0.0010		0.343	mg/L	5	02/16/2023 13:08	202915
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	02/16/2023 13:08	202915
Boron	NELAP	0.0250		0.0730	mg/L	5	02/16/2023 13:08	202915
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	02/16/2023 13:08	202915
Calcium	NELAP	0.125		122	mg/L	5	02/16/2023 13:08	202915
Chromium	NELAP	0.0015		< 0.0015	mg/L	5	02/16/2023 13:08	202915
Cobalt	NELAP	0.0010		0.0033	mg/L	5	02/16/2023 13:08	202915
Iron	NELAP	0.0250		0.480	mg/L	5	02/16/2023 13:08	202915
Lead	NELAP	0.0010		< 0.0010	mg/L	5	02/16/2023 13:08	202915
Lithium	*	0.0030		0.0146	mg/L	5	02/16/2023 13:08	202915
Manganese	NELAP	0.0020		0.941	mg/L	5	02/16/2023 13:08	202915
Molybdenum	NELAP	0.0015		< 0.0015	mg/L	5	02/16/2023 13:08	202915
Nickel	NELAP	0.0010		0.0066	mg/L	5	02/16/2023 13:08	202915
Selenium	NELAP	0.0010		0.0027	mg/L	5	02/16/2023 13:08	202915
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	02/16/2023 13:08	202915
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		< 0.00020	mg/L	1	02/10/2023 19:34	202742

Client: ERM **Work Order:** 23020169
Client Project: GTEC **Report Date:** 28-Feb-23
Lab ID: 23020169-010 **Client Sample ID:** APW-10D-WG-20230202
Matrix: GROUNDWATER **Collection Date:** 02/02/2023 12:30

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		See Attached	pci/L	1	02/10/2023 0:00	R325261
Radium-228	*	0		See Attached	pci/L	1	02/10/2023 0:00	R325261

Client: ERM

Work Order: 23020169

Client Project: GTEC

Report Date: 28-Feb-23

Lab ID: 23020169-011

Client Sample ID: APW-04-WG-20230202

Matrix: GROUNDWATER

Collection Date: 02/02/2023 14:05

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	20		416	mg/L	1	02/06/2023 12:49	R324475
SW-846 9036 (TOTAL)								
Sulfate	NELAP	20		62	mg/L	2	02/13/2023 11:51	R324732
SW-846 9040B, LABORATORY ANALYZED								
Lab pH	NELAP	1.00		7.21		1	02/08/2023 16:29	R324541
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		0.15	mg/L	1	02/09/2023 15:55	R324574
SW-846 9251 (TOTAL)								
Chloride	NELAP	1		10	mg/L	1	02/10/2023 14:31	R324670
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	02/13/2023 10:24	202753
Arsenic	NELAP	0.0010		0.0011	mg/L	5	02/10/2023 16:06	202753
Barium	NELAP	0.0010		0.116	mg/L	5	02/10/2023 16:06	202753
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	02/13/2023 10:24	202753
Boron	NELAP	0.0250		0.619	mg/L	5	02/10/2023 16:06	202753
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	02/13/2023 10:24	202753
Calcium	NELAP	0.125	S	93.3	mg/L	5	02/13/2023 10:24	202753
Chromium	NELAP	0.0015		< 0.0015	mg/L	5	02/13/2023 10:24	202753
Cobalt	NELAP	0.0010		< 0.0010	mg/L	5	02/13/2023 10:24	202753
Lead	NELAP	0.0010		< 0.0010	mg/L	5	02/10/2023 16:06	202753
Lithium	*	0.0030		0.0292	mg/L	5	02/10/2023 16:06	202753
Molybdenum	NELAP	0.0015		0.0383	mg/L	5	02/13/2023 10:24	202753
Nickel	NELAP	0.0010		0.0021	mg/L	5	02/10/2023 16:06	202753
Selenium	NELAP	0.0010		0.0090	mg/L	5	02/10/2023 16:06	202753
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	02/10/2023 16:06	202753
<i>Matrix spike control limits for Ca are not applicable due to high sample/spike ratio.</i>								
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	02/16/2023 13:15	202915
Arsenic	NELAP	0.0010		0.0017	mg/L	5	02/16/2023 13:15	202915
Barium	NELAP	0.0010		0.134	mg/L	5	02/16/2023 13:15	202915
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	02/16/2023 13:15	202915
Boron	NELAP	0.0250		0.650	mg/L	5	02/16/2023 13:15	202915
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	02/16/2023 13:15	202915
Calcium	NELAP	0.125		100	mg/L	5	02/16/2023 13:15	202915
Chromium	NELAP	0.0015		0.0016	mg/L	5	02/16/2023 13:15	202915
Cobalt	NELAP	0.0010		< 0.0010	mg/L	5	02/16/2023 13:15	202915
Iron	NELAP	0.0250		0.615	mg/L	5	02/16/2023 13:15	202915
Lead	NELAP	0.0010		< 0.0010	mg/L	5	02/16/2023 13:15	202915
Lithium	*	0.0030		0.0326	mg/L	5	02/16/2023 13:15	202915
Manganese	NELAP	0.0020		0.187	mg/L	5	02/16/2023 13:15	202915
Molybdenum	NELAP	0.0015		0.0377	mg/L	5	02/16/2023 13:15	202915
Nickel	NELAP	0.0010		0.0042	mg/L	5	02/16/2023 13:15	202915
Selenium	NELAP	0.0010		0.0099	mg/L	5	02/16/2023 13:15	202915
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	02/16/2023 13:15	202915
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		< 0.00020	mg/L	1	02/10/2023 19:37	202742

Client: ERM **Work Order:** 23020169
Client Project: GTEC **Report Date:** 28-Feb-23
Lab ID: 23020169-011 **Client Sample ID:** APW-04-WG-20230202
Matrix: GROUNDWATER **Collection Date:** 02/02/2023 14:05

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		See Attached	pci/L	1	02/10/2023 0:00	R325261
Radium-228	*	0		See Attached	pci/L	1	02/10/2023 0:00	R325261

Client: ERM

Work Order: 23020169

Client Project: GTEC

Report Date: 28-Feb-23

Lab ID: 23020169-012

Client Sample ID: APW-01R-WG-20230202

Matrix: GROUNDWATER

Collection Date: 02/02/2023 15:10

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	20		384	mg/L	1	02/06/2023 12:49	R324475
SW-846 9036 (TOTAL)								
Sulfate	NELAP	50		74	mg/L	5	02/13/2023 12:08	R324732
SW-846 9040B, LABORATORY ANALYZED								
Lab pH	NELAP	1.00		6.57		1	02/08/2023 16:31	R324541
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		0.17	mg/L	1	02/09/2023 15:58	R324574
SW-846 9251 (TOTAL)								
Chloride	NELAP	1		7	mg/L	1	02/10/2023 14:42	R324670
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	02/13/2023 10:05	202753
Arsenic	NELAP	0.0010		0.0010	mg/L	5	02/10/2023 15:47	202753
Barium	NELAP	0.0010		0.155	mg/L	5	02/10/2023 15:47	202753
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	02/13/2023 10:05	202753
Boron	NELAP	0.0250		0.205	mg/L	5	02/10/2023 15:47	202753
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	02/13/2023 10:05	202753
Calcium	NELAP	0.125		71.4	mg/L	5	02/13/2023 10:05	202753
Chromium	NELAP	0.0015		< 0.0015	mg/L	5	02/13/2023 10:05	202753
Cobalt	NELAP	0.0010		< 0.0010	mg/L	5	02/13/2023 10:05	202753
Lead	NELAP	0.0010		< 0.0010	mg/L	5	02/10/2023 15:47	202753
Lithium	*	0.0030		0.0135	mg/L	5	02/10/2023 15:47	202753
Molybdenum	NELAP	0.0015		< 0.0015	mg/L	5	02/13/2023 10:05	202753
Nickel	NELAP	0.0010		0.0059	mg/L	5	02/10/2023 15:47	202753
Selenium	NELAP	0.0010		0.0032	mg/L	5	02/10/2023 15:47	202753
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	02/10/2023 15:47	202753
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	02/16/2023 13:21	202915
Arsenic	NELAP	0.0010		0.0016	mg/L	5	02/16/2023 13:21	202915
Barium	NELAP	0.0010		0.178	mg/L	5	02/16/2023 13:21	202915
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	02/16/2023 13:21	202915
Boron	NELAP	0.0250		0.221	mg/L	5	02/16/2023 13:21	202915
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	02/16/2023 13:21	202915
Calcium	NELAP	0.125	S	75.5	mg/L	5	02/16/2023 13:21	202915
Chromium	NELAP	0.0015		0.0022	mg/L	5	02/16/2023 13:21	202915
Cobalt	NELAP	0.0010		0.0013	mg/L	5	02/16/2023 13:21	202915
Iron	NELAP	0.0250		0.627	mg/L	5	02/16/2023 13:21	202915
Lead	NELAP	0.0010		< 0.0010	mg/L	5	02/16/2023 13:21	202915
Lithium	*	0.0030		0.0157	mg/L	5	02/16/2023 13:21	202915
Manganese	NELAP	0.0020		0.0964	mg/L	5	02/16/2023 13:21	202915
Molybdenum	NELAP	0.0015		< 0.0015	mg/L	5	02/16/2023 13:21	202915
Nickel	NELAP	0.0010		0.0081	mg/L	5	02/16/2023 13:21	202915
Selenium	NELAP	0.0010		0.0037	mg/L	5	02/16/2023 13:21	202915
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	02/16/2023 13:21	202915
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		< 0.00020	mg/L	1	02/10/2023 11:37	202743

Matrix spike control limits are not applicable due to high sample/spike ratio.

Client: ERM **Work Order:** 23020169
Client Project: GTEC **Report Date:** 28-Feb-23
Lab ID: 23020169-012 **Client Sample ID:** APW-01R-WG-20230202
Matrix: GROUNDWATER **Collection Date:** 02/02/2023 15:10

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		See Attached	pci/L	1	02/16/2023 0:00	R325261
Radium-228	*	0		See Attached	pci/L	1	02/16/2023 0:00	R325261



Laboratory Results

<http://www.teklabinc.com/>

Client: ERM
Client Project: GTEC
Lab ID: 23020169-013
Matrix: AQUEOUS

Work Order: 23020169
Report Date: 28-Feb-23
Client Sample ID: EB-01-WQ-20230130
Collection Date: 01/30/2023 9:40

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	20	H	< 20	mg/L	1	02/22/2023 11:44	R325208
Sample required re-analysis out of hold time.								
SW-846 9036 (TOTAL)								
Sulfate	NELAP	10		< 10	mg/L	1	02/10/2023 15:19	R324668
SW-846 9040B, LABORATORY ANALYZED								
Lab pH	NELAP	1.00		5.54		1	02/08/2023 16:37	R324541
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		< 0.10	mg/L	1	02/09/2023 15:59	R324574
SW-846 9251 (TOTAL)								
Chloride	NELAP	1		< 1	mg/L	1	02/10/2023 15:19	R324670
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	02/16/2023 16:33	202963
Arsenic	NELAP	0.0010		< 0.0010	mg/L	5	02/16/2023 16:33	202963
Barium	NELAP	0.0010		< 0.0010	mg/L	5	02/16/2023 16:33	202963
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	02/18/2023 5:39	202963
Boron	NELAP	0.0250	S	< 0.0250	mg/L	5	02/20/2023 12:15	202963
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	02/18/2023 5:39	202963
Calcium	NELAP	0.125		< 0.125	mg/L	5	02/16/2023 16:33	202963
Chromium	NELAP	0.0015		< 0.0015	mg/L	5	02/16/2023 16:33	202963
Cobalt	NELAP	0.0010		< 0.0010	mg/L	5	02/16/2023 16:33	202963
Lead	NELAP	0.0010		< 0.0010	mg/L	5	02/16/2023 16:33	202963
Lithium	*	0.0030		< 0.0030	mg/L	5	02/18/2023 5:39	202963
Molybdenum	NELAP	0.0015		< 0.0015	mg/L	5	02/18/2023 5:39	202963
Nickel	NELAP	0.0010		< 0.0010	mg/L	5	02/16/2023 16:33	202963
Selenium	NELAP	0.0010		< 0.0010	mg/L	5	02/16/2023 16:33	202963
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	02/16/2023 16:33	202963
Matrix spike recovered outside upper control limits. Sample results are below the reporting limit. Data is reportable.								
LCS recovered outside upper control limits for Sb, As, and Ba. Sample results are below the reporting limit. Data is reportable per the TNI Standard.								
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	02/16/2023 14:25	202916
Arsenic	NELAP	0.0010		< 0.0010	mg/L	5	02/16/2023 14:25	202916
Barium	NELAP	0.0010		< 0.0010	mg/L	5	02/16/2023 14:25	202916
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	02/17/2023 9:37	202916
Boron	NELAP	0.0250		< 0.0250	mg/L	5	02/17/2023 9:37	202916
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	02/17/2023 9:37	202916
Calcium	NELAP	0.125		< 0.125	mg/L	5	02/16/2023 14:25	202916
Chromium	NELAP	0.0015		< 0.0015	mg/L	5	02/16/2023 14:25	202916
Cobalt	NELAP	0.0010		< 0.0010	mg/L	5	02/16/2023 14:25	202916
Iron	NELAP	0.0250		< 0.0250	mg/L	5	02/16/2023 14:25	202916
Lead	NELAP	0.0010		< 0.0010	mg/L	5	02/16/2023 14:25	202916
Lithium	*	0.0030		< 0.0030	mg/L	5	02/17/2023 9:37	202916
Manganese	NELAP	0.0020		< 0.0020	mg/L	5	02/16/2023 14:25	202916
Molybdenum	NELAP	0.0015		< 0.0015	mg/L	5	02/17/2023 9:37	202916
Nickel	NELAP	0.0010		< 0.0010	mg/L	5	02/16/2023 14:25	202916
Selenium	NELAP	0.0010		< 0.0010	mg/L	5	02/16/2023 14:25	202916
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	02/16/2023 14:25	202916

Client: ERM Work Order: 23020169
Client Project: GTEC Report Date: 28-Feb-23
Lab ID: 23020169-013 Client Sample ID: EB-01-WQ-20230130
Matrix: AQUEOUS Collection Date: 01/30/2023 9:40

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		< 0.00020	mg/L	1	02/10/2023 11:39	202743
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		See Attached	pci/L	1	02/16/2023 0:00	R325261
Radium-228	*	0		See Attached	pci/L	1	02/16/2023 0:00	R325261

Client: ERM

Work Order: 23020169

Client Project: GTEC

Report Date: 28-Feb-23

Lab ID: 23020169-014

Client Sample ID: DUP-01-WG-20230201

Matrix: GROUNDWATER

Collection Date: 02/01/2023 0:01

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	20		670	mg/L	1	02/03/2023 14:51	R324399
SW-846 9036 (TOTAL)								
Sulfate	NELAP	100		305	mg/L	10	02/10/2023 15:32	R324668
SW-846 9040B, LABORATORY ANALYZED								
Lab pH	NELAP	1.00		7.33		1	02/08/2023 16:40	R324541
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		0.33	mg/L	1	02/09/2023 16:02	R324574
SW-846 9251 (TOTAL)								
Chloride	NELAP	1		18	mg/L	1	02/10/2023 15:27	R324670
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	02/13/2023 10:11	202753
Arsenic	NELAP	0.0010		0.0018	mg/L	5	02/10/2023 15:54	202753
Barium	NELAP	0.0010		0.135	mg/L	5	02/10/2023 15:54	202753
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	02/13/2023 10:11	202753
Boron	NELAP	0.0250		6.76	mg/L	5	02/10/2023 15:54	202753
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	02/13/2023 10:11	202753
Calcium	NELAP	0.125		111	mg/L	5	02/13/2023 10:11	202753
Chromium	NELAP	0.0015		< 0.0015	mg/L	5	02/13/2023 10:11	202753
Cobalt	NELAP	0.0010		< 0.0010	mg/L	5	02/13/2023 10:11	202753
Lead	NELAP	0.0010		< 0.0010	mg/L	5	02/10/2023 15:54	202753
Lithium	*	0.0030		0.0375	mg/L	5	02/10/2023 15:54	202753
Molybdenum	NELAP	0.0015		0.199	mg/L	5	02/13/2023 10:11	202753
Nickel	NELAP	0.0010		0.0013	mg/L	5	02/10/2023 15:54	202753
Selenium	NELAP	0.0010		< 0.0010	mg/L	5	02/10/2023 15:54	202753
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	02/10/2023 15:54	202753
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	02/16/2023 14:31	202916
Arsenic	NELAP	0.0010		0.0025	mg/L	5	02/16/2023 14:31	202916
Barium	NELAP	0.0010		0.148	mg/L	5	02/16/2023 14:31	202916
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	02/17/2023 9:43	202916
Boron	NELAP	0.0250		7.59	mg/L	5	02/17/2023 9:43	202916
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	02/17/2023 9:43	202916
Calcium	NELAP	0.125		114	mg/L	5	02/16/2023 14:31	202916
Chromium	NELAP	0.0015		< 0.0015	mg/L	5	02/16/2023 14:31	202916
Cobalt	NELAP	0.0010		< 0.0010	mg/L	5	02/16/2023 14:31	202916
Iron	NELAP	0.0250		1.58	mg/L	5	02/16/2023 14:31	202916
Lead	NELAP	0.0010		< 0.0010	mg/L	5	02/16/2023 14:31	202916
Lithium	*	0.0030		0.0402	mg/L	5	02/17/2023 9:43	202916
Manganese	NELAP	0.0020		0.693	mg/L	5	02/16/2023 14:31	202916
Molybdenum	NELAP	0.0015		0.212	mg/L	5	02/17/2023 9:43	202916
Nickel	NELAP	0.0010		0.0018	mg/L	5	02/16/2023 14:31	202916
Selenium	NELAP	0.0010		< 0.0010	mg/L	5	02/16/2023 14:31	202916
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	02/16/2023 14:31	202916
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		< 0.00020	mg/L	1	02/10/2023 11:50	202743

Client: ERM **Work Order:** 23020169
Client Project: GTEC **Report Date:** 28-Feb-23
Lab ID: 23020169-014 **Client Sample ID:** DUP-01-WG-20230201
Matrix: GROUNDWATER **Collection Date:** 02/01/2023 0:01

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		See Attached	pci/L	1	02/16/2023 0:00	R325261
Radium-228	*	0		See Attached	pci/L	1	02/16/2023 0:00	R325261

Client: ERM

Work Order: 23020169

Client Project: GTEC

Report Date: 28-Feb-23

Lab ID: 23020169-015

Client Sample ID: DUP-02-WG-20230201

Matrix: GROUNDWATER

Collection Date: 02/01/2023 0:02

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	20		866	mg/L	1	02/03/2023 14:52	R324399
SW-846 9036 (TOTAL)								
Sulfate	NELAP	100		455	mg/L	10	02/10/2023 15:40	R324668
SW-846 9040B, LABORATORY ANALYZED								
Lab pH	NELAP	1.00		7.05		1	02/08/2023 16:42	R324541
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		0.22	mg/L	1	02/09/2023 16:04	R324574
SW-846 9251 (TOTAL)								
Chloride	NELAP	1		10	mg/L	1	02/10/2023 15:35	R324670
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	02/13/2023 10:17	202753
Arsenic	NELAP	0.0010		0.0138	mg/L	5	02/10/2023 16:00	202753
Barium	NELAP	0.0010		0.154	mg/L	5	02/10/2023 16:00	202753
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	02/13/2023 10:17	202753
Boron	NELAP	0.0250		7.39	mg/L	5	02/10/2023 16:00	202753
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	02/13/2023 10:17	202753
Calcium	NELAP	0.125		144	mg/L	5	02/13/2023 10:17	202753
Chromium	NELAP	0.0015		< 0.0015	mg/L	5	02/13/2023 10:17	202753
Cobalt	NELAP	0.0010		< 0.0010	mg/L	5	02/13/2023 10:17	202753
Lead	NELAP	0.0010		< 0.0010	mg/L	5	02/10/2023 16:00	202753
Lithium	*	0.0030		0.0387	mg/L	5	02/10/2023 16:00	202753
Molybdenum	NELAP	0.0015		0.155	mg/L	5	02/13/2023 10:17	202753
Nickel	NELAP	0.0010		< 0.0010	mg/L	5	02/10/2023 16:00	202753
Selenium	NELAP	0.0010		< 0.0010	mg/L	5	02/10/2023 16:00	202753
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	02/10/2023 16:00	202753
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	02/16/2023 14:57	202916
Arsenic	NELAP	0.0010		0.0175	mg/L	5	02/16/2023 14:57	202916
Barium	NELAP	0.0010		0.159	mg/L	5	02/16/2023 14:57	202916
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	02/17/2023 9:50	202916
Boron	NELAP	0.0250	S	8.32	mg/L	5	02/17/2023 9:50	202916
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	02/17/2023 9:50	202916
Calcium	NELAP	0.125	S	149	mg/L	5	02/16/2023 14:57	202916
Chromium	NELAP	0.0015		0.0022	mg/L	5	02/16/2023 14:57	202916
Cobalt	NELAP	0.0010		< 0.0010	mg/L	5	02/16/2023 14:57	202916
Iron	NELAP	0.0250		11.7	mg/L	5	02/16/2023 14:57	202916
Lead	NELAP	0.0010		0.0023	mg/L	5	02/16/2023 14:57	202916
Lithium	*	0.0030		0.0440	mg/L	5	02/17/2023 9:50	202916
Manganese	NELAP	0.0020		0.712	mg/L	5	02/16/2023 14:57	202916
Molybdenum	NELAP	0.0015		0.160	mg/L	5	02/17/2023 9:50	202916
Nickel	NELAP	0.0010		0.0023	mg/L	5	02/16/2023 14:57	202916
Selenium	NELAP	0.0010		< 0.0010	mg/L	5	02/16/2023 14:57	202916
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	02/16/2023 14:57	202916
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		< 0.00020	mg/L	1	02/10/2023 11:53	202743

Matrix spike control limits are not applicable due to high sample/spike ratio.

Client: ERM **Work Order:** 23020169
Client Project: GTEC **Report Date:** 28-Feb-23
Lab ID: 23020169-015 **Client Sample ID:** DUP-02-WG-20230201
Matrix: GROUNDWATER **Collection Date:** 02/01/2023 0:02

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		See Attached	pci/L	1	02/16/2023 0:00	R325261
Radium-228	*	0		See Attached	pci/L	1	02/16/2023 0:00	R325261

Client: ERM**Work Order:** 23020169**Client Project:** GTEC**Report Date:** 28-Feb-23

Lab Sample ID	Client Sample ID	Matrix	Fractions	Collection Date
23020169-001	APW-03-WG-20230130	Groundwater	4	01/30/2023 13:30
23020169-002	APW-07-WG-20230130	Groundwater	4	01/30/2023 14:45
23020169-003	APW-06S-WG-20230201	Groundwater	4	02/01/2023 9:10
23020169-004	APW-06D-WG-20230201	Groundwater	4	02/01/2023 11:00
23020169-005	APW-05-WG-20230201	Groundwater	4	02/01/2023 12:25
23020169-006	APW-02-WG-20230201	Groundwater	4	02/01/2023 13:50
23020169-007	APW-09-WG-20230201	Groundwater	4	02/01/2023 15:50
23020169-008	APW-08-WG-20230202	Groundwater	4	02/02/2023 9:45
23020169-009	APW-10S-WG-20230202	Groundwater	4	02/02/2023 11:10
23020169-010	APW-10D-WG-20230202	Groundwater	4	02/02/2023 12:30
23020169-011	APW-04-WG-20230202	Groundwater	4	02/02/2023 14:05
23020169-012	APW-01R-WG-20230202	Groundwater	4	02/02/2023 15:10
23020169-013	EB-01-WQ-20230130	Aqueous	5	01/30/2023 9:40
23020169-014	DUP-01-WG-20230201	Groundwater	4	02/01/2023 0:01
23020169-015	DUP-02-WG-20230201	Groundwater	4	02/01/2023 0:02

Client: ERM

Work Order: 23020169

Client Project: GTEC

Report Date: 28-Feb-23

Sample ID	Client Sample ID	Collection Date	Received Date		
	Test Name			Prep Date/Time	Analysis Date/Time
23020169-001A	APW-03-WG-20230130	01/30/2023 13:30	02/03/2023 8:45		
	Standard Methods 2540 C (Total) 1997, 2011				02/03/2023 12:55
	SW-846 9036 (Total)				02/10/2023 12:31
	SW-846 9040B, Laboratory Analyzed				02/08/2023 16:00
	SW-846 9214 (Total)				02/09/2023 15:22
	SW-846 9251 (Total)				02/10/2023 12:26
23020169-001B	APW-03-WG-20230130	01/30/2023 13:30	02/03/2023 8:45		
	EPA 903.0/904.0, Radium 226/228				02/10/2023 0:00
23020169-001C	APW-03-WG-20230130	01/30/2023 13:30	02/03/2023 8:45		
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			02/07/2023 9:43	02/09/2023 18:08
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			02/07/2023 9:43	02/10/2023 11:50
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			02/10/2023 14:02	02/13/2023 23:02
	SW-846 7470A (Total)			02/07/2023 8:30	02/07/2023 19:54
23020169-001D	APW-03-WG-20230130	01/30/2023 13:30	02/03/2023 8:45		
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			02/09/2023 11:06	02/10/2023 20:48
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			02/09/2023 11:06	02/13/2023 13:28
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			02/09/2023 11:06	02/14/2023 12:51
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			02/09/2023 11:06	02/15/2023 8:33
23020169-002A	APW-07-WG-20230130	01/30/2023 14:45	02/03/2023 8:45		
	Standard Methods 2540 C (Total) 1997, 2011				02/06/2023 12:21
	SW-846 9036 (Total)				02/10/2023 12:34
	SW-846 9040B, Laboratory Analyzed				02/08/2023 16:02
	SW-846 9214 (Total)				02/07/2023 12:35
	SW-846 9251 (Total)				02/10/2023 12:34
23020169-002B	APW-07-WG-20230130	01/30/2023 14:45	02/03/2023 8:45		
	EPA 903.0/904.0, Radium 226/228				02/10/2023 0:00
23020169-002C	APW-07-WG-20230130	01/30/2023 14:45	02/03/2023 8:45		
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			02/15/2023 6:27	02/15/2023 16:52
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			02/15/2023 6:27	02/16/2023 11:26
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			02/15/2023 6:27	02/20/2023 9:42
	SW-846 7470A (Total)			02/07/2023 8:30	02/07/2023 19:56
23020169-002D	APW-07-WG-20230130	01/30/2023 14:45	02/03/2023 8:45		
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			02/09/2023 11:06	02/10/2023 21:39
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			02/09/2023 11:06	02/13/2023 13:34
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			02/09/2023 11:06	02/14/2023 12:56
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			02/09/2023 11:06	02/15/2023 8:37

Client: ERM

Work Order: 23020169

Client Project: GTEC

Report Date: 28-Feb-23

Sample ID	Client Sample ID	Collection Date	Received Date		
	Test Name			Prep Date/Time	Analysis Date/Time
23020169-003A	APW-06S-WG-20230201	02/01/2023 9:10	02/03/2023 8:45		
	Standard Methods 2540 C (Total) 1997, 2011				02/03/2023 14:50
	SW-846 9036 (Total)				02/10/2023 12:55
	SW-846 9040B, Laboratory Analyzed				02/08/2023 16:03
	SW-846 9214 (Total)				02/09/2023 15:31
	SW-846 9251 (Total)				02/10/2023 12:45
23020169-003B	APW-06S-WG-20230201	02/01/2023 9:10	02/03/2023 8:45		
	EPA 903.0/904.0, Radium 226/228				02/10/2023 0:00
23020169-003C	APW-06S-WG-20230201	02/01/2023 9:10	02/03/2023 8:45		
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			02/15/2023 6:27	02/15/2023 17:23
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			02/15/2023 6:27	02/16/2023 11:52
	SW-846 7470A (Total)			02/07/2023 8:30	02/07/2023 20:03
23020169-003D	APW-06S-WG-20230201	02/01/2023 9:10	02/03/2023 8:45		
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			02/09/2023 11:06	02/10/2023 21:45
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			02/09/2023 11:06	02/13/2023 13:41
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			02/09/2023 11:06	02/14/2023 13:01
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			02/09/2023 11:06	02/15/2023 8:42
23020169-004A	APW-06D-WG-20230201	02/01/2023 11:00	02/03/2023 8:45		
	Standard Methods 2540 C (Total) 1997, 2011				02/03/2023 14:50
	SW-846 9036 (Total)				02/10/2023 13:25
	SW-846 9040B, Laboratory Analyzed				02/08/2023 16:07
	SW-846 9214 (Total)				02/09/2023 15:33
	SW-846 9251 (Total)				02/10/2023 13:19
23020169-004B	APW-06D-WG-20230201	02/01/2023 11:00	02/03/2023 8:45		
	EPA 903.0/904.0, Radium 226/228				02/10/2023 0:00
23020169-004C	APW-06D-WG-20230201	02/01/2023 11:00	02/03/2023 8:45		
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			02/15/2023 6:27	02/15/2023 16:58
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			02/15/2023 6:27	02/16/2023 11:32
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			02/15/2023 6:27	02/23/2023 11:15
	SW-846 7470A (Total)			02/09/2023 10:45	02/10/2023 19:12
23020169-004D	APW-06D-WG-20230201	02/01/2023 11:00	02/03/2023 8:45		
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			02/09/2023 11:06	02/10/2023 21:51
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			02/09/2023 11:06	02/13/2023 13:47
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			02/09/2023 11:06	02/14/2023 13:06
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			02/09/2023 11:06	02/15/2023 8:47
23020169-005A	APW-05-WG-20230201	02/01/2023 12:25	02/03/2023 8:45		

Client: ERM

Work Order: 23020169

Client Project: GTEC

Report Date: 28-Feb-23

Sample ID	Client Sample ID	Collection Date	Received Date		
	Test Name			Prep Date/Time	Analysis Date/Time
	Standard Methods 2540 C (Total) 1997, 2011				02/03/2023 14:50
	SW-846 9036 (Total)				02/10/2023 13:33
	SW-846 9040B, Laboratory Analyzed				02/08/2023 16:12
	SW-846 9214 (Total)				02/09/2023 15:35
	SW-846 9251 (Total)				02/10/2023 13:27
23020169-005B	APW-05-WG-20230201	02/01/2023 12:25	02/03/2023 8:45		
	EPA 903.0/904.0, Radium 226/228				02/10/2023 0:00
23020169-005C	APW-05-WG-20230201	02/01/2023 12:25	02/03/2023 8:45		
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			02/15/2023 6:27	02/15/2023 17:05
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			02/15/2023 6:27	02/16/2023 11:39
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			02/15/2023 6:27	02/23/2023 11:34
	SW-846 7470A (Total)			02/09/2023 10:45	02/10/2023 19:14
23020169-005D	APW-05-WG-20230201	02/01/2023 12:25	02/03/2023 8:45		
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			02/09/2023 11:06	02/10/2023 22:10
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			02/09/2023 11:06	02/13/2023 13:53
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			02/09/2023 11:06	02/14/2023 13:26
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			02/09/2023 11:06	02/15/2023 18:31
23020169-006A	APW-02-WG-20230201	02/01/2023 13:50	02/03/2023 8:45		
	Standard Methods 2540 C (Total) 1997, 2011				02/03/2023 14:51
	SW-846 9036 (Total)				02/10/2023 13:40
	SW-846 9040B, Laboratory Analyzed				02/08/2023 16:16
	SW-846 9214 (Total)				02/09/2023 15:37
	SW-846 9251 (Total)				02/10/2023 13:35
23020169-006B	APW-02-WG-20230201	02/01/2023 13:50	02/03/2023 8:45		
	EPA 903.0/904.0, Radium 226/228				02/10/2023 0:00
23020169-006C	APW-02-WG-20230201	02/01/2023 13:50	02/03/2023 8:45		
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			02/15/2023 6:27	02/15/2023 17:11
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			02/15/2023 6:27	02/16/2023 11:45
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			02/15/2023 6:27	02/20/2023 9:48
	SW-846 7470A (Total)			02/09/2023 10:45	02/10/2023 19:16
23020169-006D	APW-02-WG-20230201	02/01/2023 13:50	02/03/2023 8:45		
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			02/09/2023 11:06	02/10/2023 21:57
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			02/09/2023 11:06	02/13/2023 15:01
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			02/09/2023 11:06	02/14/2023 13:11
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			02/09/2023 11:06	02/15/2023 8:52
23020169-007A	APW-09-WG-20230201	02/01/2023 15:50	02/03/2023 8:45		
	Standard Methods 2540 C (Total) 1997, 2011				02/03/2023 14:51

Client: ERM

Work Order: 23020169

Client Project: GTEC

Report Date: 28-Feb-23

Sample ID	Client Sample ID	Collection Date	Received Date		
	Test Name			Prep Date/Time	Analysis Date/Time
	SW-846 9036 (Total)				02/10/2023 13:43
	SW-846 9040B, Laboratory Analyzed				02/08/2023 16:19
	SW-846 9214 (Total)				02/09/2023 15:39
	SW-846 9251 (Total)				02/10/2023 13:43
23020169-007B	APW-09-WG-20230201	02/01/2023 15:50	02/03/2023 8:45		
	EPA 903.0/904.0, Radium 226/228				02/10/2023 0:00
23020169-007C	APW-09-WG-20230201	02/01/2023 15:50	02/03/2023 8:45		
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			02/15/2023 6:27	02/15/2023 17:17
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			02/15/2023 6:27	02/16/2023 12:49
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			02/15/2023 6:27	02/23/2023 11:53
	SW-846 7470A (Total)			02/09/2023 10:45	02/10/2023 19:19
23020169-007D	APW-09-WG-20230201	02/01/2023 15:50	02/03/2023 8:45		
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			02/09/2023 11:06	02/10/2023 22:04
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			02/09/2023 11:06	02/13/2023 15:07
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			02/09/2023 11:06	02/14/2023 13:16
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			02/09/2023 11:06	02/24/2023 10:46
23020169-008A	APW-08-WG-20230202	02/02/2023 9:45	02/03/2023 8:45		
	Standard Methods 2540 C (Total) 1997, 2011				02/07/2023 12:03
	SW-846 9036 (Total)				02/10/2023 13:51
	SW-846 9040B, Laboratory Analyzed				02/08/2023 16:21
	SW-846 9214 (Total)				02/09/2023 15:41
	SW-846 9251 (Total)				02/10/2023 13:51
23020169-008B	APW-08-WG-20230202	02/02/2023 9:45	02/03/2023 8:45		
	EPA 903.0/904.0, Radium 226/228				02/10/2023 0:00
23020169-008C	APW-08-WG-20230202	02/02/2023 9:45	02/03/2023 8:45		
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			02/15/2023 6:27	02/15/2023 18:33
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			02/15/2023 6:27	02/16/2023 12:56
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			02/15/2023 6:27	02/23/2023 12:12
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			02/15/2023 6:27	02/24/2023 10:59
	SW-846 7470A (Total)			02/09/2023 10:45	02/10/2023 19:21
23020169-008D	APW-08-WG-20230202	02/02/2023 9:45	02/03/2023 8:45		
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			02/09/2023 11:06	02/10/2023 22:54
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			02/09/2023 11:06	02/13/2023 15:14
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			02/09/2023 11:06	02/14/2023 13:21
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			02/09/2023 11:06	02/24/2023 11:05
23020169-009A	APW-10S-WG-20230202	02/02/2023 11:10	02/03/2023 8:45		
	Standard Methods 2540 C (Total) 1997, 2011				02/07/2023 12:04

Client: ERM

Work Order: 23020169

Client Project: GTEC

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Sample ID	Client Sample ID	Collection Date	Received Date		
	Test Name			Prep Date/Time	Analysis Date/Time
	SW-846 9036 (Total)				02/10/2023 14:15
	SW-846 9040B, Laboratory Analyzed				02/08/2023 16:26
	SW-846 9214 (Total)				02/09/2023 15:43
	SW-846 9251 (Total)				02/10/2023 14:15
23020169-009B	APW-10S-WG-20230202	02/02/2023 11:10	02/03/2023 8:45		
	EPA 903.0/904.0, Radium 226/228				02/10/2023 0:00
23020169-009C	APW-10S-WG-20230202	02/02/2023 11:10	02/03/2023 8:45		
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			02/15/2023 6:27	02/15/2023 18:39
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			02/15/2023 6:27	02/16/2023 13:02
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			02/15/2023 6:27	02/20/2023 9:55
	SW-846 7470A (Total)			02/09/2023 10:45	02/10/2023 19:28
23020169-009D	APW-10S-WG-20230202	02/02/2023 11:10	02/03/2023 8:45		
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			02/09/2023 11:07	02/10/2023 15:35
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			02/09/2023 11:07	02/13/2023 9:52
23020169-010A	APW-10D-WG-20230202	02/02/2023 12:30	02/03/2023 8:45		
	Standard Methods 2540 C (Total) 1997, 2011				02/06/2023 12:49
	SW-846 9036 (Total)				02/10/2023 14:23
	SW-846 9040B, Laboratory Analyzed				02/08/2023 16:27
	SW-846 9214 (Total)				02/09/2023 15:45
	SW-846 9251 (Total)				02/10/2023 14:23
23020169-010B	APW-10D-WG-20230202	02/02/2023 12:30	02/03/2023 8:45		
	EPA 903.0/904.0, Radium 226/228				02/10/2023 0:00
23020169-010C	APW-10D-WG-20230202	02/02/2023 12:30	02/03/2023 8:45		
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			02/15/2023 6:27	02/15/2023 18:45
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			02/15/2023 6:27	02/16/2023 13:08
	SW-846 7470A (Total)			02/09/2023 10:45	02/10/2023 19:34
23020169-010D	APW-10D-WG-20230202	02/02/2023 12:30	02/03/2023 8:45		
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			02/09/2023 11:07	02/10/2023 15:41
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			02/09/2023 11:07	02/13/2023 9:59
23020169-011A	APW-04-WG-20230202	02/02/2023 14:05	02/03/2023 8:45		
	Standard Methods 2540 C (Total) 1997, 2011				02/06/2023 12:49
	SW-846 9036 (Total)				02/13/2023 11:51
	SW-846 9040B, Laboratory Analyzed				02/08/2023 16:29
	SW-846 9214 (Total)				02/09/2023 15:55
	SW-846 9251 (Total)				02/10/2023 14:31
23020169-011B	APW-04-WG-20230202	02/02/2023 14:05	02/03/2023 8:45		

Client: ERM

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Client Project: GTEC

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Sample ID	Client Sample ID	Collection Date	Received Date	Prep Date/Time	Analysis Date/Time
	Test Name				
	EPA 903.0/904.0, Radium 226/228				02/10/2023 0:00
23020169-011C	APW-04-WG-20230202	02/02/2023 14:05	02/03/2023 8:45		
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			02/15/2023 6:27	02/15/2023 18:51
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			02/15/2023 6:27	02/16/2023 13:15
	SW-846 7470A (Total)			02/09/2023 10:45	02/10/2023 19:37
23020169-011D	APW-04-WG-20230202	02/02/2023 14:05	02/03/2023 8:45		
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			02/09/2023 11:07	02/10/2023 16:06
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			02/09/2023 11:07	02/13/2023 10:24
23020169-012A	APW-01R-WG-20230202	02/02/2023 15:10	02/03/2023 8:45		
	Standard Methods 2540 C (Total) 1997, 2011				02/06/2023 12:49
	SW-846 9036 (Total)				02/13/2023 12:08
	SW-846 9040B, Laboratory Analyzed				02/08/2023 16:31
	SW-846 9214 (Total)				02/09/2023 15:58
	SW-846 9251 (Total)				02/10/2023 14:42
23020169-012B	APW-01R-WG-20230202	02/02/2023 15:10	02/03/2023 8:45		
	EPA 903.0/904.0, Radium 226/228				02/16/2023 0:00
23020169-012C	APW-01R-WG-20230202	02/02/2023 15:10	02/03/2023 8:45		
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			02/15/2023 6:27	02/15/2023 18:58
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			02/15/2023 6:27	02/16/2023 13:21
	SW-846 7470A (Total)			02/09/2023 10:46	02/10/2023 11:37
23020169-012D	APW-01R-WG-20230202	02/02/2023 15:10	02/03/2023 8:45		
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			02/09/2023 11:07	02/10/2023 15:47
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			02/09/2023 11:07	02/13/2023 10:05
23020169-013A	EB-01-WQ-20230130	01/30/2023 9:40	02/03/2023 8:45		
	Standard Methods 2540 C (Total) 1997, 2011				02/22/2023 11:44
	SW-846 9036 (Total)				02/10/2023 15:19
	SW-846 9040B, Laboratory Analyzed				02/08/2023 16:37
	SW-846 9214 (Total)				02/09/2023 15:59
	SW-846 9251 (Total)				02/10/2023 15:19
23020169-013B	EB-01-WQ-20230130	01/30/2023 9:40	02/03/2023 8:45		
	EPA 903.0/904.0, Radium 226/228				02/16/2023 0:00
23020169-013C	EB-01-WQ-20230130	01/30/2023 9:40	02/03/2023 8:45		
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			02/15/2023 6:37	02/15/2023 20:13
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			02/15/2023 6:37	02/16/2023 14:25
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			02/15/2023 6:37	02/17/2023 9:37
	SW-846 7470A (Total)			02/09/2023 10:46	02/10/2023 11:39

Client: ERM

Work Order: 23020169

Client Project: GTEC

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Sample ID	Client Sample ID	Collection Date	Received Date		
	Test Name			Prep Date/Time	Analysis Date/Time
23020169-013E	EB-01-WQ-20230130	01/30/2023 9:40	02/03/2023 8:45		
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			02/15/2023 16:05	02/16/2023 16:33
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			02/15/2023 16:05	02/18/2023 5:39
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			02/15/2023 16:05	02/20/2023 12:15
23020169-014A	DUP-01-WG-20230201	02/01/2023 0:01	02/03/2023 8:45		
	Standard Methods 2540 C (Total) 1997, 2011				02/03/2023 14:51
	SW-846 9036 (Total)				02/10/2023 15:32
	SW-846 9040B, Laboratory Analyzed				02/08/2023 16:40
	SW-846 9214 (Total)				02/09/2023 16:02
	SW-846 9251 (Total)				02/10/2023 15:27
23020169-014B	DUP-01-WG-20230201	02/01/2023 0:01	02/03/2023 8:45		
	EPA 903.0/904.0, Radium 226/228				02/16/2023 0:00
23020169-014C	DUP-01-WG-20230201	02/01/2023 0:01	02/03/2023 8:45		
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			02/15/2023 6:37	02/15/2023 20:19
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			02/15/2023 6:37	02/16/2023 14:31
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			02/15/2023 6:37	02/17/2023 9:43
	SW-846 7470A (Total)			02/09/2023 10:46	02/10/2023 11:50
23020169-014D	DUP-01-WG-20230201	02/01/2023 0:01	02/03/2023 8:45		
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			02/09/2023 11:07	02/10/2023 15:54
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			02/09/2023 11:07	02/13/2023 10:11
23020169-015A	DUP-02-WG-20230201	02/01/2023 0:02	02/03/2023 8:45		
	Standard Methods 2540 C (Total) 1997, 2011				02/03/2023 14:52
	SW-846 9036 (Total)				02/10/2023 15:40
	SW-846 9040B, Laboratory Analyzed				02/08/2023 16:42
	SW-846 9214 (Total)				02/09/2023 16:04
	SW-846 9251 (Total)				02/10/2023 15:35
23020169-015B	DUP-02-WG-20230201	02/01/2023 0:02	02/03/2023 8:45		
	EPA 903.0/904.0, Radium 226/228				02/16/2023 0:00
23020169-015C	DUP-02-WG-20230201	02/01/2023 0:02	02/03/2023 8:45		
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			02/15/2023 6:37	02/15/2023 20:25
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			02/15/2023 6:37	02/16/2023 14:57
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			02/15/2023 6:37	02/17/2023 9:50
	SW-846 7470A (Total)			02/09/2023 10:46	02/10/2023 11:53
23020169-015D	DUP-02-WG-20230201	02/01/2023 0:02	02/03/2023 8:45		
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			02/09/2023 11:07	02/10/2023 16:00
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			02/09/2023 11:07	02/13/2023 10:17

Client: ERM

Work Order: 23020169

Client Project: GTEC

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STANDARD METHODS 2540 C (TOTAL) 1997, 2011
Batch R324399 **SampType:** MBLK **Units** mg/L

SampID: MBLK

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Dissolved Solids		20		< 20	16.00	0	0	-100	100	02/03/2023
Total Dissolved Solids		20		< 20	16.00	0	0	-100	100	02/03/2023
Total Dissolved Solids		20		< 20	16.00	0	0	-100	100	02/03/2023

Batch R324399 **SampType:** LCS **Units** mg/L

SampID: LCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Dissolved Solids		20		916	1000	0	91.6	90	110	02/03/2023
Total Dissolved Solids		20		986	1000	0	98.6	90	110	02/03/2023
Total Dissolved Solids		20		904	1000	0	90.4	90	110	02/03/2023

Batch R324475 **SampType:** MBLK **Units** mg/L

SampID: MBLK

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Dissolved Solids		20		< 20	16.00	0	0	-100	100	02/06/2023
Total Dissolved Solids		20		< 20	16.00	0	0	-100	100	02/06/2023

Batch R324475 **SampType:** LCS **Units** mg/L

SampID: LCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Dissolved Solids		20		936	1000	0	93.6	90	110	02/06/2023
Total Dissolved Solids		20		932	1000	0	93.2	90	110	02/06/2023

Batch R324475 **SampType:** DUP **Units** mg/L

SampID: 23020169-002ADUP

RPD Limit: 5

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Dissolved Solids		20		832				824.0	0.97	02/06/2023

Batch R324544 **SampType:** MBLK **Units** mg/L

SampID: MBLK

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Dissolved Solids		20		< 20	16.00	0	0	-100	100	02/07/2023



Quality Control Results

<http://www.teklabinc.com/>

Client: ERM

Work Order: 23020169

Client Project: GTEC

Report Date: 28-Feb-23

STANDARD METHODS 2540 C (TOTAL) 1997, 2011

Batch R324544 SampType: LCS Units mg/L

SampID: LCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Dissolved Solids		20		962	1000	0	96.2	90	110	02/07/2023

Batch R324544 SampType: DUP Units mg/L

SampID: 23020169-009ADUP

RPD Limit: 5

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Dissolved Solids		50		780				780.0	0.00	02/07/2023

Batch R325126 SampType: MBLK Units mg/L

SampID: MBLK

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Dissolved Solids		20		< 20	16.00	0	0	-100	100	02/21/2023

Batch R325126 SampType: LCS Units mg/L

SampID: LCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Dissolved Solids		20		934	1000	0	93.4	90	110	02/21/2023

Batch R325208 SampType: MBLK Units mg/L

SampID: MBLK

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Dissolved Solids		20		< 20	16.00	0	0	-100	100	02/22/2023
Total Dissolved Solids		20		< 20	16.00	0	0	-100	100	02/22/2023

Batch R325208 SampType: LCS Units mg/L

SampID: LCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Dissolved Solids		20		912	1000	0	91.2	90	110	02/22/2023
Total Dissolved Solids		20		1040	1000	0	104.4	90	110	02/22/2023

SW-846 9036 (TOTAL)

Batch R324668 SampType: MBLK Units mg/L

SampID: ICB/MBLK

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate		10		< 10	6.140	0	0	-100	100	02/10/2023



Quality Control Results

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Client: ERM

Work Order: 23020169

Client Project: GTEC

Report Date: 28-Feb-23

SW-846 9036 (TOTAL)

Batch R324668 SampType: LCS Units mg/L

SampID: ICV/LCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate		10		19	20.00	0	96.0	90	110	02/10/2023

Batch R324668 SampType: MS Units mg/L

SampID: 23020169-003AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate		100		434	200.0	247.3	93.6	85	115	02/10/2023

Batch R324668 SampType: MSD Units mg/L

SampID: 23020169-003AMSD

RPD Limit: 10

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Sulfate		100		436	200.0	247.3	94.5	434.5	0.39	02/10/2023

Batch R324732 SampType: MBLK Units mg/L

SampID: ICB/MBLK

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate		10		< 10	6.140	0	0	-100	100	02/13/2023

Batch R324732 SampType: LCS Units mg/L

SampID: ICV/LCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate		10		19	20.00	0	96.2	90	110	02/13/2023

Batch R324732 SampType: MS Units mg/L

SampID: 23020169-012AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate		50		168	100.0	74.09	93.7	85	115	02/13/2023

Batch R324732 SampType: MSD Units mg/L

SampID: 23020169-012AMSD

RPD Limit: 10

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Sulfate		50		166	100.0	74.09	91.8	167.8	1.13	02/13/2023



Quality Control Results

<http://www.teklabinc.com/>

Client: ERM

Work Order: 23020169

Client Project: GTEC

Report Date: 28-Feb-23

SW-846 9040B, LABORATORY ANALYZED

Batch R324523		SampType: LCS		Units							
SampID: LCS											Date Analyzed
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit		
Lab pH		1.00		7.01	7.000	0	100.1	99.1	100.8	02/07/2023	

Batch R324541		SampType: LCS		Units							
SampID: LCS											Date Analyzed
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit		
Lab pH		1.00		6.97	7.000	0	99.6	99.1	100.8	02/08/2023	

Batch R324541		SampType: DUP		Units					RPD Limit: 10			Date Analyzed
SampID: 23020169-001ADUP												
Analyses		Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD		
Lab pH			1.00		7.45				7.450	0.00	02/08/2023	

Batch R324541		SampType: DUP		Units				RPD Limit: 10				Date Analyzed
SampID: 23020169-002ADUP												
Analyses		Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD		
Lab pH			1.00		7.23				7.230	0.00	02/08/2023	

Batch R324541		SampType: DUP		Units				RPD Limit: 10				Date Analyzed
SampID: 23020169-003ADUP												
Analyses		Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD		
Lab pH			1.00		7.16				7.120	0.56	02/08/2023	

Batch R324541		SampType: DUP		Units					RPD Limit: 10			Date Analyzed
SampID: 23020169-004ADUP												
Analyses		Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD		
Lab pH			1.00		7.28				7.290	0.14	02/08/2023	

Batch R324541		SampType: DUP		Units				RPD Limit: 10			
SampID: 23020169-005ADUP											
Analyses		Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Lab pH			1.00		7.32				7.310	0.14	02/08/2023

Batch R324541		SampType: DUP		Units					RPD Limit: 10			Date Analyzed
SampID: 23020169-006ADUP												
Analyses		Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD		
Lab pH			1.00		7.02				6.980	0.57	02/08/2023	



Quality Control Results

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Client: ERM

Work Order: 23020169

Client Project: GTEC

Report Date: 28-Feb-23

SW-846 9040B, LABORATORY ANALYZED

Batch R324541		SampType: DUP		Units				RPD Limit: 10			
SampleID: 23020169-007ADUP											
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed	
Lab pH		1.00		7.72				7.720	0.00	02/08/2023	

Batch R324541		SampType: DUP		Units				RPD Limit: 10			
SampleID: 23020169-008ADUP											
Analyses		Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Lab pH			1.00		7.35				7.310	0.55	02/08/2023

Batch R324541		SampType: DUP		Units				RPD Limit: 10			
SampleID: 23020169-009ADUP											
Analyses		Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Lab pH			1.00		7.20				7.200	0.00	02/08/2023

Batch R324541		SampType: DUP		Units				RPD Limit: 10			
SampleID: 23020169-010ADUP											
Analyses		Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Lab pH			1.00		7.57				7.570	0.00	02/08/2023

Batch R324541		SampType: DUP		Units				RPD Limit: 10			
SampleID: 23020169-011ADUP											
Analyses		Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Lab pH			1.00		7.23				7.210	0.28	02/08/2023

Batch R324541		SampType: DUP		Units				RPD Limit: 10			
SampleID: 23020169-012ADUP											
Analyses		Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Lab pH			1.00		6.58				6.570	0.15	02/08/2023

Batch R324541		SampType: DUP		Units				RPD Limit: 10			
SampleID: 23020169-013ADUP											
Analyses		Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Lab pH			1.00		5.48				5.540	1.09	02/08/2023

Batch R324541		SampType: DUP		Units				RPD Limit: 10			
SampleID: 23020169-014ADUP											
Analyses		Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Lab pH			1.00		7.34				7.330	0.14	02/08/2023



Quality Control Results

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Client: ERM

Work Order: 23020169

Client Project: GTEC

Report Date: 28-Feb-23

SW-846 9040B, LABORATORY ANALYZED

Batch R324541		SampType: DUP		Units				RPD Limit: 10				Date Analyzed
SampID: 23020169-015ADUP												
Analyses		Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD		
Lab pH			1.00		7.06				7.050	0.14		
02/08/2023												

SW-846 9214 (TOTAL)

Batch R324472		SampType: MBLK		Units mg/L							
SampID: MBLK											Date Analyzed
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit		
Fluoride		0.10		< 0.10	0.0370	0	0	-100	100	02/07/2023	

Batch R324472		SampType: LCS		Units mg/L							
SampID: LCS										Date Analyzed	
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit		
Fluoride		0.10		0.98	1.000	0	97.8	90	110	02/07/2023	

Batch R324472		SampType: MS		Units mg/L							
SampID: 23020169-002AMS											Date Analyzed
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit		
Fluoride		0.10		2.33	2.000	0.1930	107.0	75	125	02/07/2023	

Batch R324472		SampType: MSD		Units mg/L				RPD Limit: 15			
SampID: 23020169-002AMSD											
Analyses		Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Fluoride			0.10		2.34	2.000	0.1930	107.2	2.334	0.09	02/07/2023

Batch R324574		SampType: MBLK		Units mg/L							
SampID: MBLK											Date Analyzed
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit		
Fluoride		0.10		< 0.10	0.0370	0	0	-100	100	02/09/2023	

Batch R324574		SampType: LCS		Units mg/L							
SampID: LCS											
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed	
Fluoride		0.10		1.00	1.000	0	99.9	90	110	02/09/2023	

Client: ERM

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Client Project: GTEC

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SW-846 9214 (TOTAL)

Batch R324574		SampType: MS		Units mg/L							
SampID: 23020169-001AMS											Date Analyzed
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit		
Fluoride		0.10		2.22	2.000	0.2320	99.3	75	125	02/09/2023	

Batch R324574		SampType: MSD		Units mg/L				RPD Limit: 15			
SampID: 23020169-001AMSD											
Analyses		Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Fluoride			0.10		2.30	2.000	0.2320	103.2	2.218	3.46	02/09/2023

Batch R324574		SampType: MS		Units mg/L							
SampID: 23020169-010AMS											Date Analyzed
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit		
Fluoride		0.10		2.15	2.000	0.1150	101.6	75	125	02/09/2023	

Batch R324574		SampType: MSD		Units mg/L				RPD Limit: 15			
SampID: 23020169-010AMSD											
Analyses		Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Fluoride			0.10		2.18	2.000	0.1150	103.0	2.146	1.34	02/09/2023

Batch R324574		SampType: MS		Units mg/L							
SampID: 23020169-015AMS											
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed	
Fluoride		0.10		2.24	2.000	0.2210	100.9	75	125	02/09/2023	

Batch R324574		SampType: MSD		Units mg/L				RPD Limit: 15			
SampID: 23020169-015AMSD											
Analyses		Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Fluoride			0.10		2.34	2.000	0.2210	106.2	2.239	4.62	02/09/2023

SW-846 9251 (TOTAL)

Batch R324670		SampType: MBLK		Units mg/L							
SampID: ICB/MBLK											
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed	
Chloride		1		< 1	0.5000	0	0	-100	100	02/10/2023	



Quality Control Results

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Client: ERM

Work Order: 23020169

Client Project: GTEC

Report Date: 28-Feb-23

SW-846 9251 (TOTAL)

Batch R324670 SampType: LCS Units mg/L

SampID: ICV/LCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride		1		20	20.00	0	98.4	90	110	02/10/2023

Batch R324670 SampType: MS Units mg/L

SampID: 23020169-003AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride		1		43	20.00	24.41	92.5	85	115	02/10/2023

Batch R324670 SampType: MSD Units mg/L

SampID: 23020169-003AMSD

RPD Limit: 15

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Chloride		1		42	20.00	24.41	89.6	42.91	1.36	02/10/2023

Batch R324670 SampType: MS Units mg/L

SampID: 23020169-012AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride		1		27	20.00	7.260	99.2	85	115	02/10/2023

Batch R324670 SampType: MSD Units mg/L

SampID: 23020169-012AMSD

RPD Limit: 15

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Chloride		1		26	20.00	7.260	95.5	27.09	2.73	02/10/2023

Batch R324741 SampType: MBLK Units mg/L

SampID: ICB/MBLK

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride		1		< 1	0.5000	0	0	-100	100	02/13/2023

Batch R324741 SampType: LCS Units mg/L

SampID: ICV/LCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride		1		21	20.00	0	103.0	90	110	02/13/2023

Client: ERM

Work Order: 23020169

Client Project: GTEC

Report Date: 28-Feb-23

SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)

Batch 202752		SampType: MBLK		Units mg/L							Date Analyzed
SampID: MBLK-202752											
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit		
Antimony		0.0010		< 0.0010	0.0004	0	0	-100	100	02/10/2023	
Arsenic		0.0010		< 0.0010	0.0004	0	0	-100	100	02/10/2023	
Barium		0.0010		< 0.0010	0.0007	0	0	-100	100	02/10/2023	
Beryllium		0.0010		< 0.0010	0.0002	0	0	-100	100	02/10/2023	
Boron		0.0250		< 0.0250	0.0093	0	0	-100	100	02/10/2023	
Cadmium		0.0010		< 0.0010	0.0001	0	0	-100	100	02/10/2023	
Calcium		0.125		< 0.125	0.0700	0	0	-100	100	02/13/2023	
Chromium		0.0015		< 0.0015	0.0007	0	0	-100	100	02/13/2023	
Cobalt		0.0010		< 0.0010	0.0001	0	0	-100	100	02/10/2023	
Lead		0.0010		< 0.0010	0.0006	0	0	-100	100	02/10/2023	
Lithium	*	0.0030		< 0.0030	0.0015	0	0	-100	100	02/10/2023	
Molybdenum		0.0015		< 0.0015	0.0006	0	0	-100	100	02/13/2023	
Nickel		0.0010		< 0.0010	0.0004	0	0	-100	100	02/10/2023	
Selenium		0.0010		< 0.0010	0.0006	0	0	-100	100	02/10/2023	
Thallium		0.0020		< 0.0020	0.0010	0	0	-100	100	02/10/2023	

Batch 202752		SampType: LCS		Units mg/L							Date Analyzed
SampID: LCS-202752											
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit		
Antimony		0.0010		0.434	0.5000	0	86.7	80	120	02/10/2023	
Arsenic		0.0010		0.474	0.5000	0	94.8	80	120	02/10/2023	
Barium		0.0010		1.92	2.000	0	95.9	80	120	02/10/2023	
Beryllium		0.0010		0.0465	0.0500	0	93.0	80	120	02/10/2023	
Boron		0.0250		0.489	0.5000	0	97.9	80	120	02/10/2023	
Cadmium		0.0010		0.0454	0.0500	0	90.8	80	120	02/10/2023	
Calcium		0.125		2.37	2.500	0	94.7	80	120	02/13/2023	
Chromium		0.0015		0.183	0.2000	0	91.3	80	120	02/13/2023	
Cobalt		0.0010		0.443	0.5000	0	88.7	80	120	02/10/2023	
Lead		0.0010		0.476	0.5000	0	95.1	80	120	02/10/2023	
Lithium	*	0.0030		0.463	0.5000	0	92.7	80	120	02/10/2023	
Molybdenum		0.0015		0.446	0.5000	0	89.1	80	120	02/13/2023	
Nickel		0.0010		0.446	0.5000	0	89.2	80	120	02/10/2023	
Selenium		0.0010		0.444	0.5000	0	88.8	80	120	02/10/2023	
Thallium		0.0020		0.234	0.2500	0	93.5	80	120	02/10/2023	

Client: ERM

Work Order: 23020169

Client Project: GTEC

Report Date: 28-Feb-23

SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)

Batch 202752		SampType: MS		Units mg/L							Date Analyzed	
SampID: 23020169-005DMS												
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit			
Antimony		0.0010		0.444	0.5000	0	88.8	75	125	02/10/2023		
Arsenic		0.0010		0.455	0.5000	0.002554	90.4	75	125	02/10/2023		
Barium		0.0010		2.12	2.000	0.1750	97.1	75	125	02/10/2023		
Beryllium		0.0010		0.0438	0.0500	0	87.6	75	125	02/10/2023		
Boron		0.0250	S	6.92	0.5000	8.675	-351.8	75	125	02/10/2023		
Cadmium		0.0010		0.0432	0.0500	0	86.4	75	125	02/10/2023		
Calcium		0.125	S	137	2.500	106.1	1231	75	125	02/15/2023		
Chromium		0.0015		0.184	0.2000	0	92.1	75	125	02/14/2023		
Cobalt		0.0010		0.437	0.5000	0.0005994	87.2	75	125	02/14/2023		
Lead		0.0010		0.483	0.5000	0	96.6	75	125	02/10/2023		
Lithium	*	0.0030		0.472	0.5000	0.04503	85.5	75	125	02/10/2023		
Molybdenum		0.0015		0.672	0.5000	0.1868	97.1	75	125	02/13/2023		
Nickel		0.0010		0.436	0.5000	0.001739	86.8	75	125	02/14/2023		
Selenium		0.0010		0.426	0.5000	0	85.2	75	125	02/10/2023		
Thallium		0.0020		0.234	0.2500	0	93.8	75	125	02/10/2023		

Batch	202752	SampType:	MSD	Units				mg/L	RPD Limit: 20			
SampID: 23020169-005DMSD												
Analyses		Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed	
Antimony			0.0010		0.454	0.5000	0	90.8	0.4442	2.17	02/10/2023	
Arsenic			0.0010		0.465	0.5000	0.002554	92.4	0.4548	2.12	02/10/2023	
Barium			0.0010		2.15	2.000	0.1750	98.8	2.117	1.60	02/10/2023	
Beryllium			0.0010		0.0436	0.0500	0	87.2	0.04382	0.50	02/10/2023	
Boron			0.0250	S	7.12	0.5000	8.675	-310.6	6.916	2.94	02/10/2023	
Cadmium			0.0010		0.0441	0.0500	0	88.2	0.04320	2.10	02/10/2023	
Calcium			0.125	S	152	2.500	106.1	1840	136.9	10.54	02/15/2023	
Chromium			0.0015		0.202	0.2000	0	100.9	0.1842	9.13	02/14/2023	
Cobalt			0.0010		0.491	0.5000	0.0005994	98.0	0.4365	11.67	02/14/2023	
Lead			0.0010		0.487	0.5000	0	97.5	0.4832	0.86	02/10/2023	
Lithium		*	0.0030		0.476	0.5000	0.04503	86.2	0.4725	0.73	02/10/2023	
Molybdenum			0.0015		0.642	0.5000	0.1868	91.1	0.6724	4.59	02/13/2023	
Nickel			0.0010		0.477	0.5000	0.001739	95.1	0.4358	9.07	02/14/2023	
Selenium			0.0010		0.432	0.5000	0	86.4	0.4260	1.39	02/10/2023	
Thallium			0.0020		0.229	0.2500	0	91.6	0.2344	2.36	02/10/2023	

Client: ERM

Work Order: 23020169

Client Project: GTEC

Report Date: 28-Feb-23

SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)

Batch 202753		SampType: MBLK		Units mg/L							
SampID: MBLK-202753											Date Analyzed
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit		
Antimony		0.0010		< 0.0010	0.0004	0	0	-100	100	02/13/2023	
Arsenic		0.0010		< 0.0010	0.0004	0	0	-100	100	02/10/2023	
Barium		0.0010		< 0.0010	0.0007	0	0	-100	100	02/10/2023	
Beryllium		0.0010		< 0.0010	0.0002	0	0	-100	100	02/13/2023	
Boron	*	0.0250		< 0.0250	0.0093	0	0	-100	100	02/10/2023	
Cadmium		0.0010		< 0.0010	0.0001	0	0	-100	100	02/13/2023	
Calcium	*	0.125		< 0.125	0.0700	0	0	-100	100	02/13/2023	
Chromium		0.0150		< 0.0150	0.0007	0	0	-100	100	02/13/2023	
Cobalt		0.0010		< 0.0010	0.0001	0	0	-100	100	02/13/2023	
Lead		0.0010		< 0.0010	0.0006	0	0	-100	100	02/10/2023	
Lithium	*	0.0030		< 0.0030	0.0015	0	0	-100	100	02/10/2023	
Molybdenum		0.0015		< 0.0015	0.0006	0	0	-100	100	02/13/2023	
Nickel		0.0010		< 0.0010	0.0004	0	0	-100	100	02/10/2023	
Selenium		0.0010		< 0.0010	0.0006	0	0	-100	100	02/10/2023	
Thallium		0.0020		< 0.0020	0.0010	0	0	-100	100	02/10/2023	

Batch 202753		SampType: LCS		Units mg/L							
SampID: LCS-202753											Date Analyzed
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit		
Antimony		0.0010		0.454	0.5000	0	90.8	85	115	02/13/2023	
Arsenic		0.0010		0.475	0.5000	0	94.9	85	115	02/10/2023	
Barium		0.0010		1.93	2.000	0	96.5	85	115	02/10/2023	
Beryllium		0.0010		0.0456	0.0500	0	91.3	85	115	02/13/2023	
Boron	*	0.0250		0.447	0.5000	0	89.4	85	115	02/10/2023	
Cadmium		0.0010		0.0469	0.0500	0	93.7	85	115	02/13/2023	
Calcium	*	0.125		2.48	2.500	0	99.0	85	115	02/13/2023	
Chromium		0.0150		0.194	0.2000	0	97.0	85	115	02/13/2023	
Cobalt		0.0010		0.490	0.5000	0	97.9	85	115	02/13/2023	
Lead		0.0010		0.463	0.5000	0	92.5	85	115	02/10/2023	
Lithium	*	0.0030		0.439	0.5000	0	87.8	85	115	02/10/2023	
Molybdenum		0.0015		0.463	0.5000	0	92.5	85	115	02/13/2023	
Nickel		0.0010		0.461	0.5000	0	92.3	85	115	02/10/2023	
Selenium		0.0010		0.435	0.5000	0	86.9	85	115	02/10/2023	
Thallium		0.0020		0.227	0.2500	0	90.7	85	115	02/10/2023	

Client: ERM

Work Order: 23020169

Client Project: GTEC

Report Date: 28-Feb-23

SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)

Batch 202753		SampType: MS		Units mg/L							Date Analyzed	
SampID: 23020169-011DMS												
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit			
Antimony		0.0010		0.449	0.5000	0	89.8	75	125	02/13/2023		
Arsenic		0.0010		0.438	0.5000	0.001128	87.4	75	125	02/10/2023		
Barium		0.0010		1.94	2.000	0.1158	91.3	75	125	02/10/2023		
Beryllium		0.0010		0.0490	0.0500	0	98.0	75	125	02/13/2023		
Boron		0.0250		1.04	0.5000	0.6186	83.4	75	125	02/10/2023		
Cadmium		0.0010		0.0460	0.0500	0	91.9	75	125	02/13/2023		
Calcium		0.125	S	95.1	2.500	93.35	72.1	75	125	02/13/2023		
Chromium		0.0015		0.180	0.2000	0	90.0	75	125	02/13/2023		
Cobalt		0.0010		0.454	0.5000	0	90.8	75	125	02/13/2023		
Lead		0.0010		0.450	0.5000	0	90.0	75	125	02/10/2023		
Lithium	*	0.0030		0.469	0.5000	0.02915	88.0	75	125	02/10/2023		
Molybdenum		0.0015		0.493	0.5000	0.03831	91.0	75	125	02/13/2023		
Nickel		0.0010		0.399	0.5000	0.002098	79.5	75	125	02/10/2023		
Selenium		0.0010		0.418	0.5000	0.008992	81.7	75	125	02/10/2023		
Thallium		0.0020		0.225	0.2500	0	90.0	75	125	02/10/2023		

Batch	202753	SampType:	MSD	Units				mg/L			RPD Limit: 20		
SampID: 23020169-011DMSD													
Analyses		Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed		
Antimony			0.0010		0.449	0.5000	0	89.7	0.4489	0.05	02/13/2023		
Arsenic			0.0010		0.481	0.5000	0.001128	95.9	0.4380	9.31	02/10/2023		
Barium			0.0010		2.06	2.000	0.1158	97.2	1.942	5.88	02/10/2023		
Beryllium			0.0010		0.0478	0.0500	0	95.5	0.04900	2.58	02/13/2023		
Boron			0.0250		1.07	0.5000	0.6186	90.0	1.036	3.13	02/10/2023		
Cadmium			0.0010		0.0454	0.0500	0	90.8	0.04597	1.25	02/13/2023		
Calcium			0.125	S	93.6	2.500	93.35	11.6	95.15	1.60	02/13/2023		
Chromium			0.0015		0.179	0.2000	0	89.6	0.1799	0.43	02/13/2023		
Cobalt			0.0010		0.459	0.5000	0	91.8	0.4541	1.05	02/13/2023		
Lead			0.0010		0.488	0.5000	0	97.6	0.4500	8.14	02/10/2023		
Lithium		*	0.0030		0.492	0.5000	0.02915	92.6	0.4692	4.79	02/10/2023		
Molybdenum			0.0015		0.497	0.5000	0.03831	91.8	0.4931	0.82	02/13/2023		
Nickel			0.0010		0.438	0.5000	0.002098	87.3	0.3995	9.32	02/10/2023		
Selenium			0.0010		0.455	0.5000	0.008992	89.2	0.4176	8.61	02/10/2023		
Thallium			0.0020		0.243	0.2500	0	97.1	0.2251	7.51	02/10/2023		

Client: ERM

Work Order: 23020169

Client Project: GTEC

Report Date: 28-Feb-23

SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)

Batch 202963		SampType: MBLK		Units mg/L							Date Analyzed
SampID: MBLK-202963											
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit		
Antimony		0.0010		< 0.0010	0.0004	0	0	-100	100	02/16/2023	
Arsenic		0.0010		< 0.0010	0.0004	0	0	-100	100	02/16/2023	
Barium		0.0010		< 0.0010	0.0007	0	0	-100	100	02/16/2023	
Beryllium		0.0010		< 0.0010	0.0002	0	0	-100	100	02/17/2023	
Boron		0.0250		< 0.0250	0.0093	0	0	-100	100	02/17/2023	
Calcium		0.125		< 0.125	0.0700	0	0	-100	100	02/16/2023	
Chromium		0.0015		< 0.0015	0.0007	0	0	-100	100	02/16/2023	
Cobalt		0.0010		< 0.0010	0.0001	0	0	-100	100	02/16/2023	
Lead		0.0010		< 0.0010	0.0006	0	0	-100	100	02/16/2023	
Lithium	*	0.0030		< 0.0030	0.0015	0	0	-100	100	02/17/2023	
Molybdenum		0.0015		< 0.0015	0.0006	0	0	-100	100	02/17/2023	
Nickel		0.0010		< 0.0010	0.0004	0	0	-100	100	02/16/2023	
Selenium		0.0010		< 0.0010	0.0006	0	0	-100	100	02/16/2023	
Thallium		0.0020		< 0.0020	0.0010	0	0	-100	100	02/16/2023	

Batch 202963		SampType: LCS		Units mg/L							Date Analyzed
SampID: LCS-202963											
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit		
Antimony		0.0010	S	0.611	0.5000	0	122.2	80	120	02/16/2023	
Arsenic		0.0010	S	0.638	0.5000	0	127.7	80	120	02/16/2023	
Barium		0.0010	S	2.60	2.000	0	129.9	80	120	02/16/2023	
Beryllium		0.0010		0.0420	0.0500	0	84.1	80	120	02/17/2023	
Boron		0.0250		0.422	0.5000	0	84.4	80	120	02/17/2023	
Cadmium		0.0010		0.0407	0.0500	0	81.3	80	120	02/17/2023	
Calcium		0.125		2.84	2.500	0	113.5	80	120	02/16/2023	
Chromium		0.0015		0.234	0.2000	0	117.1	80	120	02/16/2023	
Cobalt		0.0010		0.591	0.5000	0	118.1	80	120	02/16/2023	
Lead		0.0010		0.590	0.5000	0	118.1	80	120	02/16/2023	
Lithium	*	0.0030		0.437	0.5000	0	87.5	80	120	02/17/2023	
Molybdenum		0.0015		0.402	0.5000	0	80.4	80	120	02/17/2023	
Nickel		0.0010		0.574	0.5000	0	114.8	80	120	02/16/2023	
Thallium		0.0020		0.296	0.2500	0	118.3	80	120	02/16/2023	

Client: ERM

Work Order: 23020169

Client Project: GTEC

Report Date: 28-Feb-23

SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)

Batch 202963		SampType: MS		Units mg/L							Date Analyzed	
SampID: 23020169-013EMS												
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit			
Antimony		0.0010		0.560	0.5000	0	112.1	75	125	02/16/2023		
Arsenic		0.0010		0.586	0.5000	0	117.2	75	125	02/16/2023		
Barium		0.0010		2.45	2.000	0	122.7	75	125	02/16/2023		
Beryllium		0.0010		0.0424	0.0500	0	84.9	75	125	02/18/2023		
Boron		0.0250	S	0.697	0.5000	0	139.4	75	125	02/20/2023		
Cadmium		0.0010		0.0435	0.0500	0	87.0	75	125	02/18/2023		
Calcium		0.125		2.78	2.500	0	111.3	75	125	02/16/2023		
Chromium		0.0015		0.215	0.2000	0	107.7	75	125	02/16/2023		
Cobalt		0.0010		0.552	0.5000	0	110.3	75	125	02/16/2023		
Lead		0.0010		0.551	0.5000	0	110.2	75	125	02/16/2023		
Lithium	*	0.0030		0.449	0.5000	0	89.8	75	125	02/18/2023		
Molybdenum		0.0015		0.432	0.5000	0	86.5	75	125	02/18/2023		
Nickel		0.0010		0.534	0.5000	0.0004881	106.7	75	125	02/16/2023		
Selenium		0.0010		0.558	0.5000	0	111.6	75	125	02/16/2023		
Thallium		0.0020		0.271	0.2500	0	108.5	75	125	02/16/2023		

Batch	202963	SampType:	MSD	Units				mg/L	RPD Limit: 20			
SampID: 23020169-013EMSD												
Analyses		Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed	
Antimony			0.0010		0.533	0.5000	0	106.7	0.5603	4.95	02/16/2023	
Arsenic			0.0010		0.536	0.5000	0	107.2	0.5862	8.98	02/16/2023	
Barium			0.0010		2.32	2.000	0	116.2	2.455	5.50	02/16/2023	
Beryllium			0.0010		0.0413	0.0500	0	82.6	0.04243	2.69	02/18/2023	
Boron			0.0250	S	0.667	0.5000	0	133.4	0.6970	4.37	02/20/2023	
Cadmium			0.0010		0.0430	0.0500	0	86.0	0.04352	1.16	02/18/2023	
Calcium			0.125		2.46	2.500	0	98.3	2.783	12.38	02/16/2023	
Chromium			0.0015		0.202	0.2000	0	101.2	0.2154	6.21	02/16/2023	
Cobalt			0.0010		0.505	0.5000	0	101.0	0.5517	8.79	02/16/2023	
Lead			0.0010		0.505	0.5000	0	100.9	0.5508	8.75	02/16/2023	
Lithium		*	0.0030		0.441	0.5000	0	88.3	0.4488	1.66	02/18/2023	
Molybdenum			0.0015		0.433	0.5000	0	86.6	0.4323	0.16	02/18/2023	
Nickel			0.0010		0.489	0.5000	0.0004881	97.8	0.5339	8.69	02/16/2023	
Selenium			0.0010		0.511	0.5000	0	102.2	0.5579	8.76	02/16/2023	
Thallium			0.0020		0.248	0.2500	0	99.4	0.2712	8.76	02/16/2023	

Client: ERM

Work Order: 23020169

Client Project: GTEC

Report Date: 28-Feb-23

SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)
Batch 202662 **SampType:** MBLK **Units** mg/L

SampleID: MBLK-202662

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010		< 0.0010	0.0004	0	0	-100	100	02/09/2023
Barium		0.0010		< 0.0010	0.0007	0	0	-100	100	02/09/2023
Beryllium		0.0010		< 0.0010	0.0002	0	0	-100	100	02/09/2023
Boron		0.0250		< 0.0250	0.0093	0	0	-100	100	02/09/2023
Cadmium		0.0010		< 0.0010	0.0001	0	0	-100	100	02/09/2023
Calcium		0.125		< 0.125	0.1150	0	0	-100	100	02/10/2023
Chromium		0.0015		< 0.0015	0.0007	0	0	-100	100	02/10/2023
Cobalt		0.0010		< 0.0010	0.0001	0	0	-100	100	02/09/2023
Iron		0.0250		< 0.0250	0.0115	0	0	-100	100	02/09/2023
Lead		0.0010		< 0.0010	0.0006	0	0	-100	100	02/09/2023
Lithium	*	0.0030		< 0.0030	0.0015	0	0	-100	100	02/09/2023
Manganese		0.0020		< 0.0020	0.0008	0	0	-100	100	02/09/2023
Molybdenum		0.0015		< 0.0015	0.0006	0	0	-100	100	02/09/2023
Nickel		0.0010		< 0.0010	0.0004	0	0	-100	100	02/09/2023
Selenium		0.0010		< 0.0010	0.0006	0	0	-100	100	02/09/2023
Thallium		0.0020		< 0.0020	0.0010	0	0	-100	100	02/09/2023

Client: ERM

Work Order: 23020169

Client Project: GTEC

Report Date: 28-Feb-23

SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)
Batch 202662 **SampType: LCS** Units mg/L

SampleID: LCS-202662

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010		0.438	0.5000	0	87.5	80	120	02/09/2023
Arsenic		0.0010		0.465	0.5000	0	93.0	80	120	02/09/2023
Barium		0.0010		1.82	2.000	0	91.2	80	120	02/09/2023
Beryllium		0.0010		0.0436	0.0500	0	87.3	80	120	02/09/2023
Boron		0.0250		0.441	0.5000	0	88.2	80	120	02/09/2023
Cadmium		0.0010		0.0439	0.0500	0	87.8	80	120	02/09/2023
Calcium		0.125		2.13	2.500	0	85.4	80	120	02/10/2023
Chromium		0.0015		0.175	0.2000	0	87.5	80	120	02/10/2023
Cobalt		0.0010		0.472	0.5000	0	94.4	80	120	02/09/2023
Iron		0.0250		1.79	2.000	0	89.3	80	120	02/09/2023
Lead		0.0010		0.439	0.5000	0	87.8	80	120	02/09/2023
Lithium	*	0.0030		0.447	0.5000	0	89.4	80	120	02/09/2023
Manganese		0.0020		0.449	0.5000	0	89.7	80	120	02/09/2023
Molybdenum		0.0015		0.433	0.5000	0	86.6	80	120	02/09/2023
Nickel		0.0010		0.463	0.5000	0	92.6	80	120	02/09/2023
Selenium		0.0010		0.424	0.5000	0	84.8	80	120	02/09/2023
Thallium		0.0020		0.217	0.2500	0	86.7	80	120	02/09/2023

Batch 202807 **SampType: MBLK** Units mg/L

SampleID: MBLK-202807

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Arsenic		0.0010		< 0.0010	0.0004	0	0	-100	100	02/13/2023

Batch 202807 **SampType: LCS** Units mg/L

SampleID: LCS-202807

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Arsenic		0.0010		0.545	0.5000	0	109.0	80	120	02/13/2023

Client: ERM

Work Order: 23020169

Client Project: GTEC

Report Date: 28-Feb-23

SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)

Batch 202915		SampType: MBLK		Units mg/L							Date Analyzed
SampID: MBLK-202915											
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit		
Antimony		0.0010		< 0.0010	0.0004	0	0	-100	100	02/15/2023	
Arsenic		0.0010		< 0.0010	0.0004	0	0	-100	100	02/16/2023	
Barium		0.0010		< 0.0010	0.0007	0	0	-100	100	02/15/2023	
Beryllium		0.0010		< 0.0010	0.0002	0	0	-100	100	02/16/2023	
Boron	*	0.0250		< 0.0250	0.0093	0	0	-100	100	02/16/2023	
Cadmium		0.0010		< 0.0010	0.0001	0	0	-100	100	02/16/2023	
Calcium		0.125		< 0.125	0.0700	0	0	-100	100	02/17/2023	
Chromium		0.0015		< 0.0015	0.0007	0	0	-100	100	02/17/2023	
Cobalt		0.0010		< 0.0010	0.0001	0	0	-100	100	02/16/2023	
Iron		0.0250		< 0.0250	0.0115	0	0	-100	100	02/17/2023	
Lead		0.0010		< 0.0010	0.0006	0	0	-100	100	02/15/2023	
Lithium	*	0.0030		< 0.0030	0.0015	0	0	-100	100	02/17/2023	
Manganese		0.0020		< 0.0020	0.0008	0	0	-100	100	02/17/2023	
Molybdenum		0.0015		< 0.0015	0.0006	0	0	-100	100	02/16/2023	
Nickel		0.0010		< 0.0010	0.0004	0	0	-100	100	02/16/2023	
Selenium		0.0010		< 0.0010	0.0006	0	0	-100	100	02/16/2023	
Thallium		0.0020		< 0.0020	0.0010	0	0	-100	100	02/15/2023	

Client: ERM

Work Order: 23020169

Client Project: GTEC

Report Date: 28-Feb-23

SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)

Batch 202915		SampType: LCS		Units mg/L							Date Analyzed
SampleID: LCS-202915											
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit		
Antimony		0.0010		0.509	0.5000	0	101.8	85	115	02/16/2023	
Arsenic		0.0010		0.554	0.5000	0	110.8	85	115	02/16/2023	
Barium		0.0010		2.19	2.000	0	109.5	85	115	02/16/2023	
Beryllium		0.0010		0.0509	0.0500	0	101.9	85	115	02/16/2023	
Boron	*	0.0250		0.509	0.5000	0	101.8	85	115	02/16/2023	
Cadmium		0.0010		0.0502	0.0500	0	100.4	85	115	02/16/2023	
Calcium	*	0.125		2.66	2.500	0	106.5	85	115	02/16/2023	
Chromium		0.0015		0.210	0.2000	0	104.9	85	115	02/16/2023	
Cobalt		0.0010		0.548	0.5000	0	109.7	85	115	02/16/2023	
Iron	*	0.0250		2.15	2.000	0	107.5	85	115	02/16/2023	
Lead		0.0010		0.521	0.5000	0	104.3	85	115	02/16/2023	
Lithium	*	0.0030		0.515	0.5000	0	103.0	85	115	02/16/2023	
Manganese		0.0020		0.531	0.5000	0	106.2	85	115	02/16/2023	
Molybdenum		0.0015		0.510	0.5000	0	102.0	85	115	02/16/2023	
Nickel		0.0010		0.539	0.5000	0	107.9	85	115	02/16/2023	
Selenium		0.0010		0.506	0.5000	0	101.2	85	115	02/16/2023	
Thallium		0.0020		0.257	0.2500	0	102.8	85	115	02/16/2023	



Quality Control Results

<http://www.teklabinc.com/>

Client: ERM

Work Order: 23020169

Client Project: GTEC

Report Date: 28-Feb-23

SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)

Batch 202915		SampType: MS		Units mg/L							Date Analyzed	
SampID: 23020169-003CMS												
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit			
Antimony		0.0010		0.514	0.5000	0	102.8	75	125			
Arsenic		0.0010		0.543	0.5000	0.001099	108.3	75	125			
Barium		0.0010		2.29	2.000	0.2020	104.2	75	125			
Beryllium		0.0010		0.0532	0.0500	0	106.3	75	125			
Boron		0.0250	S	7.61	0.5000	6.842	154.2	75	125			
Cadmium		0.0010		0.0505	0.0500	0	101.0	75	125			
Calcium		0.125	S	103	2.500	97.08	240.5	75	125			
Chromium		0.0015		0.200	0.2000	0.0008781	99.3	75	125			
Cobalt		0.0010		0.514	0.5000	0.0001671	102.9	75	125			
Iron		0.0250		11.3	2.000	9.074	111.9	75	125			
Lead		0.0010		0.518	0.5000	0	103.6	75	125			
Lithium	*	0.0030		0.572	0.5000	0.04058	106.2	75	125			
Manganese		0.0020		1.03	0.5000	0.5065	104.0	75	125			
Molybdenum		0.0015		0.799	0.5000	0.2648	106.9	75	125			
Nickel		0.0010		0.497	0.5000	0.001399	99.1	75	125			
Selenium		0.0010		0.492	0.5000	0	98.4	75	125			
Thallium		0.0020		0.262	0.2500	0	105.0	75	125			

Client: ERM

Work Order: 23020169

Client Project: GTEC

Report Date: 28-Feb-23

SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)

Batch 202915		SampType: MSD		Units mg/L				RPD Limit: 20			
SampID: 23020169-003CMSD											
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed	
Antimony		0.0010		0.518	0.5000	0	103.7	0.5139	0.88	02/16/2023	
Arsenic		0.0010		0.556	0.5000	0.001099	110.9	0.5426	2.39	02/16/2023	
Barium		0.0010		2.33	2.000	0.2020	106.6	2.285	2.08	02/16/2023	
Beryllium		0.0010		0.0537	0.0500	0	107.5	0.05317	1.08	02/16/2023	
Boron		0.0250	S	7.69	0.5000	6.842	169.1	7.613	0.97	02/16/2023	
Cadmium		0.0010		0.0505	0.0500	0	101.0	0.05051	0.02	02/16/2023	
Calcium		0.125	S	104	2.500	97.08	272.9	103.1	0.78	02/16/2023	
Chromium		0.0015		0.204	0.2000	0.0008781	101.7	0.1995	2.34	02/16/2023	
Cobalt		0.0010		0.521	0.5000	0.0001671	104.2	0.5145	1.25	02/16/2023	
Iron		0.0250		11.5	2.000	9.074	123.4	11.31	2.01	02/16/2023	
Lead		0.0010		0.517	0.5000	0	103.4	0.5179	0.14	02/16/2023	
Lithium	*	0.0030		0.579	0.5000	0.04058	107.7	0.5717	1.24	02/16/2023	
Manganese		0.0020		1.03	0.5000	0.5065	105.5	1.027	0.69	02/16/2023	
Molybdenum		0.0015		0.804	0.5000	0.2648	107.8	0.7995	0.54	02/16/2023	
Nickel		0.0010		0.502	0.5000	0.001399	100.0	0.4967	0.98	02/16/2023	
Selenium		0.0010		0.498	0.5000	0	99.5	0.4918	1.16	02/16/2023	
Thallium		0.0020		0.262	0.2500	0	104.8	0.2625	0.13	02/16/2023	

Client: ERM

Work Order: 23020169

Client Project: GTEC

Report Date: 28-Feb-23

SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)

Batch 202915		SampType: MS		Units mg/L							Date Analyzed
SampID: 23020169-012CMS											
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit		
Antimony		0.0010		0.490	0.5000	0	98.0	75	125	02/16/2023	
Arsenic		0.0010		0.514	0.5000	0.001571	102.4	75	125	02/16/2023	
Barium		0.0010		2.20	2.000	0.1781	101.2	75	125	02/16/2023	
Beryllium		0.0010		0.0512	0.0500	0	102.5	75	125	02/16/2023	
Boron		0.0250		0.709	0.5000	0.2212	97.6	75	125	02/16/2023	
Cadmium		0.0010		0.0482	0.0500	0	96.4	75	125	02/16/2023	
Calcium		0.125	S	75.5	2.500	75.53	0.3	75	125	02/16/2023	
Chromium		0.0015		0.192	0.2000	0.002176	95.0	75	125	02/16/2023	
Cobalt		0.0010		0.482	0.5000	0.001273	96.2	75	125	02/16/2023	
Iron		0.0250		2.50	2.000	0.6273	93.7	75	125	02/16/2023	
Lead		0.0010		0.496	0.5000	0	99.1	75	125	02/16/2023	
Lithium	*	0.0030		0.530	0.5000	0.01575	102.9	75	125	02/16/2023	
Manganese		0.0020		0.575	0.5000	0.09643	95.8	75	125	02/16/2023	
Molybdenum		0.0015		0.468	0.5000	0	93.6	75	125	02/16/2023	
Nickel		0.0010		0.469	0.5000	0.008130	92.2	75	125	02/16/2023	
Selenium		0.0010		0.480	0.5000	0.003666	95.2	75	125	02/16/2023	
Thallium		0.0020		0.246	0.2500	0	98.4	75	125	02/16/2023	

Client: ERM

Work Order: 23020169

Client Project: GTEC

Report Date: 28-Feb-23

SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)

Batch 202915		SampType: MSD		Units mg/L				RPD Limit: 20			
SampID: 23020169-012CMSD											
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed	
Antimony		0.0010		0.506	0.5000	0	101.2	0.4901	3.17	02/16/2023	
Arsenic		0.0010		0.541	0.5000	0.001571	107.8	0.5138	5.09	02/16/2023	
Barium		0.0010		2.23	2.000	0.1781	102.8	2.202	1.45	02/16/2023	
Beryllium		0.0010		0.0519	0.0500	0	103.8	0.05124	1.25	02/16/2023	
Boron		0.0250		0.725	0.5000	0.2212	100.8	0.7091	2.27	02/16/2023	
Cadmium		0.0010		0.0486	0.0500	0	97.1	0.04819	0.74	02/16/2023	
Calcium		0.125	S	76.7	2.500	75.53	46.6	75.53	1.52	02/16/2023	
Chromium		0.0015		0.195	0.2000	0.002176	96.5	0.1921	1.56	02/16/2023	
Cobalt		0.0010		0.494	0.5000	0.001273	98.5	0.4824	2.35	02/16/2023	
Iron		0.0250		2.56	2.000	0.6273	96.5	2.501	2.22	02/16/2023	
Lead		0.0010		0.499	0.5000	0	99.8	0.4955	0.71	02/16/2023	
Lithium	*	0.0030		0.543	0.5000	0.01575	105.5	0.5304	2.37	02/16/2023	
Manganese		0.0020		0.598	0.5000	0.09643	100.3	0.5753	3.84	02/16/2023	
Molybdenum		0.0015		0.488	0.5000	0	97.5	0.4678	4.15	02/16/2023	
Nickel		0.0010		0.481	0.5000	0.008130	94.6	0.4694	2.44	02/16/2023	
Selenium		0.0010		0.509	0.5000	0.003666	101.0	0.4799	5.81	02/16/2023	
Thallium		0.0020		0.254	0.2500	0	101.5	0.2461	3.01	02/16/2023	

Client: ERM

Work Order: 23020169

Client Project: GTEC

Report Date: 28-Feb-23

SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)
Batch 202916 **SampType:** MBLK **Units** mg/L

SampleID: MBLK-202916

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010		< 0.0010	0.0004	0	0	-100	100	02/15/2023
Arsenic		0.0010		< 0.0010	0.0004	0	0	-100	100	02/16/2023
Barium		0.0010		< 0.0010	0.0007	0	0	-100	100	02/15/2023
Beryllium		0.0010		< 0.0010	0.0002	0	0	-100	100	02/17/2023
Boron		0.0250		< 0.0250	0.0093	0	0	-100	100	02/17/2023
Cadmium		0.0010		< 0.0010	0.0001	0	0	-100	100	02/17/2023
Calcium		0.125		< 0.125	0.0700	0	0	-100	100	02/16/2023
Chromium		0.0015		< 0.0015	0.0007	0	0	-100	100	02/16/2023
Cobalt		0.0010		< 0.0010	0.0001	0	0	-100	100	02/16/2023
Iron		0.0250		< 0.0250	0.0115	0	0	-100	100	02/16/2023
Lead		0.0010		< 0.0010	0.0006	0	0	-100	100	02/15/2023
Lithium	*	0.0030		< 0.0030	0.0015	0	0	-100	100	02/17/2023
Manganese		0.0020		< 0.0020	0.0008	0	0	-100	100	02/16/2023
Molybdenum		0.0015		< 0.0015	0.0006	0	0	-100	100	02/17/2023
Nickel		0.0010		< 0.0010	0.0004	0	0	-100	100	02/16/2023
Selenium		0.0010		< 0.0010	0.0006	0	0	-100	100	02/16/2023
Thallium		0.0020		< 0.0020	0.0010	0	0	-100	100	02/15/2023



Quality Control Results

<http://www.teklabinc.com/>

Client: ERM

Work Order: 23020169

Client Project: GTEC

Report Date: 28-Feb-23

SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)

Batch 202916		SampType: LCS		Units mg/L							
SampID: LCS-202916											Date Analyzed
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit		
Antimony		0.0010		0.478	0.5000	0	95.5	80	120	02/16/2023	
Arsenic		0.0010		0.506	0.5000	0	101.2	80	120	02/16/2023	
Barium		0.0010		2.00	2.000	0	100.0	80	120	02/16/2023	
Beryllium		0.0010		0.0495	0.0500	0	98.9	80	120	02/17/2023	
Boron		0.0250		0.497	0.5000	0	99.4	80	120	02/17/2023	
Cadmium		0.0010		0.0479	0.0500	0	95.8	80	120	02/17/2023	
Calcium		0.125		2.32	2.500	0	92.8	80	120	02/16/2023	
Chromium		0.0015		0.191	0.2000	0	95.5	80	120	02/16/2023	
Cobalt		0.0010		0.486	0.5000	0	97.2	80	120	02/16/2023	
Iron		0.0250		1.94	2.000	0	97.1	80	120	02/16/2023	
Lead		0.0010		0.490	0.5000	0	98.0	80	120	02/16/2023	
Lithium	*	0.0030		0.509	0.5000	0	101.8	80	120	02/17/2023	
Manganese		0.0020		0.489	0.5000	0	97.7	80	120	02/16/2023	
Molybdenum		0.0015		0.478	0.5000	0	95.5	80	120	02/17/2023	
Nickel		0.0010		0.472	0.5000	0	94.3	80	120	02/16/2023	
Selenium		0.0010		0.476	0.5000	0	95.1	80	120	02/16/2023	
Thallium		0.0020		0.284	0.2500	0	113.7	85	115	02/15/2023	

Client: ERM

Work Order: 23020169

Client Project: GTEC

Report Date: 28-Feb-23

SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)
Batch 202916 **SampType:** MS **Units** mg/L

SampleID: 23020169-015CMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010		0.508	0.5000	0	101.6	75	125	02/16/2023
Arsenic		0.0010		0.534	0.5000	0.01748	103.4	75	125	02/16/2023
Barium		0.0010		2.34	2.000	0.1588	108.9	75	125	02/16/2023
Beryllium		0.0010		0.0505	0.0500	0	101.0	75	125	02/17/2023
Boron		0.0250	S	8.35	0.5000	8.317	6.0	75	125	02/17/2023
Cadmium		0.0010		0.0492	0.0500	0.0002302	97.8	75	125	02/17/2023
Calcium		0.125	S	146	2.500	149.0	-107.6	75	125	02/16/2023
Chromium		0.0015		0.189	0.2000	0.002223	93.3	75	125	02/16/2023
Cobalt		0.0010		0.469	0.5000	0.0005275	93.7	75	125	02/16/2023
Iron		0.0250		13.5	2.000	11.66	89.6	75	125	02/16/2023
Lead		0.0010		0.488	0.5000	0.002327	97.2	75	125	02/16/2023
Lithium	*	0.0030		0.562	0.5000	0.04402	103.7	75	125	02/17/2023
Manganese		0.0020		1.18	0.5000	0.7120	93.7	75	125	02/16/2023
Molybdenum		0.0015		0.653	0.5000	0.1596	98.7	75	125	02/17/2023
Nickel		0.0010		0.446	0.5000	0.002271	88.7	75	125	02/16/2023
Selenium		0.0010		0.499	0.5000	0	99.8	75	125	02/16/2023
Thallium		0.0020		0.242	0.2500	0	96.7	75	125	02/16/2023



Quality Control Results

<http://www.teklabinc.com/>

Client: ERM

Work Order: 23020169

Client Project: GTEC

Report Date: 28-Feb-23

SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)

Batch 202916		SampType: MSD		Units mg/L				RPD Limit: 20		
SampID: 23020169-015CMSD										
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Antimony		0.0010		0.486	0.5000	0	97.3	0.5079	4.33	02/16/2023
Arsenic		0.0010		0.524	0.5000	0.01748	101.3	0.5344	1.95	02/16/2023
Barium		0.0010		2.30	2.000	0.1588	106.9	2.337	1.77	02/16/2023
Beryllium		0.0010		0.0502	0.0500	0	100.4	0.05049	0.61	02/17/2023
Boron		0.0250	S	8.43	0.5000	8.317	23.6	8.347	1.05	02/17/2023
Cadmium		0.0010		0.0467	0.0500	0.0002302	93.0	0.04915	5.05	02/17/2023
Calcium		0.125	S	144	2.500	149.0	-181.4	146.3	1.27	02/16/2023
Chromium		0.0015		0.186	0.2000	0.002223	92.1	0.1888	1.32	02/16/2023
Cobalt		0.0010		0.453	0.5000	0.0005275	90.5	0.4692	3.48	02/16/2023
Iron		0.0250		13.7	2.000	11.66	100.3	13.46	1.57	02/16/2023
Lead		0.0010		0.481	0.5000	0.002327	95.8	0.4884	1.50	02/16/2023
Lithium	*	0.0030		0.564	0.5000	0.04402	104.0	0.5624	0.28	02/17/2023
Manganese		0.0020		1.16	0.5000	0.7120	90.3	1.180	1.42	02/16/2023
Molybdenum		0.0015		0.639	0.5000	0.1596	96.0	0.6529	2.09	02/17/2023
Nickel		0.0010		0.434	0.5000	0.002271	86.4	0.4458	2.57	02/16/2023
Selenium		0.0010		0.485	0.5000	0	96.9	0.4992	2.96	02/16/2023
Thallium		0.0020		0.239	0.2500	0	95.5	0.2418	1.27	02/16/2023

SW-846 7470A (TOTAL)

Batch 202649		SampType: MBLK		Units mg/L						
SampID: MBLK-202649										
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury		0.00020		< 0.00020	0.0001	0	0	-100	100	02/07/2023

Batch 202649		SampType: LCS		Units mg/L							
SampID: LCS-202649											
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed	
Mercury		0.00020		0.00466	0.0050	0	93.2	85	115	02/07/2023	

Batch 202649		SampType: MS		Units mg/L							
SampID: 23020169-002CMS											
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed	
Mercury		0.00020		0.00475	0.0050	0	95.0	75	125	02/07/2023	

Client: ERM

Work Order: 23020169

Client Project: GTEC

Report Date: 28-Feb-23

SW-846 7470A (TOTAL)

Batch 202649		SampType: MSD		Units mg/L				RPD Limit: 15			
SampID: 23020169-002CMSD											
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed	
Mercury		0.00020		0.00466	0.0050	0	93.3	0.004748	1.78	02/07/2023	

Batch 202742		SampType: MBLK		Units mg/L							
SampID: MBLK-202742											
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed	
Mercury		0.00020		< 0.00020	0.0001	0	0	-100	100	02/10/2023	

Batch 202742		SampType: LCS		Units mg/L							
SampID: LCS-202742											Date Analyzed
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit		
Mercury		0.00020		0.00512	0.0050	0	102.4	85	115	02/10/2023	

Batch 202742		SampType: MS		Units mg/L							
SampID: 23020169-008CMS											Date Analyzed
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit		
Mercury		0.00020		0.00520	0.0050	0	103.9	75	125	02/10/2023	

Batch 202742		SampType: MSD		Units mg/L				RPD Limit: 15			
SampID: 23020169-008CMSD											
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed	
Mercury		0.00020		0.00503	0.0050	0	100.6	0.005197	3.25	02/10/2023	

Batch 202743		SampType: MBLK		Units mg/L							
SampID: MBLK-202743											
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed	
Mercury		0.00020		< 0.00020	0.0001	0	0	-100	100	02/10/2023	

Batch 202743		SampType: LCS		Units mg/L							
SampID: LCS-202743											
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed	
Mercury		0.00020		0.00541	0.0050	0	108.2	85	115	02/10/2023	

Batch 202743		SampType: MS		Units mg/L							
SampID: 23020169-013CMS											
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed	
Mercury		0.00020		0.00516	0.0050	0	103.2	75	125	02/10/2023	



Quality Control Results

<http://www.teklabinc.com/>

Client: ERM

Work Order: 23020169

Client Project: GTEC

Report Date: 28-Feb-23

SW-846 7470A (TOTAL)

Batch 202743		SampType: MSD		Units mg/L				RPD Limit: 15			
SampID: 23020169-013CMSD											
Analyses		Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Mercury			0.00020		0.00495	0.0050	0	98.9	0.005159	4.22	02/10/2023



Receiving Check List

<http://www.teklabinc.com/>

Client: ERM

Work Order: 23020169

Client Project: GTEC

Report Date: 28-Feb-23

Carrier: Clay Sansoucie

Received By: TWM

Completed by:

Reviewed by:

On:

On:

03-Feb-23

03-Feb-23

Lindsey Maddox

Marvin L. Darling

Pages to follow:

Chain of custody

2

Extra pages included

30

Shipping container/cooler in good condition?

Yes ☒

No ☐

Not Present ☐

Temp °C **1.6**

Type of thermal preservation?

None ☐

Ice ☒

Blue Ice ☐

Dry Ice ☐

Chain of custody present?

Yes ☒

No ☐

Chain of custody signed when relinquished and received?

Yes ☒

No ☐

Chain of custody agrees with sample labels?

Yes ☒

No ☐

Samples in proper container/bottle?

Yes ☒

No ☐

Sample containers intact?

Yes ☒

No ☐

Sufficient sample volume for indicated test?

Yes ☒

No ☐

All samples received within holding time?

Yes ☐

No ☒

Reported field parameters measured:

Field ☐

Lab ☒

NA ☐

Sample analyses to be measured in the field and/or within 15 minutes of collection were analyzed in the lab as soon as practicable. These analyses include Chlorine (demand, free and/or residual), Carbon Dioxide, Dissolved Oxygen, Ferrous Iron, pH, and Sulfite.

Container/Temp Blank temperature in compliance?

Yes ☒

No ☐

When thermal preservation is required, samples are compliant with a temperature between 0.1°C - 6.0°C, or when samples are received on ice the same day as collected.

Water – at least one vial per sample has zero headspace?

Yes ☐

No ☐

No VOA vials ☒

Water - TOX containers have zero headspace?

Yes ☐

No ☐

No TOX containers ☒

Water - pH acceptable upon receipt?

Yes ☒

No ☐

NA ☐

NPDES/CWA TCN interferences checked/treated in the field?

Yes ☐

No ☐

NA ☒

Any No responses must be detailed below or on the COC.

pH strip #87147. - lmaddox - 2/3/2023 10:56:50 AM

Additional nitric acid (86511) was needed in both 2L containers for samples APW-07-WG-20230130 and APW-10S-WG-20230202 and one APW-10D-WG-20230202 container upon arrival at the laboratory. - lmaddox - 2/3/2023 10:57:21 AM

No container was received for dissolved metals for EB-01-WQ-20230130. The sample was split, filtered and preserved upon arrival at the laboratory. Client was notified via workorder summary. LAM 2/3/23

CHAIN OF CUSTODY

pg. 1 of 2 Work order # 23020169

TEKLAB, INC. 5445 Horseshoe Lake Road - Collinsville, IL 62234 - Phone: (618) 344-1004 - Fax: (618) 344-1005

Client: ERM
Address: 1968 Craig Road
City / State / Zip: St. Louis, MO 63146
Contact: Matt Halley **Phone:** (314) 952-2760
E-Mail: matt.halley@erm.com **Fax:**

Samples on: ☒ ICE ☐ BLUE ICE ☐ NO ICE 1.6 °C LTG# 3
Preserved in: ☒ LAB ☐ FIELD **FOR LAB USE ONLY**

Lab Notes
 APW-07 APW 100
 2487147 Added HNO3 (8/5/11) APW 105 AC 2/3/20

Are these samples known to be involved in litigation? If yes, a surcharge will apply ☐ Yes ☒ No
 Are these samples known to be hazardous? ☐ Yes ☐ No
 Are there any required reporting limits to be met on the requested analysis? If yes, please provide limits in the comment section. ☐ Yes ☐ No

Client Comments:
 *Total and Dissolved: Sb As Ba Be B Cd Ca Cr Co Pb Li Mo Ni Se Ti
 Field filtered for dissolved metals.

Project Name/Number		Sample Collector's Name		MATRIX		INDICATE ANALYSIS REQUESTED																													
GTEC		Clay Sansouire / Marshall Arndell																																	
Results Requested		Billing Instructions		# and Type of Containers								Drinking Water		Soil		Sludge		Special Waste		Groundwater		CI SO4		Dissolved Metals*		F- pH TDS		Radium 226/228		Total Fe/Mn		Total Hg		Total Metals*	
☒ Standard ☐ 1-2 Day (100% Surcharge) ☐ Other ☐ 3 Day (50% Surcharge)																																			
Lab Use Only	Sample Identification	Date/Time Sampled	UNRES	HNO3	NaOH	H2SO4	HCL	MeOH	NaHSO4	OTHER	Aqueous		Soil		Sludge		Special Waste		Groundwater		CI SO4		Dissolved Metals*		F- pH TDS		Radium 226/228		Total Fe/Mn		Total Hg		Total Metals*		
23020169 001	APW-03-WG-20230130	1/30/23; 1330	1	2		2																													
-002	APW-07-WG-20230130	1/30/23; 1445	1	2		2																													
-003	APW-06S-WG-20230201	2/1/23; 0910	1	2		2																													
-004	APW-06D-WG-20230201	2/1/23; 1100	1	2		2																													
-005	APW-05-WG-20230201	2/1/23; 1225	1	2		2																													
-006	APW-02-WG-20230201	2/1/23; 1350	1	2		2																													
-007	APW-09-WG-20230201	2/1/23; 1950	1	2		2																													
-008	APW-08-WG-20230202	2/2/23; 0945	1	2		2																													
-009	APW-10S-WG-20230202	2/2/23; 1110	1	2		2																													
-010	APW-10D-WG-20230202	2/2/23; 1230	1	2		2																													
Relinquished By			Date/Time								Received By								Date/Time																
Clay Sansouire			2/3/23; 0845								[Signature]								2.3.23 0845																

The individual signing this agreement on behalf of the client, acknowledges that he/she has read and understands the terms and conditions of this agreement, and that he/she has the authority to sign on behalf of the client. See www.teklabinc.com for terms and conditions.

BottleOrder: 77879



AC 2/3/23

pg. 2 of 2 Work order # 23020169

Client:	ERM		
Address:	1968 Craig Road		
City / State / Zip	St. Louis, MO 63146		
Contact:	Matt Halley	Phone:	(314) 952-2760
E-Mail:	matt.halley@erm.com	Fax:	

Preserved in: ☐ LAB ☐ FIELD **FOR LAB USE ONLY**

Client Comments:

*Total and Dissolved: Sb As Ba Be B Cd Ca Cr Co Pb Li Mo Ni Se Ti

Field filtered for dissolved metals.

Are these samples known to be involved in litigation? If yes, a surcharge will apply ☐ Yes ☐ No

Are these samples known to be hazardous? ☐ Yes ☐ No

Are there any required reporting limits to be met on the requested analysis?. If yes, please provide limits in the comment section. ☐ Yes ☐ No

[illegible]

BottleOrder: 77879



TEKLAB, Inc.

Sample Delivery Group: L1582645

Samples Received: 02/06/2023

Project Number: 23020169

Description:

Report To: Elizabeth Hurley
5445 Horseshoe Lake Road
Collinsville, IL 62234

Entire Report Reviewed By:



Mark W. Beasley
Project Manager

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by Pace Analytical National is performed per guidance provided in laboratory standard operating procedures ENV-SOP-MTJL-0067 and ENV-SOP-MTJL-0068. Where sampling conducted by the customer, results relate to the accuracy of the information provided, and as the samples are received.

Pace Analytical National12065 Lebanon Rd Mount Juliet, TN 37122 615-758-5858 800-767-5859 www.pacenational.com

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SAMPLE SUMMARY

23020169-001 L1582645-01 Non-Potable Water

Collected by
Collected date/time
Received date/time

01/30/23 13:30 02/06/23 10:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904/9320	WG2004306	1	02/13/23 17:33	02/16/23 16:43	SWM	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG2001731	1	02/08/23 13:09	02/16/23 16:43	SWM	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG2001731	1	02/08/23 13:09	02/10/23 10:57	RGT	Mt. Juliet, TN

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

23020169-002 L1582645-02 Non-Potable Water

Collected by
Collected date/time
Received date/time

01/30/23 14:45 02/06/23 10:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904/9320	WG2004306	1	02/13/23 17:33	02/16/23 16:43	SWM	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG2001731	1	02/08/23 13:09	02/16/23 16:43	SWM	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG2001731	1	02/08/23 13:09	02/10/23 10:57	RGT	Mt. Juliet, TN

23020169-003 L1582645-03 Non-Potable Water

Collected by
Collected date/time
Received date/time

02/01/23 08:10 02/06/23 10:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904/9320	WG2004306	1	02/13/23 17:33	02/16/23 16:43	SWM	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG2001731	1	02/08/23 13:09	02/16/23 16:43	SWM	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG2001731	1	02/08/23 13:09	02/10/23 10:57	RGT	Mt. Juliet, TN

23020169-004 L1582645-04 Non-Potable Water

Collected by
Collected date/time
Received date/time

02/01/23 11:00 02/06/23 10:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904/9320	WG2004306	1	02/13/23 17:33	02/16/23 16:43	SWM	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG2001731	1	02/08/23 13:09	02/16/23 16:43	SWM	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG2001731	1	02/08/23 13:09	02/10/23 10:57	RGT	Mt. Juliet, TN

23020169-005 L1582645-05 Non-Potable Water

Collected by
Collected date/time
Received date/time

02/01/23 12:25 02/06/23 10:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904/9320	WG2004306	1	02/13/23 17:33	02/16/23 16:43	SWM	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG2001731	1	02/08/23 13:09	02/16/23 16:43	SWM	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG2001731	1	02/08/23 13:09	02/10/23 10:57	RGT	Mt. Juliet, TN

23020169-006 L1582645-06 Non-Potable Water

Collected by
Collected date/time
Received date/time

02/01/23 13:50 02/06/23 10:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904/9320	WG2004306	1	02/13/23 17:33	02/16/23 16:43	SWM	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG2001731	1	02/08/23 13:09	02/16/23 16:43	SWM	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG2001731	1	02/08/23 13:09	02/10/23 10:57	RGT	Mt. Juliet, TN

SAMPLE SUMMARY

23020169-007 L1582645-07 Non-Potable Water

Collected by
Collected date/time
02/01/23 15:50
Received date/time
02/06/23 10:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904/9320	WG2004309	1	02/16/23 18:01	02/22/23 13:00	SWM	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG2001731	1	02/08/23 13:09	02/22/23 13:00	SWM	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG2001731	1	02/08/23 13:09	02/10/23 10:57	RGT	Mt. Juliet, TN

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

23020169-008 L1582645-08 Non-Potable Water

Collected by
Collected date/time
02/01/23 09:45
Received date/time
02/06/23 10:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904/9320	WG2004309	1	02/16/23 18:01	02/22/23 13:00	SWM	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG2001731	1	02/08/23 13:09	02/22/23 13:00	SWM	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG2001731	1	02/08/23 13:09	02/10/23 10:57	RGT	Mt. Juliet, TN

23020169-009 L1582645-09 Non-Potable Water

Collected by
Collected date/time
02/01/23 11:10
Received date/time
02/06/23 10:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904/9320	WG2004309	1	02/16/23 18:01	02/22/23 13:00	SWM	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG2001731	1	02/08/23 13:09	02/22/23 13:00	SWM	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG2001731	1	02/08/23 13:09	02/10/23 10:57	RGT	Mt. Juliet, TN

23020169-010 L1582645-10 Non-Potable Water

Collected by
Collected date/time
02/01/23 12:30
Received date/time
02/06/23 10:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904/9320	WG2004309	1	02/16/23 18:01	02/22/23 13:00	SWM	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG2001731	1	02/08/23 13:09	02/22/23 13:00	SWM	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG2001731	1	02/08/23 13:09	02/10/23 10:57	RGT	Mt. Juliet, TN

23020169-011 L1582645-11 Non-Potable Water

Collected by
Collected date/time
02/01/23 14:05
Received date/time
02/06/23 10:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904/9320	WG2004309	1	02/16/23 18:01	02/22/23 13:00	SWM	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG2001731	1	02/08/23 13:09	02/22/23 13:00	SWM	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG2001731	1	02/08/23 13:09	02/10/23 10:57	RGT	Mt. Juliet, TN

23020169-012 L1582645-12 Non-Potable Water

Collected by
Collected date/time
02/01/23 15:10
Received date/time
02/06/23 10:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904/9320	WG2004309	1	02/16/23 18:01	02/22/23 13:00	SWM	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG2001734	1	02/09/23 14:52	02/22/23 13:00	SWM	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG2001734	1	02/09/23 14:52	02/16/23 10:25	RGT	Mt. Juliet, TN

SAMPLE SUMMARY

23020169-013 L1582645-13 Non-Potable Water

Collected by

Collected date/time

Received date/time

01/30/23 09:40

02/06/23 10:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904/9320	WG2004309	1	02/16/23 18:01	02/22/23 13:00	SWM	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG2001734	1	02/09/23 14:52	02/22/23 13:00	SWM	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG2001734	1	02/09/23 14:52	02/16/23 10:25	RGT	Mt. Juliet, TN

¹Cp

²Tc

³Ss

⁴Cn

23020169-014 L1582645-14 Non-Potable Water

Collected by

Collected date/time

Received date/time

02/01/23 00:01

02/06/23 10:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904/9320	WG2004309	1	02/16/23 18:01	02/22/23 13:00	SWM	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG2001734	1	02/09/23 14:52	02/22/23 13:00	SWM	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG2001734	1	02/09/23 14:52	02/16/23 10:25	RGT	Mt. Juliet, TN

⁵Sr

⁶Qc

⁷Gl

23020169-015 L1582645-15 Non-Potable Water

Collected by

Collected date/time

Received date/time

02/01/23 00:02

02/06/23 10:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904/9320	WG2004309	1	02/16/23 18:01	02/22/23 13:00	SWM	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG2001734	1	02/09/23 14:52	02/22/23 13:00	SWM	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG2001734	1	02/09/23 14:52	02/16/23 10:25	RGT	Mt. Juliet, TN

⁸Al

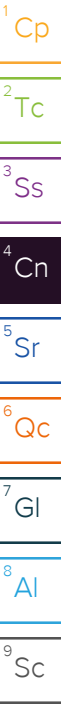
⁹Sc

CASE NARRATIVE

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All radiochemical sample results for solids are reported on a dry weight basis with the exception of tritium, carbon-14 and radon, unless wet weight was requested by the client. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.



Mark W. Beasley
Project Manager



Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-228	0.119	U	0.430	0.749	02/16/2023 16:43	WG2004306
(T) Barium	88.7			30.0-143	02/16/2023 16:43	WG2004306
(T) Yttrium	95.0			30.0-136	02/16/2023 16:43	WG2004306

¹Cp

²Tc

³Ss

Radiochemistry by Method Calculation

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
Combined Radium	0.412	J	0.479	0.776	02/16/2023 16:43	WG2001731

⁴Cn

⁵Sr

Radiochemistry by Method SM7500Ra B M

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-226	0.293		0.212	0.202	02/10/2023 10:57	WG2001731
(T) Barium-133	81.0			30.0-143	02/10/2023 10:57	WG2001731

⁶Qc

⁷Gl

⁸Al

⁹Sc

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-228	1.77		0.352	0.561	02/16/2023 16:43	WG2004306
(T) Barium	108			30.0-143	02/16/2023 16:43	WG2004306
(T) Yttrium	98.1			30.0-136	02/16/2023 16:43	WG2004306

¹Cp

²Tc

³Ss

Radiochemistry by Method Calculation

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
Combined Radium	2.10		0.441	0.638	02/16/2023 16:43	WG2001731

⁴Cn

⁵Sr

Radiochemistry by Method SM7500Ra B M

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-226	0.337		0.265	0.303	02/10/2023 10:57	WG2001731
(T) Barium-133	84.2			30.0-143	02/10/2023 10:57	WG2001731

⁶Qc

⁷Gl

⁸Al

⁹Sc

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-228	1.44		0.518	0.862	02/16/2023 16:43	WG2004306
(T) Barium	87.3			30.0-143	02/16/2023 16:43	WG2004306
(T) Yttrium	94.0			30.0-136	02/16/2023 16:43	WG2004306

¹Cp

²Tc

³Ss

Radiochemistry by Method Calculation

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
Combined Radium	1.47		0.568	0.949	02/16/2023 16:43	WG2001731

⁴Cn

⁵Sr

Radiochemistry by Method SM7500Ra B M

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-226	0.0283	U	0.232	0.397	02/10/2023 10:57	WG2001731
(T) Barium-133	92.2			30.0-143	02/10/2023 10:57	WG2001731

⁶Qc

⁷Gl

⁸Al

⁹Sc

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-228	1.02		0.451	0.758	02/16/2023 16:43	WG2004306
(T) Barium	101			30.0-143	02/16/2023 16:43	WG2004306
(T) Yttrium	91.9			30.0-136	02/16/2023 16:43	WG2004306

¹Cp

²Tc

³Ss

Radiochemistry by Method Calculation

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
Combined Radium	1.38		0.528	0.822	02/16/2023 16:43	WG2001731

⁴Cn

⁵Sr

Radiochemistry by Method SM7500Ra B M

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-226	0.355		0.275	0.317	02/10/2023 10:57	WG2001731
(T) Barium-133	104			30.0-143	02/10/2023 10:57	WG2001731

⁶Qc

⁷Gl

⁸Al

⁹Sc

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-228	0.399	J	0.422	0.723	02/16/2023 16:43	WG2004306
(T) Barium	105			30.0-143	02/16/2023 16:43	WG2004306
(T) Yttrium	98.9			30.0-136	02/16/2023 16:43	WG2004306

1
Cp

2
Tc

3
Ss

Radiochemistry by Method Calculation

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
Combined Radium	0.608	J	0.488	0.798	02/16/2023 16:43	WG2001731

4
Cn

5
Sr

Radiochemistry by Method SM7500Ra B M

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-226	0.209	J	0.245	0.338	02/10/2023 10:57	WG2001731
(T) Barium-133	87.7			30.0-143	02/10/2023 10:57	WG2001731

6
Qc

7
Gl

8
Al

9
Sc

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-228	1.07		0.466	0.782	02/16/2023 16:43	WG2004306
(T) Barium	94.3			30.0-143	02/16/2023 16:43	WG2004306
(T) Yttrium	97.3			30.0-136	02/16/2023 16:43	WG2004306

¹Cp

²Tc

³Ss

Radiochemistry by Method Calculation

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
Combined Radium	1.14		0.532	0.890	02/16/2023 16:43	WG2001731

⁴Cn

⁵Sr

Radiochemistry by Method SM7500Ra B M

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-226	0.0737	U	0.256	0.425	02/10/2023 10:57	WG2001731
(T) Barium-133	90.3			30.0-143	02/10/2023 10:57	WG2001731

⁶Qc

⁷Gl

⁸Al

⁹Sc

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-228	0.0230	U	0.243	0.451	02/22/2023 13:00	WG2004309
(T) Barium	97.5			30.0-143	02/22/2023 13:00	WG2004309
(T) Yttrium	95.3			30.0-136	02/22/2023 13:00	WG2004309

1
Cp

2
Tc

3
Ss

Radiochemistry by Method Calculation

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
Combined Radium	0.120	U	0.289	0.512	02/22/2023 13:00	WG2001731

4
Cn

5
Sr

Radiochemistry by Method SM7500Ra B M

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-226	0.0975	J	0.156	0.242	02/10/2023 10:57	WG2001731
(T) Barium-133	95.2			30.0-143	02/10/2023 10:57	WG2001731

6
Qc

7
Gl

8
Al

9
Sc

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-228	-0.157	U	0.282	0.525	02/22/2023 13:00	WG2004309
(T) Barium	94.3			30.0-143	02/22/2023 13:00	WG2004309
(T) Yttrium	107			30.0-136	02/22/2023 13:00	WG2004309

¹Cp

²Tc

³Ss

Radiochemistry by Method Calculation

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
Combined Radium	0.247	J	0.373	0.611	02/22/2023 13:00	WG2001731

⁴Cn

⁵Sr

Radiochemistry by Method SM7500Ra B M

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-226	0.247	J	0.244	0.312	02/10/2023 10:57	WG2001731
(T) Barium-133	90.7			30.0-143	02/10/2023 10:57	WG2001731

⁶Qc

⁷Gl

⁸Al

⁹Sc

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-228	0.162	U	0.371	0.680	02/22/2023 13:00	WG2004309
(T) Barium	91.8			30.0-143	02/22/2023 13:00	WG2004309
(T) Yttrium	107			30.0-136	02/22/2023 13:00	WG2004309

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

Radiochemistry by Method Calculation

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
Combined Radium	1.24		0.542	0.732	02/22/2023 13:00	WG2001731

Radiochemistry by Method SM7500Ra B M

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-226	1.08		0.395	0.272	02/10/2023 10:57	WG2001731
(T) Barium-133	93.8			30.0-143	02/10/2023 10:57	WG2001731

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-228	0.847		0.370	0.661	02/22/2023 13:00	WG2004309
(T) Barium	73.1			30.0-143	02/22/2023 13:00	WG2004309
(T) Yttrium	107			30.0-136	02/22/2023 13:00	WG2004309

¹Cp

²Tc

³Ss

Radiochemistry by Method Calculation

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
Combined Radium	1.03		0.402	0.682	02/22/2023 13:00	WG2001731

⁴Cn

⁵Sr

Radiochemistry by Method SM7500Ra B M

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-226	0.186		0.157	0.168	02/10/2023 10:57	WG2001731
(T) Barium-133	97.3			30.0-143	02/10/2023 10:57	WG2001731

⁶Qc

⁷Gl

⁸Al

⁹Sc

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-228	0.961		0.296	0.521	02/22/2023 13:00	WG2004309
(T) Barium	95.1			30.0-143	02/22/2023 13:00	WG2004309
(T) Yttrium	103			30.0-136	02/22/2023 13:00	WG2004309

¹ Cp

² Tc

³ Ss

Radiochemistry by Method Calculation

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
Combined Radium	1.31		0.376	0.568	02/22/2023 13:00	WG2001731

⁴ Cn

⁵ Sr

Radiochemistry by Method SM7500Ra B M

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-226	0.352		0.232	0.226	02/10/2023 10:57	WG2001731
(T) Barium-133	97.4			30.0-143	02/10/2023 10:57	WG2001731

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-228	0.531		0.284	0.511	02/22/2023 13:00	WG2004309
(T) Barium	95.5			30.0-143	02/22/2023 13:00	WG2004309
(T) Yttrium	93.9			30.0-136	02/22/2023 13:00	WG2004309

¹Cp

²Tc

³Ss

Radiochemistry by Method Calculation

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
Combined Radium	0.691		0.330	0.552	02/22/2023 13:00	WG2001734

⁴Cn

⁵Sr

Radiochemistry by Method SM7500Ra B M

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-226	0.160	J	0.169	0.210	02/16/2023 10:25	WG2001734
(T) Barium-133	93.7			30.0-143	02/16/2023 10:25	WG2001734

⁶Qc

⁷Gl

⁸Al

⁹Sc

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-228	-0.573	U	0.349	0.665	02/22/2023 13:00	WG2004309
(T) Barium	82.2			30.0-143	02/22/2023 13:00	WG2004309
(T) Yttrium	88.2			30.0-136	02/22/2023 13:00	WG2004309

¹Cp

²Tc

³Ss

Radiochemistry by Method Calculation

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
Combined Radium	0.0194	U	0.369	0.722	02/22/2023 13:00	WG2001734

⁴Cn

⁵Sr

Radiochemistry by Method SM7500Ra B M

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-226	0.0194	U	0.120	0.281	02/16/2023 10:25	WG2001734
(T) Barium-133	58.2			30.0-143	02/16/2023 10:25	WG2001734

⁶Qc

⁷Gl

⁸Al

⁹Sc

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-228	0.249	J	0.228	0.416	02/22/2023 13:00	WG2004309
(T) Barium	93.0			30.0-143	02/22/2023 13:00	WG2004309
(T) Yttrium	102			30.0-136	02/22/2023 13:00	WG2004309

¹Cp

²Tc

³Ss

Radiochemistry by Method Calculation

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
Combined Radium	0.454	J	0.332	0.532	02/22/2023 13:00	WG2001734

⁴Cn

⁵Sr

Radiochemistry by Method SM7500Ra B M

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-226	0.205	J	0.241	0.332	02/16/2023 10:25	WG2001734
(T) Barium-133	76.9			30.0-143	02/16/2023 10:25	WG2001734

⁶Qc

⁷Gl

⁸Al

⁹Sc

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-228	0.981		0.290	0.506	02/22/2023 13:00	WG2004309
(T) Barium	88.2			30.0-143	02/22/2023 13:00	WG2004309
(T) Yttrium	117			30.0-136	02/22/2023 13:00	WG2004309

¹Cp

²Tc

³Ss

Radiochemistry by Method Calculation

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
Combined Radium	1.16		0.402	0.651	02/22/2023 13:00	WG2001734

⁴Cn

⁵Sr

Radiochemistry by Method SM7500Ra B M

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-226	0.175	J	0.279	0.409	02/16/2023 10:25	WG2001734
(T) Barium-133	89.4			30.0-143	02/16/2023 10:25	WG2001734

⁶Qc

⁷Gl

⁸Al

⁹Sc

Method Blank (MB)

(MB) R3891876-1 02/16/23 16:43

Analyte	MB Result pCi/l	MB Qualifier	MB Uncertainty + / -	MB MDA pCi/l
Radium-228	0.288	J	0.202	0.345
(T) Barium	105		105	
(T) Yttrium	101		101	

L1582632-20 Original Sample (OS) • Duplicate (DUP)

(OS) L1582632-20 02/16/23 16:43 • (DUP) R3891876-5 02/16/23 16:43

Analyte	Original Result pCi/l	Original Uncertainty + / -	Original MDA pCi/l	DUP Result pCi/l	DUP Uncertainty + / -	DUP MDA pCi/l	Dilution	DUP RPD %	DUP RER	DUP Qualifier	DUP RPD Limits %	DUP RER Limit
Radium-228	1.04	0.448	0.756	1.16	0.394	0.756	1	11.1	0.204		20	3
(T) Barium	89.0			105	105							
(T) Yttrium	100			93.8	93.8							

Laboratory Control Sample (LCS)

(LCS) R3891876-2 02/16/23 16:43

Analyte	Spike Amount pCi/l	LCS Result pCi/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Radium-228	5.00	4.22	84.5	80.0-120	
(T) Barium			106		
(T) Yttrium			108		

L1583846-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1583846-01 02/16/23 16:43 • (MS) R3891876-3 02/16/23 16:43 • (MSD) R3891876-4 02/16/23 16:43

Analyte	Spike Amount pCi/l	Original Result pCi/l	MS Result pCi/l	MSD Result pCi/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	MS RER	RPD Limits %
Radium-228	10.0	-0.811	6.43	6.66	64.3	66.6	1	70.0-130	J6	J6	3.39		20
(T) Barium		99.2			98.5	108							
(T) Yttrium		102			98.3	102							

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R3894152-1 02/22/23 13:00

Analyte	MB Result pCi/l	MB Qualifier	MB Uncertainty + / -	MB MDA pCi/l
Radium-228	0.236	⬇	0.208	0.377
(T) Barium	96.2		96.2	
(T) Yttrium	106		106	

L1580085-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1580085-01 02/22/23 13:00 • (DUP) R3894152-5 02/22/23 13:00

Analyte	Original Result pCi/l	Original Uncertainty + / -	Original MDA pCi/l	DUP Result pCi/l	DUP Uncertainty + / -	DUP MDA pCi/l	Dilution	DUP RPD %	DUP RER	DUP Qualifier	DUP RPD Limits %	DUP RER Limit
Radium-228	1.20	0.415	0.734	0.653	0.353	0.734	1	59.1	1.01		20	3
(T) Barium	92.3			93.1	93.1							
(T) Yttrium	99.0			102	102							

Laboratory Control Sample (LCS)

(LCS) R3894152-2 02/22/23 13:00

Analyte	Spike Amount pCi/l	LCS Result pCi/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Radium-228	5.00	4.17	83.5	80.0-120	
(T) Barium			83.0		
(T) Yttrium			111		

L1579058-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1579058-02 02/22/23 13:00 • (MS) R3894152-3 02/22/23 13:00 • (MSD) R3894152-4 02/22/23 13:00

Analyte	Spike Amount pCi/l	Original Result pCi/l	MS Result pCi/l	MSD Result pCi/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	MS RER	RPD Limits %
Radium-228	10.0	0.153	9.11	8.76	89.6	86.1	1	70.0-130			3.87		20
(T) Barium		98.6			101	102							
(T) Yttrium		96.1			103	105							

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R3891354-1 02/10/23 10:57

Analyte	MB Result pCi/l	MB Qualifier	MB Uncertainty + / -	MB MDA pCi/l
Radium-226	0.0221	<u>U</u>	0.0497	0.0810
(T) Barium-133	91.0		91.0	

L1582632-29 Original Sample (OS) • Duplicate (DUP)

(OS) L1582632-29 02/10/23 10:57 • (DUP) R3891354-5 02/10/23 10:57

Analyte	Original Result pCi/l	Original Uncertainty + / -	Original MDA pCi/l	DUP Result pCi/l	DUP Uncertainty + / -	DUP MDA pCi/l	Dilution	DUP RPD %	DUP RER	DUP Qualifier	DUP RPD Limits %	DUP RER Limit
Radium-226	0.438	0.255	0.205	0.0630	0.219	0.205	1	150	1.12	<u>U</u>	20	3
(T) Barium-133	96.4			85.5	85.5							

Laboratory Control Sample (LCS)

(LCS) R3891354-2 02/10/23 10:57

Analyte	Spike Amount pCi/l	LCS Result pCi/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Radium-226	5.02	5.03	100	80.0-120	
(T) Barium-133			94.2		

L1582632-21 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1582632-21 02/10/23 10:57 • (MS) R3891354-3 02/10/23 10:57 • (MSD) R3891354-4 02/10/23 10:57

Analyte	Spike Amount pCi/l	Original Result pCi/l	MS Result pCi/l	MSD Result pCi/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	MS RER	RPD Limits %
Radium-226	20.0	0.219	18.6	18.8	91.9	93.0	1	75.0-125			1.18		20
(T) Barium-133		94.6			96.6	92.7							

1
Cp

2
Tc

3
Ss

4
Cn

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Sr

6
Qc

7
Gl

8
Al

9
Sc

Method Blank (MB)

(MB) R3893260-1 02/16/23 10:25

Analyte	MB Result pCi/l	MB Qualifier	MB Uncertainty + / -	MB MDA pCi/l
Radium-226	0.305		0.130	0.106
(T) Barium-133	69.7		69.7	

L1580251-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1580251-01 02/16/23 10:25 • (DUP) R3893260-5 02/16/23 10:25

Analyte	Original Result pCi/l	Original Uncertainty + / -	Original MDA pCi/l	DUP Result pCi/l	DUP Uncertainty + / -	DUP MDA pCi/l	Dilution	DUP RPD %	DUP RER	DUP Qualifier	DUP RPD Limits %	DUP RER Limit
Radium-226	0.783	0.466	0.442	0.513	0.474	0.442	1	41.6	0.406	U	20	3
(T) Barium-133	55.3			51.4	51.4							

Laboratory Control Sample (LCS)

(LCS) R3893260-2 02/16/23 10:25

Analyte	Spike Amount pCi/l	LCS Result pCi/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Radium-226	5.02	5.06	101	80.0-120	
(T) Barium-133			75.5		

L1582645-12 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1582645-12 02/16/23 10:25 • (MS) R3893260-3 02/16/23 10:25 • (MSD) R3893260-4 02/16/23 10:25

Analyte	Spike Amount pCi/l	Original Result pCi/l	MS Result pCi/l	MSD Result pCi/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	MS RER	RPD Limits %
Radium-226	20.0	0.160	20.1	21.2	99.8	105	1	75.0-125			4.99		20
(T) Barium-133		93.7			88.8	81.0							

1
Cp

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Tc

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Cn

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Sr

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Gl

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Al

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Sc

GLOSSARY OF TERMS

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

Abbreviations and Definitions

MDA	Minimum Detectable Activity.
Rec.	Recovery.
RER	Replicate Error Ratio.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(T)	Tracer - A radioisotope of known concentration added to a solution of chemically equivalent radioisotopes at a known concentration to assist in monitoring the yield of the chemical separation.
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier Description

J	The identification of the analyte is acceptable; the reported value is an estimate.
J6	The sample matrix interfered with the ability to make any accurate determination; spike value is low.
U	Below Detectable Limits: Indicates that the analyte was not detected.

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

ACCREDITATIONS & LOCATIONS

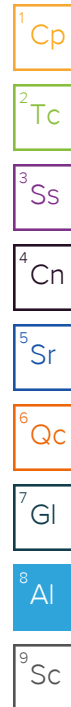
Pace Analytical National 12065 Lebanon Rd Mount Juliet, TN 37122

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN000032021-1
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey--NELAP	TN002
California	2932	New Mexico ¹	TN00003
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina ¹	DW21704
Georgia	NELAP	North Carolina ³	41
Georgia ¹	923	North Dakota	R-140
Idaho	TN00003	Ohio--VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LA000356
Kentucky ^{1 6}	KY90010	South Carolina	84004002
Kentucky ²	16	South Dakota	n/a
Louisiana	AI30792	Tennessee ^{1 4}	2006
Louisiana	LA018	Texas	T104704245-20-18
Maine	TN00003	Texas ⁵	LAB0152
Maryland	324	Utah	TN000032021-11
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	110033
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	998093910
Montana	CERT0086	Wyoming	A2LA
A2LA -- ISO 17025	1461.01	AIHA-LAP,LLC EMLAP	100789
A2LA -- ISO 17025 ⁵	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA--Crypto	TN00003		

¹ Drinking Water ² Underground Storage Tanks ³ Aquatic Toxicity ⁴ Chemical/Microbiological ⁵ Mold ⁶ Wastewater n/a Accreditation not applicable

* Not all certifications held by the laboratory are applicable to the results reported in the attached report.

* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace Analytical.



TEKLAB, INC. Chain of Custody

5445 Horseshoe Lake Road, Collinsville, IL 62234 Phone (618) 344-1004 Fax (618) 344-1005

Are the samples chilled? YES ☐ NO ☒ With: ☐ Ice ☐ Blue Ice Preserved in: ☐ Lab ☐ FieldTeklab Inc
5445 Horseshoe Lake Road
Collinsville, IL 62234Cooler Temp: Sampler: Joseph Riley/Adam BridgesQC Level: 3

Project# 23020169

Contact: Elizabeth Hurley

Email: EHurley@TekLabInc.com

Requested Due Date: Standard TAT

Billing/PO: 33948

Phone: (618) 344-1004

LF882645

Comments: Please Issue reports and invoices via email only

Please analyze for Radium 226/228 on your standard turn around time.

Samples collected from an IL site.

Batch QC is required for all analyses requested. EDD requested..

PLEASE NOTE:

NELAP accreditation is required on the requested analytes and must be documented as such on the final report. If your laboratory does not currently hold a NELAP accreditation for the requested method and/or analytes, please contact Teklab immediately. If your laboratory loses accreditation or is suspended for any analyte/method during the life of the contract, you must contact Teklab immediately.

Any changes to analysis/methods must be approved by Teklab, Inc.

Lab Use	Sample ID	Sample Date/Time	Preservative	Matrix	Ra226/228															
-01	23010169-001	1/30/23 1330	HNO3	Groundwater	✓															
-02	23010169-002	1/30/23 1445	HNO3	Groundwater	✓															
-03	23010169-003	2/1/23 0810	HNO3	Groundwater	✓															
-04	23010169-004	2/1/23 1100	HNO3	Groundwater	✓															
-05	23010169-005	2/1/23 1225	HNO3	Groundwater	✓															
-06	23010169-006	2/1/23 1350	HNO3	Groundwater	✓															
-07	23010169-007	2/1/23 1550	HNO3	Groundwater	✓															
-08	23010169-008	2/1/23 0945	HNO3	Groundwater	✓															
-09	23010169-009	2/1/23 1110	HNO3	Groundwater	✓															
-10	23010169-010	2/1/23 1230	HNO3	Groundwater	✓															
-11	23010169-011	2/1/23 1405	HNO3	Groundwater	✓															

*Relinquished By	Date/Time	Received By	Date/Time
<i>[Signature]</i>	2/3/23 16:00	<i>[Signature]</i> PACE	2-6-23 1000

Sample Receipt Checklist
 COC Seal Present/Intact: ☒ Y ☐ N
 COC Signed/Accurate: ☒ Y ☐ N
 Bottles arrive intact: ☒ Y ☐ N
 Correct bottles used: ☒ Y ☐ N
 Sufficient volume sent: ☒ Y ☐ N
 RAD Screen <0.5 mR/hr: ☒ Y ☐ N
 IF Applicable
 VOA Zero Headspace: ☒ Y ☐ N
 Pres. Correct/Check: ☒ Y ☐ N
 19.1 + 0 = 19.1

does not provide client/sampler information without proper authorization. and proprietary rights, ted by local, state or federal laws. (Teklab QAM Section 9.1, TNI V1 M2 Section 4.1.5 c)

6319 3615 8308

TEKLAB, INC. Chain of Custody

5445 Horseshoe Lake Road, Collinsville, IL 62234 Phone (618) 344-1004 Fax (618) 344-1005

Are the samples chilled? YES ☐ NO ☒ With: ☐ Ice ☐ Blue Ice Preserved in: ☐ Lab ☐ FieldTeklab Inc
5445 Horseshoe Lake Road
Collinsville, IL 62234Cooler Temp: Sampler: Joseph Riley/Adam BridgesQC Level: 3

Project# 23020169

Contact: Elizabeth Hurley

Email: EHurley@TekLabInc.com

Requested Due Date: Standard TAT

Billing/PO: 33948

Phone: (618) 344-1004

Comments: Please Issue reports and invoices via email only

Please analyze for Radium 226/228 on your standard turn around time.

Samples collected from an IL site.

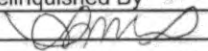
Batch QC is required for all analyses requested. EDD requested..

PLEASE NOTE:

NELAP accreditation is required on the requested analytes and must be documented as such on the final report. If your laboratory does not currently hold a NELAP accreditation for the requested method and/or analytes, please contact Teklab immediately. If your laboratory loses accreditation or is suspended for any analyte/method during the life of the contract, you must contact Teklab immediately.

Any changes to analysis/methods must be approved by Teklab, Inc.

Lab Use	Sample ID	Sample Date/Time	Preservative	Matrix	Ra226/228															
-12	23020169-012	2/1/23 1510	HNO3	Groundwater	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
-13	23020169-013	1/30/23 0940	HNO3	Groundwater	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
-14	23020169-014	2/1/23 0001	HNO3	Groundwater	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
-15	23020169-015	2/1/23 0002	HNO3	Groundwater	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
			HNO3	Groundwater	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
			HNO3	Groundwater	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
			HNO3	Groundwater	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
			HNO3	Groundwater	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
			HNO3	Groundwater	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
			HNO3	Groundwater	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
			HNO3	Groundwater	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

*Relinquished By	Date/Time	Received By	Date/Time
	2/3/23		

4582645

1582645

<u>Tracking</u> <u>Numbers</u>	<u>Feel</u> <u>Ex</u>	<u>Temperature</u>
6319 3615 8308		MSK 20.4
8282		14.1
8319		26.1
8293		19.1

August 10, 2023

Matt Halley
ERM
1968 Craig Road
Suite 100
St. Louis, MO 63146
TEL: (314) 952-2760
FAX:



Illinois	100226
Kansas	E-10374
Louisiana	05002
Louisiana	05003
Oklahoma	9978

RE: 0599247

WorkOrder: 23062071

Dear Matt Halley:

TEKLAB, INC received 15 samples on 6/28/2023 10:10:00 AM for the analysis presented in the following report.

Samples are analyzed on an as received basis unless otherwise requested and documented. The sample results contained in this report relate only to the requested analytes of interest as directed on the chain of custody. NELAP accredited fields of testing are indicated by the letters NELAP under the Certification column. Unless otherwise documented within this report, Teklab Inc. analyzes samples utilizing the most current methods in compliance with 40CFR. All tests are performed in the Collinsville, IL laboratory unless otherwise noted in the Case Narrative.

All quality control criteria applicable to the test methods employed for this project have been satisfactorily met and are in accordance with NELAP except where noted. The following report shall not be reproduced, except in full, without the written approval of Teklab, Inc.

If you have any questions regarding these tests results, please feel free to call.

Sincerely,



Elizabeth A. Hurley
Director of Customer Service
(618)344-1004 ex 33
ehurley@teklabinc.com

Client: ERM

Work Order: 23062071

Client Project: 0599247

Report Date: 10-Aug-23

This reporting package includes the following:

Cover Letter	1
Report Contents	2
Definitions	3
Case Narrative	5
Accreditations	6
Laboratory Results	7
Sample Summary	23
Dates Report	24
Quality Control Results	31
Receiving Check List	47
Chain of Custody	Appended

Client: ERM**Work Order:** 23062071**Client Project:** 0599247**Report Date:** 10-Aug-23**Abbr Definition**

* Analytes on report marked with an asterisk are not NELAP accredited

CCV Continuing calibration verification is a check of a standard to determine the state of calibration of an instrument between recalibration.

CRQL A Client Requested Quantitation Limit is a reporting limit that varies according to customer request. The CRQL may not be less than the MDL.

DF Dilution factor is the dilution performed during analysis only and does not take into account any dilutions made during sample preparation. The reported result is final and includes all dilution factors.

DNI Did not ignite

DUP Laboratory duplicate is a replicate aliquot prepared under the same laboratory conditions and independently analyzed to obtain a measure of precision.

ICV Initial calibration verification is a check of a standard to determine the state of calibration of an instrument before sample analysis is initiated.

IDPH IL Dept. of Public Health

LCS Laboratory control sample is a sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes and analyzed exactly like a sample to establish intra-laboratory or analyst specific precision and bias or to assess the performance of all or a portion of the measurement system.

LCSD Laboratory control sample duplicate is a replicate laboratory control sample that is prepared and analyzed in order to determine the precision of the approved test method. The acceptable recovery range is listed in the QC Package (provided upon request).

MBLK Method blank is a sample of a matrix similar to the batch of associated sample (when available) that is free from the analytes of interest and is processed simultaneously with and under the same conditions as samples through all steps of the analytical procedures, and in which no target analytes or interferences should present at concentrations that impact the analytical results for sample analyses.

MDL "The method detection limit is defined as the minimum measured concentration of a substance that can be reported with 99% confidence that the measured concentration is distinguishable from method blank results."

MS Matrix spike is an aliquot of matrix fortified (spiked) with known quantities of specific analytes that is subjected to the entire analytical procedures in order to determine the effect of the matrix on an approved test method's recovery system. The acceptable recovery range is listed in the QC Package (provided upon request).

MSD Matrix spike duplicate means a replicate matrix spike that is prepared and analyzed in order to determine the precision of the approved test method. The acceptable recovery range is listed in the QC Package (provided upon request).

MW Molecular weight

NC Data is not acceptable for compliance purposes

ND Not Detected at the Reporting Limit

NELAP NELAP Accredited

PQL Practical quantitation limit means the lowest level that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operation conditions.

RL The reporting limit the lowest level that the data is displayed in the final report. The reporting limit may vary according to customer request or sample dilution. The reporting limit may not be less than the MDL.

RPD Relative percent difference is a calculated difference between two recoveries (ie. MS/MSD). The acceptable recovery limit is listed in the QC Package (provided upon request).

SPK The spike is a known mass of target analyte added to a blank sample or sub-sample; used to determine recovery deficiency or for other quality control purposes.

Surr Surrogates are compounds which are similar to the analytes of interest in chemical composition and behavior in the analytical process, but which are not normally found in environmental samples.

TIC Tentatively identified compound: Analytes tentatively identified in the sample by using a library search. Only results not in the calibration standard will be reported as tentatively identified compounds. Results for tentatively identified compounds that are not present in the calibration standard, but are assigned a specific chemical name based upon the library search, are calculated using total peak areas from reconstructed ion chromatograms and a response factor of one. The nearest Internal Standard is used for the calculation. The results of any TICs must be considered estimated, and are flagged with a "T". If the estimated result is above the calibration range it is flagged "ET"

TNTC Too numerous to count (> 200 CFU)

Client: ERM

Work Order: 23062071

Client Project: 0599247

Report Date: 10-Aug-23

Qualifiers

# - Unknown hydrocarbon	B - Analyte detected in associated Method Blank
C - RL shown is a Client Requested Quantitation Limit	E - Value above quantitation range
H - Holding times exceeded	I - Associated internal standard was outside method criteria
J - Analyte detected below quantitation limits	M - Manual Integration used to determine area response
ND - Not Detected at the Reporting Limit	R - RPD outside accepted recovery limits
S - Spike Recovery outside recovery limits	T - TIC(Tentatively identified compound)
X - Value exceeds Maximum Contaminant Level	



Case Narrative

<http://www.teklabinc.com/>

Client: ERM

Work Order: 23062071

Client Project: 0599247

Report Date: 10-Aug-23

Cooler Receipt Temp: 4.0 °C

Radium analyses were performed by Summit Environmental Technologies, Inc. See attached report for results and QC.

This report was revised on August 10, 2023 per Alison Treglia's request. The reason for the revision is to update the Ra228 values for -005 and -009 from ND to negative values. Please replace report dated August 8, 2023 with this report. EAH 8/10/23

Locations

Collinsville

Address 5445 Horseshoe Lake Road
Collinsville, IL 62234-7425
Phone (618) 344-1004
Fax (618) 344-1005
Email jhriley@teklabinc.com

Collinsville Air

Address 5445 Horseshoe Lake Road
Collinsville, IL 62234-7425
Phone (618) 344-1004
Fax (618) 344-1005
Email EHurley@teklabinc.com

Springfield

Address 3920 Pintail Dr
Springfield, IL 62711-9415
Phone (217) 698-1004
Fax (217) 698-1005
Email KKlostermann@teklabinc.com

Chicago

Address 1319 Butterfield Rd.
Downers Grove, IL 60515
Phone (630) 324-6855
Fax
Email arenner@teklabinc.com

Kansas City

Address 8421 Nieman Road
Lenexa, KS 66214
Phone (913) 541-1998
Fax (913) 541-1998
Email jhriley@teklabinc.com

Client: ERM**Work Order:** 23062071**Client Project:** 0599247**Report Date:** 10-Aug-23

State	Dept	Cert #	NELAP	Exp Date	Lab
Illinois	IEPA	100226	NELAP	1/31/2024	Collinsville
Kansas	KDHE	E-10374	NELAP	4/30/2024	Collinsville
Louisiana	LDEQ	05002	NELAP	6/30/2024	Collinsville
Louisiana	LDEQ	05003	NELAP	6/30/2024	Collinsville
Oklahoma	ODEQ	9978	NELAP	8/31/2023	Collinsville
Arkansas	ADEQ	88-0966		3/14/2024	Collinsville
Illinois	IDPH	17584		5/31/2025	Collinsville
Iowa	IDNR	430		6/1/2024	Collinsville
Kentucky	UST	0073		1/31/2024	Collinsville
Missouri	MDNR	00930		5/31/2023	Collinsville
Missouri	MDNR	930		1/31/2025	Collinsville



Laboratory Results

<http://www.teklabinc.com/>

Client: ERM
Client Project: 0599247
Lab ID: 23062071-001
Matrix: GROUNDWATER

Work Order: 23062071
Report Date: 10-Aug-23
Client Sample ID: EB-01-WQ-20230626
Collection Date: 06/26/2023 9:00

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	20		< 20	mg/L	1	06/28/2023 15:02	R330972
SW-846 9036 (TOTAL)								
Sulfate	NELAP	10		< 10	mg/L	1	07/03/2023 21:04	R331147
SW-846 9040B, LABORATORY ANALYZED								
Lab pH	NELAP	1.00	H	5.33		1	06/29/2023 11:33	R330948
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		< 0.10	mg/L	1	07/03/2023 12:15	R331110
SW-846 9251 (TOTAL)								
Chloride	NELAP	4		< 4	mg/L	1	07/03/2023 21:02	R331159
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	07/04/2023 0:04	207943
Arsenic	NELAP	0.0010		< 0.0010	mg/L	5	07/04/2023 0:04	207943
Barium	NELAP	0.0010		< 0.0010	mg/L	5	07/04/2023 0:04	207943
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	07/04/2023 0:04	207943
Boron	NELAP	0.0250		< 0.0250	mg/L	5	07/04/2023 0:04	207943
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	07/04/2023 0:04	207943
Calcium	NELAP	0.125		< 0.125	mg/L	5	07/04/2023 0:04	207943
Chromium	NELAP	0.0015		< 0.0015	mg/L	5	07/06/2023 15:58	207943
Cobalt	NELAP	0.0010		< 0.0010	mg/L	5	07/06/2023 15:58	207943
Lead	NELAP	0.0010		< 0.0010	mg/L	5	07/04/2023 0:04	207943
Lithium	*	0.0030		< 0.0030	mg/L	5	07/06/2023 15:58	207943
Molybdenum	NELAP	0.0015		< 0.0015	mg/L	5	07/04/2023 0:04	207943
Selenium	NELAP	0.0010		< 0.0010	mg/L	5	07/04/2023 0:04	207943
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	07/04/2023 0:04	207943
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	07/06/2023 3:47	208035
Arsenic	NELAP	0.0010		< 0.0010	mg/L	5	07/07/2023 3:12	208035
Barium	NELAP	0.0010		< 0.0010	mg/L	5	07/07/2023 3:12	208035
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	07/07/2023 3:12	208035
Boron	NELAP	0.0250		< 0.0250	mg/L	5	07/07/2023 3:12	208035
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	07/07/2023 3:12	208035
Calcium	NELAP	0.125	B	< 0.125	mg/L	5	07/07/2023 3:12	208035
Chromium	NELAP	0.0015		< 0.0015	mg/L	5	07/07/2023 3:12	208035
Cobalt	NELAP	0.0010		< 0.0010	mg/L	5	07/07/2023 3:12	208035
Lead	NELAP	0.0010		< 0.0010	mg/L	5	07/06/2023 3:47	208035
Lithium	*	0.0030		< 0.0030	mg/L	5	07/07/2023 3:12	208035
Molybdenum	NELAP	0.0015		< 0.0015	mg/L	5	07/07/2023 3:12	208035
Selenium	NELAP	0.0010		< 0.0010	mg/L	5	07/07/2023 3:12	208035
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	07/06/2023 3:47	208035
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		< 0.00020	mg/L	1	07/05/2023 9:10	207990
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		See Attached	pci/L	1	07/17/2023 15:33	R334662
Radium-228	*	0		See Attached	pci/L	1	07/17/2023 15:33	R334662

Contamination present in the MBLK for Ca. Sample results below the reporting limit are reportable per the TNI Standard.

Client: ERM
Client Project: 0599247

Work Order: 23062071
Report Date: 10-Aug-23

Lab ID: 23062071-002

Client Sample ID: APW-03-WG-20230626

Matrix: GROUNDWATER

Collection Date: 06/26/2023 12:10

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	20		614	mg/L	1	06/28/2023 15:03	R330972
SW-846 9036 (TOTAL)								
Sulfate	NELAP	100		292	mg/L	10	07/03/2023 21:24	R331147
SW-846 9040B, LABORATORY ANALYZED								
Lab pH	NELAP	1.00	H	7.77		1	06/29/2023 11:37	R330948
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		0.23	mg/L	1	07/03/2023 12:17	R331110
SW-846 9251 (TOTAL)								
Chloride	NELAP	4		17	mg/L	1	07/03/2023 21:13	R331159
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	07/03/2023 16:03	207896
Arsenic	NELAP	0.0010		0.0016	mg/L	5	06/29/2023 17:43	207896
Barium	NELAP	0.0010		0.130	mg/L	5	07/03/2023 16:03	207896
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	07/03/2023 16:03	207896
Boron	NELAP	0.0250		4.64	mg/L	5	07/03/2023 16:03	207896
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	07/03/2023 16:03	207896
Calcium	NELAP	0.125		125	mg/L	5	07/03/2023 16:03	207896
Chromium	NELAP	0.0015		< 0.0015	mg/L	5	07/06/2023 5:26	207896
Cobalt	NELAP	0.0010		< 0.0010	mg/L	5	07/06/2023 5:26	207896
Lead	NELAP	0.0010		< 0.0010	mg/L	5	07/03/2023 16:03	207896
Lithium	*	0.0030		0.0262	mg/L	5	06/29/2023 17:43	207896
Molybdenum	NELAP	0.0015		0.0656	mg/L	5	07/03/2023 16:03	207896
Selenium	NELAP	0.0010		< 0.0010	mg/L	5	06/29/2023 17:43	207896
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	07/03/2023 16:03	207896
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	07/06/2023 3:54	208035
Arsenic	NELAP	0.0010		0.0040	mg/L	5	07/07/2023 3:18	208035
Barium	NELAP	0.0010		0.155	mg/L	5	07/07/2023 3:18	208035
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	07/07/2023 3:18	208035
Boron	NELAP	0.0250		4.67	mg/L	5	07/07/2023 3:18	208035
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	07/07/2023 3:18	208035
Calcium	NELAP	0.125	B	139	mg/L	5	07/07/2023 3:18	208035
Chromium	NELAP	0.0015		0.0241	mg/L	5	07/07/2023 3:18	208035
Cobalt	NELAP	0.0010		0.0014	mg/L	5	07/07/2023 3:18	208035
Lead	NELAP	0.0010		0.0044	mg/L	5	07/06/2023 3:54	208035
Lithium	*	0.0030		0.0352	mg/L	5	07/07/2023 3:18	208035
Molybdenum	NELAP	0.0015		0.0553	mg/L	5	07/07/2023 3:18	208035
Selenium	NELAP	0.0010		< 0.0010	mg/L	5	07/07/2023 3:18	208035
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	07/06/2023 3:54	208035
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		< 0.00020	mg/L	1	07/05/2023 9:17	207990
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		See Attached	pci/L	1	07/18/2023 9:09	R334662
Radium-228	*	0		See Attached	pci/L	1	07/18/2023 9:09	R334662

Sample result for Ca exceed 10 times the method blank contamination. Data is reportable per the TNI Standard.

Client: ERM
Client Project: 0599247

Work Order: 23062071
Report Date: 10-Aug-23

Lab ID: 23062071-003

Client Sample ID: APW-08-WG-20230626

Matrix: GROUNDWATER

Collection Date: 06/26/2023 14:15

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	50		420	mg/L	2.5	06/28/2023 15:03	R330972
SW-846 9036 (TOTAL)								
Sulfate	NELAP	10		31	mg/L	1	07/03/2023 21:47	R331147
SW-846 9040B, LABORATORY ANALYZED								
Lab pH	NELAP	1.00	H	7.18		1	06/29/2023 11:40	R330948
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		0.26	mg/L	1	07/03/2023 12:20	R331110
SW-846 9251 (TOTAL)								
Chloride	NELAP	4		10	mg/L	1	07/03/2023 21:48	R331159
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	07/03/2023 16:09	207896
Arsenic	NELAP	0.0010		0.0010	mg/L	5	06/29/2023 17:50	207896
Barium	NELAP	0.0010		0.191	mg/L	5	07/03/2023 16:09	207896
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	07/03/2023 16:09	207896
Boron	NELAP	0.0250		0.124	mg/L	5	07/03/2023 16:09	207896
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	07/03/2023 16:09	207896
Calcium	NELAP	0.125		92.6	mg/L	5	07/03/2023 16:09	207896
Chromium	NELAP	0.0015		< 0.0015	mg/L	5	07/06/2023 5:32	207896
Cobalt	NELAP	0.0010		< 0.0010	mg/L	5	07/06/2023 5:32	207896
Lead	NELAP	0.0010		< 0.0010	mg/L	5	07/03/2023 16:09	207896
Lithium	*	0.0030		0.0125	mg/L	5	06/29/2023 17:50	207896
Molybdenum	NELAP	0.0015		< 0.0015	mg/L	5	07/03/2023 16:09	207896
Selenium	NELAP	0.0010		0.0113	mg/L	5	06/29/2023 17:50	207896
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	07/03/2023 16:09	207896
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	07/06/2023 4:00	208035
Arsenic	NELAP	0.0010		0.0020	mg/L	5	07/07/2023 4:09	208035
Barium	NELAP	0.0010		0.225	mg/L	5	07/07/2023 4:09	208035
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	07/07/2023 4:09	208035
Boron	NELAP	0.0250		0.103	mg/L	5	07/07/2023 4:09	208035
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	07/07/2023 4:09	208035
Calcium	NELAP	0.125	B	99.4	mg/L	5	07/07/2023 4:09	208035
Chromium	NELAP	0.0015		0.0082	mg/L	5	07/07/2023 4:09	208035
Cobalt	NELAP	0.0010		0.0019	mg/L	5	07/07/2023 4:09	208035
Lead	NELAP	0.0010		0.0028	mg/L	5	07/07/2023 4:09	208035
Lithium	*	0.0030		0.0157	mg/L	5	07/07/2023 4:09	208035
Molybdenum	NELAP	0.0015		< 0.0015	mg/L	5	07/07/2023 4:09	208035
Selenium	NELAP	0.0010		0.0129	mg/L	5	07/07/2023 4:09	208035
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	07/06/2023 4:00	208035
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		< 0.00020	mg/L	1	07/05/2023 9:19	207990
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		See Attached	pci/L	1	07/17/2023 15:33	R334662
Radium-228	*	0		See Attached	pci/L	1	07/17/2023 15:33	R334662

Sample result for Ca exceed 10 times the method blank contamination. Data is reportable per the TNI Standard.

Client: ERM
Client Project: 0599247

Work Order: 23062071
Report Date: 10-Aug-23

Lab ID: 23062071-004

Client Sample ID: APW-07-WG-20230626

Matrix: GROUNDWATER

Collection Date: 06/26/2023 15:20

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	50		665	mg/L	2.5	06/28/2023 15:03	R330972
SW-846 9036 (TOTAL)								
Sulfate	NELAP	20		54	mg/L	2	07/06/2023 13:28	R331244
SW-846 9040B, LABORATORY ANALYZED								
Lab pH	NELAP	1.00	H	6.79		1	06/29/2023 11:42	R330948
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		0.17	mg/L	1	07/03/2023 12:21	R331110
SW-846 9251 (TOTAL)								
Chloride	NELAP	4		10	mg/L	1	07/03/2023 21:56	R331159
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	07/03/2023 16:33	207896
Arsenic	NELAP	0.0010		0.0012	mg/L	5	06/29/2023 18:15	207896
Barium	NELAP	0.0010		0.303	mg/L	5	07/03/2023 16:33	207896
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	07/03/2023 16:33	207896
Boron	NELAP	0.0250		0.208	mg/L	5	07/03/2023 16:33	207896
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	07/03/2023 16:33	207896
Calcium	NELAP	0.125	S	180	mg/L	5	07/03/2023 16:33	207896
Chromium	NELAP	0.0015		< 0.0015	mg/L	5	07/06/2023 5:56	207896
Cobalt	NELAP	0.0010		< 0.0010	mg/L	5	07/06/2023 5:56	207896
Lead	NELAP	0.0010		< 0.0010	mg/L	5	07/03/2023 16:33	207896
Lithium	*	0.0030		0.0136	mg/L	5	06/29/2023 18:15	207896
Molybdenum	NELAP	0.0015		0.0027	mg/L	5	07/03/2023 16:33	207896
Selenium	NELAP	0.0010		< 0.0010	mg/L	5	06/29/2023 18:15	207896
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	07/03/2023 16:33	207896
<i>Matrix spike control limits are not applicable due to high sample/spike ratio.</i>								
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	07/07/2023 4:53	208035
Arsenic	NELAP	0.0010		0.0014	mg/L	5	07/07/2023 4:53	208035
Barium	NELAP	0.0010		0.312	mg/L	5	07/07/2023 4:53	208035
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	07/07/2023 4:53	208035
Boron	NELAP	0.0250		0.237	mg/L	5	07/07/2023 4:53	208035
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	07/07/2023 4:53	208035
Calcium	NELAP	0.125	BS	183	mg/L	5	07/07/2023 4:53	208035
Chromium	NELAP	0.0015		< 0.0015	mg/L	5	07/07/2023 4:53	208035
Cobalt	NELAP	0.0010		< 0.0010	mg/L	5	07/07/2023 4:53	208035
Lead	NELAP	0.0010		< 0.0010	mg/L	5	07/07/2023 4:53	208035
Lithium	*	0.0030		0.0153	mg/L	5	07/07/2023 4:53	208035
Molybdenum	NELAP	0.0015		0.0028	mg/L	5	07/07/2023 4:53	208035
Selenium	NELAP	0.0010		< 0.0010	mg/L	5	07/07/2023 4:53	208035
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	07/07/2023 4:53	208035
<i>Sample result for Ca exceed 10 times the method blank contamination. Data is reportable per the TNI Standard.</i>								
<i>Matrix spike control limits are not applicable due to high sample/spike ratio.</i>								
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		< 0.00020	mg/L	1	07/05/2023 9:21	207990
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		See Attached	pci/L	1	07/17/2023 15:33	R334662



Laboratory Results

<http://www.teklabinc.com/>

Client: ERM

Work Order: 23062071

Client Project: 0599247

Report Date: 10-Aug-23

Lab ID: 23062071-004

Client Sample ID: APW-07-WG-20230626

Matrix: GROUNDWATER

Collection Date: 06/26/2023 15:20

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
EPA 903.0/904.0, RADIUM 226/228								
Radium-228	*	0		See Attached	pCi/L	1	07/17/2023 15:33	R334662

Client: ERM
Client Project: 0599247

Work Order: 23062071
Report Date: 10-Aug-23

Lab ID: 23062071-005

Client Sample ID: APW-10S-WG-20230626

Matrix: GROUNDWATER

Collection Date: 06/26/2023 17:00

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	50		725	mg/L	2.5	06/28/2023 15:05	R330972
SW-846 9036 (TOTAL)								
Sulfate	NELAP	10		< 10	mg/L	1	07/03/2023 22:03	R331147
SW-846 9040B, LABORATORY ANALYZED								
Lab pH	NELAP	1.00	H	7.01		1	06/29/2023 11:45	R330948
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		0.15	mg/L	1	07/03/2023 12:23	R331110
SW-846 9251 (TOTAL)								
Chloride	NELAP	4		14	mg/L	1	07/03/2023 22:04	R331159
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	07/03/2023 16:15	207896
Arsenic	NELAP	0.0010		0.166	mg/L	5	06/29/2023 17:56	207896
Barium	NELAP	0.0010		0.506	mg/L	5	07/03/2023 16:15	207896
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	07/03/2023 16:15	207896
Boron	NELAP	0.0250		0.578	mg/L	5	07/03/2023 16:15	207896
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	07/03/2023 16:15	207896
Calcium	NELAP	0.125		142	mg/L	5	07/03/2023 16:15	207896
Chromium	NELAP	0.0015		< 0.0015	mg/L	5	07/06/2023 5:38	207896
Cobalt	NELAP	0.0010		< 0.0010	mg/L	5	07/06/2023 5:38	207896
Lead	NELAP	0.0010		< 0.0010	mg/L	5	07/03/2023 16:15	207896
Lithium	*	0.0030		0.0278	mg/L	5	06/29/2023 17:56	207896
Molybdenum	NELAP	0.0015		< 0.0015	mg/L	5	07/03/2023 16:15	207896
Selenium	NELAP	0.0010		< 0.0010	mg/L	5	06/29/2023 17:56	207896
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	07/03/2023 16:15	207896
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	07/06/2023 4:06	208035
Arsenic	NELAP	0.0010		0.194	mg/L	5	07/07/2023 4:15	208035
Barium	NELAP	0.0010		0.589	mg/L	5	07/07/2023 4:15	208035
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	07/07/2023 4:15	208035
Boron	NELAP	0.0250		0.582	mg/L	5	07/07/2023 4:15	208035
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	07/07/2023 4:15	208035
Calcium	NELAP	0.125	B	153	mg/L	5	07/07/2023 4:15	208035
Chromium	NELAP	0.0015		0.0025	mg/L	5	07/07/2023 4:15	208035
Cobalt	NELAP	0.0010		< 0.0010	mg/L	5	07/07/2023 4:15	208035
Lead	NELAP	0.0010		0.0016	mg/L	5	07/06/2023 4:06	208035
Lithium	*	0.0030		0.0291	mg/L	5	07/07/2023 4:15	208035
Molybdenum	NELAP	0.0015		< 0.0015	mg/L	5	07/07/2023 4:15	208035
Selenium	NELAP	0.0010		< 0.0010	mg/L	5	07/07/2023 4:15	208035
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	07/06/2023 4:06	208035
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		< 0.00020	mg/L	1	07/05/2023 9:23	207990
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		See Attached	pci/L	1	07/18/2023 9:09	R334662
Radium-228	*	0		See Attached	pci/L	1	07/18/2023 9:09	R334662

Sample result for Ca exceed 10 times the method blank contamination. Data is reportable per the TNI Standard.

Client: ERM
Client Project: 0599247

Work Order: 23062071
Report Date: 10-Aug-23

Lab ID: 23062071-006

Client Sample ID: APW-10D-WG-20230626

Matrix: GROUNDWATER

Collection Date: 06/26/2023 18:45

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	50		485	mg/L	2.5	06/28/2023 15:21	R330972
SW-846 9036 (TOTAL)								
Sulfate	NELAP	10		44	mg/L	1	07/03/2023 22:11	R331147
SW-846 9040B, LABORATORY ANALYZED								
Lab pH	NELAP	1.00	H	6.98		1	06/29/2023 11:49	R330948
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		0.11	mg/L	1	07/03/2023 12:43	R331110
SW-846 9251 (TOTAL)								
Chloride	NELAP	4		14	mg/L	1	07/03/2023 22:12	R331159
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	07/03/2023 16:21	207896
Arsenic	NELAP	0.0010		0.0011	mg/L	5	06/29/2023 18:02	207896
Barium	NELAP	0.0010		0.348	mg/L	5	07/03/2023 16:21	207896
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	07/03/2023 16:21	207896
Boron	NELAP	0.0250		0.0704	mg/L	5	07/03/2023 16:21	207896
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	07/03/2023 16:21	207896
Calcium	NELAP	0.125		114	mg/L	5	07/03/2023 16:21	207896
Chromium	NELAP	0.0015		< 0.0015	mg/L	5	07/06/2023 5:44	207896
Cobalt	NELAP	0.0010		0.0026	mg/L	5	07/06/2023 5:44	207896
Lead	NELAP	0.0010		< 0.0010	mg/L	5	07/03/2023 16:21	207896
Lithium	*	0.0030		0.0148	mg/L	5	06/29/2023 18:02	207896
Molybdenum	NELAP	0.0015		< 0.0015	mg/L	5	07/03/2023 16:21	207896
Selenium	NELAP	0.0010		0.0013	mg/L	5	06/29/2023 18:02	207896
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	07/03/2023 16:21	207896
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	07/07/2023 4:22	208035
Arsenic	NELAP	0.0010		0.0019	mg/L	5	07/07/2023 4:22	208035
Barium	NELAP	0.0010		0.485	mg/L	5	07/07/2023 4:22	208035
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	07/07/2023 4:22	208035
Boron	NELAP	0.0250		0.0674	mg/L	5	07/07/2023 4:22	208035
Cadmium	NELAP	0.0010		0.0011	mg/L	5	07/07/2023 4:22	208035
Calcium	NELAP	0.125	B	611	mg/L	5	07/07/2023 4:22	208035
Chromium	NELAP	0.0015		0.0015	mg/L	5	07/07/2023 4:22	208035
Cobalt	NELAP	0.0010		0.0070	mg/L	5	07/07/2023 4:22	208035
Lead	NELAP	0.0010		< 0.0010	mg/L	5	07/07/2023 4:22	208035
Lithium	*	0.0030		0.0158	mg/L	5	07/07/2023 4:22	208035
Molybdenum	NELAP	0.0015		< 0.0015	mg/L	5	07/07/2023 4:22	208035
Selenium	NELAP	0.0010		0.0016	mg/L	5	07/07/2023 4:22	208035
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	07/07/2023 4:22	208035
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		< 0.00020	mg/L	1	07/05/2023 9:30	207990
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		See Attached	pci/L	1	07/17/2023 15:33	R334662
Radium-228	*	0		See Attached	pci/L	1	07/17/2023 15:33	R334662

Sample result for Ca exceed 10 times the method blank contamination. Data is reportable per the TNI Standard.

Client: ERM
Client Project: 0599247

Work Order: 23062071
Report Date: 10-Aug-23

Lab ID: 23062071-007

Client Sample ID: APW-06S-WG-20230627

Matrix: GROUNDWATER

Collection Date: 06/27/2023 9:10

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	50		615	mg/L	2.5	06/28/2023 15:21	R330972
SW-846 9036 (TOTAL)								
Sulfate	NELAP	100		208	mg/L	10	07/03/2023 22:25	R331147
SW-846 9040B, LABORATORY ANALYZED								
Lab pH	NELAP	1.00	H	7.05		1	06/29/2023 11:51	R330948
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		0.26	mg/L	1	07/03/2023 12:45	R331110
SW-846 9251 (TOTAL)								
Chloride	NELAP	4		23	mg/L	1	07/03/2023 22:20	R331159
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	07/03/2023 16:27	207896
Arsenic	NELAP	0.0010		0.0010	mg/L	5	06/29/2023 18:08	207896
Barium	NELAP	0.0010		0.210	mg/L	5	07/03/2023 16:27	207896
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	07/03/2023 16:27	207896
Boron	NELAP	0.0250		5.83	mg/L	5	07/03/2023 16:27	207896
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	07/03/2023 16:27	207896
Calcium	NELAP	0.125		100	mg/L	5	07/03/2023 16:27	207896
Chromium	NELAP	0.0015		< 0.0015	mg/L	5	07/06/2023 5:50	207896
Cobalt	NELAP	0.0010		< 0.0010	mg/L	5	07/06/2023 5:50	207896
Lead	NELAP	0.0010		< 0.0010	mg/L	5	07/03/2023 16:27	207896
Lithium	*	0.0030		0.0411	mg/L	5	06/29/2023 18:08	207896
Molybdenum	NELAP	0.0015		0.232	mg/L	5	07/03/2023 16:27	207896
Selenium	NELAP	0.0010		< 0.0010	mg/L	5	06/29/2023 18:08	207896
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	07/03/2023 16:27	207896
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	07/07/2023 4:28	208035
Arsenic	NELAP	0.0010		< 0.0010	mg/L	5	07/07/2023 4:28	208035
Barium	NELAP	0.0010		0.224	mg/L	5	07/07/2023 4:28	208035
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	07/07/2023 4:28	208035
Boron	NELAP	0.0250		5.84	mg/L	5	07/07/2023 4:28	208035
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	07/07/2023 4:28	208035
Calcium	NELAP	0.125	B	109	mg/L	5	07/07/2023 4:28	208035
Chromium	NELAP	0.0015		0.0019	mg/L	5	07/07/2023 4:28	208035
Cobalt	NELAP	0.0010		< 0.0010	mg/L	5	07/07/2023 4:28	208035
Lead	NELAP	0.0010		< 0.0010	mg/L	5	07/07/2023 4:28	208035
Lithium	*	0.0030		0.0412	mg/L	5	07/07/2023 4:28	208035
Molybdenum	NELAP	0.0015		0.235	mg/L	5	07/07/2023 4:28	208035
Selenium	NELAP	0.0010		< 0.0010	mg/L	5	07/07/2023 4:28	208035
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	07/07/2023 4:28	208035
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		< 0.00020	mg/L	1	07/06/2023 8:37	208092
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		See Attached	pci/L	1	07/17/2023 15:33	R334662
Radium-228	*	0		See Attached	pci/L	1	07/17/2023 15:33	R334662

Sample result for Ca exceed 10 times the method blank contamination. Data is reportable per the TNI Standard.

Client: ERM
Client Project: 0599247

Work Order: 23062071
Report Date: 10-Aug-23

Lab ID: 23062071-008

Client Sample ID: APW-06D-WG-20230627

Matrix: GROUNDWATER

Collection Date: 06/27/2023 10:35

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	50		735	mg/L	2.5	06/28/2023 15:21	R330972
SW-846 9036 (TOTAL)								
Sulfate	NELAP	100		270	mg/L	10	07/03/2023 22:49	R331147
SW-846 9040B, LABORATORY ANALYZED								
Lab pH	NELAP	1.00	H	7.39		1	06/29/2023 11:54	R330948
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		0.20	mg/L	1	07/03/2023 12:47	R331110
SW-846 9251 (TOTAL)								
Chloride	NELAP	4		15	mg/L	1	07/03/2023 22:44	R331159
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	07/03/2023 17:16	207896
Arsenic	NELAP	0.0010		0.0102	mg/L	5	06/29/2023 18:59	207896
Barium	NELAP	0.0010		0.130	mg/L	5	07/03/2023 17:16	207896
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	07/03/2023 17:16	207896
Boron	NELAP	0.0250		5.01	mg/L	5	07/03/2023 17:16	207896
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	07/03/2023 17:16	207896
Calcium	NELAP	0.125		118	mg/L	5	07/03/2023 17:16	207896
Chromium	NELAP	0.0015		< 0.0015	mg/L	5	07/06/2023 6:39	207896
Cobalt	NELAP	0.0010		< 0.0010	mg/L	5	07/06/2023 6:39	207896
Lead	NELAP	0.0010		< 0.0010	mg/L	5	07/03/2023 17:16	207896
Lithium	*	0.0030		0.0160	mg/L	5	06/29/2023 18:59	207896
Molybdenum	NELAP	0.0015		0.0643	mg/L	5	07/03/2023 17:16	207896
Selenium	NELAP	0.0010		< 0.0010	mg/L	5	06/29/2023 18:59	207896
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	07/03/2023 17:16	207896
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	07/07/2023 4:34	208035
Arsenic	NELAP	0.0010		0.0115	mg/L	5	07/07/2023 4:34	208035
Barium	NELAP	0.0010		0.145	mg/L	5	07/07/2023 4:34	208035
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	07/07/2023 4:34	208035
Boron	NELAP	0.0250		4.99	mg/L	5	07/07/2023 4:34	208035
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	07/07/2023 4:34	208035
Calcium	NELAP	0.125	B	128	mg/L	5	07/07/2023 4:34	208035
Chromium	NELAP	0.0015		0.0057	mg/L	5	07/07/2023 4:34	208035
Cobalt	NELAP	0.0010		0.0054	mg/L	5	07/07/2023 4:34	208035
Lead	NELAP	0.0010		0.0016	mg/L	5	07/07/2023 4:34	208035
Lithium	*	0.0030		0.0184	mg/L	5	07/07/2023 4:34	208035
Molybdenum	NELAP	0.0015		0.0602	mg/L	5	07/07/2023 4:34	208035
Selenium	NELAP	0.0010		< 0.0010	mg/L	5	07/07/2023 4:34	208035
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	07/07/2023 4:34	208035
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		< 0.00020	mg/L	1	07/06/2023 8:39	208092
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		See Attached	pci/L	1	07/18/2023 9:09	R334662
Radium-228	*	0		See Attached	pci/L	1	07/18/2023 9:09	R334662

Sample result for Ca exceed 10 times the method blank contamination. Data is reportable per the TNI Standard.

Client: ERM
Client Project: 0599247

Work Order: 23062071
Report Date: 10-Aug-23

Lab ID: 23062071-009

Client Sample ID: APW-02-WG-20230627

Matrix: GROUNDWATER

Collection Date: 06/27/2023 12:15

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	50		920	mg/L	2.5	06/28/2023 15:21	R330972
SW-846 9036 (TOTAL)								
Sulfate	NELAP	100		500	mg/L	10	07/03/2023 22:57	R331147
SW-846 9040B, LABORATORY ANALYZED								
Lab pH	NELAP	1.00	H	6.90		1	06/29/2023 12:00	R330948
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		0.22	mg/L	1	07/03/2023 12:49	R331110
SW-846 9251 (TOTAL)								
Chloride	NELAP	4		7	mg/L	1	07/03/2023 22:52	R331159
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	07/03/2023 17:22	207896
Arsenic	NELAP	0.0010		0.0110	mg/L	5	06/29/2023 19:05	207896
Barium	NELAP	0.0010		0.142	mg/L	5	07/03/2023 17:22	207896
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	07/03/2023 17:22	207896
Boron	NELAP	0.0250		8.97	mg/L	5	07/03/2023 17:22	207896
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	07/03/2023 17:22	207896
Calcium	NELAP	0.125		147	mg/L	5	07/03/2023 17:22	207896
Chromium	NELAP	0.0015		< 0.0015	mg/L	5	07/06/2023 6:45	207896
Cobalt	NELAP	0.0010		< 0.0010	mg/L	5	07/06/2023 6:45	207896
Lead	NELAP	0.0010		< 0.0010	mg/L	5	07/03/2023 17:22	207896
Lithium	*	0.0030		0.0442	mg/L	5	06/29/2023 19:05	207896
Molybdenum	NELAP	0.0015		0.227	mg/L	5	07/03/2023 17:22	207896
Selenium	NELAP	0.0010		< 0.0010	mg/L	5	06/29/2023 19:05	207896
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	07/03/2023 17:22	207896
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	07/07/2023 4:41	208035
Arsenic	NELAP	0.0010		0.0148	mg/L	5	07/07/2023 4:41	208035
Barium	NELAP	0.0010		0.149	mg/L	5	07/07/2023 4:41	208035
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	07/07/2023 4:41	208035
Boron	NELAP	0.0250		9.14	mg/L	5	07/07/2023 4:41	208035
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	07/07/2023 4:41	208035
Calcium	NELAP	0.125	B	161	mg/L	5	07/07/2023 4:41	208035
Chromium	NELAP	0.0015		0.0024	mg/L	5	07/07/2023 4:41	208035
Cobalt	NELAP	0.0010		< 0.0010	mg/L	5	07/07/2023 4:41	208035
Lead	NELAP	0.0010		0.0025	mg/L	5	07/07/2023 4:41	208035
Lithium	*	0.0030		0.0459	mg/L	5	07/07/2023 4:41	208035
Molybdenum	NELAP	0.0015		0.229	mg/L	5	07/07/2023 4:41	208035
Selenium	NELAP	0.0010		< 0.0010	mg/L	5	07/07/2023 4:41	208035
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	07/07/2023 4:41	208035
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		< 0.00020	mg/L	1	07/06/2023 8:46	208092
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		See Attached	pci/L	1	07/18/2023 9:09	R334662
Radium-228	*	0		See Attached	pci/L	1	07/18/2023 9:09	R334662

Sample result for Ca exceed 10 times the method blank contamination. Data is reportable per the TNI Standard.

Client: ERM
Client Project: 0599247

Work Order: 23062071
Report Date: 10-Aug-23

Lab ID: 23062071-010

Client Sample ID: APW-05R-WG-20230627

Matrix: GROUNDWATER

Collection Date: 06/27/2023 14:10

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	50		740	mg/L	2.5	06/28/2023 15:22	R330972
SW-846 9036 (TOTAL)								
Sulfate	NELAP	100		335	mg/L	10	07/03/2023 23:06	R331147
SW-846 9040B, LABORATORY ANALYZED								
Lab pH	NELAP	1.00	H	7.27		1	06/29/2023 12:03	R330948
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		0.30	mg/L	1	07/03/2023 12:55	R331110
SW-846 9251 (TOTAL)								
Chloride	NELAP	4		17	mg/L	1	07/03/2023 23:00	R331159
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	07/03/2023 17:28	207896
Arsenic	NELAP	0.0010		0.0024	mg/L	5	06/29/2023 19:11	207896
Barium	NELAP	0.0010		0.168	mg/L	5	07/03/2023 17:28	207896
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	07/03/2023 17:28	207896
Boron	NELAP	0.0250		8.64	mg/L	5	07/03/2023 17:28	207896
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	07/03/2023 17:28	207896
Calcium	NELAP	0.125		120	mg/L	5	07/03/2023 17:28	207896
Chromium	NELAP	0.0015		< 0.0015	mg/L	5	07/06/2023 6:51	207896
Cobalt	NELAP	0.0010		< 0.0010	mg/L	5	07/06/2023 6:51	207896
Lead	NELAP	0.0010		< 0.0010	mg/L	5	07/03/2023 17:28	207896
Lithium	*	0.0030		0.0384	mg/L	5	06/29/2023 19:11	207896
Molybdenum	NELAP	0.0015		0.213	mg/L	5	07/03/2023 17:28	207896
Selenium	NELAP	0.0010		< 0.0010	mg/L	5	06/29/2023 19:11	207896
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	07/03/2023 17:28	207896
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	07/07/2023 4:47	208035
Arsenic	NELAP	0.0010		0.0030	mg/L	5	07/07/2023 4:47	208035
Barium	NELAP	0.0010		0.183	mg/L	5	07/07/2023 4:47	208035
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	07/07/2023 4:47	208035
Boron	NELAP	0.0250		8.76	mg/L	5	07/07/2023 4:47	208035
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	07/07/2023 4:47	208035
Calcium	NELAP	0.125	B	136	mg/L	5	07/07/2023 4:47	208035
Chromium	NELAP	0.0015		< 0.0015	mg/L	5	07/07/2023 4:47	208035
Cobalt	NELAP	0.0010		< 0.0010	mg/L	5	07/07/2023 4:47	208035
Lead	NELAP	0.0010		0.0011	mg/L	5	07/07/2023 4:47	208035
Lithium	*	0.0030		0.0423	mg/L	5	07/07/2023 4:47	208035
Molybdenum	NELAP	0.0015		0.212	mg/L	5	07/07/2023 4:47	208035
Selenium	NELAP	0.0010		< 0.0010	mg/L	5	07/07/2023 4:47	208035
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	07/07/2023 4:47	208035
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		< 0.00020	mg/L	1	07/06/2023 8:48	208092
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		See Attached	pci/L	1	07/20/2023 15:16	R334662
Radium-228	*	0		See Attached	pci/L	1	07/20/2023 15:16	R334662

Sample result for Ca exceed 10 times the method blank contamination. Data is reportable per the TNI Standard.

Client: ERM
Client Project: 0599247

Work Order: 23062071
Report Date: 10-Aug-23

Lab ID: 23062071-011

Client Sample ID: APW-09-WG-20230627

Matrix: GROUNDWATER

Collection Date: 06/27/2023 15:20

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	20		386	mg/L	1	06/29/2023 11:35	R331052
SW-846 9036 (TOTAL)								
Sulfate	NELAP	10		47	mg/L	1	07/03/2023 23:07	R331147
SW-846 9040B, LABORATORY ANALYZED								
Lab pH	NELAP	1.00	H	7.32		1	06/29/2023 14:43	R330948
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		0.19	mg/L	1	07/03/2023 12:57	R331110
SW-846 9251 (TOTAL)								
Chloride	NELAP	4		12	mg/L	1	07/03/2023 23:08	R331159
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	07/03/2023 17:59	207896
Arsenic	NELAP	0.0010		0.0021	mg/L	5	06/29/2023 19:43	207896
Barium	NELAP	0.0010		0.116	mg/L	5	07/03/2023 17:59	207896
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	07/03/2023 17:59	207896
Boron	NELAP	0.0250		0.572	mg/L	5	07/06/2023 7:21	207896
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	07/03/2023 17:59	207896
Calcium	NELAP	0.125	S	82.8	mg/L	5	07/03/2023 17:59	207896
Chromium	NELAP	0.0015		< 0.0015	mg/L	5	07/06/2023 7:21	207896
Cobalt	NELAP	0.0010		< 0.0010	mg/L	5	07/06/2023 7:21	207896
Lead	NELAP	0.0010		< 0.0010	mg/L	5	07/03/2023 17:59	207896
Lithium	*	0.0030		0.0163	mg/L	5	06/29/2023 19:43	207896
Molybdenum	NELAP	0.0015		0.0211	mg/L	5	07/03/2023 17:59	207896
Selenium	NELAP	0.0010		0.0186	mg/L	5	06/29/2023 19:43	207896
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	07/03/2023 17:59	207896
<i>Matrix spike control limits are not applicable due to high sample/spike ratio.</i>								
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		0.0010	mg/L	5	07/07/2023 5:57	208035
Arsenic	NELAP	0.0010		0.0021	mg/L	5	07/07/2023 5:57	208035
Barium	NELAP	0.0010		0.123	mg/L	5	07/07/2023 5:57	208035
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	07/07/2023 5:57	208035
Boron	NELAP	0.0250		0.473	mg/L	5	07/07/2023 5:57	208035
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	07/07/2023 5:57	208035
Calcium	NELAP	0.125	B	86.9	mg/L	5	07/07/2023 5:57	208035
Chromium	NELAP	0.0015		< 0.0015	mg/L	5	07/07/2023 5:57	208035
Cobalt	NELAP	0.0010		< 0.0010	mg/L	5	07/07/2023 5:57	208035
Lead	NELAP	0.0010		< 0.0010	mg/L	5	07/07/2023 5:57	208035
Lithium	*	0.0030		0.0157	mg/L	5	07/07/2023 5:57	208035
Molybdenum	NELAP	0.0015		0.0189	mg/L	5	07/07/2023 5:57	208035
Selenium	NELAP	0.0010		0.0198	mg/L	5	07/07/2023 5:57	208035
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	07/07/2023 5:57	208035
<i>Sample result for Ca exceed 10 times the method blank contamination. Data is reportable per the TNI Standard.</i>								
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		< 0.00020	mg/L	1	07/06/2023 8:51	208092
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		See Attached	pci/L	1	07/20/2023 15:16	R334662
Radium-228	*	0		See Attached	pci/L	1	07/20/2023 15:16	R334662

Client: ERM
Client Project: 0599247

Work Order: 23062071
Report Date: 10-Aug-23

Lab ID: 23062071-012

Client Sample ID: APW-01R-WG-20230627

Matrix: GROUNDWATER

Collection Date: 06/27/2023 16:30

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	20		328	mg/L	1	06/29/2023 11:35	R331052
SW-846 9036 (TOTAL)								
Sulfate	NELAP	20		37	mg/L	2	07/06/2023 13:39	R331244
SW-846 9040B, LABORATORY ANALYZED								
Lab pH	NELAP	1.00	H	6.53		1	06/29/2023 14:46	R330948
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		0.14	mg/L	1	07/03/2023 12:51	R331110
SW-846 9251 (TOTAL)								
Chloride	NELAP	4		< 4	mg/L	1	07/03/2023 23:18	R331159
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	07/03/2023 17:34	207896
Arsenic	NELAP	0.0010		0.0011	mg/L	5	06/29/2023 19:18	207896
Barium	NELAP	0.0010		0.164	mg/L	5	07/03/2023 17:34	207896
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	07/03/2023 17:34	207896
Boron	NELAP	0.0250		0.249	mg/L	5	07/03/2023 17:34	207896
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	07/03/2023 17:34	207896
Calcium	NELAP	0.125		66.4	mg/L	5	07/03/2023 17:34	207896
Chromium	NELAP	0.0015		< 0.0015	mg/L	5	07/06/2023 6:57	207896
Cobalt	NELAP	0.0010		< 0.0010	mg/L	5	07/06/2023 6:57	207896
Lead	NELAP	0.0010		< 0.0010	mg/L	5	07/03/2023 17:34	207896
Lithium	*	0.0030		0.0150	mg/L	5	06/29/2023 19:18	207896
Molybdenum	NELAP	0.0015		< 0.0015	mg/L	5	07/03/2023 17:34	207896
Selenium	NELAP	0.0010		0.0032	mg/L	5	06/29/2023 19:18	207896
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	07/03/2023 17:34	207896
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	07/07/2023 6:03	208035
Arsenic	NELAP	0.0010		0.0013	mg/L	5	07/07/2023 6:03	208035
Barium	NELAP	0.0010		0.168	mg/L	5	07/07/2023 6:03	208035
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	07/07/2023 6:03	208035
Boron	NELAP	0.0250		0.176	mg/L	5	07/07/2023 6:03	208035
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	07/07/2023 6:03	208035
Calcium	NELAP	0.125	B	66.8	mg/L	5	07/07/2023 6:03	208035
Chromium	NELAP	0.0015		< 0.0015	mg/L	5	07/07/2023 6:03	208035
Cobalt	NELAP	0.0010		0.0014	mg/L	5	07/07/2023 6:03	208035
Lead	NELAP	0.0010		< 0.0010	mg/L	5	07/07/2023 6:03	208035
Lithium	*	0.0030		0.0142	mg/L	5	07/07/2023 6:03	208035
Molybdenum	NELAP	0.0015		< 0.0015	mg/L	5	07/07/2023 6:03	208035
Selenium	NELAP	0.0010		0.0033	mg/L	5	07/07/2023 6:03	208035
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	07/07/2023 6:03	208035
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		< 0.00020	mg/L	1	07/06/2023 8:53	208092
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		See Attached	pci/L	1	07/20/2023 15:16	R334662
Radium-228	*	0		See Attached	pci/L	1	07/20/2023 15:16	R334662

Sample result for Ca exceed 10 times the method blank contamination. Data is reportable per the TNI Standard.

Client: ERM
Client Project: 0599247

Work Order: 23062071
Report Date: 10-Aug-23

Lab ID: 23062071-013

Client Sample ID: APW-04-WG-20230627

Matrix: GROUNDWATER

Collection Date: 06/27/2023 17:35

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	20		432	mg/L	1	06/29/2023 11:35	R331052
SW-846 9036 (TOTAL)								
Sulfate	NELAP	20		65	mg/L	2	07/06/2023 14:12	R331244
SW-846 9040B, LABORATORY ANALYZED								
Lab pH	NELAP	1.00	H	7.39		1	06/29/2023 14:50	R330948
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		0.16	mg/L	1	07/03/2023 12:53	R331110
SW-846 9251 (TOTAL)								
Chloride	NELAP	4		12	mg/L	1	07/03/2023 23:56	R331159
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	07/03/2023 17:41	207896
Arsenic	NELAP	0.0010		0.0014	mg/L	5	06/29/2023 19:24	207896
Barium	NELAP	0.0010		0.122	mg/L	5	07/03/2023 17:41	207896
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	07/03/2023 17:41	207896
Boron	NELAP	0.0250		0.908	mg/L	5	07/03/2023 17:41	207896
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	07/03/2023 17:41	207896
Calcium	NELAP	0.125		88.3	mg/L	5	07/03/2023 17:41	207896
Chromium	NELAP	0.0015		< 0.0015	mg/L	5	07/06/2023 7:03	207896
Cobalt	NELAP	0.0010		< 0.0010	mg/L	5	07/06/2023 7:03	207896
Lead	NELAP	0.0010		< 0.0010	mg/L	5	07/03/2023 17:41	207896
Lithium	*	0.0030		0.0311	mg/L	5	06/29/2023 19:24	207896
Molybdenum	NELAP	0.0015		0.0503	mg/L	5	07/03/2023 17:41	207896
Selenium	NELAP	0.0010		0.0165	mg/L	5	06/29/2023 19:24	207896
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	07/03/2023 17:41	207896
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	07/07/2023 6:10	208035
Arsenic	NELAP	0.0010		0.0020	mg/L	5	07/07/2023 6:10	208035
Barium	NELAP	0.0010		0.138	mg/L	5	07/07/2023 6:10	208035
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	07/07/2023 6:10	208035
Boron	NELAP	0.0250		0.876	mg/L	5	07/07/2023 6:10	208035
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	07/07/2023 6:10	208035
Calcium	NELAP	0.125	B	97.5	mg/L	5	07/07/2023 6:10	208035
Chromium	NELAP	0.0015		< 0.0015	mg/L	5	07/07/2023 6:10	208035
Cobalt	NELAP	0.0010		< 0.0010	mg/L	5	07/07/2023 6:10	208035
Lead	NELAP	0.0010		< 0.0010	mg/L	5	07/07/2023 6:10	208035
Lithium	*	0.0030		0.0314	mg/L	5	07/07/2023 6:10	208035
Molybdenum	NELAP	0.0015		0.0449	mg/L	5	07/07/2023 6:10	208035
Selenium	NELAP	0.0010		0.0165	mg/L	5	07/07/2023 6:10	208035
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	07/07/2023 6:10	208035
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		< 0.00020	mg/L	1	07/06/2023 9:00	208092
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		See Attached	pci/L	1	07/20/2023 15:16	R334662
Radium-228	*	0		See Attached	pci/L	1	07/20/2023 15:16	R334662

Sample result for Ca exceed 10 times the method blank contamination. Data is reportable per the TNI Standard.

Client: ERM
Client Project: 0599247

Work Order: 23062071
Report Date: 10-Aug-23

Lab ID: 23062071-014

Client Sample ID: DUP-01-WG-20230627

Matrix: GROUNDWATER

Collection Date: 06/27/2023 0:01

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	50		695	mg/L	2.5	06/29/2023 11:36	R331052
SW-846 9036 (TOTAL)								
Sulfate	NELAP	100		326	mg/L	10	07/04/2023 0:09	R331147
SW-846 9040B, LABORATORY ANALYZED								
Lab pH	NELAP	1.00	H	7.30		1	06/29/2023 14:53	R330948
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		0.32	mg/L	1	07/03/2023 13:07	R331110
SW-846 9251 (TOTAL)								
Chloride	NELAP	4		18	mg/L	1	07/04/2023 0:04	R331159
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	07/03/2023 17:47	207896
Arsenic	NELAP	0.0010		0.0025	mg/L	5	06/29/2023 19:30	207896
Barium	NELAP	0.0010		0.167	mg/L	5	07/03/2023 17:47	207896
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	07/03/2023 17:47	207896
Boron	NELAP	0.0250		8.37	mg/L	5	07/03/2023 17:47	207896
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	07/03/2023 17:47	207896
Calcium	NELAP	0.125		120	mg/L	5	07/03/2023 17:47	207896
Chromium	NELAP	0.0015		< 0.0015	mg/L	5	07/06/2023 7:09	207896
Cobalt	NELAP	0.0010		< 0.0010	mg/L	5	07/06/2023 7:09	207896
Lead	NELAP	0.0010		< 0.0010	mg/L	5	07/03/2023 17:47	207896
Lithium	*	0.0030		0.0398	mg/L	5	06/29/2023 19:30	207896
Molybdenum	NELAP	0.0015		0.204	mg/L	5	07/03/2023 17:47	207896
Selenium	NELAP	0.0010		< 0.0010	mg/L	5	06/29/2023 19:30	207896
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	07/03/2023 17:47	207896
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	07/07/2023 6:16	208035
Arsenic	NELAP	0.0010		0.0030	mg/L	5	07/07/2023 6:16	208035
Barium	NELAP	0.0010		0.181	mg/L	5	07/07/2023 6:16	208035
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	07/07/2023 6:16	208035
Boron	NELAP	0.0250		8.68	mg/L	5	07/07/2023 6:16	208035
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	07/07/2023 6:16	208035
Calcium	NELAP	0.125	B	133	mg/L	5	07/07/2023 6:16	208035
Chromium	NELAP	0.0015		< 0.0015	mg/L	5	07/07/2023 6:16	208035
Cobalt	NELAP	0.0010		< 0.0010	mg/L	5	07/07/2023 6:16	208035
Lead	NELAP	0.0010		0.0010	mg/L	5	07/07/2023 6:16	208035
Lithium	*	0.0030		0.0415	mg/L	5	07/07/2023 6:16	208035
Molybdenum	NELAP	0.0015		0.210	mg/L	5	07/07/2023 6:16	208035
Selenium	NELAP	0.0010		< 0.0010	mg/L	5	07/07/2023 6:16	208035
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	07/07/2023 6:16	208035
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		< 0.00020	mg/L	1	07/06/2023 9:02	208092
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		See Attached	pci/L	1	07/20/2023 15:16	R334662
Radium-228	*	0		See Attached	pci/L	1	07/20/2023 15:16	R334662

Sample result for Ca exceed 10 times the method blank contamination. Data is reportable per the TNI Standard.

Client: ERM
Client Project: 0599247

Work Order: 23062071
Report Date: 10-Aug-23

Lab ID: 23062071-015

Client Sample ID: DUP-02-WG-20230627

Matrix: GROUNDWATER

Collection Date: 06/27/2023 0:02

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	50		870	mg/L	2.5	06/29/2023 11:36	R331052
SW-846 9036 (TOTAL)								
Sulfate	NELAP	200		465	mg/L	20	07/06/2023 14:20	R331244
SW-846 9040B, LABORATORY ANALYZED								
Lab pH	NELAP	1.00	H	7.03		1	06/29/2023 14:56	R330948
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		0.22	mg/L	1	07/03/2023 13:09	R331110
SW-846 9251 (TOTAL)								
Chloride	NELAP	4		8	mg/L	1	07/04/2023 0:12	R331159
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	07/03/2023 17:53	207896
Arsenic	NELAP	0.0010		0.0107	mg/L	5	06/29/2023 19:36	207896
Barium	NELAP	0.0010		0.145	mg/L	5	07/03/2023 17:53	207896
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	07/03/2023 17:53	207896
Boron	NELAP	0.0250		9.24	mg/L	5	07/03/2023 17:53	207896
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	07/03/2023 17:53	207896
Calcium	NELAP	0.125		148	mg/L	5	07/03/2023 17:53	207896
Chromium	NELAP	0.0015		< 0.0015	mg/L	5	07/06/2023 7:15	207896
Cobalt	NELAP	0.0010		< 0.0010	mg/L	5	07/06/2023 7:15	207896
Lead	NELAP	0.0010		< 0.0010	mg/L	5	07/03/2023 17:53	207896
Lithium	*	0.0030		0.0455	mg/L	5	06/29/2023 19:36	207896
Molybdenum	NELAP	0.0015		0.227	mg/L	5	07/03/2023 17:53	207896
Selenium	NELAP	0.0010		< 0.0010	mg/L	5	06/29/2023 19:36	207896
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	07/03/2023 17:53	207896
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	07/06/2023 22:13	208048
Arsenic	NELAP	0.0010		0.0146	mg/L	5	07/05/2023 22:45	208048
Barium	NELAP	0.0010		0.206	mg/L	5	07/06/2023 22:13	208048
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	07/06/2023 22:13	208048
Boron	NELAP	0.0250	S	9.51	mg/L	5	07/06/2023 22:13	208048
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	07/05/2023 22:45	208048
Calcium	NELAP	0.125	S	167	mg/L	5	07/06/2023 22:13	208048
Chromium	NELAP	0.0015		0.0079	mg/L	5	07/05/2023 22:45	208048
Cobalt	NELAP	0.0010		0.0016	mg/L	5	07/05/2023 22:45	208048
Lead	NELAP	0.0010		0.0029	mg/L	5	07/05/2023 22:45	208048
Lithium	*	0.0030		0.0480	mg/L	5	07/06/2023 22:13	208048
Molybdenum	NELAP	0.0015		0.252	mg/L	5	07/06/2023 22:13	208048
Selenium	NELAP	0.0010		< 0.0010	mg/L	5	07/05/2023 22:45	208048
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	07/05/2023 22:45	208048
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		< 0.00020	mg/L	1	07/06/2023 9:04	208092
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		See Attached	pci/L	1	07/20/2023 15:16	R334662
Radium-228	*	0		See Attached	pci/L	1	07/20/2023 15:16	R334662

Matrix spike control limits are not applicable due to high sample/spike ratio.

Client: ERM**Work Order:** 23062071**Client Project:** 0599247**Report Date:** 10-Aug-23

Lab Sample ID	Client Sample ID	Matrix	Fractions	Collection Date
23062071-001	EB-01-WQ-20230626	Groundwater	4	06/26/2023 9:00
23062071-002	APW-03-WG-20230626	Groundwater	4	06/26/2023 12:10
23062071-003	APW-08-WG-20230626	Groundwater	4	06/26/2023 14:15
23062071-004	APW-07-WG-20230626	Groundwater	4	06/26/2023 15:20
23062071-005	APW-10S-WG-20230626	Groundwater	4	06/26/2023 17:00
23062071-006	APW-10D-WG-20230626	Groundwater	4	06/26/2023 18:45
23062071-007	APW-06S-WG-20230627	Groundwater	4	06/27/2023 9:10
23062071-008	APW-06D-WG-20230627	Groundwater	4	06/27/2023 10:35
23062071-009	APW-02-WG-20230627	Groundwater	4	06/27/2023 12:15
23062071-010	APW-05R-WG-20230627	Groundwater	4	06/27/2023 14:10
23062071-011	APW-09-WG-20230627	Groundwater	4	06/27/2023 15:20
23062071-012	APW-01R-WG-20230627	Groundwater	4	06/27/2023 16:30
23062071-013	APW-04-WG-20230627	Groundwater	4	06/27/2023 17:35
23062071-014	DUP-01-WG-20230627	Groundwater	4	06/27/2023 0:01
23062071-015	DUP-02-WG-20230627	Groundwater	4	06/27/2023 0:02

Client: ERM

Work Order: 23062071

Client Project: 0599247

Report Date: 10-Aug-23

Sample ID	Client Sample ID	Collection Date	Received Date		
	Test Name			Prep Date/Time	Analysis Date/Time
23062071-001A	EB-01-WQ-20230626	06/26/2023 9:00	06/28/2023 10:10		
	Standard Methods 2540 C (Total) 1997, 2011				06/28/2023 15:02
	SW-846 9036 (Total)				07/03/2023 21:04
	SW-846 9040B, Laboratory Analyzed				06/29/2023 11:33
	SW-846 9214 (Total)				07/03/2023 12:15
	SW-846 9251 (Total)				07/03/2023 21:02
23062071-001B	EB-01-WQ-20230626	06/26/2023 9:00	06/28/2023 10:10		
	EPA 903.0/904.0, Radium 226/228				07/17/2023 15:33
23062071-001C	EB-01-WQ-20230626	06/26/2023 9:00	06/28/2023 10:10		
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			07/03/2023 10:51	07/06/2023 3:47
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			07/03/2023 10:51	07/07/2023 3:12
	SW-846 7470A (Total)			06/30/2023 14:49	07/05/2023 9:10
23062071-001D	EB-01-WQ-20230626	06/26/2023 9:00	06/28/2023 10:10		
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			06/30/2023 10:09	07/04/2023 0:04
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			06/30/2023 10:09	07/06/2023 15:58
23062071-002A	APW-03-WG-20230626	06/26/2023 12:10	06/28/2023 10:10		
	Standard Methods 2540 C (Total) 1997, 2011				06/28/2023 15:03
	SW-846 9036 (Total)				07/03/2023 21:24
	SW-846 9040B, Laboratory Analyzed				06/29/2023 11:37
	SW-846 9214 (Total)				07/03/2023 12:17
	SW-846 9251 (Total)				07/03/2023 21:13
23062071-002B	APW-03-WG-20230626	06/26/2023 12:10	06/28/2023 10:10		
	EPA 903.0/904.0, Radium 226/228				07/18/2023 9:09
23062071-002C	APW-03-WG-20230626	06/26/2023 12:10	06/28/2023 10:10		
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			07/03/2023 10:51	07/06/2023 3:54
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			07/03/2023 10:51	07/07/2023 3:18
	SW-846 7470A (Total)			06/30/2023 14:49	07/05/2023 9:17
23062071-002D	APW-03-WG-20230626	06/26/2023 12:10	06/28/2023 10:10		
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			06/28/2023 19:26	06/29/2023 17:43
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			06/28/2023 19:26	07/03/2023 16:03
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			06/28/2023 19:26	07/06/2023 5:26
23062071-003A	APW-08-WG-20230626	06/26/2023 14:15	06/28/2023 10:10		
	Standard Methods 2540 C (Total) 1997, 2011				06/28/2023 15:03
	SW-846 9036 (Total)				07/03/2023 21:47
	SW-846 9040B, Laboratory Analyzed				06/29/2023 11:40
	SW-846 9214 (Total)				07/03/2023 12:20

Client: ERM

Work Order: 23062071

Client Project: 0599247

Report Date: 10-Aug-23

Sample ID	Client Sample ID	Collection Date	Received Date	Prep Date/Time	Analysis Date/Time
Test Name					
	SW-846 9251 (Total)				07/03/2023 21:48
23062071-003B	APW-08-WG-20230626	06/26/2023 14:15	06/28/2023 10:10		
	EPA 903.0/904.0, Radium 226/228				07/17/2023 15:33
23062071-003C	APW-08-WG-20230626	06/26/2023 14:15	06/28/2023 10:10		
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			07/03/2023 10:51	07/06/2023 4:00
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			07/03/2023 10:51	07/07/2023 4:09
	SW-846 7470A (Total)			06/30/2023 14:49	07/05/2023 9:19
23062071-003D	APW-08-WG-20230626	06/26/2023 14:15	06/28/2023 10:10		
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			06/28/2023 19:26	06/29/2023 17:50
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			06/28/2023 19:26	07/03/2023 16:09
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			06/28/2023 19:26	07/06/2023 5:32
23062071-004A	APW-07-WG-20230626	06/26/2023 15:20	06/28/2023 10:10		
	Standard Methods 2540 C (Total) 1997, 2011				06/28/2023 15:03
	SW-846 9036 (Total)				07/06/2023 13:28
	SW-846 9040B, Laboratory Analyzed				06/29/2023 11:42
	SW-846 9214 (Total)				07/03/2023 12:21
	SW-846 9251 (Total)				07/03/2023 21:56
23062071-004B	APW-07-WG-20230626	06/26/2023 15:20	06/28/2023 10:10		
	EPA 903.0/904.0, Radium 226/228				07/17/2023 15:33
23062071-004C	APW-07-WG-20230626	06/26/2023 15:20	06/28/2023 10:10		
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			07/03/2023 10:51	07/07/2023 4:53
	SW-846 7470A (Total)			06/30/2023 14:49	07/05/2023 9:21
23062071-004D	APW-07-WG-20230626	06/26/2023 15:20	06/28/2023 10:10		
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			06/28/2023 19:26	06/29/2023 18:15
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			06/28/2023 19:26	07/03/2023 16:33
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			06/28/2023 19:26	07/06/2023 5:56
23062071-005A	APW-10S-WG-20230626	06/26/2023 17:00	06/28/2023 10:10		
	Standard Methods 2540 C (Total) 1997, 2011				06/28/2023 15:05
	SW-846 9036 (Total)				07/03/2023 22:03
	SW-846 9040B, Laboratory Analyzed				06/29/2023 11:45
	SW-846 9214 (Total)				07/03/2023 12:23
	SW-846 9251 (Total)				07/03/2023 22:04
23062071-005B	APW-10S-WG-20230626	06/26/2023 17:00	06/28/2023 10:10		
	EPA 903.0/904.0, Radium 226/228				07/18/2023 9:09
23062071-005C	APW-10S-WG-20230626	06/26/2023 17:00	06/28/2023 10:10		
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			07/03/2023 10:51	07/06/2023 4:06

Client: ERM

Work Order: 23062071

Client Project: 0599247

Report Date: 10-Aug-23

Sample ID	Client Sample ID	Collection Date	Received Date		
	Test Name			Prep Date/Time	Analysis Date/Time
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			07/03/2023 10:51	07/07/2023 4:15
	SW-846 7470A (Total)			06/30/2023 14:49	07/05/2023 9:23
23062071-005D	APW-10S-WG-20230626	06/26/2023 17:00	06/28/2023 10:10		
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			06/28/2023 19:26	06/29/2023 17:56
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			06/28/2023 19:26	07/03/2023 16:15
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			06/28/2023 19:26	07/06/2023 5:38
23062071-006A	APW-10D-WG-20230626	06/26/2023 18:45	06/28/2023 10:10		
	Standard Methods 2540 C (Total) 1997, 2011				06/28/2023 15:21
	SW-846 9036 (Total)				07/03/2023 22:11
	SW-846 9040B, Laboratory Analyzed				06/29/2023 11:49
	SW-846 9214 (Total)				07/03/2023 12:43
	SW-846 9251 (Total)				07/03/2023 22:12
23062071-006B	APW-10D-WG-20230626	06/26/2023 18:45	06/28/2023 10:10		
	EPA 903.0/904.0, Radium 226/228				07/17/2023 15:33
23062071-006C	APW-10D-WG-20230626	06/26/2023 18:45	06/28/2023 10:10		
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			07/03/2023 10:51	07/07/2023 4:22
	SW-846 7470A (Total)			06/30/2023 14:49	07/05/2023 9:30
23062071-006D	APW-10D-WG-20230626	06/26/2023 18:45	06/28/2023 10:10		
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			06/28/2023 19:26	06/29/2023 18:02
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			06/28/2023 19:26	07/03/2023 16:21
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			06/28/2023 19:26	07/06/2023 5:44
23062071-007A	APW-06S-WG-20230627	06/27/2023 9:10	06/28/2023 10:10		
	Standard Methods 2540 C (Total) 1997, 2011				06/28/2023 15:21
	SW-846 9036 (Total)				07/03/2023 22:25
	SW-846 9040B, Laboratory Analyzed				06/29/2023 11:51
	SW-846 9214 (Total)				07/03/2023 12:45
	SW-846 9251 (Total)				07/03/2023 22:20
23062071-007B	APW-06S-WG-20230627	06/27/2023 9:10	06/28/2023 10:10		
	EPA 903.0/904.0, Radium 226/228				07/17/2023 15:33
23062071-007C	APW-06S-WG-20230627	06/27/2023 9:10	06/28/2023 10:10		
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			07/03/2023 10:51	07/07/2023 4:28
	SW-846 7470A (Total)			07/05/2023 10:52	07/06/2023 8:37
23062071-007D	APW-06S-WG-20230627	06/27/2023 9:10	06/28/2023 10:10		
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			06/28/2023 19:26	06/29/2023 18:08
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			06/28/2023 19:26	07/03/2023 16:27
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			06/28/2023 19:26	07/06/2023 5:50

Client: ERM

Work Order: 23062071

Client Project: 0599247

Report Date: 10-Aug-23

Sample ID	Client Sample ID	Collection Date	Received Date		
	Test Name			Prep Date/Time	Analysis Date/Time
23062071-008A	APW-06D-WG-20230627	06/27/2023 10:35	06/28/2023 10:10		
	Standard Methods 2540 C (Total) 1997, 2011				06/28/2023 15:21
	SW-846 9036 (Total)				07/03/2023 22:49
	SW-846 9040B, Laboratory Analyzed				06/29/2023 11:54
	SW-846 9214 (Total)				07/03/2023 12:47
	SW-846 9251 (Total)				07/03/2023 22:44
23062071-008B	APW-06D-WG-20230627	06/27/2023 10:35	06/28/2023 10:10		
	EPA 903.0/904.0, Radium 226/228				07/18/2023 9:09
23062071-008C	APW-06D-WG-20230627	06/27/2023 10:35	06/28/2023 10:10		
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			07/03/2023 10:51	07/07/2023 4:34
	SW-846 7470A (Total)			07/05/2023 10:52	07/06/2023 8:39
23062071-008D	APW-06D-WG-20230627	06/27/2023 10:35	06/28/2023 10:10		
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			06/28/2023 19:26	06/29/2023 18:59
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			06/28/2023 19:26	07/03/2023 17:16
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			06/28/2023 19:26	07/06/2023 6:39
23062071-009A	APW-02-WG-20230627	06/27/2023 12:15	06/28/2023 10:10		
	Standard Methods 2540 C (Total) 1997, 2011				06/28/2023 15:21
	SW-846 9036 (Total)				07/03/2023 22:57
	SW-846 9040B, Laboratory Analyzed				06/29/2023 12:00
	SW-846 9214 (Total)				07/03/2023 12:49
	SW-846 9251 (Total)				07/03/2023 22:52
23062071-009B	APW-02-WG-20230627	06/27/2023 12:15	06/28/2023 10:10		
	EPA 903.0/904.0, Radium 226/228				07/18/2023 9:09
23062071-009C	APW-02-WG-20230627	06/27/2023 12:15	06/28/2023 10:10		
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			07/03/2023 10:51	07/07/2023 4:41
	SW-846 7470A (Total)			07/05/2023 10:52	07/06/2023 8:46
23062071-009D	APW-02-WG-20230627	06/27/2023 12:15	06/28/2023 10:10		
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			06/28/2023 19:26	06/29/2023 19:05
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			06/28/2023 19:26	07/03/2023 17:22
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			06/28/2023 19:26	07/06/2023 6:45
23062071-010A	APW-05R-WG-20230627	06/27/2023 14:10	06/28/2023 10:10		
	Standard Methods 2540 C (Total) 1997, 2011				06/28/2023 15:22
	SW-846 9036 (Total)				07/03/2023 23:06
	SW-846 9040B, Laboratory Analyzed				06/29/2023 12:03
	SW-846 9214 (Total)				07/03/2023 12:55
	SW-846 9251 (Total)				07/03/2023 23:00

Client: ERM

Work Order: 23062071

Client Project: 0599247

Report Date: 10-Aug-23

Sample ID	Client Sample ID	Collection Date	Received Date	Prep Date/Time	Analysis Date/Time
Test Name					
23062071-010B	APW-05R-WG-20230627	06/27/2023 14:10	06/28/2023 10:10		
	EPA 903.0/904.0, Radium 226/228				07/20/2023 15:16
23062071-010C	APW-05R-WG-20230627	06/27/2023 14:10	06/28/2023 10:10		
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			07/03/2023 10:51	07/07/2023 4:47
	SW-846 7470A (Total)			07/05/2023 10:52	07/06/2023 8:48
23062071-010D	APW-05R-WG-20230627	06/27/2023 14:10	06/28/2023 10:10		
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			06/28/2023 19:26	06/29/2023 19:11
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			06/28/2023 19:26	07/03/2023 17:28
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			06/28/2023 19:26	07/06/2023 6:51
23062071-011A	APW-09-WG-20230627	06/27/2023 15:20	06/28/2023 10:10		
	Standard Methods 2540 C (Total) 1997, 2011				06/29/2023 11:35
	SW-846 9036 (Total)				07/03/2023 23:07
	SW-846 9040B, Laboratory Analyzed				06/29/2023 14:43
	SW-846 9214 (Total)				07/03/2023 12:57
	SW-846 9251 (Total)				07/03/2023 23:08
23062071-011B	APW-09-WG-20230627	06/27/2023 15:20	06/28/2023 10:10		
	EPA 903.0/904.0, Radium 226/228				07/20/2023 15:16
23062071-011C	APW-09-WG-20230627	06/27/2023 15:20	06/28/2023 10:10		
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			07/03/2023 10:51	07/07/2023 5:57
	SW-846 7470A (Total)			07/05/2023 10:52	07/06/2023 8:51
23062071-011D	APW-09-WG-20230627	06/27/2023 15:20	06/28/2023 10:10		
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			06/28/2023 19:26	06/29/2023 19:43
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			06/28/2023 19:26	07/03/2023 17:59
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			06/28/2023 19:26	07/06/2023 7:21
23062071-012A	APW-01R-WG-20230627	06/27/2023 16:30	06/28/2023 10:10		
	Standard Methods 2540 C (Total) 1997, 2011				06/29/2023 11:35
	SW-846 9036 (Total)				07/06/2023 13:39
	SW-846 9040B, Laboratory Analyzed				06/29/2023 14:46
	SW-846 9214 (Total)				07/03/2023 12:51
	SW-846 9251 (Total)				07/03/2023 23:18
23062071-012B	APW-01R-WG-20230627	06/27/2023 16:30	06/28/2023 10:10		
	EPA 903.0/904.0, Radium 226/228				07/20/2023 15:16
23062071-012C	APW-01R-WG-20230627	06/27/2023 16:30	06/28/2023 10:10		
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			07/03/2023 10:51	07/07/2023 6:03
	SW-846 7470A (Total)			07/05/2023 10:52	07/06/2023 8:53
23062071-012D	APW-01R-WG-20230627	06/27/2023 16:30	06/28/2023 10:10		

Client: ERM

Work Order: 23062071

Client Project: 0599247

Report Date: 10-Aug-23

Sample ID	Client Sample ID	Collection Date	Received Date		
	Test Name			Prep Date/Time	Analysis Date/Time
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			06/28/2023 19:26	06/29/2023 19:18
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			06/28/2023 19:26	07/03/2023 17:34
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			06/28/2023 19:26	07/06/2023 6:57
23062071-013A	APW-04-WG-20230627	06/27/2023 17:35	06/28/2023 10:10		
	Standard Methods 2540 C (Total) 1997, 2011				06/29/2023 11:35
	SW-846 9036 (Total)				07/06/2023 14:12
	SW-846 9040B, Laboratory Analyzed				06/29/2023 14:50
	SW-846 9214 (Total)				07/03/2023 12:53
	SW-846 9251 (Total)				07/03/2023 23:56
23062071-013B	APW-04-WG-20230627	06/27/2023 17:35	06/28/2023 10:10		
	EPA 903.0/904.0, Radium 226/228				07/20/2023 15:16
23062071-013C	APW-04-WG-20230627	06/27/2023 17:35	06/28/2023 10:10		
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			07/03/2023 10:51	07/07/2023 6:10
	SW-846 7470A (Total)			07/05/2023 10:52	07/06/2023 9:00
23062071-013D	APW-04-WG-20230627	06/27/2023 17:35	06/28/2023 10:10		
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			06/28/2023 19:48	06/29/2023 19:24
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			06/28/2023 19:48	07/03/2023 17:41
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			06/28/2023 19:48	07/06/2023 7:03
23062071-014A	DUP-01-WG-20230627	06/27/2023 0:01	06/28/2023 10:10		
	Standard Methods 2540 C (Total) 1997, 2011				06/29/2023 11:36
	SW-846 9036 (Total)				07/04/2023 0:09
	SW-846 9040B, Laboratory Analyzed				06/29/2023 14:53
	SW-846 9214 (Total)				07/03/2023 13:07
	SW-846 9251 (Total)				07/04/2023 0:04
23062071-014B	DUP-01-WG-20230627	06/27/2023 0:01	06/28/2023 10:10		
	EPA 903.0/904.0, Radium 226/228				07/20/2023 15:16
23062071-014C	DUP-01-WG-20230627	06/27/2023 0:01	06/28/2023 10:10		
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			07/03/2023 10:51	07/07/2023 6:16
	SW-846 7470A (Total)			07/05/2023 10:52	07/06/2023 9:02
23062071-014D	DUP-01-WG-20230627	06/27/2023 0:01	06/28/2023 10:10		
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			06/28/2023 19:48	06/29/2023 19:30
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			06/28/2023 19:48	07/03/2023 17:47
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			06/28/2023 19:48	07/06/2023 7:09
23062071-015A	DUP-02-WG-20230627	06/27/2023 0:02	06/28/2023 10:10		
	Standard Methods 2540 C (Total) 1997, 2011				06/29/2023 11:36
	SW-846 9036 (Total)				07/06/2023 14:20

Client: ERM

Work Order: 23062071

Client Project: 0599247

Report Date: 10-Aug-23

Sample ID	Client Sample ID	Collection Date	Received Date	Prep Date/Time	Analysis Date/Time
Test Name				Prep Date/Time	Analysis Date/Time
	SW-846 9040B, Laboratory Analyzed				06/29/2023 14:56
	SW-846 9214 (Total)				07/03/2023 13:09
	SW-846 9251 (Total)				07/04/2023 0:12
23062071-015B	DUP-02-WG-20230627	06/27/2023 0:02	06/28/2023 10:10		
	EPA 903.0/904.0, Radium 226/228				07/20/2023 15:16
23062071-015C	DUP-02-WG-20230627	06/27/2023 0:02	06/28/2023 10:10		
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			07/03/2023 12:56	07/05/2023 22:45
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			07/03/2023 12:56	07/06/2023 22:13
	SW-846 7470A (Total)			07/05/2023 10:52	07/06/2023 9:04
23062071-015D	DUP-02-WG-20230627	06/27/2023 0:02	06/28/2023 10:10		
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			06/28/2023 19:48	06/29/2023 19:36
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			06/28/2023 19:48	07/03/2023 17:53
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			06/28/2023 19:48	07/06/2023 7:15



Quality Control Results

<http://www.teklabinc.com/>

Client: ERM

Work Order: 23062071

Client Project: 0599247

Report Date: 10-Aug-23

STANDARD METHODS 2540 C (TOTAL) 1997, 2011

Batch R330972 SampType: MBLK Units mg/L

SampID: MBLK

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Dissolved Solids		20		< 20	16.00	0	0	-100	100	06/28/2023

Batch R330972 SampType: LCS Units mg/L

SampID: LCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Dissolved Solids		20		966	1000	0	96.6	90	110	06/28/2023

Batch R330972 SampType: DUP Units mg/L

SampID: 23062071-002ADUP

RPD Limit 10

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Dissolved Solids		20		626				614.0	1.94	06/28/2023

Batch R331052 SampType: MBLK Units mg/L

SampID: MBLK

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Dissolved Solids		20		< 20	16.00	0	0	-100	100	06/29/2023
Total Dissolved Solids		20		< 20	16.00	0	0	-100	100	06/29/2023

Batch R331052 SampType: LCS Units mg/L

SampID: LCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Dissolved Solids		20		948	1000	0	94.8	90	110	06/29/2023
Total Dissolved Solids		20		938	1000	0	93.8	90	110	06/29/2023

Batch R331052 SampType: DUP Units mg/L

SampID: 23062071-015ADUP

RPD Limit 10

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Dissolved Solids		50		905				870.0	3.94	06/29/2023

SW-846 9036 (TOTAL)

Batch R331147 SampType: MBLK Units mg/L

SampID: ICB/MBLK

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate		10		< 10	6.140	0	0	-100	100	07/03/2023



Quality Control Results

<http://www.teklabinc.com/>

Client: ERM

Work Order: 23062071

Client Project: 0599247

Report Date: 10-Aug-23

SW-846 9036 (TOTAL)

Batch R331147 SampType: LCS Units mg/L

SampID: ICV/LCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate		10		18	20.00	0	91.6	90	110	07/03/2023

Batch R331147 SampType: MS Units mg/L

SampID: 23062071-002AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate		100		484	200.0	292.1	96.1	85	115	07/03/2023

Batch R331147 SampType: MSD Units mg/L

SampID: 23062071-002AMSD

RPD Limit 10

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Sulfate		100		468	200.0	292.1	88.1	484.4	3.37	07/03/2023

Batch R331244 SampType: MBLK Units mg/L

SampID: ICB/MBLK

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate		10		< 10	6.140	0	0	-100	100	07/06/2023

Batch R331244 SampType: LCS Units mg/L

SampID: ICV/LCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate		10		19	20.00	0	93.3	90	110	07/06/2023

Batch R331244 SampType: MS Units mg/L

SampID: 23062071-012AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate		20		75	40.00	37.28	93.7	85	115	07/06/2023

Batch R331244 SampType: MSD Units mg/L

SampID: 23062071-012AMSD

RPD Limit 10

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Sulfate		20		76	40.00	37.28	96.7	74.74	1.61	07/06/2023



Quality Control Results

<http://www.teklabinc.com/>

Client: ERM

Work Order: 23062071

Client Project: 0599247

Report Date: 10-Aug-23

SW-846 9040B, LABORATORY ANALYZED

Batch R330948		SampType: LCS		Units							
SampID: LCS											Date Analyzed
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit		
Lab pH		1.00		6.97	7.000	0	99.6	99.29	100.7	06/29/2023	

Batch R330948		SampType: DUP		Units				RPD Limit 10			
SampID: 23062071-001ADUP											
Analyses		Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Lab pH			1.00	H	5.25				5.330	1.51	06/29/2023

Batch R330948		SampType: DUP		Units				RPD Limit 10				Date Analyzed
SampID: 23062071-002ADUP												
Analyses		Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD		
Lab pH			1.00	H	7.79				7.770	0.26	06/29/2023	

Batch R330948		SampType: DUP		Units				RPD Limit 10				Date Analyzed
SampID: 23062071-003ADUP												
Analyses		Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD		
Lab pH			1.00	H	7.19				7.180	0.14	06/29/2023	

Batch R330948		SampType: DUP		Units				RPD Limit 10			
SampID: 23062071-004ADUP											
Analyses		Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Lab pH			1.00	H	6.81				6.790	0.29	06/29/2023

Batch R330948		SampType: DUP		Units				RPD Limit 10			
SampID: 23062071-005ADUP											
Analyses		Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Lab pH			1.00	H	7.01				7.010	0.00	06/29/2023

Batch R330948		SampType: DUP		Units				RPD Limit 10			
SampID: 23062071-006ADUP											
Analyses		Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Lab pH			1.00	H	6.98				6.980	0.00	06/29/2023

Batch R330948		SampType: DUP		Units				RPD Limit 10			
SampID: 23062071-007ADUP											
Analyses		Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Lab pH			1.00	H	7.07				7.050	0.28	06/29/2023



Quality Control Results

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Client: ERM

Work Order: 23062071

Client Project: 0599247

Report Date: 10-Aug-23

SW-846 9040B, LABORATORY ANALYZED

Batch R330948		SampType: DUP		Units				RPD Limit 10			
SampID: 23062071-008ADUP											
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed	
Lab pH		1.00	H	7.40				7.390	0.14	06/29/2023	

Batch R330948		SampType: DUP		Units				RPD Limit 10			
SampID: 23062071-009ADUP											
Analyses		Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Lab pH			1.00	H	6.95				6.900	0.72	06/29/2023

Batch R330948		SampType: DUP		Units				RPD Limit 10			
SampID: 23062071-010ADUP											
Analyses		Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Lab pH			1.00	H	7.28				7.270	0.14	06/29/2023

Batch R330948		SampType: DUP		Units				RPD Limit 10			
SampID: 23062071-011ADUP											
Analyses		Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Lab pH			1.00	H	7.34				7.320	0.27	06/29/2023

Batch R330948		SampType: DUP		Units				RPD Limit 10			
SampID: 23062071-012ADUP											
Analyses		Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Lab pH			1.00	H	6.55				6.530	0.31	06/29/2023

Batch R330948		SampType: DUP		Units				RPD Limit 10			
SampID: 23062071-013ADUP											
Analyses		Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Lab pH			1.00	H	7.39				7.390	0.00	06/29/2023

Batch R330948		SampType: DUP		Units				RPD Limit 10			
SampID: 23062071-014ADUP											
Analyses		Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Lab pH			1.00	H	7.31				7.300	0.14	06/29/2023

Batch R330948		SampType: DUP		Units				RPD Limit 10			
SampID: 23062071-015ADUP											
Analyses		Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Lab pH			1.00	H	7.03				7.030	0.00	06/29/2023

Client: ERM

Work Order: 23062071

Client Project: 0599247

Report Date: 10-Aug-23

SW-846 9214 (TOTAL)

Batch R331110		SampType: MBLK		Units mg/L							
SampID: MBLK											
Analyses		Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Fluoride			0.10		< 0.10	0.0500	0	0	-100	100	07/03/2023

Batch R331110		SampType: LCS		Units mg/L							
SampID: LCS										Date Analyzed	
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit		
Fluoride		0.10		0.92	1.000	0	92.0	90	110	07/03/2023	

Batch R331110		SampType: MS		Units mg/L							Date Analyzed
SampID: 23062071-005AMS											
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit		
Fluoride		0.10		2.06	2.000	0.1500	95.6	75	125	07/03/2023	

Batch R331110		SampType: MSD		Units mg/L					RPD Limit 15		
SampID: 23062071-005AMSD											
Analyses		Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Fluoride			0.10		2.06	2.000	0.1500	95.8	2.061	0.19	07/03/2023

Batch R331110		SampType: MS		Units mg/L							
SampID: 23062071-011AMS											Date Analyzed
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit		
Fluoride		0.10		2.15	2.000	0.1860	98.1	75	125	07/03/2023	

Batch R331110		SampType: MSD		Units mg/L					RPD Limit 15		
SampID: 23062071-011AMSD											
Analyses		Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Fluoride			0.10		2.14	2.000	0.1860	97.8	2.148	0.33	07/03/2023

Batch R331110		SampType: MS		Units mg/L							
SampID: 23062071-015AMS											
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed	
Fluoride		0.10		2.14	2.000	0.2250	95.7	75	125	07/03/2023	

Batch R331110		SampType: MSD		Units mg/L					RPD Limit 15		
SampID: 23062071-015AMSD											
Analyses		Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Fluoride			0.10		2.15	2.000	0.2250	96.3	2.139	0.51	07/03/2023

Client: ERM

Work Order: 23062071

Client Project: 0599247

Report Date: 10-Aug-23

SW-846 9251 (TOTAL)

Batch R331159		SampType: MBLK		Units mg/L							
SampID: ICB/MBLK											
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed	
Chloride		4		< 4	0.5000	0	0	-100	100	07/03/2023	

Batch R331159		SampType: LCS		Units mg/L							
SampID: ICV/LCS											Date Analyzed
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit		
Chloride		4		20	20.00	0	99.6	90	110	07/03/2023	

Batch R331159		SampType: MS		Units mg/L							
SampID: 23062071-002AMS											
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed	
Chloride		4		36	20.00	17.09	93.9	85	115	07/03/2023	

Batch R331159		SampType: MSD		Units mg/L				RPD Limit 15			
SampID: 23062071-002AMSD											
Analyses		Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Chloride			4		36	20.00	17.09	93.0	35.87	0.53	07/03/2023

Batch R331159		SampType: MS		Units mg/L							
SampID: 23062071-012AMS											Date Analyzed
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit		
Chloride		4		21	20.00	1.650	94.6	85	115	07/03/2023	

Batch R331159		SampType: MSD		Units mg/L				RPD Limit 15			
SampID: 23062071-012AMSD											
Analyses		Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Chloride			4		21	20.00	1.650	95.6	20.57	0.92	07/03/2023

Batch R331275		SampType: MBLK		Units mg/L							
SampID: ICB/MBLK											
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed	
Chloride		4		< 4	0.5000	0	0	-100	100	07/06/2023	

Batch R331275		SampType: LCS		Units mg/L							
SampID: ICV/LCS											
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed	
Chloride		4		20	20.00	0	102.5	90	110	07/06/2023	



Quality Control Results

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Client: ERM

Work Order: 23062071

Client Project: 0599247

Report Date: 10-Aug-23

SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)

Batch 207896		SampType: MBLK		Units mg/L							Date Analyzed	
SampID: MBLK-207896												
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit			
Antimony		0.0010		< 0.0010	0.0004	0	0	-100	100	06/29/2023		
Arsenic		0.0010		< 0.0010	0.0004	0	0	-100	100	06/29/2023		
Barium		0.0010		< 0.0010	0.0007	0	0	-100	100	06/29/2023		
Beryllium		0.0010		< 0.0010	0.0002	0	0	-100	100	06/29/2023		
Boron		0.0250		< 0.0250	0.0093	0	0	-100	100	07/03/2023		
Cadmium		0.0010		< 0.0010	0.0001	0	0	-100	100	06/29/2023		
Calcium		0.125		< 0.125	0.0700	0	0	-100	100	07/03/2023		
Chromium		0.0015		< 0.0015	0.0007	0	0	-100	100	06/29/2023		
Cobalt		0.0010		< 0.0010	0.0001	0	0	-100	100	06/29/2023		
Lead		0.0010		< 0.0010	0.0006	0	0	-100	100	06/29/2023		
Lithium	*	0.0030		< 0.0030	0.0015	0	0	-100	100	06/29/2023		
Molybdenum		0.0015		< 0.0015	0.0006	0	0	-100	100	06/29/2023		
Selenium		0.0010		< 0.0010	0.0006	0	0	-100	100	06/29/2023		
Thallium		0.0020		< 0.0020	0.0010	0	0	-100	100	06/29/2023		

Batch 207896		SampType: LCS		Units mg/L							
SampID: LCS-207896											
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed	
Antimony		0.0010		0.527	0.5000	0	105.3	80	120	07/03/2023	
Arsenic		0.0010		0.433	0.5000	0	86.7	80	120	06/29/2023	
Barium		0.0010		2.18	2.000	0	108.8	80	120	07/03/2023	
Beryllium		0.0010		0.0481	0.0500	0	96.2	80	120	07/03/2023	
Boron		0.0250		0.494	0.5000	0	98.7	80	120	07/03/2023	
Cadmium		0.0010		0.0504	0.0500	0	100.7	80	120	07/03/2023	
Calcium		0.125		2.49	2.500	0	99.8	80	120	07/03/2023	
Chromium		0.0015		0.215	0.2000	0	107.4	80	120	07/06/2023	
Cobalt		0.0010		0.541	0.5000	0	108.2	80	120	07/06/2023	
Lead		0.0010		0.530	0.5000	0	106.1	80	120	07/03/2023	
Lithium	*	0.0030		0.457	0.5000	0	91.4	80	120	06/29/2023	
Molybdenum		0.0015		0.496	0.5000	0	99.2	80	120	07/03/2023	
Selenium		0.0010		0.405	0.5000	0	81.0	80	120	06/29/2023	
Thallium		0.0020		0.252	0.2500	0	100.6	80	120	07/03/2023	

Client: ERM

Work Order: 23062071

Client Project: 0599247

Report Date: 10-Aug-23

SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)

Batch 207896 SampType: MS Units mg/L										
SampID: 23062071-004DMS										
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010		0.431	0.5000	0	86.3	75	125	07/03/2023
Arsenic		0.0010		0.444	0.5000	0.001228	88.5	75	125	06/29/2023
Barium		0.0010		2.02	2.000	0.3029	85.8	75	125	07/03/2023
Beryllium		0.0010		0.0410	0.0500	0	81.9	75	125	07/03/2023
Boron		0.0250		0.627	0.5000	0.2084	83.7	75	125	07/03/2023
Cadmium		0.0010		0.0428	0.0500	0	85.5	75	125	07/03/2023
Calcium		0.125	S	173	2.500	179.6	-281.4	75	125	07/03/2023
Chromium		0.0015		0.185	0.2000	0	92.6	75	125	07/06/2023
Cobalt		0.0010		0.456	0.5000	0	91.1	75	125	07/06/2023
Lead		0.0010		0.431	0.5000	0	86.3	75	125	07/03/2023
Lithium	*	0.0030		0.461	0.5000	0.01363	89.4	75	125	06/29/2023
Molybdenum		0.0015		0.425	0.5000	0.002674	84.4	75	125	07/03/2023
Selenium		0.0010		0.406	0.5000	0	81.3	75	125	06/29/2023
Thallium		0.0020		0.206	0.2500	0	82.5	75	125	07/03/2023

Batch 207896 SampType: MSD Units mg/L RPD Limit 20										
SampID: 23062071-004DMSD										
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Antimony		0.0010		0.433	0.5000	0	86.7	0.4313	0.49	07/03/2023
Arsenic		0.0010		0.468	0.5000	0.001228	93.4	0.4437	5.33	06/29/2023
Barium		0.0010		2.02	2.000	0.3029	85.7	2.019	0.11	07/03/2023
Beryllium		0.0010		0.0411	0.0500	0	82.2	0.04096	0.36	07/03/2023
Boron		0.0250		0.622	0.5000	0.2084	82.8	0.6271	0.75	07/03/2023
Cadmium		0.0010		0.0422	0.0500	0	84.4	0.04277	1.37	07/03/2023
Calcium		0.125	S	174	2.500	179.6	-221.6	172.6	0.86	07/03/2023
Chromium		0.0015		0.183	0.2000	0	91.4	0.1853	1.30	07/06/2023
Cobalt		0.0010		0.451	0.5000	0	90.2	0.4557	1.05	07/06/2023
Lead		0.0010		0.434	0.5000	0	86.7	0.4315	0.47	07/03/2023
Lithium	*	0.0030		0.477	0.5000	0.01363	92.6	0.4607	3.40	06/29/2023
Molybdenum		0.0015		0.429	0.5000	0.002674	85.2	0.4246	0.98	07/03/2023
Selenium		0.0010		0.428	0.5000	0	85.7	0.4063	5.30	06/29/2023
Thallium		0.0020		0.204	0.2500	0	81.5	0.2063	1.21	07/03/2023

Client: ERM

Work Order: 23062071

Client Project: 0599247

Report Date: 10-Aug-23

SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)

Batch 207896		SampType: MS		Units mg/L							Date Analyzed	
SampID: 23062071-011DMS												
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit			
Antimony		0.0010		0.429	0.5000	0	85.9	75	125	07/03/2023		
Arsenic		0.0010		0.444	0.5000	0.002084	88.4	75	125	06/29/2023		
Barium		0.0010		1.78	2.000	0.1160	83.3	75	125	07/03/2023		
Beryllium		0.0010		0.0421	0.0500	0	84.1	75	125	07/03/2023		
Boron		0.0250		1.02	0.5000	0.5720	88.8	75	125	07/06/2023		
Cadmium		0.0010		0.0425	0.0500	0	85.1	75	125	07/03/2023		
Calcium		0.125	S	80.8	2.500	82.79	-80.5	75	125	07/03/2023		
Chromium		0.0015		0.173	0.2000	0	86.4	75	125	07/06/2023		
Cobalt		0.0010		0.425	0.5000	0	85.1	75	125	07/06/2023		
Lead		0.0010		0.439	0.5000	0	87.8	75	125	07/03/2023		
Lithium	*	0.0030		0.484	0.5000	0.01627	93.5	75	125	06/29/2023		
Molybdenum		0.0015		0.436	0.5000	0.02111	83.0	75	125	07/03/2023		
Selenium		0.0010		0.429	0.5000	0.01862	82.1	75	125	06/29/2023		
Thallium		0.0020		0.204	0.2500	0	81.7	75	125	07/03/2023		

Batch	207896	SampType:	MSD	Units mg/L				RPD Limit			20
SampID: 23062071-011DMSD											
Analyses		Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Antimony			0.0010		0.391	0.5000	0	78.3	0.4294	9.28	07/03/2023
Arsenic			0.0010		0.415	0.5000	0.002084	82.6	0.4439	6.65	06/29/2023
Barium			0.0010		1.67	2.000	0.1160	77.5	1.781	6.68	07/03/2023
Beryllium			0.0010		0.0393	0.0500	0	78.5	0.04206	6.90	07/03/2023
Boron			0.0250		0.960	0.5000	0.5720	77.7	1.016	5.64	07/06/2023
Cadmium			0.0010		0.0379	0.0500	0	75.8	0.04254	11.54	07/03/2023
Calcium			0.125	S	81.2	2.500	82.79	-65.4	80.78	0.47	07/03/2023
Chromium			0.0015		0.162	0.2000	0	80.8	0.1729	6.78	07/06/2023
Cobalt			0.0010		0.398	0.5000	0	79.5	0.4253	6.75	07/06/2023
Lead			0.0010		0.412	0.5000	0	82.4	0.4392	6.36	07/03/2023
Lithium		*	0.0030		0.480	0.5000	0.01627	92.7	0.4836	0.75	06/29/2023
Molybdenum			0.0015		0.404	0.5000	0.02111	76.6	0.4360	7.57	07/03/2023
Selenium			0.0010		0.402	0.5000	0.01862	76.7	0.4290	6.50	06/29/2023
Thallium			0.0020		0.192	0.2500	0	77.0	0.2043	5.96	07/03/2023



Quality Control Results

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Client: ERM

Work Order: 23062071

Client Project: 0599247

Report Date: 10-Aug-23

SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)

Batch 207943 SampType: MBLK Units mg/L										
SampID: MBLK-207943										
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010		< 0.0010	0.0004	0	0	-100	100	07/03/2023
Arsenic		0.0010		< 0.0010	0.0004	0	0	-100	100	07/03/2023
Barium		0.0010		< 0.0010	0.0007	0	0	-100	100	07/03/2023
Beryllium		0.0010		< 0.0010	0.0002	0	0	-100	100	07/03/2023
Boron		0.0250		< 0.0250	0.0093	0	0	-100	100	07/03/2023
Cadmium		0.0010		< 0.0010	0.0001	0	0	-100	100	07/03/2023
Calcium		0.125		< 0.125	0.0700	0	0	-100	100	07/03/2023
Chromium		0.0015		< 0.0015	0.0007	0	0	-100	100	07/06/2023
Cobalt		0.0010		< 0.0010	0.0001	0	0	-100	100	07/06/2023
Lead		0.0010		< 0.0010	0.0006	0	0	-100	100	07/03/2023
Lithium	*	0.0030		< 0.0030	0.0015	0	0	-100	100	07/06/2023
Molybdenum		0.0015		< 0.0015	0.0006	0	0	-100	100	07/03/2023
Selenium		0.0010		< 0.0010	0.0006	0	0	-100	100	07/03/2023
Thallium		0.0020		< 0.0020	0.0010	0	0	-100	100	07/03/2023

Batch 207943 SampType: LCS Units mg/L										
SampID: LCS-207943										
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010		0.482	0.5000	0	96.3	80	120	07/03/2023
Arsenic		0.0010		0.513	0.5000	0	102.5	80	120	07/03/2023
Barium		0.0010		2.05	2.000	0	102.6	80	120	07/03/2023
Beryllium		0.0010		0.0464	0.0500	0	92.8	80	120	07/03/2023
Boron		0.0250		0.504	0.5000	0	100.8	80	120	07/03/2023
Cadmium		0.0010		0.0482	0.0500	0	96.3	80	120	07/03/2023
Calcium		0.125		2.40	2.500	0	96.2	80	120	07/03/2023
Chromium		0.0015		0.211	0.2000	0	105.3	80	120	07/06/2023
Cobalt		0.0010		0.539	0.5000	0	107.9	80	120	07/06/2023
Lead		0.0010		0.527	0.5000	0	105.4	80	120	07/03/2023
Lithium	*	0.0030		0.502	0.5000	0	100.5	80	120	07/06/2023
Molybdenum		0.0015		0.486	0.5000	0	97.2	80	120	07/03/2023
Selenium		0.0010		0.475	0.5000	0	95.0	80	120	07/03/2023
Thallium		0.0020		0.246	0.2500	0	98.3	80	120	07/03/2023

Client: ERM

Work Order: 23062071

Client Project: 0599247

Report Date: 10-Aug-23

SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)

Batch 207943		SampType: MS		Units mg/L							Date Analyzed	
SampID: 23062071-001DMS												
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit			
Antimony		0.0010		0.469	0.5000	0	93.8	75	125			
Arsenic		0.0010		0.468	0.5000	0	93.7	75	125			
Barium		0.0010		1.96	2.000	0	98.1	75	125			
Beryllium		0.0010		0.0452	0.0500	0	90.5	75	125			
Boron		0.0250		0.492	0.5000	0	98.4	75	125			
Cadmium		0.0010		0.0455	0.0500	0	91.0	75	125			
Calcium		0.125		2.18	2.500	0	87.0	75	125			
Chromium		0.0015		0.199	0.2000	0	99.3	75	125			
Cobalt		0.0010		0.500	0.5000	0	100.1	75	125			
Lead		0.0010		0.514	0.5000	0	102.9	75	125			
Lithium	*	0.0030		0.485	0.5000	0	97.1	75	125			
Molybdenum		0.0015		0.457	0.5000	0	91.3	75	125			
Selenium		0.0010		0.437	0.5000	0	87.5	75	125			
Thallium		0.0020		0.244	0.2500	0	97.5	75	125			

Batch	207943	SampType:	MSD	Units mg/L					RPD Limit		20
SampID: 23062071-001DMSD											
Analyses		Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Antimony			0.0010		0.478	0.5000	0	95.5	0.4691	1.81	07/04/2023
Arsenic			0.0010		0.498	0.5000	0	99.5	0.4683	6.06	07/04/2023
Barium			0.0010		2.00	2.000	0	100.2	1.962	2.14	07/04/2023
Beryllium			0.0010		0.0452	0.0500	0	90.3	0.04523	0.13	07/04/2023
Boron			0.0250		0.502	0.5000	0	100.4	0.4920	2.06	07/04/2023
Cadmium			0.0010		0.0474	0.0500	0	94.8	0.04551	4.08	07/04/2023
Calcium			0.125		2.14	2.500	0	85.7	2.176	1.58	07/04/2023
Chromium			0.0015		0.209	0.2000	0	104.4	0.1986	5.04	07/06/2023
Cobalt			0.0010		0.535	0.5000	0	106.9	0.5004	6.60	07/06/2023
Lead			0.0010		0.522	0.5000	0	104.5	0.5145	1.51	07/04/2023
Lithium		*	0.0030		0.498	0.5000	0	99.5	0.4854	2.46	07/06/2023
Molybdenum			0.0015		0.477	0.5000	0	95.4	0.4567	4.37	07/04/2023
Selenium			0.0010		0.460	0.5000	0	91.9	0.4374	4.97	07/04/2023
Thallium			0.0020		0.245	0.2500	0	97.9	0.2436	0.42	07/04/2023

Client: ERM

Work Order: 23062071

Client Project: 0599247

Report Date: 10-Aug-23

SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)
Batch 208035 **SampType:** MBLK **Units** mg/L

SampID: MBLK-208035

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010		< 0.0010	0.0004	0	0	-100	100	07/06/2023
Arsenic		0.0010		< 0.0010	0.0004	0	0	-100	100	07/07/2023
Barium		0.0010		< 0.0010	0.0007	0	0	-100	100	07/06/2023
Beryllium		0.0010		< 0.0010	0.0002	0	0	-100	100	07/07/2023
Boron		0.0250		< 0.0250	0.0093	0	0	-100	100	07/07/2023
Cadmium		0.0010		< 0.0010	0.0001	0	0	-100	100	07/07/2023
Calcium		0.125	S	0.260	0.0700	0	371.9	-100	100	07/07/2023
Chromium		0.0015		< 0.0015	0.0007	0	0	-100	100	07/07/2023
Cobalt		0.0010		< 0.0010	0.0001	0	0	-100	100	07/07/2023
Lead		0.0010		< 0.0010	0.0006	0	0	-100	100	07/06/2023
Lithium	*	0.0030		< 0.0030	0.0015	0	0	-100	100	07/07/2023
Molybdenum		0.0015		< 0.0015	0.0006	0	0	-100	100	07/07/2023
Selenium		0.0010		< 0.0010	0.0006	0	0	-100	100	07/07/2023
Thallium		0.0020		< 0.0020	0.0010	0	0	-100	100	07/06/2023

Batch 208035 **SampType:** LCS **Units** mg/L

SampID: LCS-208035

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010		0.551	0.5000	0	110.2	85	115	07/06/2023
Arsenic		0.0010		0.517	0.5000	0	103.5	80	120	07/07/2023
Barium		0.0010		2.10	2.000	0	104.8	80	120	07/07/2023
Beryllium		0.0010		0.0479	0.0500	0	95.8	80	120	07/07/2023
Boron		0.0250		0.497	0.5000	0	99.4	80	120	07/07/2023
Cadmium		0.0010		0.0482	0.0500	0	96.4	80	120	07/07/2023
Calcium		0.125	B	2.70	2.500	0	108.0	80	120	07/07/2023
Chromium		0.0015		0.199	0.2000	0	99.3	80	120	07/07/2023
Cobalt		0.0010		0.497	0.5000	0	99.4	80	120	07/07/2023
Lead		0.0010		0.518	0.5000	0	103.6	85	115	07/06/2023
Lithium	*	0.0030		0.483	0.5000	0	96.5	80	120	07/07/2023
Molybdenum		0.0015		0.471	0.5000	0	94.1	80	120	07/07/2023
Selenium		0.0010		0.481	0.5000	0	96.1	80	120	07/07/2023
Thallium		0.0020		0.246	0.2500	0	98.4	85	115	07/06/2023

Client: ERM

Work Order: 23062071

Client Project: 0599247

Report Date: 10-Aug-23

SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)
Batch 208035 **SampType:** MS Units mg/L

SampID: 23062071-004CMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010		0.536	0.5000	0	107.3	75	125	07/07/2023
Arsenic		0.0010		0.539	0.5000	0.001382	107.5	75	125	07/07/2023
Barium		0.0010		2.53	2.000	0.3121	111.0	75	125	07/07/2023
Beryllium		0.0010		0.0499	0.0500	0	99.7	75	125	07/07/2023
Boron		0.0250		0.724	0.5000	0.2368	97.4	75	125	07/07/2023
Cadmium		0.0010		0.0516	0.0500	0	103.1	75	125	07/07/2023
Calcium		0.125	BS	189	2.500	183.1	237.9	75	125	07/07/2023
Chromium		0.0015		0.206	0.2000	0	103.2	75	125	07/07/2023
Cobalt		0.0010		0.506	0.5000	0.0004089	101.1	75	125	07/07/2023
Lead		0.0010		0.528	0.5000	0	105.6	75	125	07/07/2023
Lithium	*	0.0030		0.524	0.5000	0.01531	101.7	75	125	07/07/2023
Molybdenum		0.0015		0.518	0.5000	0.002814	103.0	75	125	07/07/2023
Selenium		0.0010		0.505	0.5000	0	101.0	75	125	07/07/2023
Thallium		0.0020		0.250	0.2500	0	100.1	75	125	07/07/2023

Batch 208035 **SampType:** MSD Units mg/L

RPD Limit 20

SampID: 23062071-004CMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Antimony		0.0010		0.501	0.5000	0	100.2	0.5365	6.85	07/07/2023
Arsenic		0.0010		0.510	0.5000	0.001382	101.7	0.5390	5.56	07/07/2023
Barium		0.0010		2.39	2.000	0.3121	104.1	2.531	5.61	07/07/2023
Beryllium		0.0010		0.0489	0.0500	0	97.8	0.04986	1.93	07/07/2023
Boron		0.0250		0.695	0.5000	0.2368	91.6	0.7237	4.10	07/07/2023
Cadmium		0.0010		0.0482	0.0500	0	96.4	0.05157	6.73	07/07/2023
Calcium		0.125	BS	182	2.500	183.1	-44.2	189.1	3.80	07/07/2023
Chromium		0.0015		0.198	0.2000	0	99.2	0.2065	3.97	07/07/2023
Cobalt		0.0010		0.486	0.5000	0.0004089	97.1	0.5058	3.99	07/07/2023
Lead		0.0010		0.519	0.5000	0	103.8	0.5280	1.69	07/07/2023
Lithium	*	0.0030		0.507	0.5000	0.01531	98.3	0.5237	3.26	07/07/2023
Molybdenum		0.0015		0.482	0.5000	0.002814	95.9	0.5178	7.14	07/07/2023
Selenium		0.0010		0.471	0.5000	0	94.1	0.5048	6.99	07/07/2023
Thallium		0.0020		0.250	0.2500	0	100.0	0.2503	0.11	07/07/2023

Client: ERM

Work Order: 23062071

Client Project: 0599247

Report Date: 10-Aug-23

SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)
Batch 208048 **SampType:** MBLK **Units** mg/L

SampID: MBLK-208048

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010		< 0.0010	0.0004	0	0	-100	100	07/05/2023
Arsenic		0.0010		< 0.0010	0.0004	0	0	-100	100	07/05/2023
Barium		0.0010		< 0.0010	0.0007	0	0	-100	100	07/05/2023
Beryllium		0.0010		< 0.0010	0.0002	0	0	-100	100	07/06/2023
Boron		0.0250		< 0.0250	0.0093	0	0	-100	100	07/06/2023
Cadmium		0.0010		< 0.0010	0.0001	0	0	-100	100	07/05/2023
Calcium		0.125		< 0.125	0.0700	0	0	-100	100	07/06/2023
Chromium		0.0015		< 0.0015	0.0007	0	0	-100	100	07/05/2023
Cobalt		0.0010		< 0.0010	0.0001	0	0	-100	100	07/05/2023
Lead		0.0010		< 0.0010	0.0006	0	0	-100	100	07/05/2023
Lithium	*	0.0030		< 0.0030	0.0015	0	0	-100	100	07/06/2023
Molybdenum		0.0015		< 0.0015	0.0006	0	0	-100	100	07/06/2023
Selenium		0.0010		< 0.0010	0.0006	0	0	-100	100	07/05/2023
Thallium		0.0020		< 0.0020	0.0010	0	0	-100	100	07/05/2023

Batch 208048 **SampType:** LCS **Units** mg/L

SampID: LCS-208048

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010		0.537	0.5000	0	107.3	80	120	07/06/2023
Arsenic		0.0010		0.542	0.5000	0	108.4	80	120	07/05/2023
Barium		0.0010		2.21	2.000	0	110.7	80	120	07/06/2023
Beryllium		0.0010		0.0520	0.0500	0	104.0	80	120	07/06/2023
Boron		0.0250		0.535	0.5000	0	107.0	80	120	07/06/2023
Cadmium		0.0010		0.0482	0.0500	0	96.5	80	120	07/05/2023
Calcium		0.125		2.82	2.500	0	112.8	80	120	07/06/2023
Chromium		0.0015		0.210	0.2000	0	104.8	80	120	07/05/2023
Cobalt		0.0010		0.513	0.5000	0	102.6	80	120	07/05/2023
Lead		0.0010		0.502	0.5000	0	100.4	80	120	07/05/2023
Lithium	*	0.0030		0.521	0.5000	0	104.1	80	120	07/06/2023
Molybdenum		0.0015		0.515	0.5000	0	103.0	80	120	07/06/2023
Selenium		0.0010		0.486	0.5000	0	97.2	80	120	07/05/2023
Thallium		0.0020		0.251	0.2500	0	100.5	80	120	07/05/2023

Client: ERM

Work Order: 23062071

Client Project: 0599247

Report Date: 10-Aug-23

SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)
Batch 208048 **SampType:** MS **Units** mg/L

SampID: 23062071-015CMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Arsenic		0.0010		0.547	0.5000	0.01457	106.6	75	125	07/05/2023
Arsenic		0.0010		0.560	0.5000	0.01576	108.9	75	125	07/06/2023
Barium		0.0010		2.29	2.000	0.2057	104.2	75	125	07/06/2023
Beryllium		0.0010		0.0508	0.0500	0.0002715	101.0	75	125	07/06/2023
Boron		0.0250	S	9.60	0.5000	9.506	19.0	75	125	07/06/2023
Cadmium		0.0010		0.0469	0.0500	0.0002636	93.3	75	125	07/05/2023
Calcium		0.125	S	160	2.500	167.0	-272.8	75	125	07/06/2023
Chromium		0.0015		0.201	0.2000	0.007883	96.6	75	125	07/05/2023
Cobalt		0.0010		0.483	0.5000	0.001560	96.3	75	125	07/05/2023
Lead		0.0010		0.513	0.5000	0.002909	102.0	75	125	07/05/2023
Lithium	*	0.0030		0.575	0.5000	0.04800	105.5	75	125	07/06/2023
Molybdenum		0.0015		0.754	0.5000	0.2517	100.4	75	125	07/06/2023
Selenium		0.0010		0.469	0.5000	0	93.9	75	125	07/05/2023
Thallium		0.0020		0.255	0.2500	0	102.0	75	125	07/05/2023

Batch 208048 **SampType:** MSD **Units** mg/L

RPD Limit 20

SampID: 23062071-015CMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Arsenic		0.0010		0.569	0.5000	0.01576	110.7	0.5602	1.57	07/06/2023
Arsenic		0.0010		0.575	0.5000	0.01457	112.1	0.5475	4.91	07/05/2023
Barium		0.0010		2.29	2.000	0.2057	104.1	2.289	0.04	07/06/2023
Beryllium		0.0010		0.0517	0.0500	0.0002715	102.9	0.05079	1.85	07/06/2023
Boron		0.0250	S	9.78	0.5000	9.506	55.1	9.601	1.86	07/06/2023
Cadmium		0.0010		0.0502	0.0500	0.0002636	99.9	0.04692	6.77	07/05/2023
Calcium		0.125	S	164	2.500	167.0	-125.7	160.2	2.27	07/06/2023
Chromium		0.0015		0.215	0.2000	0.007883	103.7	0.2012	6.77	07/05/2023
Cobalt		0.0010		0.510	0.5000	0.001560	101.7	0.4833	5.36	07/05/2023
Lead		0.0010		0.527	0.5000	0.002909	104.8	0.5128	2.66	07/05/2023
Lithium	*	0.0030		0.588	0.5000	0.04800	108.0	0.5754	2.16	07/06/2023
Molybdenum		0.0015		0.760	0.5000	0.2517	101.7	0.7535	0.86	07/06/2023
Selenium		0.0010		0.495	0.5000	0	99.0	0.4693	5.32	07/05/2023
Thallium		0.0020		0.270	0.2500	0	108.0	0.2550	5.77	07/05/2023

Client: ERM

Work Order: 23062071

Client Project: 0599247

Report Date: 10-Aug-23

SW-846 7470A (TOTAL)

Batch 207990		SampType: MBLK		Units mg/L							
SampID: MBLK-207990											
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed	
Mercury		0.00020		< 0.00020	0.0001	0	0	-100	100	07/05/2023	

Batch 207990		SampType: LCS		Units mg/L							
SampID: LCS-207990											
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed	
Mercury		0.00020		0.00448	0.0050	0	89.6	85	115	07/03/2023	

Batch 207990		SampType: MS		Units mg/L							
SampID: 23062071-001CMS											
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed	
Mercury		0.00020		0.00527	0.0050	0	105.4	75	125	07/05/2023	

Batch 207990		SampType: MSD		Units mg/L				RPD Limit 15			
SampID: 23062071-001CMSD											
Analyses		Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Mercury			0.00020		0.00517	0.0050	0	103.4	0.005268	1.84	07/05/2023

Batch 208092		SampType: MBLK		Units mg/L							
SampID: MBLK-208092											Date Analyzed
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit		
Mercury		0.00020		< 0.00020	0.0001	0	0	-100	100	07/06/2023	

Batch 208092		SampType: LCS		Units mg/L							
SampID: LCS-208092											
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed	
Mercury		0.00020		0.00488	0.0050	0	97.7	85	115	07/06/2023	

Batch 208092		SampType: MS		Units mg/L							
SampID: 23062071-008CMS											
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed	
Mercury		0.00020		0.00491	0.0050	0	98.2	75	125	07/06/2023	

Batch 208092		SampType: MSD		Units mg/L				RPD Limit 15			
SampID: 23062071-008CMSD											
Analyses		Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Mercurv			0.00020		0.00487	0.0050	0	97.4	0.004912	0.90	07/06/2023



Receiving Check List

<http://www.teklabinc.com/>

Client: ERM

Work Order: 23062071

Client Project: 0599247

Report Date: 10-Aug-23

Carrier: Clay Sansoucie

Received By: MBP

Completed by:

On:

28-Jun-23

Allison Colin

Reviewed by:

On:

28-Jun-23

Ellie Hopkins

Pages to follow:

Chain of custody

2

Extra pages included

39

Shipping container/cooler in good condition?

Yes ☒

No ☐

Not Present ☐

Temp °C 4.0

Type of thermal preservation?

None ☐

Ice ☒

Blue Ice ☐

Dry Ice ☐

Chain of custody present?

Yes ☒

No ☐

Chain of custody signed when relinquished and received?

Yes ☒

No ☐

Chain of custody agrees with sample labels?

Yes ☒

No ☐

Samples in proper container/bottle?

Yes ☒

No ☐

Sample containers intact?

Yes ☒

No ☐

Sufficient sample volume for indicated test?

Yes ☒

No ☐

All samples received within holding time?

Yes ☐

No ☒

Reported field parameters measured:

Field ☐

Lab ☒

NA ☐

Sample analyses to be measured in the field and/or within 15 minutes of collection were analyzed in the lab as soon as practicable. These analyses include Chlorine (demand, free and/or residual), Carbon Dioxide, Dissolved Oxygen, Ferrous Iron, pH, and Sulfite.

Container/Temp Blank temperature in compliance?

Yes ☒

No ☐

When thermal preservation is required, samples are compliant with a temperature between 0.1°C - 6.0°C, or when samples are received on ice the same day as collected.

Water – at least one vial per sample has zero headspace?

Yes ☐

No ☐

No VOA vials ☒

Water - TOX containers have zero headspace?

Yes ☐

No ☐

No TOX containers ☒

Water - pH acceptable upon receipt?

Yes ☐

No ☒

NA ☐

NPDES/CWA TCN interferences checked/treated in the field?

Yes ☐

No ☐

NA ☒

Any No responses must be detailed below or on the COC.

pH strip #88374. - acoln - 6/28/2023 11:13:59 AM

Additional HNO3 (90404) was needed in APW-08 and APW-10S upon arrival at the laboratory. - acoln - 6/28/2023 11:14:09 AM

EB-01-WQ-20230626 was split, filtered and preserved with HNO3 (90404) upon arrival at laboratory. - TWM - 6/28/23

CHAIN OF CUSTODY

pg. 1 of 2 Work order # 23062071

TEKLAB, INC. 5445 Horseshoe Lake Road - Collinsville, IL 62234 - Phone: (618) 344-1004 - Fax: (618) 344-1005

Client: ERM
Address: 1968 Craig Road
City / State / Zip: St. Louis, MO 63146
Contact: Matt Halley **Phone:** (314) 952-2760
E-Mail: matt.halley@erm.com **Fax:**

Samples on: ☒ ICE ☐ BLUE ICE ☐ NO ICE 4.0 °C LTG# 3
Preserved in: ☒ LAB ☐ FIELD **FOR LAB USE ONLY**
Lab Notes: 88374 Added #103(90404)
 to: APW08, APW105, 12/12, 2/2 IL
 ERM Springfield project = Grand Tower CCR GW

Client Comments:
 Total Metals: Sb As Ba Be B Cd Ca Cr Co Pb Li Mo Se Tl and Hg
 Dissolved Metals: Sb As Ba Be B Cd Ca Cr Co Pb Li Mo Se and Tl
 FORTIFIED FOR EQUIPMENT BLANK FOR DISSOLVED METALS APON ARRIVAL AT LAB. IN

Are these samples known to be involved in litigation? If yes, a surcharge will apply ☐ Yes ☒ No
 Are these samples known to be hazardous? ☐ Yes ☒ No
 Are there any required reporting limits to be met on the requested analysis?. If yes, please provide limits in the comment section. ☒ Yes ☐ No

Project Name/Number		Sample Collector's Name		MATRIX		INDICATE ANALYSIS REQUESTED																					
0599247		C. Sanguine / M. Arendell																									
Results Requested		Billing Instructions		# and Type of Containers		Drinking Water		Soil		Sludge		Groundwater		Chloride		Dissolved Metals		Fluoride		pH TDS		Radium 226/228		Sulfate		Total Metals	
☒ Standard ☐ 1-2 Day (100% Surcharge) ☐ Other ☐ 3 Day (50% Surcharge)																											
Lab Use Only	Sample Identification	Date/Time Sampled	UNPRES	HNO3	NaOH	H2SO4	HCL	MeOH	NaHSO4	OTHER																	
062071-001	EB-01-WR-20230626	6/26/23, 0900	1	2	1							X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
002	APW-03-WR-20230626	6/26/23, 1210	1	2	2												X										
003	APW-08-WR-20230626	6/26/23, 1415	1	2	2																						
004	APW-07-WR-20230626	6/26/23, 1520	1	2	2																						
005	APW-105-WR-20230626	6/26/23, 1700	1	2	2																						
006	APW-100-WR-20230626	6/26/23, 1845	1	2	2																						
007	APW-065-WR-20230627	6/27/23, 0910	1	2	2																						
008	APW-040-WR-20230627	6/27/23, 1035	1	2	2																						
009	APW-02-WR-20230627	6/27/23, 1215	1	2	2																						
010	APW-05R-WR-20230627	6/27/23, 1410	1	2	2																						
Relinquished By			Date/Time			Received By			Date/Time																		
Kay Jones			6/28/23, 1010			Morgan Patten			6/28/23, 1010																		

The individual signing this agreement on behalf of the client, acknowledges that he/she has read and understands the terms and conditions of this agreement, and that he/she has the authority to sign on behalf of the client. See www.teklabinc.com for terms and conditions.

BottleOrder: 81078



pg. 2 of 2 Work order # 73062071

Client:	ERM		
Address:	1968 Craig Road		
City / State / Zip	St. Louis, MO 63146		
Contact:	Matt Halley	Phone:	(314) 952-2760
E-Mail:	matt.halley@erm.com		Fax:

Lab Notes

ERM Springfield project = Grand Tower CCR GW

Client Comments:

Total Metals: Sb As Ba Be B Cd Ca Cr Co Pb Li Mo Se Ti and Hg

Dissolved Metals: Sb As Ba Be B Cd Ca Cr Co Pb Li Mo Se and Ti

Are these samples known to be involved in litigation? If yes, a surcharge will apply ☐ Yes ☒ No

Are these samples known to be hazardous? ☐ Yes ☒ No

Are there any required reporting limits to be met on the requested analysis?. If yes, please provide limits in the comment section. ☒ Yes ☐ No

[illegible]

The individual signing this agreement on behalf of the client, acknowledges that he/she has read and understands the terms and conditions of this agreement, and that he/she has the authority to sign on behalf of the client. See www.teklabinc.com for terms and conditions.

BottleOrder: 81078





Summit Environmental Technologies, Inc.
3310 Win St.
Cuyahoga Falls, Ohio 44223
TEL: (330) 253-8211 FAX: (330) 253-4489
Website: <http://www.settek.com>

August 09, 2023

Elizabeth Hurley
TEKLAB Inc,
5445 Horseshoe lake Road
Collinsville, IL 62234
TEL:
FAX:
RE: 23062071

Order No.: 23070477

Dear Elizabeth Hurley:

Summit Environmental Technologies, Inc. received 15 sample(s) on 7/7/2023 for the analyses presented in the following report.

There were no problems with the analytical events associated with this report unless noted in the Case Narrative.

Quality control data is within laboratory defined or method specified acceptance limits except where noted.

If you have any questions regarding these tests results, please feel free to call the laboratory.

Sincerely,

Jennifer Woolf

Project Manager

3310 Win St.
Cuyahoga Falls, Ohio 44223

Arkansas 88-0735, California 2943, Colorado, Connecticut PH-0108, Florida NELAC E87688, Idaho OH00923, Illinois 200061, Indiana C-OH-13, ISO/IEC 17025:2017 119125 L22-544, Kansas E-10347, Kentucky (Underground Storage Tank) 3, Kentucky 90146, Maryland 339, Michigan 9988, Minnesota 1780279, Nevada OH009232020-1, New Hampshire 2996, New Jersey OH006, New York 11777, North Carolina 39705 and 631, North Dakota R-201, Ohio DW, Ohio VAP CL0052, Oklahoma 2019-155, Oregon OH200001, Pennsylvania 68-01335, Rhode Island LA000317, South Carolina 92016001, Texas T104704466-19-16, Utah OH009232020-12, Virginia VELAP 10381, West Virginia 9957C



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Case Narrative

WO#: 23070477
Date: 8/9/2023

CLIENT: TEKLAB Inc,
Project: 23062071

WorkOrder Narrative:

23070477: This report in its entirety consists of the following documents: Cover Letter, Case Narrative, Analytical Results, QC Summary Report, Applicable Accreditation Information, Chain-of-Custody, Cooler Receipt Form, and other applicable forms as necessary. All documents contain the Summit Environmental Technologies, Inc., Work Order Number assigned to this report.

Summit Environmental Technologies, Inc., holds the accreditations/certifications listed at the bottom of the cover letter that may or may not pertain to this report. Please refer to the "Accreditation Program Analytes Report" for accredited analytes list.

The information contained in this analytical report is the sole property of Summit Environmental Technologies, Inc. and that of the customer. It cannot be reproduced in any form without the consent of Summit Environmental Technologies, Inc. or the customer for which this report was issued. The results contained in this report are only representative of the samples received. Conditions can vary at different times and at different sampling conditions. Summit Environmental Technologies, Inc. is not responsible for use or interpretation of the data included herein.

All results for Solid Samples are reported on an "as received" or "wet weight" basis unless indicated as "dry weight" using the "-dry" designation on the reporting units.

This report is believed to meet all of the requirements of the accrediting agency, where applicable. Any comments or problems with the analytical events associated with this report are noted below.

Analytical Sequence Sample Notes:

23070477-010A Radium-228_NPW(904.0): Parent sample and duplicate exhibited a high RPD, both sample and duplicate are below PQL

REVISED REPORT 8/9/23: Corrected negative values for -005 & -009.

Revision v1

These commonly used Qualifiers and Acronyms may or may not be present in this report.

Qualifiers

U	The compound was analyzed for but was not detected above the MDL.
J	The reported value is greater than the Method Detection Limit but less than the Reporting Limit.
H	The hold time for sample preparation and/or analysis was exceeded. Not Clean Water Act compliant.
D	The result is reported from a dilution.
E	The result exceeded the linear range of the calibration or is estimated due to interference.
MC	The result is below the Minimum Compound Limit.
*	The result exceeds the Regulatory Limit or Maximum Contamination Limit.
m	Manual integration was used to determine the area response.
d	Manual integration in which peak was deleted
N	The result is presumptive based on a Mass Spectral library search assuming a 1:1 response.
P	The second column confirmation exceeded 25% difference.
C	The result has been confirmed by GC/MS.
X	The result was not confirmed when GC/MS Analysis was performed.
B	The analyte was detected in the Method Blank at a concentration greater than the RL.
MB+	The analyte was detected in the Method Blank at a concentration greater than the MDL.
G	The ICB or CCB contained reportable amounts of analyte.
QC-/+	The CCV recovery failed low (-) or high (+).
R/QDR	The RPD was outside of accepted recovery limits.
QL-/+	The LCS or LCSD recovery failed low (-) or high (+).
QLR	The LCS/LCSD RPD was outside of accepted recovery limits.
QM-/+	The MS or MSD recovery failed low (-) or high (+).
QMR	The MS/MSD RPD was outside of accepted recovery limits.
QV-/+	The ICV recovery failed low (-) or high (+).
S	The spike result was outside of accepted recovery limits.
W	Samples were received outside temperature limits (0° – 6° C). Not Clean Water Act compliant.
Z	Deviation; A deviation from the method was performed; Please refer to the Case Narrative for additional information

Acronyms

ND	Not Detected	RL	Reporting Limit
QC	Quality Control	MDL	Method Detection Limit
MB	Method Blank	LOD	Level of Detection
LCS	Laboratory Control Sample	LOQ	Level of Quantitation
LCSD	Laboratory Control Sample Duplicate	PQL	Practical Quantitation Limit
QCS	Quality Control Sample	CRQL	Contract Required Quantitation Limit
DUP	Duplicate	PL	Permit Limit
MS	Matrix Spike	RegLvl	Regulatory Limit
MSD	Matrix Spike Duplicate	MCL	Maximum Contamination Limit
RPD	Relative Percent Different	MinCL	Minimum Compound Limit
ICV	Initial Calibration Verification	RA	Reanalysis
ICB	Initial Calibration Blank	RE	Reextraction
CCV	Continuing Calibration Verification	TIC	Tentatively Identified Compound
CCB	Continuing Calibration Blank	RT	Retention Time
RLC	Reporting Limit Check	CF	Calibration Factor

This list of Qualifiers and Acronyms reflects the most commonly utilized Qualifiers and Acronyms for reporting. Please refer to the Analytical Notes in the Case Narrative for any Qualifiers or Acronyms that do not appear in this list or for additional information regarding the use of these Qualifiers on reported data.



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TEL: (330) 253-8211 FAX: (330) 253-4489
Website: <http://www.settek.com>

Workorder Sample Summary

WO#: 23070477

09-Aug-23

CLIENT: TEKLAB Inc,
Project: 23062071

Lab SampleID	Client Sample ID	Tag No	Date Collected	Date Received	Matrix
23070477-001	23062071-001		6/26/2023 9:00:00 AM	7/7/2023 1:30:00 PM	Non-Potable Water
23070477-002	23062071-002		6/26/2023 12:10:00 PM	7/7/2023 1:30:00 PM	Non-Potable Water
23070477-003	23062071-003		6/26/2023 2:15:00 PM	7/7/2023 1:30:00 PM	Non-Potable Water
23070477-004	23062071-004		6/26/2023 3:20:00 PM	7/7/2023 1:30:00 PM	Non-Potable Water
23070477-005	23062071-005		6/26/2023 5:00:00 PM	7/7/2023 1:30:00 PM	Non-Potable Water
23070477-006	23062071-006		6/26/2023 6:45:00 PM	7/7/2023 1:30:00 PM	Non-Potable Water
23070477-007	23062071-007		6/27/2023 9:10:00 AM	7/7/2023 1:30:00 PM	Non-Potable Water
23070477-008	23062071-008		6/27/2023 10:35:00 AM	7/7/2023 1:30:00 PM	Non-Potable Water
23070477-009	23062071-009		6/27/2023 12:15:00 PM	7/7/2023 1:30:00 PM	Non-Potable Water
23070477-010	23062071-010		6/27/2023 2:10:00 PM	7/7/2023 1:30:00 PM	Non-Potable Water
23070477-011	23062071-011		6/27/2023 3:20:00 PM	7/7/2023 1:30:00 PM	Non-Potable Water
23070477-012	23062071-012		6/27/2023 4:30:00 PM	7/7/2023 1:30:00 PM	Non-Potable Water
23070477-013	23062071-013		6/27/2023 5:35:00 PM	7/7/2023 1:30:00 PM	Non-Potable Water
23070477-014	23062071-014		6/27/2023 12:01:00 AM	7/7/2023 1:30:00 PM	Non-Potable Water
23070477-015	23062071-015		6/27/2023 12:02:00 AM	7/7/2023 1:30:00 PM	Non-Potable Water



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DATES REPORT

WO#: 23070477

09-Aug-23

Client: TEKLAB Inc,
Project: 23062071

Sample ID	Client Sample ID	Collection Date	Matrix	Test Name	Leachate Date	Prep Date	Analysis Date
23070477-001A	23062071-001	6/26/2023 9:00:00 AM	Non-Potable Water	Combined Radium (EPA903+904)			8/7/2023 8:05:48 AM
				Radium-226 (EPA 903.0)		7/12/2023 11:59:36 AM	7/18/2023 9:09:00 AM
				Radium-228 (EPA 904.0)		7/12/2023 11:59:36 AM	7/17/2023 3:33:00 PM
23070477-002A	23062071-002	6/26/2023 12:10:00 PM		Combined Radium (EPA903+904)			8/7/2023 8:05:48 AM
				Radium-226 (EPA 903.0)		7/12/2023 11:59:36 AM	7/18/2023 9:09:00 AM
				Radium-228 (EPA 904.0)		7/25/2023 12:57:10 PM	8/2/2023 3:10:00 PM
				Radium-228 (EPA 904.0)		7/12/2023 11:59:36 AM	7/17/2023 3:33:00 PM
23070477-003A	23062071-003	6/26/2023 2:15:00 PM		Combined Radium (EPA903+904)			8/7/2023 8:05:48 AM
				Radium-226 (EPA 903.0)		7/12/2023 11:59:36 AM	7/18/2023 9:09:00 AM
				Radium-228 (EPA 904.0)		7/12/2023 11:59:36 AM	7/17/2023 3:33:00 PM
23070477-004A	23062071-004	6/26/2023 3:20:00 PM		Combined Radium (EPA903+904)			8/7/2023 8:05:48 AM
				Radium-226 (EPA 903.0)		7/12/2023 11:59:36 AM	7/18/2023 9:09:00 AM
				Radium-228 (EPA 904.0)		7/12/2023 11:59:36 AM	7/17/2023 3:33:00 PM
23070477-005A	23062071-005	6/26/2023 5:00:00 PM		Combined Radium (EPA903+904)			8/7/2023 8:05:48 AM
				Radium-226 (EPA 903.0)		7/12/2023 11:59:36 AM	7/18/2023 9:09:00 AM
				Radium-228 (EPA 904.0)		7/25/2023 12:57:10 PM	8/2/2023 3:10:00 PM
				Radium-228 (EPA 904.0)		7/12/2023 11:59:36 AM	7/17/2023 3:33:00 PM
23070477-006A	23062071-006	6/26/2023 6:45:00 PM		Combined Radium (EPA903+904)			8/7/2023 8:05:48 AM
				Radium-226 (EPA 903.0)		7/12/2023 11:59:36 AM	7/18/2023 9:09:00 AM
				Radium-228 (EPA 904.0)		7/12/2023 11:59:36 AM	7/17/2023 3:33:00 PM
23070477-007A	23062071-007	6/27/2023 9:10:00 AM		Combined Radium (EPA903+904)			8/7/2023 8:05:48 AM
				Radium-226 (EPA 903.0)		7/12/2023 11:59:36 AM	7/18/2023 9:09:00 AM
				Radium-228 (EPA 904.0)		7/12/2023 11:59:36 AM	7/17/2023 3:33:00 PM

Revision v1



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DATES REPORT

WO#: 23070477

09-Aug-23

Client: TEKLAB Inc,
Project: 23062071

Sample ID	Client Sample ID	Collection Date	Matrix	Test Name	Leachate Date	Prep Date	Analysis Date
23070477-008A	23062071-008	6/27/2023 10:35:00 AM	Non-Potable Water	Combined Radium (EPA903+904)			8/7/2023 8:05:48 AM
				Radium-226 (EPA 903.0)		7/12/2023 11:59:36 AM	7/18/2023 9:09:00 AM
				Radium-228 (EPA 904.0)		7/12/2023 11:59:36 AM	7/17/2023 3:33:00 PM
				Radium-228 (EPA 904.0)		7/25/2023 12:57:10 PM	8/2/2023 3:10:00 PM
23070477-009A	23062071-009	6/27/2023 12:15:00 PM		Combined Radium (EPA903+904)			8/7/2023 8:05:48 AM
				Radium-226 (EPA 903.0)		7/12/2023 11:59:36 AM	7/18/2023 9:09:00 AM
				Radium-228 (EPA 904.0)		7/12/2023 11:59:36 AM	7/17/2023 3:33:00 PM
				Radium-228 (EPA 904.0)		7/25/2023 12:57:10 PM	8/2/2023 3:10:00 PM
23070477-010A	23062071-010	6/27/2023 2:10:00 PM		Combined Radium (EPA903+904)			8/7/2023 8:05:48 AM
				Radium-226 (EPA 903.0)		7/13/2023 12:34:34 PM	7/21/2023 9:43:00 AM
				Radium-228 (EPA 904.0)		7/13/2023 12:34:34 PM	7/20/2023 3:16:00 PM
23070477-011A	23062071-011	6/27/2023 3:20:00 PM		Combined Radium (EPA903+904)			8/7/2023 8:05:48 AM
				Radium-226 (EPA 903.0)		7/13/2023 12:34:34 PM	7/21/2023 9:43:00 AM
				Radium-228 (EPA 904.0)		7/13/2023 12:34:34 PM	7/20/2023 3:16:00 PM
23070477-012A	23062071-012	6/27/2023 4:30:00 PM		Combined Radium (EPA903+904)			8/7/2023 8:05:48 AM
				Radium-226 (EPA 903.0)		7/13/2023 12:34:34 PM	7/21/2023 9:43:00 AM
				Radium-228 (EPA 904.0)		7/13/2023 12:34:34 PM	7/20/2023 3:16:00 PM
23070477-013A	23062071-013	6/27/2023 5:35:00 PM		Combined Radium (EPA903+904)			8/7/2023 8:05:48 AM
				Radium-226 (EPA 903.0)		7/13/2023 12:34:34 PM	7/21/2023 9:43:00 AM
				Radium-228 (EPA 904.0)		7/13/2023 12:34:34 PM	7/20/2023 3:16:00 PM
23070477-014A	23062071-014	6/27/2023 12:01:00 AM		Combined Radium (EPA903+904)			8/7/2023 8:05:48 AM
				Radium-226 (EPA 903.0)		7/13/2023 12:34:34 PM	7/21/2023 9:43:00 AM
				Radium-228 (EPA 904.0)		7/13/2023 12:34:34 PM	7/20/2023 3:16:00 PM

Revision v1



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DATES REPORT

WO#: 23070477

09-Aug-23

Client: TEKLAB Inc,

Project: 23062071

Sample ID	Client Sample ID	Collection Date	Matrix	Test Name	Leachate Date	Prep Date	Analysis Date
23070477-015A	23062071-015	6/27/2023 12:02:00 AM	Non-Potable Water	Combined Radium (EPA903+904)			8/7/2023 8:05:48 AM
				Radium-226 (EPA 903.0)		7/13/2023 12:34:34 PM	7/21/2023 9:43:00 AM
				Radium-228 (EPA 904.0)		7/13/2023 12:34:34 PM	7/20/2023 3:16:00 PM

Revision v1



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Analytical Report

(consolidated)

WO#: 23070477

Date Reported: 8/9/2023

CLIENT: TEKLAB Inc, Collection Date: 6/26/2023 9:00:00 AM
Project: 23062071
Lab ID: 23070477-001 Matrix: NON-POTABLE WATER
Client Sample ID: 23062071-001

Analyses	Result	PQL	Qual	Units	Uncertainty	DF	Date Analyzed
RAD226/228 COMBINED RADIUM (EPA903+904)					CALCULATION		Analyst: CXS
Radium-226/Radium-228	2	2.00		pCi/L	± 0.87	1	8/7/2023 8:05:48 AM
RAD226/228 RADIUM-226 (EPA 903.0)					E903.0	E903-904	Analyst: HDJ
Radium-226	0.01	1.00	U	pCi/L	± 0.06	1	7/18/2023 9:09:00 AM
Yield	1					1	7/18/2023 9:09:00 AM
RAD226/228 RADIUM-228 (EPA 904.0)					E904.0	E903-904	Analyst: HDJ
Radium-228	1.99	1.00		pCi/L	± 0.81	1	7/17/2023 3:33:00 PM
Yield	1					1	7/17/2023 3:33:00 PM

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	M	Manual Integration used to determine area response
	MC	Value is below Minimum Compound Limit.	N	Tentatively identified compounds
	ND	Not Detected	OG1	
	P	Second column confirmation exceeds	PL	Permit Limit



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Analytical Report

(consolidated)

WO#: 23070477

Date Reported: 8/9/2023

CLIENT: TEKLAB Inc, **Collection Date:** 6/26/2023 12:10:00 PM
Project: 23062071
Lab ID: 23070477-002 **Matrix:** NON-POTABLE WATER
Client Sample ID: 23062071-002

Analyses	Result	PQL	Qual	Units	Uncertainty	DF	Date Analyzed
RAD226/228				CALCULATION		Analyst: CXS	
COMBINED RADIUM (EPA903+904)							
Radium-226/Radium-228	0.84	2.00	U	pCi/L	± 0.65	1	8/7/2023 8:05:48 AM
RAD226/228				E903.0	E903-904	Analyst: HDJ	
RADIUM-226 (EPA 903.0)							
Radium-226	0.23	1.00	U	pCi/L	± 0.11	1	7/18/2023 9:09:00 AM
Yield	1					1	7/18/2023 9:09:00 AM
RAD226/228				E904.0	E903-904	Analyst: HDJ	
RADIUM-228 (EPA 904.0)							
Radium-228	0.61	1.00	U	pCi/L	± 0.54	1	8/2/2023 3:10:00 PM
Yield	1					1	8/2/2023 3:10:00 PM

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	M	Manual Integration used to determine area response
	MC	Value is below Minimum Compound Limit.	N	Tentatively identified compounds
	ND	Not Detected	OG1	
	P	Second column confirmation exceeds	PL	Permit Limit



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Analytical Report

(consolidated)

WO#: 23070477

Date Reported: 8/9/2023

CLIENT: TEKLAB Inc,

Collection Date: 6/26/2023 2:15:00 PM

Project: 23062071

Lab ID: 23070477-003

Matrix: NON-POTABLE WATER

Client Sample ID: 23062071-003

Analyses	Result	PQL	Qual	Units	Uncertainty	DF	Date Analyzed
RAD226/228							
COMBINED RADIUM (EPA903+904)							Analyst: CXS
Radium-226/Radium-228	0.45	2.00	U	pCi/L	± 0.72	1	8/7/2023 8:05:48 AM
RAD226/228							
RADIUM-226 (EPA 903.0)							Analyst: HDJ
Radium-226	0.34	1.00	U	pCi/L	± 0.12	1	7/18/2023 9:09:00 AM
Yield	1					1	7/18/2023 9:09:00 AM
RAD226/228							
RADIUM-228 (EPA 904.0)							Analyst: HDJ
Radium-228	0.11	1.00	U	pCi/L	± 0.6	1	7/17/2023 3:33:00 PM
Yield	1					1	7/17/2023 3:33:00 PM

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	M	Manual Integration used to determine area response
	MC	Value is below Minimum Compound Limit.	N	Tentatively identified compounds
	ND	Not Detected	OG1	
	P	Second column confirmation exceeds	PL	Permit Limit



Summit Environmental Technologies, Inc.
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Analytical Report

(consolidated)

WO#: 23070477

Date Reported: 8/9/2023

CLIENT: TEKLAB Inc, Collection Date: 6/26/2023 3:20:00 PM
Project: 23062071
Lab ID: 23070477-004 Matrix: NON-POTABLE WATER
Client Sample ID: 23062071-004

Analyses	Result	PQL	Qual	Units	Uncertainty	DF	Date Analyzed
RAD226/228							
COMBINED RADIUM (EPA903+904)							Analyst: CXS
Radium-226/Radium-228	1.11	2.00	U	pCi/L	± 0.8	1	8/7/2023 8:05:48 AM
RAD226/228							
RADIUM-226 (EPA 903.0)							Analyst: HDJ
Radium-226	-0.01	1.00	U	pCi/L	± 0.06	1	7/18/2023 9:09:00 AM
Yield	1					1	7/18/2023 9:09:00 AM
RAD226/228							
RADIUM-228 (EPA 904.0)							Analyst: HDJ
Radium-228	1.11	1.00		pCi/L	± 0.74	1	7/17/2023 3:33:00 PM
Yield	1					1	7/17/2023 3:33:00 PM

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	M	Manual Integration used to determine area response
	MC	Value is below Minimum Compound Limit.	N	Tentatively identified compounds
	ND	Not Detected	OG1	
	P	Second column confirmation exceeds	PL	Permit Limit



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Analytical Report

(consolidated)

WO#: 23070477

Date Reported: 8/9/2023

CLIENT: TEKLAB Inc, Collection Date: 6/26/2023 5:00:00 PM
Project: 23062071
Lab ID: 23070477-005 Matrix: NON-POTABLE WATER
Client Sample ID: 23062071-005

Analyses	Result	PQL	Qual	Units	Uncertainty	DF	Date Analyzed
RAD226/228							
COMBINED RADIUM (EPA903+904)							Analyst: CXS
Radium-226/Radium-228	0.37	2.00	U	pCi/L	± 0.6	1	8/7/2023 8:05:48 AM
RAD226/228							
RADIUM-226 (EPA 903.0)							Analyst: HDJ
Radium-226	0.37	1.00	U	pCi/L	± 0.13	1	7/18/2023 9:09:00 AM
Yield	1					1	7/18/2023 9:09:00 AM
RAD226/228							
RADIUM-228 (EPA 904.0)							Analyst: HDJ
Radium-228	-0.18	1.00	U	pCi/L	± 0.47	1	8/2/2023 3:10:00 PM
Yield	1					1	8/2/2023 3:10:00 PM

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	M	Manual Integration used to determine area response
	MC	Value is below Minimum Compound Limit.	N	Tentatively identified compounds
	ND	Not Detected	OG1	
	P	Second column confirmation exceeds	PL	Permit Limit



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WO#: 23070477

Date Reported: 8/9/2023

CLIENT: TEKLAB Inc, Collection Date: 6/26/2023 6:45:00 PM
Project: 23062071
Lab ID: 23070477-006 Matrix: NON-POTABLE WATER
Client Sample ID: 23062071-006

Analyses	Result	PQL	Qual	Units	Uncertainty	DF	Date Analyzed
RAD226/228							
COMBINED RADIUM (EPA903+904)							Analyst: CXS
Radium-226/Radium-228	1.7	2.00	U	pCi/L	± 0.88	1	8/7/2023 8:05:48 AM
RAD226/228							
RADIUM-226 (EPA 903.0)							Analyst: HDJ
Radium-226	0.31	1.00	U	pCi/L	± 0.12	1	7/18/2023 9:09:00 AM
Yield	1					1	7/18/2023 9:09:00 AM
RAD226/228							
RADIUM-228 (EPA 904.0)							Analyst: HDJ
Radium-228	1.39	1.00		pCi/L	± 0.76	1	7/17/2023 3:33:00 PM
Yield	1					1	7/17/2023 3:33:00 PM

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	M	Manual Integration used to determine area response
	MC	Value is below Minimum Compound Limit.	N	Tentatively identified compounds
	ND	Not Detected	OG1	
	P	Second column confirmation exceeds	PL	Permit Limit



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Analytical Report

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WO#: 23070477

Date Reported: 8/9/2023

CLIENT: TEKLAB Inc, **Collection Date:** 6/27/2023 9:10:00 AM
Project: 23062071
Lab ID: 23070477-007 **Matrix:** NON-POTABLE WATER
Client Sample ID: 23062071-007

Analyses	Result	PQL	Qual	Units	Uncertainty	DF	Date Analyzed
RAD226/228					CALCULATION		Analyst: CXS
COMBINED RADIUM (EPA903+904)							
Radium-226/Radium-228	0.11	2.00	U	pCi/L	± 0.67	1	8/7/2023 8:05:48 AM
RAD226/228					E903.0	E903-904	Analyst: HDJ
RADIUM-226 (EPA 903.0)							
Radium-226	0.11	1.00	U	pCi/L	± 0.08	1	7/18/2023 9:09:00 AM
Yield	0.99					1	7/18/2023 9:09:00 AM
RAD226/228					E904.0	E903-904	Analyst: HDJ
RADIUM-228 (EPA 904.0)							
Radium-228	-0.03	1.00	U	pCi/L	± 0.59	1	7/17/2023 3:33:00 PM
Yield	1					1	7/17/2023 3:33:00 PM

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	M	Manual Integration used to determine area response
	MC	Value is below Minimum Compound Limit.	N	Tentatively identified compounds
	ND	Not Detected	OG1	
	P	Second column confirmation exceeds	PL	Permit Limit



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Analytical Report

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WO#: 23070477

Date Reported: 8/9/2023

CLIENT: TEKLAB Inc, Collection Date: 6/27/2023 10:35:00 AM
Project: 23062071
Lab ID: 23070477-008 Matrix: NON-POTABLE WATER
Client Sample ID: 23062071-008

Analyses	Result	PQL	Qual	Units	Uncertainty	DF	Date Analyzed
RAD226/228 COMBINED RADIUM (EPA903+904)					CALCULATION		Analyst: CXS
Radium-226/Radium-228	1.04	2.00	U	pCi/L	± 0.66	1	8/7/2023 8:05:48 AM
RAD226/228 RADIUM-226 (EPA 903.0)					E903.0	E903-904	Analyst: HDJ
Radium-226	0.3	1.00	U	pCi/L	± 0.12	1	7/18/2023 9:09:00 AM
Yield	1					1	7/18/2023 9:09:00 AM
RAD226/228 RADIUM-228 (EPA 904.0)					E904.0	E903-904	Analyst: HDJ
Radium-228	0.74	1.00	J	pCi/L	± 0.54	1	8/2/2023 3:10:00 PM
Yield	1					1	8/2/2023 3:10:00 PM

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	M	Manual Integration used to determine area response
	MC	Value is below Minimum Compound Limit.	N	Tentatively identified compounds
	ND	Not Detected	OG1	
	P	Second column confirmation exceeds	PL	Permit Limit



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Analytical Report

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WO#: 23070477

Date Reported: 8/9/2023

CLIENT: TEKLAB Inc,

Collection Date: 6/27/2023 12:15:00 PM

Project: 23062071

Lab ID: 23070477-009

Matrix: NON-POTABLE WATER

Client Sample ID: 23062071-009

Analyses	Result	PQL	Qual	Units	Uncertainty	DF	Date Analyzed
RAD226/228							
COMBINED RADIUM (EPA903+904)							Analyst: CXS
Radium-226/Radium-228	0.21	2.00	U	pCi/L	± 0.7	1	8/7/2023 8:05:48 AM
RAD226/228							
RADIUM-226 (EPA 903.0)							Analyst: HDJ
Radium-226	0.21	1.00	U	pCi/L	± 0.1	1	7/18/2023 9:09:00 AM
Yield	1					1	7/18/2023 9:09:00 AM
RAD226/228							
RADIUM-228 (EPA 904.0)							Analyst: HDJ
Radium-228	-0.42	1.00	U	pCi/L	± 0.6	1	8/2/2023 3:10:00 PM
Yield	0.99					1	8/2/2023 3:10:00 PM

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	M	Manual Integration used to determine area response
	MC	Value is below Minimum Compound Limit.	N	Tentatively identified compounds
	ND	Not Detected	OG1	
	P	Second column confirmation exceeds	PL	Permit Limit



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Analytical Report

(consolidated)

WO#: 23070477

Date Reported: 8/9/2023

CLIENT: TEKLAB Inc, **Collection Date:** 6/27/2023 2:10:00 PM
Project: 23062071
Lab ID: 23070477-010 **Matrix:** NON-POTABLE WATER
Client Sample ID: 23062071-010

Analyses	Result	PQL	Qual	Units	Uncertainty	DF	Date Analyzed
RAD226/228 COMBINED RADIUM (EPA903+904)					CALCULATION		Analyst: CXS
Radium-226/Radium-228	0.54	2.00	U	pCi/L	± 0.6	1	8/7/2023 8:05:48 AM
RAD226/228 RADIUM-226 (EPA 903.0)					E903.0	E903-904	Analyst: HDJ
Radium-226	0.23	1.00	U	pCi/L	± 0.1	1	7/21/2023 9:43:00 AM
Yield	1					1	7/21/2023 9:43:00 AM
RAD226/228 RADIUM-228 (EPA 904.0)					E904.0	E903-904	Analyst: HDJ
Radium-228	0.31	1.00	UQDR	pCi/L	± 0.5	1	7/20/2023 3:16:00 PM
Yield	1					1	7/20/2023 3:16:00 PM

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	M	Manual Integration used to determine area response
	MC	Value is below Minimum Compound Limit.	N	Tentatively identified compounds
	ND	Not Detected	OG1	
	P	Second column confirmation exceeds	PL	Permit Limit



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Analytical Report

(consolidated)

WO#: 23070477

Date Reported: 8/9/2023

CLIENT: TEKLAB Inc, Collection Date: 6/27/2023 3:20:00 PM
Project: 23062071
Lab ID: 23070477-011 Matrix: NON-POTABLE WATER
Client Sample ID: 23062071-011

Analyses	Result	PQL	Qual	Units	Uncertainty	DF	Date Analyzed
RAD226/228							
COMBINED RADIUM (EPA903+904)							Analyst: CXS
Radium-226/Radium-228	0.53	2.00	U	pCi/L	± 0.74	1	8/7/2023 8:05:48 AM
RAD226/228							
RADIUM-226 (EPA 903.0)							Analyst: HDJ
Radium-226	0.18	1.00	U	pCi/L	± 0.09	1	7/21/2023 9:43:00 AM
Yield	1					1	7/21/2023 9:43:00 AM
RAD226/228							
RADIUM-228 (EPA 904.0)							Analyst: HDJ
Radium-228	0.35	1.00	U	pCi/L	± 0.65	1	7/20/2023 3:16:00 PM
Yield	1					1	7/20/2023 3:16:00 PM

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	M	Manual Integration used to determine area response
	MC	Value is below Minimum Compound Limit.	N	Tentatively identified compounds
	ND	Not Detected	OG1	
	P	Second column confirmation exceeds	PL	Permit Limit



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Analytical Report

(consolidated)

WO#: 23070477

Date Reported: 8/9/2023

CLIENT: TEKLAB Inc,
Project: 23062071
Lab ID: 23070477-012
Client Sample ID: 23062071-012

Collection Date: 6/27/2023 4:30:00 PM

Matrix: NON-POTABLE WATER

Analyses	Result	PQL	Qual	Units	Uncertainty	DF	Date Analyzed
RAD226/228 COMBINED RADIUM (EPA903+904)					CALCULATION		Analyst: CXS
Radium-226/Radium-228	1.12	2.00	U	pCi/L	± 0.72	1	8/7/2023 8:05:48 AM
RAD226/228 RADIUM-226 (EPA 903.0)					E903.0	E903-904	Analyst: HDJ
Radium-226	0.27	1.00	U	pCi/L	± 0.11	1	7/21/2023 9:43:00 AM
Yield	1					1	7/21/2023 9:43:00 AM
RAD226/228 RADIUM-228 (EPA 904.0)					E904.0	E903-904	Analyst: HDJ
Radium-228	0.85	1.00	J	pCi/L	± 0.61	1	7/20/2023 3:16:00 PM
Yield	1					1	7/20/2023 3:16:00 PM

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	M	Manual Integration used to determine area response
	MC	Value is below Minimum Compound Limit.	N	Tentatively identified compounds
	ND	Not Detected	OG1	
	P	Second column confirmation exceeds	PL	Permit Limit



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Analytical Report

(consolidated)

WO#: 23070477

Date Reported: 8/9/2023

CLIENT: TEKLAB Inc, Collection Date: 6/27/2023 5:35:00 PM
Project: 23062071
Lab ID: 23070477-013 Matrix: NON-POTABLE WATER
Client Sample ID: 23062071-013

Analyses	Result	PQL	Qual	Units	Uncertainty	DF	Date Analyzed
RAD226/228							
COMBINED RADIUM (EPA903+904)							Analyst: CXS
Radium-226/Radium-228	1.25	2.00	U	pCi/L	± 0.8	1	8/7/2023 8:05:48 AM
RAD226/228							
RADIUM-226 (EPA 903.0)							Analyst: HDJ
Radium-226	0.33	1.00	U	pCi/L	± 0.12	1	7/21/2023 9:43:00 AM
Yield	1					1	7/21/2023 9:43:00 AM
RAD226/228							
RADIUM-228 (EPA 904.0)							Analyst: HDJ
Radium-228	0.92	1.00	J	pCi/L	± 0.68	1	7/20/2023 3:16:00 PM
Yield	0.92					1	7/20/2023 3:16:00 PM

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	M	Manual Integration used to determine area response
	MC	Value is below Minimum Compound Limit.	N	Tentatively identified compounds
	ND	Not Detected	OG1	
	P	Second column confirmation exceeds	PL	Permit Limit



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Analytical Report

(consolidated)

WO#: 23070477

Date Reported: 8/9/2023

CLIENT: TEKLAB Inc,
Project: 23062071
Lab ID: 23070477-014
Client Sample ID: 23062071-014

Collection Date: 6/27/2023 12:01:00 AM

Matrix: NON-POTABLE WATER

Analyses	Result	PQL	Qual	Units	Uncertainty	DF	Date Analyzed
RAD226/228 COMBINED RADIUM (EPA903+904)					CALCULATION		Analyst: CXS
Radium-226/Radium-228	0.72	2.00	U	pCi/L	± 0.75	1	8/7/2023 8:05:48 AM
RAD226/228 RADIUM-226 (EPA 903.0)					E903.0	E903-904	Analyst: HDJ
Radium-226	0.11	1.00	U	pCi/L	± 0.08	1	7/21/2023 9:43:00 AM
Yield	0.96					1	7/21/2023 9:43:00 AM
RAD226/228 RADIUM-228 (EPA 904.0)					E904.0	E903-904	Analyst: HDJ
Radium-228	0.61	1.00	U	pCi/L	± 0.67	1	7/20/2023 3:16:00 PM
Yield	1					1	7/20/2023 3:16:00 PM

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	M	Manual Integration used to determine area response
	MC	Value is below Minimum Compound Limit.	N	Tentatively identified compounds
	ND	Not Detected	OG1	
	P	Second column confirmation exceeds	PL	Permit Limit



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Analytical Report

(consolidated)

WO#: 23070477

Date Reported: 8/9/2023

CLIENT: TEKLAB Inc,
Project: 23062071
Lab ID: 23070477-015
Client Sample ID: 23062071-015

Collection Date: 6/27/2023 12:02:00 AM

Matrix: NON-POTABLE WATER

Analyses	Result	PQL	Qual	Units	Uncertainty	DF	Date Analyzed
RAD226/228 COMBINED RADIUM (EPA903+904)					CALCULATION		Analyst: CXS
Radium-226/Radium-228	0.13	2.00	U	pCi/L	± 0.59	1	8/7/2023 8:05:48 AM
RAD226/228 RADIUM-226 (EPA 903.0)					E903.0	E903-904	Analyst: HDJ
Radium-226	-0.05	1.00	U	pCi/L	± 0.07	1	7/21/2023 9:43:00 AM
Yield	1					1	7/21/2023 9:43:00 AM
RAD226/228 RADIUM-228 (EPA 904.0)					E904.0	E903-904	Analyst: HDJ
Radium-228	0.13	1.00	U	pCi/L	± 0.52	1	7/20/2023 3:16:00 PM
Yield	1					1	7/20/2023 3:16:00 PM

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	M	Manual Integration used to determine area response
	MC	Value is below Minimum Compound Limit.	N	Tentatively identified compounds
	ND	Not Detected	OG1	
	P	Second column confirmation exceeds	PL	Permit Limit



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QC SUMMARY REPORT

WO#: 23070477

09-Aug-23

Client: TEKLAB Inc,

Project: 23062071

BatchID: 66785

Sample ID: MB-66785	SampType: MBLK	TestCode: Radium-228_ Units: pCi/L				Prep Date: 7/12/2023				RunNo: 167598		
Client ID: PBW	Batch ID: 66785	TestNo: E904.0		E903-904		Analysis Date: 7/17/2023				SeqNo: 4496562		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	
Radium-228	ND	1.00		0	0						U	
Yield	1.00			0	0							

Sample ID: LCS-66785	SampType: LCS	TestCode: Radium-228_ Units: pCi/L				Prep Date: 7/12/2023			RunNo: 167598		
Client ID: LCSW	Batch ID: 66785	TestNo: E904.0		E903-904		Analysis Date: 7/17/2023			SeqNo: 4496563		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Radium-228	4.19	1.00	5.000	0	83.8	70	130				
Yield	0.800			0	0						

Sample ID: RLC-66785		SampType: RLC		TestCode: Radium-228_ Units: pCi/L		Prep Date: 7/12/2023			RunNo: 167598			
Client ID: BatchQC		Batch ID: 66785		TestNo: E904.0 E903-904		Analysis Date: 7/17/2023			SeqNo: 4496566			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Radium-228		0.840	1.00	1.000	0	84.0	50	150				J
Yield		0.840			0	0						

Qualifiers: B Analyte detected in the associated Method Blank E Value above quantitation range H Holding times for preparation or analy
J Analyte detected below quantitation limits M Manual Integration used to determine area response MC Value is below Minimum Compound
ND Not Detected OG1 P Second column confirmation exceeds
PL Permit Limit R RPD outside accepted recovery limits RL Reporting Detection Limit

Revision v1



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QC SUMMARY REPORT

WO#: 23070477

09-Aug-23

Client: TEKLAB Inc,

Project: 23062071

BatchID: 66785

Sample ID: RLCD-66785	SampType: RLC	TestCode: Radium-228_ Units: pCi/L				Prep Date: 7/12/2023			RunNo: 167598		
Client ID: BatchQC	Batch ID: 66785	TestNo: E904.0		E903-904		Analysis Date: 7/17/2023			SeqNo: 4496567		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Radium-228	4.24	1.00	1.000	0	424	50	150				S
Yield	0.890			0	0						

Sample ID: 23070127-001AMS		SampType: MS		TestCode: Radium-228_		Units: pCi/L		Prep Date: 7/12/2023		RunNo: 167598			
Client ID: BatchQC		Batch ID: 66785		TestNo: E904.0		E903-904		Analysis Date: 7/17/2023		SeqNo: 4496568			
Analyte		Result		PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Radium-228		2.57		1.00	5.000	0	51.4	70	130				S
Yield		0.970				1.000	0						

Sample ID: 23070149-001ADUP	SampType: DUP	TestCode: Radium-228_	Units: pCi/L	Prep Date: 7/12/2023	RunNo: 167598						
Client ID: BatchQC	Batch ID: 66785	TestNo: E904.0	E903-904	Analysis Date: 7/17/2023	SeqNo: 4496571						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Radium-228	ND	1.00		0	0			0	0	20	U
Yield	1.00			0	0			0.9400	6.19		

Qualifiers: B Analyte detected in the associated Method Blank
J Analyte detected below quantitation limits
ND Not Detected
PL Permit Limit

E Value above quantitation range
M Manual Integration used to determine area response
OG1
R RPD outside accepted recovery limits

H Holding times for preparation or analy
MC Value is below Minimum Compound
P Second column confirmation exceeds
RL Reporting Detection Limit

Revision v1



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QC SUMMARY REPORT

WO#: 23070477

09-Aug-23

Client: TEKLAB Inc,

Project: 23062071

BatchID: 66785

Sample ID: MB-66785		SampType: MBLK		TestCode: Radium-226_		Units: pCi/L		Prep Date: 7/12/2023		RunNo: 167616			
Client ID: PBW		Batch ID: 66785		TestNo: E903.0		E903-904		Analysis Date: 7/18/2023		SeqNo: 4497012			
Analyte		Result		PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Radium-226		ND		1.00									U
Yield		1.00											

Sample ID: LCS-66785	SampType: LCS	TestCode: Radium-226_ Units: pCi/L				Prep Date: 7/12/2023				RunNo: 167616		
Client ID: LCSW	Batch ID: 66785	TestNo: E903.0		E903-904		Analysis Date: 7/18/2023				SeqNo: 4497013		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	
Radium-226	5.08	1.00	5.000	0	102	70	130					

Sample ID: LCSD-66785	SampType: LCSD	TestCode: Radium-226_ Units: pCi/L				Prep Date: 7/12/2023			RunNo: 167616		
Client ID: LCSS02	Batch ID: 66785	TestNo: E903.0		E903-904		Analysis Date: 7/18/2023			SeqNo: 4497014		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Radium-226	5.20	1.00	5.000	0	104	70	130	5.080	2.33	20	

Sample ID: RLC-66785	SampType: RLC	TestCode: Radium-226_	Units: pCi/L	Prep Date: 7/12/2023	RunNo: 167616						
Client ID: BatchQC	Batch ID: 66785	TestNo: E903.0	E903-904	Analysis Date: 7/18/2023	SeqNo: 4497016						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Qualifiers: B Analyte detected in the associated Method Blank
J Analyte detected below quantitation limits
ND Not Detected
PL Permit Limit

E Value above quantitation range
M Manual Integration used to determine area response
OG1
R RPD outside accepted recovery limits

H Holding times for preparation or analy
MC Value is below Minimum Compound
P Second column confirmation exceeds
RL Reporting Detection Limit

Revision v1



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QC SUMMARY REPORT

WO#: 23070477

09-Aug-23

Client: TEKLAB Inc,

Project: 23062071

BatchID: 66785

Sample ID: RLC-66785	SampType: RLC	TestCode: Radium-226_ Units: pCi/L				Prep Date: 7/12/2023				RunNo: 167616		
Client ID: BatchQC	Batch ID: 66785	TestNo: E903.0		E903-904		Analysis Date: 7/18/2023				SeqNo: 4497016		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	
Radium-226	1.39	1.00	1.000	0	139	50	150					

Sample ID: RLCD-66785	SampType: RLC	TestCode: Radium-226_ Units: pCi/L				Prep Date: 7/12/2023				RunNo: 167616		
Client ID: BatchQC	Batch ID: 66785	TestNo: E903.0		E903-904		Analysis Date: 7/18/2023				SeqNo: 4497017		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	
Radium-226	1.05	1.00	1.000	0	105	50	150					

Sample ID: 23070127-001AMS		SampType: MS		TestCode: Radium-226_ Units: pCi/L		Prep Date: 7/12/2023			RunNo: 167616				
Client ID: BatchQC		Batch ID: 66785		TestNo: E903.0 E903-904		Analysis Date: 7/18/2023			SeqNo: 4497018				
Analyte		Result		PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Radium-226		6.10		1.00	5.000	0	122	70	130				

Sample ID: 23070149-001ADUP	SampType: DUP	TestCode: Radium-226_	Units: pCi/L	Prep Date: 7/12/2023	RunNo: 167616						
Client ID: BatchQC	Batch ID: 66785	TestNo: E903.0	E903-904	Analysis Date: 7/18/2023	SeqNo: 4497021						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Radium-226	ND	1.00						0	0	20	U

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analy
J	Analyte detected below quantitation limits	M	Manual Integration used to determine area response	MC	Value is below Minimum Compound
ND	Not Detected	OG1		P	Second column confirmation exceeds
PL	Permit Limit	R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

Revision v1



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QC SUMMARY REPORT

WO#: 23070477

09-Aug-23

Client: TEKLAB Inc,

Project: 23062071

BatchID: 66785

Sample ID: 23070149-001ADUP	SampType: DUP	TestCode: Radium-226_	Units: pCi/L	Prep Date: 7/12/2023	RunNo: 167616						
Client ID: BatchQC	Batch ID: 66785	TestNo: E903.0	E903-904	Analysis Date: 7/18/2023	SeqNo: 4497021						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Yield	1.00							1.000	0	0	

Sample ID: 23070155-001ADUP	SampType: DUP	TestCode: Radium-226_	Units: pCi/L	Prep Date: 7/12/2023	RunNo: 167616						
Client ID: BatchQC	Batch ID: 66785	TestNo: E903.0	E903-904	Analysis Date: 7/18/2023	SeqNo: 4497023						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Radium-226	ND	1.00						0	0	20	U
Yield	1.00							1.000	0	0	

Qualifiers: B Analyte detected in the associated Method Blank
J Analyte detected below quantitation limits
ND Not Detected
PL Permit Limit

E Value above quantitation range
M Manual Integration used to determine area response
OG1
R RPD outside accepted recovery limits

H Holding times for preparation or analy
MC Value is below Minimum Compound
P Second column confirmation exceeds
RL Reporting Detection Limit

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QC SUMMARY REPORT

WO#: 23070477

09-Aug-23

Client: TEKLAB Inc,

Project: 23062071

BatchID: 66816

Sample ID: 23070477-010ADUP	SampType: DUP	TestCode: Radium-228_	Units: pCi/L	Prep Date: 7/13/2023	RunNo: 167622						
Client ID: 23062071-010	Batch ID: 66816	TestNo: E904.0	E903-904	Analysis Date: 7/20/2023	SeqNo: 4497251						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Radium-228	0.97	1.00		0	0			0	200	30	JR
Yield	1			0	0			1.000	0		

Qualifiers: B Analyte detected in the associated Method Blank
J Analyte detected below quantitation limits
ND Not Detected
PL Permit Limit

E Value above quantitation range
M Manual Integration used to determine area response
OG1
R RPD outside accepted recovery limits

H Holding times for preparation or analy
MC Value is below Minimum Compound
P Second column confirmation exceeds
RL Reporting Detection Limit

Revision v1



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QC SUMMARY REPORT

WO#: 23070477

09-Aug-23

Client: TEKLAB Inc,

Project: 23062071

BatchID: 66816

Sample ID: MB-66816	SampType: MBLK	TestCode: Radium-228_ Units: pCi/L				Prep Date: 7/13/2023				RunNo: 167622		
Client ID: PBW	Batch ID: 66816	TestNo: E904.0		E903-904		Analysis Date: 7/20/2023				SeqNo: 4497240		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	
Radium-228	ND	1.00		0	0						U	
Yield	1.00			0	0							

Sample ID: LCS-66816	SampType: LCS	TestCode: Radium-228_ Units: pCi/L				Prep Date: 7/13/2023				RunNo: 167622		
Client ID: LCSW	Batch ID: 66816	TestNo: E904.0		E903-904		Analysis Date: 7/20/2023				SeqNo: 4497241		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	
Radium-228	6.04	1.00	5.000	0	121	70	130				QLR	
Yield	1.00			0	0							

Sample ID: LCSD-66816	SampType: LCSD	TestCode: Radium-228_ Units: pCi/L				Prep Date: 7/13/2023			RunNo: 167622		
Client ID: LCSS02	Batch ID: 66816	TestNo: E904.0		E903-904		Analysis Date: 7/20/2023			SeqNo: 4497242		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Radium-228	3.64	1.00	5.000	0	72.8	70	130	6.040	49.6	20	R
Yield	1.00			0	0			1.000	0		

Qualifiers: B Analyte detected in the associated Method Blank E Value above quantitation range H Holding times for preparation or analy
J Analyte detected below quantitation limits M Manual Integration used to determine area response MC Value is below Minimum Compound
ND Not Detected OG1 P Second column confirmation exceeds
PL Permit Limit R RPD outside accepted recovery limits RL Reporting Detection Limit

Revision v1



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QC SUMMARY REPORT

WO#: 23070477

09-Aug-23

Client: TEKLAB Inc,

Project: 23062071

BatchID: 66816

Sample ID: RLC-66816	SampType: RLC	TestCode: Radium-228_ Units: pCi/L				Prep Date: 7/13/2023			RunNo: 167622		
Client ID: BatchQC	Batch ID: 66816	TestNo: E904.0		E903-904		Analysis Date: 7/20/2023			SeqNo: 4497244		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Radium-228	ND	1.00	1.000	0	54.0	50	150				
Yield	0.220			0	0						

Sample ID: 23070591-001AMS	SampType: MS	TestCode: Radium-228_	Units: pCi/L	Prep Date: 7/13/2023	RunNo: 167622						
Client ID: BatchQC	Batch ID: 66816	TestNo: E904.0	E903-904	Analysis Date: 7/20/2023	SeqNo: 4497246						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Radium-228	2.03	1.00	5.000	0.9200	22.2	70	130				S
Yield	0.640			0.7800	0						

Sample ID: 23070592-001ADUP	SampType: DUP	TestCode: Radium-228_	Units: pCi/L	Prep Date: 7/13/2023	RunNo: 167622						
Client ID: BatchQC	Batch ID: 66816	TestNo: E904.0	E903-904	Analysis Date: 7/20/2023	SeqNo: 4497249						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Radium-228	0.760	1.00		0	0			0	200	20	JR
Yield	0.950			0	0			1.000	5.13		

Qualifiers: B Analyte detected in the associated Method Blank
J Analyte detected below quantitation limits
ND Not Detected
PL Permit Limit

E Value above quantitation range
M Manual Integration used to determine area response
OG1
R RPD outside accepted recovery limits

H Holding times for preparation or analy
MC Value is below Minimum Compound
P Second column confirmation exceeds
RL Reporting Detection Limit

Revision v1



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QC SUMMARY REPORT

WO#: 23070477

09-Aug-23

Client: TEKLAB Inc,

Project: 23062071

BatchID: 66816

Sample ID: 23070477-010ADUP	SampType: DUP	TestCode: Radium-226_	Units: pCi/L	Prep Date: 7/13/2023	RunNo: 167641						
Client ID: 23062071-010	Batch ID: 66816	TestNo: E903.0	E903-904	Analysis Date: 7/21/2023	SeqNo: 4497507						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Radium-226	0.12	1.00						0	0	30	U
Yield	0.99							1.000	1.01	0	

Qualifiers: B Analyte detected in the associated Method Blank
J Analyte detected below quantitation limits
ND Not Detected
PL Permit Limit

E Value above quantitation range
M Manual Integration used to determine area response
OG1
R RPD outside accepted recovery limits

H Holding times for preparation or analy
MC Value is below Minimum Compound
P Second column confirmation exceeds
RL Reporting Detection Limit

Revision v1



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QC SUMMARY REPORT

WO#: 23070477

09-Aug-23

Client: TEKLAB Inc,
Project: 23062071

BatchID: 66816

Sample ID: MB-66816	SampType: MBLK	TestCode: Radium-226_ Units: pCi/L			Prep Date: 7/13/2023				RunNo: 167641		
Client ID: PBW	Batch ID: 66816	TestNo: E903.0		E903-904		Analysis Date: 7/21/2023				SeqNo: 4497498	
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Radium-226	ND	1.00									U
Yield	1.00										

Sample ID: LCS-66816	SampType: LCS	TestCode: Radium-226_ Units: pCi/L			Prep Date: 7/13/2023				RunNo: 167641		
Client ID: LCSW	Batch ID: 66816	TestNo: E903.0		E903-904		Analysis Date: 7/21/2023				SeqNo: 4497499	
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Radium-226	6.33	1.00	5.000	0	127	70	130				

Sample ID: LCSD-66816	SampType: LCSD	TestCode: Radium-226_ Units: pCi/L				Prep Date: 7/13/2023			RunNo: 167641		
Client ID: LCSS02	Batch ID: 66816	TestNo: E903.0		E903-904		Analysis Date: 7/21/2023			SeqNo: 4497500		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Radium-226	5.86	1.00	5.000	0	117	70	130	6.330	7.71	20	

Sample ID: RLC-66816		SampType: RLC		TestCode: Radium-226_		Units: pCi/L		Prep Date: 7/13/2023		RunNo: 167641			
Client ID: BatchQC		Batch ID: 66816		TestNo: E903.0		E903-904		Analysis Date: 7/21/2023		SeqNo: 4497502			
Analyte		Result		PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Qualifiers: B Analyte detected in the associated Method Blank
J Analyte detected below quantitation limits
ND Not Detected
PL Permit Limit

E Value above quantitation range
M Manual Integration used to determine area response
OG1
R RPD outside accepted recovery limits

H Holding times for preparation or analy
MC Value is below Minimum Compound
P Second column confirmation exceeds
RL Reporting Detection Limit

Revision v1



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QC SUMMARY REPORT

WO#: 23070477

09-Aug-23

Client: TEKLAB Inc,

Project: 23062071

BatchID: 66816

Sample ID: RLC-66816	SampType: RLC	TestCode: Radium-226_	Units: pCi/L	Prep Date: 7/13/2023	RunNo: 167641						
Client ID: BatchQC	Batch ID: 66816	TestNo: E903.0	E903-904	Analysis Date: 7/21/2023	SeqNo: 4497502						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Radium-226	1.41	1.00	1.000	0	141	50	150				

Sample ID: RLCD-66816	SampType: RLC	TestCode: Radium-226_	Units: pCi/L	Prep Date: 7/13/2023	RunNo: 167641						
Client ID: BatchQC	Batch ID: 66816	TestNo: E903.0	E903-904	Analysis Date: 7/21/2023	SeqNo: 4497503						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Radium-226	1.00	1.00	1.000	0	100	50	150				

Qualifiers: B Analyte detected in the associated Method Blank
J Analyte detected below quantitation limits
ND Not Detected
PL Permit Limit

E Value above quantitation range
M Manual Integration used to determine area response
OG1
R RPD outside accepted recovery limits

H Holding times for preparation or analy
MC Value is below Minimum Compound
P Second column confirmation exceeds
RL Reporting Detection Limit

Revision v1



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QC SUMMARY REPORT

WO#: 23070477

09-Aug-23

Client: TEKLAB Inc,
Project: 23062071

BatchID: 67186

Sample ID: MB-67186	SampType: MBLK	TestCode: Radium-228_ Units: pCi/L				Prep Date: 7/25/2023				RunNo: 168446		
Client ID: PBW	Batch ID: 67186	TestNo: E904.0		E903-904		Analysis Date: 8/2/2023				SeqNo: 4522176		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	
Radium-228	ND	1.00		0	0						U	
Yield	0.780			0	0							

Sample ID: LCS-67186	SampType: LCS	TestCode: Radium-228_ Units: pCi/L				Prep Date: 7/25/2023			RunNo: 168446		
Client ID: LCSW	Batch ID: 67186	TestNo: E904.0		E903-904		Analysis Date: 8/2/2023			SeqNo: 4522177		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Radium-228	3.56	1.00	5.000	0	71.2	70	130				
Yield	1.00			0	0						

Sample ID: LCSD-67186	SampType: LCSD	TestCode: Radium-228_ Units: pCi/L				Prep Date: 7/25/2023			RunNo: 168446		
Client ID: LCSS02	Batch ID: 67186	TestNo: E904.0		E903-904		Analysis Date: 8/2/2023			SeqNo: 4522178		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Radium-228	4.06	1.00	5.000	0	81.2	70	130	3.560	13.1	20	
Yield	1.00			0	0			1.000	0		

Qualifiers: B Analyte detected in the associated Method Blank E Value above quantitation range H Holding times for preparation or analy
J Analyte detected below quantitation limits M Manual Integration used to determine area response MC Value is below Minimum Compound
ND Not Detected OG1 P Second column confirmation exceeds
PL Permit Limit R RPD outside accepted recovery limits RL Reporting Detection Limit

Revision v1



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QC SUMMARY REPORT

WO#: 23070477

09-Aug-23

Client: TEKLAB Inc,

Project: 23062071

BatchID: 67186

Sample ID: RLC-67186	SampType: RLC	TestCode: Radium-228_ Units: pCi/L				Prep Date: 7/25/2023			RunNo: 168446		
Client ID: BatchQC	Batch ID: 67186	TestNo: E904.0		E903-904		Analysis Date: 8/2/2023			SeqNo: 4522180		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Radium-228	ND	1.00	1.000	0	51.0	50	150				
Yield	0.640			0	0						

Sample ID: 23071399-001AMS	SampType: MS	TestCode: Radium-228_	Units: pCi/L	Prep Date: 7/25/2023	RunNo: 168446						
Client ID: BatchQC	Batch ID: 67186	TestNo: E904.0	E903-904	Analysis Date: 8/2/2023	SeqNo: 4522182						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Radium-228	3.73	1.00	5.000	0	74.6	70	130				
Yield	0.860			1.000	0						

Sample ID: 23071400-001ADUP	SampType: DUP	TestCode: Radium-228_	Units: pCi/L	Prep Date: 7/25/2023	RunNo: 168446						
Client ID: BatchQC	Batch ID: 67186	TestNo: E904.0	E903-904	Analysis Date: 8/2/2023	SeqNo: 4522185						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Radium-228	3.28	1.00		0	0			2.950	10.6	20	
Yield	1.00			0	0			1.000	0		

Qualifiers: B Analyte detected in the associated Method Blank
J Analyte detected below quantitation limits
ND Not Detected
PL Permit Limit

E Value above quantitation range
M Manual Integration used to determine area response
OG1
R RPD outside accepted recovery limits

H Holding times for preparation or analy
MC Value is below Minimum Compound
P Second column confirmation exceeds
RL Reporting Detection Limit

Revision v1



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TEL: (330) 253-8211 FAX: (330) 253-4489
Website: <http://www.settek.com>

QC SUMMARY REPORT

WO#: 23070477

09-Aug-23

Client: TEKLAB Inc,

Project: 23062071

BatchID: 67186

Sample ID: 23071401-001ADUP	SampType: DUP	TestCode: Radium-228_	Units: pCi/L	Prep Date: 7/25/2023	RunNo: 168446						
Client ID: BatchQC	Batch ID: 67186	TestNo: E904.0	E903-904	Analysis Date: 8/2/2023	SeqNo: 4522187						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Radium-228	ND	1.00		0	0			0	0	20	U
Yield	1.00			0	0			1.000	0		

Qualifiers: B Analyte detected in the associated Method Blank
J Analyte detected below quantitation limits
ND Not Detected
PL Permit Limit

E Value above quantitation range
M Manual Integration used to determine area response
OG1
R RPD outside accepted recovery limits

H Holding times for preparation or analy
MC Value is below Minimum Compound
P Second column confirmation exceeds
RL Reporting Detection Limit

Revision v1

Lab Use	Sample ID	Sample Date/Time	Preservative	Matrix
	23062071-001	6/26/23 9.00	HNO3	Groundwater
	23062071-002	6/26/23 12.10	HNO3	Groundwater
	23062071-003	6/26/23 14.15	HNO3	Groundwater
	23062071-004	6/26/23 15.20	HNO3	Groundwater
	23062071-005	6/26/23 17.00	HNO3	Groundwater
	23062071-006	6/26/23 18.45	HNO3	Groundwater
	23062071-007	6/27/23 9.10	HNO3	Groundwater
	23062071-008	6/27/23 10.35	HNO3	Groundwater
	23062071-009	6/27/23 12.15	HNO3	Groundwater
	23062071-010	6/27/23 14.10	HNO3	Groundwater
	23062071-011	6/27/23 15.20	HNO3	Groundwater

PLEASE NOTE:

NELAP accreditation is required on the requested analytes and must be documented as such on the final report. If your laboratory does not currently hold a NELAP accreditation for the requested method and/or analytes, please contact Teklab immediately. If your laboratory loses accreditation or is suspended for any analyte/method during the life of the contract, you must contact Teklab immediately.

Changes to analysis methods must be approved by Teklab, Inc.

Radium 226	Radium 228	Combined Radium	pH	CPM	
✓	✓	✓	1.1	31	36
✓	✓	✓	1.1	33	28
✓	✓	✓	1.1	32	26
✓	✓	✓	1.1	93	47
✓	✓	✓	1.1	28	27
✓	✓	✓	1.1	33	32
✓	✓	✓	1.1	28	37
✓	✓	✓	1.1	41	16
✓	✓	✓	1.1	18	21
✓	✓	✓	1.1	33	43
✓	✓	✓	1.1	19	12

[illegible]

20.7+0.0=20.7 *Feder case*

TEKLAB, INC. Chain of Custody

5445 Horseshoe Lake Road, Collinsville, IL 62234 Phone (618) 344-1004 Fax (618) 344-1005

Are the samples chilled? YES ☐ NO ☒

With: ☐ Ice ☐ Blue Ice

Preserved in: ☐ Lab ☐ Field

Teklab Inc

5445 Horseshoe Lake Road
Collinsville, IL 62234

Cooler Temp: [

Sampler:

Comments: **Please Issue reports and invoices via email only**

Please analyze for Radium (226, 228, and combined) by method EPA903.0/904.0

Project# 23062071

Contact: Elizabeth Hurley

Email: phurley@teklabinc.com

Requested Due Date: 20 business days or less

Billing/PO: 34627

Phone: 618-344-1004 ext. 33

State of Origin: ~~WA~~ IL

PLEASE NOTE:

NELAP accreditation is required on the requested analytes and must be documented as such on the final report. If your laboratory does not currently hold a NELAP accreditation for the requested method and/or analytes, please contact Teklab immediately. If your laboratory loses accreditation or is suspended for any analyte/method during the life of the contract, you must contact Teklab immediately.

Changes to analysis/methods must be approved by Teklab, Inc.

[illegible]

***Relinquished By**

Date/Time

Received By

Date/Time

Teklab maintains a strict policy of client confidentiality and as such does not provide client's sampler information without proper authorization, and proprietary rights, Teklab Inc. protects clients' confidential information as directed by local, state or federal laws. (Taktak QAM Section 9.1; TNI V1 M2 Section 4.1.5 c)

SubCotRevA
3/2/2018



Summit Environmental Technologies, Inc.
3310 Win St.
Cuyahoga Falls, Ohio 44223
TEL: (330) 253-8211 FAX: (330) 253-4489
Website: <http://www.settek.com>

Sample Log-In Check List

Client Name: **TEK-IL-62234-A**

Work Order Number: **23070477**

RcptNo: **1**

Logged by: **Anthony W. Britton** 7/7/2023 1:30:00 PM

Anthony Britton

Completed By: **Jacqueline Rasile** 7/11/2023 12:09:49 AM

Jacqueline Rasile

Reviewed By: **Jennifer Woolf** 7/12/2023 10:24:31 AM

Jennifer Woolf

Chain of Custody

1. Were seals intact? Yes ☒ No ☐ Not Present ☐
2. Is Chain of Custody complete? Yes ☒ No ☐ Not Present ☐
3. How was the sample delivered? FedEx

Log In

4. Coolers are present? Yes ☒ No ☐ NA ☐
5. Was an attempt made to cool the samples? Yes ☐ No ☐ NA ☒
6. Were all samples received at a temperature of $>0^{\circ}\text{C}$ to 6.0°C ? Yes ☐ No ☐ NA ☒
7. Sample(s) in proper container(s)? Yes ☒ No ☐
8. Sufficient sample volume for indicated test(s)? Yes ☒ No ☐
9. Are samples (except VOA and ONG) properly preserved? Yes ☒ No ☐
10. Was preservative added to bottles? Yes ☐ No ☒ NA ☐
11. Is the headspace in the VOA vials less than 1/4 inch or 6 mm? Yes ☐ No ☐ No VOA Vials ☒
12. Were any sample containers received broken? Yes ☐ No ☒
13. Does paperwork match bottle labels?
(Note discrepancies on chain of custody) Yes ☒ No ☐
14. Are matrices correctly identified on Chain of Custody? Yes ☒ No ☐
15. Is it clear what analyses were requested? Yes ☒ No ☐
16. Were all holding times able to be met?
(If no, notify customer for authorization.) Yes ☒ No ☐

Special Handling (if applicable)

17. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☒

Person Notified: Date:
By Whom: Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person
Regarding:
Client Instructions:

18. Additional remarks:

Cooler Information

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	20.7	Good	Not Present			

October 30, 2023

Clay Sansoucie
ERM
1968 Craig Road
Suite 100
St. Louis, MO 63146
TEL: (314) 956-0269
FAX:



Illinois	100226
Kansas	E-10374
Louisiana	05002
Louisiana	05003
Oklahoma	9978

RE: 0599247

WorkOrder: 23091500

Dear Clay Sansoucie:

TEKLAB, INC received 15 samples on 9/21/2023 9:45:00 AM for the analysis presented in the following report.

Samples are analyzed on an as received basis unless otherwise requested and documented. The sample results contained in this report relate only to the requested analytes of interest as directed on the chain of custody. NELAP accredited fields of testing are indicated by the letters NELAP under the Certification column. Unless otherwise documented within this report, Teklab Inc. analyzes samples utilizing the most current methods in compliance with 40CFR. All tests are performed in the Collinsville, IL laboratory unless otherwise noted in the Case Narrative.

All quality control criteria applicable to the test methods employed for this project have been satisfactorily met and are in accordance with NELAP except where noted. The following report shall not be reproduced, except in full, without the written approval of Teklab, Inc.

If you have any questions regarding these tests results, please feel free to call.

Sincerely,



Elizabeth A. Hurley
Director of Customer Service
(618)344-1004 ex 33
ehurley@teklabinc.com

Client: ERM

Work Order: 23091500

Client Project: 0599247

Report Date: 30-Oct-23

This reporting package includes the following:

Cover Letter	1
Report Contents	2
Definitions	3
Case Narrative	5
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Quality Control Results	31
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Chain of Custody	Appended

Client: ERM

Work Order: 23091500

Client Project: 0599247

Report Date: 30-Oct-23

Abbr Definition

* Analytes on report marked with an asterisk are not NELAP accredited

CCV Continuing calibration verification is a check of a standard to determine the state of calibration of an instrument between recalibration.

CRQL A Client Requested Quantitation Limit is a reporting limit that varies according to customer request. The CRQL may not be less than the MDL.

DF Dilution factor is the dilution performed during analysis only and does not take into account any dilutions made during sample preparation. The reported result is final and includes all dilution factors.

DNI Did not ignite

DUP Laboratory duplicate is a replicate aliquot prepared under the same laboratory conditions and independently analyzed to obtain a measure of precision.

ICV Initial calibration verification is a check of a standard to determine the state of calibration of an instrument before sample analysis is initiated.

IDPH IL Dept. of Public Health

LCS Laboratory control sample is a sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes and analyzed exactly like a sample to establish intra-laboratory or analyst specific precision and bias or to assess the performance of all or a portion of the measurement system.

LCSD Laboratory control sample duplicate is a replicate laboratory control sample that is prepared and analyzed in order to determine the precision of the approved test method. The acceptable recovery range is listed in the QC Package (provided upon request).

MBLK Method blank is a sample of a matrix similar to the batch of associated sample (when available) that is free from the analytes of interest and is processed simultaneously with and under the same conditions as samples through all steps of the analytical procedures, and in which no target analytes or interferences should present at concentrations that impact the analytical results for sample analyses.

MDL "The method detection limit is defined as the minimum measured concentration of a substance that can be reported with 99% confidence that the measured concentration is distinguishable from method blank results."

MS Matrix spike is an aliquot of matrix fortified (spiked) with known quantities of specific analytes that is subjected to the entire analytical procedures in order to determine the effect of the matrix on an approved test method's recovery system. The acceptable recovery range is listed in the QC Package (provided upon request).

MSD Matrix spike duplicate means a replicate matrix spike that is prepared and analyzed in order to determine the precision of the approved test method. The acceptable recovery range is listed in the QC Package (provided upon request).

MW Molecular weight

NC Data is not acceptable for compliance purposes

ND Not Detected at the Reporting Limit

NELAP NELAP Accredited

PQL Practical quantitation limit means the lowest level that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operation conditions.

RL The reporting limit the lowest level that the data is displayed in the final report. The reporting limit may vary according to customer request or sample dilution. The reporting limit may not be less than the MDL.

RPD Relative percent difference is a calculated difference between two recoveries (ie. MS/MSD). The acceptable recovery limit is listed in the QC Package (provided upon request).

SPK The spike is a known mass of target analyte added to a blank sample or sub-sample; used to determine recovery deficiency or for other quality control purposes.

Surr Surrogates are compounds which are similar to the analytes of interest in chemical composition and behavior in the analytical process, but which are not normally found in environmental samples.

TIC Tentatively identified compound: Analytes tentatively identified in the sample by using a library search. Only results not in the calibration standard will be reported as tentatively identified compounds. Results for tentatively identified compounds that are not present in the calibration standard, but are assigned a specific chemical name based upon the library search, are calculated using total peak areas from reconstructed ion chromatograms and a response factor of one. The nearest Internal Standard is used for the calculation. The results of any TICs must be considered estimated, and are flagged with a "T". If the estimated result is above the calibration range it is flagged "ET"

TNTC Too numerous to count (> 200 CFU)

Client: ERM

Work Order: 23091500

Client Project: 0599247

Report Date: 30-Oct-23

Qualifiers

# - Unknown hydrocarbon	B - Analyte detected in associated Method Blank
C - RL shown is a Client Requested Quantitation Limit	E - Value above quantitation range
H - Holding times exceeded	I - Associated internal standard was outside method criteria
J - Analyte detected below quantitation limits	M - Manual Integration used to determine area response
ND - Not Detected at the Reporting Limit	R - RPD outside accepted recovery limits
S - Spike Recovery outside recovery limits	T - TIC(Tentatively identified compound)
X - Value exceeds Maximum Contaminant Level	



Case Narrative

<http://www.teklabinc.com/>

Client: ERM

Work Order: 23091500

Client Project: 0599247

Report Date: 30-Oct-23

Cooler Receipt Temp: 3.4 °C

Ra226/228 analyses were performed by Summit Environmental Technologies, Inc. See attached report for results and QC.

Locations

Collinsville

Address 5445 Horseshoe Lake Road
Collinsville, IL 62234-7425
Phone (618) 344-1004
Fax (618) 344-1005
Email jhriley@teklabinc.com

Collinsville Air

Address 5445 Horseshoe Lake Road
Collinsville, IL 62234-7425
Phone (618) 344-1004
Fax (618) 344-1005
Email EHurley@teklabinc.com

Springfield

Address 3920 Pintail Dr
Springfield, IL 62711-9415
Phone (217) 698-1004
Fax (217) 698-1005
Email KKlostermann@teklabinc.com

Chicago

Address 1319 Butterfield Rd.
Downers Grove, IL 60515
Phone (630) 324-6855
Fax
Email arenner@teklabinc.com

Kansas City

Address 8421 Nieman Road
Lenexa, KS 66214
Phone (913) 541-1998
Fax (913) 541-1998
Email jhriley@teklabinc.com

Client: ERM**Work Order:** 23091500**Client Project:** 0599247**Report Date:** 30-Oct-23

State	Dept	Cert #	NELAP	Exp Date	Lab
Illinois	IEPA	100226	NELAP	1/31/2024	Collinsville
Kansas	KDHE	E-10374	NELAP	4/30/2024	Collinsville
Louisiana	LDEQ	05002	NELAP	6/30/2024	Collinsville
Louisiana	LDEQ	05003	NELAP	6/30/2024	Collinsville
Oklahoma	ODEQ	9978	NELAP	8/31/2024	Collinsville
Arkansas	ADEQ	88-0966		3/14/2024	Collinsville
Illinois	IDPH	17584		5/31/2025	Collinsville
Iowa	IDNR	430		6/1/2024	Collinsville
Kentucky	UST	0073		1/31/2024	Collinsville
Missouri	MDNR	00930		5/31/2023	Collinsville
Missouri	MDNR	930		1/31/2025	Collinsville

Client: ERM
Client Project: 0599247

Work Order: 23091500
Report Date: 30-Oct-23

Lab ID: 23091500-001

Client Sample ID: APW-03-WG-20230919

Matrix: GROUNDWATER

Collection Date: 09/19/2023 11:35

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	20		636	mg/L	1	09/21/2023 15:53	R336743
SW-846 9036 (TOTAL)								
Sulfate	NELAP	100		280	mg/L	10	09/22/2023 17:36	R336796
SW-846 9040B, LABORATORY ANALYZED								
Lab pH	NELAP	1.00	H	7.84		1	09/27/2023 14:06	R336927
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		0.25	mg/L	1	09/26/2023 11:11	R336875
SW-846 9251 (TOTAL)								
Chloride	NELAP	4		16	mg/L	1	09/22/2023 17:30	R336801
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	09/25/2023 18:04	212291
Arsenic	NELAP	0.0010		0.0019	mg/L	5	09/25/2023 18:04	212291
Barium	NELAP	0.0010		0.136	mg/L	5	09/25/2023 18:04	212291
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	10/02/2023 13:29	212291
Boron	NELAP	0.0250		4.11	mg/L	5	09/25/2023 18:04	212291
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	09/25/2023 18:04	212291
Calcium	NELAP	0.125		137	mg/L	5	09/29/2023 14:29	212291
Chromium	NELAP	0.0015		< 0.0015	mg/L	5	09/25/2023 18:04	212291
Cobalt	NELAP	0.0010		< 0.0010	mg/L	5	09/25/2023 18:04	212291
Lead	NELAP	0.0010		< 0.0010	mg/L	5	09/25/2023 18:04	212291
Lithium	*	0.0030		0.0406	mg/L	5	10/02/2023 13:29	212291
Molybdenum	*	0.0015		0.0487	mg/L	5	09/25/2023 18:04	212291
Selenium	NELAP	0.0010		< 0.0010	mg/L	5	09/25/2023 18:04	212291
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	09/25/2023 18:04	212291
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	09/26/2023 23:46	212304
Arsenic	NELAP	0.0010		0.0017	mg/L	5	09/26/2023 23:46	212304
Barium	NELAP	0.0010		0.137	mg/L	5	09/26/2023 23:46	212304
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	09/26/2023 23:46	212304
Boron	NELAP	0.0250	S	4.19	mg/L	5	09/28/2023 10:48	212304
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	09/26/2023 23:46	212304
Calcium	NELAP	0.125	S	124	mg/L	5	09/26/2023 23:46	212304
Chromium	NELAP	0.0015		< 0.0015	mg/L	5	09/26/2023 23:46	212304
Cobalt	NELAP	0.0010		< 0.0010	mg/L	5	09/26/2023 23:46	212304
Lead	NELAP	0.0010		< 0.0010	mg/L	5	09/26/2023 23:46	212304
Lithium	*	0.0030		0.0312	mg/L	5	09/26/2023 23:46	212304
Molybdenum	*	0.0015		0.0558	mg/L	5	09/26/2023 23:46	212304
Selenium	NELAP	0.0010		< 0.0010	mg/L	5	09/26/2023 23:46	212304
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	09/26/2023 23:46	212304
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		< 0.00020	mg/L	1	09/26/2023 15:11	212412
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		See Attached	pci/L	1	10/13/2023 14:22	R338467
Radium-228	*	0		See Attached	pci/L	1	10/13/2023 14:22	R338467

Matrix spike control limits are not applicable due to high sample/spike ratio.

Client: ERM
Client Project: 0599247

Work Order: 23091500
Report Date: 30-Oct-23

Lab ID: 23091500-002

Client Sample ID: APW-08-WG-20230919

Matrix: GROUNDWATER

Collection Date: 09/19/2023 12:55

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	50		440	mg/L	2.5	09/21/2023 15:54	R336743
SW-846 9036 (TOTAL)								
Sulfate	NELAP	10		23	mg/L	1	09/22/2023 17:54	R336796
SW-846 9040B, LABORATORY ANALYZED								
Lab pH	NELAP	1.00	H	7.16		1	09/27/2023 14:07	R336927
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		0.26	mg/L	1	09/26/2023 11:13	R336875
SW-846 9251 (TOTAL)								
Chloride	NELAP	4		10	mg/L	1	09/22/2023 17:54	R336801
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	09/25/2023 18:23	212291
Arsenic	NELAP	0.0010		0.0014	mg/L	5	09/25/2023 18:23	212291
Barium	NELAP	0.0010		0.236	mg/L	5	10/02/2023 14:13	212291
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	10/02/2023 14:13	212291
Boron	NELAP	0.0250		0.117	mg/L	5	09/25/2023 18:23	212291
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	09/25/2023 18:23	212291
Calcium	NELAP	0.125	S	94.1	mg/L	5	09/29/2023 16:11	212291
Chromium	NELAP	0.0015		< 0.0015	mg/L	5	09/25/2023 18:23	212291
Cobalt	NELAP	0.0010		< 0.0010	mg/L	5	09/25/2023 18:23	212291
Lead	NELAP	0.0010		< 0.0010	mg/L	5	09/25/2023 18:23	212291
Lithium	*	0.0030		0.0220	mg/L	5	10/02/2023 14:13	212291
Molybdenum	*	0.0015		< 0.0015	mg/L	5	09/25/2023 18:23	212291
Selenium	NELAP	0.0010		0.0121	mg/L	5	09/25/2023 18:23	212291
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	09/29/2023 16:11	212291
<i>Matrix spike control limits are not applicable due to high sample/spike ratio.</i>								
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	09/26/2023 23:29	212304
Arsenic	NELAP	0.0010		0.0018	mg/L	5	09/26/2023 23:29	212304
Barium	NELAP	0.0010		0.199	mg/L	5	09/26/2023 23:29	212304
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	09/26/2023 23:29	212304
Boron	NELAP	0.0250		0.116	mg/L	5	09/28/2023 9:13	212304
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	09/26/2023 23:29	212304
Calcium	NELAP	0.125		86.4	mg/L	5	09/26/2023 23:29	212304
Chromium	NELAP	0.0015		0.0031	mg/L	5	09/26/2023 23:29	212304
Cobalt	NELAP	0.0010		0.0014	mg/L	5	09/26/2023 23:29	212304
Lead	NELAP	0.0010		0.0015	mg/L	5	09/26/2023 23:29	212304
Lithium	*	0.0030		0.0177	mg/L	5	09/26/2023 23:29	212304
Molybdenum	*	0.0015		< 0.0015	mg/L	5	09/26/2023 23:29	212304
Selenium	NELAP	0.0010		0.0122	mg/L	5	09/26/2023 23:29	212304
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	09/26/2023 23:29	212304
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		< 0.00020	mg/L	1	09/26/2023 15:13	212412
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		See Attached	pci/L	1	10/13/2023 14:22	R338467
Radium-228	*	0		See Attached	pci/L	1	10/13/2023 14:22	R338467

Client: ERM
Client Project: 0599247

Work Order: 23091500
Report Date: 30-Oct-23

Lab ID: 23091500-003

Client Sample ID: APW-07-WG-20230919

Matrix: GROUNDWATER

Collection Date: 09/19/2023 13:50

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	50		740	mg/L	2.5	09/21/2023 15:54	R336743
SW-846 9036 (TOTAL)								
Sulfate	NELAP	10		44	mg/L	1	09/22/2023 18:02	R336796
SW-846 9040B, LABORATORY ANALYZED								
Lab pH	NELAP	1.00	H	6.94		1	09/27/2023 14:09	R336927
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		0.18	mg/L	1	09/26/2023 11:15	R336875
SW-846 9251 (TOTAL)								
Chloride	NELAP	4		9	mg/L	1	09/22/2023 18:02	R336801
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	09/25/2023 18:10	212291
Arsenic	NELAP	0.0010		0.0013	mg/L	5	09/29/2023 14:35	212291
Barium	NELAP	0.0010		0.336	mg/L	5	09/25/2023 18:10	212291
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	10/02/2023 13:35	212291
Boron	NELAP	0.0250		0.192	mg/L	5	09/25/2023 18:10	212291
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	09/25/2023 18:10	212291
Calcium	NELAP	0.125		196	mg/L	5	09/29/2023 14:35	212291
Chromium	NELAP	0.0015		< 0.0015	mg/L	5	09/25/2023 18:10	212291
Cobalt	NELAP	0.0010		< 0.0010	mg/L	5	09/25/2023 18:10	212291
Lead	NELAP	0.0010		< 0.0010	mg/L	5	09/25/2023 18:10	212291
Lithium	*	0.0030		0.0184	mg/L	5	10/02/2023 13:35	212291
Molybdenum	*	0.0015		0.0029	mg/L	5	09/25/2023 18:10	212291
Selenium	NELAP	0.0010		< 0.0010	mg/L	5	09/25/2023 18:10	212291
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	09/25/2023 18:10	212291
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	09/26/2023 23:35	212304
Arsenic	NELAP	0.0010		0.0018	mg/L	5	09/26/2023 23:35	212304
Barium	NELAP	0.0010		0.303	mg/L	5	09/26/2023 23:35	212304
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	09/26/2023 23:35	212304
Boron	NELAP	0.0250		0.181	mg/L	5	09/28/2023 9:18	212304
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	09/26/2023 23:35	212304
Calcium	NELAP	0.125		161	mg/L	5	09/26/2023 23:35	212304
Chromium	NELAP	0.0015		0.0057	mg/L	5	09/26/2023 23:35	212304
Cobalt	NELAP	0.0010		< 0.0010	mg/L	5	09/26/2023 23:35	212304
Lead	NELAP	0.0010		< 0.0010	mg/L	5	09/26/2023 23:35	212304
Lithium	*	0.0030		0.0141	mg/L	5	09/26/2023 23:35	212304
Molybdenum	*	0.0015		0.0029	mg/L	5	09/26/2023 23:35	212304
Selenium	NELAP	0.0010		< 0.0010	mg/L	5	09/26/2023 23:35	212304
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	09/26/2023 23:35	212304
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		< 0.00020	mg/L	1	09/26/2023 15:20	212412
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		See Attached	pci/L	1	10/13/2023 14:22	R338467
Radium-228	*	0		See Attached	pci/L	1	10/13/2023 14:22	R338467

Client: ERM
Client Project: 0599247

Work Order: 23091500
Report Date: 30-Oct-23

Lab ID: 23091500-004

Client Sample ID: APW-10S-WG-20230919

Matrix: GROUNDWATER

Collection Date: 09/19/2023 14:50

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	50		775	mg/L	2.5	09/21/2023 16:05	R336743
SW-846 9036 (TOTAL)								
Sulfate	NELAP	10	S	< 10	mg/L	1	09/22/2023 18:13	R336796
<i>Matrix spike did not recover within control limits due to matrix interference.</i>								
SW-846 9040B, LABORATORY ANALYZED								
Lab pH	NELAP	1.00	H	7.17		1	09/27/2023 14:12	R336927
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		0.16	mg/L	1	09/26/2023 11:16	R336875
SW-846 9251 (TOTAL)								
Chloride	NELAP	4		15	mg/L	1	09/22/2023 18:13	R336801
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	09/25/2023 18:16	212291
Arsenic	NELAP	0.0010		0.176	mg/L	5	09/25/2023 18:16	212291
Barium	NELAP	0.0010		0.567	mg/L	5	09/25/2023 18:16	212291
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	10/02/2023 13:42	212291
Boron	NELAP	0.0250		0.571	mg/L	5	09/25/2023 18:16	212291
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	09/25/2023 18:16	212291
Calcium	NELAP	0.125		151	mg/L	5	09/29/2023 15:26	212291
Chromium	NELAP	0.0015		< 0.0015	mg/L	5	09/25/2023 18:16	212291
Cobalt	NELAP	0.0010		< 0.0010	mg/L	5	09/25/2023 18:16	212291
Lead	NELAP	0.0010		< 0.0010	mg/L	5	09/25/2023 18:16	212291
Lithium	*	0.0030		0.0349	mg/L	5	10/02/2023 13:42	212291
Molybdenum	*	0.0015		< 0.0015	mg/L	5	09/25/2023 18:16	212291
Selenium	NELAP	0.0010		< 0.0010	mg/L	5	09/25/2023 18:16	212291
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	09/25/2023 18:16	212291
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	09/26/2023 23:40	212304
Arsenic	NELAP	0.0010		0.174	mg/L	5	09/26/2023 23:40	212304
Barium	NELAP	0.0010		0.591	mg/L	5	09/26/2023 23:40	212304
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	09/26/2023 23:40	212304
Boron	NELAP	0.0250		0.553	mg/L	5	09/28/2023 9:22	212304
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	09/26/2023 23:40	212304
Calcium	NELAP	0.125		134	mg/L	5	09/26/2023 23:40	212304
Chromium	NELAP	0.0015		0.0087	mg/L	5	09/26/2023 23:40	212304
Cobalt	NELAP	0.0010		0.0021	mg/L	5	09/26/2023 23:40	212304
Lead	NELAP	0.0010		0.0031	mg/L	5	09/26/2023 23:40	212304
Lithium	*	0.0030		0.0301	mg/L	5	09/26/2023 23:40	212304
Molybdenum	*	0.0015		< 0.0015	mg/L	5	09/26/2023 23:40	212304
Selenium	NELAP	0.0010		< 0.0010	mg/L	5	09/26/2023 23:40	212304
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	09/26/2023 23:40	212304
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		< 0.00020	mg/L	1	09/26/2023 15:22	212412
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		See Attached	pci/L	1	10/23/2023 14:46	R338467
Radium-228	*	0		See Attached	pci/L	1	10/23/2023 14:46	R338467

Client: ERM
Client Project: 0599247

Work Order: 23091500
Report Date: 30-Oct-23

Lab ID: 23091500-005

Client Sample ID: APW-10D-WG-20230919

Matrix: GROUNDWATER

Collection Date: 09/19/2023 16:00

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	20		468	mg/L	1	09/21/2023 16:05	R336743
SW-846 9036 (TOTAL)								
Sulfate	NELAP	10		31	mg/L	1	09/22/2023 18:48	R336796
SW-846 9040B, LABORATORY ANALYZED								
Lab pH	NELAP	1.00	H	7.22		1	09/27/2023 14:13	R336927
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		0.11	mg/L	1	09/26/2023 11:18	R336875
SW-846 9251 (TOTAL)								
Chloride	NELAP	4		10	mg/L	1	09/22/2023 18:47	R336801
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	09/25/2023 20:48	212291
Arsenic	NELAP	0.0010		0.0011	mg/L	5	09/25/2023 20:48	212291
Barium	NELAP	0.0010		0.355	mg/L	5	09/25/2023 20:48	212291
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	10/02/2023 13:48	212291
Boron	NELAP	0.0250		0.0639	mg/L	5	09/29/2023 15:33	212291
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	09/25/2023 20:48	212291
Calcium	NELAP	0.125		116	mg/L	5	09/29/2023 15:33	212291
Chromium	NELAP	0.0015		< 0.0015	mg/L	5	09/25/2023 20:48	212291
Cobalt	NELAP	0.0010		0.0026	mg/L	5	09/25/2023 20:48	212291
Lead	NELAP	0.0010		< 0.0010	mg/L	5	09/25/2023 20:48	212291
Lithium	*	0.0030		0.0200	mg/L	5	10/02/2023 13:48	212291
Molybdenum	*	0.0015		< 0.0015	mg/L	5	09/25/2023 20:48	212291
Selenium	NELAP	0.0010		0.0016	mg/L	5	09/25/2023 20:48	212291
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	09/25/2023 20:48	212291
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	09/27/2023 0:31	212304
Arsenic	NELAP	0.0010		0.0016	mg/L	5	09/27/2023 0:31	212304
Barium	NELAP	0.0010		0.339	mg/L	5	09/27/2023 0:31	212304
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	09/27/2023 0:31	212304
Boron	NELAP	0.0250		0.0660	mg/L	5	09/28/2023 9:26	212304
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	09/27/2023 0:31	212304
Calcium	NELAP	0.125		118	mg/L	5	09/27/2023 0:31	212304
Chromium	NELAP	0.0015		0.0042	mg/L	5	09/27/2023 0:31	212304
Cobalt	NELAP	0.0010		0.0031	mg/L	5	09/27/2023 0:31	212304
Lead	NELAP	0.0010		< 0.0010	mg/L	5	09/27/2023 0:31	212304
Lithium	*	0.0030		0.0148	mg/L	5	09/28/2023 9:26	212304
Molybdenum	*	0.0015		< 0.0015	mg/L	5	09/27/2023 0:31	212304
Selenium	NELAP	0.0010		0.0013	mg/L	5	09/27/2023 0:31	212304
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	09/27/2023 0:31	212304
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		< 0.00020	mg/L	1	09/26/2023 15:24	212412
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		See Attached	pci/L	1	10/13/2023 14:22	R338467
Radium-228	*	0		See Attached	pci/L	1	10/13/2023 14:22	R338467



Laboratory Results

<http://www.teklabinc.com/>

Client: ERM
Client Project: 0599247

Work Order: 23091500
Report Date: 30-Oct-23

Lab ID: 23091500-006

Client Sample ID: APW-06S-WG-20230920

Matrix: GROUNDWATER

Collection Date: 09/20/2023 8:50

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	50		565	mg/L	2.5	09/22/2023 10:42	R336815
SW-846 9036 (TOTAL)								
Sulfate	NELAP	100		221	mg/L	10	09/22/2023 19:00	R336796
SW-846 9040B, LABORATORY ANALYZED								
Lab pH	NELAP	1.00	H	7.21		1	09/27/2023 14:47	R336927
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		0.30	mg/L	1	09/26/2023 11:20	R336875
SW-846 9251 (TOTAL)								
Chloride	NELAP	4		20	mg/L	1	09/22/2023 18:55	R336801
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	09/25/2023 20:54	212291
Arsenic	NELAP	0.0010		< 0.0010	mg/L	5	09/25/2023 20:54	212291
Barium	NELAP	0.0010		0.216	mg/L	5	09/25/2023 20:54	212291
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	10/02/2023 13:54	212291
Boron	NELAP	0.0250		6.65	mg/L	5	09/29/2023 15:39	212291
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	09/25/2023 20:54	212291
Calcium	NELAP	0.125		107	mg/L	5	09/29/2023 15:39	212291
Chromium	NELAP	0.0015		< 0.0015	mg/L	5	09/25/2023 20:54	212291
Cobalt	NELAP	0.0010		< 0.0010	mg/L	5	09/25/2023 20:54	212291
Lead	NELAP	0.0010		< 0.0010	mg/L	5	09/25/2023 20:54	212291
Lithium	*	0.0030		0.0487	mg/L	5	10/02/2023 13:54	212291
Molybdenum	*	0.0015		0.234	mg/L	5	09/25/2023 20:54	212291
Selenium	NELAP	0.0010		< 0.0010	mg/L	5	09/25/2023 20:54	212291
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	09/25/2023 20:54	212291
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	09/27/2023 0:37	212304
Arsenic	NELAP	0.0010		0.0012	mg/L	5	09/27/2023 0:37	212304
Barium	NELAP	0.0010		0.206	mg/L	5	09/27/2023 0:37	212304
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	09/27/2023 0:37	212304
Boron	NELAP	0.0250		5.79	mg/L	5	09/28/2023 10:19	212304
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	09/27/2023 0:37	212304
Calcium	NELAP	0.125		92.7	mg/L	5	09/27/2023 0:37	212304
Chromium	NELAP	0.0015		0.0067	mg/L	5	09/27/2023 0:37	212304
Cobalt	NELAP	0.0010		< 0.0010	mg/L	5	09/27/2023 0:37	212304
Lead	NELAP	0.0010		< 0.0010	mg/L	5	09/27/2023 0:37	212304
Lithium	*	0.0030		0.0369	mg/L	5	09/28/2023 10:19	212304
Molybdenum	*	0.0015		0.225	mg/L	5	09/27/2023 0:37	212304
Selenium	NELAP	0.0010		< 0.0010	mg/L	5	09/27/2023 0:37	212304
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	09/27/2023 0:37	212304
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		< 0.00020	mg/L	1	09/26/2023 15:26	212412
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		See Attached	pci/L	1	10/23/2023 14:46	R338467
Radium-228	*	0		See Attached	pci/L	1	10/23/2023 14:46	R338467

Client: ERM
Client Project: 0599247

Work Order: 23091500
Report Date: 30-Oct-23

Lab ID: 23091500-007

Client Sample ID: APW-06D-WG-20230920

Matrix: GROUNDWATER

Collection Date: 09/20/2023 10:05

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	50		565	mg/L	2.5	09/22/2023 10:42	R336815
SW-846 9036 (TOTAL)								
Sulfate	NELAP	100		218	mg/L	10	09/22/2023 19:08	R336796
SW-846 9040B, LABORATORY ANALYZED								
Lab pH	NELAP	1.00	H	7.30		1	09/27/2023 14:50	R336927
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		0.22	mg/L	1	09/26/2023 11:22	R336875
SW-846 9251 (TOTAL)								
Chloride	NELAP	4		16	mg/L	1	09/22/2023 19:03	R336801
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	09/25/2023 21:00	212291
Arsenic	NELAP	0.0010		0.0100	mg/L	5	09/25/2023 21:00	212291
Barium	NELAP	0.0010		0.121	mg/L	5	09/25/2023 21:00	212291
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	10/02/2023 14:01	212291
Boron	NELAP	0.0250		3.77	mg/L	5	09/29/2023 15:45	212291
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	09/25/2023 21:00	212291
Calcium	NELAP	0.125		114	mg/L	5	09/29/2023 15:45	212291
Chromium	NELAP	0.0015		< 0.0015	mg/L	5	09/25/2023 21:00	212291
Cobalt	NELAP	0.0010		< 0.0010	mg/L	5	09/25/2023 21:00	212291
Lead	NELAP	0.0010		< 0.0010	mg/L	5	09/25/2023 21:00	212291
Lithium	*	0.0030		0.0197	mg/L	5	10/02/2023 14:01	212291
Molybdenum	*	0.0015		0.0559	mg/L	5	09/25/2023 21:00	212291
Selenium	NELAP	0.0010		< 0.0010	mg/L	5	09/25/2023 21:00	212291
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	09/25/2023 21:00	212291
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	09/27/2023 0:42	212304
Arsenic	NELAP	0.0010		0.0109	mg/L	5	09/27/2023 0:42	212304
Barium	NELAP	0.0010		0.128	mg/L	5	09/27/2023 0:42	212304
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	09/27/2023 0:42	212304
Boron	NELAP	0.0250		3.81	mg/L	5	09/28/2023 10:23	212304
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	09/27/2023 0:42	212304
Calcium	NELAP	0.125		106	mg/L	5	09/27/2023 0:42	212304
Chromium	NELAP	0.0015		0.0727	mg/L	5	09/27/2023 0:42	212304
Cobalt	NELAP	0.0010		0.0035	mg/L	5	09/27/2023 0:42	212304
Lead	NELAP	0.0010		< 0.0010	mg/L	5	09/27/2023 0:42	212304
Lithium	*	0.0030		0.0169	mg/L	5	09/28/2023 10:23	212304
Molybdenum	*	0.0015		0.0672	mg/L	5	09/27/2023 0:42	212304
Selenium	NELAP	0.0010		< 0.0010	mg/L	5	09/27/2023 0:42	212304
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	09/27/2023 0:42	212304
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		< 0.00020	mg/L	1	09/26/2023 15:29	212412
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		See Attached	pci/L	1	10/13/2023 14:22	R338467
Radium-228	*	0		See Attached	pci/L	1	10/13/2023 14:22	R338467

Client: ERM
Client Project: 0599247

Work Order: 23091500
Report Date: 30-Oct-23

Lab ID: 23091500-008

Client Sample ID: APW-05R-WG-20230920

Matrix: GROUNDWATER

Collection Date: 09/20/2023 11:25

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	50		680	mg/L	2.5	09/22/2023 10:42	R336815
SW-846 9036 (TOTAL)								
Sulfate	NELAP	100		343	mg/L	10	09/22/2023 19:17	R336796
SW-846 9040B, LABORATORY ANALYZED								
Lab pH	NELAP	1.00	H	7.36		1	09/27/2023 14:52	R336927
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		0.35	mg/L	1	09/26/2023 11:31	R336875
SW-846 9251 (TOTAL)								
Chloride	NELAP	4		14	mg/L	1	09/22/2023 19:11	R336801
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	09/25/2023 21:07	212291
Arsenic	NELAP	0.0010		0.0023	mg/L	5	09/25/2023 21:07	212291
Barium	NELAP	0.0010		0.167	mg/L	5	09/25/2023 21:07	212291
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	10/02/2023 14:07	212291
Boron	NELAP	0.0250		7.91	mg/L	5	09/29/2023 15:52	212291
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	09/25/2023 21:07	212291
Calcium	NELAP	0.125		118	mg/L	5	09/29/2023 15:52	212291
Chromium	NELAP	0.0015		< 0.0015	mg/L	5	09/25/2023 21:07	212291
Cobalt	NELAP	0.0010		< 0.0010	mg/L	5	09/25/2023 21:07	212291
Lead	NELAP	0.0010		< 0.0010	mg/L	5	09/25/2023 21:07	212291
Lithium	*	0.0030		0.0624	mg/L	5	10/02/2023 14:07	212291
Molybdenum	*	0.0015		0.235	mg/L	5	09/25/2023 21:07	212291
Selenium	NELAP	0.0010		< 0.0010	mg/L	5	09/25/2023 21:07	212291
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	09/25/2023 21:07	212291
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	09/27/2023 0:48	212304
Arsenic	NELAP	0.0010		0.0028	mg/L	5	09/27/2023 0:48	212304
Barium	NELAP	0.0010		0.162	mg/L	5	09/27/2023 0:48	212304
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	09/27/2023 0:48	212304
Boron	NELAP	0.0250		7.12	mg/L	5	09/28/2023 10:27	212304
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	09/27/2023 0:48	212304
Calcium	NELAP	0.125		105	mg/L	5	09/27/2023 0:48	212304
Chromium	NELAP	0.0015		0.0031	mg/L	5	09/27/2023 0:48	212304
Cobalt	NELAP	0.0010		< 0.0010	mg/L	5	09/27/2023 0:48	212304
Lead	NELAP	0.0010		0.0026	mg/L	5	09/27/2023 0:48	212304
Lithium	*	0.0030		0.0367	mg/L	5	09/28/2023 10:27	212304
Molybdenum	*	0.0015		0.223	mg/L	5	09/27/2023 0:48	212304
Selenium	NELAP	0.0010		< 0.0010	mg/L	5	09/27/2023 0:48	212304
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	09/27/2023 0:48	212304
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		< 0.00020	mg/L	1	09/26/2023 15:31	212412
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		See Attached	pci/L	1	10/13/2023 14:22	R338467
Radium-228	*	0		See Attached	pci/L	1	10/13/2023 14:22	R338467



Laboratory Results

<http://www.teklabinc.com/>

Client: ERM
Client Project: 0599247

Work Order: 23091500
Report Date: 30-Oct-23

Lab ID: 23091500-009

Client Sample ID: APW-09-WG-20230920

Matrix: GROUNDWATER

Collection Date: 09/20/2023 14:00

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	20		372	mg/L	1	09/22/2023 11:08	R336815
SW-846 9036 (TOTAL)								
Sulfate	NELAP	10		32	mg/L	1	09/22/2023 19:20	R336796
SW-846 9040B, LABORATORY ANALYZED								
Lab pH	NELAP	1.00	H	7.56		1	09/27/2023 14:56	R336927
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		0.20	mg/L	1	09/26/2023 11:33	R336875
SW-846 9251 (TOTAL)								
Chloride	NELAP	4		11	mg/L	1	09/22/2023 19:19	R336801
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	09/25/2023 21:13	212291
Arsenic	NELAP	0.0010		0.0022	mg/L	5	09/25/2023 21:13	212291
Barium	NELAP	0.0010		0.114	mg/L	5	09/25/2023 21:13	212291
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	10/02/2023 15:17	212291
Boron	NELAP	0.0250		0.234	mg/L	5	09/29/2023 15:58	212291
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	09/25/2023 21:13	212291
Calcium	NELAP	0.125		81.0	mg/L	5	09/29/2023 15:58	212291
Chromium	NELAP	0.0015		< 0.0015	mg/L	5	09/25/2023 21:13	212291
Cobalt	NELAP	0.0010		< 0.0010	mg/L	5	09/25/2023 21:13	212291
Lead	NELAP	0.0010		< 0.0010	mg/L	5	09/25/2023 21:13	212291
Lithium	*	0.0030		0.0196	mg/L	5	10/02/2023 15:17	212291
Molybdenum	*	0.0015		0.0167	mg/L	5	09/25/2023 21:13	212291
Selenium	NELAP	0.0010		0.0155	mg/L	5	09/25/2023 21:13	212291
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	09/25/2023 21:13	212291
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	09/27/2023 0:53	212304
Arsenic	NELAP	0.0010		0.0020	mg/L	5	09/27/2023 0:53	212304
Barium	NELAP	0.0010		0.120	mg/L	5	09/27/2023 0:53	212304
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	09/27/2023 0:53	212304
Boron	NELAP	0.0250		0.209	mg/L	5	09/28/2023 10:31	212304
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	09/27/2023 0:53	212304
Calcium	NELAP	0.125		69.5	mg/L	5	09/27/2023 0:53	212304
Chromium	NELAP	0.0015		0.0018	mg/L	5	09/27/2023 0:53	212304
Cobalt	NELAP	0.0010		< 0.0010	mg/L	5	09/27/2023 0:53	212304
Lead	NELAP	0.0010		< 0.0010	mg/L	5	09/27/2023 0:53	212304
Lithium	*	0.0030		0.0134	mg/L	5	09/28/2023 10:31	212304
Molybdenum	*	0.0015		0.0162	mg/L	5	09/27/2023 0:53	212304
Selenium	NELAP	0.0010		0.0153	mg/L	5	09/27/2023 0:53	212304
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	09/27/2023 0:53	212304
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		< 0.00020	mg/L	1	09/26/2023 15:33	212412
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		See Attached	pci/L	1	10/13/2023 14:22	R338467
Radium-228	*	0		See Attached	pci/L	1	10/13/2023 14:22	R338467

Client: ERM
Client Project: 0599247

Work Order: 23091500
Report Date: 30-Oct-23

Lab ID: 23091500-010

Client Sample ID: APW-02-WG-20230920

Matrix: GROUNDWATER

Collection Date: 09/20/2023 12:30

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	50		845	mg/L	2.5	09/22/2023 11:09	R336815
SW-846 9036 (TOTAL)								
Sulfate	NELAP	100		460	mg/L	10	09/22/2023 19:49	R336796
SW-846 9040B, LABORATORY ANALYZED								
Lab pH	NELAP	1.00	H	7.15		1	09/27/2023 14:58	R336927
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		0.24	mg/L	1	09/26/2023 11:35	R336875
SW-846 9251 (TOTAL)								
Chloride	NELAP	4		7	mg/L	1	09/22/2023 19:43	R336801
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	09/25/2023 21:19	212291
Arsenic	NELAP	0.0010		0.0072	mg/L	5	09/25/2023 21:19	212291
Barium	NELAP	0.0010		0.133	mg/L	5	09/25/2023 21:19	212291
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	10/02/2023 15:23	212291
Boron	NELAP	0.0250		8.91	mg/L	5	09/29/2023 16:04	212291
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	09/25/2023 21:19	212291
Calcium	NELAP	0.125		151	mg/L	5	09/29/2023 16:04	212291
Chromium	NELAP	0.0015		< 0.0015	mg/L	5	09/25/2023 21:19	212291
Cobalt	NELAP	0.0010		< 0.0010	mg/L	5	09/25/2023 21:19	212291
Lead	NELAP	0.0010		< 0.0010	mg/L	5	09/25/2023 21:19	212291
Lithium	*	0.0030		0.0583	mg/L	5	10/02/2023 15:23	212291
Molybdenum	*	0.0015		0.214	mg/L	5	09/25/2023 21:19	212291
Selenium	NELAP	0.0010		< 0.0010	mg/L	5	09/25/2023 21:19	212291
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	09/25/2023 21:19	212291
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	09/27/2023 0:59	212304
Arsenic	NELAP	0.0010		0.0093	mg/L	5	09/27/2023 0:59	212304
Barium	NELAP	0.0010		0.152	mg/L	5	09/27/2023 0:59	212304
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	09/27/2023 0:59	212304
Boron	NELAP	0.0250		8.24	mg/L	5	09/28/2023 10:35	212304
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	09/27/2023 0:59	212304
Calcium	NELAP	0.125		132	mg/L	5	09/27/2023 0:59	212304
Chromium	NELAP	0.0015		0.0080	mg/L	5	09/27/2023 0:59	212304
Cobalt	NELAP	0.0010		< 0.0010	mg/L	5	09/27/2023 0:59	212304
Lead	NELAP	0.0010		0.0020	mg/L	5	09/27/2023 0:59	212304
Lithium	*	0.0030		0.0422	mg/L	5	09/28/2023 10:35	212304
Molybdenum	*	0.0015		0.198	mg/L	5	09/27/2023 0:59	212304
Selenium	NELAP	0.0010		< 0.0010	mg/L	5	09/27/2023 0:59	212304
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	09/27/2023 0:59	212304
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		< 0.00020	mg/L	1	09/26/2023 15:35	212412
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		See Attached	pci/L	1	10/13/2023 14:22	R338467
Radium-228	*	0		See Attached	pci/L	1	10/13/2023 14:22	R338467

Client: ERM
Client Project: 0599247
Lab ID: 23091500-011
Matrix: GROUNDWATER

Work Order: 23091500
Report Date: 30-Oct-23
Client Sample ID: APW-01R-WG-20230920
Collection Date: 09/20/2023 15:10

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	50		355	mg/L	2.5	09/22/2023 11:09	R336815
SW-846 9036 (TOTAL)								
Sulfate	NELAP	50		79	mg/L	5	09/29/2023 16:21	R337145
SW-846 9040B, LABORATORY ANALYZED								
Lab pH	NELAP	1.00	H	6.66		1	09/28/2023 9:40	R336991
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		0.17	mg/L	1	09/26/2023 11:36	R336875
SW-846 9251 (TOTAL)								
Chloride	NELAP	4		5	mg/L	1	09/22/2023 19:51	R336801
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	09/25/2023 21:25	212291
Arsenic	NELAP	0.0010		0.0016	mg/L	5	09/25/2023 21:25	212291
Barium	NELAP	0.0010		0.210	mg/L	5	09/25/2023 21:25	212291
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	10/02/2023 15:30	212291
Boron	NELAP	0.0250		0.204	mg/L	5	09/29/2023 17:14	212291
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	09/25/2023 21:25	212291
Calcium	NELAP	0.125		72.1	mg/L	5	09/29/2023 17:14	212291
Chromium	NELAP	0.0015		< 0.0015	mg/L	5	09/25/2023 21:25	212291
Cobalt	NELAP	0.0010		0.0012	mg/L	5	09/25/2023 21:25	212291
Lead	NELAP	0.0010		< 0.0010	mg/L	5	09/25/2023 21:25	212291
Lithium	*	0.0030		0.0211	mg/L	5	10/02/2023 15:30	212291
Molybdenum	*	0.0015		< 0.0015	mg/L	5	09/25/2023 21:25	212291
Selenium	NELAP	0.0010		0.0037	mg/L	5	09/25/2023 21:25	212291
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	09/25/2023 21:25	212291
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	09/27/2023 1:10	212304
Arsenic	NELAP	0.0010		0.0029	mg/L	5	09/27/2023 1:10	212304
Barium	NELAP	0.0010		0.202	mg/L	5	09/27/2023 1:10	212304
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	09/27/2023 1:10	212304
Boron	NELAP	0.0250		0.180	mg/L	5	09/28/2023 11:29	212304
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	09/27/2023 1:10	212304
Calcium	NELAP	0.125	S	59.2	mg/L	5	09/27/2023 1:10	212304
Chromium	NELAP	0.0015		0.0085	mg/L	5	09/27/2023 1:10	212304
Cobalt	NELAP	0.0010		0.0041	mg/L	5	09/27/2023 1:10	212304
Lead	NELAP	0.0010		0.0026	mg/L	5	09/27/2023 1:10	212304
Lithium	*	0.0030		0.0147	mg/L	5	09/28/2023 11:29	212304
Molybdenum	*	0.0015		< 0.0015	mg/L	5	09/27/2023 1:10	212304
Selenium	NELAP	0.0010		0.0037	mg/L	5	09/27/2023 1:10	212304
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	09/27/2023 1:10	212304
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		< 0.00020	mg/L	1	09/26/2023 15:38	212412
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		See Attached	pci/L	1	10/13/2023 14:22	R338467
Radium-228	*	0		See Attached	pci/L	1	10/13/2023 14:22	R338467

Matrix spike control limits are not applicable due to high sample/spike ratio.

Client: ERM
Client Project: 0599247

Work Order: 23091500
Report Date: 30-Oct-23

Lab ID: 23091500-012

Client Sample ID: APW-04-WG-20230920

Matrix: GROUNDWATER

Collection Date: 09/20/2023 16:10

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	20		476	mg/L	1	09/22/2023 11:10	R336815
SW-846 9036 (TOTAL)								
Sulfate	NELAP	20		66	mg/L	2	09/27/2023 13:00	R337008
SW-846 9040B, LABORATORY ANALYZED								
Lab pH	NELAP	1.00	H	7.56		1	09/28/2023 9:43	R336991
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		0.15	mg/L	1	09/26/2023 11:38	R336875
SW-846 9251 (TOTAL)								
Chloride	NELAP	4		9	mg/L	1	09/22/2023 20:02	R336801
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	09/25/2023 20:04	212291
Arsenic	NELAP	0.0010		0.0016	mg/L	5	09/25/2023 20:04	212291
Barium	NELAP	0.0010		0.138	mg/L	5	09/25/2023 20:04	212291
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	10/02/2023 15:49	212291
Boron	NELAP	0.0250		0.591	mg/L	5	09/25/2023 20:04	212291
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	09/25/2023 20:04	212291
Calcium	NELAP	0.125	S	101	mg/L	5	09/29/2023 17:46	212291
Chromium	NELAP	0.0015		< 0.0015	mg/L	5	09/25/2023 20:04	212291
Cobalt	NELAP	0.0010		< 0.0010	mg/L	5	09/25/2023 20:04	212291
Lead	NELAP	0.0010		< 0.0010	mg/L	5	09/25/2023 20:04	212291
Lithium	*	0.0030		0.0411	mg/L	5	10/02/2023 15:49	212291
Molybdenum	*	0.0015		0.0367	mg/L	5	09/25/2023 20:04	212291
Selenium	NELAP	0.0010		0.0096	mg/L	5	09/25/2023 20:04	212291
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	09/25/2023 20:04	212291
<i>Matrix spike control limits are not applicable due to high sample/spike ratio.</i>								
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	09/27/2023 1:04	212304
Arsenic	NELAP	0.0010		0.0019	mg/L	5	09/27/2023 1:04	212304
Barium	NELAP	0.0010		0.131	mg/L	5	09/27/2023 1:04	212304
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	09/27/2023 1:04	212304
Boron	NELAP	0.0250		0.572	mg/L	5	09/28/2023 10:39	212304
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	09/27/2023 1:04	212304
Calcium	NELAP	0.125		87.9	mg/L	5	09/27/2023 1:04	212304
Chromium	NELAP	0.0015		0.0023	mg/L	5	09/27/2023 1:04	212304
Cobalt	NELAP	0.0010		< 0.0010	mg/L	5	09/27/2023 1:04	212304
Lead	NELAP	0.0010		< 0.0010	mg/L	5	09/27/2023 1:04	212304
Lithium	*	0.0030		0.0299	mg/L	5	09/28/2023 10:39	212304
Molybdenum	*	0.0015		0.0299	mg/L	5	09/27/2023 1:04	212304
Selenium	NELAP	0.0010		0.0090	mg/L	5	09/27/2023 1:04	212304
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	09/27/2023 1:04	212304
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		< 0.00020	mg/L	1	09/26/2023 15:40	212412
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		See Attached	pci/L	1	10/13/2023 14:22	R338467
Radium-228	*	0		See Attached	pci/L	1	10/13/2023 14:22	R338467

Client: ERM
Client Project: 0599247

Work Order: 23091500
Report Date: 30-Oct-23

Lab ID: 23091500-013

Client Sample ID: EB-01-WQ-20230919

Matrix: GROUNDWATER

Collection Date: 09/19/2023 8:40

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	20		< 20	mg/L	1	09/21/2023 16:06	R336743
SW-846 9036 (TOTAL)								
Sulfate	NELAP	10		< 10	mg/L	1	09/22/2023 20:36	R336796
SW-846 9040B, LABORATORY ANALYZED								
Lab pH	NELAP	1.00	H	5.50		1	09/27/2023 15:03	R336927
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		< 0.10	mg/L	1	09/26/2023 11:40	R336875
SW-846 9251 (TOTAL)								
Chloride	NELAP	4		< 4	mg/L	1	09/22/2023 20:37	R336801
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	09/25/2023 19:19	212291
Arsenic	NELAP	0.0010		< 0.0010	mg/L	5	09/25/2023 19:19	212291
Barium	NELAP	0.0010		< 0.0010	mg/L	5	09/25/2023 19:19	212291
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	10/02/2023 15:36	212291
Boron	NELAP	0.0250		< 0.0250	mg/L	5	09/25/2023 19:19	212291
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	09/25/2023 19:19	212291
Calcium	NELAP	0.125		0.464	mg/L	5	09/29/2023 17:21	212291
Chromium	NELAP	0.0015		< 0.0015	mg/L	5	09/25/2023 19:19	212291
Cobalt	NELAP	0.0010		< 0.0010	mg/L	5	09/25/2023 19:19	212291
Lead	NELAP	0.0010		< 0.0010	mg/L	5	09/25/2023 19:19	212291
Lithium	*	0.0030		< 0.0030	mg/L	5	10/02/2023 15:36	212291
Molybdenum	*	0.0015		< 0.0015	mg/L	5	09/25/2023 19:19	212291
Selenium	NELAP	0.0010		< 0.0010	mg/L	5	09/25/2023 19:19	212291
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	09/25/2023 19:19	212291
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	09/27/2023 2:12	212304
Arsenic	NELAP	0.0010		< 0.0010	mg/L	5	09/27/2023 2:12	212304
Barium	NELAP	0.0010		< 0.0010	mg/L	5	09/27/2023 2:12	212304
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	09/27/2023 2:12	212304
Boron	NELAP	0.0250		< 0.0250	mg/L	5	09/28/2023 10:44	212304
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	09/27/2023 2:12	212304
Calcium	NELAP	0.125		< 0.125	mg/L	5	09/27/2023 2:12	212304
Chromium	NELAP	0.0015		< 0.0015	mg/L	5	09/27/2023 2:12	212304
Cobalt	NELAP	0.0010		< 0.0010	mg/L	5	09/27/2023 2:12	212304
Lead	NELAP	0.0010		< 0.0010	mg/L	5	09/27/2023 2:12	212304
Lithium	*	0.0030		< 0.0030	mg/L	5	09/27/2023 2:12	212304
Molybdenum	*	0.0015		< 0.0015	mg/L	5	09/27/2023 2:12	212304
Selenium	NELAP	0.0010		< 0.0010	mg/L	5	09/27/2023 2:12	212304
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	09/27/2023 2:12	212304
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		0.00119	mg/L	1	09/27/2023 9:48	212412
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		See Attached	pci/L	1	10/13/2023 14:22	R338467
Radium-228	*	0		See Attached	pci/L	1	10/13/2023 14:22	R338467

CCV recovered outside the upper control limits for Li. Sample results are below the reporting limit. Data is reportable per the TNI standard.

Client: ERM
Client Project: 0599247

Work Order: 23091500
Report Date: 30-Oct-23

Lab ID: 23091500-014

Client Sample ID: DUP-01-WG-20230920

Matrix: GROUNDWATER

Collection Date: 09/20/2023 0:01

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	50		710	mg/L	2.5	09/22/2023 11:10	R336815
SW-846 9036 (TOTAL)								
Sulfate	NELAP	100		333	mg/L	10	09/22/2023 20:50	R336796
SW-846 9040B, LABORATORY ANALYZED								
Lab pH	NELAP	1.00	H	7.36		1	09/27/2023 15:00	R336927
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		0.34	mg/L	1	09/26/2023 11:43	R336875
SW-846 9251 (TOTAL)								
Chloride	NELAP	4		14	mg/L	1	09/22/2023 20:45	R336801
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	09/25/2023 19:26	212291
Arsenic	NELAP	0.0010		0.0024	mg/L	5	09/25/2023 19:26	212291
Barium	NELAP	0.0010		0.172	mg/L	5	09/25/2023 19:26	212291
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	10/02/2023 15:42	212291
Boron	NELAP	0.0250		8.05	mg/L	5	09/25/2023 19:26	212291
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	09/25/2023 19:26	212291
Calcium	NELAP	0.125		119	mg/L	5	09/29/2023 17:27	212291
Chromium	NELAP	0.0015		< 0.0015	mg/L	5	09/25/2023 19:26	212291
Cobalt	NELAP	0.0010		< 0.0010	mg/L	5	09/25/2023 19:26	212291
Lead	NELAP	0.0010		< 0.0010	mg/L	5	09/25/2023 19:26	212291
Lithium	*	0.0030		0.0509	mg/L	5	10/02/2023 15:42	212291
Molybdenum	*	0.0015		0.233	mg/L	5	09/25/2023 19:26	212291
Selenium	NELAP	0.0010		< 0.0010	mg/L	5	09/25/2023 19:26	212291
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	09/25/2023 19:26	212291
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	09/23/2023 5:57	212305
Arsenic	NELAP	0.0010		0.0026	mg/L	5	09/26/2023 7:25	212305
Barium	NELAP	0.0010		0.158	mg/L	5	09/23/2023 5:57	212305
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	09/26/2023 7:25	212305
Boron	NELAP	0.0250	S	8.33	mg/L	5	09/29/2023 14:42	212305
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	09/23/2023 5:57	212305
Calcium	NELAP	0.125	S	126	mg/L	5	09/29/2023 14:42	212305
Chromium	NELAP	0.0015		0.0016	mg/L	5	10/02/2023 12:45	212305
Cobalt	NELAP	0.0010		< 0.0010	mg/L	5	09/26/2023 7:25	212305
Lead	NELAP	0.0010		0.0021	mg/L	5	09/28/2023 1:32	212305
Lithium	*	0.0030		0.0425	mg/L	5	10/02/2023 12:45	212305
Molybdenum	*	0.0015		0.235	mg/L	5	09/26/2023 7:25	212305
Selenium	NELAP	0.0010		< 0.0010	mg/L	5	09/26/2023 7:25	212305
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	09/23/2023 5:57	212305
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		< 0.00020	mg/L	1	09/27/2023 9:50	212412
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		See Attached	pci/L	1	10/13/2023 14:22	R338467
Radium-228	*	0		See Attached	pci/L	1	10/13/2023 14:22	R338467

Matrix spike control limits are not applicable due to high sample/spike ratio.

CCV recovered outside the upper control limits for TL. Sample results are below the reporting limit. Data is reportable per the TNI standard.

Client: ERM
Client Project: 0599247

Work Order: 23091500
Report Date: 30-Oct-23

Lab ID: 23091500-015

Client Sample ID: DUP-02-WG-20230920

Matrix: GROUNDWATER

Collection Date: 09/20/2023 0:02

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	20		386	mg/L	1	09/22/2023 11:31	R336815
SW-846 9036 (TOTAL)								
Sulfate	NELAP	10		31	mg/L	1	09/22/2023 20:53	R336796
SW-846 9040B, LABORATORY ANALYZED								
Lab pH	NELAP	1.00	H	7.65		1	09/27/2023 15:05	R336927
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		0.19	mg/L	1	09/26/2023 11:46	R336875
SW-846 9251 (TOTAL)								
Chloride	NELAP	4		11	mg/L	1	09/22/2023 20:53	R336801
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	09/25/2023 19:32	212291
Arsenic	NELAP	0.0010		0.0021	mg/L	5	09/25/2023 19:32	212291
Barium	NELAP	0.0010		0.117	mg/L	5	09/25/2023 19:32	212291
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	10/02/2023 16:33	212291
Boron	NELAP	0.0250		0.236	mg/L	5	09/25/2023 19:32	212291
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	09/25/2023 19:32	212291
Calcium	NELAP	0.125		81.1	mg/L	5	09/29/2023 17:33	212291
Chromium	NELAP	0.0015		< 0.0015	mg/L	5	09/25/2023 19:32	212291
Cobalt	NELAP	0.0010		< 0.0010	mg/L	5	09/25/2023 19:32	212291
Lead	NELAP	0.0010		< 0.0010	mg/L	5	09/25/2023 19:32	212291
Lithium	*	0.0030		0.0184	mg/L	5	10/02/2023 16:33	212291
Molybdenum	*	0.0015		0.0173	mg/L	5	09/25/2023 19:32	212291
Selenium	NELAP	0.0010		0.0162	mg/L	5	09/25/2023 19:32	212291
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	09/25/2023 19:32	212291
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	09/23/2023 5:35	212305
Arsenic	NELAP	0.0010		0.0023	mg/L	5	09/26/2023 7:06	212305
Barium	NELAP	0.0010		0.125	mg/L	5	09/23/2023 5:35	212305
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	09/26/2023 7:06	212305
Boron	NELAP	0.0250		0.239	mg/L	5	09/29/2023 14:23	212305
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	09/23/2023 5:35	212305
Calcium	NELAP	0.125		87.5	mg/L	5	09/29/2023 14:23	212305
Chromium	NELAP	0.0015		< 0.0015	mg/L	5	09/23/2023 5:35	212305
Cobalt	NELAP	0.0010		< 0.0010	mg/L	5	09/26/2023 7:06	212305
Lead	NELAP	0.0010		< 0.0010	mg/L	5	09/26/2023 7:06	212305
Lithium	*	0.0030		0.0150	mg/L	5	10/02/2023 12:38	212305
Molybdenum	*	0.0015		0.0173	mg/L	5	09/26/2023 7:06	212305
Selenium	NELAP	0.0010		0.0182	mg/L	5	09/26/2023 7:06	212305
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	09/23/2023 5:35	212305
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		< 0.00020	mg/L	1	09/29/2023 9:48	212516
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		See Attached	pci/L	1	10/23/2023 14:46	R338467
Radium-228	*	0		See Attached	pci/L	1	10/23/2023 14:46	R338467

LCS recovered outside upper control limits for Pb. Sample results are below the reporting limit. Data is reportable per the TNI Standard.

CCV recovered outside the upper control limits for TL. Sample results are below the reporting limit. Data is reportable per the TNI standard.

Client: ERM**Work Order:** 23091500**Client Project:** 0599247**Report Date:** 30-Oct-23

Lab Sample ID	Client Sample ID	Matrix	Fractions	Collection Date
23091500-001	APW-03-WG-20230919	Groundwater	4	09/19/2023 11:35
23091500-002	APW-08-WG-20230919	Groundwater	4	09/19/2023 12:55
23091500-003	APW-07-WG-20230919	Groundwater	4	09/19/2023 13:50
23091500-004	APW-10S-WG-20230919	Groundwater	4	09/19/2023 14:50
23091500-005	APW-10D-WG-20230919	Groundwater	4	09/19/2023 16:00
23091500-006	APW-06S-WG-20230920	Groundwater	4	09/20/2023 8:50
23091500-007	APW-06D-WG-20230920	Groundwater	4	09/20/2023 10:05
23091500-008	APW-05R-WG-20230920	Groundwater	4	09/20/2023 11:25
23091500-009	APW-09-WG-20230920	Groundwater	4	09/20/2023 14:00
23091500-010	APW-02-WG-20230920	Groundwater	4	09/20/2023 12:30
23091500-011	APW-01R-WG-20230920	Groundwater	4	09/20/2023 15:10
23091500-012	APW-04-WG-20230920	Groundwater	4	09/20/2023 16:10
23091500-013	EB-01-WQ-20230919	Groundwater	4	09/19/2023 8:40
23091500-014	DUP-01-WG-20230920	Groundwater	4	09/20/2023 0:01
23091500-015	DUP-02-WG-20230920	Groundwater	4	09/20/2023 0:02

Client: ERM

Work Order: 23091500

Client Project: 0599247

Report Date: 30-Oct-23

Sample ID	Client Sample ID	Collection Date	Received Date		
	Test Name			Prep Date/Time	Analysis Date/Time
23091500-001A	APW-03-WG-20230919	09/19/2023 11:35	09/21/2023 9:45		
	Standard Methods 2540 C (Total) 1997, 2011				09/21/2023 15:53
	SW-846 9036 (Total)				09/22/2023 17:36
	SW-846 9040B, Laboratory Analyzed				09/27/2023 14:06
	SW-846 9214 (Total)				09/26/2023 11:11
	SW-846 9251 (Total)				09/22/2023 17:30
23091500-001B	APW-03-WG-20230919	09/19/2023 11:35	09/21/2023 9:45		
	EPA 903.0/904.0, Radium 226/228				10/13/2023 14:22
23091500-001C	APW-03-WG-20230919	09/19/2023 11:35	09/21/2023 9:45		
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			09/21/2023 18:37	09/25/2023 23:39
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			09/21/2023 18:37	09/26/2023 23:46
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			09/21/2023 18:37	09/27/2023 18:12
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			09/21/2023 18:37	09/28/2023 10:48
	SW-846 7470A (Total)			09/26/2023 8:27	09/26/2023 15:11
23091500-001D	APW-03-WG-20230919	09/19/2023 11:35	09/21/2023 9:45		
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			09/21/2023 14:04	09/25/2023 18:04
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			09/21/2023 14:04	09/29/2023 14:29
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			09/21/2023 14:04	10/02/2023 13:29
23091500-002A	APW-08-WG-20230919	09/19/2023 12:55	09/21/2023 9:45		
	Standard Methods 2540 C (Total) 1997, 2011				09/21/2023 15:54
	SW-846 9036 (Total)				09/22/2023 17:54
	SW-846 9040B, Laboratory Analyzed				09/27/2023 14:07
	SW-846 9214 (Total)				09/26/2023 11:13
	SW-846 9251 (Total)				09/22/2023 17:54
23091500-002B	APW-08-WG-20230919	09/19/2023 12:55	09/21/2023 9:45		
	EPA 903.0/904.0, Radium 226/228				10/13/2023 14:22
23091500-002C	APW-08-WG-20230919	09/19/2023 12:55	09/21/2023 9:45		
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			09/21/2023 18:37	09/25/2023 23:28
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			09/21/2023 18:37	09/26/2023 23:29
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			09/21/2023 18:37	09/27/2023 17:49
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			09/21/2023 18:37	09/28/2023 9:13
	SW-846 7470A (Total)			09/26/2023 8:27	09/26/2023 15:13
23091500-002D	APW-08-WG-20230919	09/19/2023 12:55	09/21/2023 9:45		
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			09/21/2023 14:04	09/25/2023 18:23
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			09/21/2023 14:04	09/29/2023 16:11
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			09/21/2023 14:04	10/02/2023 14:13

Client: ERM

Work Order: 23091500

Client Project: 0599247

Report Date: 30-Oct-23

Sample ID	Client Sample ID	Collection Date	Received Date		
	Test Name			Prep Date/Time	Analysis Date/Time
23091500-003A	APW-07-WG-20230919	09/19/2023 13:50	09/21/2023 9:45		
	Standard Methods 2540 C (Total) 1997, 2011				09/21/2023 15:54
	SW-846 9036 (Total)				09/22/2023 18:02
	SW-846 9040B, Laboratory Analyzed				09/27/2023 14:09
	SW-846 9214 (Total)				09/26/2023 11:15
	SW-846 9251 (Total)				09/22/2023 18:02
23091500-003B	APW-07-WG-20230919	09/19/2023 13:50	09/21/2023 9:45		
	EPA 903.0/904.0, Radium 226/228				10/13/2023 14:22
23091500-003C	APW-07-WG-20230919	09/19/2023 13:50	09/21/2023 9:45		
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			09/21/2023 18:37	09/25/2023 23:34
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			09/21/2023 18:37	09/26/2023 23:35
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			09/21/2023 18:37	09/27/2023 17:55
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			09/21/2023 18:37	09/28/2023 9:18
	SW-846 7470A (Total)			09/26/2023 8:27	09/26/2023 15:20
23091500-003D	APW-07-WG-20230919	09/19/2023 13:50	09/21/2023 9:45		
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			09/21/2023 14:04	09/25/2023 18:10
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			09/21/2023 14:04	09/29/2023 14:35
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			09/21/2023 14:04	10/02/2023 13:35
23091500-004A	APW-10S-WG-20230919	09/19/2023 14:50	09/21/2023 9:45		
	Standard Methods 2540 C (Total) 1997, 2011				09/21/2023 16:05
	SW-846 9036 (Total)				09/22/2023 18:13
	SW-846 9040B, Laboratory Analyzed				09/27/2023 14:12
	SW-846 9214 (Total)				09/26/2023 11:16
	SW-846 9251 (Total)				09/22/2023 18:13
23091500-004B	APW-10S-WG-20230919	09/19/2023 14:50	09/21/2023 9:45		
	EPA 903.0/904.0, Radium 226/228				10/23/2023 14:46
23091500-004C	APW-10S-WG-20230919	09/19/2023 14:50	09/21/2023 9:45		
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			09/21/2023 18:37	09/26/2023 0:19
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			09/21/2023 18:37	09/26/2023 23:40
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			09/21/2023 18:37	09/27/2023 18:01
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			09/21/2023 18:37	09/28/2023 9:22
	SW-846 7470A (Total)			09/26/2023 8:27	09/26/2023 15:22
23091500-004D	APW-10S-WG-20230919	09/19/2023 14:50	09/21/2023 9:45		
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			09/21/2023 14:04	09/25/2023 18:16
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			09/21/2023 14:04	09/29/2023 15:26
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			09/21/2023 14:04	10/02/2023 13:42

Client: ERM

Work Order: 23091500

Client Project: 0599247

Report Date: 30-Oct-23

Sample ID	Client Sample ID	Collection Date	Received Date		
	Test Name			Prep Date/Time	Analysis Date/Time
23091500-005A	APW-10D-WG-20230919	09/19/2023 16:00	09/21/2023 9:45		
	Standard Methods 2540 C (Total) 1997, 2011				09/21/2023 16:05
	SW-846 9036 (Total)				09/22/2023 18:48
	SW-846 9040B, Laboratory Analyzed				09/27/2023 14:13
	SW-846 9214 (Total)				09/26/2023 11:18
	SW-846 9251 (Total)				09/22/2023 18:47
23091500-005B	APW-10D-WG-20230919	09/19/2023 16:00	09/21/2023 9:45		
	EPA 903.0/904.0, Radium 226/228				10/13/2023 14:22
23091500-005C	APW-10D-WG-20230919	09/19/2023 16:00	09/21/2023 9:45		
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			09/21/2023 18:37	09/26/2023 0:25
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			09/21/2023 18:37	09/27/2023 0:31
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			09/21/2023 18:37	09/27/2023 18:06
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			09/21/2023 18:37	09/28/2023 9:26
	SW-846 7470A (Total)			09/26/2023 8:27	09/26/2023 15:24
23091500-005D	APW-10D-WG-20230919	09/19/2023 16:00	09/21/2023 9:45		
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			09/21/2023 14:04	09/25/2023 20:48
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			09/21/2023 14:04	09/29/2023 15:33
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			09/21/2023 14:04	10/02/2023 13:48
23091500-006A	APW-06S-WG-20230920	09/20/2023 8:50	09/21/2023 9:45		
	Standard Methods 2540 C (Total) 1997, 2011				09/22/2023 10:42
	SW-846 9036 (Total)				09/22/2023 19:00
	SW-846 9040B, Laboratory Analyzed				09/27/2023 14:47
	SW-846 9214 (Total)				09/26/2023 11:20
	SW-846 9251 (Total)				09/22/2023 18:55
23091500-006B	APW-06S-WG-20230920	09/20/2023 8:50	09/21/2023 9:45		
	EPA 903.0/904.0, Radium 226/228				10/23/2023 14:46
23091500-006C	APW-06S-WG-20230920	09/20/2023 8:50	09/21/2023 9:45		
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			09/21/2023 18:37	09/26/2023 0:30
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			09/21/2023 18:37	09/27/2023 0:37
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			09/21/2023 18:37	09/27/2023 18:56
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			09/21/2023 18:37	09/28/2023 10:19
	SW-846 7470A (Total)			09/26/2023 8:27	09/26/2023 15:26
23091500-006D	APW-06S-WG-20230920	09/20/2023 8:50	09/21/2023 9:45		
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			09/21/2023 14:04	09/25/2023 20:54
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			09/21/2023 14:04	09/29/2023 15:39
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			09/21/2023 14:04	10/02/2023 13:54

Client: ERM

Work Order: 23091500

Client Project: 0599247

Report Date: 30-Oct-23

Sample ID	Client Sample ID	Collection Date	Received Date		
	Test Name			Prep Date/Time	Analysis Date/Time
23091500-007A	APW-06D-WG-20230920	09/20/2023 10:05	09/21/2023 9:45		
	Standard Methods 2540 C (Total) 1997, 2011				09/22/2023 10:42
	SW-846 9036 (Total)				09/22/2023 19:08
	SW-846 9040B, Laboratory Analyzed				09/27/2023 14:50
	SW-846 9214 (Total)				09/26/2023 11:22
	SW-846 9251 (Total)				09/22/2023 19:03
23091500-007B	APW-06D-WG-20230920	09/20/2023 10:05	09/21/2023 9:45		
	EPA 903.0/904.0, Radium 226/228				10/13/2023 14:22
23091500-007C	APW-06D-WG-20230920	09/20/2023 10:05	09/21/2023 9:45		
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			09/21/2023 18:37	09/26/2023 0:36
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			09/21/2023 18:37	09/27/2023 0:42
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			09/21/2023 18:37	09/27/2023 19:02
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			09/21/2023 18:37	09/28/2023 10:23
	SW-846 7470A (Total)			09/26/2023 8:27	09/26/2023 15:29
23091500-007D	APW-06D-WG-20230920	09/20/2023 10:05	09/21/2023 9:45		
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			09/21/2023 14:04	09/25/2023 21:00
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			09/21/2023 14:04	09/29/2023 15:45
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			09/21/2023 14:04	10/02/2023 14:01
23091500-008A	APW-05R-WG-20230920	09/20/2023 11:25	09/21/2023 9:45		
	Standard Methods 2540 C (Total) 1997, 2011				09/22/2023 10:42
	SW-846 9036 (Total)				09/22/2023 19:17
	SW-846 9040B, Laboratory Analyzed				09/27/2023 14:52
	SW-846 9214 (Total)				09/26/2023 11:31
	SW-846 9251 (Total)				09/22/2023 19:11
23091500-008B	APW-05R-WG-20230920	09/20/2023 11:25	09/21/2023 9:45		
	EPA 903.0/904.0, Radium 226/228				10/13/2023 14:22
23091500-008C	APW-05R-WG-20230920	09/20/2023 11:25	09/21/2023 9:45		
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			09/21/2023 18:37	09/26/2023 0:41
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			09/21/2023 18:37	09/27/2023 0:48
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			09/21/2023 18:37	09/27/2023 19:08
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			09/21/2023 18:37	09/28/2023 10:27
	SW-846 7470A (Total)			09/26/2023 8:27	09/26/2023 15:31
23091500-008D	APW-05R-WG-20230920	09/20/2023 11:25	09/21/2023 9:45		
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			09/21/2023 14:04	09/25/2023 21:07
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			09/21/2023 14:04	09/29/2023 15:52
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			09/21/2023 14:04	10/02/2023 14:07

Client: ERM

Work Order: 23091500

Client Project: 0599247

Report Date: 30-Oct-23

Sample ID	Client Sample ID	Collection Date	Received Date		
	Test Name			Prep Date/Time	Analysis Date/Time
23091500-009A	APW-09-WG-20230920	09/20/2023 14:00	09/21/2023 9:45		
	Standard Methods 2540 C (Total) 1997, 2011				09/22/2023 11:08
	SW-846 9036 (Total)				09/22/2023 19:20
	SW-846 9040B, Laboratory Analyzed				09/27/2023 14:56
	SW-846 9214 (Total)				09/26/2023 11:33
	SW-846 9251 (Total)				09/22/2023 19:19
23091500-009B	APW-09-WG-20230920	09/20/2023 14:00	09/21/2023 9:45		
	EPA 903.0/904.0, Radium 226/228				10/13/2023 14:22
23091500-009C	APW-09-WG-20230920	09/20/2023 14:00	09/21/2023 9:45		
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			09/21/2023 18:37	09/26/2023 0:47
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			09/21/2023 18:37	09/27/2023 0:53
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			09/21/2023 18:37	09/27/2023 19:13
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			09/21/2023 18:37	09/28/2023 10:31
	SW-846 7470A (Total)			09/26/2023 8:27	09/26/2023 15:33
23091500-009D	APW-09-WG-20230920	09/20/2023 14:00	09/21/2023 9:45		
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			09/21/2023 14:04	09/25/2023 21:13
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			09/21/2023 14:04	09/29/2023 15:58
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			09/21/2023 14:04	10/02/2023 15:17
23091500-010A	APW-02-WG-20230920	09/20/2023 12:30	09/21/2023 9:45		
	Standard Methods 2540 C (Total) 1997, 2011				09/22/2023 11:09
	SW-846 9036 (Total)				09/22/2023 19:49
	SW-846 9040B, Laboratory Analyzed				09/27/2023 14:58
	SW-846 9214 (Total)				09/26/2023 11:35
	SW-846 9251 (Total)				09/22/2023 19:43
23091500-010B	APW-02-WG-20230920	09/20/2023 12:30	09/21/2023 9:45		
	EPA 903.0/904.0, Radium 226/228				10/13/2023 14:22
23091500-010C	APW-02-WG-20230920	09/20/2023 12:30	09/21/2023 9:45		
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			09/21/2023 18:37	09/26/2023 0:53
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			09/21/2023 18:37	09/27/2023 0:59
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			09/21/2023 18:37	09/27/2023 19:19
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			09/21/2023 18:37	09/28/2023 10:35
	SW-846 7470A (Total)			09/26/2023 8:27	09/26/2023 15:35
23091500-010D	APW-02-WG-20230920	09/20/2023 12:30	09/21/2023 9:45		
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			09/21/2023 14:04	09/25/2023 21:19
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			09/21/2023 14:04	09/29/2023 16:04
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			09/21/2023 14:04	10/02/2023 15:23

Client: ERM

Work Order: 23091500

Client Project: 0599247

Report Date: 30-Oct-23

Sample ID	Client Sample ID	Collection Date	Received Date		
	Test Name			Prep Date/Time	Analysis Date/Time
23091500-011A	APW-01R-WG-20230920	09/20/2023 15:10	09/21/2023 9:45		
	Standard Methods 2540 C (Total) 1997, 2011				09/22/2023 11:09
	SW-846 9036 (Total)				09/29/2023 16:21
	SW-846 9040B, Laboratory Analyzed				09/28/2023 9:40
	SW-846 9214 (Total)				09/26/2023 11:36
	SW-846 9251 (Total)				09/22/2023 19:51
23091500-011B	APW-01R-WG-20230920	09/20/2023 15:10	09/21/2023 9:45		
	EPA 903.0/904.0, Radium 226/228				10/13/2023 14:22
23091500-011C	APW-01R-WG-20230920	09/20/2023 15:10	09/21/2023 9:45		
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			09/21/2023 18:37	09/26/2023 0:58
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			09/21/2023 18:37	09/27/2023 1:10
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			09/21/2023 18:37	09/27/2023 19:35
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			09/21/2023 18:37	09/28/2023 11:29
	SW-846 7470A (Total)			09/26/2023 8:27	09/26/2023 15:38
23091500-011D	APW-01R-WG-20230920	09/20/2023 15:10	09/21/2023 9:45		
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			09/21/2023 14:04	09/25/2023 21:25
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			09/21/2023 14:04	09/29/2023 17:14
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			09/21/2023 14:04	10/02/2023 15:30
23091500-012A	APW-04-WG-20230920	09/20/2023 16:10	09/21/2023 9:45		
	Standard Methods 2540 C (Total) 1997, 2011				09/22/2023 11:10
	SW-846 9036 (Total)				09/27/2023 13:00
	SW-846 9040B, Laboratory Analyzed				09/28/2023 9:43
	SW-846 9214 (Total)				09/26/2023 11:38
	SW-846 9251 (Total)				09/22/2023 20:02
23091500-012B	APW-04-WG-20230920	09/20/2023 16:10	09/21/2023 9:45		
	EPA 903.0/904.0, Radium 226/228				10/13/2023 14:22
23091500-012C	APW-04-WG-20230920	09/20/2023 16:10	09/21/2023 9:45		
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			09/21/2023 18:37	09/26/2023 1:55
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			09/21/2023 18:37	09/27/2023 1:04
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			09/21/2023 18:37	09/27/2023 19:24
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			09/21/2023 18:37	09/28/2023 10:39
	SW-846 7470A (Total)			09/26/2023 8:27	09/26/2023 15:40
23091500-012D	APW-04-WG-20230920	09/20/2023 16:10	09/21/2023 9:45		
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			09/21/2023 14:04	09/25/2023 20:04
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			09/21/2023 14:04	09/29/2023 17:46
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			09/21/2023 14:04	10/02/2023 15:49

Client: ERM

Work Order: 23091500

Client Project: 0599247

Report Date: 30-Oct-23

Sample ID	Client Sample ID	Collection Date	Received Date	Prep Date/Time	Analysis Date/Time
Test Name					
23091500-013A	EB-01-WQ-20230919	09/19/2023 8:40	09/21/2023 9:45		
	Standard Methods 2540 C (Total) 1997, 2011				09/21/2023 16:06
	SW-846 9036 (Total)				09/22/2023 20:36
	SW-846 9040B, Laboratory Analyzed				09/27/2023 15:03
	SW-846 9214 (Total)				09/26/2023 11:40
	SW-846 9251 (Total)				09/22/2023 20:37
23091500-013B	EB-01-WQ-20230919	09/19/2023 8:40	09/21/2023 9:45		
	EPA 903.0/904.0, Radium 226/228				10/13/2023 14:22
23091500-013C	EB-01-WQ-20230919	09/19/2023 8:40	09/21/2023 9:45		
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			09/21/2023 18:37	09/26/2023 2:00
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			09/21/2023 18:37	09/27/2023 2:12
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			09/21/2023 18:37	09/27/2023 19:30
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			09/21/2023 18:37	09/28/2023 10:44
	SW-846 7470A (Total)			09/26/2023 8:27	09/27/2023 9:48
23091500-013D	EB-01-WQ-20230919	09/19/2023 8:40	09/21/2023 9:45		
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			09/21/2023 14:04	09/25/2023 19:19
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			09/21/2023 14:04	09/29/2023 17:21
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			09/21/2023 14:04	10/02/2023 15:36
23091500-014A	DUP-01-WG-20230920	09/20/2023 0:01	09/21/2023 9:45		
	Standard Methods 2540 C (Total) 1997, 2011				09/22/2023 11:10
	SW-846 9036 (Total)				09/22/2023 20:50
	SW-846 9040B, Laboratory Analyzed				09/27/2023 15:00
	SW-846 9214 (Total)				09/26/2023 11:43
	SW-846 9251 (Total)				09/22/2023 20:45
23091500-014B	DUP-01-WG-20230920	09/20/2023 0:01	09/21/2023 9:45		
	EPA 903.0/904.0, Radium 226/228				10/13/2023 14:22
23091500-014C	DUP-01-WG-20230920	09/20/2023 0:01	09/21/2023 9:45		
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			09/21/2023 18:38	09/23/2023 5:57
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			09/21/2023 18:38	09/26/2023 7:25
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			09/21/2023 18:38	09/28/2023 1:32
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			09/21/2023 18:38	09/29/2023 14:42
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			09/21/2023 18:38	10/02/2023 12:45
	SW-846 7470A (Total)			09/26/2023 8:27	09/27/2023 9:50
23091500-014D	DUP-01-WG-20230920	09/20/2023 0:01	09/21/2023 9:45		
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			09/21/2023 14:04	09/25/2023 19:26
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			09/21/2023 14:04	09/29/2023 17:27
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			09/21/2023 14:04	10/02/2023 15:42

Client: ERM

Work Order: 23091500

Client Project: 0599247

Report Date: 30-Oct-23

Sample ID	Client Sample ID	Collection Date	Received Date		
	Test Name			Prep Date/Time	Analysis Date/Time
23091500-015A	DUP-02-WG-20230920	09/20/2023 0:02	09/21/2023 9:45		
	Standard Methods 2540 C (Total) 1997, 2011				09/22/2023 11:31
	SW-846 9036 (Total)				09/22/2023 20:53
	SW-846 9040B, Laboratory Analyzed				09/27/2023 15:05
	SW-846 9214 (Total)				09/26/2023 11:46
	SW-846 9251 (Total)				09/22/2023 20:53
23091500-015B	DUP-02-WG-20230920	09/20/2023 0:02	09/21/2023 9:45		
	EPA 903.0/904.0, Radium 226/228				10/23/2023 14:46
23091500-015C	DUP-02-WG-20230920	09/20/2023 0:02	09/21/2023 9:45		
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			09/21/2023 18:38	09/23/2023 5:35
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			09/21/2023 18:38	09/26/2023 7:06
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			09/21/2023 18:38	09/28/2023 1:26
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			09/21/2023 18:38	09/29/2023 14:23
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			09/21/2023 18:38	10/02/2023 12:38
	SW-846 7470A (Total)			09/27/2023 11:50	09/29/2023 9:48
23091500-015D	DUP-02-WG-20230920	09/20/2023 0:02	09/21/2023 9:45		
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			09/21/2023 14:04	09/25/2023 19:32
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			09/21/2023 14:04	09/29/2023 17:33
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			09/21/2023 14:04	10/02/2023 16:33

Client: ERM

Work Order: 23091500

Client Project: 0599247

Report Date: 30-Oct-23

STANDARD METHODS 2540 C (TOTAL) 1997, 2011

Batch R336743		SampType: MBLK		Units mg/L							
SampID: MBLK											Date
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Analyzed	
Total Dissolved Solids		20		< 20	16.00	0	0	-100	100	09/21/2023	
Total Dissolved Solids		20		< 20	16.00	0	0	-100	100	09/21/2023	

Batch R336743		SampType: LCS		Units mg/L						
SampID: LCS										
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Dissolved Solids		20		940	1000	0	94.0	90	110	09/21/2023
Total Dissolved Solids		20		948	1000	0	94.8	90	110	09/21/2023

Batch R336743		SampType: DUP		Units mg/L				RPD Limit 10			
SampID: 23091500-001ADUP											
Analyses		Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Dissolved Solids			20		660				636.0	3.70	09/21/2023

Batch R336815		SampType: MBLK		Units mg/L							
SampID: MBLK											Date
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Analyzed	
Total Dissolved Solids		20		< 20	16.00	0	0	-100	100	09/22/2023	
Total Dissolved Solids		20		< 20	16.00	0	0	-100	100	09/22/2023	
Total Dissolved Solids		20		< 20	16.00	0	0	-100	100	09/22/2023	

Batch R336815		SampType: LCS		Units mg/L							
SampID: LCS											Date
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Analyzed	
Total Dissolved Solids		20		950	1000	0	95.0	90	110	09/22/2023	
Total Dissolved Solids		20		964	1000	0	96.4	90	110	09/22/2023	
Total Dissolved Solids		20		962	1000	0	96.2	90	110	09/22/2023	

Batch R336815		SampType: DUP		Units mg/L					RPD Limit 10		
SampID: 23091500-006ADUP											
Analyses		Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Dissolved Solids			50		585				565.0	3.48	09/22/2023



Quality Control Results

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Client: ERM

Work Order: 23091500

Client Project: 0599247

Report Date: 30-Oct-23

STANDARD METHODS 2540 C (TOTAL) 1997, 2011

Batch	R336815	SampType:	DUP	Units	mg/L	RPD Limit	10					Date Analyzed
SampID:	23091500-015ADUP											
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD			
Total Dissolved Solids		20		380				386.0	1.57			09/22/2023

SW-846 9036 (TOTAL)

Batch	R336796	SampType:	MBLK	Units	mg/L							Date Analyzed
SampID:	ICB/MBLK											
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit			
Sulfate		10		< 10	6.140	0	0	-100	100			09/22/2023

Batch	R336796	SampType:	MBLK	Units	mg/L							Date Analyzed
SampID:	MB-R336796											
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit			
Sulfate		10		< 10	6.140	0	0	-100	100			09/22/2023

Batch	R336796	SampType:	LCS	Units	mg/L							Date Analyzed
SampID:	ICV/LCS											
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit			
Sulfate		10		18	20.00	0	90.1	90	110			09/22/2023

Batch	R336796	SampType:	LCS	Units	mg/L							Date Analyzed
SampID:	LCS-R336796											
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit			
Sulfate		10		18	20.00	0	90.1	90	110			09/22/2023

Batch	R336796	SampType:	MS	Units	mg/L							Date Analyzed
SampID:	23091500-004AMS											
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit			
Sulfate		10	S	12	20.00	0	60.6	85	115			09/22/2023

Batch	R336796	SampType:	MSD	Units	mg/L	RPD Limit	10					Date Analyzed
SampID:	23091500-004AMSD											
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD			
Sulfate		10	S	13	20.00	0	63.8	12.11	5.15			09/22/2023



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Client: ERM

Work Order: 23091500

Client Project: 0599247

Report Date: 30-Oct-23

SW-846 9036 (TOTAL)

Batch R336910		SampType: MBLK		Units mg/L							
SampID: ICB/MBLK											
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed	
Sulfate		10		< 10	6.140	0	0	-100	100	09/26/2023	

Batch R336910		SampType: MBLK		Units mg/L							
SampID: MB-R336910											
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed	
Sulfate		10		< 10	7.620	0	0	-100	100	09/26/2023	

Batch R336910		SampType: LCS		Units mg/L							
SampID: ICV/LCS											
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed	
Sulfate		10		18	20.00	0	90.5	90	110	09/26/2023	

Batch R336910		SampType: LCS		Units mg/L							
SampID: LCS-R336910											
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed	
Sulfate		10		18	20.00	0	90.5	90	110	09/26/2023	

Batch R337008		SampType: MBLK		Units mg/L							
SampID: ICB/MBLK											
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed	
Sulfate		10		< 10	6.140	0	0	-100	100	09/27/2023	

Batch R337008		SampType: MBLK		Units mg/L							
SampID: MB-R337008											
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed	
Sulfate		10		< 10	6.140	0	0	-100	100	09/27/2023	

Batch R337008		SampType: LCS		Units mg/L							
SampID: ICB/LCS											
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed	
Sulfate		10		19	20.00	0	93.6	90	110	09/27/2023	

Batch R337008		SampType: LCS		Units mg/L							
SampID: LCS-R337008											
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed	
Sulfate		10		19	20.00	0	93.6	90	110	09/27/2023	

Client: ERM

Work Order: 23091500

Client Project: 0599247

Report Date: 30-Oct-23

SW-846 9036 (TOTAL)

Batch R337008		SampType: MS		Units mg/L						
SampID: 23091500-012AMS										
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate		20	E	103	40.00	66.47	92.1	85	115	09/27/2023

Batch R337008		SampType: MSD		Units mg/L				RPD Limit 10			
SampID: 23091500-012AMSD											
Analyses		Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Sulfate			20	E	105	40.00	66.47	96.3	103.3	1.63	09/27/2023

Batch R337145		SampType: MBLK		Units mg/L							
SampID: ICB/MBLK											
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed	
Sulfate		10		< 10	6.280	0	100.0	-100	100	09/29/2023	

Batch R337145		SampType: MBLK		Units mg/L							
SampID: MB-R337145											
Analyses		Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate			10		< 10	6.280	0	100.0	-100	100	09/29/2023

Batch R337145		SampType: LCS		Units mg/L							
SampID: ICV/LCS											
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed	
Sulfate		10		19	20.00	0	92.8	90	110	09/29/2023	

Batch R337145		SampType: LCS		Units mg/L							
SampID: LCS-R337145											
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed	
Sulfate		10		19	20.00	0	92.8	90	110	09/29/2023	

SW-846 9040B, LABORATORY ANALYZED

Batch R336927		SampType: LCS		Units							
SampID: LCS											
Analyses		Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Lab pH			1.00		6.99	7.000	0	99.9	99.29	100.7	09/27/2023



Quality Control Results

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Client: ERM

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SW-846 9040B, LABORATORY ANALYZED

Batch R336927		SampType: DUP		Units				RPD Limit 10			
SampID: 23091500-001ADUP											
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed	
Lab pH		1.00	H	7.84				7.840	0.00	09/27/2023	

Batch R336927		SampType: DUP		Units				RPD Limit 10			
SampID: 23091500-002ADUP											
Analyses		Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Lab pH			1.00	H	7.17				7.160	0.14	09/27/2023

Batch R336927		SampType: DUP		Units				RPD Limit 10			
SampID: 23091500-003ADUP											
Analyses		Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Lab pH			1.00	H	6.95				6.940	0.14	09/27/2023

Batch R336927		SampType: DUP		Units				RPD Limit 10			
SampID: 23091500-004ADUP											
Analyses		Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Lab pH			1.00	H	7.18				7.170	0.14	09/27/2023

Batch R336927		SampType: DUP		Units				RPD Limit 10			
SampID: 23091500-005ADUP											
Analyses		Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Lab pH			1.00	H	7.21				7.220	0.14	09/27/2023

Batch R336927		SampType: DUP		Units				RPD Limit 10			
SampID: 23091500-006ADUP											
Analyses		Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Lab pH			1.00	H	7.23				7.210	0.28	09/27/2023

Batch R336927		SampType: DUP		Units				RPD Limit 10			
SampID: 23091500-007ADUP											
Analyses		Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Lab pH			1.00	H	7.30				7.300	0.00	09/27/2023

Batch R336927		SampType: DUP		Units				RPD Limit 10			
SampID: 23091500-008ADUP											
Analyses		Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Lab pH			1.00	H	7.36				7.360	0.00	09/27/2023



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Client Project: 0599247

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SW-846 9040B, LABORATORY ANALYZED

Batch R336927		SampType: DUP		Units				RPD Limit 10			
SampID: 23091500-009ADUP											
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed	
Lab pH		1.00	H	7.55				7.560	0.13	09/27/2023	

Batch R336927		SampType: DUP		Units				RPD Limit 10			
SampID: 23091500-010ADUP											
Analyses		Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Lab pH			1.00	H	7.16				7.150	0.14	09/27/2023

Batch R336927		SampType: DUP		Units				RPD Limit 10			Date Analyzed	
SampID: 23091500-013ADUP												
Analyses		Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD		
Lab pH			1.00	H	5.48				5.500	0.36	09/27/2023	

Batch R336927		SampType: DUP		Units				RPD Limit 10				Date Analyzed
SampID: 23091500-014ADUP												
Analyses		Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD		
Lab pH			1.00	H	7.36				7.360	0.00	09/27/2023	

Batch R336927		SampType: DUP		Units				RPD Limit 10				Date Analyzed
SampID: 23091500-015ADUP												
Analyses		Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD		
Lab pH			1.00	H	7.67				7.650	0.26	09/27/2023	

Batch R336991		SampType: LCS		Units							
SampID: LCS											
Analyses		Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Lab pH			1.00		6.99	7.000	0	99.9	99.29	100.7	09/28/2023

Batch R336991		SampType: DUP		Units				RPD Limit 10			
SampID: 23091500-011ADUP											
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed	
Lab pH		1.00	H	6.68				6.660	0.30	09/28/2023	

Batch R336991		SampType: DUP		Units				RPD Limit 10			
SampID: 23091500-012ADUP											
Analyses		Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Lab pH			1.00	H	7.59				7.560	0.40	09/28/2023



Quality Control Results

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Client: ERM

Work Order: 23091500

Client Project: 0599247

Report Date: 30-Oct-23

SW-846 9214 (TOTAL)

Batch R336875		SampType: MBLK		Units mg/L							
SampID: MBLK											
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed	
Fluoride		0.10		< 0.10	0.0500	0	0	-100	100	09/26/2023	

Batch R336875		SampType: LCS		Units mg/L							
SampID: LCS											Date Analyzed
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit		
Fluoride		0.10		1.03	1.000	0	103.3	90	110	09/26/2023	

Batch R336875		SampType: MS		Units mg/L							
SampID: 23091500-007AMS											
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed	
Fluoride		0.10		2.25	2.000	0.2180	101.5	75	125	09/26/2023	

Batch R336875		SampType: MSD		Units mg/L				RPD Limit 15			
SampID: 23091500-007AMSD											
Analyses		Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Fluoride			0.10		2.23	2.000	0.2180	100.7	2.247	0.67	09/26/2023

Batch R336875		SampType: MS		Units mg/L							
SampID: 23091500-015AMS											
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed	
Fluoride		0.10		2.36	2.000	0.1890	108.4	75	125	09/26/2023	

Batch R336875		SampType: MSD		Units mg/L		RPD Limit 15					
SampID: 23091500-015AMSD											
Analyses		Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Fluoride			0.10		2.24	2.000	0.1890	102.6	2.358	5.09	09/26/2023

SW-846 9251 (TOTAL)

Batch R336801		SampType: MBLK		Units mg/L							
SampID: ICB/MBLK											
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed	
Chloride		4		< 4	0.5000	0	0	-100	100	09/22/2023	

Quality Control Results

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SW-846 9251 (TOTAL)

Batch R336801		SampType: LCS		Units mg/L							
SampID: ICV/LCS											
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed	
Chloride		4		19	20.00	0	93.4	90	110	09/22/2023	

Batch R336801		SampType: MS		Units mg/L						
SampID: 23091500-004AMS										
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride		4		33	20.00	14.98	87.7	85	115	09/22/2023

Batch R336801		SampType: MSD		Units mg/L				RPD Limit 15			Date Analyzed
SampID: 23091500-004AMSD											
Analyses		Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	
Chloride			4		33	20.00	14.98	89.0	32.52	0.80	09/22/2023

Batch R336801		SampType: MS		Units mg/L							
SampID: 23091500-012AMS											
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed	
Chloride		4		27	20.00	9.220	90.3	85	115	09/22/2023	

Batch R336801		SampType: MSD		Units mg/L				RPD Limit 15				Date Analyzed
SampID: 23091500-012AMSD												
Analyses		Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD		
Chloride			4		28	20.00	9.220	94.3	27.28	2.89	09/22/2023	

Batch R336945		SampType: MBLK		Units mg/L							
SampID: ICB/MBLK											
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed	
Chloride		4		< 4	0.5000	0	0	-100	100	09/26/2023	

Batch R336945		SampType: LCS		Units mg/L							
SampID: ICV/LCS											
Analyses		Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride			4		21	20.00	0	105.2	90	110	09/26/2023

Batch R337023		SampType: MBLK		Units mg/L							
SampID: ICB/MBLK											
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed	
Chloride		4		< 4	0.5000	0	0	-100	100	09/27/2023	

Client: ERM

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SW-846 9251 (TOTAL)

Batch R337023		SampType: LCS		Units mg/L							
SampID: ICV/LCS											Date
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Analyzed	
Chloride		4		20	20.00	0	99.6	90	110	09/27/2023	

Batch R337157		SampType: MBLK		Units mg/L							
SampID: ICB/MBLK											Date
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Analyzed	
Chloride		4		< 4	0.5000	0	0	-100	100	09/29/2023	

Batch R337157		SampType: LCS		Units mg/L							
SampID: ICV/LCS											Date
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Analyzed	
Chloride		4		20	20.00	0	100.0	90	110	09/29/2023	

SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)

Batch 212291		SampType: MBLK		Units mg/L							
SampID: MBLK-212291											Date Analyzed
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit		
Antimony		0.0010		< 0.0010	0.0004	0	0	-100	100	09/25/2023	
Arsenic		0.0010		< 0.0010	0.0004	0	0	-100	100	09/25/2023	
Barium		0.0010		< 0.0010	0.0007	0	0	-100	100	09/25/2023	
Beryllium		0.0010		< 0.0010	0.0002	0	0	-100	100	09/25/2023	
Boron		0.0250		< 0.0250	0.0093	0	0	-100	100	09/25/2023	
Cadmium		0.0010		< 0.0010	0.0001	0	0	-100	100	09/25/2023	
Calcium		0.125		< 0.125	0.0700	0	0	-100	100	09/25/2023	
Chromium		0.0015		< 0.0015	0.0007	0	0	-100	100	09/25/2023	
Cobalt		0.0010		< 0.0010	0.0001	0	0	-100	100	09/25/2023	
Lead		0.0010		< 0.0010	0.0006	0	0	-100	100	09/25/2023	
Lithium	*	0.0030		< 0.0030	0.0015	0	0	-100	100	09/25/2023	
Molybdenum	*	0.0015		< 0.0015	0.0006	0	0	-100	100	09/25/2023	
Selenium		0.0010		< 0.0010	0.0006	0	0	-100	100	09/25/2023	
Thallium		0.0020		< 0.0020	0.0010	0	0	-100	100	09/25/2023	

Client: ERM

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SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)

Batch 212291 SampType: LCS Units mg/L										
SampID: LCS-212291										
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010		0.492	0.5000	0	98.5	80	120	09/25/2023
Arsenic		0.0010		0.477	0.5000	0	95.4	80	120	09/25/2023
Barium		0.0010		2.00	2.000	0	100.2	80	120	09/25/2023
Beryllium		0.0010		0.0476	0.0500	0	95.3	80	120	10/02/2023
Boron		0.0250		0.502	0.5000	0	100.5	80	120	09/25/2023
Cadmium		0.0010		0.0487	0.0500	0	97.3	80	120	09/25/2023
Calcium		0.125		2.47	2.500	0	99.0	80	120	09/29/2023
Chromium		0.0015		0.199	0.2000	0	99.6	80	120	09/25/2023
Cobalt		0.0010		0.510	0.5000	0	102.0	80	120	09/25/2023
Lead		0.0010		0.520	0.5000	0	104.0	80	120	09/25/2023
Lithium	*	0.0030		0.497	0.5000	0	99.4	80	120	10/02/2023
Molybdenum	*	0.0015		0.476	0.5000	0	95.1	80	120	09/25/2023
Selenium		0.0010		0.434	0.5000	0	86.9	80	120	09/25/2023
Thallium		0.0020		0.245	0.2500	0	98.0	80	120	09/25/2023

Batch 212291 SampType: MS Units mg/L										
SampID: 23091500-002DMS										
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010		0.508	0.5000	0	101.6	75	125	09/25/2023
Arsenic		0.0010		0.518	0.5000	0.001392	103.2	75	125	09/25/2023
Barium		0.0010		2.28	2.000	0.2358	102.1	75	125	10/02/2023
Beryllium		0.0010		0.0516	0.0500	0	103.2	75	125	10/02/2023
Boron		0.0250		0.629	0.5000	0.1174	102.3	75	125	09/25/2023
Cadmium		0.0010		0.0503	0.0500	0	100.5	75	125	09/25/2023
Calcium		0.125	S	95.9	2.500	94.13	70.4	75	125	09/29/2023
Chromium		0.0015		0.205	0.2000	0	102.6	75	125	09/25/2023
Cobalt		0.0010		0.509	0.5000	0.0007075	101.6	75	125	09/25/2023
Lead		0.0010		0.524	0.5000	0	104.8	75	125	09/25/2023
Lithium	*	0.0030		0.539	0.5000	0.02205	103.4	75	125	10/02/2023
Molybdenum	*	0.0015		0.500	0.5000	0	100.0	75	125	09/25/2023
Selenium		0.0010		0.476	0.5000	0.01213	92.9	75	125	09/25/2023
Thallium		0.0020		0.251	0.2500	0	100.5	75	125	09/29/2023

Client: ERM

Work Order: 23091500

Client Project: 0599247

Report Date: 30-Oct-23

SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)

Batch 212291		SampType: MSD		Units mg/L				RPD Limit 20			Date Analyzed
SampID: 23091500-002DMSD											
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD		
Antimony		0.0010		0.440	0.5000	0	88.0	0.5079	14.32	09/25/2023	
Arsenic		0.0010		0.472	0.5000	0.001392	94.2	0.5175	9.14	09/25/2023	
Barium		0.0010		2.25	2.000	0.2358	100.8	2.277	1.12	10/02/2023	
Beryllium		0.0010		0.0514	0.0500	0	102.8	0.05159	0.34	10/02/2023	
Boron		0.0250		0.592	0.5000	0.1174	95.0	0.6287	5.95	09/25/2023	
Cadmium		0.0010		0.0433	0.0500	0	86.6	0.05025	14.83	09/25/2023	
Calcium		0.125	S	90.6	2.500	94.13	-140.5	95.89	5.65	09/29/2023	
Chromium		0.0015		0.169	0.2000	0	84.3	0.2052	19.61	09/25/2023	
Cobalt		0.0010		0.422	0.5000	0.0007075	84.2	0.5086	18.70	09/25/2023	
Lead		0.0010		0.446	0.5000	0	89.3	0.5242	16.01	09/25/2023	
Lithium	*	0.0030		0.533	0.5000	0.02205	102.3	0.5392	1.10	10/02/2023	
Molybdenum	*	0.0015		0.437	0.5000	0	87.5	0.4998	13.32	09/25/2023	
Selenium		0.0010		0.454	0.5000	0.01213	88.4	0.4765	4.82	09/25/2023	
Thallium		0.0020		0.213	0.2500	0	85.2	0.2513	16.50	09/29/2023	

Batch 212291		SampType: MS		Units mg/L							Date Analyzed	
SampID: 23091500-012DMS												
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit			
Antimony		0.0010		0.495	0.5000	0	99.0	75	125	09/25/2023		
Arsenic		0.0010		0.489	0.5000	0.001563	97.5	75	125	09/25/2023		
Barium		0.0010		2.14	2.000	0.1383	100.3	75	125	09/25/2023		
Beryllium		0.0010		0.0500	0.0500	0	100.0	75	125	10/02/2023		
Boron		0.0250		1.06	0.5000	0.5910	93.8	75	125	09/25/2023		
Cadmium		0.0010		0.0494	0.0500	0	98.8	75	125	09/25/2023		
Calcium		0.125	S	105	2.500	101.4	148.5	75	125	09/29/2023		
Chromium		0.0015		0.195	0.2000	0	97.3	75	125	09/25/2023		
Cobalt		0.0010		0.494	0.5000	0.0001230	98.7	75	125	09/25/2023		
Lead		0.0010		0.511	0.5000	0	102.2	75	125	09/25/2023		
Lithium	*	0.0030		0.544	0.5000	0.04106	100.6	75	125	10/02/2023		
Molybdenum	*	0.0015		0.520	0.5000	0.03666	96.6	75	125	09/25/2023		
Selenium		0.0010		0.452	0.5000	0.009604	88.5	75	125	09/25/2023		
Thallium		0.0020		0.255	0.2500	0	101.9	75	125	09/25/2023		

Client: ERM

Work Order: 23091500

Client Project: 0599247

Report Date: 30-Oct-23

SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)

Batch 212291		SampType: MSD		Units mg/L				RPD Limit 20			Date Analyzed
SampID: 23091500-012DMSD											
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD		
Antimony		0.0010		0.506	0.5000	0	101.2	0.4952	2.19	09/25/2023	
Arsenic		0.0010		0.480	0.5000	0.001563	95.7	0.4892	1.89	09/25/2023	
Barium		0.0010		2.21	2.000	0.1383	103.4	2.144	2.88	09/25/2023	
Beryllium		0.0010		0.0477	0.0500	0	95.3	0.04999	4.77	10/02/2023	
Boron		0.0250		1.09	0.5000	0.5910	100.7	1.060	3.18	09/25/2023	
Cadmium		0.0010		0.0496	0.0500	0	99.2	0.04938	0.40	09/25/2023	
Calcium		0.125	S	102	2.500	101.4	38.9	105.1	2.64	09/29/2023	
Chromium		0.0015		0.195	0.2000	0	97.7	0.1945	0.47	09/25/2023	
Cobalt		0.0010		0.497	0.5000	0.0001230	99.3	0.4936	0.66	09/25/2023	
Lead		0.0010		0.515	0.5000	0	103.0	0.5111	0.76	09/25/2023	
Lithium	*	0.0030		0.534	0.5000	0.04106	98.7	0.5440	1.79	10/02/2023	
Molybdenum	*	0.0015		0.524	0.5000	0.03666	97.4	0.5198	0.77	09/25/2023	
Selenium		0.0010		0.445	0.5000	0.009604	87.2	0.4519	1.44	09/25/2023	
Thallium		0.0020		0.257	0.2500	0	102.8	0.2547	0.93	09/25/2023	

SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)

Batch 212304		SampType: MBLK		Units mg/L							Date Analyzed	
SampID: MBLK-212304												
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit			
Antimony		0.0010		< 0.0010	0.0004	0	0	-100	100	09/26/2023		
Arsenic		0.0010		< 0.0010	0.0004	0	0	-100	100	09/26/2023		
Barium		0.0010		< 0.0010	0.0007	0	0	-100	100	09/26/2023		
Beryllium		0.0010		< 0.0010	0.0002	0	0	-100	100	09/26/2023		
Boron	*	0.0250		< 0.0250	0.0093	0	0	-100	100	09/28/2023		
Cadmium		0.0010		< 0.0010	0.0001	0	0	-100	100	09/26/2023		
Calcium	*	0.125		< 0.125	0.0700	0	0	-100	100	09/26/2023		
Chromium		0.0015		< 0.0015	0.0007	0	0	-100	100	09/26/2023		
Cobalt		0.0010		< 0.0010	0.0001	0	0	-100	100	09/26/2023		
Lead		0.0010		< 0.0010	0.0006	0	0	-100	100	09/26/2023		
Lithium	*	0.0030		< 0.0030	0.0015	0	0	-100	100	09/26/2023		
Molybdenum	*	0.0015		< 0.0015	0.0006	0	0	-100	100	09/26/2023		
Selenium		0.0010		< 0.0010	0.0006	0	0	-100	100	09/26/2023		
Thallium		0.0020		< 0.0020	0.0010	0	0	-100	100	09/26/2023		



Quality Control Results

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Client: ERM

Work Order: 23091500

Client Project: 0599247

Report Date: 30-Oct-23

SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)

Batch 212304		SampType: LCS		Units mg/L							
SampID: LCS-212304											Date Analyzed
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit		
Antimony		0.0010		0.504	0.5000	0	100.9	85	115	09/26/2023	
Arsenic		0.0010		0.517	0.5000	0	103.5	85	115	09/26/2023	
Barium		0.0010		1.99	2.000	0	99.4	85	115	09/26/2023	
Beryllium		0.0010		0.0509	0.0500	0	101.9	85	115	09/26/2023	
Boron	*	0.0250		0.509	0.5000	0	101.8	85	115	09/28/2023	
Cadmium		0.0010		0.0508	0.0500	0	101.7	85	115	09/26/2023	
Calcium	*	0.125		2.32	2.500	0	92.7	85	115	09/26/2023	
Chromium		0.0015		0.207	0.2000	0	103.7	85	115	09/26/2023	
Cobalt		0.0010		0.535	0.5000	0	106.9	85	115	09/26/2023	
Lead		0.0010		0.516	0.5000	0	103.2	85	115	09/26/2023	
Lithium	*	0.0030		0.487	0.5000	0	97.5	85	115	09/28/2023	
Lithium	*	0.0030		0.532	0.5000	0	106.3	85	115	09/26/2023	
Molybdenum	*	0.0015		0.505	0.5000	0	101.0	85	115	09/26/2023	
Selenium		0.0010		0.454	0.5000	0	90.8	85	115	09/26/2023	
Thallium		0.0020		0.255	0.2500	0	101.9	85	115	09/26/2023	

Batch 212304		SampType: MS		Units mg/L							Date Analyzed
SampID: 23091500-001CMS											
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit		
Antimony		0.0010		0.501	0.5000	0	100.2	75	125	09/26/2023	
Arsenic		0.0010		0.520	0.5000	0.001745	103.6	75	125	09/26/2023	
Barium		0.0010		2.16	2.000	0.1367	100.9	75	125	09/26/2023	
Beryllium		0.0010		0.0498	0.0500	0	99.5	75	125	09/26/2023	
Boron		0.0250		4.70	0.5000	4.185	102.8	75	125	09/28/2023	
Cadmium		0.0010		0.0494	0.0500	0	98.7	75	125	09/26/2023	
Calcium		0.125	S	124	2.500	124.1	1.5	75	125	09/26/2023	
Chromium		0.0015		0.199	0.2000	0.0008581	99.1	75	125	09/26/2023	
Cobalt		0.0010		0.509	0.5000	0	101.7	75	125	09/26/2023	
Lead		0.0010		0.521	0.5000	0	104.3	75	125	09/26/2023	
Lithium	*	0.0030		0.534	0.5000	0.03125	100.6	75	125	09/26/2023	
Molybdenum	*	0.0015		0.552	0.5000	0.05583	99.2	75	125	09/26/2023	
Selenium		0.0010		0.462	0.5000	0	92.4	75	125	09/26/2023	
Thallium		0.0020		0.255	0.2500	0	101.8	75	125	09/26/2023	

Client: ERM

Work Order: 23091500

Client Project: 0599247

Report Date: 30-Oct-23

SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)

Batch 212304		SampType: MSD		Units mg/L				RPD Limit 20			Date Analyzed
SampID: 23091500-001CMSD											
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD		
Antimony		0.0010		0.501	0.5000	0	100.2	0.5011	0.01	09/26/2023	
Arsenic		0.0010		0.525	0.5000	0.001745	104.7	0.5198	1.09	09/26/2023	
Barium		0.0010		2.16	2.000	0.1367	100.9	2.156	0.01	09/26/2023	
Beryllium		0.0010		0.0500	0.0500	0	100.0	0.04977	0.49	09/26/2023	
Boron		0.0250	S	4.86	0.5000	4.185	135.0	4.699	3.37	09/28/2023	
Cadmium		0.0010		0.0492	0.0500	0	98.5	0.04937	0.25	09/26/2023	
Calcium		0.125	S	128	2.500	124.1	158.0	124.1	3.10	09/26/2023	
Chromium		0.0015		0.195	0.2000	0.0008581	97.0	0.1990	2.13	09/26/2023	
Cobalt		0.0010		0.492	0.5000	0	98.5	0.5087	3.25	09/26/2023	
Lead		0.0010		0.514	0.5000	0	102.7	0.5213	1.49	09/26/2023	
Lithium	*	0.0030		0.543	0.5000	0.03125	102.4	0.5344	1.67	09/26/2023	
Molybdenum	*	0.0015		0.540	0.5000	0.05583	96.8	0.5520	2.26	09/26/2023	
Selenium		0.0010		0.468	0.5000	0	93.6	0.4621	1.31	09/26/2023	
Thallium		0.0020		0.241	0.2500	0	96.3	0.2546	5.56	09/26/2023	

Batch 212304		SampType: MS		Units mg/L							
SampID: 23091500-011CMS											
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed	
Antimony		0.0010		0.483	0.5000	0	96.7	75	125	09/27/2023	
Arsenic		0.0010		0.497	0.5000	0.002886	98.9	75	125	09/27/2023	
Barium		0.0010		2.26	2.000	0.2016	102.9	75	125	09/27/2023	
Beryllium		0.0010		0.0522	0.0500	0	104.5	75	125	09/27/2023	
Boron		0.0250		0.699	0.5000	0.1801	103.8	75	125	09/28/2023	
Cadmium		0.0010		0.0497	0.0500	0	99.5	75	125	09/27/2023	
Calcium		0.125	S	70.6	2.500	59.21	454.3	75	125	09/27/2023	
Chromium		0.0015		0.214	0.2000	0.008548	102.6	75	125	09/27/2023	
Cobalt		0.0010		0.504	0.5000	0.004115	100.0	75	125	09/27/2023	
Lead		0.0010		0.504	0.5000	0.002599	100.4	75	125	09/27/2023	
Lithium	*	0.0030		0.498	0.5000	0.01467	96.6	75	125	09/28/2023	
Molybdenum	*	0.0015		0.482	0.5000	0.0007717	96.2	75	125	09/27/2023	
Selenium		0.0010		0.465	0.5000	0.003654	92.3	75	125	09/27/2023	
Thallium		0.0020		0.251	0.2500	0	100.5	75	125	09/27/2023	

Client: ERM

Work Order: 23091500

Client Project: 0599247

Report Date: 30-Oct-23

SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)

Batch 212304		SampType: MSD		Units mg/L				RPD Limit 20			Date Analyzed
SampID: 23091500-011CMSD											
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD		
Antimony		0.0010		0.487	0.5000	0	97.4	0.4834	0.75	09/27/2023	
Arsenic		0.0010		0.521	0.5000	0.002886	103.7	0.4975	4.70	09/27/2023	
Barium		0.0010		2.25	2.000	0.2016	102.5	2.259	0.29	09/27/2023	
Beryllium		0.0010		0.0524	0.0500	0	104.9	0.05225	0.38	09/27/2023	
Boron		0.0250		0.748	0.5000	0.1801	113.6	0.6993	6.77	09/28/2023	
Cadmium		0.0010		0.0514	0.0500	0	102.8	0.04975	3.26	09/27/2023	
Calcium		0.125	S	70.9	2.500	59.21	465.9	70.57	0.41	09/27/2023	
Chromium		0.0015		0.207	0.2000	0.008548	99.4	0.2137	2.99	09/27/2023	
Cobalt		0.0010		0.499	0.5000	0.004115	98.9	0.5040	1.04	09/27/2023	
Lead		0.0010		0.513	0.5000	0.002599	102.1	0.5045	1.72	09/27/2023	
Lithium	*	0.0030		0.525	0.5000	0.01467	102.0	0.4978	5.24	09/28/2023	
Molybdenum	*	0.0015		0.495	0.5000	0.0007717	98.8	0.4816	2.65	09/27/2023	
Selenium		0.0010		0.486	0.5000	0.003654	96.5	0.4650	4.44	09/27/2023	
Thallium		0.0020		0.246	0.2500	0	98.5	0.2512	2.02	09/27/2023	

Batch 212305		SampType:	MBLK	Units mg/L							
SampID: MBLK-212305											Date Analyzed
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit		
Antimony		0.0010		< 0.0010	0.0004	0	0	-100	100	09/23/2023	
Arsenic		0.0010		< 0.0010	0.0004	0	0	-100	100	09/26/2023	
Barium		0.0010		< 0.0010	0.0007	0	0	-100	100	09/23/2023	
Beryllium		0.0010		< 0.0010	0.0002	0	0	-100	100	09/26/2023	
Boron		0.0250		< 0.0250	0.0093	0	0	-100	100	09/29/2023	
Cadmium		0.0010		< 0.0010	0.0001	0	0	-100	100	09/23/2023	
Calcium	*	0.125		< 0.125	0.0700	0	0	-100	100	09/23/2023	
Chromium		0.0015		< 0.0015	0.0007	0	0	-100	100	09/23/2023	
Cobalt		0.0010		< 0.0010	0.0001	0	0	-100	100	09/26/2023	
Lead		0.0010		< 0.0010	0.0006	0	0	-100	100	09/26/2023	
Lithium	*	0.0030		< 0.0030	0.0015	0	0	-100	100	09/29/2023	
Molybdenum	*	0.0015		< 0.0015	0.0006	0	0	-100	100	09/26/2023	
Molybdenum	*	0.0015		< 0.0015	0.0006	0	0	-100	100	09/23/2023	
Selenium		0.0010		< 0.0010	0.0006	0	0	-100	100	09/26/2023	
Thallium		0.0020		< 0.0020	0.0010	0	0	-100	100	09/23/2023	



Quality Control Results

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Client: ERM

Work Order: 23091500

Client Project: 0599247

Report Date: 30-Oct-23

SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)

Batch 212305 SampType: LCS Units mg/L

SampID: LCS-212305

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010		0.475	0.5000	0	95.0	85	115	09/23/2023
Arsenic		0.0010		0.560	0.5000	0	111.9	85	115	09/26/2023
Barium		0.0010		1.96	2.000	0	97.9	85	115	09/23/2023
Beryllium		0.0010		0.0529	0.0500	0	105.8	85	115	09/26/2023
Boron		0.0250		0.535	0.5000	0	107.1	80	120	09/29/2023
Cadmium		0.0010		0.0475	0.0500	0	94.9	85	115	09/23/2023
Calcium		0.125		2.63	2.500	0	105.3	80	120	09/29/2023
Chromium		0.0015		0.188	0.2000	0	94.0	85	115	09/23/2023
Cobalt		0.0010		0.564	0.5000	0	112.9	85	115	09/26/2023
Lead		0.0010		0.516	0.5000	0	103.2	80	120	09/28/2023
Lead		0.0010	SE	0.591	0.5000	0	118.2	85	115	09/26/2023
Lithium	*	0.0030		0.541	0.5000	0	108.1	80	120	10/02/2023
Molybdenum	*	0.0015		0.475	0.5000	0	94.9	85	115	09/23/2023
Molybdenum	*	0.0015		0.542	0.5000	0	108.4	85	115	09/26/2023
Selenium		0.0010		0.509	0.5000	0	101.8	85	115	09/26/2023
Thallium		0.0020		0.244	0.2500	0	97.6	85	115	09/23/2023

Batch 212305 SampType: MS Units mg/L

SampID: 23091500-014CMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010		0.479	0.5000	0	95.9	75	125	09/23/2023
Arsenic		0.0010		0.556	0.5000	0.002554	110.7	75	125	09/26/2023
Barium		0.0010		2.17	2.000	0.1579	100.4	75	125	09/23/2023
Beryllium		0.0010		0.0548	0.0500	0	109.6	75	125	09/26/2023
Boron		0.0250	S	9.34	0.5000	8.327	202.8	75	125	09/29/2023
Cadmium		0.0010		0.0477	0.0500	0	95.4	75	125	09/23/2023
Calcium		0.125	S	132	2.500	125.9	241.4	75	125	09/29/2023
Chromium		0.0015		0.211	0.2000	0.001567	104.7	75	125	10/02/2023
Cobalt		0.0010		0.567	0.5000	0.0003208	113.4	75	125	09/26/2023
Lead		0.0010		0.528	0.5000	0.002105	105.2	75	125	09/28/2023
Lithium	*	0.0030		0.585	0.5000	0.04248	108.5	75	125	10/02/2023
Molybdenum	*	0.0015		0.793	0.5000	0.2350	111.7	75	125	09/26/2023
Selenium		0.0010		0.499	0.5000	0	99.8	75	125	09/26/2023
Thallium		0.0020		0.247	0.2500	0	98.9	75	125	09/23/2023



Quality Control Results

<http://www.teklabinc.com/>

Client: ERM

Work Order: 23091500

Client Project: 0599247

Report Date: 30-Oct-23

SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)

Batch 212305		SampType: MSD		Units mg/L				RPD Limit 20			Date Analyzed
SampID: 23091500-014CMSD											
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD		
Antimony		0.0010		0.500	0.5000	0	100.0	0.4795	4.23	09/23/2023	
Arsenic		0.0010		0.541	0.5000	0.002554	107.7	0.5563	2.73	09/26/2023	
Barium		0.0010		2.16	2.000	0.1579	99.9	2.166	0.46	09/23/2023	
Beryllium		0.0010		0.0561	0.0500	0	112.2	0.05478	2.35	09/26/2023	
Boron		0.0250	S	9.13	0.5000	8.327	160.2	9.342	2.31	09/29/2023	
Cadmium		0.0010		0.0490	0.0500	0	98.0	0.04770	2.71	09/23/2023	
Calcium		0.125		129	2.500	125.9	122.9	131.9	2.27	09/29/2023	
Chromium		0.0015		0.208	0.2000	0.001567	103.2	0.2110	1.39	10/02/2023	
Cobalt		0.0010		0.535	0.5000	0.0003208	107.0	0.5673	5.78	09/26/2023	
Lead		0.0010		0.526	0.5000	0.002105	104.8	0.5279	0.35	09/28/2023	
Lithium	*	0.0030		0.592	0.5000	0.04248	109.9	0.5848	1.25	10/02/2023	
Molybdenum	*	0.0015		0.787	0.5000	0.2350	110.5	0.7932	0.76	09/26/2023	
Selenium		0.0010		0.480	0.5000	0	96.1	0.4988	3.77	09/26/2023	
Thallium		0.0020		0.246	0.2500	0	98.4	0.2472	0.46	09/23/2023	

SW-846 7470A (TOTAL)

Batch 212412		SampType: MBLK		Units mg/L							
SampID: MBLK-212412											Date Analyzed
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit		
Mercury		0.00020		< 0.00020	0.0001	0	0	-100	100	09/26/2023	

Batch 212412		SampType: LCS		Units mg/L							
SampID: LCS-212412											Date Analyzed
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit		
Mercury		0.00020		0.00505	0.0050	0	100.9	85	115	09/26/2023	

Batch 212412		SampType: MS		Units mg/L							Date Analyzed
SampID: 23091500-012CMS											
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit		
Mercury		0.00020		0.00521	0.0050	0	104.1	75	125	09/27/2023	

Batch 212412		SampType: MSD		Units mg/L				RPD Limit 15			
SampID: 23091500-012CMSD											
Analyses		Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Mercury			0.00020		0.00537	0.0050	0	107.4	0.005206	3.08	09/27/2023



Quality Control Results

<http://www.teklabinc.com/>

Client: ERM

Work Order: 23091500

Client Project: 0599247

Report Date: 30-Oct-23

SW-846 7470A (TOTAL)

Batch 212516		SampType: MBLK		Units mg/L							
SampID: MBLK-212516											
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed	
Mercury		0.00020		< 0.00020	0.0001	0	0	-100	100	09/29/2023	

Batch 212516		SampType: LCS		Units mg/L							Date Analyzed
SampID: LCS-212516											
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit		
Mercury		0.00020		0.00522	0.0050	0	104.3	85	115	09/29/2023	

Batch 212516		SampType: MS		Units mg/L							
SampID: 23091500-015CMS											
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed	
Mercury		0.00020		0.00518	0.0050	0	103.5	75	125	09/29/2023	

Batch 212516		SampType: MSD		Units mg/L				RPD Limit 15				Date Analyzed
SampID: 23091500-015CMSD												
Analyses		Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD		
Mercury			0.00020		0.00489	0.0050	0	97.8	0.005176	5.69	09/29/2023	

Client: ERM

Work Order: 23091500

Client Project: 0599247

Report Date: 30-Oct-23

Carrier: Marshall Arendell

Received By: MBP

Completed by:
On:

21-Sep-23

Amber Dilallo

Reviewed by:
On:

21-Sep-23

Ellie Hopkins

Pages to follow:

Chain of custody

2

Extra pages included

34

Shipping container/cooler in good condition?

 Yes ☒

 No ☐

 Not Present ☐

Temp °C

3.4

Type of thermal preservation?

 None ☐

 Ice ☒

 Blue Ice ☐

Dry Ice

☐

Chain of custody present?

 Yes ☒

 No ☐

Chain of custody signed when relinquished and received?

 Yes ☒

 No ☐

Chain of custody agrees with sample labels?

 Yes ☒

 No ☐

Samples in proper container/bottle?

 Yes ☒

 No ☐

Sample containers intact?

 Yes ☒

 No ☐

Sufficient sample volume for indicated test?

 Yes ☒

 No ☐

All samples received within holding time?

 Yes ☐

 No ☒

Reported field parameters measured:

 Field ☐

 Lab ☒

 NA ☐

Sample analyses to be measured in the field and/or within 15 minutes of collection were analyzed in the lab as soon as practicable. These analyses include Chlorine (demand, free and/or residual), Carbon Dioxide, Dissolved Oxygen, Ferrous Iron, pH, and Sulfite.

Container/Temp Blank temperature in compliance?

 Yes ☒

 No ☐

When thermal preservation is required, samples are compliant with a temperature between 0.1°C - 6.0°C, or when samples are received on ice the same day as collected.

Water – at least one vial per sample has zero headspace?

 Yes ☐

 No ☐

 No VOA vials ☒

Water - TOX containers have zero headspace?

 Yes ☐

 No ☐

 No TOX containers ☒

Water - pH acceptable upon receipt?

 Yes ☐

 No ☒

 NA ☐

NPDES/CWA TCN interferences checked/treated in the field?

 Yes ☐

 No ☐

 NA ☒
Any No responses must be detailed below or on the COC.

pH strip #90719. - amberdilallo - 9/21/2023 12:08:50 PM

Additional Nitric Acid (92447) was needed in APW-07-WG-20230919 and APW-105-WG-20230919 upon arrival at the laboratory. - CET/amberdilallo - 9/21/2023 12:09:03 PM

EB-01-WQ-20230919 was filtered and preserved with Nitric Acid (92447) for the dissolved parameters upon arrival at the laboratory. - amberdilallo - 9/21/2023 12:10:41 PM

CHAIN OF CUSTODY

pg. 1 of 2 Work order # 23091500

TEKLAB, INC. 5445 Horseshoe Lake Road - Collinsville, IL 62234 - Phone: (618) 344-1004 - Fax: (618) 344-1005

Client: ERM
 Address: 1968 Craig Road
 City / State / Zip: St. Louis, MO 63146
 Contact: Matt Halley Phone: (314) 952-2760
 E-Mail: matt.halley@erm.com Fax:

Samples on: ☒ ICE ☐ BLUE ICE ☐ NO ICE 3.4 °C LTG# 3
 Preserved in: ☒ LAB ☐ FIELD FOR LAB USE ONLY
 Lab Notes: PH 7.19, 2222 HN-3 (2447) to a 2 liters
 from APW-07 and APW-05. CFA 9-21-23

Are these samples known to be involved in litigation? If yes, a surcharge will apply ☐ Yes ☐ No
 Are these samples known to be hazardous? If yes, include details of the hazard. ☐ Yes ☐ No
 Are there any required reporting limits to be met on the requested analysis? If yes, please provide limits in the comment section. ☐ Yes ☐ No

Client Comments:
 Total Metals: Sb As Ba Be B Cd Ca Cr Co Pb Li Mo Se Ti and Hg
 Dissolved Metals: Sb As Ba Be B Cd Ca Cr Co Pb Li Mo Se and Ti
 SUB Ra226/228 to Summit-OH.

Project Name/Number		Sample Collector's Name		MATRIX		INDICATE ANALYSIS REQUESTED																									
0599247		Clay Sansouere/Marshall Arendell																													
Results Requested		Billing Instructions		# and Type of Containers		Drinking Water		Soil		Sludge		Special Waste		Groundwater		Chloride		Dissolved Metals		Fluoride		pH		Ra226/228		Sulfate		TDS		Total Metals	
☒ Standard ☐ 1-2 Day (100% Surcharge) ☐ Other ☐ 3 Day (50% Surcharge)		0599247		UNPRES		Aqueous																									
Lab Use Only	Sample Identification	Date/Time Sampled	UNPRES	NaOH	H2SO4	HCL	MeOH	NaHSO4	OTHER																						
23091500	APW-03-WG-20230919	9/19/23; 1135	1	2	2											X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
002	APW-08-WG-20230919	9/19/23; 1255	1	2	2																										
003	APW-07-WG-20230919	9/19/23; 1350	1	2	2																										
004	APW-10-WG-20230919	9/19/23; 1450	1	2	2																										
005	APW-100-WG-20230919	9/19/23; 11000	1	2	2																										
006	APW-065-WG-20230920	9/20/23; 0850	1	2	2																										
007	APW-060-WG-20230920	9/20/23; 1005	1	2	2																										
008	APW-05R-WG-20230920	9/20/23; 1125	1	2	2																										
009	APW-09-WG-20230920	9/20/23; 1400	1	2	2																										
010	APW-02-WG-20230920	9/20/23; 1230	1	2	2																										
Relinquished By			Date/Time			Received By			Date/Time																						
Marshall Arendell			9/21/23 0945			M. Arendell			9/21/23 0945																						

The individual signing this agreement on behalf of the client, acknowledges that he/she has read and understands the terms and conditions of this agreement, and that he/she has the authority to sign on behalf of the client. See www.teklabinc.com for terms and conditions.

BottleOrder: 82816



Ch 9/21/23

CHAIN OF CUSTODY

pg. 2 of 2 Work order # 23091500

TEKLAB, INC. 5445 Horseshoe Lake Road - Collinsville, IL 62234 - Phone: (618) 344-1004 - Fax: (618) 344-1005

Client: ERM
 Address: 1968 Craig Road
 City / State / Zip: St. Louis, MO 63146
 Contact: Matt Halley Phone: (314) 952-2760
 E-Mail: matt.halley@erm.com Fax: _____

Samples on: ☒ ICE ☐ BLUE ICE ☐ NO ICE 3.4 °C LTG# 3
 Preserved in: ☐ LAB ☐ FIELD **FOR LAB USE ONLY**
 Lab Notes _____

Are these samples known to be involved in litigation? If yes, a surcharge will apply ☐ Yes ☐ No
 Are these samples known to be hazardous? If yes, include details of the hazard. ☐ Yes ☐ No
 Are there any required reporting limits to be met on the requested analysis? If yes, please provide limits in the comment section. ☐ Yes ☐ No

Client Comments:

Total Metals: Sb As Ba Be B Cd Ca Cr Co Pb Li Mo Se Ti and Hg

Dissolved Metals: Sb As Ba Be B Cd Ca Cr Co Pb Li Mo Se and Ti

SUB Ra226/228 to Summit-OH.

Project Name/Number 0599247		Sample Collector's Name <u>Clay Sansouere/Marshall Arendell</u>		MATRIX		INDICATE ANALYSIS REQUESTED																		
Results Requested ☒ Standard ☐ 1-2 Day (100% Surcharge) ☐ Other ☐ 3 Day (50% Surcharge)		Billing Instructions <u>0599247</u>		# and Type of Containers							Drinking Water	Soil	Sludge	Special Waste	Groundwater	Chloride	Dissolved Metals	Fluoride	pH	Ra226/228	Sulfate	TDS	Total Metals	
Lab Use Only		Sample Identification		Date/Time Sampled		UNPRES	HNO3	NaOH	H2SO4	HCL														MeOH
<u>23091500</u>	<u>APW-01R-WB-20230920</u>	<u>9/20/23, 1510</u>	<u>1</u>	<u>2</u>	<u>2</u>									<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	
<u>012</u>	<u>APW-04-WB-20230920</u>	<u>9/20/23, 11010</u>	<u>1</u>	<u>2</u>	<u>2</u>																			
<u>013</u>	<u>EB-01-WB-20230919</u>	<u>9/19/23, 0840</u>	<u>1</u>	<u>1</u>	<u>2</u>																			
<u>014</u>	<u>DAP-01-WB-20230920</u>	<u>9/20/23, 0001</u>	<u>1</u>	<u>2</u>	<u>2</u>																			
<u>015</u>	<u>DAP-02-WB-20230920</u>	<u>9/20/23, 0002</u>	<u>1</u>	<u>2</u>	<u>2</u>																			

Relinquished By		Date/Time	Received By		Date/Time
<u>Marshall Arendell</u>		<u>9/21/23 0945</u>	<u>Mike Ryan Petric</u>		<u>9/21/23 0945</u>

The individual signing this agreement on behalf of the client, acknowledges that he/she has read and understands the terms and conditions of this agreement, and that he/she has the authority to sign on behalf of the client. See www.teklabinc.com for terms and conditions.

BottleOrder: 82816





Summit Environmental Technologies, Inc.
3310 Win St.
Cuyahoga Falls, Ohio 44223
TEL: (330) 253-8211 FAX: (330) 253-4489
Website: <http://www.settek.com>

October 30, 2023

Elizabeth Hurley
TEKLAB Inc,
5445 Horseshoe lake Road
Collinsville, IL 62234
TEL:
FAX:
RE: 23091500

Order No.: 23091975

Dear Elizabeth Hurley:

Summit Environmental Technologies, Inc. received 15 sample(s) on 9/28/2023 for the analyses presented in the following report.

There were no problems with the analytical events associated with this report unless noted in the Case Narrative.

Quality control data is within laboratory defined or method specified acceptance limits except where noted.

If you have any questions regarding these tests results, please feel free to call the laboratory.

Sincerely,

Jennifer Woolf

Project Manager

3310 Win St.
Cuyahoga Falls, Ohio 44223

Arkansas 88-0735, California 2943, Colorado, Connecticut PH-0108, Florida NELAC E87688, Idaho OH00923, Illinois 200061, Indiana C-OH-13, ISO/IEC 17025:2017 119125 L22-544, Kansas E-10347, Kentucky (Underground Storage Tank) 3, Kentucky 90146, Maryland 339, Michigan 9988, Minnesota 1780279, Nevada OH009232020-1, New Hampshire 2996, New Jersey OH006, New York 11777, North Carolina 39705 and 631, North Dakota R-201, Ohio DW, Ohio VAP CL0052, Oklahoma 2019-155, Oregon OH200001, Pennsylvania 68-01335, Rhode Island LA000317, South Carolina 92016001, Texas T104704466-19-16, Utah OH009232020-12, Virginia VELAP 10381, West Virginia 9957C



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Case Narrative

WO#: 23091975
Date: 10/30/2023

CLIENT: TEKLAB Inc,
Project: 23091500

WorkOrder Narrative:

23091975: This report in its entirety consists of the following documents: Cover Letter, Case Narrative, Analytical Results, QC Summary Report, Applicable Accreditation Information, Chain-of-Custody, Cooler Receipt Form, and other applicable forms as necessary. All documents contain the Summit Environmental Technologies, Inc., Work Order Number assigned to this report.

Summit Environmental Technologies, Inc., holds the accreditations/certifications listed at the bottom of the cover letter that may or may not pertain to this report. Please refer to the "Accreditation Program Analytes Report" for accredited analytes list.

The information contained in this analytical report is the sole property of Summit Environmental Technologies, Inc. and that of the customer. It cannot be reproduced in any form without the consent of Summit Environmental Technologies, Inc. or the customer for which this report was issued. The results contained in this report are only representative of the samples received. Conditions can vary at different times and at different sampling conditions. Summit Environmental Technologies, Inc. is not responsible for use or interpretation of the data included herein.

All results for Solid Samples are reported on an "as received" or "wet weight" basis unless indicated as "dry weight" using the "-dry" designation on the reporting units.

This report is believed to meet all of the requirements of the accrediting agency, where applicable. Any comments or problems with the analytical events associated with this report are noted below.

Analytical Sequence Sample Notes:

23091975-002A Radium-228_NPW(904.0): Sample and Sample Duplicate exhibited high RPD for Radium-228. Both samples exhibit detections < PQL.

23091975-003A Radium-228_NPW(904.0): Sample and Sample Duplicate exhibited high RPD for Radium-228. Both samples exhibit detections < PQL.

Original

These commonly used Qualifiers and Acronyms may or may not be present in this report.

Qualifiers

U	The compound was analyzed for but was not detected above the MDL.
J	The reported value is greater than the Method Detection Limit but less than the Reporting Limit.
H	The hold time for sample preparation and/or analysis was exceeded. Not Clean Water Act compliant.
D	The result is reported from a dilution.
E	The result exceeded the linear range of the calibration or is estimated due to interference.
MC	The result is below the Minimum Compound Limit.
*	The result exceeds the Regulatory Limit or Maximum Contamination Limit.
m	Manual integration was used to determine the area response.
d	Manual integration in which peak was deleted
N	The result is presumptive based on a Mass Spectral library search assuming a 1:1 response.
P	The second column confirmation exceeded 25% difference.
C	The result has been confirmed by GC/MS.
X	The result was not confirmed when GC/MS Analysis was performed.
B	The analyte was detected in the Method Blank at a concentration greater than the RL.
MB+	The analyte was detected in the Method Blank at a concentration greater than the MDL.
G	The ICB or CCB contained reportable amounts of analyte.
QC-/+	The CCV recovery failed low (-) or high (+).
R/QDR	The RPD was outside of accepted recovery limits.
QL-/+	The LCS or LCSD recovery failed low (-) or high (+).
QLR	The LCS/LCSD RPD was outside of accepted recovery limits.
QM-/+	The MS or MSD recovery failed low (-) or high (+).
QMR	The MS/MSD RPD was outside of accepted recovery limits.
QV-/+	The ICV recovery failed low (-) or high (+).
S	The spike result was outside of accepted recovery limits.
W	Samples were received outside temperature limits (0° – 6° C). Not Clean Water Act compliant.
Z	Deviation; A deviation from the method was performed; Please refer to the Case Narrative for additional information

Acronyms

ND	Not Detected	RL	Reporting Limit
QC	Quality Control	MDL	Method Detection Limit
MB	Method Blank	LOD	Level of Detection
LCS	Laboratory Control Sample	LOQ	Level of Quantitation
LCSD	Laboratory Control Sample Duplicate	PQL	Practical Quantitation Limit
QCS	Quality Control Sample	CRQL	Contract Required Quantitation Limit
DUP	Duplicate	PL	Permit Limit
MS	Matrix Spike	RegLvl	Regulatory Limit
MSD	Matrix Spike Duplicate	MCL	Maximum Contamination Limit
RPD	Relative Percent Different	MinCL	Minimum Compound Limit
ICV	Initial Calibration Verification	RA	Reanalysis
ICB	Initial Calibration Blank	RE	Reextraction
CCV	Continuing Calibration Verification	TIC	Tentatively Identified Compound
CCB	Continuing Calibration Blank	RT	Retention Time
RLC	Reporting Limit Check	CF	Calibration Factor

This list of Qualifiers and Acronyms reflects the most commonly utilized Qualifiers and Acronyms for reporting. Please refer to the Analytical Notes in the Case Narrative for any Qualifiers or Acronyms that do not appear in this list or for additional information regarding the use of these Qualifiers on reported data.



Summit Environmental Technologies, Inc.
3310 Win St.
Cuyahoga Falls, Ohio 44223
TEL: (330) 253-8211 FAX: (330) 253-4489
Website: <http://www.settek.com>

Workorder Sample Summary

WO#: 23091975
30-Oct-23

CLIENT: TEKLAB Inc,
Project: 23091500

Lab SampleID	Client Sample ID	Tag No	Date Collected	Date Received	Matrix
23091975-001	23091500-001		9/19/2023 11:35:00 AM	9/28/2023 12:45:00 PM	Non-Potable Water
23091975-002	23091500-002		9/19/2023 12:55:00 PM	9/28/2023 12:45:00 PM	Non-Potable Water
23091975-003	23091500-003		9/19/2023 1:50:00 PM	9/28/2023 12:45:00 PM	Non-Potable Water
23091975-004	23091500-004		9/19/2023 2:50:00 PM	9/28/2023 12:45:00 PM	Non-Potable Water
23091975-005	23091500-005		9/19/2023 4:00:00 PM	9/28/2023 12:45:00 PM	Non-Potable Water
23091975-006	23091500-006		9/20/2023 8:50:00 AM	9/28/2023 12:45:00 PM	Non-Potable Water
23091975-007	23091500-007		9/20/2023 10:05:00 AM	9/28/2023 12:45:00 PM	Non-Potable Water
23091975-008	23091500-008		9/20/2023 11:25:00 AM	9/28/2023 12:45:00 PM	Non-Potable Water
23091975-009	23091500-009		9/20/2023 2:00:00 PM	9/28/2023 12:45:00 PM	Non-Potable Water
23091975-010	23091500-010		9/20/2023 12:30:00 PM	9/28/2023 12:45:00 PM	Non-Potable Water
23091975-011	23091500-011		9/20/2023 3:10:00 PM	9/28/2023 12:45:00 PM	Non-Potable Water
23091975-012	23091500-012		9/20/2023 4:10:00 PM	9/28/2023 12:45:00 PM	Non-Potable Water
23091975-013	23091500-013		9/19/2023 8:40:00 AM	9/28/2023 12:45:00 PM	Non-Potable Water
23091975-014	23091500-014		9/20/2023 12:01:00 AM	9/28/2023 12:45:00 PM	Non-Potable Water
23091975-015	23091500-015		9/20/2023 12:02:00 AM	9/28/2023 12:45:00 PM	Non-Potable Water



Summit Environmental Technologies, Inc.
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Cuyahoga Falls, Ohio 44223
TEL: (330) 253-8211 FAX: (330) 253-4489
Website: <http://www.settek.com>

DATES REPORT

WO#: 23091975

30-Oct-23

Client: TEKLAB Inc,
Project: 23091500

Sample ID	Client Sample ID	Collection Date	Matrix	Test Name	Leachate Date	Prep Date	Analysis Date
23091975-001A	23091500-001	9/19/2023 11:35:00 AM	Non-Potable Water	Combined Radium (EPA903+904)			10/27/2023 8:17:34 AM
				Radium-226 (EPA 903.0)		10/3/2023 12:20:13 PM	10/16/2023 10:09:00 AM
				Radium-228 (EPA 904.0)		10/3/2023 12:20:13 PM	10/13/2023 2:22:00 PM
23091975-002A	23091500-002	9/19/2023 12:55:00 PM		Combined Radium (EPA903+904)			10/27/2023 8:17:34 AM
				Radium-226 (EPA 903.0)		10/3/2023 12:20:13 PM	10/16/2023 10:09:00 AM
				Radium-228 (EPA 904.0)		10/3/2023 12:20:13 PM	10/13/2023 2:22:00 PM
23091975-003A	23091500-003	9/19/2023 1:50:00 PM		Combined Radium (EPA903+904)			10/27/2023 8:17:34 AM
				Radium-226 (EPA 903.0)		10/3/2023 12:20:13 PM	10/16/2023 10:09:00 AM
				Radium-228 (EPA 904.0)		10/3/2023 12:20:13 PM	10/13/2023 2:22:00 PM
23091975-004A	23091500-004	9/19/2023 2:50:00 PM		Combined Radium (EPA903+904)			10/27/2023 8:17:34 AM
				Radium-226 (EPA 903.0)		10/3/2023 12:20:13 PM	10/16/2023 10:09:00 AM
				Radium-228 (EPA 904.0)		10/17/2023 1:42:45 PM	10/23/2023 2:46:00 PM
				Radium-228 (EPA 904.0)		10/3/2023 12:20:13 PM	10/13/2023 2:22:00 PM
23091975-005A	23091500-005	9/19/2023 4:00:00 PM		Combined Radium (EPA903+904)			10/27/2023 8:17:34 AM
				Radium-226 (EPA 903.0)		10/3/2023 12:20:13 PM	10/16/2023 10:09:00 AM
				Radium-228 (EPA 904.0)		10/3/2023 12:20:13 PM	10/13/2023 2:22:00 PM
23091975-006A	23091500-006	9/20/2023 8:50:00 AM		Combined Radium (EPA903+904)			10/27/2023 8:17:34 AM
				Radium-226 (EPA 903.0)		10/3/2023 12:20:13 PM	10/16/2023 10:09:00 AM
				Radium-228 (EPA 904.0)		10/3/2023 12:20:13 PM	10/13/2023 2:22:00 PM
				Radium-228 (EPA 904.0)		10/17/2023 1:42:45 PM	10/23/2023 2:46:00 PM
23091975-007A	23091500-007	9/20/2023 10:05:00 AM		Combined Radium (EPA903+904)			10/27/2023 8:17:34 AM
				Radium-226 (EPA 903.0)		10/3/2023 12:20:13 PM	10/16/2023 10:09:00 AM
				Radium-228 (EPA 904.0)		10/3/2023 12:20:13 PM	10/13/2023 2:22:00 PM

Original



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DATES REPORT

WO#: 23091975

30-Oct-23

Client: TEKLAB Inc,
Project: 23091500

Sample ID	Client Sample ID	Collection Date	Matrix	Test Name	Leachate Date	Prep Date	Analysis Date
23091975-008A	23091500-008	9/20/2023 11:25:00 AM	Non-Potable Water	Combined Radium (EPA903+904)			10/27/2023 8:17:34 AM
				Radium-226 (EPA 903.0)		10/3/2023 12:20:13 PM	10/16/2023 10:09:00 AM
				Radium-228 (EPA 904.0)		10/3/2023 12:20:13 PM	10/13/2023 2:22:00 PM
23091975-009A	23091500-009	9/20/2023 2:00:00 PM		Combined Radium (EPA903+904)			10/27/2023 8:17:34 AM
				Radium-226 (EPA 903.0)		10/3/2023 12:20:13 PM	10/16/2023 10:09:00 AM
				Radium-228 (EPA 904.0)		10/3/2023 12:20:13 PM	10/13/2023 2:22:00 PM
23091975-010A	23091500-010	9/20/2023 12:30:00 PM		Combined Radium (EPA903+904)			10/27/2023 8:17:34 AM
				Radium-226 (EPA 903.0)		10/3/2023 12:20:13 PM	10/16/2023 10:09:00 AM
				Radium-228 (EPA 904.0)		10/3/2023 12:20:13 PM	10/13/2023 2:22:00 PM
23091975-011A	23091500-011	9/20/2023 3:10:00 PM		Combined Radium (EPA903+904)			10/27/2023 8:17:34 AM
				Radium-226 (EPA 903.0)		10/3/2023 12:20:13 PM	10/16/2023 10:09:00 AM
				Radium-228 (EPA 904.0)		10/3/2023 12:20:13 PM	10/13/2023 2:22:00 PM
23091975-012A	23091500-012	9/20/2023 4:10:00 PM		Combined Radium (EPA903+904)			10/27/2023 8:17:34 AM
				Radium-226 (EPA 903.0)		10/3/2023 12:20:13 PM	10/16/2023 10:09:00 AM
				Radium-228 (EPA 904.0)		10/3/2023 12:20:13 PM	10/13/2023 2:22:00 PM
23091975-013A	23091500-013	9/19/2023 8:40:00 AM		Combined Radium (EPA903+904)			10/27/2023 8:17:34 AM
				Radium-226 (EPA 903.0)		10/3/2023 12:20:13 PM	10/16/2023 10:09:00 AM
				Radium-228 (EPA 904.0)		10/3/2023 12:20:13 PM	10/13/2023 2:22:00 PM
23091975-014A	23091500-014	9/20/2023 12:01:00 AM		Combined Radium (EPA903+904)			10/27/2023 8:17:34 AM
				Radium-226 (EPA 903.0)		10/3/2023 12:20:13 PM	10/16/2023 10:09:00 AM
				Radium-228 (EPA 904.0)		10/3/2023 12:20:13 PM	10/13/2023 2:22:00 PM
23091975-015A	23091500-015	9/20/2023 12:02:00 AM		Combined Radium (EPA903+904)			10/27/2023 8:17:34 AM
				Radium-226 (EPA 903.0)		10/3/2023 12:20:13 PM	10/16/2023 10:09:00 AM

Original



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DATES REPORT

WO#: 23091975
30-Oct-23

Client: TEKLAB Inc,
Project: 23091500

Sample ID	Client Sample ID	Collection Date	Matrix	Test Name	Leachate Date	Prep Date	Analysis Date
23091975-015A	23091500-015	9/20/2023 12:02:00 AM	Non-Potable Water	Radium-228 (EPA 904.0)		10/17/2023 1:42:45 PM	10/23/2023 2:46:00 PM
				Radium-228 (EPA 904.0)		10/3/2023 12:20:13 PM	10/13/2023 2:22:00 PM

Original



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Analytical Report

(consolidated)

WO#: 23091975

Date Reported: 10/30/2023

CLIENT: TEKLAB Inc, **Collection Date:** 9/19/2023 11:35:00 AM
Project: 23091500
Lab ID: 23091975-001 **Matrix:** NON-POTABLE WATER
Client Sample ID: 23091500-001

Analyses	Result	PQL	Qual	Units	Uncertainty	DF	Date Analyzed
COMBINED RADIUM (EPA903+904)				CALCULATION		Analyst: CXS	
Radium-226/Radium-228	1.05	2.00	U	pCi/L	± 0.61	1	10/27/2023 8:17:34 AM
RADIUM-226 (EPA 903.0)				E903.0	E903-904	Analyst: HDJ	
Radium-226	0.2	1.00	U	pCi/L	± 0.09	1	10/16/2023 10:09:00 A
Yield	1					1	10/16/2023 10:09:00 A
RADIUM-228 (EPA 904.0)				E904.0	E903-904	Analyst: HDJ	
Radium-228	0.85	1.00	J	pCi/L	± 0.52	1	10/13/2023 2:22:00 PM
Yield	1					1	10/13/2023 2:22:00 PM

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	M	Manual Integration used to determine area response
	MC	Value is below Minimum Compound Limit.	N	Tentatively identified compounds
	ND	Not Detected	OG1	
	P	Second column confirmation exceeds	PL	Permit Limit



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Analytical Report

(consolidated)

WO#: 23091975

Date Reported: 10/30/2023

CLIENT: TEKLAB Inc,
Project: 23091500
Lab ID: 23091975-002
Client Sample ID: 23091500-002

Collection Date: 9/19/2023 12:55:00 PM

Matrix: NON-POTABLE WATER

Analyses	Result	PQL	Qual	Units	Uncertainty	DF	Date Analyzed
COMBINED RADIUM (EPA903+904)				CALCULATION		Analyst: CXS	
Radium-226/Radium-228	1.04	2.00	U	pCi/L	± 0.58	1	10/27/2023 8:17:34 AM
RADIUM-226 (EPA 903.0)				E903.0	E903-904	Analyst: HDJ	
Radium-226	0.23	1.00	U	pCi/L	± 0.09	1	10/16/2023 10:09:00 A
Yield	1					1	10/16/2023 10:09:00 A
RADIUM-228 (EPA 904.0)				E904.0	E903-904	Analyst: HDJ	
Radium-228	0.81	1.00	JQDR	pCi/L	± 0.49	1	10/13/2023 2:22:00 PM
Yield	0.97					1	10/13/2023 2:22:00 PM

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	M	Manual Integration used to determine area response
	MC	Value is below Minimum Compound Limit.	N	Tentatively identified compounds
	ND	Not Detected	OG1	
	P	Second column confirmation exceeds	PL	Permit Limit



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Analytical Report

(consolidated)

WO#: 23091975

Date Reported: 10/30/2023

CLIENT: TEKLAB Inc, **Collection Date:** 9/19/2023 1:50:00 PM
Project: 23091500
Lab ID: 23091975-003 **Matrix:** NON-POTABLE WATER
Client Sample ID: 23091500-003

Analyses	Result	PQL	Qual	Units	Uncertainty	DF	Date Analyzed
COMBINED RADIUM (EPA903+904)				CALCULATION		Analyst: CXS	
Radium-226/Radium-228	1.1	2.00	U	pCi/L	± 0.69	1	10/27/2023 8:17:34 AM
RADIUM-226 (EPA 903.0)				E903.0	E903-904	Analyst: HDJ	
Radium-226	0.11	1.00	U	pCi/L	± 0.07	1	10/16/2023 10:09:00 A
Yield	1					1	10/16/2023 10:09:00 A
RADIUM-228 (EPA 904.0)				E904.0	E903-904	Analyst: HDJ	
Radium-228	0.99	1.00	JQDR	pCi/L	± 0.62	1	10/13/2023 2:22:00 PM
Yield	0.94					1	10/13/2023 2:22:00 PM

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	M	Manual Integration used to determine area response
	MC	Value is below Minimum Compound Limit.	N	Tentatively identified compounds
	ND	Not Detected	OG1	
	P	Second column confirmation exceeds	PL	Permit Limit



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Analytical Report

(consolidated)

WO#: 23091975

Date Reported: 10/30/2023

CLIENT: TEKLAB Inc, **Collection Date:** 9/19/2023 2:50:00 PM
Project: 23091500
Lab ID: 23091975-004 **Matrix:** NON-POTABLE WATER
Client Sample ID: 23091500-004

Analyses	Result	PQL	Qual	Units	Uncertainty	DF	Date Analyzed
COMBINED RADIUM (EPA903+904)				CALCULATION		Analyst: CXS	
Radium-226/Radium-228	4.83	2.00		pCi/L	± 1.05	1	10/27/2023 8:17:34 AM
RADIUM-226 (EPA 903.0)				E903.0	E903-904	Analyst: HDJ	
Radium-226	0.59	1.00	U	pCi/L	± 0.14	1	10/16/2023 10:09:00 A
Yield	1					1	10/16/2023 10:09:00 A
RADIUM-228 (EPA 904.0)				E904.0	E903-904	Analyst: HDJ	
Radium-228	4.24	1.00		pCi/L	± 0.91	1	10/23/2023 2:46:00 PM
Yield	1					1	10/23/2023 2:46:00 PM

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	M	Manual Integration used to determine area response
	MC	Value is below Minimum Compound Limit.	N	Tentatively identified compounds
	ND	Not Detected	OG1	
	P	Second column confirmation exceeds	PL	Permit Limit



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Analytical Report

(consolidated)

WO#: 23091975

Date Reported: 10/30/2023

CLIENT: TEKLAB Inc,

Collection Date: 9/19/2023 4:00:00 PM

Project: 23091500

Lab ID: 23091975-005

Matrix: NON-POTABLE WATER

Client Sample ID: 23091500-005

Analyses	Result	PQL	Qual	Units	Uncertainty	DF	Date Analyzed
COMBINED RADIUM (EPA903+904)				CALCULATION		Analyst: CXS	
Radium-226/Radium-228	0.82	2.00	U	pCi/L	± 0.58	1	10/27/2023 8:17:34 AM
RADIUM-226 (EPA 903.0)				E903.0	E903-904	Analyst: HDJ	
Radium-226	0.21	1.00	U	pCi/L	± 0.09	1	10/16/2023 10:09:00 A
Yield	1					1	10/16/2023 10:09:00 A
RADIUM-228 (EPA 904.0)				E904.0	E903-904	Analyst: HDJ	
Radium-228	0.61	1.00	U	pCi/L	± 0.49	1	10/13/2023 2:22:00 PM
Yield	1					1	10/13/2023 2:22:00 PM

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	M	Manual Integration used to determine area response
	MC	Value is below Minimum Compound Limit.	N	Tentatively identified compounds
	ND	Not Detected	OG1	
	P	Second column confirmation exceeds	PL	Permit Limit



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Analytical Report

(consolidated)

WO#: 23091975

Date Reported: 10/30/2023

CLIENT: TEKLAB Inc,
Project: 23091500
Lab ID: 23091975-006
Client Sample ID: 23091500-006

Collection Date: 9/20/2023 8:50:00 AM

Matrix: NON-POTABLE WATER

Analyses	Result	PQL	Qual	Units	Uncertainty	DF	Date Analyzed
COMBINED RADIUM (EPA903+904)				CALCULATION		Analyst: CXS	
Radium-226/Radium-228	0.73	2.00	U	pCi/L	± 0.49	1	10/27/2023 8:17:34 AM
RADIUM-226 (EPA 903.0)				E903.0	E903-904	Analyst: HDJ	
Radium-226	0.32	1.00	U	pCi/L	± 0.11	1	10/16/2023 10:09:00 A
Yield	0.98					1	10/16/2023 10:09:00 A
RADIUM-228 (EPA 904.0)				E904.0	E903-904	Analyst: HDJ	
Radium-228	0.41	1.00	U	pCi/L	± 0.38	1	10/23/2023 2:46:00 PM
Yield	1					1	10/23/2023 2:46:00 PM

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	M	Manual Integration used to determine area response
	MC	Value is below Minimum Compound Limit.	N	Tentatively identified compounds
	ND	Not Detected	OG1	
	P	Second column confirmation exceeds	PL	Permit Limit



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Analytical Report

(consolidated)

WO#: 23091975

Date Reported: 10/30/2023

CLIENT: TEKLAB Inc,

Collection Date: 9/20/2023 10:05:00 AM

Project: 23091500

Lab ID: 23091975-007

Matrix: NON-POTABLE WATER

Client Sample ID: 23091500-007

Analyses	Result	PQL	Qual	Units	Uncertainty	DF	Date Analyzed
COMBINED RADIUM (EPA903+904)				CALCULATION		Analyst: CXS	
Radium-226/Radium-228	2.8	2.00		pCi/L	± 0.85	1	10/27/2023 8:17:34 AM
RADIUM-226 (EPA 903.0)				E903.0		E903-904	Analyst: HDJ
Radium-226	0.18	1.00	U	pCi/L	± 0.09	1	10/16/2023 10:09:00 A
Yield	0.98					1	10/16/2023 10:09:00 A
RADIUM-228 (EPA 904.0)				E904.0		E903-904	Analyst: HDJ
Radium-228	2.62	1.00		pCi/L	± 0.76	1	10/13/2023 2:22:00 PM
Yield	1					1	10/13/2023 2:22:00 PM

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	M	Manual Integration used to determine area response
	MC	Value is below Minimum Compound Limit.	N	Tentatively identified compounds
	ND	Not Detected	OG1	
	P	Second column confirmation exceeds	PL	Permit Limit



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Analytical Report

(consolidated)

WO#: 23091975

Date Reported: 10/30/2023

CLIENT: TEKLAB Inc, **Collection Date:** 9/20/2023 11:25:00 AM
Project: 23091500
Lab ID: 23091975-008 **Matrix:** NON-POTABLE WATER
Client Sample ID: 23091500-008

Analyses	Result	PQL	Qual	Units	Uncertainty	DF	Date Analyzed
COMBINED RADIUM (EPA903+904)				CALCULATION		Analyst: CXS	
Radium-226/Radium-228	6.34	2.00		pCi/L	± 1.53	1	10/27/2023 8:17:34 AM
RADIUM-226 (EPA 903.0)				E903.0	E903-904	Analyst: HDJ	
Radium-226	0.49	1.00	U	pCi/L	± 0.13	1	10/16/2023 10:09:00 A
Yield	0.96					1	10/16/2023 10:09:00 A
RADIUM-228 (EPA 904.0)				E904.0	E903-904	Analyst: HDJ	
Radium-228	5.85	1.00	*	pCi/L	± 1.14	1	10/13/2023 2:22:00 PM
Yield	0.97					1	10/13/2023 2:22:00 PM

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	M	Manual Integration used to determine area response
	MC	Value is below Minimum Compound Limit.	N	Tentatively identified compounds
	ND	Not Detected	OG1	
	P	Second column confirmation exceeds	PL	Permit Limit



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Analytical Report

(consolidated)

WO#: 23091975

Date Reported: 10/30/2023

CLIENT: TEKLAB Inc,

Collection Date: 9/20/2023 2:00:00 PM

Project: 23091500

Lab ID: 23091975-009

Matrix: NON-POTABLE WATER

Client Sample ID: 23091500-009

Analyses	Result	PQL	Qual	Units	Uncertainty	DF	Date Analyzed
COMBINED RADIUM (EPA903+904)				CALCULATION		Analyst: CXS	
Radium-226/Radium-228	1.17	2.00	U	pCi/L	± 0.65	1	10/27/2023 8:17:34 AM
RADIUM-226 (EPA 903.0)				E903.0	E903-904	Analyst: HDJ	
Radium-226	0	1.00	U	pCi/L	± 0.05	1	10/16/2023 10:09:00 A
Yield	0.97					1	10/16/2023 10:09:00 A
RADIUM-228 (EPA 904.0)				E904.0	E903-904	Analyst: HDJ	
Radium-228	1.17	1.00		pCi/L	± 0.6	1	10/13/2023 2:22:00 PM
Yield	0.96					1	10/13/2023 2:22:00 PM

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	M	Manual Integration used to determine area response
	MC	Value is below Minimum Compound Limit.	N	Tentatively identified compounds
	ND	Not Detected	OG1	
	P	Second column confirmation exceeds	PL	Permit Limit



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Analytical Report

(consolidated)

WO#: 23091975

Date Reported: 10/30/2023

CLIENT: TEKLAB Inc, **Collection Date:** 9/20/2023 12:30:00 PM
Project: 23091500
Lab ID: 23091975-010 **Matrix:** NON-POTABLE WATER
Client Sample ID: 23091500-010

Analyses	Result	PQL	Qual	Units	Uncertainty	DF	Date Analyzed
COMBINED RADIUM (EPA903+904)				CALCULATION		Analyst: CXS	
Radium-226/Radium-228	4.09	2.00		pCi/L	± 1.05	1	10/27/2023 8:17:34 AM
RADIUM-226 (EPA 903.0)				E903.0	E903-904	Analyst: HDJ	
Radium-226	0.38	1.00	U	pCi/L	± 0.12	1	10/16/2023 10:09:00 A
Yield	0.97					1	10/16/2023 10:09:00 A
RADIUM-228 (EPA 904.0)				E904.0	E903-904	Analyst: HDJ	
Radium-228	3.71	1.00		pCi/L	± 0.93	1	10/13/2023 2:22:00 PM
Yield	0.99					1	10/13/2023 2:22:00 PM

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	M	Manual Integration used to determine area response
	MC	Value is below Minimum Compound Limit.	N	Tentatively identified compounds
	ND	Not Detected	OG1	
	P	Second column confirmation exceeds	PL	Permit Limit



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Analytical Report

(consolidated)

WO#: 23091975

Date Reported: 10/30/2023

CLIENT: TEKLAB Inc, **Collection Date:** 9/20/2023 3:10:00 PM
Project: 23091500
Lab ID: 23091975-011 **Matrix:** NON-POTABLE WATER
Client Sample ID: 23091500-011

Analyses	Result	PQL	Qual	Units	Uncertainty	DF	Date Analyzed
COMBINED RADIUM (EPA903+904)				CALCULATION		Analyst: CXS	
Radium-226/Radium-228	0.64	2.00	U	pCi/L	± 0.67	1	10/27/2023 8:17:34 AM
RADIUM-226 (EPA 903.0)				E903.0	E903-904	Analyst: HDJ	
Radium-226	0.32	1.00	U	pCi/L	± 0.11	1	10/16/2023 10:09:00 A
Yield	0.93					1	10/16/2023 10:09:00 A
RADIUM-228 (EPA 904.0)				E904.0	E903-904	Analyst: HDJ	
Radium-228	0.32	1.00	U	pCi/L	± 0.56	1	10/13/2023 2:22:00 PM
Yield	0.94					1	10/13/2023 2:22:00 PM

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	M	Manual Integration used to determine area response
	MC	Value is below Minimum Compound Limit.	N	Tentatively identified compounds
	ND	Not Detected	OG1	
	P	Second column confirmation exceeds	PL	Permit Limit



Summit Environmental Technologies, Inc.
3310 Win St.
Cuyahoga Falls, Ohio 44223
TEL: (330) 253-8211 FAX: (330) 253-4489
Website: <http://www.settek.com>

Analytical Report

(consolidated)

WO#: 23091975

Date Reported: 10/30/2023

CLIENT: TEKLAB Inc, **Collection Date:** 9/20/2023 4:10:00 PM
Project: 23091500
Lab ID: 23091975-012 **Matrix:** NON-POTABLE WATER
Client Sample ID: 23091500-012

Analyses	Result	PQL	Qual	Units	Uncertainty	DF	Date Analyzed
COMBINED RADIUM (EPA903+904)				CALCULATION		Analyst: CXS	
Radium-226/Radium-228	1.27	2.00	U	pCi/L	± 0.74	1	10/27/2023 8:17:34 AM
RADIUM-226 (EPA 903.0)				E903.0	E903-904	Analyst: HDJ	
Radium-226	0.09	1.00	U	pCi/L	± 0.07	1	10/16/2023 10:09:00 A
Yield	0.91					1	10/16/2023 10:09:00 A
RADIUM-228 (EPA 904.0)				E904.0	E903-904	Analyst: HDJ	
Radium-228	1.18	1.00		pCi/L	± 0.67	1	10/13/2023 2:22:00 PM
Yield	0.93					1	10/13/2023 2:22:00 PM

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	M	Manual Integration used to determine area response
	MC	Value is below Minimum Compound Limit.	N	Tentatively identified compounds
	ND	Not Detected	OG1	
	P	Second column confirmation exceeds	PL	Permit Limit



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Analytical Report

(consolidated)

WO#: 23091975

Date Reported: 10/30/2023

CLIENT: TEKLAB Inc,

Collection Date: 9/19/2023 8:40:00 AM

Project: 23091500

Lab ID: 23091975-013

Matrix: NON-POTABLE WATER

Client Sample ID: 23091500-013

Analyses	Result	PQL	Qual	Units	Uncertainty	DF	Date Analyzed
COMBINED RADIUM (EPA903+904)				CALCULATION		Analyst: CXS	
Radium-226/Radium-228	0.94	2.00	U	pCi/L	± 0.73	1	10/27/2023 8:17:34 AM
RADIUM-226 (EPA 903.0)				E903.0	E903-904	Analyst: HDJ	
Radium-226	-0.02	1.00	U	pCi/L	± 0.05	1	10/16/2023 10:09:00 A
Yield	0.97					1	10/16/2023 10:09:00 A
RADIUM-228 (EPA 904.0)				E904.0	E903-904	Analyst: HDJ	
Radium-228	0.94	1.00	J	pCi/L	± 0.68	1	10/13/2023 2:22:00 PM
Yield	0.98					1	10/13/2023 2:22:00 PM

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	M	Manual Integration used to determine area response
	MC	Value is below Minimum Compound Limit.	N	Tentatively identified compounds
	ND	Not Detected	OG1	
	P	Second column confirmation exceeds	PL	Permit Limit



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Analytical Report

(consolidated)

WO#: 23091975

Date Reported: 10/30/2023

CLIENT: TEKLAB Inc, **Collection Date:** 9/20/2023 12:01:00 AM
Project: 23091500
Lab ID: 23091975-014 **Matrix:** NON-POTABLE WATER
Client Sample ID: 23091500-014

Analyses	Result	PQL	Qual	Units	Uncertainty	DF	Date Analyzed
COMBINED RADIUM (EPA903+904)				CALCULATION		Analyst: CXS	
Radium-226/Radium-228	0.78	2.00	U	pCi/L	± 0.84	1	10/27/2023 8:17:34 AM
RADIUM-226 (EPA 903.0)				E903.0	E903-904	Analyst: HDJ	
Radium-226	0.36	1.00	U	pCi/L	± 0.13	1	10/16/2023 10:09:00 A
Yield	0.79					1	10/16/2023 10:09:00 A
RADIUM-228 (EPA 904.0)				E904.0	E903-904	Analyst: HDJ	
Radium-228	0.42	1.00	U	pCi/L	± 0.71	1	10/13/2023 2:22:00 PM
Yield	0.76					1	10/13/2023 2:22:00 PM

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	M	Manual Integration used to determine area response
	MC	Value is below Minimum Compound Limit.	N	Tentatively identified compounds
	ND	Not Detected	OG1	
	P	Second column confirmation exceeds	PL	Permit Limit



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Analytical Report

(consolidated)

WO#: 23091975

Date Reported: 10/30/2023

CLIENT: TEKLAB Inc,

Collection Date: 9/20/2023 12:02:00 AM

Project: 23091500

Lab ID: 23091975-015

Matrix: NON-POTABLE WATER

Client Sample ID: 23091500-015

Analyses	Result	PQL	Qual	Units	Uncertainty	DF	Date Analyzed
COMBINED RADIUM (EPA903+904)				CALCULATION		Analyst: CXS	
Radium-226/Radium-228	0.22	2.00	U	pCi/L	± 0.46	1	10/27/2023 8:17:34 AM
RADIUM-226 (EPA 903.0)				E903.0	E903-904	Analyst: HDJ	
Radium-226	-0.02	1.00	U	pCi/L	± 0.05	1	10/16/2023 10:09:00 A
Yield	0.96					1	10/16/2023 10:09:00 A
RADIUM-228 (EPA 904.0)				E904.0	E903-904	Analyst: HDJ	
Radium-228	0.22	1.00	U	pCi/L	± 0.41	1	10/23/2023 2:46:00 PM
Yield	1					1	10/23/2023 2:46:00 PM

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	M	Manual Integration used to determine area response
	MC	Value is below Minimum Compound Limit.	N	Tentatively identified compounds
	ND	Not Detected	OG1	
	P	Second column confirmation exceeds	PL	Permit Limit



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QC SUMMARY REPORT

WO#: 23091975

30-Oct-23

Client: TEKLAB Inc,

Project: 23091500

BatchID: 69189

Sample ID: 23091975-001AMS	SampType: MS	TestCode: Radium-228_	Units: pCi/L	Prep Date: 10/3/2023	RunNo: 172738						
Client ID: 23091500-001	Batch ID: 69189	TestNo: E904.0	E903-904	Analysis Date: 10/13/2023	SeqNo: 4657493						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Radium-228	4.70	1.00	5.000	0.8500	77.0	70	130				
Yield	0.970			1.000	0						

Sample ID: 23091975-002ADUP	SampType: DUP	TestCode: Radium-228_	Units: pCi/L	Prep Date: 10/3/2023	RunNo: 172738						
Client ID: 23091500-002	Batch ID: 69189	TestNo: E904.0	E903-904	Analysis Date: 10/13/2023	SeqNo: 4657496						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Radium-228	0.24	1.00		0	0			0.8100	200	30	RU
Yield	1			0	0			0.9700	3.05		

Sample ID: 23091975-003ADUP	SampType: DUP	TestCode: Radium-228_	Units: pCi/L	Prep Date: 10/3/2023	RunNo: 172738						
Client ID: 23091500-003	Batch ID: 69189	TestNo: E904.0	E903-904	Analysis Date: 10/13/2023	SeqNo: 4657498						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Radium-228	0.69	1.00		0	0			0.9900	35.7	30	JR
Yield	0.97			0	0			0.9400	3.14		

Qualifiers: B Analyte detected in the associated Method Blank
J Analyte detected below quantitation limits
ND Not Detected
PL Permit Limit

E Value above quantitation range
M Manual Integration used to determine area response
OG1
R RPD outside accepted recovery limits

H Holding times for preparation or analy
MC Value is below Minimum Compound
P Second column confirmation exceeds
RL Reporting Detection Limit

Original



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QC SUMMARY REPORT

WO#: 23091975

30-Oct-23

Client: TEKLAB Inc,

Project: 23091500

BatchID: 69189

Sample ID: MB-69189	SampType: MBLK	TestCode: Radium-228_ Units: pCi/L				Prep Date: 10/3/2023				RunNo: 172738		
Client ID: PBW	Batch ID: 69189	TestNo: E904.0		E903-904		Analysis Date: 10/13/2023				SeqNo: 4657487		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	
Radium-228	0.910	1.00		0	0						J	
Yield	1.00			0	0							

Sample ID: LCS-69189	SampType: LCS	TestCode: Radium-228_ Units: pCi/L				Prep Date: 10/3/2023			RunNo: 172738		
Client ID: LCSW	Batch ID: 69189	TestNo: E904.0		E903-904		Analysis Date: 10/13/2023			SeqNo: 4657488		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Radium-228	3.60	1.00	5.000	0	72.0	70	130				
Yield	0.970			0	0						

Sample ID: RLC-69189	SampType: RLC	TestCode: Radium-228_	Units: pCi/L	Prep Date: 10/3/2023	RunNo: 172738						
Client ID: BatchQC	Batch ID: 69189	TestNo: E904.0	E903-904	Analysis Date: 10/13/2023	SeqNo: 4657491						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Radium-228	0.830	1.00	1.000	0	83.0	50	150				J
Yield	1.00			0	0						

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analy
J	Analyte detected below quantitation limits	M	Manual Integration used to determine area response	MC	Value is below Minimum Compound
ND	Not Detected	OG1		P	Second column confirmation exceeds
PL	Permit Limit	R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

Original



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QC SUMMARY REPORT

WO#: 23091975
30-Oct-23

Client: TEKLAB Inc,
Project: 23091500

BatchID: 69189

Sample ID: RLCD-69189	SampType: RLC	TestCode: Radium-228_ Units: pCi/L				Prep Date: 10/3/2023			RunNo: 172738		
Client ID: BatchQC	Batch ID: 69189	TestNo: E904.0		E903-904		Analysis Date: 10/13/2023			SeqNo: 4657492		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Radium-228	0.710	1.00	1.000	0	71.0	50	150				J
Yield	1.00			0	0						

Qualifiers: B Analyte detected in the associated Method Blank E Value above quantitation range H Holding times for preparation or analy
J Analyte detected below quantitation limits M Manual Integration used to determine area response MC Value is below Minimum Compound
ND Not Detected OG1 P Second column confirmation exceeds
PL Permit Limit R RPD outside accepted recovery limits RL Reporting Detection Limit

Original



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QC SUMMARY REPORT

WO#: 23091975

30-Oct-23

Client: TEKLAB Inc,

Project: 23091500

BatchID: 69189

Sample ID: 23091975-001AMS	SampType: MS	TestCode: Radium-226_	Units: pCi/L	Prep Date: 10/3/2023	RunNo: 172765						
Client ID: 23091500-001	Batch ID: 69189	TestNo: E903.0	E903-904	Analysis Date: 10/16/2023	SeqNo: 4658312						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Radium-226	4.71	1.00	5.000	0	94.2	70	130				

Sample ID: 23091975-002ADUP	SampType: DUP	TestCode: Radium-226_	Units: pCi/L	Prep Date: 10/3/2023	RunNo: 172765						
Client ID: 23091500-002	Batch ID: 69189	TestNo: E903.0	E903-904	Analysis Date: 10/16/2023	SeqNo: 4658315						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Radium-226	0.19	1.00						0	0	30	U
Yield	0.99							1.000	1.01	0	

Sample ID: 23091975-003ADUP	SampType: DUP	TestCode: Radium-226_	Units: pCi/L	Prep Date: 10/3/2023	RunNo: 172765						
Client ID: 23091500-003	Batch ID: 69189	TestNo: E903.0	E903-904	Analysis Date: 10/16/2023	SeqNo: 4658317						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Radium-226	0.24	1.00						0	0	30	U
Yield	0.99							1.000	1.01	0	

Qualifiers: B Analyte detected in the associated Method Blank E Value above quantitation range H Holding times for preparation or analy
J Analyte detected below quantitation limits M Manual Integration used to determine area response MC Value is below Minimum Compound
ND Not Detected OG1 P Second column confirmation exceeds
PL Permit Limit R RPD outside accepted recovery limits RL Reporting Detection Limit

Original



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QC SUMMARY REPORT

WO#: 23091975

30-Oct-23

Client: TEKLAB Inc,

Project: 23091500

BatchID: 69189

Sample ID: MB-69189	SampType: MBLK	TestCode: Radium-226_			Units: pCi/L	Prep Date: 10/3/2023			RunNo: 172765		
Client ID: PBW	Batch ID: 69189	TestNo: E903.0		E903-904		Analysis Date: 10/16/2023			SeqNo: 4658306		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Radium-226	ND	1.00									U
Yield	0.920										

Sample ID: LCS-69189	SampType: LCS	TestCode: Radium-226_ Units: pCi/L				Prep Date: 10/3/2023				RunNo: 172765		
Client ID: LCSW	Batch ID: 69189	TestNo: E903.0		E903-904		Analysis Date: 10/16/2023				SeqNo: 4658307		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	
Radium-226	5.06	1.00	5.000	0	101	70	130					

Sample ID: LCSD-69189	SampType: LCSD	TestCode: Radium-226_ Units: pCi/L				Prep Date: 10/3/2023			RunNo: 172765		
Client ID: LCSS02	Batch ID: 69189	TestNo: E903.0		E903-904		Analysis Date: 10/16/2023			SeqNo: 4658308		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Radium-226	4.60	1.00	5.000	0	92.0	70	130	5.060	9.52	20	

Sample ID: RLC-69189	SampType: RLC	TestCode: Radium-226_	Units: pCi/L	Prep Date: 10/3/2023	RunNo: 172765						
Client ID: BatchQC	Batch ID: 69189	TestNo: E903.0	E903-904	Analysis Date: 10/16/2023	SeqNo: 4658310						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Qualifiers: B Analyte detected in the associated Method Blank
J Analyte detected below quantitation limits
ND Not Detected
PL Permit Limit

E Value above quantitation range
M Manual Integration used to determine area response
OG1
R RPD outside accepted recovery limits

H Holding times for preparation or analy
MC Value is below Minimum Compound
P Second column confirmation exceeds
RL Reporting Detection Limit

Original



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QC SUMMARY REPORT

WO#: 23091975

30-Oct-23

Client: TEKLAB Inc,

Project: 23091500

BatchID: 69189

Sample ID: RLC-69189	SampType: RLC	TestCode: Radium-226_ Units: pCi/L				Prep Date: 10/3/2023			RunNo: 172765		
Client ID: BatchQC	Batch ID: 69189	TestNo: E903.0		E903-904		Analysis Date: 10/16/2023			SeqNo: 4658310		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Radium-226	0.980	1.00	1.000	0	98.0	50	150				J

Sample ID: RLCD-69189	SampType: RLC	TestCode: Radium-226_	Units: pCi/L	Prep Date: 10/3/2023	RunNo: 172765						
Client ID: BatchQC	Batch ID: 69189	TestNo: E903.0	E903-904	Analysis Date: 10/16/2023	SeqNo: 4658311						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Radium-226	1.06	1.00	1.000	0	106	50	150				

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analy
	J	Analyte detected below quantitation limits	M	Manual Integration used to determine area response	MC	Value is below Minimum Compound
	ND	Not Detected	OG1		P	Second column confirmation exceeds
	PL	Permit Limit	R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

Original



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QC SUMMARY REPORT

WO#: 23091975

30-Oct-23

Client: TEKLAB Inc,

Project: 23091500

BatchID: 69650

Sample ID: MB-69650	SampType: MBLK	TestCode: Radium-228_ Units: pCi/L				Prep Date: 10/17/2023			RunNo: 173444		
Client ID: PBW	Batch ID: 69650	TestNo: E904.0		E903-904		Analysis Date: 10/23/2023			SeqNo: 4682310		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Radium-228	ND	1.00		0	0						U
Yield	1.00			0	0						

Sample ID: LCS-69650	SampType: LCS	TestCode: Radium-228_ Units: pCi/L				Prep Date: 10/17/2023			RunNo: 173444		
Client ID: LCSW	Batch ID: 69650	TestNo: E904.0		E903-904		Analysis Date: 10/23/2023			SeqNo: 4682311		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Radium-228	5.99	1.00	5.000	0	120	70	130				
Yield	1.00			0	0						

Sample ID: RLCD-69650	SampType: RLC	TestCode: Radium-228_	Units: pCi/L	Prep Date: 10/17/2023	RunNo: 173444						
Client ID: BatchQC	Batch ID: 69650	TestNo: E904.0	E903-904	Analysis Date: 10/23/2023	SeqNo: 4682315						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Radium-228	1.24	1.00	1.000	0	124	50	150				
Yield	1.00			0	0						

Qualifiers: B Analyte detected in the associated Method Blank E Value above quantitation range H Holding times for preparation or analy
J Analyte detected below quantitation limits M Manual Integration used to determine area response MC Value is below Minimum Compound
ND Not Detected OG1 P Second column confirmation exceeds
PL Permit Limit R RPD outside accepted recovery limits RL Reporting Detection Limit

Original



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QC SUMMARY REPORT

WO#: 23091975
30-Oct-23

Client: TEKLAB Inc,
Project: 23091500

BatchID: 69650

Sample ID: 23101248-001AMS		SampType: MS		TestCode: Radium-228_		Units: pCi/L		Prep Date: 10/17/2023		RunNo: 173444			
Client ID: BatchQC		Batch ID: 69650		TestNo: E904.0		E903-904		Analysis Date: 10/23/2023		SeqNo: 4682316			
Analyte		Result		PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Radium-228		2.36		1.00	5.000	1.290	21.4	70	130				S
Yield		1.00				1.000	0						

Qualifiers: B Analyte detected in the associated Method Blank E Value above quantitation range H Holding times for preparation or analy
J Analyte detected below quantitation limits M Manual Integration used to determine area response MC Value is below Minimum Compound
ND Not Detected OG1 P Second column confirmation exceeds
PL Permit Limit R RPD outside accepted recovery limits RL Reporting Detection Limit

Original

Are the samples chilled? YES ☐ NO ☒ With: ☐ Ice ☐ Blue Ice ☐ Preserved in: ☐ Lab ☐ Field

Teklab Inc
 5445 Horseshoe Lake Road
 Collinsville, IL 62234

Project# 23091500

Cooler Temp: Sampler: QC Level: 3

Contact: Elizabeth Hurley Email: ehurley@teklabinc.com State of Origin: MO

Requested Due Date: 20 business days or less Billing/PO: 35072 Phone: (618-344-1004 ext 33)

Comments: Please issue reports and invoices via email only
Please analyze for Radium (226, 228, and combined) by method EPA903.0/904.0
on standard TAT. Please include negative values (no ND).
Batch QC and CCR EDD are required. Receipt summary requested.

PLEASE NOTE:
 NELAP accreditation is required on the requested analytes and must be documented as such on the final report. If your laboratory does not currently hold a NELAP accreditation for the requested method and/or analytes, please contact Teklab immediately. If your laboratory loses accreditation or is suspended for any analyte/method during the life of the contract, you must contact Teklab immediately. Changes to analysis/methods must be approved by Teklab, Inc.

Lab Use	Sample ID	Sample Date/Time	Preservative	Matrix	Radium 226	Radium 228	Combined Radium
	23091500-001	9/19/23 11:35	HNO3	Groundwater	☒	☒	☒
	23091500-002	9/19/23 12:55	HNO3	Groundwater	☒	☒	☒
	23091500-003	9/19/23 13:50	HNO3	Groundwater	☒	☒	☒
	23091500-004	9/19/23 14:50	HNO3	Groundwater	☒	☒	☒
	23091500-005	9/19/23 16:00	HNO3	Groundwater	☒	☒	☒
	23091500-006	9/20/23 08:50	HNO3	Groundwater	☒	☒	☒
	23091500-007	9/20/23 10:05	HNO3	Groundwater	☒	☒	☒
	23091500-008	9/20/23 11:25	HNO3	Groundwater	☒	☒	☒
	23091500-009	9/20/23 14:00	HNO3	Groundwater	☒	☒	☒
	23091500-010	9/20/23 12:30	HNO3	Groundwater	☒	☒	☒
	23091500-011	9/20/23 15:10	HNO3	Groundwater	☒	☒	☒

*Relinquished By: Elizabeth Hurley Date/Time: 9/20/23 11:00

Received By: Adrian Davis Date/Time: 9/20/23/12:45

Teklab maintains a strict policy of client confidentiality and as such does not provide client/sampler information without proper authorization, and proprietary rights. Teklab, Inc. protects clients' confidential information as directed by local, state or federal laws. (Teklab QAM Section 9.1, TNI V1 M2 Section 4.1.5 c)

SubCocRevA
3/2/2016

TEKLAB, INC. Chain of Custody

5445 Horseshoe Lake Road, Collinsville, IL 62234 Phone (618) 344-1004 Fax (618) 344-1005

Are the samples chilled? YES ☐ NO ☒ With: ☐ Ice ☐ Blue Ice Preserved in: ☐ Lab ☐ Field

Teklab Inc
5445 Horseshoe Lake Road
Collinsville, IL 62234

Cooler Temp: Sampler: QC Level: 3

IL 62234

Comments: Please issue reports and invoices via email only
 Please analyze for Radium (226, 228, and combined) by method EPA903.0/904.0
 on standard TAT Please include negative values (no ND).
 Batch QC and CCR EDD are required. Receipt summary requested.

Contact:

Email:	ehurley@teklabinc.com
Billing/PO:	35072

Requested Due Date: 20 business days or less

Phone: 618-344-1004 ext 33

State of Origin: MO

PLEASE NOTE:

NELAP accreditation is required on the requested analytes and must be documented as such on the final report. If your laboratory does not currently hold a NELAP accreditation for the requested method and/or analytes, please contact Teklab immediately. If your laboratory loses accreditation or is suspended for any analyte/method during the life of the contract, you must contact Teklab immediately. Changes to analysis/methods must be approved by Teklab, Inc.

[illegible]

*Relinquished By	Date/Time	Received By	Date/Time
Bryan Deanez	9/17/23 noon		
		[Signature]	08-18-23 / 12:04

Teklab maintains a strict policy of client confidentiality and as such does not provide client/sampler information without proper authorization, and proprietary rights, Teklab, Inc. protects clients' confidential information as directed by local, state or federal laws. (Teklab QAM Section 9.1, TNI V1 M2 Section 4.1.5 c)

SubCocRevA
3/2/2018



Summit Environmental Technologies, Inc.
3310 Win St.
Cuyahoga Falls, Ohio 44223
TEL: (330) 253-8211 FAX: (330) 253-4489
Website: <http://www.settek.com>

Sample Log-In Check List

Client Name: **TEK-IL-62234-A**

Work Order Number: **23091975**

RcptNo: **1**

Logged by: **Anthony W. Britton** 9/28/2023 12:45:00 PM

Anthony Britton

Completed By: **Anthony W. Britton** 9/29/2023 8:19:46 AM

Anthony Britton

Reviewed By: **Jennifer Woolf** 9/29/2023 12:20:29 PM

Jennifer Woolf

Chain of Custody

1. Were seals intact? Yes ☒ No ☐ Not Present ☐
2. Is Chain of Custody complete? Yes ☒ No ☐ Not Present ☐
3. How was the sample delivered? FedEx

Log In

4. Coolers are present? Yes ☐ No ☒ NA ☐
5. Was an attempt made to cool the samples? Yes ☐ No ☒ NA ☐
6. Were all samples received at a temperature of $>0^{\circ}\text{C}$ to 6.0°C ? Yes ☐ No ☒ NA ☐
Not required
7. Sample(s) in proper container(s)? Yes ☒ No ☐
8. Sufficient sample volume for indicated test(s)? Yes ☒ No ☐
9. Are samples (except VOA and ONG) properly preserved? Yes ☒ No ☐
10. Was preservative added to bottles? Yes ☐ No ☒ NA ☐
11. Is the headspace in the VOA vials less than 1/4 inch or 6 mm? Yes ☐ No ☐ No VOA Vials ☒
12. Were any sample containers received broken? Yes ☐ No ☒
13. Does paperwork match bottle labels?
(Note discrepancies on chain of custody) Yes ☒ No ☐
14. Are matrices correctly identified on Chain of Custody? Yes ☒ No ☐
15. Is it clear what analyses were requested? Yes ☒ No ☐
16. Were all holding times able to be met?
(If no, notify customer for authorization.) Yes ☒ No ☐

Special Handling (if applicable)

17. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☒

Person Notified: Date:
By Whom: Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person
Regarding:
Client Instructions:

18. Additional remarks:

Cooler Information

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	18.7	Good	Not Present			
2	18.9	Good	Not Present			
3	19.0	Good	Not Present			



Summit Environmental Technologies, Inc.
3310 Win St.
Cuyahoga Falls, Ohio 44223
TEL: (330) 253-8211 FAX: (330) 253-4489
Website: <http://www.settek.com>

Sample Log-In Check List

Client Name: **TEK-IL-62234-A**

Work Order Number: **23091975**

RcptNo: **1**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
4	19.3	Good	Not Present			

January 02, 2024

Clay Sansoucie
ERM
1968 Craig Road
Suite 100
St. Louis, MO 63146
TEL: (314) 956-0269
FAX:



Illinois	100226
Kansas	E-10374
Louisiana	05002
Louisiana	05003
Oklahoma	9978

RE: 0599247

WorkOrder: 23112078

Dear Clay Sansoucie:

TEKLAB, INC received 15 samples on 11/29/2023 2:30:00 PM for the analysis presented in the following report.

Samples are analyzed on an as received basis unless otherwise requested and documented. The sample results contained in this report relate only to the requested analytes of interest as directed on the chain of custody. NELAP accredited fields of testing are indicated by the letters NELAP under the Certification column. Unless otherwise documented within this report, Teklab Inc. analyzes samples utilizing the most current methods in compliance with 40CFR. All tests are performed in the Collinsville, IL laboratory unless otherwise noted in the Case Narrative.

All quality control criteria applicable to the test methods employed for this project have been satisfactorily met and are in accordance with NELAP except where noted. The following report shall not be reproduced, except in full, without the written approval of Teklab, Inc.

If you have any questions regarding these tests results, please feel free to call.

Sincerely,



Elizabeth A. Hurley
Director of Customer Service
(618)344-1004 ex 33
ehurley@teklabinc.com

Client: ERM

Work Order: 23112078

Client Project: 0599247

Report Date: 02-Jan-24

This reporting package includes the following:

Cover Letter	1
Report Contents	2
Definitions	3
Case Narrative	5
Accreditations	6
Laboratory Results	7
Sample Summary	22
Dates Report	23
Quality Control Results	31
Receiving Check List	45
Chain of Custody	Appended

Client: ERM

Work Order: 23112078

Client Project: 0599247

Report Date: 02-Jan-24

Abbr Definition

* Analytes on report marked with an asterisk are not NELAP accredited

CCV Continuing calibration verification is a check of a standard to determine the state of calibration of an instrument between recalibration.

CRQL A Client Requested Quantitation Limit is a reporting limit that varies according to customer request. The CRQL may not be less than the MDL.

DF Dilution factor is the dilution performed during analysis only and does not take into account any dilutions made during sample preparation. The reported result is final and includes all dilution factors.

DNI Did not ignite

DUP Laboratory duplicate is a replicate aliquot prepared under the same laboratory conditions and independently analyzed to obtain a measure of precision.

ICV Initial calibration verification is a check of a standard to determine the state of calibration of an instrument before sample analysis is initiated.

IDPH IL Dept. of Public Health

LCS Laboratory control sample is a sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes and analyzed exactly like a sample to establish intra-laboratory or analyst specific precision and bias or to assess the performance of all or a portion of the measurement system.

LCSD Laboratory control sample duplicate is a replicate laboratory control sample that is prepared and analyzed in order to determine the precision of the approved test method. The acceptable recovery range is listed in the QC Package (provided upon request).

MBLK Method blank is a sample of a matrix similar to the batch of associated sample (when available) that is free from the analytes of interest and is processed simultaneously with and under the same conditions as samples through all steps of the analytical procedures, and in which no target analytes or interferences should present at concentrations that impact the analytical results for sample analyses.

MDL "The method detection limit is defined as the minimum measured concentration of a substance that can be reported with 99% confidence that the measured concentration is distinguishable from method blank results."

MS Matrix spike is an aliquot of matrix fortified (spiked) with known quantities of specific analytes that is subjected to the entire analytical procedures in order to determine the effect of the matrix on an approved test method's recovery system. The acceptable recovery range is listed in the QC Package (provided upon request).

MSD Matrix spike duplicate means a replicate matrix spike that is prepared and analyzed in order to determine the precision of the approved test method. The acceptable recovery range is listed in the QC Package (provided upon request).

MW Molecular weight

NC Data is not acceptable for compliance purposes

ND Not Detected at the Reporting Limit

NELAP NELAP Accredited

PQL Practical quantitation limit means the lowest level that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operation conditions.

RL The reporting limit the lowest level that the data is displayed in the final report. The reporting limit may vary according to customer request or sample dilution. The reporting limit may not be less than the MDL.

RPD Relative percent difference is a calculated difference between two recoveries (ie. MS/MSD). The acceptable recovery limit is listed in the QC Package (provided upon request).

SPK The spike is a known mass of target analyte added to a blank sample or sub-sample; used to determine recovery deficiency or for other quality control purposes.

Surr Surrogates are compounds which are similar to the analytes of interest in chemical composition and behavior in the analytical process, but which are not normally found in environmental samples.

TIC Tentatively identified compound: Analytes tentatively identified in the sample by using a library search. Only results not in the calibration standard will be reported as tentatively identified compounds. Results for tentatively identified compounds that are not present in the calibration standard, but are assigned a specific chemical name based upon the library search, are calculated using total peak areas from reconstructed ion chromatograms and a response factor of one. The nearest Internal Standard is used for the calculation. The results of any TICs must be considered estimated, and are flagged with a "T". If the estimated result is above the calibration range it is flagged "ET"

TNTC Too numerous to count (> 200 CFU)

Client: ERM

Work Order: 23112078

Client Project: 0599247

Report Date: 02-Jan-24

Qualifiers

# - Unknown hydrocarbon	B - Analyte detected in associated Method Blank
C - RL shown is a Client Requested Quantitation Limit	E - Value above quantitation range
H - Holding times exceeded	I - Associated internal standard was outside method criteria
J - Analyte detected below quantitation limits	M - Manual Integration used to determine area response
ND - Not Detected at the Reporting Limit	R - RPD outside accepted recovery limits
S - Spike Recovery outside recovery limits	T - TIC(Tentatively identified compound)
X - Value exceeds Maximum Contaminant Level	



Case Narrative

<http://www.teklabinc.com/>

Client: ERM

Work Order: 23112078

Client Project: 0599247

Report Date: 02-Jan-24

Cooler Receipt Temp: 3.0 °C

Ra226/228 analyses were performed by Summit Environmental Technologies, Inc. See attached report for results and QC.

Locations

Collinsville

Address 5445 Horseshoe Lake Road
Collinsville, IL 62234-7425
Phone (618) 344-1004
Fax (618) 344-1005
Email jhriley@teklabinc.com

Collinsville Air

Address 5445 Horseshoe Lake Road
Collinsville, IL 62234-7425
Phone (618) 344-1004
Fax (618) 344-1005
Email EHurley@teklabinc.com

Springfield

Address 3920 Pintail Dr
Springfield, IL 62711-9415
Phone (217) 698-1004
Fax (217) 698-1005
Email KKlostermann@teklabinc.com

Chicago

Address 1319 Butterfield Rd.
Downers Grove, IL 60515
Phone (630) 324-6855
Fax
Email arenner@teklabinc.com

Kansas City

Address 8421 Nieman Road
Lenexa, KS 66214
Phone (913) 541-1998
Fax (913) 541-1998
Email jhriley@teklabinc.com

Client: ERM**Work Order:** 23112078**Client Project:** 0599247**Report Date:** 02-Jan-24

State	Dept	Cert #	NELAP	Exp Date	Lab
Illinois	IEPA	100226	NELAP	1/31/2024	Collinsville
Kansas	KDHE	E-10374	NELAP	4/30/2024	Collinsville
Louisiana	LDEQ	05002	NELAP	6/30/2024	Collinsville
Louisiana	LDEQ	05003	NELAP	6/30/2024	Collinsville
Oklahoma	ODEQ	9978	NELAP	8/31/2024	Collinsville
Arkansas	ADEQ	88-0966		3/14/2024	Collinsville
Illinois	IDPH	17584		5/31/2025	Collinsville
Iowa	IDNR	430		6/1/2024	Collinsville
Kentucky	UST	0073		1/31/2024	Collinsville
Missouri	MDNR	00930		5/31/2023	Collinsville
Missouri	MDNR	930		1/31/2025	Collinsville

Client: ERM
Client Project: 0599247

Work Order: 23112078
Report Date: 02-Jan-24

Lab ID: 23112078-001

Client Sample ID: APW-03-WG-20231127

Matrix: GROUNDWATER

Collection Date: 11/27/2023 14:10

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	20		556	mg/L	1	11/30/2023 10:29	R339971
SW-846 9036 (TOTAL)								
Sulfate	NELAP	100		133	mg/L	10	12/01/2023 20:46	R340009
SW-846 9040B, LABORATORY ANALYZED								
Lab pH	NELAP	1.00	H	7.24		1	11/30/2023 15:19	R339913
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		0.24	mg/L	1	11/30/2023 10:13	R339841
SW-846 9251 (TOTAL)								
Chloride	NELAP	4		11	mg/L	1	12/01/2023 20:36	R340022
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		0.0018	mg/L	5	12/11/2023 9:48	215495
Arsenic	NELAP	0.0010		0.0013	mg/L	5	12/05/2023 19:36	215495
Barium	NELAP	0.0010		0.122	mg/L	5	12/05/2023 19:36	215495
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	12/05/2023 19:36	215495
Boron	NELAP	0.0250		1.69	mg/L	5	12/05/2023 19:36	215495
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	12/05/2023 19:36	215495
Calcium	NELAP	0.125		111	mg/L	5	12/07/2023 11:49	215495
Chromium	NELAP	0.0015		< 0.0015	mg/L	5	12/08/2023 11:38	215495
Cobalt	NELAP	0.0010		< 0.0010	mg/L	5	12/05/2023 19:36	215495
Lead	NELAP	0.0010		< 0.0010	mg/L	5	12/05/2023 19:36	215495
Lithium	*	0.0030		0.0256	mg/L	5	12/05/2023 19:36	215495
Molybdenum	NELAP	0.0015		0.0303	mg/L	5	12/07/2023 11:49	215495
Selenium	NELAP	0.0010		0.0012	mg/L	5	12/05/2023 19:36	215495
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	12/05/2023 19:36	215495
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	12/11/2023 10:29	215460
Arsenic	NELAP	0.0010		0.0020	mg/L	5	12/05/2023 21:02	215460
Barium	NELAP	0.0010		0.167	mg/L	5	12/05/2023 21:02	215460
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	12/05/2023 21:02	215460
Boron	NELAP	0.0250		2.22	mg/L	5	12/05/2023 21:02	215460
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	12/05/2023 21:02	215460
Calcium	NELAP	0.125		115	mg/L	5	12/07/2023 13:09	215460
Chromium	NELAP	0.0015		< 0.0015	mg/L	5	12/08/2023 12:03	215460
Cobalt	NELAP	0.0010		< 0.0010	mg/L	5	12/05/2023 21:02	215460
Lead	NELAP	0.0010		< 0.0010	mg/L	5	12/05/2023 21:02	215460
Lithium	*	0.0030		0.0324	mg/L	5	12/05/2023 21:02	215460
Molybdenum	NELAP	0.0015		0.0319	mg/L	5	12/07/2023 13:09	215460
Selenium	NELAP	0.0010		0.0019	mg/L	5	12/05/2023 21:02	215460
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	12/05/2023 21:02	215460
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		< 0.00020	mg/L	1	12/06/2023 12:09	215503
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		See Attached	pci/L	1	12/21/2023 14:33	R341236
Radium-228	*	0		See Attached	pci/L	1	12/21/2023 14:33	R341236

Client: ERM
Client Project: 0599247

Work Order: 23112078
Report Date: 02-Jan-24

Lab ID: 23112078-002

Client Sample ID: APW-10D-WG-20231127

Matrix: GROUNDWATER

Collection Date: 11/27/2023 15:30

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	50		445	mg/L	2.5	11/30/2023 10:29	R339971
SW-846 9036 (TOTAL)								
Sulfate	NELAP	10		26	mg/L	1	12/01/2023 20:57	R340009
SW-846 9040B, LABORATORY ANALYZED								
Lab pH	NELAP	1.00	H	7.08		1	11/30/2023 15:21	R339913
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		0.14	mg/L	1	11/30/2023 10:16	R339841
SW-846 9251 (TOTAL)								
Chloride	NELAP	4		10	mg/L	1	12/01/2023 20:57	R340022
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		0.0013	mg/L	5	12/06/2023 11:51	215379
Arsenic	NELAP	0.0010		0.0018	mg/L	5	12/04/2023 18:20	215379
Barium	NELAP	0.0010		0.448	mg/L	5	12/04/2023 18:20	215379
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	12/04/2023 18:20	215379
Boron	NELAP	0.0250		0.0823	mg/L	5	12/04/2023 18:20	215379
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	12/04/2023 18:20	215379
Calcium	NELAP	0.125		83.4	mg/L	5	12/07/2023 9:58	215379
Chromium	NELAP	0.0015		< 0.0015	mg/L	5	12/04/2023 18:20	215379
Cobalt	NELAP	0.0010		0.0038	mg/L	5	12/04/2023 18:20	215379
Lead	NELAP	0.0010		< 0.0010	mg/L	5	12/04/2023 18:20	215379
Lithium	*	0.0030		0.0176	mg/L	5	12/04/2023 18:20	215379
Molybdenum	NELAP	0.0015		0.0025	mg/L	5	12/04/2023 18:20	215379
Selenium	NELAP	0.0010		0.0043	mg/L	5	12/04/2023 18:20	215379
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	12/04/2023 18:20	215379
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	12/11/2023 10:33	215460
Arsenic	NELAP	0.0010		0.0021	mg/L	5	12/05/2023 21:08	215460
Barium	NELAP	0.0010		0.398	mg/L	5	12/05/2023 21:08	215460
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	12/05/2023 21:08	215460
Boron	NELAP	0.0250		0.0754	mg/L	5	12/05/2023 21:08	215460
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	12/05/2023 21:08	215460
Calcium	NELAP	0.125		120	mg/L	5	12/07/2023 13:15	215460
Chromium	NELAP	0.0015		0.0021	mg/L	5	12/08/2023 12:53	215460
Cobalt	NELAP	0.0010		0.0039	mg/L	5	12/05/2023 21:08	215460
Lead	NELAP	0.0010		< 0.0010	mg/L	5	12/05/2023 21:08	215460
Lithium	*	0.0030		0.0154	mg/L	5	12/05/2023 21:08	215460
Molybdenum	NELAP	0.0015		< 0.0015	mg/L	5	12/07/2023 13:15	215460
Selenium	NELAP	0.0010		0.0033	mg/L	5	12/05/2023 21:08	215460
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	12/05/2023 21:08	215460
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		< 0.00020	mg/L	1	12/06/2023 12:11	215503
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		See Attached	pci/L	1	12/21/2023 14:33	R341236
Radium-228	*	0		See Attached	pci/L	1	12/21/2023 14:33	R341236

Client: ERM
Client Project: 0599247

Work Order: 23112078
Report Date: 02-Jan-24

Lab ID: 23112078-003

Client Sample ID: APW-10S-WG-20231127

Matrix: GROUNDWATER

Collection Date: 11/27/2023 16:35

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	100		900	mg/L	5	11/30/2023 10:30	R339971
SW-846 9036 (TOTAL)								
Sulfate	NELAP	10		< 10	mg/L	1	12/01/2023 21:22	R340009
SW-846 9040B, LABORATORY ANALYZED								
Lab pH	NELAP	1.00	H	7.01		1	11/30/2023 15:22	R339913
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		0.18	mg/L	1	11/30/2023 10:19	R339841
SW-846 9251 (TOTAL)								
Chloride	NELAP	4		20	mg/L	1	12/01/2023 21:21	R340022
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	12/06/2023 11:57	215379
Arsenic	NELAP	0.0010		0.251	mg/L	5	12/04/2023 18:26	215379
Barium	NELAP	0.0010		0.711	mg/L	5	12/04/2023 18:26	215379
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	12/04/2023 18:26	215379
Boron	NELAP	0.0250		0.682	mg/L	5	12/04/2023 18:26	215379
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	12/04/2023 18:26	215379
Calcium	NELAP	0.125		137	mg/L	5	12/07/2023 10:04	215379
Chromium	NELAP	0.0015		< 0.0015	mg/L	5	12/04/2023 18:26	215379
Cobalt	NELAP	0.0010		< 0.0010	mg/L	5	12/04/2023 18:26	215379
Lead	NELAP	0.0010		< 0.0010	mg/L	5	12/04/2023 18:26	215379
Lithium	*	0.0030		0.0359	mg/L	5	12/04/2023 18:26	215379
Molybdenum	NELAP	0.0015		< 0.0015	mg/L	5	12/04/2023 18:26	215379
Selenium	NELAP	0.0010		< 0.0010	mg/L	5	12/04/2023 18:26	215379
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	12/04/2023 18:26	215379
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	12/11/2023 10:53	215460
Arsenic	NELAP	0.0010		0.276	mg/L	5	12/05/2023 21:33	215460
Barium	NELAP	0.0010		0.804	mg/L	5	12/05/2023 21:33	215460
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	12/05/2023 21:33	215460
Boron	NELAP	0.0250		0.555	mg/L	5	12/07/2023 15:11	215460
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	12/05/2023 21:33	215460
Calcium	NELAP	0.125	S	129	mg/L	5	12/07/2023 15:11	215460
Chromium	NELAP	0.0015		0.0016	mg/L	5	12/12/2023 9:35	215460
Cobalt	NELAP	0.0010		0.0013	mg/L	5	12/05/2023 21:33	215460
Lead	NELAP	0.0010		< 0.0010	mg/L	5	12/05/2023 21:33	215460
Lithium	*	0.0030		0.0401	mg/L	5	12/05/2023 21:33	215460
Molybdenum	NELAP	0.0015		0.0021	mg/L	5	12/07/2023 15:11	215460
Selenium	NELAP	0.0010		< 0.0010	mg/L	5	12/05/2023 21:33	215460
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	12/05/2023 21:33	215460
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		< 0.00020	mg/L	1	12/06/2023 12:13	215503
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		See Attached	pci/L	1	12/21/2023 14:33	R341236
Radium-228	*	0		See Attached	pci/L	1	12/21/2023 14:33	R341236

Matrix spike control limits are not applicable due to high sample/spike ratio.

Client: ERM
Client Project: 0599247

Work Order: 23112078
Report Date: 02-Jan-24

Lab ID: 23112078-004

Client Sample ID: APW-06S-WG-20231128

Matrix: GROUNDWATER

Collection Date: 11/28/2023 9:00

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	50		635	mg/L	2.5	11/30/2023 10:30	R339971
SW-846 9036 (TOTAL)								
Sulfate	NELAP	100		237	mg/L	10	12/01/2023 21:34	R340009
SW-846 9040B, LABORATORY ANALYZED								
Lab pH	NELAP	1.00	H	7.12		1	11/30/2023 15:24	R339913
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		0.33	mg/L	1	11/30/2023 10:22	R339841
SW-846 9251 (TOTAL)								
Chloride	NELAP	4		22	mg/L	1	12/01/2023 21:29	R340022
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	12/06/2023 12:02	215379
Arsenic	NELAP	0.0010		0.0019	mg/L	5	12/04/2023 18:32	215379
Barium	NELAP	0.0010		0.269	mg/L	5	12/04/2023 18:32	215379
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	12/04/2023 18:32	215379
Boron	NELAP	0.0250		8.41	mg/L	5	12/04/2023 18:32	215379
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	12/04/2023 18:32	215379
Calcium	NELAP	0.125		88.8	mg/L	5	12/07/2023 10:10	215379
Chromium	NELAP	0.0015		< 0.0015	mg/L	5	12/04/2023 18:32	215379
Cobalt	NELAP	0.0010		< 0.0010	mg/L	5	12/04/2023 18:32	215379
Lead	NELAP	0.0010		< 0.0010	mg/L	5	12/04/2023 18:32	215379
Lithium	*	0.0030		0.0498	mg/L	5	12/04/2023 18:32	215379
Molybdenum	NELAP	0.0015		0.309	mg/L	5	12/04/2023 18:32	215379
Selenium	NELAP	0.0010		< 0.0010	mg/L	5	12/04/2023 18:32	215379
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	12/04/2023 18:32	215379
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	12/11/2023 10:37	215460
Arsenic	NELAP	0.0010		0.0016	mg/L	5	12/05/2023 21:14	215460
Barium	NELAP	0.0010		0.305	mg/L	5	12/05/2023 21:14	215460
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	12/05/2023 21:14	215460
Boron	NELAP	0.0250		9.19	mg/L	5	12/05/2023 21:14	215460
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	12/05/2023 21:14	215460
Calcium	NELAP	0.125		90.0	mg/L	5	12/07/2023 13:21	215460
Chromium	NELAP	0.0015		< 0.0015	mg/L	5	12/12/2023 9:00	215460
Cobalt	NELAP	0.0010		< 0.0010	mg/L	5	12/05/2023 21:14	215460
Lead	NELAP	0.0010		< 0.0010	mg/L	5	12/05/2023 21:14	215460
Lithium	*	0.0030		0.0564	mg/L	5	12/05/2023 21:14	215460
Molybdenum	NELAP	0.0015		0.207	mg/L	5	12/07/2023 13:21	215460
Selenium	NELAP	0.0010		< 0.0010	mg/L	5	12/05/2023 21:14	215460
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	12/05/2023 21:14	215460
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		< 0.00020	mg/L	1	12/06/2023 12:16	215503
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		See Attached	pci/L	1	12/21/2023 14:33	R341236
Radium-228	*	0		See Attached	pci/L	1	12/21/2023 14:33	R341236

Client: ERM
Client Project: 0599247

Work Order: 23112078
Report Date: 02-Jan-24

Lab ID: 23112078-005

Client Sample ID: APW-06D-WG-20231128

Matrix: GROUNDWATER

Collection Date: 11/28/2023 10:35

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	50		560	mg/L	2.5	11/30/2023 10:31	R339971
SW-846 9036 (TOTAL)								
Sulfate	NELAP	100		184	mg/L	10	12/01/2023 21:42	R340009
SW-846 9040B, LABORATORY ANALYZED								
Lab pH	NELAP	1.00	H	7.36		1	11/30/2023 15:26	R339913
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		0.24	mg/L	1	11/30/2023 10:24	R339841
SW-846 9251 (TOTAL)								
Chloride	NELAP	4		22	mg/L	1	12/01/2023 21:37	R340022
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	12/06/2023 12:07	215379
Arsenic	NELAP	0.0010		0.0161	mg/L	5	12/04/2023 18:38	215379
Barium	NELAP	0.0010		0.185	mg/L	5	12/04/2023 18:38	215379
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	12/04/2023 18:38	215379
Boron	NELAP	0.0250		4.67	mg/L	5	12/04/2023 18:38	215379
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	12/04/2023 18:38	215379
Calcium	NELAP	0.125		80.3	mg/L	5	12/07/2023 10:16	215379
Chromium	NELAP	0.0015		< 0.0015	mg/L	5	12/04/2023 18:38	215379
Cobalt	NELAP	0.0010		0.0012	mg/L	5	12/04/2023 18:38	215379
Lead	NELAP	0.0010		< 0.0010	mg/L	5	12/04/2023 18:38	215379
Lithium	*	0.0030		0.0241	mg/L	5	12/04/2023 18:38	215379
Molybdenum	NELAP	0.0015		0.0949	mg/L	5	12/04/2023 18:38	215379
Selenium	NELAP	0.0010		< 0.0010	mg/L	5	12/04/2023 18:38	215379
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	12/04/2023 18:38	215379
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	12/11/2023 10:41	215460
Arsenic	NELAP	0.0010		0.0135	mg/L	5	12/05/2023 21:21	215460
Barium	NELAP	0.0010		0.151	mg/L	5	12/05/2023 21:21	215460
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	12/05/2023 21:21	215460
Boron	NELAP	0.0250		3.80	mg/L	5	12/05/2023 21:21	215460
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	12/05/2023 21:21	215460
Calcium	NELAP	0.125		98.4	mg/L	5	12/07/2023 13:27	215460
Chromium	NELAP	0.0015		< 0.0015	mg/L	5	12/12/2023 9:05	215460
Cobalt	NELAP	0.0010		0.0013	mg/L	5	12/05/2023 21:21	215460
Lead	NELAP	0.0010		< 0.0010	mg/L	5	12/05/2023 21:21	215460
Lithium	*	0.0030		0.0199	mg/L	5	12/05/2023 21:21	215460
Molybdenum	NELAP	0.0015		0.0557	mg/L	5	12/07/2023 13:27	215460
Selenium	NELAP	0.0010		< 0.0010	mg/L	5	12/05/2023 21:21	215460
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	12/05/2023 21:21	215460
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		< 0.00020	mg/L	1	12/06/2023 12:18	215503
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		See Attached	pci/L	1	12/21/2023 14:33	R341236
Radium-228	*	0		See Attached	pci/L	1	12/21/2023 14:33	R341236

Client: ERM
Client Project: 0599247

Work Order: 23112078
Report Date: 02-Jan-24

Lab ID: 23112078-006

Client Sample ID: APW-05R-WG-20231128

Matrix: GROUNDWATER

Collection Date: 11/28/2023 12:05

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	50		705	mg/L	2.5	11/30/2023 10:31	R339971
SW-846 9036 (TOTAL)								
Sulfate	NELAP	100		330	mg/L	10	12/01/2023 21:50	R340009
SW-846 9040B, LABORATORY ANALYZED								
Lab pH	NELAP	1.00	H	7.33		1	11/30/2023 15:27	R339913
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		0.38	mg/L	1	11/30/2023 10:35	R339841
SW-846 9251 (TOTAL)								
Chloride	NELAP	4		16	mg/L	1	12/01/2023 21:45	R340022
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	12/06/2023 12:12	215379
Arsenic	NELAP	0.0010		0.0029	mg/L	5	12/04/2023 18:44	215379
Barium	NELAP	0.0010		0.186	mg/L	5	12/04/2023 18:44	215379
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	12/04/2023 18:44	215379
Boron	NELAP	0.0250		8.71	mg/L	5	12/04/2023 18:44	215379
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	12/04/2023 18:44	215379
Calcium	NELAP	0.125		98.4	mg/L	5	12/07/2023 10:22	215379
Chromium	NELAP	0.0015		< 0.0015	mg/L	5	12/04/2023 18:44	215379
Cobalt	NELAP	0.0010		< 0.0010	mg/L	5	12/04/2023 18:44	215379
Lead	NELAP	0.0010		< 0.0010	mg/L	5	12/04/2023 18:44	215379
Lithium	*	0.0030		0.0455	mg/L	5	12/04/2023 18:44	215379
Molybdenum	NELAP	0.0015		0.282	mg/L	5	12/04/2023 18:44	215379
Selenium	NELAP	0.0010		< 0.0010	mg/L	5	12/04/2023 18:44	215379
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	12/04/2023 18:44	215379
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	12/11/2023 10:45	215460
Arsenic	NELAP	0.0010		0.0042	mg/L	5	12/05/2023 21:27	215460
Barium	NELAP	0.0010		0.225	mg/L	5	12/05/2023 21:27	215460
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	12/05/2023 21:27	215460
Boron	NELAP	0.0250		9.62	mg/L	5	12/05/2023 21:27	215460
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	12/05/2023 21:27	215460
Calcium	NELAP	0.125		97.1	mg/L	5	12/07/2023 13:33	215460
Chromium	NELAP	0.0015		0.0020	mg/L	5	12/12/2023 9:10	215460
Cobalt	NELAP	0.0010		< 0.0010	mg/L	5	12/05/2023 21:27	215460
Lead	NELAP	0.0010		0.0020	mg/L	5	12/05/2023 21:27	215460
Lithium	*	0.0030		0.0523	mg/L	5	12/05/2023 21:27	215460
Molybdenum	NELAP	0.0015		0.203	mg/L	5	12/07/2023 13:33	215460
Selenium	NELAP	0.0010		< 0.0010	mg/L	5	12/05/2023 21:27	215460
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	12/05/2023 21:27	215460
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		< 0.00020	mg/L	1	12/06/2023 12:20	215503
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		See Attached	pci/L	1	12/21/2023 14:33	R341236
Radium-228	*	0		See Attached	pci/L	1	12/21/2023 14:33	R341236

Client: ERM
Client Project: 0599247

Work Order: 23112078
Report Date: 02-Jan-24

Lab ID: 23112078-007

Client Sample ID: APW-02-WG-20231128

Matrix: GROUNDWATER

Collection Date: 11/28/2023 13:20

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	50		920	mg/L	2.5	11/30/2023 10:31	R339971
SW-846 9036 (TOTAL)								
Sulfate	NELAP	100		440	mg/L	10	12/01/2023 21:58	R340009
SW-846 9040B, LABORATORY ANALYZED								
Lab pH	NELAP	1.00	H	7.11		1	11/30/2023 15:29	R339913
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		0.26	mg/L	1	11/30/2023 10:37	R339841
SW-846 9251 (TOTAL)								
Chloride	NELAP	4		8	mg/L	1	12/01/2023 21:53	R340022
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	12/06/2023 13:36	215379
Arsenic	NELAP	0.0010		0.0168	mg/L	5	12/04/2023 20:03	215379
Barium	NELAP	0.0010		0.205	mg/L	5	12/04/2023 20:03	215379
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	12/04/2023 20:03	215379
Boron	NELAP	0.0250	S	9.57	mg/L	5	12/04/2023 20:03	215379
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	12/04/2023 20:03	215379
Calcium	NELAP	0.125	S	121	mg/L	5	12/07/2023 12:08	215379
Chromium	NELAP	0.0015		< 0.0015	mg/L	5	12/04/2023 20:03	215379
Cobalt	NELAP	0.0010		< 0.0010	mg/L	5	12/04/2023 20:03	215379
Lead	NELAP	0.0010		< 0.0010	mg/L	5	12/04/2023 20:03	215379
Lithium	*	0.0030		0.0506	mg/L	5	12/04/2023 20:03	215379
Molybdenum	NELAP	0.0015		0.205	mg/L	5	12/04/2023 20:03	215379
Selenium	NELAP	0.0010		< 0.0010	mg/L	5	12/04/2023 20:03	215379
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	12/04/2023 20:03	215379
<i>Matrix spike control limits are not applicable due to high sample/spike ratio.</i>								
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	12/11/2023 10:49	215460
Arsenic	NELAP	0.0010		0.0237	mg/L	5	12/05/2023 22:16	215460
Barium	NELAP	0.0010		0.303	mg/L	5	12/05/2023 22:16	215460
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	12/05/2023 22:16	215460
Boron	NELAP	0.0250		9.62	mg/L	5	12/05/2023 22:16	215460
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	12/05/2023 22:16	215460
Calcium	NELAP	0.125		132	mg/L	5	12/07/2023 14:28	215460
Chromium	NELAP	0.0015		0.0092	mg/L	5	12/12/2023 9:15	215460
Cobalt	NELAP	0.0010		0.0027	mg/L	5	12/12/2023 9:15	215460
Lead	NELAP	0.0010		0.0057	mg/L	5	12/05/2023 22:16	215460
Lithium	*	0.0030		0.0560	mg/L	5	12/05/2023 22:16	215460
Molybdenum	NELAP	0.0015		0.147	mg/L	5	12/07/2023 14:28	215460
Selenium	NELAP	0.0010		0.0015	mg/L	5	12/12/2023 9:15	215460
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	12/05/2023 22:16	215460
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		< 0.00020	mg/L	1	12/06/2023 12:22	215503
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		See Attached	pci/L	1	12/21/2023 14:33	R341236
Radium-228	*	0		See Attached	pci/L	1	12/21/2023 14:33	R341236

Client: ERM
Client Project: 0599247

Work Order: 23112078
Report Date: 02-Jan-24

Lab ID: 23112078-008

Client Sample ID: APW-07-WG-20231128

Matrix: GROUNDWATER

Collection Date: 11/28/2023 15:10

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	50		790	mg/L	2.5	11/30/2023 10:32	R339971
SW-846 9036 (TOTAL)								
Sulfate	NELAP	10		40	mg/L	1	12/01/2023 22:17	R340009
SW-846 9040B, LABORATORY ANALYZED								
Lab pH	NELAP	1.00	H	6.86		1	11/30/2023 15:32	R339913
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		0.20	mg/L	1	11/30/2023 10:40	R339841
SW-846 9251 (TOTAL)								
Chloride	NELAP	4		11	mg/L	1	12/01/2023 22:17	R340022
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	12/06/2023 12:17	215379
Arsenic	NELAP	0.0010		0.0016	mg/L	5	12/04/2023 19:33	215379
Barium	NELAP	0.0010		0.465	mg/L	5	12/04/2023 19:33	215379
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	12/04/2023 19:33	215379
Boron	NELAP	0.0250		0.243	mg/L	5	12/04/2023 19:33	215379
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	12/04/2023 19:33	215379
Calcium	NELAP	0.125		162	mg/L	5	12/07/2023 10:28	215379
Chromium	NELAP	0.0015		< 0.0015	mg/L	5	12/04/2023 19:33	215379
Cobalt	NELAP	0.0010		< 0.0010	mg/L	5	12/04/2023 19:33	215379
Lead	NELAP	0.0010		< 0.0010	mg/L	5	12/04/2023 19:33	215379
Lithium	*	0.0030		0.0212	mg/L	5	12/04/2023 19:33	215379
Molybdenum	NELAP	0.0015		0.0040	mg/L	5	12/04/2023 19:33	215379
Selenium	NELAP	0.0010		< 0.0010	mg/L	5	12/04/2023 19:33	215379
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	12/04/2023 19:33	215379
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	12/11/2023 11:24	215460
Arsenic	NELAP	0.0010		0.0022	mg/L	5	12/05/2023 22:22	215460
Barium	NELAP	0.0010		0.522	mg/L	5	12/05/2023 22:22	215460
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	12/05/2023 22:22	215460
Boron	NELAP	0.0250		0.274	mg/L	5	12/05/2023 22:22	215460
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	12/05/2023 22:22	215460
Calcium	NELAP	0.125		177	mg/L	5	12/07/2023 14:34	215460
Chromium	NELAP	0.0015		0.0024	mg/L	5	12/12/2023 9:20	215460
Cobalt	NELAP	0.0010		0.0013	mg/L	5	12/12/2023 9:20	215460
Lead	NELAP	0.0010		< 0.0010	mg/L	5	12/05/2023 22:22	215460
Lithium	*	0.0030		0.0231	mg/L	5	12/05/2023 22:22	215460
Molybdenum	NELAP	0.0015		0.0042	mg/L	5	12/07/2023 14:34	215460
Selenium	NELAP	0.0010		< 0.0010	mg/L	5	12/12/2023 9:20	215460
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	12/05/2023 22:22	215460
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		< 0.00020	mg/L	1	12/06/2023 12:35	215503
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		See Attached	pci/L	1	12/21/2023 14:33	R341236
Radium-228	*	0		See Attached	pci/L	1	12/21/2023 14:33	R341236

Client: ERM
Client Project: 0599247

Work Order: 23112078
Report Date: 02-Jan-24

Lab ID: 23112078-009

Client Sample ID: APW-08-WG-20231128

Matrix: GROUNDWATER

Collection Date: 11/28/2023 16:30

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	50		395	mg/L	2.5	11/30/2023 10:32	R339971
SW-846 9036 (TOTAL)								
Sulfate	NELAP	10		24	mg/L	1	12/01/2023 22:25	R340009
SW-846 9040B, LABORATORY ANALYZED								
Lab pH	NELAP	1.00	H	7.27		1	11/30/2023 15:34	R339913
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		0.29	mg/L	1	11/30/2023 10:43	R339841
SW-846 9251 (TOTAL)								
Chloride	NELAP	4		11	mg/L	1	12/01/2023 22:25	R340022
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	12/06/2023 13:20	215379
Arsenic	NELAP	0.0010		0.0019	mg/L	5	12/04/2023 19:39	215379
Barium	NELAP	0.0010		0.255	mg/L	5	12/04/2023 19:39	215379
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	12/04/2023 19:39	215379
Boron	NELAP	0.0250		0.154	mg/L	5	12/04/2023 19:39	215379
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	12/04/2023 19:39	215379
Calcium	NELAP	0.125		71.3	mg/L	5	12/07/2023 10:34	215379
Chromium	NELAP	0.0015		< 0.0015	mg/L	5	12/04/2023 19:39	215379
Cobalt	NELAP	0.0010		< 0.0010	mg/L	5	12/04/2023 19:39	215379
Lead	NELAP	0.0010		< 0.0010	mg/L	5	12/04/2023 19:39	215379
Lithium	*	0.0030		0.0204	mg/L	5	12/04/2023 19:39	215379
Molybdenum	NELAP	0.0015		< 0.0015	mg/L	5	12/04/2023 19:39	215379
Selenium	NELAP	0.0010		0.0231	mg/L	5	12/04/2023 19:39	215379
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	12/04/2023 19:39	215379
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	12/11/2023 11:28	215460
Arsenic	NELAP	0.0010		0.0025	mg/L	5	12/05/2023 22:28	215460
Barium	NELAP	0.0010		0.261	mg/L	5	12/05/2023 22:28	215460
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	12/05/2023 22:28	215460
Boron	NELAP	0.0250		0.155	mg/L	5	12/05/2023 22:28	215460
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	12/05/2023 22:28	215460
Calcium	NELAP	0.125		81.2	mg/L	5	12/07/2023 14:41	215460
Chromium	NELAP	0.0015		0.0049	mg/L	5	12/12/2023 9:25	215460
Cobalt	NELAP	0.0010		0.0021	mg/L	5	12/12/2023 9:25	215460
Lead	NELAP	0.0010		0.0018	mg/L	5	12/05/2023 22:28	215460
Lithium	*	0.0030		0.0211	mg/L	5	12/05/2023 22:28	215460
Molybdenum	NELAP	0.0015		< 0.0015	mg/L	5	12/07/2023 14:41	215460
Selenium	NELAP	0.0010		0.0221	mg/L	5	12/12/2023 9:25	215460
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	12/05/2023 22:28	215460
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		< 0.00020	mg/L	1	12/06/2023 12:38	215503
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		See Attached	pci/L	1	12/21/2023 14:33	R341236
Radium-228	*	0		See Attached	pci/L	1	12/21/2023 14:33	R341236

Client: ERM
Client Project: 0599247

Work Order: 23112078
Report Date: 02-Jan-24

Lab ID: 23112078-010

Client Sample ID: APW-04-WG-20231129

Matrix: GROUNDWATER

Collection Date: 11/29/2023 8:30

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	20		430	mg/L	1	11/30/2023 10:40	R339971
SW-846 9036 (TOTAL)								
Sulfate	NELAP	20		54	mg/L	2	12/05/2023 12:03	R340126
SW-846 9040B, LABORATORY ANALYZED								
Lab pH	NELAP	1.00	H	7.31		1	11/30/2023 15:36	R339913
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		0.18	mg/L	1	11/30/2023 10:45	R339841
SW-846 9251 (TOTAL)								
Chloride	NELAP	4		11	mg/L	1	12/01/2023 22:36	R340022
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	12/06/2023 13:25	215379
Arsenic	NELAP	0.0010		0.0020	mg/L	5	12/04/2023 19:45	215379
Barium	NELAP	0.0010		0.165	mg/L	5	12/04/2023 19:45	215379
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	12/04/2023 19:45	215379
Boron	NELAP	0.0250		0.645	mg/L	5	12/04/2023 19:45	215379
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	12/04/2023 19:45	215379
Calcium	NELAP	0.125		77.9	mg/L	5	12/07/2023 10:41	215379
Chromium	NELAP	0.0015		< 0.0015	mg/L	5	12/04/2023 19:45	215379
Cobalt	NELAP	0.0010		< 0.0010	mg/L	5	12/04/2023 19:45	215379
Lead	NELAP	0.0010		< 0.0010	mg/L	5	12/04/2023 19:45	215379
Lithium	*	0.0030		0.0333	mg/L	5	12/04/2023 19:45	215379
Molybdenum	NELAP	0.0015		0.0461	mg/L	5	12/04/2023 19:45	215379
Selenium	NELAP	0.0010		0.0139	mg/L	5	12/04/2023 19:45	215379
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	12/04/2023 19:45	215379
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	12/11/2023 11:33	215460
Arsenic	NELAP	0.0010		0.0028	mg/L	5	12/05/2023 22:35	215460
Barium	NELAP	0.0010		0.153	mg/L	5	12/05/2023 22:35	215460
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	12/05/2023 22:35	215460
Boron	NELAP	0.0250		0.559	mg/L	5	12/05/2023 22:35	215460
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	12/05/2023 22:35	215460
Calcium	NELAP	0.125		124	mg/L	5	12/12/2023 9:30	215460
Chromium	NELAP	0.0015		0.0033	mg/L	5	12/12/2023 9:30	215460
Cobalt	NELAP	0.0010		0.0012	mg/L	5	12/12/2023 9:30	215460
Lead	NELAP	0.0010		< 0.0010	mg/L	5	12/05/2023 22:35	215460
Lithium	*	0.0030		0.0298	mg/L	5	12/05/2023 22:35	215460
Molybdenum	NELAP	0.0015		0.0347	mg/L	5	12/07/2023 14:47	215460
Selenium	NELAP	0.0010		0.0150	mg/L	5	12/12/2023 9:30	215460
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	12/05/2023 22:35	215460
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		< 0.00020	mg/L	1	12/06/2023 12:40	215503
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		See Attached	pci/L	1	12/21/2023 14:33	R341236
Radium-228	*	0		See Attached	pci/L	1	12/21/2023 14:33	R341236

Client: ERM
Client Project: 0599247

Work Order: 23112078
Report Date: 02-Jan-24

Lab ID: 23112078-011

Client Sample ID: APW-01R-WG-20231129

Matrix: GROUNDWATER

Collection Date: 11/29/2023 10:00

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	50		300	mg/L	2.5	11/30/2023 10:41	R339971
SW-846 9036 (TOTAL)								
Sulfate	NELAP	50		73	mg/L	5	12/05/2023 12:40	R340126
SW-846 9040B, LABORATORY ANALYZED								
Lab pH	NELAP	1.00	H	6.59		1	11/30/2023 15:41	R339913
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		0.17	mg/L	1	11/30/2023 10:47	R339841
SW-846 9251 (TOTAL)								
Chloride	NELAP	4		7	mg/L	1	12/01/2023 23:10	R340022
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	12/06/2023 13:31	215379
Arsenic	NELAP	0.0010		0.0015	mg/L	5	12/04/2023 19:51	215379
Barium	NELAP	0.0010		0.245	mg/L	5	12/04/2023 19:51	215379
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	12/04/2023 19:51	215379
Boron	NELAP	0.0250		0.279	mg/L	5	12/04/2023 19:51	215379
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	12/04/2023 19:51	215379
Calcium	NELAP	0.125		57.6	mg/L	5	12/07/2023 12:01	215379
Chromium	NELAP	0.0015		< 0.0015	mg/L	5	12/04/2023 19:51	215379
Cobalt	NELAP	0.0010		0.0013	mg/L	5	12/04/2023 19:51	215379
Lead	NELAP	0.0010		< 0.0010	mg/L	5	12/04/2023 19:51	215379
Lithium	*	0.0030		0.0193	mg/L	5	12/04/2023 19:51	215379
Molybdenum	NELAP	0.0015		< 0.0015	mg/L	5	12/04/2023 19:51	215379
Selenium	NELAP	0.0010		0.0058	mg/L	5	12/04/2023 19:51	215379
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	12/04/2023 19:51	215379
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	12/11/2023 11:37	215460
Arsenic	NELAP	0.0010		0.0033	mg/L	5	12/05/2023 22:41	215460
Barium	NELAP	0.0010		0.259	mg/L	5	12/05/2023 22:41	215460
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	12/05/2023 22:41	215460
Boron	NELAP	0.0250		0.263	mg/L	5	12/05/2023 22:41	215460
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	12/05/2023 22:41	215460
Calcium	NELAP	0.125		94.3	mg/L	5	12/12/2023 10:29	215460
Chromium	NELAP	0.0015		0.0049	mg/L	5	12/12/2023 10:29	215460
Cobalt	NELAP	0.0010		0.0027	mg/L	5	12/12/2023 10:29	215460
Lead	NELAP	0.0010		0.0020	mg/L	5	12/05/2023 22:41	215460
Lithium	*	0.0030		0.0189	mg/L	5	12/05/2023 22:41	215460
Molybdenum	NELAP	0.0015		< 0.0015	mg/L	5	12/12/2023 10:29	215460
Selenium	NELAP	0.0010		0.0054	mg/L	5	12/12/2023 10:29	215460
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	12/05/2023 22:41	215460
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		< 0.00020	mg/L	1	12/06/2023 12:42	215503
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		See Attached	pci/L	1	12/21/2023 14:33	R341236
Radium-228	*	0		See Attached	pci/L	1	12/21/2023 14:33	R341236

Client: ERM
Client Project: 0599247

Work Order: 23112078
Report Date: 02-Jan-24

Lab ID: 23112078-012

Client Sample ID: APW-09-WG-20231129

Matrix: GROUNDWATER

Collection Date: 11/29/2023 11:30

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	20		380	mg/L	1	12/01/2023 10:01	R339971
SW-846 9036 (TOTAL)								
Sulfate	NELAP	10		34	mg/L	1	12/01/2023 23:18	R340009
SW-846 9040B, LABORATORY ANALYZED								
Lab pH	NELAP	1.00	H	7.50		1	11/30/2023 15:43	R339913
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		0.20	mg/L	1	11/30/2023 10:50	R339841
SW-846 9251 (TOTAL)								
Chloride	NELAP	4		12	mg/L	1	12/01/2023 23:18	R340022
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		0.0011	mg/L	5	12/11/2023 9:52	215495
Arsenic	NELAP	0.0010		0.0020	mg/L	5	12/05/2023 19:42	215495
Barium	NELAP	0.0010		0.109	mg/L	5	12/05/2023 19:42	215495
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	12/05/2023 19:42	215495
Boron	NELAP	0.0250		0.169	mg/L	5	12/05/2023 19:42	215495
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	12/05/2023 19:42	215495
Calcium	NELAP	0.125		73.5	mg/L	5	12/07/2023 11:55	215495
Chromium	NELAP	0.0015		< 0.0015	mg/L	5	12/08/2023 11:45	215495
Cobalt	NELAP	0.0010		< 0.0010	mg/L	5	12/05/2023 19:42	215495
Lead	NELAP	0.0010		< 0.0010	mg/L	5	12/05/2023 19:42	215495
Lithium	*	0.0030		0.0121	mg/L	5	12/05/2023 19:42	215495
Molybdenum	NELAP	0.0015		0.0154	mg/L	5	12/07/2023 11:55	215495
Selenium	NELAP	0.0010		0.0163	mg/L	5	12/05/2023 19:42	215495
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	12/05/2023 19:42	215495
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	12/11/2023 11:41	215460
Arsenic	NELAP	0.0010		0.0026	mg/L	5	12/05/2023 22:47	215460
Barium	NELAP	0.0010		0.131	mg/L	5	12/05/2023 22:47	215460
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	12/05/2023 22:47	215460
Boron	NELAP	0.0250		0.191	mg/L	5	12/05/2023 22:47	215460
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	12/05/2023 22:47	215460
Calcium	NELAP	0.125		80.9	mg/L	5	12/12/2023 10:34	215460
Chromium	NELAP	0.0015		< 0.0015	mg/L	5	12/12/2023 10:34	215460
Cobalt	NELAP	0.0010		< 0.0010	mg/L	5	12/12/2023 10:34	215460
Lead	NELAP	0.0010		< 0.0010	mg/L	5	12/05/2023 22:47	215460
Lithium	*	0.0030		0.0138	mg/L	5	12/05/2023 22:47	215460
Molybdenum	NELAP	0.0015		0.0188	mg/L	5	12/12/2023 10:34	215460
Selenium	NELAP	0.0010		0.0214	mg/L	5	12/12/2023 10:34	215460
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	12/05/2023 22:47	215460
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		< 0.00020	mg/L	1	12/06/2023 12:45	215503
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		See Attached	pci/L	1	12/21/2023 14:33	R341236
Radium-228	*	0		See Attached	pci/L	1	12/21/2023 14:33	R341236

Client: ERM
Client Project: 0599247

Work Order: 23112078
Report Date: 02-Jan-24

Lab ID: 23112078-013

Client Sample ID: DUP-01-WG-20231128

Matrix: GROUNDWATER

Collection Date: 11/28/2023 0:01

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	50		690	mg/L	2.5	11/30/2023 10:40	R339971
SW-846 9036 (TOTAL)								
Sulfate	NELAP	100		321	mg/L	10	12/01/2023 23:32	R340009
SW-846 9040B, LABORATORY ANALYZED								
Lab pH	NELAP	1.00	H	7.34		1	11/30/2023 15:45	R339913
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		0.35	mg/L	1	11/30/2023 10:52	R339841
SW-846 9251 (TOTAL)								
Chloride	NELAP	4		16	mg/L	1	12/01/2023 23:26	R340022
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010	S	< 0.0010	mg/L	5	12/11/2023 10:00	215495
Arsenic	NELAP	0.0010		0.0018	mg/L	5	12/07/2023 13:39	215495
Barium	NELAP	0.0010		0.127	mg/L	5	12/07/2023 13:39	215495
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	12/07/2023 13:39	215495
Boron	NELAP	0.0250	S	6.44	mg/L	5	12/07/2023 13:39	215495
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	12/07/2023 13:39	215495
Calcium	NELAP	0.125	S	91.9	mg/L	5	12/07/2023 13:39	215495
Chromium	NELAP	0.0015	S	< 0.0015	mg/L	5	12/08/2023 12:09	215495
Cobalt	NELAP	0.0010	S	< 0.0010	mg/L	5	12/12/2023 11:53	215495
Lead	NELAP	0.0010		< 0.0010	mg/L	5	12/07/2023 13:39	215495
Lithium	*	0.0030		0.0343	mg/L	5	12/07/2023 13:39	215495
Molybdenum	NELAP	0.0015		0.192	mg/L	5	12/07/2023 13:39	215495
Selenium	NELAP	0.0010		< 0.0010	mg/L	5	12/07/2023 13:39	215495
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	12/07/2023 13:39	215495
<i>Matrix spike did not recover within control limits due to sample composition.</i>								
<i>Matrix spike control limits are not applicable due to high sample/spike ratio.</i>								
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	12/11/2023 11:45	215460
Arsenic	NELAP	0.0010		0.0031	mg/L	5	12/05/2023 22:53	215460
Barium	NELAP	0.0010		0.158	mg/L	5	12/05/2023 22:53	215460
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	12/05/2023 22:53	215460
Boron	NELAP	0.0250		6.77	mg/L	5	12/05/2023 22:53	215460
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	12/05/2023 22:53	215460
Calcium	NELAP	0.125		134	mg/L	5	12/12/2023 10:39	215460
Chromium	NELAP	0.0015		0.0023	mg/L	5	12/12/2023 10:39	215460
Cobalt	NELAP	0.0010		< 0.0010	mg/L	5	12/12/2023 10:39	215460
Lead	NELAP	0.0010		0.0014	mg/L	5	12/05/2023 22:53	215460
Lithium	*	0.0030		0.0371	mg/L	5	12/05/2023 22:53	215460
Molybdenum	NELAP	0.0015		0.215	mg/L	5	12/07/2023 15:05	215460
Selenium	NELAP	0.0010		< 0.0010	mg/L	5	12/12/2023 10:39	215460
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	12/05/2023 22:53	215460
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		< 0.00020	mg/L	1	12/06/2023 12:47	215503
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		See Attached	pci/L	1	12/21/2023 14:33	R341236
Radium-228	*	0		See Attached	pci/L	1	12/21/2023 14:33	R341236

Client: ERM
Client Project: 0599247

Work Order: 23112078
Report Date: 02-Jan-24

Lab ID: 23112078-014

Client Sample ID: DUP-02-WG-20231129

Matrix: GROUNDWATER

Collection Date: 11/29/2023 0:02

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	20		376	mg/L	1	11/30/2023 10:41	R339971
SW-846 9036 (TOTAL)								
Sulfate	NELAP	10		35	mg/L	1	12/01/2023 23:34	R340009
SW-846 9040B, LABORATORY ANALYZED								
Lab pH	NELAP	1.00	H	7.45		1	11/30/2023 15:46	R339913
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		0.21	mg/L	1	11/30/2023 11:06	R339841
SW-846 9251 (TOTAL)								
Chloride	NELAP	4		12	mg/L	1	12/01/2023 23:34	R340022
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	12/11/2023 9:56	215495
Arsenic	NELAP	0.0010		0.0020	mg/L	5	12/05/2023 19:48	215495
Barium	NELAP	0.0010		0.108	mg/L	5	12/05/2023 19:48	215495
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	12/05/2023 19:48	215495
Boron	NELAP	0.0250		0.166	mg/L	5	12/05/2023 19:48	215495
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	12/05/2023 19:48	215495
Calcium	NELAP	0.125		73.6	mg/L	5	12/07/2023 12:57	215495
Chromium	NELAP	0.0015		< 0.0015	mg/L	5	12/05/2023 19:48	215495
Cobalt	NELAP	0.0010		< 0.0010	mg/L	5	12/05/2023 19:48	215495
Lead	NELAP	0.0010		< 0.0010	mg/L	5	12/05/2023 19:48	215495
Lithium	*	0.0030		0.0120	mg/L	5	12/05/2023 19:48	215495
Molybdenum	NELAP	0.0015		0.0146	mg/L	5	12/07/2023 12:57	215495
Selenium	NELAP	0.0010		0.0159	mg/L	5	12/05/2023 19:48	215495
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	12/05/2023 19:48	215495
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	12/11/2023 11:49	215460
Arsenic	NELAP	0.0010		0.0028	mg/L	5	12/05/2023 22:59	215460
Barium	NELAP	0.0010		0.143	mg/L	5	12/05/2023 22:59	215460
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	12/05/2023 22:59	215460
Boron	NELAP	0.0250		0.221	mg/L	5	12/05/2023 22:59	215460
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	12/05/2023 22:59	215460
Calcium	NELAP	0.125		111	mg/L	5	12/12/2023 10:43	215460
Chromium	NELAP	0.0015		< 0.0015	mg/L	5	12/12/2023 10:43	215460
Cobalt	NELAP	0.0010		< 0.0010	mg/L	5	12/12/2023 10:43	215460
Lead	NELAP	0.0010		< 0.0010	mg/L	5	12/05/2023 22:59	215460
Lithium	*	0.0030		0.0163	mg/L	5	12/05/2023 22:59	215460
Molybdenum	NELAP	0.0015		0.0171	mg/L	5	12/07/2023 16:43	215460
Selenium	NELAP	0.0010		0.0194	mg/L	5	12/07/2023 16:43	215460
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	12/05/2023 22:59	215460
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		< 0.00020	mg/L	1	12/06/2023 12:49	215503
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		See Attached	pci/L	1	12/21/2023 14:33	R341236
Radium-228	*	0		See Attached	pci/L	1	12/21/2023 14:33	R341236

Client: ERM
Client Project: 0599247

Work Order: 23112078
Report Date: 02-Jan-24

Lab ID: 23112078-015

Client Sample ID: EB-01-WQ-20231127

Matrix: GROUNDWATER

Collection Date: 11/27/2023 11:00

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	20		< 20	mg/L	1	11/30/2023 10:30	R339971
SW-846 9036 (TOTAL)								
Sulfate	NELAP	10		< 10	mg/L	1	12/01/2023 23:42	R340009
SW-846 9040B, LABORATORY ANALYZED								
Lab pH	NELAP	1.00	H	5.15		1	11/30/2023 15:52	R339913
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		< 0.10	mg/L	1	11/30/2023 11:09	R339841
SW-846 9251 (TOTAL)								
Chloride	NELAP	4		< 4	mg/L	1	12/01/2023 23:42	R340022
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		0.0012	mg/L	5	12/11/2023 10:25	215495
Arsenic	NELAP	0.0010		< 0.0010	mg/L	5	12/05/2023 19:54	215495
Barium	NELAP	0.0010		< 0.0010	mg/L	5	12/05/2023 19:54	215495
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	12/05/2023 19:54	215495
Boron	NELAP	0.0250		< 0.0250	mg/L	5	12/05/2023 19:54	215495
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	12/05/2023 19:54	215495
Calcium	NELAP	0.125		< 0.125	mg/L	5	12/07/2023 13:03	215495
Chromium	NELAP	0.0015		< 0.0015	mg/L	5	12/05/2023 19:54	215495
Cobalt	NELAP	0.0010		< 0.0010	mg/L	5	12/05/2023 19:54	215495
Lead	NELAP	0.0010		< 0.0010	mg/L	5	12/05/2023 19:54	215495
Lithium	*	0.0030		< 0.0030	mg/L	5	12/05/2023 19:54	215495
Molybdenum	NELAP	0.0015		< 0.0015	mg/L	5	12/07/2023 13:03	215495
Selenium	NELAP	0.0010		< 0.0010	mg/L	5	12/05/2023 19:54	215495
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	12/05/2023 19:54	215495
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		< 0.0010	mg/L	5	12/11/2023 11:53	215460
Arsenic	NELAP	0.0010		< 0.0010	mg/L	5	12/06/2023 0:19	215460
Barium	NELAP	0.0010		< 0.0010	mg/L	5	12/06/2023 0:19	215460
Beryllium	NELAP	0.0010		< 0.0010	mg/L	5	12/06/2023 0:19	215460
Boron	NELAP	0.0250		< 0.0250	mg/L	5	12/06/2023 0:19	215460
Cadmium	NELAP	0.0010		< 0.0010	mg/L	5	12/06/2023 0:19	215460
Calcium	NELAP	0.125	SR	< 0.125	mg/L	5	12/12/2023 10:58	215460
Chromium	NELAP	0.0015	SR	< 0.0015	mg/L	5	12/12/2023 10:58	215460
Cobalt	NELAP	0.0010	SR	< 0.0010	mg/L	5	12/12/2023 10:58	215460
Lead	NELAP	0.0010		< 0.0010	mg/L	5	12/06/2023 0:19	215460
Lithium	*	0.0030		< 0.0030	mg/L	5	12/06/2023 0:19	215460
Molybdenum	NELAP	0.0015		< 0.0015	mg/L	5	12/07/2023 16:49	215460
Selenium	NELAP	0.0010		< 0.0010	mg/L	5	12/07/2023 16:49	215460
Thallium	NELAP	0.0020		< 0.0020	mg/L	5	12/06/2023 0:19	215460
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		< 0.00020	mg/L	1	12/06/2023 12:51	215503
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		See Attached	pci/L	1	12/21/2023 14:33	R341236
Radium-228	*	0		See Attached	pci/L	1	12/21/2023 14:33	R341236

RPD for MS/MSD was outside control limits.

Matrix spike recovered outside upper control limits. Sample results are below the reporting limit. Data is reportable.

Client: ERM**Work Order:** 23112078**Client Project:** 0599247**Report Date:** 02-Jan-24

Lab Sample ID	Client Sample ID	Matrix	Fractions	Collection Date
23112078-001	APW-03-WG-20231127	Groundwater	4	11/27/2023 14:10
23112078-002	APW-10D-WG-20231127	Groundwater	4	11/27/2023 15:30
23112078-003	APW-10S-WG-20231127	Groundwater	4	11/27/2023 16:35
23112078-004	APW-06S-WG-20231128	Groundwater	4	11/28/2023 9:00
23112078-005	APW-06D-WG-20231128	Groundwater	4	11/28/2023 10:35
23112078-006	APW-05R-WG-20231128	Groundwater	4	11/28/2023 12:05
23112078-007	APW-02-WG-20231128	Groundwater	4	11/28/2023 13:20
23112078-008	APW-07-WG-20231128	Groundwater	4	11/28/2023 15:10
23112078-009	APW-08-WG-20231128	Groundwater	4	11/28/2023 16:30
23112078-010	APW-04-WG-20231129	Groundwater	4	11/29/2023 8:30
23112078-011	APW-01R-WG-20231129	Groundwater	4	11/29/2023 10:00
23112078-012	APW-09-WG-20231129	Groundwater	4	11/29/2023 11:30
23112078-013	DUP-01-WG-20231128	Groundwater	4	11/28/2023 0:01
23112078-014	DUP-02-WG-20231129	Groundwater	4	11/29/2023 0:02
23112078-015	EB-01-WQ-20231127	Groundwater	4	11/27/2023 11:00

Client: ERM

Work Order: 23112078

Client Project: 0599247

Report Date: 02-Jan-24

Sample ID	Client Sample ID	Collection Date	Received Date		
	Test Name			Prep Date/Time	Analysis Date/Time
23112078-001A	APW-03-WG-20231127	11/27/2023 14:10	11/29/2023 14:30		
	Standard Methods 2540 C (Total) 1997, 2011				11/30/2023 10:29
	SW-846 9036 (Total)				12/01/2023 20:46
	SW-846 9040B, Laboratory Analyzed				11/30/2023 15:19
	SW-846 9214 (Total)				11/30/2023 10:13
	SW-846 9251 (Total)				12/01/2023 20:36
23112078-001B	APW-03-WG-20231127	11/27/2023 14:10	11/29/2023 14:30		
	EPA 903.0/904.0, Radium 226/228				12/21/2023 14:33
23112078-001C	APW-03-WG-20231127	11/27/2023 14:10	11/29/2023 14:30		
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			12/04/2023 10:16	12/05/2023 21:02
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			12/04/2023 10:16	12/07/2023 13:09
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			12/04/2023 10:16	12/08/2023 12:03
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			12/04/2023 10:16	12/11/2023 10:29
	SW-846 7470A (Total)			12/05/2023 8:14	12/06/2023 12:09
23112078-001D	APW-03-WG-20231127	11/27/2023 14:10	11/29/2023 14:30		
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			12/04/2023 17:50	12/05/2023 19:36
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			12/04/2023 17:50	12/07/2023 11:49
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			12/04/2023 17:50	12/08/2023 11:38
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			12/04/2023 17:50	12/11/2023 9:48
23112078-002A	APW-10D-WG-20231127	11/27/2023 15:30	11/29/2023 14:30		
	Standard Methods 2540 C (Total) 1997, 2011				11/30/2023 10:29
	SW-846 9036 (Total)				12/01/2023 20:57
	SW-846 9040B, Laboratory Analyzed				11/30/2023 15:21
	SW-846 9214 (Total)				11/30/2023 10:16
	SW-846 9251 (Total)				12/01/2023 20:57
23112078-002B	APW-10D-WG-20231127	11/27/2023 15:30	11/29/2023 14:30		
	EPA 903.0/904.0, Radium 226/228				12/21/2023 14:33
23112078-002C	APW-10D-WG-20231127	11/27/2023 15:30	11/29/2023 14:30		
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			12/04/2023 10:16	12/05/2023 21:08
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			12/04/2023 10:16	12/07/2023 13:15
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			12/04/2023 10:16	12/08/2023 12:53
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			12/04/2023 10:16	12/11/2023 10:33
	SW-846 7470A (Total)			12/05/2023 8:14	12/06/2023 12:11
23112078-002D	APW-10D-WG-20231127	11/27/2023 15:30	11/29/2023 14:30		
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			12/01/2023 8:52	12/04/2023 18:20
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			12/01/2023 8:52	12/06/2023 11:51
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			12/01/2023 8:52	12/07/2023 9:58

Client: ERM

Work Order: 23112078

Client Project: 0599247

Report Date: 02-Jan-24

Sample ID	Client Sample ID	Collection Date	Received Date		
	Test Name			Prep Date/Time	Analysis Date/Time
23112078-003A	APW-10S-WG-20231127	11/27/2023 16:35	11/29/2023 14:30		
	Standard Methods 2540 C (Total) 1997, 2011				11/30/2023 10:30
	SW-846 9036 (Total)				12/01/2023 21:22
	SW-846 9040B, Laboratory Analyzed				11/30/2023 15:22
	SW-846 9214 (Total)				11/30/2023 10:19
	SW-846 9251 (Total)				12/01/2023 21:21
23112078-003B	APW-10S-WG-20231127	11/27/2023 16:35	11/29/2023 14:30		
	EPA 903.0/904.0, Radium 226/228				12/21/2023 14:33
23112078-003C	APW-10S-WG-20231127	11/27/2023 16:35	11/29/2023 14:30		
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			12/04/2023 10:16	12/05/2023 21:33
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			12/04/2023 10:16	12/07/2023 15:11
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			12/04/2023 10:16	12/08/2023 13:36
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			12/04/2023 10:16	12/11/2023 10:53
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			12/04/2023 10:16	12/12/2023 9:35
	SW-846 7470A (Total)			12/05/2023 8:14	12/06/2023 12:13
23112078-003D	APW-10S-WG-20231127	11/27/2023 16:35	11/29/2023 14:30		
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			12/01/2023 8:52	12/04/2023 18:26
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			12/01/2023 8:52	12/06/2023 11:57
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			12/01/2023 8:52	12/07/2023 10:04
23112078-004A	APW-06S-WG-20231128	11/28/2023 9:00	11/29/2023 14:30		
	Standard Methods 2540 C (Total) 1997, 2011				11/30/2023 10:30
	SW-846 9036 (Total)				12/01/2023 21:34
	SW-846 9040B, Laboratory Analyzed				11/30/2023 15:24
	SW-846 9214 (Total)				11/30/2023 10:22
	SW-846 9251 (Total)				12/01/2023 21:29
23112078-004B	APW-06S-WG-20231128	11/28/2023 9:00	11/29/2023 14:30		
	EPA 903.0/904.0, Radium 226/228				12/21/2023 14:33
23112078-004C	APW-06S-WG-20231128	11/28/2023 9:00	11/29/2023 14:30		
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			12/04/2023 10:16	12/05/2023 21:14
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			12/04/2023 10:16	12/07/2023 13:21
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			12/04/2023 10:16	12/08/2023 12:59
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			12/04/2023 10:16	12/11/2023 10:37
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			12/04/2023 10:16	12/12/2023 9:00
	SW-846 7470A (Total)			12/05/2023 8:14	12/06/2023 12:16
23112078-004D	APW-06S-WG-20231128	11/28/2023 9:00	11/29/2023 14:30		
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			12/01/2023 8:52	12/04/2023 18:32
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			12/01/2023 8:52	12/06/2023 12:02

Client: ERM

Work Order: 23112078

Client Project: 0599247

Report Date: 02-Jan-24

Sample ID	Client Sample ID	Collection Date	Received Date		
	Test Name			Prep Date/Time	Analysis Date/Time
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			12/01/2023 8:52	12/07/2023 10:10
23112078-005A	APW-06D-WG-20231128	11/28/2023 10:35	11/29/2023 14:30		
	Standard Methods 2540 C (Total) 1997, 2011				11/30/2023 10:31
	SW-846 9036 (Total)				12/01/2023 21:42
	SW-846 9040B, Laboratory Analyzed				11/30/2023 15:26
	SW-846 9214 (Total)				11/30/2023 10:24
	SW-846 9251 (Total)				12/01/2023 21:37
23112078-005B	APW-06D-WG-20231128	11/28/2023 10:35	11/29/2023 14:30		
	EPA 903.0/904.0, Radium 226/228				12/21/2023 14:33
23112078-005C	APW-06D-WG-20231128	11/28/2023 10:35	11/29/2023 14:30		
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			12/04/2023 10:16	12/05/2023 21:21
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			12/04/2023 10:16	12/07/2023 13:27
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			12/04/2023 10:16	12/08/2023 13:06
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			12/04/2023 10:16	12/11/2023 10:41
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			12/04/2023 10:16	12/12/2023 9:05
	SW-846 7470A (Total)			12/05/2023 8:14	12/06/2023 12:18
23112078-005D	APW-06D-WG-20231128	11/28/2023 10:35	11/29/2023 14:30		
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			12/01/2023 8:52	12/04/2023 18:38
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			12/01/2023 8:52	12/06/2023 12:07
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			12/01/2023 8:52	12/07/2023 10:16
23112078-006A	APW-05R-WG-20231128	11/28/2023 12:05	11/29/2023 14:30		
	Standard Methods 2540 C (Total) 1997, 2011				11/30/2023 10:31
	SW-846 9036 (Total)				12/01/2023 21:50
	SW-846 9040B, Laboratory Analyzed				11/30/2023 15:27
	SW-846 9214 (Total)				11/30/2023 10:35
	SW-846 9251 (Total)				12/01/2023 21:45
23112078-006B	APW-05R-WG-20231128	11/28/2023 12:05	11/29/2023 14:30		
	EPA 903.0/904.0, Radium 226/228				12/21/2023 14:33
23112078-006C	APW-05R-WG-20231128	11/28/2023 12:05	11/29/2023 14:30		
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			12/04/2023 10:16	12/05/2023 21:27
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			12/04/2023 10:16	12/07/2023 13:33
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			12/04/2023 10:16	12/08/2023 13:12
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			12/04/2023 10:16	12/11/2023 10:45
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			12/04/2023 10:16	12/12/2023 9:10
	SW-846 7470A (Total)			12/05/2023 8:14	12/06/2023 12:20
23112078-006D	APW-05R-WG-20231128	11/28/2023 12:05	11/29/2023 14:30		
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			12/01/2023 8:52	12/04/2023 18:44

Client: ERM

Work Order: 23112078

Client Project: 0599247

Report Date: 02-Jan-24

Sample ID	Client Sample ID	Collection Date	Received Date		
	Test Name			Prep Date/Time	Analysis Date/Time
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			12/01/2023 8:52	12/06/2023 12:12
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			12/01/2023 8:52	12/07/2023 10:22
23112078-007A	APW-02-WG-20231128	11/28/2023 13:20	11/29/2023 14:30		
	Standard Methods 2540 C (Total) 1997, 2011				11/30/2023 10:31
	SW-846 9036 (Total)				12/01/2023 21:58
	SW-846 9040B, Laboratory Analyzed				11/30/2023 15:29
	SW-846 9214 (Total)				11/30/2023 10:37
	SW-846 9251 (Total)				12/01/2023 21:53
23112078-007B	APW-02-WG-20231128	11/28/2023 13:20	11/29/2023 14:30		
	EPA 903.0/904.0, Radium 226/228				12/21/2023 14:33
23112078-007C	APW-02-WG-20231128	11/28/2023 13:20	11/29/2023 14:30		
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			12/04/2023 10:16	12/05/2023 22:16
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			12/04/2023 10:16	12/07/2023 14:28
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			12/04/2023 10:16	12/08/2023 13:18
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			12/04/2023 10:16	12/11/2023 10:49
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			12/04/2023 10:16	12/12/2023 9:15
	SW-846 7470A (Total)			12/05/2023 8:14	12/06/2023 12:22
23112078-007D	APW-02-WG-20231128	11/28/2023 13:20	11/29/2023 14:30		
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			12/01/2023 8:52	12/04/2023 20:03
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			12/01/2023 8:52	12/06/2023 13:36
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			12/01/2023 8:52	12/07/2023 12:08
23112078-008A	APW-07-WG-20231128	11/28/2023 15:10	11/29/2023 14:30		
	Standard Methods 2540 C (Total) 1997, 2011				11/30/2023 10:32
	SW-846 9036 (Total)				12/01/2023 22:17
	SW-846 9040B, Laboratory Analyzed				11/30/2023 15:32
	SW-846 9214 (Total)				11/30/2023 10:40
	SW-846 9251 (Total)				12/01/2023 22:17
23112078-008B	APW-07-WG-20231128	11/28/2023 15:10	11/29/2023 14:30		
	EPA 903.0/904.0, Radium 226/228				12/21/2023 14:33
23112078-008C	APW-07-WG-20231128	11/28/2023 15:10	11/29/2023 14:30		
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			12/04/2023 10:16	12/05/2023 22:22
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			12/04/2023 10:16	12/07/2023 14:34
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			12/04/2023 10:16	12/08/2023 13:24
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			12/04/2023 10:16	12/11/2023 11:24
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			12/04/2023 10:16	12/12/2023 9:20
	SW-846 7470A (Total)			12/05/2023 8:14	12/06/2023 12:35
23112078-008D	APW-07-WG-20231128	11/28/2023 15:10	11/29/2023 14:30		

Client: ERM

Work Order: 23112078

Client Project: 0599247

Report Date: 02-Jan-24

Sample ID	Client Sample ID	Collection Date	Received Date		
	Test Name			Prep Date/Time	Analysis Date/Time
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			12/01/2023 8:52	12/04/2023 19:33
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			12/01/2023 8:52	12/06/2023 12:17
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			12/01/2023 8:52	12/07/2023 10:28
23112078-009A	APW-08-WG-20231128	11/28/2023 16:30	11/29/2023 14:30		
	Standard Methods 2540 C (Total) 1997, 2011				11/30/2023 10:32
	SW-846 9036 (Total)				12/01/2023 22:25
	SW-846 9040B, Laboratory Analyzed				11/30/2023 15:34
	SW-846 9214 (Total)				11/30/2023 10:43
	SW-846 9251 (Total)				12/01/2023 22:25
23112078-009B	APW-08-WG-20231128	11/28/2023 16:30	11/29/2023 14:30		
	EPA 903.0/904.0, Radium 226/228				12/21/2023 14:33
23112078-009C	APW-08-WG-20231128	11/28/2023 16:30	11/29/2023 14:30		
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			12/04/2023 10:16	12/05/2023 22:28
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			12/04/2023 10:16	12/07/2023 14:41
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			12/04/2023 10:16	12/08/2023 13:30
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			12/04/2023 10:16	12/11/2023 11:28
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			12/04/2023 10:16	12/12/2023 9:25
	SW-846 7470A (Total)			12/05/2023 8:14	12/06/2023 12:38
23112078-009D	APW-08-WG-20231128	11/28/2023 16:30	11/29/2023 14:30		
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			12/01/2023 8:52	12/04/2023 19:39
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			12/01/2023 8:52	12/06/2023 13:20
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			12/01/2023 8:52	12/07/2023 10:34
23112078-010A	APW-04-WG-20231129	11/29/2023 8:30	11/29/2023 14:30		
	Standard Methods 2540 C (Total) 1997, 2011				11/30/2023 10:40
	SW-846 9036 (Total)				12/05/2023 12:03
	SW-846 9040B, Laboratory Analyzed				11/30/2023 15:36
	SW-846 9214 (Total)				11/30/2023 10:45
	SW-846 9251 (Total)				12/01/2023 22:36
23112078-010B	APW-04-WG-20231129	11/29/2023 8:30	11/29/2023 14:30		
	EPA 903.0/904.0, Radium 226/228				12/21/2023 14:33
23112078-010C	APW-04-WG-20231129	11/29/2023 8:30	11/29/2023 14:30		
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			12/04/2023 10:16	12/05/2023 22:35
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			12/04/2023 10:16	12/07/2023 14:47
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			12/04/2023 10:16	12/08/2023 14:45
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			12/04/2023 10:16	12/11/2023 11:33
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			12/04/2023 10:16	12/12/2023 9:30
	SW-846 7470A (Total)			12/05/2023 8:14	12/06/2023 12:40

Client: ERM

Work Order: 23112078

Client Project: 0599247

Report Date: 02-Jan-24

Sample ID	Client Sample ID	Collection Date	Received Date		
	Test Name			Prep Date/Time	Analysis Date/Time
23112078-010D	APW-04-WG-20231129	11/29/2023 8:30	11/29/2023 14:30		
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			12/01/2023 8:52	12/04/2023 19:45
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			12/01/2023 8:52	12/06/2023 13:25
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			12/01/2023 8:52	12/07/2023 10:41
23112078-011A	APW-01R-WG-20231129	11/29/2023 10:00	11/29/2023 14:30		
	Standard Methods 2540 C (Total) 1997, 2011				11/30/2023 10:41
	SW-846 9036 (Total)				12/05/2023 12:40
	SW-846 9040B, Laboratory Analyzed				11/30/2023 15:41
	SW-846 9214 (Total)				11/30/2023 10:47
	SW-846 9251 (Total)				12/01/2023 23:10
23112078-011B	APW-01R-WG-20231129	11/29/2023 10:00	11/29/2023 14:30		
	EPA 903.0/904.0, Radium 226/228				12/21/2023 14:33
23112078-011C	APW-01R-WG-20231129	11/29/2023 10:00	11/29/2023 14:30		
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			12/04/2023 10:16	12/05/2023 22:41
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			12/04/2023 10:16	12/07/2023 14:53
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			12/04/2023 10:16	12/08/2023 14:51
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			12/04/2023 10:16	12/11/2023 11:37
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			12/04/2023 10:16	12/12/2023 10:29
	SW-846 7470A (Total)			12/05/2023 8:14	12/06/2023 12:42
23112078-011D	APW-01R-WG-20231129	11/29/2023 10:00	11/29/2023 14:30		
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			12/01/2023 8:52	12/04/2023 19:51
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			12/01/2023 8:52	12/06/2023 13:31
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			12/01/2023 8:52	12/07/2023 12:01
23112078-012A	APW-09-WG-20231129	11/29/2023 11:30	11/29/2023 14:30		
	Standard Methods 2540 C (Total) 1997, 2011				12/01/2023 10:01
	SW-846 9036 (Total)				12/01/2023 23:18
	SW-846 9040B, Laboratory Analyzed				11/30/2023 15:43
	SW-846 9214 (Total)				11/30/2023 10:50
	SW-846 9251 (Total)				12/01/2023 23:18
23112078-012B	APW-09-WG-20231129	11/29/2023 11:30	11/29/2023 14:30		
	EPA 903.0/904.0, Radium 226/228				12/21/2023 14:33
23112078-012C	APW-09-WG-20231129	11/29/2023 11:30	11/29/2023 14:30		
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			12/04/2023 10:16	12/05/2023 22:47
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			12/04/2023 10:16	12/07/2023 14:59
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			12/04/2023 10:16	12/08/2023 14:57
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			12/04/2023 10:16	12/11/2023 11:41
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			12/04/2023 10:16	12/12/2023 10:34

Client: ERM

Work Order: 23112078

Client Project: 0599247

Report Date: 02-Jan-24

Sample ID	Client Sample ID	Collection Date	Received Date		
	Test Name			Prep Date/Time	Analysis Date/Time
	SW-846 7470A (Total)			12/05/2023 8:14	12/06/2023 12:45
23112078-012D	APW-09-WG-20231129	11/29/2023 11:30	11/29/2023 14:30		
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			12/04/2023 17:50	12/05/2023 19:42
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			12/04/2023 17:50	12/07/2023 11:55
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			12/04/2023 17:50	12/08/2023 11:45
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			12/04/2023 17:50	12/11/2023 9:52
23112078-013A	DUP-01-WG-20231128	11/28/2023 0:01	11/29/2023 14:30		
	Standard Methods 2540 C (Total) 1997, 2011				11/30/2023 10:40
	SW-846 9036 (Total)				12/01/2023 23:32
	SW-846 9040B, Laboratory Analyzed				11/30/2023 15:45
	SW-846 9214 (Total)				11/30/2023 10:52
	SW-846 9251 (Total)				12/01/2023 23:26
23112078-013B	DUP-01-WG-20231128	11/28/2023 0:01	11/29/2023 14:30		
	EPA 903.0/904.0, Radium 226/228				12/21/2023 14:33
23112078-013C	DUP-01-WG-20231128	11/28/2023 0:01	11/29/2023 14:30		
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			12/04/2023 10:16	12/05/2023 22:53
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			12/04/2023 10:16	12/07/2023 15:05
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			12/04/2023 10:16	12/08/2023 15:04
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			12/04/2023 10:16	12/11/2023 11:45
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			12/04/2023 10:16	12/12/2023 10:39
	SW-846 7470A (Total)			12/05/2023 8:14	12/06/2023 12:47
23112078-013D	DUP-01-WG-20231128	11/28/2023 0:01	11/29/2023 14:30		
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			12/04/2023 17:50	12/07/2023 13:39
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			12/04/2023 17:50	12/08/2023 12:09
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			12/04/2023 17:50	12/11/2023 10:00
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			12/04/2023 17:50	12/12/2023 11:53
23112078-014A	DUP-02-WG-20231129	11/29/2023 0:02	11/29/2023 14:30		
	Standard Methods 2540 C (Total) 1997, 2011				11/30/2023 10:41
	SW-846 9036 (Total)				12/01/2023 23:34
	SW-846 9040B, Laboratory Analyzed				11/30/2023 15:46
	SW-846 9214 (Total)				11/30/2023 11:06
	SW-846 9251 (Total)				12/01/2023 23:34
23112078-014B	DUP-02-WG-20231129	11/29/2023 0:02	11/29/2023 14:30		
	EPA 903.0/904.0, Radium 226/228				12/21/2023 14:33
23112078-014C	DUP-02-WG-20231129	11/29/2023 0:02	11/29/2023 14:30		
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			12/04/2023 10:16	12/05/2023 22:59
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			12/04/2023 10:16	12/07/2023 16:43

Client: ERM

Work Order: 23112078

Client Project: 0599247

Report Date: 02-Jan-24

Sample ID	Client Sample ID	Collection Date	Received Date	Test Name	Prep Date/Time	Analysis Date/Time
				SW-846 3005A, 6020A, Metals by ICPMS (Total)	12/04/2023 10:16	12/08/2023 15:53
				SW-846 3005A, 6020A, Metals by ICPMS (Total)	12/04/2023 10:16	12/11/2023 11:49
				SW-846 3005A, 6020A, Metals by ICPMS (Total)	12/04/2023 10:16	12/12/2023 10:43
				SW-846 7470A (Total)	12/05/2023 8:14	12/06/2023 12:49
23112078-014D	DUP-02-WG-20231129	11/29/2023 0:02	11/29/2023 14:30			
				SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)	12/04/2023 17:50	12/05/2023 19:48
				SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)	12/04/2023 17:50	12/07/2023 12:57
				SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)	12/04/2023 17:50	12/11/2023 9:56
23112078-015A	EB-01-WQ-20231127	11/27/2023 11:00	11/29/2023 14:30			
				Standard Methods 2540 C (Total) 1997, 2011		11/30/2023 10:30
				SW-846 9036 (Total)		12/01/2023 23:42
				SW-846 9040B, Laboratory Analyzed		11/30/2023 15:52
				SW-846 9214 (Total)		11/30/2023 11:09
				SW-846 9251 (Total)		12/01/2023 23:42
23112078-015B	EB-01-WQ-20231127	11/27/2023 11:00	11/29/2023 14:30			
				EPA 903.0/904.0, Radium 226/228		12/21/2023 14:33
23112078-015C	EB-01-WQ-20231127	11/27/2023 11:00	11/29/2023 14:30			
				SW-846 3005A, 6020A, Metals by ICPMS (Total)	12/04/2023 10:16	12/06/2023 0:19
				SW-846 3005A, 6020A, Metals by ICPMS (Total)	12/04/2023 10:16	12/07/2023 16:49
				SW-846 3005A, 6020A, Metals by ICPMS (Total)	12/04/2023 10:16	12/08/2023 15:10
				SW-846 3005A, 6020A, Metals by ICPMS (Total)	12/04/2023 10:16	12/11/2023 11:53
				SW-846 3005A, 6020A, Metals by ICPMS (Total)	12/04/2023 10:16	12/12/2023 10:58
				SW-846 7470A (Total)	12/05/2023 8:14	12/06/2023 12:51
23112078-015D	EB-01-WQ-20231127	11/27/2023 11:00	11/29/2023 14:30			
				SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)	12/04/2023 17:50	12/05/2023 19:54
				SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)	12/04/2023 17:50	12/07/2023 13:03
				SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)	12/04/2023 17:50	12/11/2023 10:25

Quality Control Results

<http://www.teklabinc.com/>
Client: ERM

Work Order: 23112078

Client Project: 0599247

Report Date: 02-Jan-24

STANDARD METHODS 2540 C (TOTAL) 1997, 2011

Batch R339971	SampType: MBLK	Units mg/L								
SampID: MBLK										
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Dissolved Solids		20		< 20	16.00	0	0	-100	100	11/30/2023

Batch R339971		SampType: LCS		Units mg/L							
SampID: LCS											Date Analyzed
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit		
Total Dissolved Solids		20		990	1000	0	99.0	90	110	11/30/2023	

Batch R339971		SampType: DUP		Units mg/L					RPD Limit 10		
SampID: 23112078-012ADUP											
Analyses		Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Dissolved Solids			20		350				380.0	8.22	12/01/2023

SW-846 9036 (TOTAL)

Batch R340009		SampType: MBLK		Units mg/L							
SampID: ICB/MBLK											
Analyses		Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate			10		< 10	6.140	0	0	-100	100	12/01/2023

Batch R340009		SampType: LCS		Units mg/L							
SampID: ICB/LCS											
Analyses		Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate			10		19	20.00	0	95.5	90	110	12/01/2023

Batch R340009		SampType: MS		Units mg/L							
SampID: 23112078-001AMS											
Analyses		Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate			100		316	200.0	133.3	91.2	85	115	12/01/2023

Batch R340009		SampType: MSD		Units mg/L				RPD Limit 10			
SampID: 23112078-001AMSD											
Analyses		Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Sulfate			100		319	200.0	133.3	92.9	315.7	1.06	12/01/2023

Client: ERM

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SW-846 9036 (TOTAL)

Batch R340126		SampType: MBLK		Units mg/L							
SampID: ICB/MBLK											
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed	
Sulfate		10		< 10	6.140	0	0	-100	100	12/05/2023	

Batch R340126		SampType: LCS		Units mg/L							
SampID: ICV/LCS											Date Analyzed
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit		
Sulfate		10		19	20.00	0	95.0	90	110	12/05/2023	

Batch R340126		SampType: MS		Units mg/L							
SampID: 23112078-010AMS											
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed	
Sulfate		20		92	40.00	53.68	94.8	85	115	12/05/2023	

Batch R340126		SampType: MSD		Units mg/L				RPD Limit 10			
SampID: 23112078-010AMSD											
Analyses		Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Sulfate			20		92	40.00	53.68	96.7	91.58	0.84	12/05/2023

SW-846 9040B, LABORATORY ANALYZED

Batch R339913		SampType: LCS		Units							
SampID: LCS											Date Analyzed
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit		
Lab pH		1.00		6.97	7.000	0	99.6	99.29	100.7	11/30/2023	

Batch R339913		SampType: DUP		Units				RPD Limit 10			
SampID: 23112078-001ADUP											
Analyses		Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Lab pH			1.00	H	7.20				7.240	0.55	11/30/2023

Batch R339913		SampType: DUP		Units				RPD Limit 10			
SampID: 23112078-002ADUP											
Analyses		Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Lab pH			1.00	H	7.07				7.080	0.14	11/30/2023



Quality Control Results

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SW-846 9040B, LABORATORY ANALYZED

Batch R339913		SampType: DUP		Units				RPD Limit 10			
SampID: 23112078-003ADUP											
Analyses		Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Lab pH			1.00	H	7.03				7.010	0.28	11/30/2023

Batch R339913		SampType: DUP		Units				RPD Limit 10			
SampID: 23112078-004ADUP											
Analyses		Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Lab pH			1.00	H	7.14				7.120	0.28	11/30/2023

Batch R339913		SampType: DUP		Units				RPD Limit 10				Date Analyzed
SampID: 23112078-005ADUP												
Analyses		Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD		
Lab pH			1.00	H	7.38				7.360	0.27		
11/30/2023												

Batch R339913		SampType: DUP		Units				RPD Limit 10				Date Analyzed
SampID: 23112078-006ADUP												
Analyses		Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD		
Lab pH			1.00	H	7.32				7.330	0.14		

Batch R339913		SampType: DUP		Units				RPD Limit 10				Date Analyzed
SampID: 23112078-007ADUP												
Analyses		Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD		
Lab pH			1.00	H	7.13				7.110	0.28		

Batch R339913		SampType: DUP		Units				RPD Limit 10			
SampID: 23112078-008ADUP											
Analyses		Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Lab pH			1.00	H	6.85				6.860	0.15	11/30/2023

Batch R339913		SampType: DUP		Units				RPD Limit 10			
SampID: 23112078-009ADUP											
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed	
Lab pH		1.00	H	7.32				7.270	0.69	11/30/2023	

Batch R339913		SampType: DUP		Units				RPD Limit 10			
SampID: 23112078-010ADUP											
Analyses		Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Lab pH			1.00	H	7.33				7.310	0.27	11/30/2023



Quality Control Results

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SW-846 9040B, LABORATORY ANALYZED

Batch R339913		SampType: DUP		Units				RPD Limit 10				Date Analyzed
SampID: 23112078-011ADUP												
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD			
Lab pH		1.00	H	6.58				6.590	0.15			

Batch R339913		SampType: DUP		Units				RPD Limit 10			Date Analyzed
SampID: 23112078-012ADUP											
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD		
Lab pH		1.00	H	7.51				7.500	0.13		

Batch R339913		SampType: DUP		Units				RPD Limit 10				Date Analyzed
SampID: 23112078-013ADUP												
Analyses		Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD		
Lab pH			1.00	H	7.33				7.340	0.14		

Batch R339913		SampType: DUP		Units				RPD Limit 10			
SampID: 23112078-014ADUP											
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed	
Lab pH		1.00	H	7.45				7.450	0.00	11/30/2023	

Batch R339913		SampType: DUP		Units				RPD Limit 10			Date Analyzed
SampID: 23112078-015ADUP											
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD		
Lab pH		1.00	H	5.16				5.150	0.19		

SW-846 9214 (TOTAL)

Batch R339841		SampType: MBLK		Units mg/L							
SampID: MBLK											
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed	
Fluoride		0.10		< 0.10	0.0500	0	0	-100	100	11/29/2023	

Batch R339841		SampType: LCS		Units mg/L							
SampID: LCS											
Analyses		Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Fluoride			0.10		1.00	1.000	0	99.5	90	110	11/29/2023

Quality Control Results

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SW-846 9214 (TOTAL)

Batch R339841		SampType: MS		Units mg/L							
SampID: 23112078-005AMS											Date Analyzed
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit		
Fluoride		0.10		2.31	2.000	0.2400	103.6	75	125	11/30/2023	

Batch R339841		SampType: MSD		Units mg/L				RPD Limit 15			
SampID: 23112078-005AMSD											
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed	
Fluoride		0.10		2.38	2.000	0.2400	107.2	2.311	3.11	11/30/2023	

Batch R339841		SampType: MS		Units mg/L							
SampID: 23112078-013AMS											
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed	
Fluoride		0.10		2.50	2.000	0.3540	107.4	75	125	11/30/2023	

Batch R339841		SampType: MSD		Units mg/L				RPD Limit 15			
SampID: 23112078-013AMSD											
Analyses		Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Fluoride			0.10		2.41	2.000	0.3540	102.7	2.501	3.79	11/30/2023

SW-846 9251 (TOTAL)

Batch R340022		SampType: MBLK		Units mg/L							
SampID: ICB/MBLK											
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed	
Chloride		4		< 4	0.5000	0	0	-100	100	12/01/2023	

Batch R340022		SampType: LCS		Units mg/L							
SampID: ICB/LCS											
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed	
Chloride		4		20	20.00	0	101.0	90	110	12/01/2023	

Batch R340022		SampType: MS		Units mg/L							
SampID: 23112078-001AMS											
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed	
Chloride		4		30	20.00	11.15	93.3	85	115	12/01/2023	

Client: ERM

Work Order: 23112078

Client Project: 0599247

Report Date: 02-Jan-24

SW-846 9251 (TOTAL)

Batch R340022		SampType: MSD		Units mg/L				RPD Limit 15			
SampID: 23112078-001AMSD											
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed	
Chloride		4		30	20.00	11.15	93.4	29.80	0.07	12/01/2023	

Batch R340022		SampType: MS		Units mg/L							
SampID: 23112078-010AMS											Date Analyzed
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit		
Chloride		4		30	20.00	10.55	95.6	85	115	12/01/2023	

Batch R340022		SampType: MSD		Units mg/L				RPD Limit 15			Date Analyzed	
SampID: 23112078-010AMSD												
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD			
Chloride		4		30	20.00	10.55	94.8	29.66	0.54	12/01/2023		

Batch R340139		SampType: MBLK		Units mg/L							
SampID: ICB/MBLK											
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed	
Chloride		4		< 4	0.5000	0	0	-100	100	12/05/2023	

Batch R340139		SampType: LCS		Units mg/L							
SampID: ICV/LCS											
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed	
Chloride		4		21	20.00	0	102.9	90	110	12/05/2023	

Client: ERM

Work Order: 23112078

Client Project: 0599247

Report Date: 02-Jan-24

SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)

Batch 215379 SampType: MBLK Units mg/L										
SampID: MBLK-215379										
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010		< 0.0010	0.0004	0	0	-100	100	12/06/2023
Arsenic		0.0010		< 0.0010	0.0004	0	0	-100	100	12/04/2023
Barium		0.0010		< 0.0010	0.0007	0	0	-100	100	12/04/2023
Beryllium		0.0010		< 0.0010	0.0002	0	0	-100	100	12/04/2023
Boron		0.0250		< 0.0250	0.0093	0	0	-100	100	12/04/2023
Cadmium		0.0010		< 0.0010	0.0001	0	0	-100	100	12/04/2023
Calcium		0.125		< 0.125	0.0700	0	0	-100	100	12/05/2023
Chromium		0.0015		< 0.0015	0.0007	0	0	-100	100	12/04/2023
Cobalt		0.0010		< 0.0010	0.0001	0	0	-100	100	12/04/2023
Lead		0.0010		< 0.0010	0.0006	0	0	-100	100	12/04/2023
Lithium	*	0.0030		< 0.0030	0.0015	0	0	-100	100	12/04/2023
Molybdenum		0.0015		< 0.0015	0.0006	0	0	-100	100	12/04/2023
Selenium		0.0010		< 0.0010	0.0006	0	0	-100	100	12/04/2023
Thallium		0.0020		< 0.0020	0.0010	0	0	-100	100	12/04/2023

Batch 215379 SampType: LCS Units mg/L										
SampID: LCS-215379										
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010		0.438	0.5000	0	87.6	80	120	12/06/2023
Arsenic		0.0010		0.486	0.5000	0	97.1	80	120	12/04/2023
Barium		0.0010		1.89	2.000	0	94.7	80	120	12/04/2023
Beryllium		0.0010		0.0474	0.0500	0	94.9	80	120	12/04/2023
Boron		0.0250		0.456	0.5000	0	91.3	80	120	12/04/2023
Cadmium		0.0010		0.0466	0.0500	0	93.1	80	120	12/04/2023
Calcium		0.125		2.34	2.500	0	93.8	80	120	12/07/2023
Chromium		0.0015		0.188	0.2000	0	93.8	80	120	12/04/2023
Cobalt		0.0010		0.469	0.5000	0	93.7	80	120	12/04/2023
Lead		0.0010		0.487	0.5000	0	97.4	80	120	12/04/2023
Lithium	*	0.0030		0.476	0.5000	0	95.2	80	120	12/04/2023
Molybdenum		0.0015		0.441	0.5000	0	88.3	80	120	12/04/2023
Selenium		0.0010		0.471	0.5000	0	94.3	80	120	12/04/2023
Thallium		0.0020		0.233	0.2500	0	93.3	80	120	12/04/2023

Client: ERM

Work Order: 23112078

Client Project: 0599247

Report Date: 02-Jan-24

SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)

Batch 215379 SampType: MS Units mg/L										
SampID: 23112078-007DMS										
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010		0.509	0.5000	0	101.8	75	125	12/06/2023
Arsenic		0.0010		0.504	0.5000	0.01677	97.5	75	125	12/04/2023
Barium		0.0010		2.04	2.000	0.2048	91.6	75	125	12/04/2023
Beryllium		0.0010		0.0470	0.0500	0	93.9	75	125	12/04/2023
Boron		0.0250	S	7.39	0.5000	9.565	-435.1	75	125	12/04/2023
Cadmium		0.0010		0.0459	0.0500	0	91.7	75	125	12/04/2023
Calcium		0.125	S	136	2.500	121.4	570.3	75	125	12/07/2023
Chromium		0.0015		0.185	0.2000	0	92.6	75	125	12/04/2023
Cobalt		0.0010		0.459	0.5000	0.0001408	91.8	75	125	12/04/2023
Lead		0.0010		0.461	0.5000	0	92.2	75	125	12/04/2023
Lithium	*	0.0030		0.502	0.5000	0.05065	90.2	75	125	12/04/2023
Molybdenum		0.0015		0.621	0.5000	0.2053	83.1	75	125	12/04/2023
Selenium		0.0010		0.464	0.5000	0	92.8	75	125	12/04/2023
Thallium		0.0020		0.222	0.2500	0	88.9	75	125	12/04/2023

Batch 215379 SampType: MSD Units mg/L RPD Limit 20										
SampID: 23112078-007DMSD										
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Antimony		0.0010		0.474	0.5000	0	94.7	0.5091	7.22	12/06/2023
Arsenic		0.0010		0.508	0.5000	0.01677	98.3	0.5043	0.77	12/04/2023
Barium		0.0010		2.04	2.000	0.2048	91.9	2.037	0.26	12/04/2023
Beryllium		0.0010		0.0472	0.0500	0	94.3	0.04696	0.46	12/04/2023
Boron		0.0250	S	7.48	0.5000	9.565	-417.3	7.390	1.20	12/04/2023
Cadmium		0.0010		0.0462	0.0500	0	92.4	0.04587	0.76	12/04/2023
Calcium		0.125	S	133	2.500	121.4	467.7	135.6	1.91	12/07/2023
Chromium		0.0015		0.183	0.2000	0	91.6	0.1853	1.14	12/04/2023
Cobalt		0.0010		0.455	0.5000	0.0001408	91.0	0.4591	0.85	12/04/2023
Lead		0.0010		0.462	0.5000	0	92.4	0.4610	0.27	12/04/2023
Lithium	*	0.0030		0.509	0.5000	0.05065	91.7	0.5018	1.50	12/04/2023
Molybdenum		0.0015		0.630	0.5000	0.2053	84.9	0.6207	1.46	12/04/2023
Selenium		0.0010		0.469	0.5000	0	93.8	0.4641	1.01	12/04/2023
Thallium		0.0020		0.227	0.2500	0	90.8	0.2224	2.08	12/04/2023

Client: ERM

Work Order: 23112078

Client Project: 0599247

Report Date: 02-Jan-24

SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)

Batch 215495 SampType: MBLK Units mg/L										
SampID: MBLK-215495										
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010		< 0.0010	0.0004	0	0	-100	100	12/11/2023
Arsenic		0.0010		< 0.0010	0.0004	0	0	-100	100	12/05/2023
Barium		0.0010		< 0.0010	0.0007	0	0	-100	100	12/05/2023
Beryllium		0.0010		< 0.0010	0.0002	0	0	-100	100	12/05/2023
Boron		0.0250		< 0.0250	0.0093	0	0	-100	100	12/05/2023
Cadmium		0.0010		< 0.0010	0.0001	0	0	-100	100	12/05/2023
Calcium		0.125		< 0.125	0.0700	0	0	-100	100	12/07/2023
Chromium		0.0015		< 0.0015	0.0007	0	0	-100	100	12/07/2023
Cobalt		0.0010		< 0.0010	0.0001	0	0	-100	100	12/05/2023
Lead		0.0010		< 0.0010	0.0006	0	0	-100	100	12/05/2023
Lithium	*	0.0030		< 0.0030	0.0015	0	0	-100	100	12/05/2023
Molybdenum		0.0015		< 0.0015	0.0006	0	0	-100	100	12/07/2023
Selenium		0.0010		< 0.0010	0.0006	0	0	-100	100	12/05/2023
Thallium		0.0020		< 0.0020	0.0010	0	0	-100	100	12/05/2023

Batch 215495 SampType: LCS Units mg/L										
SampID: LCS-215495										
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010		0.504	0.5000	0	100.8	80	120	12/11/2023
Arsenic		0.0010		0.500	0.5000	0	99.9	80	120	12/05/2023
Barium		0.0010		1.93	2.000	0	96.7	80	120	12/05/2023
Beryllium		0.0010		0.0435	0.0500	0	86.9	80	120	12/05/2023
Boron		0.0250		0.411	0.5000	0	82.3	80	120	12/05/2023
Cadmium		0.0010		0.0458	0.0500	0	91.6	80	120	12/05/2023
Calcium		0.125		2.03	2.500	0	81.1	80	120	12/07/2023
Chromium		0.0015		0.180	0.2000	0	90.0	80	120	12/08/2023
Cobalt		0.0010		0.454	0.5000	0	90.8	80	120	12/05/2023
Lead		0.0010		0.475	0.5000	0	95.1	80	120	12/05/2023
Lithium	*	0.0030		0.430	0.5000	0	86.0	80	120	12/05/2023
Molybdenum		0.0015		0.425	0.5000	0	85.1	80	120	12/07/2023
Selenium		0.0010		0.471	0.5000	0	94.2	80	120	12/05/2023
Thallium		0.0020		0.231	0.2500	0	92.2	80	120	12/05/2023

Client: ERM

Work Order: 23112078

Client Project: 0599247

Report Date: 02-Jan-24

SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)

Batch 215495 SampType: MS Units mg/L										
SampID: 23112078-013DMS										
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010	S	< 0.0010	0.5000	0	0	75	125	12/11/2023
Arsenic		0.0010		0.487	0.5000	0.001777	97.1	75	125	12/07/2023
Barium		0.0010		2.01	2.000	0.1265	94.1	75	125	12/07/2023
Beryllium		0.0010		0.0487	0.0500	0	97.4	75	125	12/07/2023
Boron		0.0250	S	7.30	0.5000	6.439	172.8	75	125	12/07/2023
Cadmium		0.0010		0.0479	0.0500	0	95.8	75	125	12/07/2023
Calcium		0.125	S	100	2.500	91.91	331.8	75	125	12/07/2023
Chromium		0.0015	S	< 0.0015	0.2000	0.0007115	-0.4	75	125	12/08/2023
Cobalt		0.0010	S	< 0.0010	0.5000	0	0	75	125	12/12/2023
Lead		0.0010		0.486	0.5000	0	97.1	75	125	12/07/2023
Lithium	*	0.0030		0.549	0.5000	0.03434	103.0	75	125	12/07/2023
Molybdenum		0.0015		0.686	0.5000	0.1916	98.9	75	125	12/07/2023
Selenium		0.0010		0.481	0.5000	0	96.3	75	125	12/07/2023
Thallium		0.0020		0.237	0.2500	0	94.9	75	125	12/07/2023

Batch 215495 SampType: MSD Units mg/L RPD Limit 20										
SampID: 23112078-013DMSD										
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Antimony		0.0010	S	< 0.0010	0.5000	0	0	0	0.00	12/11/2023
Arsenic		0.0010		0.486	0.5000	0.001777	96.9	0.4873	0.17	12/07/2023
Barium		0.0010		1.97	2.000	0.1265	92.4	2.008	1.71	12/07/2023
Beryllium		0.0010		0.0473	0.0500	0	94.7	0.04869	2.83	12/07/2023
Boron		0.0250	S	7.24	0.5000	6.439	160.2	7.304	0.87	12/07/2023
Cadmium		0.0010		0.0469	0.0500	0	93.7	0.04792	2.24	12/07/2023
Calcium		0.125	S	99.5	2.500	91.91	301.9	100.2	0.75	12/07/2023
Chromium		0.0015	S	< 0.0015	0.2000	0.0007115	-0.4	0	0.00	12/08/2023
Cobalt		0.0010	S	< 0.0010	0.5000	0	0	0	0.00	12/12/2023
Lead		0.0010		0.474	0.5000	0	94.8	0.4856	2.39	12/07/2023
Lithium	*	0.0030		0.545	0.5000	0.03434	102.2	0.5495	0.80	12/07/2023
Molybdenum		0.0015		0.670	0.5000	0.1916	95.6	0.6861	2.40	12/07/2023
Selenium		0.0010		0.476	0.5000	0	95.2	0.4814	1.13	12/07/2023
Thallium		0.0020		0.229	0.2500	0	91.8	0.2372	3.36	12/07/2023

Client: ERM

Work Order: 23112078

Client Project: 0599247

Report Date: 02-Jan-24

SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)
Batch 215460 **SampType:** MBLK **Units** mg/L

SampID: MBLK-215460

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010		< 0.0010	0.0004	0	0	-100	100	12/11/2023
Arsenic		0.0010		< 0.0010	0.0004	0	0	-100	100	12/05/2023
Barium		0.0010		< 0.0010	0.0007	0	0	-100	100	12/05/2023
Beryllium		0.0010		< 0.0010	0.0002	0	0	-100	100	12/05/2023
Boron		0.0250		< 0.0250	0.0093	0	0	-100	100	12/05/2023
Cadmium		0.0010		< 0.0010	0.0001	0	0	-100	100	12/05/2023
Calcium		0.125		< 0.125	0.0700	0	0	-100	100	12/07/2023
Chromium		0.0015		< 0.0015	0.0007	0	0	-100	100	12/07/2023
Cobalt		0.0010		< 0.0010	0.0001	0	0	-100	100	12/05/2023
Lead		0.0010		< 0.0010	0.0006	0	0	-100	100	12/05/2023
Lithium	*	0.0030		< 0.0030	0.0015	0	0	-100	100	12/05/2023
Molybdenum		0.0015		< 0.0015	0.0006	0	0	-100	100	12/07/2023
Selenium		0.0010		< 0.0010	0.0006	0	0	-100	100	12/05/2023
Thallium		0.0020		< 0.0020	0.0010	0	0	-100	100	12/05/2023

Batch 215460 **SampType:** LCS **Units** mg/L

SampID: LCS-215460

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010		0.596	0.5000	0	119.3	80	120	12/11/2023
Arsenic		0.0010		0.554	0.5000	0	110.7	80	120	12/05/2023
Barium		0.0010		2.12	2.000	0	106.0	80	120	12/05/2023
Beryllium		0.0010		0.0520	0.0500	0	103.9	80	120	12/05/2023
Boron		0.0250		0.495	0.5000	0	99.0	80	120	12/05/2023
Cadmium		0.0010		0.0519	0.0500	0	103.7	80	120	12/05/2023
Calcium		0.125		2.33	2.500	0	93.3	80	120	12/07/2023
Chromium		0.0015		0.198	0.2000	0	99.0	80	120	12/08/2023
Cobalt		0.0010		0.507	0.5000	0	101.4	80	120	12/05/2023
Lead		0.0010		0.547	0.5000	0	109.3	80	120	12/05/2023
Lithium	*	0.0030		0.525	0.5000	0	104.9	80	120	12/05/2023
Molybdenum		0.0015		0.480	0.5000	0	95.9	80	120	12/07/2023
Selenium		0.0010		0.519	0.5000	0	103.8	80	120	12/05/2023
Thallium		0.0020		0.256	0.2500	0	102.5	80	120	12/05/2023

Quality Control Results

<http://www.teklabinc.com/>

Client: ERM

Work Order: 23112078

Client Project: 0599247

Report Date: 02-Jan-24

SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)

Batch 215460 SampType: MS Units mg/L

SampID: 23112078-003CMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010		0.568	0.5000	0	113.6	75	125	12/11/2023
Arsenic		0.0010		0.746	0.5000	0.2757	94.0	75	125	12/05/2023
Barium		0.0010		2.98	2.000	0.8042	109.0	75	125	12/05/2023
Beryllium		0.0010		0.0508	0.0500	0	101.6	75	125	12/05/2023
Boron		0.0250		1.09	0.5000	0.5548	107.3	75	125	12/07/2023
Cadmium		0.0010		0.0512	0.0500	0	102.4	75	125	12/05/2023
Calcium		0.125	S	139	2.500	128.5	431.9	75	125	12/07/2023
Chromium		0.0015		0.233	0.2000	0.001607	115.8	75	125	12/12/2023
Cobalt		0.0010		0.484	0.5000	0.001319	96.5	75	125	12/05/2023
Lead		0.0010		0.511	0.5000	0	102.3	75	125	12/05/2023
Lithium	*	0.0030		0.516	0.5000	0.04008	95.1	75	125	12/05/2023
Molybdenum		0.0015		0.499	0.5000	0.002064	99.4	75	125	12/07/2023
Selenium		0.0010		0.509	0.5000	0	101.8	75	125	12/05/2023
Thallium		0.0020		0.242	0.2500	0	96.7	75	125	12/05/2023

Batch 215460 SampType: MSD Units mg/L

RPD Limit 20

SampID: 23112078-003CMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Antimony		0.0010		0.607	0.5000	0	121.4	0.5681	6.61	12/11/2023
Arsenic		0.0010		0.747	0.5000	0.2757	94.3	0.7455	0.23	12/05/2023
Barium		0.0010		2.91	2.000	0.8042	105.5	2.984	2.37	12/05/2023
Beryllium		0.0010		0.0489	0.0500	0	97.7	0.05081	3.88	12/05/2023
Boron		0.0250		1.11	0.5000	0.5548	110.6	1.091	1.49	12/07/2023
Cadmium		0.0010		0.0501	0.0500	0	100.1	0.05119	2.20	12/05/2023
Calcium		0.125	S	149	2.500	128.5	817.6	139.3	6.69	12/07/2023
Chromium		0.0015		0.240	0.2000	0.001607	119.1	0.2333	2.73	12/12/2023
Cobalt		0.0010		0.476	0.5000	0.001319	95.0	0.4838	1.54	12/05/2023
Lead		0.0010		0.507	0.5000	0	101.3	0.5115	0.96	12/05/2023
Lithium	*	0.0030		0.509	0.5000	0.04008	93.8	0.5158	1.33	12/05/2023
Molybdenum		0.0015		0.504	0.5000	0.002064	100.3	0.4993	0.86	12/07/2023
Selenium		0.0010		0.498	0.5000	0	99.6	0.5090	2.15	12/05/2023
Thallium		0.0020		0.238	0.2500	0	95.3	0.2416	1.37	12/05/2023

Client: ERM

Work Order: 23112078

Client Project: 0599247

Report Date: 02-Jan-24

SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)

Batch 215460		SampType: MS		Units mg/L							
SampID: 23112078-015CMS											Date Analyzed
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit		
Antimony		0.0010		0.571	0.5000	0	114.1	75	125	12/11/2023	
Arsenic		0.0010		0.542	0.5000	0	108.3	75	125	12/06/2023	
Barium		0.0010		2.14	2.000	0	107.2	75	125	12/06/2023	
Beryllium		0.0010		0.0483	0.0500	0	96.5	75	125	12/06/2023	
Boron		0.0250		0.460	0.5000	0	92.0	75	125	12/06/2023	
Cadmium		0.0010		0.0515	0.0500	0	103.1	75	125	12/06/2023	
Calcium		0.125		2.37	2.500	0	94.8	75	125	12/12/2023	
Chromium		0.0015		0.203	0.2000	0	101.5	75	125	12/12/2023	
Cobalt		0.0010		0.501	0.5000	0	100.2	75	125	12/12/2023	
Lead		0.0010		0.535	0.5000	0	106.9	75	125	12/06/2023	
Lithium	*	0.0030		0.485	0.5000	0	97.0	75	125	12/06/2023	
Molybdenum		0.0015		0.476	0.5000	0.0009545	95.0	75	125	12/07/2023	
Selenium		0.0010		0.511	0.5000	0	102.2	75	125	12/07/2023	
Thallium		0.0020		0.247	0.2500	0	98.6	75	125	12/06/2023	

Batch 215460	SampType: MSD	Units mg/L				RPD Limit 20				
SampID: 23112078-015CMSD										
Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Antimony		0.0010		0.572	0.5000	0	114.4	0.5706	0.24	12/11/2023
Arsenic		0.0010		0.522	0.5000	0	104.3	0.5416	3.76	12/06/2023
Barium		0.0010		2.02	2.000	0	100.8	2.144	6.15	12/06/2023
Beryllium		0.0010		0.0477	0.0500	0	95.4	0.04826	1.23	12/06/2023
Boron		0.0250		0.445	0.5000	0	89.0	0.4602	3.40	12/06/2023
Cadmium		0.0010		0.0497	0.0500	0	99.4	0.05154	3.67	12/06/2023
Calcium		0.125	SR	5.92	2.500	0	236.7	2.371	85.58	12/12/2023
Chromium		0.0015	SR	0.286	0.2000	0	142.8	0.2031	33.79	12/12/2023
Cobalt		0.0010	SR	0.708	0.5000	0	141.6	0.5012	34.19	12/12/2023
Lead		0.0010		0.505	0.5000	0	100.9	0.5346	5.75	12/06/2023
Lithium	*	0.0030		0.474	0.5000	0	94.8	0.4851	2.32	12/06/2023
Molybdenum		0.0015		0.484	0.5000	0.0009545	96.5	0.4760	1.57	12/07/2023
Selenium		0.0010		0.504	0.5000	0	100.8	0.5109	1.40	12/07/2023
Thallium		0.0020		0.238	0.2500	0	95.1	0.2466	3.67	12/06/2023



Quality Control Results

<http://www.teklabinc.com/>

Client: ERM

Work Order: 23112078

Client Project: 0599247

Report Date: 02-Jan-24

SW-846 7470A (TOTAL)

Batch 215503 SampType: MBLK Units mg/L

SampID: MBLK-215503

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury		0.00020		< 0.00020	0.0001	0	0	-100	100	12/06/2023

Batch 215503 SampType: LCS Units mg/L

SampID: LCS-215503

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury		0.00020		0.00489	0.0050	0	97.7	85	115	12/07/2023

Batch 215503 SampType: MS Units mg/L

SampID: 23112078-007CMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury		0.00020		0.00485	0.0050	0	97.0	75	125	12/06/2023

Batch 215503 SampType: MSD Units mg/L

RPD Limit 15

SampID: 23112078-007CMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Mercury		0.00020		0.00476	0.0050	0	95.2	0.004851	1.90	12/06/2023

Client: ERM

Work Order: 23112078

Client Project: 0599247

Report Date: 02-Jan-24

Carrier: Marshall Arendell

Received By: HAW

Completed by:

On:

29-Nov-23

Amber Dilallo

Reviewed by:

On:

29-Nov-23

Ellie Hopkins

Pages to follow:

Chain of custody

2

Extra pages included

29

Shipping container/cooler in good condition?

Yes ☒

No ☐

Not Present ☐

Temp °C **3.0**

Type of thermal preservation?

None ☐

Ice ☒

Blue Ice ☐

Dry Ice ☐

Chain of custody present?

Yes ☒

No ☐

Chain of custody signed when relinquished and received?

Yes ☒

No ☐

Chain of custody agrees with sample labels?

Yes ☒

No ☐

Samples in proper container/bottle?

Yes ☒

No ☐

Sample containers intact?

Yes ☒

No ☐

Sufficient sample volume for indicated test?

Yes ☒

No ☐

All samples received within holding time?

Yes ☐

No ☒

Reported field parameters measured:

Field ☐

Lab ☒

NA ☐

Sample analyses to be measured in the field and/or within 15 minutes of collection were analyzed in the lab as soon as practicable. These analyses include Chlorine (demand, free and/or residual), Carbon Dioxide, Dissolved Oxygen, Ferrous Iron, pH, and Sulfite.

Container/Temp Blank temperature in compliance?

Yes ☒

No ☐

When thermal preservation is required, samples are compliant with a temperature between 0.1°C - 6.0°C, or when samples are received on ice the same day as collected.

Water – at least one vial per sample has zero headspace?

Yes ☐

No ☐

No VOA vials ☒

Water - TOX containers have zero headspace?

Yes ☐

No ☐

No TOX containers ☒

Water - pH acceptable upon receipt?

Yes ☐

No ☒

NA ☐

NPDES/CWA TCN interferences checked/treated in the field?

Yes ☐

No ☐

NA ☒

Any No responses must be detailed below or on the COC.

pH strip #90719. - HW/amberdilallo - 11/29/2023 4:12:46 PM

Additional Nitric Acid (94769) was needed in APW-10D-WG-20231127 and APW-10S-WG-20231127 upon arrival at the laboratory. - HW/amberdilallo - 11/29/2023 4:12:48 PM

EB-01-WQ-20231127 was filtered and preserved with Nitric Acid (94769) for the dissolved parameters upon arrival at the laboratory. - amberdilallo - 11/29/2023 4:12:51 PM

CHAIN OF CUSTODY

pg. 1 of 2 Work order # 23112078

TEKLAB, INC. 5445 Horseshoe Lake Road - Collinsville, IL 62234 - Phone: (618) 344-1004 - Fax: (618) 344-1005

Client:	ERM			Samples on:	☒ ICE ☐ BLUE ICE ☐ NO ICE <u>30</u> °C			LTG#	<u>1</u>
Address:	1968 Craig Road			Preserved in:	☒ LAB ☐ FIELD			FOR LAB USE ONLY	
City / State / Zip	St. Louis, MO 63146			Lab Notes <u>PHW 90719. Added HNO3 (95% 94769) + 0</u>					
Contact:	Clay Sansoucie		Phone:	(314) 952-2760		<u>APW-10D-WG-20231127 and APW-10S-WG-20231127. HW 11/29</u>			
E-Mail:	clay.sansoucie@erm.com			Fax:					

Are these samples known to be involved in litigation? If yes, a surcharge will apply ☐ Yes ☐ No
 Are these samples known to be hazardous? If yes, include details of the hazard. ☐ Yes ☐ No
 Are there any required reporting limits to be met on the requested analysis? If yes, please provide limits in the comment section: ☐ Yes ☐ No

Client Comments:

Total Metals: Sb As Ba Be B Cd Ca Cr Co Pb Li Mo Se Ti and Hg

Dissolved Metals: Sb As Ba Be B Cd Ca Cr Co Pb Li Mo Se and Ti

SUB Ra226/228 to Summit-OH.

Project Name/Number		Sample Collector's Name		MATRIX		INDICATE ANALYSIS REQUESTED																			
0599247		Marshall Krenkel / Nolan Legg																							
Results Requested		Billing Instructions		# and Type of Containers																					
☒ Standard ☐ 1-2 Day (100% Surcharge) ☐ Other ☐ 3 Day (50% Surcharge)		0599247		UNPRES HNO3 NaOH H2SO4 HCL MeOH NaHSO4 OTHER																					
Lab Use Only	Sample Identification	Date/Time Sampled	UNPRES	HNO3	NaOH	H2SO4	HCL	MeOH	NaHSO4	OTHER	Aqueous	Drinking Water	Soil	Sludge	Special Waste	Groundwater	Chloride	Dissolved Metals	Fluoride	pH	Ra226/228	Sulfate	TDS	Total Metals	
23112078	APW-03-WG-20231127	11/27/23 1410	1	2	2												X	X	X	X	X	X	X	X	X
002	APW-10D-WG-20231127	11/27/23 1530	1	2	2																				
003	APW-10S-WG-20231127	11/27/23 1635	1	2	2																				
004	APW-06S-WG-20231123	11/28/23 0900	1	2	2																				
005	APW-06D-WG-20231128	11/28/23 1035	1	2	2																				
006	APW-05R-WG-20231128	11/28/23 1205	1	2	2																				
007	APW-02-WG-20231128	11/28/23 1320	1	2	2																				
008	APW-07-WG-20231123	11/28/23 1510	1	2	2																				
009	APW-08-WG-20231128	11/28/23 1630	1	2	2																				
010	APW-04-WG-20231129	11/29/23 0830	1	2	2																				
Relinquished By			Date/Time			Received By			Date/Time																
[Signature]			11/29/23 1430			[Signature]			11/29/23 1430																

The individual signing this agreement on behalf of the client, acknowledges that he/she has read and understands the terms and conditions of this agreement, and that he/she has the authority to sign on behalf of the client. See www.teklabinc.com for terms and conditions.

BottleOrder: 84755



HW 11/29

pg. 2 of 2 Work order # 23112078

TEKLAB, INC. 5445 Horseshoe Lake Road - Collinsville, IL 62234 - Phone: (618) 344-1004 - Fax: (618) 344-1005

Client: ERM	Samples on: ☐ ICE ☐ BLUE ICE ☐ NO ICE _____ °C
Address: 1968 Craig Road	Preserved in: ☐ LAB ☐ FIELD <u>FOR LAB USE ONLY</u>
City / State / Zip St. Louis, MO 63146	Lab Notes
Contact: Clay Sansoucie Phone: (314) 952-2760	
E-Mail: clay.sansoucie@erm.com Fax:	Client Comments:

Are these samples known to be involved in litigation? If yes, a surcharge will apply ☐ Yes ☐ No

Are these samples known to be hazardous? If yes, include details of the hazard. ☐ Yes ☐ No

Are there any required reporting limits to be met on the requested analysis? If yes, please provide limits in the comment section. ☐ Yes ☐ No

Total Metals: Sb As Ba Be B Cd Ca Cr Co Pb Li Mo Se Ti and Hg

Dissolved Metals: Sb As Ba Be B Cd Ca Cr Co Pb Li Mo Se and Ti

SUB Ra226/228 to Summit-OH.

[illegible]

The individual signing this agreement on behalf of the client, acknowledges that he/she has read and understands the terms and conditions of this agreement, and that he/she has the authority to sign on behalf of the client. See www.teklabinc.com for terms and conditions.

BottleOrder: 84755





SUMMIT
ENVIRONMENTAL TECHNOLOGIES, INC
Analytical Laboratories

Summit Environmental Technologies, Inc.
3310 Win St.
Cuyahoga Falls, Ohio 44223
TEL: (330) 253-8211 FAX: (330) 253-4489
Website: <http://www.settek.com>

December 29, 2023

Elizabeth Hurley
TEKLAB Inc,
5445 Horseshoe lake Road
Collinsville, IL 62234
TEL:
FAX:
RE: 23112078

Order No.: 23120232

Dear Elizabeth Hurley:

Summit Environmental Technologies, Inc. received 15 sample(s) on 12/4/2023 for the analyses presented in the following report.

There were no problems with the analytical events associated with this report unless noted in the Case Narrative.

Quality control data is within laboratory defined or method specified acceptance limits except where noted.

If you have any questions regarding these tests results, please feel free to call the laboratory.

Sincerely,

Jennifer Woolf

Project Manager

3310 Win St.
Cuyahoga Falls, Ohio 44223

Arkansas 88-0735, California 2943, Colorado, Connecticut PH-0108, Florida NELAC E87688, Idaho OH00923, Illinois 200061, Indiana C-OH-13, ISO/IEC 17025:2017 119125 L22-544, Kansas E-10347, Kentucky (Underground Storage Tank) 3, Kentucky 90146, Maryland 339, Michigan 9988, Minnesota 1780279, Nevada OH009232020-1, New Hampshire 2996, New Jersey OH006, New York 11777, North Carolina 39705 and 631, North Dakota R-201, Ohio DW, Ohio VAP CL0052, Oklahoma 2019-155, Oregon OH200001, Pennsylvania 68-01335, Rhode Island LA000317, South Carolina 92016001, Texas T104704466-19-16, Utah OH009232020-12, Virginia VELAP 10381, West Virginia 9957C



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Case Narrative

WO#: 23120232
Date: 12/29/2023

CLIENT: TEKLAB Inc,
Project: 23112078

This report in its entirety consists of the following documents: Cover Letter, Case Narrative, Analytical Results, QC Summary Report, Applicable Accreditation Information, Chain-of-Custody, Cooler Receipt Form, and other applicable forms as necessary. All documents contain the Summit Environmental Technologies, Inc., Work Order Number assigned to this report.

Summit Environmental Technologies, Inc., holds the accreditations/certifications listed at the bottom of the cover letter that may or may not pertain to this report. Please refer to the "Accreditation Program Analytes Report" for accredited analytes list.

The information contained in this analytical report is the sole property of Summit Environmental Technologies, Inc. and that of the customer. It cannot be reproduced in any form without the consent of Summit Environmental Technologies, Inc. or the customer for which this report was issued. The results contained in this report are only representative of the samples received. Conditions can vary at different times and at different sampling conditions. Summit Environmental Technologies, Inc. is not responsible for use or interpretation of the data included herein.

All results for Solid Samples are reported on an "as received" or "wet weight" basis unless indicated as "dry weight" using the "-dry" designation on the reporting units.

This report is believed to meet all of the requirements of the accrediting agency, where applicable. Any comments or problems with the analytical events associated with this report are noted below.

Original

These commonly used Qualifiers and Acronyms may or may not be present in this report.

Qualifiers

U	The compound was analyzed for but was not detected above the MDL.
J	The reported value is greater than the Method Detection Limit but less than the Reporting Limit.
H	The hold time for sample preparation and/or analysis was exceeded. Not Clean Water Act compliant.
D	The result is reported from a dilution.
E	The result exceeded the linear range of the calibration or is estimated due to interference.
MC	The result is below the Minimum Compound Limit.
*	The result exceeds the Regulatory Limit or Maximum Contamination Limit.
m	Manual integration was used to determine the area response.
d	Manual integration in which peak was deleted
N	The result is presumptive based on a Mass Spectral library search assuming a 1:1 response.
P	The second column confirmation exceeded 25% difference.
C	The result has been confirmed by GC/MS.
X	The result was not confirmed when GC/MS Analysis was performed.
B	The analyte was detected in the Method Blank at a concentration greater than the RL.
MB+	The analyte was detected in the Method Blank at a concentration greater than the MDL.
G	The ICB or CCB contained reportable amounts of analyte.
QC-/+	The CCV recovery failed low (-) or high (+).
R/QDR	The RPD was outside of accepted recovery limits.
QL-/+	The LCS or LCSD recovery failed low (-) or high (+).
QLR	The LCS/LCSD RPD was outside of accepted recovery limits.
QM-/+	The MS or MSD recovery failed low (-) or high (+).
QMR	The MS/MSD RPD was outside of accepted recovery limits.
QV-/+	The ICV recovery failed low (-) or high (+).
S	The spike result was outside of accepted recovery limits.
W	Samples were received outside temperature limits (0° – 6° C). Not Clean Water Act compliant.
Z	Deviation; A deviation from the method was performed; Please refer to the Case Narrative for additional information

Acronyms

ND	Not Detected	RL	Reporting Limit
QC	Quality Control	MDL	Method Detection Limit
MB	Method Blank	LOD	Level of Detection
LCS	Laboratory Control Sample	LOQ	Level of Quantitation
LCSD	Laboratory Control Sample Duplicate	PQL	Practical Quantitation Limit
QCS	Quality Control Sample	CRQL	Contract Required Quantitation Limit
DUP	Duplicate	PL	Permit Limit
MS	Matrix Spike	RegLvl	Regulatory Limit
MSD	Matrix Spike Duplicate	MCL	Maximum Contamination Limit
RPD	Relative Percent Different	MinCL	Minimum Compound Limit
ICV	Initial Calibration Verification	RA	Reanalysis
ICB	Initial Calibration Blank	RE	Reextraction
CCV	Continuing Calibration Verification	TIC	Tentatively Identified Compound
CCB	Continuing Calibration Blank	RT	Retention Time
RLC	Reporting Limit Check	CF	Calibration Factor

This list of Qualifiers and Acronyms reflects the most commonly utilized Qualifiers and Acronyms for reporting. Please refer to the Analytical Notes in the Case Narrative for any Qualifiers or Acronyms that do not appear in this list or for additional information regarding the use of these Qualifiers on reported data.



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Workorder Sample Summary

WO#: 23120232
29-Dec-23

CLIENT: TEKLAB Inc,
Project: 23112078

Lab SampleID	Client Sample ID	Tag No	Date Collected	Date Received	Matrix
23120232-001	23112078-001		11/27/2023 2:10:00 PM	12/4/2023 12:05:00 PM	Non-Potable Water
23120232-002	23112078-002		11/27/2023 3:30:00 PM	12/4/2023 12:05:00 PM	Non-Potable Water
23120232-003	23112078-003		11/27/2023 4:35:00 PM	12/4/2023 12:05:00 PM	Non-Potable Water
23120232-004	23112078-004		11/28/2023 9:00:00 AM	12/4/2023 12:05:00 PM	Non-Potable Water
23120232-005	23112078-005		11/28/2023 10:35:00 AM	12/4/2023 12:05:00 PM	Non-Potable Water
23120232-006	23112078-006		11/28/2023 12:05:00 PM	12/4/2023 12:05:00 PM	Non-Potable Water
23120232-007	23112078-007		11/28/2023 1:20:00 PM	12/4/2023 12:05:00 PM	Non-Potable Water
23120232-008	23112078-008		11/28/2023 3:10:00 PM	12/4/2023 12:05:00 PM	Non-Potable Water
23120232-009	23112078-009		11/28/2023 4:30:00 PM	12/4/2023 12:05:00 PM	Non-Potable Water
23120232-010	23112078-010		11/29/2023 8:30:00 AM	12/4/2023 12:05:00 PM	Non-Potable Water
23120232-011	23112078-011		11/29/2023 10:00:00 AM	12/4/2023 12:05:00 PM	Non-Potable Water
23120232-012	23112078-012		11/29/2023 11:30:00 AM	12/4/2023 12:05:00 PM	Non-Potable Water
23120232-013	23112078-013		11/28/2023 12:01:00 AM	12/4/2023 12:05:00 PM	Non-Potable Water
23120232-014	23112078-014		11/29/2023 12:02:00 AM	12/4/2023 12:05:00 PM	Non-Potable Water
23120232-015	23112078-015		11/27/2023 11:00:00 AM	12/4/2023 12:05:00 PM	Non-Potable Water



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DATES REPORT

WO#: 23120232

29-Dec-23

Client: TEKLAB Inc,
Project: 23112078

Sample ID	Client Sample ID	Collection Date	Matrix	Test Name	Leachate Date	Prep Date	Analysis Date
23120232-001A	23112078-001	11/27/2023 2:10:00 PM	Non-Potable Water	Combined Radium (EPA903+904)			12/28/2023 8:38:11 AM
				Radium-226 (EPA 903.0)		12/18/2023 3:46:12 PM	12/22/2023 10:59:00 AM
				Radium-228 (EPA 904.0)		12/18/2023 3:46:12 PM	12/21/2023 2:33:00 PM
23120232-002A	23112078-002	11/27/2023 3:30:00 PM		Combined Radium (EPA903+904)			12/28/2023 8:38:11 AM
				Radium-226 (EPA 903.0)		12/18/2023 3:46:12 PM	12/22/2023 10:59:00 AM
				Radium-228 (EPA 904.0)		12/18/2023 3:46:12 PM	12/21/2023 2:33:00 PM
23120232-003A	23112078-003	11/27/2023 4:35:00 PM		Combined Radium (EPA903+904)			12/28/2023 8:38:11 AM
				Radium-226 (EPA 903.0)		12/18/2023 3:46:12 PM	12/22/2023 10:59:00 AM
				Radium-228 (EPA 904.0)		12/18/2023 3:46:12 PM	12/21/2023 2:33:00 PM
23120232-004A	23112078-004	11/28/2023 9:00:00 AM		Combined Radium (EPA903+904)			12/28/2023 8:38:11 AM
				Radium-226 (EPA 903.0)		12/18/2023 3:46:12 PM	12/22/2023 10:59:00 AM
				Radium-228 (EPA 904.0)		12/18/2023 3:46:12 PM	12/21/2023 2:33:00 PM
23120232-005A	23112078-005	11/28/2023 10:35:00 AM		Combined Radium (EPA903+904)			12/28/2023 8:38:11 AM
				Radium-226 (EPA 903.0)		12/18/2023 3:46:12 PM	12/22/2023 10:59:00 AM
				Radium-228 (EPA 904.0)		12/18/2023 3:46:12 PM	12/21/2023 2:33:00 PM
23120232-006A	23112078-006	11/28/2023 12:05:00 PM		Combined Radium (EPA903+904)			12/28/2023 8:38:11 AM
				Radium-226 (EPA 903.0)		12/18/2023 3:46:12 PM	12/22/2023 10:59:00 AM
				Radium-228 (EPA 904.0)		12/18/2023 3:46:12 PM	12/21/2023 2:33:00 PM
23120232-007A	23112078-007	11/28/2023 1:20:00 PM		Combined Radium (EPA903+904)			12/28/2023 8:38:11 AM
				Radium-226 (EPA 903.0)		12/18/2023 3:46:12 PM	12/22/2023 10:59:00 AM
				Radium-228 (EPA 904.0)		12/18/2023 3:46:12 PM	12/21/2023 2:33:00 PM
23120232-008A	23112078-008	11/28/2023 3:10:00 PM		Combined Radium (EPA903+904)			12/28/2023 8:38:11 AM
				Radium-226 (EPA 903.0)		12/18/2023 3:46:12 PM	12/22/2023 10:59:00 AM

Original



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Analytical Laboratories

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DATES REPORT

WO#: 23120232
29-Dec-23

Client: TEKLAB Inc,
Project: 23112078

Sample ID	Client Sample ID	Collection Date	Matrix	Test Name	Leachate Date	Prep Date	Analysis Date
23120232-008A	23112078-008	11/28/2023 3:10:00 PM	Non-Potable Water	Radium-228 (EPA 904.0)		12/18/2023 3:46:12 PM	12/21/2023 2:33:00 PM
23120232-009A	23112078-009	11/28/2023 4:30:00 PM		Combined Radium (EPA903+904)			12/28/2023 8:38:11 AM
				Radium-226 (EPA 903.0)		12/18/2023 3:46:12 PM	12/22/2023 10:59:00 AM
				Radium-228 (EPA 904.0)		12/18/2023 3:46:12 PM	12/21/2023 2:33:00 PM
23120232-010A	23112078-010	11/29/2023 8:30:00 AM		Combined Radium (EPA903+904)			12/28/2023 8:38:11 AM
				Radium-226 (EPA 903.0)		12/18/2023 3:46:12 PM	12/22/2023 10:59:00 AM
				Radium-228 (EPA 904.0)		12/18/2023 3:46:12 PM	12/21/2023 2:33:00 PM
23120232-011A	23112078-011	11/29/2023 10:00:00 AM		Combined Radium (EPA903+904)			12/28/2023 8:38:11 AM
				Radium-226 (EPA 903.0)		12/18/2023 3:46:12 PM	12/22/2023 10:59:00 AM
				Radium-228 (EPA 904.0)		12/18/2023 3:46:12 PM	12/21/2023 2:33:00 PM
23120232-012A	23112078-012	11/29/2023 11:30:00 AM		Combined Radium (EPA903+904)			12/28/2023 8:38:11 AM
				Radium-226 (EPA 903.0)		12/18/2023 3:46:12 PM	12/22/2023 10:59:00 AM
				Radium-228 (EPA 904.0)		12/18/2023 3:46:12 PM	12/21/2023 2:33:00 PM
23120232-013A	23112078-013	11/28/2023 12:01:00 AM		Combined Radium (EPA903+904)			12/28/2023 8:38:11 AM
				Radium-226 (EPA 903.0)		12/18/2023 3:46:12 PM	12/22/2023 10:59:00 AM
				Radium-228 (EPA 904.0)		12/18/2023 3:46:12 PM	12/21/2023 2:33:00 PM
23120232-014A	23112078-014	11/29/2023 12:02:00 AM		Combined Radium (EPA903+904)			12/28/2023 8:38:11 AM
				Radium-226 (EPA 903.0)		12/18/2023 3:46:12 PM	12/22/2023 10:59:00 AM
				Radium-228 (EPA 904.0)		12/18/2023 3:46:12 PM	12/21/2023 2:33:00 PM
23120232-015A	23112078-015	11/27/2023 11:00:00 AM		Combined Radium (EPA903+904)			12/28/2023 8:38:11 AM
				Radium-226 (EPA 903.0)		12/18/2023 3:46:12 PM	12/22/2023 10:59:00 AM
				Radium-228 (EPA 904.0)		12/18/2023 3:46:12 PM	12/21/2023 2:33:00 PM

Original



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Analytical Report

(consolidated)

WO#: 23120232

Date Reported: 12/29/2023

CLIENT: TEKLAB Inc, **Collection Date:** 11/27/2023 2:10:00 PM
Project: 23112078
Lab ID: 23120232-001 **Matrix:** NON-POTABLE WATER
Client Sample ID: 23112078-001

Analyses	Result	RL	Qual	Units	Uncertainty	DF	Date Analyzed
RAD226/228					CALCULATION		Analyst: CXS
COMBINED RADIUM (EPA903+904)							
Radium-226/Radium-228	0.77	2.00	U	pCi/L	± 0.630	1	12/28/2023 8:38:11 AM
RAD226/228					E903.0	E903-904	Analyst: SMZ
RADIUM-226 (EPA 903.0)							
Radium-226	0.11	1.00	U	pCi/L	± 0.0500	1	12/22/2023 10:59:00 AM
Yield	1					1	12/22/2023 10:59:00 AM
RAD226/228					E904.0	E903-904	Analyst: SMZ
RADIUM-228 (EPA 904.0)							
Radium-228	0.66	1.00	JQDR	pCi/L	± 0.580	1	12/21/2023 2:33:00 PM
Yield	1					1	12/21/2023 2:33:00 PM

Qualifiers:	H	Holding times for preparation or analysis exceeded	M	Manual Integration used to determine area response
	ND	Not Detected	PL	Permit Limit
	R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
	U	Samples with CalcVal < MDL	W	Sample container temperature is out of limit as specified at test site

Original



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Analytical Report

(consolidated)

WO#: 23120232

Date Reported: 12/29/2023

CLIENT: TEKLAB Inc,
Project: 23112078
Lab ID: 23120232-002
Client Sample ID: 23112078-002

Collection Date: 11/27/2023 3:30:00 PM

Matrix: NON-POTABLE WATER

Analyses	Result	RL	Qual	Units	Uncertainty	DF	Date Analyzed
RAD226/228 COMBINED RADIUM (EPA903+904)				CALCULATION		Analyst: CXS	
Radium-226/Radium-228	1.5	2.00	U	pCi/L	± 0.830	1	12/28/2023 8:38:11 AM
RAD226/228 RADIUM-226 (EPA 903.0)				E903.0	E903-904	Analyst: SMZ	
Radium-226	0.14	1.00	U	pCi/L	± 0.0600	1	12/22/2023 10:59:00 AM
Yield	1					1	12/22/2023 10:59:00 AM
RAD226/228 RADIUM-228 (EPA 904.0)				E904.0	E903-904	Analyst: SMZ	
Radium-228	1.36	1.00		pCi/L	± 0.770	1	12/21/2023 2:33:00 PM
Yield	1					1	12/21/2023 2:33:00 PM

Qualifiers:
H Holding times for preparation or analysis exceeded
ND Not Detected
R RPD outside accepted recovery limits
U Samples with CalcVal < MDL

M Manual Integration used to determine area response
PL Permit Limit
RL Reporting Detection Limit
W Sample container temperature is out of limit as specified at test site

Original



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Analytical Report

(consolidated)

WO#: 23120232

Date Reported: 12/29/2023

CLIENT: TEKLAB Inc,

Collection Date: 11/27/2023 4:35:00 PM

Project: 23112078

Lab ID: 23120232-003

Matrix: NON-POTABLE WATER

Client Sample ID: 23112078-003

Analyses	Result	RL	Qual	Units	Uncertainty	DF	Date Analyzed
RAD226/228 COMBINED RADIUM (EPA903+904)					CALCULATION		Analyst: CXS
Radium-226/Radium-228	1.27	2.00	U	pCi/L	± 0.750	1	12/28/2023 8:38:11 AM
RAD226/228 RADIUM-226 (EPA 903.0)					E903.0	E903-904	Analyst: SMZ
Radium-226	0.32	1.00	U	pCi/L	± 0.0900	1	12/22/2023 10:59:00 AM
Yield	1					1	12/22/2023 10:59:00 AM
RAD226/228 RADIUM-228 (EPA 904.0)					E904.0	E903-904	Analyst: SMZ
Radium-228	0.95	1.00	J	pCi/L	± 0.660	1	12/21/2023 2:33:00 PM
Yield	1					1	12/21/2023 2:33:00 PM

Qualifiers:

H	Holding times for preparation or analysis exceeded
ND	Not Detected
R	RPD outside accepted recovery limits
U	Samples with CalcVal < MDL

M	Manual Integration used to determine area response
PL	Permit Limit
RL	Reporting Detection Limit
W	Sample container temperature is out of limit as specified at test site

Original



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Analytical Report

(consolidated)

WO#: 23120232

Date Reported: 12/29/2023

CLIENT: TEKLAB Inc,
Project: 23112078
Lab ID: 23120232-004
Client Sample ID: 23112078-004

Collection Date: 11/28/2023 9:00:00 AM

Matrix: NON-POTABLE WATER

Analyses	Result	RL	Qual	Units	Uncertainty	DF	Date Analyzed
RAD226/228 COMBINED RADIUM (EPA903+904)					CALCULATION		Analyst: CXS
Radium-226/Radium-228	0.38	2.00	U	pCi/L	± 0.560	1	12/28/2023 8:38:11 AM
RAD226/228 RADIUM-226 (EPA 903.0)					E903.0	E903-904	Analyst: SMZ
Radium-226	0.09	1.00	U	pCi/L	± 0.0500	1	12/22/2023 10:59:00 AM
Yield	1					1	12/22/2023 10:59:00 AM
RAD226/228 RADIUM-228 (EPA 904.0)					E904.0	E903-904	Analyst: SMZ
Radium-228	0.29	1.00	U	pCi/L	± 0.510	1	12/21/2023 2:33:00 PM
Yield	1					1	12/21/2023 2:33:00 PM

Qualifiers:
H Holding times for preparation or analysis exceeded
ND Not Detected
R RPD outside accepted recovery limits
U Samples with CalcVal < MDL

M Manual Integration used to determine area response
PL Permit Limit
RL Reporting Detection Limit
W Sample container temperature is out of limit as specified at test site

Original



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Cuyahoga Falls, Ohio 44223
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Analytical Report

(consolidated)

WO#: 23120232

Date Reported: 12/29/2023

CLIENT: TEKLAB Inc, **Collection Date:** 11/28/2023 10:35:00 AM
Project: 23112078
Lab ID: 23120232-005 **Matrix:** NON-POTABLE WATER
Client Sample ID: 23112078-005

Analyses	Result	RL	Qual	Units	Uncertainty	DF	Date Analyzed
RAD226/228 COMBINED RADIUM (EPA903+904)					CALCULATION		Analyst: CXS
Radium-226/Radium-228	0.87	2.00	U	pCi/L	± 0.650	1	12/28/2023 8:38:11 AM
RAD226/228 RADIUM-226 (EPA 903.0)					E903.0	E903-904	Analyst: SMZ
Radium-226	0.11	1.00	U	pCi/L	± 0.0500	1	12/22/2023 10:59:00 AM
Yield	1					1	12/22/2023 10:59:00 AM
RAD226/228 RADIUM-228 (EPA 904.0)					E904.0	E903-904	Analyst: SMZ
Radium-228	0.76	1.00	J	pCi/L	± 0.600	1	12/21/2023 2:33:00 PM
Yield	1					1	12/21/2023 2:33:00 PM

Qualifiers:	H	Holding times for preparation or analysis exceeded	M	Manual Integration used to determine area response
	ND	Not Detected	PL	Permit Limit
	R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
	U	Samples with CalcVal < MDL	W	Sample container temperature is out of limit as specified at test site



Summit Environmental Technologies, Inc.
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Analytical Report

(consolidated)

WO#: 23120232

Date Reported: 12/29/2023

CLIENT: TEKLAB Inc,
Project: 23112078
Lab ID: 23120232-006
Client Sample ID: 23112078-006

Collection Date: 11/28/2023 12:05:00 PM

Matrix: NON-POTABLE WATER

Analyses	Result	RL	Qual	Units	Uncertainty	DF	Date Analyzed
RAD226/228 COMBINED RADIUM (EPA903+904)					CALCULATION		Analyst: CXS
Radium-226/Radium-228	0.88	2.00	U	pCi/L	± 0.630	1	12/28/2023 8:38:11 AM
RAD226/228 RADIUM-226 (EPA 903.0)					E903.0	E903-904	Analyst: SMZ
Radium-226	0.15	1.00	U	pCi/L	± 0.0600	1	12/22/2023 10:59:00 AM
Yield	1					1	12/22/2023 10:59:00 AM
RAD226/228 RADIUM-228 (EPA 904.0)					E904.0	E903-904	Analyst: SMZ
Radium-228	0.73	1.00	J	pCi/L	± 0.570	1	12/21/2023 2:33:00 PM
Yield	1					1	12/21/2023 2:33:00 PM

Qualifiers:
H Holding times for preparation or analysis exceeded
ND Not Detected
R RPD outside accepted recovery limits
U Samples with CalcVal < MDL

M Manual Integration used to determine area response
PL Permit Limit
RL Reporting Detection Limit
W Sample container temperature is out of limit as specified at test site

Original



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Analytical Report

(consolidated)

WO#: 23120232

Date Reported: 12/29/2023

CLIENT: TEKLAB Inc, **Collection Date:** 11/28/2023 1:20:00 PM
Project: 23112078
Lab ID: 23120232-007 **Matrix:** NON-POTABLE WATER
Client Sample ID: 23112078-007

Analyses	Result	RL	Qual	Units	Uncertainty	DF	Date Analyzed
RAD226/228 COMBINED RADIUM (EPA903+904)					CALCULATION		Analyst: CXS
Radium-226/Radium-228	0.68	2.00	U	pCi/L	± 0.700	1	12/28/2023 8:38:11 AM
RAD226/228 RADIUM-226 (EPA 903.0)					E903.0	E903-904	Analyst: SMZ
Radium-226	0.12	1.00	U	pCi/L	± 0.0600	1	12/22/2023 10:59:00 AM
Yield	1					1	12/22/2023 10:59:00 AM
RAD226/228 RADIUM-228 (EPA 904.0)					E904.0	E903-904	Analyst: SMZ
Radium-228	0.56	1.00	U	pCi/L	± 0.640	1	12/21/2023 2:33:00 PM
Yield	1					1	12/21/2023 2:33:00 PM

Qualifiers:	H	Holding times for preparation or analysis exceeded	M	Manual Integration used to determine area response
	ND	Not Detected	PL	Permit Limit
	R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
	U	Samples with CalcVal < MDL	W	Sample container temperature is out of limit as specified at test site

Original



Summit Environmental Technologies, Inc.
3310 Win St.
Cuyahoga Falls, Ohio 44223
TEL: (330) 253-8211 FAX: (330) 253-4489
Website: <http://www.settek.com>

Analytical Report

(consolidated)

WO#: 23120232

Date Reported: 12/29/2023

CLIENT: TEKLAB Inc,

Collection Date: 11/28/2023 3:10:00 PM

Project: 23112078

Lab ID: 23120232-008

Matrix: NON-POTABLE WATER

Client Sample ID: 23112078-008

Analyses	Result	RL	Qual	Units	Uncertainty	DF	Date Analyzed
RAD226/228 COMBINED RADIUM (EPA903+904)					CALCULATION		Analyst: CXS
Radium-226/Radium-228	0.61	2.00	U	pCi/L	± 0.630	1	12/28/2023 8:38:11 AM
RAD226/228 RADIUM-226 (EPA 903.0)					E903.0	E903-904	Analyst: SMZ
Radium-226	0.16	1.00	U	pCi/L	± 0.0600	1	12/22/2023 10:59:00 AM
Yield	1					1	12/22/2023 10:59:00 AM
RAD226/228 RADIUM-228 (EPA 904.0)					E904.0	E903-904	Analyst: SMZ
Radium-228	0.45	1.00	U	pCi/L	± 0.570	1	12/21/2023 2:33:00 PM
Yield	1					1	12/21/2023 2:33:00 PM

Qualifiers:
H Holding times for preparation or analysis exceeded
ND Not Detected
R RPD outside accepted recovery limits
U Samples with CalcVal < MDL

M Manual Integration used to determine area response
PL Permit Limit
RL Reporting Detection Limit
W Sample container temperature is out of limit as specified at test site

Original



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Analytical Report

(consolidated)

WO#: 23120232

Date Reported: 12/29/2023

CLIENT: TEKLAB Inc, **Collection Date:** 11/28/2023 4:30:00 PM
Project: 23112078
Lab ID: 23120232-009 **Matrix:** NON-POTABLE WATER
Client Sample ID: 23112078-009

Analyses	Result	RL	Qual	Units	Uncertainty	DF	Date Analyzed
RAD226/228 COMBINED RADIUM (EPA903+904)					CALCULATION		Analyst: CXS
Radium-226/Radium-228	0.25	2.00	U	pCi/L	± 0.590	1	12/28/2023 8:38:11 AM
RAD226/228 RADIUM-226 (EPA 903.0)					E903.0	E903-904	Analyst: SMZ
Radium-226	0.1	1.00	U	pCi/L	± 0.0500	1	12/22/2023 10:59:00 AM
Yield	1					1	12/22/2023 10:59:00 AM
RAD226/228 RADIUM-228 (EPA 904.0)					E904.0	E903-904	Analyst: SMZ
Radium-228	0.15	1.00	U	pCi/L	± 0.540	1	12/21/2023 2:33:00 PM
Yield	1					1	12/21/2023 2:33:00 PM

Qualifiers:	H	Holding times for preparation or analysis exceeded	M	Manual Integration used to determine area response
	ND	Not Detected	PL	Permit Limit
	R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
	U	Samples with CalcVal < MDL	W	Sample container temperature is out of limit as specified at test site

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Analytical Report

(consolidated)

WO#: 23120232

Date Reported: 12/29/2023

CLIENT: TEKLAB Inc, **Collection Date:** 11/29/2023 8:30:00 AM
Project: 23112078
Lab ID: 23120232-010 **Matrix:** NON-POTABLE WATER
Client Sample ID: 23112078-010

Analyses	Result	RL	Qual	Units	Uncertainty	DF	Date Analyzed
RAD226/228 COMBINED RADIUM (EPA903+904)					CALCULATION		Analyst: CXS
Radium-226/Radium-228	0.85	2.00	U	pCi/L	± 0.710	1	12/28/2023 8:38:11 AM
RAD226/228 RADIUM-226 (EPA 903.0)					E903.0	E903-904	Analyst: SMZ
Radium-226	0.19	1.00	U	pCi/L	± 0.0700	1	12/22/2023 10:59:00 AM
Yield	1					1	12/22/2023 10:59:00 AM
RAD226/228 RADIUM-228 (EPA 904.0)					E904.0	E903-904	Analyst: SMZ
Radium-228	0.66	1.00	J	pCi/L	± 0.640	1	12/21/2023 2:33:00 PM
Yield	1					1	12/21/2023 2:33:00 PM

Qualifiers:	H	Holding times for preparation or analysis exceeded	M	Manual Integration used to determine area response
	ND	Not Detected	PL	Permit Limit
	R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
	U	Samples with CalcVal < MDL	W	Sample container temperature is out of limit as specified at test site

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Analytical Report

(consolidated)

WO#: 23120232

Date Reported: 12/29/2023

CLIENT: TEKLAB Inc,

Collection Date: 11/29/2023 10:00:00 AM

Project: 23112078

Lab ID: 23120232-011

Matrix: NON-POTABLE WATER

Client Sample ID: 23112078-011

Analyses	Result	RL	Qual	Units	Uncertainty	DF	Date Analyzed
RAD226/228 COMBINED RADIUM (EPA903+904)					CALCULATION		Analyst: CXS
Radium-226/Radium-228	1.21	2.00	U	pCi/L	± 0.750	1	12/28/2023 8:38:11 AM
RAD226/228 RADIUM-226 (EPA 903.0)					E903.0	E903-904	Analyst: SMZ
Radium-226	0.24	1.00	U	pCi/L	± 0.0800	1	12/22/2023 10:59:00 AM
Yield	1					1	12/22/2023 10:59:00 AM
RAD226/228 RADIUM-228 (EPA 904.0)					E904.0	E903-904	Analyst: SMZ
Radium-228	0.97	1.00	J	pCi/L	± 0.670	1	12/21/2023 2:33:00 PM
Yield	1					1	12/21/2023 2:33:00 PM

Qualifiers:
H Holding times for preparation or analysis exceeded
ND Not Detected
R RPD outside accepted recovery limits
U Samples with CalcVal < MDL

M Manual Integration used to determine area response
PL Permit Limit
RL Reporting Detection Limit
W Sample container temperature is out of limit as specified at test site

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Analytical Report

(consolidated)

WO#: 23120232

Date Reported: 12/29/2023

CLIENT: TEKLAB Inc, **Collection Date:** 11/29/2023 11:30:00 AM
Project: 23112078
Lab ID: 23120232-012 **Matrix:** NON-POTABLE WATER
Client Sample ID: 23112078-012

Analyses	Result	RL	Qual	Units	Uncertainty	DF	Date Analyzed
RAD226/228 COMBINED RADIUM (EPA903+904)					CALCULATION		Analyst: CXS
Radium-226/Radium-228	0.8	2.00	U	pCi/L	± 0.670	1	12/28/2023 8:38:11 AM
RAD226/228 RADIUM-226 (EPA 903.0)					E903.0	E903-904	Analyst: SMZ
Radium-226	0	1.00	U	pCi/L	± 0.0200	1	12/22/2023 10:59:00 AM
Yield	1					1	12/22/2023 10:59:00 AM
RAD226/228 RADIUM-228 (EPA 904.0)					E904.0	E903-904	Analyst: SMZ
Radium-228	0.8	1.00	J	pCi/L	± 0.650	1	12/21/2023 2:33:00 PM
Yield	1					1	12/21/2023 2:33:00 PM

Qualifiers:	H	Holding times for preparation or analysis exceeded	M	Manual Integration used to determine area response
	ND	Not Detected	PL	Permit Limit
	R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
	U	Samples with CalcVal < MDL	W	Sample container temperature is out of limit as specified at test site

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Analytical Report

(consolidated)

WO#: 23120232

Date Reported: 12/29/2023

CLIENT: TEKLAB Inc, **Collection Date:** 11/28/2023 12:01:00 AM
Project: 23112078
Lab ID: 23120232-013 **Matrix:** NON-POTABLE WATER
Client Sample ID: 23112078-013

Analyses	Result	RL	Qual	Units	Uncertainty	DF	Date Analyzed
RAD226/228 COMBINED RADIUM (EPA903+904)					CALCULATION		Analyst: CXS
Radium-226/Radium-228	0.8	2.00	U	pCi/L	± 0.710	1	12/28/2023 8:38:11 AM
RAD226/228 RADIUM-226 (EPA 903.0)					E903.0	E903-904	Analyst: SMZ
Radium-226	0.05	1.00	U	pCi/L	± 0.0400	1	12/22/2023 10:59:00 AM
Yield	1					1	12/22/2023 10:59:00 AM
RAD226/228 RADIUM-228 (EPA 904.0)					E904.0	E903-904	Analyst: SMZ
Radium-228	0.75	1.00	J	pCi/L	± 0.670	1	12/21/2023 2:33:00 PM
Yield	1					1	12/21/2023 2:33:00 PM

Qualifiers:	H	Holding times for preparation or analysis exceeded	M	Manual Integration used to determine area response
	ND	Not Detected	PL	Permit Limit
	R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
	U	Samples with CalcVal < MDL	W	Sample container temperature is out of limit as specified at test site

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Analytical Report

(consolidated)

WO#: 23120232

Date Reported: 12/29/2023

CLIENT: TEKLAB Inc,
Project: 23112078
Lab ID: 23120232-014
Client Sample ID: 23112078-014

Collection Date: 11/29/2023 12:02:00 AM

Matrix: NON-POTABLE WATER

Analyses	Result	RL	Qual	Units	Uncertainty	DF	Date Analyzed
RAD226/228 COMBINED RADIUM (EPA903+904)					CALCULATION		Analyst: CXS
Radium-226/Radium-228	0.23	2.00	U	pCi/L	± 0.690	1	12/28/2023 8:38:11 AM
RAD226/228 RADIUM-226 (EPA 903.0)					E903.0	E903-904	Analyst: SMZ
Radium-226	0.03	1.00	U	pCi/L	± 0.0300	1	12/22/2023 10:59:00 AM
Yield	1					1	12/22/2023 10:59:00 AM
RAD226/228 RADIUM-228 (EPA 904.0)					E904.0	E903-904	Analyst: SMZ
Radium-228	0.2	1.00	U	pCi/L	± 0.660	1	12/21/2023 2:33:00 PM
Yield	1					1	12/21/2023 2:33:00 PM

Qualifiers:
H Holding times for preparation or analysis exceeded
ND Not Detected
R RPD outside accepted recovery limits
U Samples with CalcVal < MDL

M Manual Integration used to determine area response
PL Permit Limit
RL Reporting Detection Limit
W Sample container temperature is out of limit as specified at test site

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Analytical Report

(consolidated)

WO#: 23120232

Date Reported: 12/29/2023

CLIENT: TEKLAB Inc,
Project: 23112078
Lab ID: 23120232-015
Client Sample ID: 23112078-015

Collection Date: 11/27/2023 11:00:00 AM

Matrix: NON-POTABLE WATER

Analyses	Result	RL	Qual	Units	Uncertainty	DF	Date Analyzed
RAD226/228 COMBINED RADIUM (EPA903+904)				CALCULATION		Analyst: CXS	
Radium-226/Radium-228	0.45	2.00	U	pCi/L	± 0.540	1	12/28/2023 8:38:11 AM
RAD226/228 RADIUM-226 (EPA 903.0)				E903.0	E903-904	Analyst: SMZ	
Radium-226	0.01	1.00	U	pCi/L	± 0.0200	1	12/22/2023 10:59:00 AM
Yield	1					1	12/22/2023 10:59:00 AM
RAD226/228 RADIUM-228 (EPA 904.0)				E904.0	E903-904	Analyst: SMZ	
Radium-228	0.44	1.00	U	pCi/L	± 0.520	1	12/21/2023 2:33:00 PM
Yield	1					1	12/21/2023 2:33:00 PM

Qualifiers:
H Holding times for preparation or analysis exceeded
ND Not Detected
R RPD outside accepted recovery limits
U Samples with CalcVal < MDL

M Manual Integration used to determine area response
PL Permit Limit
RL Reporting Detection Limit
W Sample container temperature is out of limit as specified at test site

Original



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QC SUMMARY REPORT

WO#: 23120232
29-Dec-23

Client: TEKLAB Inc,
Project: 23112078

BatchID: 71448

Sample ID: 23120232-001A DUP		SampType: DUP	TestCode: Radium-228_			Units: pCi/L	Prep Date: 12/18/2023			RunNo: 176918		
Client ID: 23112078-001		Batch ID: 71448	TestNo: E904.0		E903-904		Analysis Date: 12/21/2023			SeqNo: 4792114		
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Radium-228		0.4	1.00		0	0			0.6600	200	30	RU
Yield		1			0	0			1.000	0		

Sample ID: 23120232-002A DUP	SampType: DUP	TestCode: Radium-228_	Units: pCi/L	Prep Date: 12/18/2023	RunNo: 176918						
Client ID: 23112078-002	Batch ID: 71448	TestNo: E904.0	E903-904	Analysis Date: 12/21/2023	SeqNo: 4792115						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Radium-228	1.03	1.00		0	0			1.360	27.6	30	
Yield	1			0	0			1.000	0		

Qualifiers:
H Holding times for preparation or analysis exceeded
ND Not Detected
RL Reporting Detection Limit

J Analyte detected below quantitation limits
PL Permit Limit
U Samples with CalcVal < MDL

M Manual Integration used to determine area respons
R RPD outside accepted recovery limits
W Sample container temperature is out of limit as spe



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QC SUMMARY REPORT

WO#: 23120232

29-Dec-23

Client: TEKLAB Inc,

Project: 23112078

BatchID: 71448

Sample ID: MB-71448		SampType: MBLK		TestCode: Radium-228_ Units: pCi/L		Prep Date: 12/18/2023			RunNo: 176918				
Client ID: PBW		Batch ID: 71448		TestNo: E904.0 E903-904		Analysis Date: 12/21/2023			SeqNo: 4792101				
Analyte		Result		PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Radium-228		ND		1.00		0	0						U
Yield		1.00				0	0						

Sample ID: LCSD-71448	SampType: LCSD	TestCode: Radium-228_ Units: pCi/L				Prep Date: 12/18/2023			RunNo: 176918		
Client ID: LCSS02	Batch ID: 71448	TestNo: E904.0		E903-904		Analysis Date: 12/21/2023			SeqNo: 4792103		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Radium-228	3.60	1.00	5.000	0	72.0	70	130	2.830	24.0	20	
Yield	0.990			0	0			1.000	1.01		

Sample ID: RLCD-71448	SampType: RLC	TestCode: Radium-228_ Units: pCi/L				Prep Date: 12/18/2023			RunNo: 176918		
Client ID: BatchQC	Batch ID: 71448	TestNo: E904.0		E903-904		Analysis Date: 12/21/2023			SeqNo: 4792106		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Radium-228	1.16	1.00	1.000	0	116	50	150				
Yield	1.00			0	0						

Qualifiers: H Holding times for preparation or analysis exceeded
ND Not Detected
RL Reporting Detection Limit

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QC SUMMARY REPORT

WO#: 23120232

29-Dec-23

Client: TEKLAB Inc,

Project: 23112078

BatchID: 71448

Sample ID: MB-71448	SampType: MBLK	TestCode: Radium-226_ Units: pCi/L			Prep Date: 12/18/2023			RunNo: 176923			
Client ID: PBW	Batch ID: 71448	TestNo: E903.0		E903-904		Analysis Date: 12/22/2023			SeqNo: 4792235		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Radium-226	ND	1.00									U
Yield	1.00										

Sample ID: LCS-71448	SampType: LCS	TestCode: Radium-226_ Units: pCi/L				Prep Date: 12/18/2023			RunNo: 176923		
Client ID: LCSW	Batch ID: 71448	TestNo: E903.0		E903-904		Analysis Date: 12/22/2023			SeqNo: 4792236		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Radium-226	4.35	1.00	5.000	0	87.0	70	130				

Sample ID: LCSD-71448	SampType: LCSD	TestCode: Radium-226_ Units: pCi/L				Prep Date: 12/18/2023			RunNo: 176923		
Client ID: LCSS02	Batch ID: 71448	TestNo: E903.0		E903-904		Analysis Date: 12/22/2023			SeqNo: 4792237		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Radium-226	5.12	1.00	5.000	0	102	70	130	4.350	16.3	20	

Sample ID: RLC-71448	SampType: RLC	TestCode: Radium-226_	Units: pCi/L	Prep Date: 12/18/2023	RunNo: 176923						
Client ID: BatchQC	Batch ID: 71448	TestNo: E903.0	E903-904	Analysis Date: 12/22/2023	SeqNo: 4792239						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Qualifiers:
H Holding times for preparation or analysis exceeded
ND Not Detected
RL Reporting Detection Limit

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QC SUMMARY REPORT

WO#: 23120232

29-Dec-23

Client: TEKLAB Inc,

Project: 23112078

BatchID: 71448

Sample ID: RLC-71448	SampType: RLC	TestCode: Radium-226_ Units: pCi/L				Prep Date: 12/18/2023			RunNo: 176923		
Client ID: BatchQC	Batch ID: 71448	TestNo: E903.0 E903-904				Analysis Date: 12/22/2023			SeqNo: 4792239		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Radium-226	0.970	1.00	1.000	0	97.0	50	150				J

Sample ID: RLCD-71448	SampType: RLC	TestCode: Radium-226_ Units: pCi/L				Prep Date: 12/18/2023			RunNo: 176923		
Client ID: BatchQC	Batch ID: 71448	TestNo: E903.0 E903-904				Analysis Date: 12/22/2023			SeqNo: 4792240		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Radium-226	1.13	1.00	1.000	0	113	50	150				

Qualifiers: H Holding times for preparation or analysis exceeded
ND Not Detected
RL Reporting Detection Limit

J Analyte detected below quantitation limits
PL Permit Limit
U Samples with CalcVal < MDL

M Manual Integration used to determine area respons
R RPD outside accepted recovery limits
W Sample container temperature is out of limit as spec

TEKLAB, INC. Chain of Custody 

5445 Horseshoe Lake Road, Collinsville, IL 62234 Phone (618) 344-1004 Fax (618) 344-1005

5445 Horseshoe Lake Road, Collinsville, IL 62234 Phone (618) 344-1004 Fax (618) 344-1005

Preserved in: ☐ Lab ☐ Field

With: ☐ Ice ☐ Blue Ice

	YES	NO
1. Do you have a current driver's license?	☐	☒
2. Do you have a current vehicle registration?	☐	☒
3. Do you have a current insurance policy?	☐	☒
4. Do you have a current safety inspection?	☐	☒
5. Do you have a current title?	☐	☒
6. Do you have a current license plate?	☐	☒
7. Do you have a current vehicle identification number (VIN)?	☐	☒
8. Do you have a current vehicle history report?	☐	☒
9. Do you have a current vehicle maintenance record?	☐	☒
10. Do you have a current vehicle safety record?	☐	☒

Are the samples chilled?

Teklab Inc

5445 Horseshoe Lake Road
Collinsville, IL 62234

Project#

23112078

Contact:

Elizabeth Hurley

Email:

ehurley@teklabinc.com

Requested Due Date: 20 business days or less

Billing/PO: 35417

35417

Phone: 618 344 1004 ext 33

State of Origin: IL

Comments: Please Issue reports and invoices via email only

Please analyze for Radium (226, 228, and combined) on your standard TAT.

Receipt summary requested.

PLEASE NOTE:

NELAP accreditation is required on the requested analytes and must be documented as such on the final report. If your laboratory does not currently hold a NELAP accreditation for the requested method and/or analytes, please contact Teklab immediately. If your laboratory loses accreditation or is suspended for any analyte/method during the life of the contract, you must contact Teklab immediately. Changes to analysis/methods must be approved by Teklab, Inc.

Lab Use	Sample ID	Sample Date/Time	Preservative	Matrix
	23112078-001	11/27/23 1410	HNO3	Groundwater
	23112078-002	11/27/23 1530	HNO3	Groundwater
	23112078-003	11/27/23 1635	HNO3	Groundwater
	23112078-004	11/28/23 0900	HNO3	Groundwater
	23112078-005	11/28/23 1035	HNO3	Groundwater
	23112078-006	11/28/23 1205	HNO3	Groundwater
	23112078-007	11/28/23 1320	HNO3	Groundwater
	23112078-008	11/28/23 1510	HNO3	Groundwater
	23112078-009	11/28/23 1630	HNO3	Groundwater
	23112078-010	11/29/23 0830	HNO3	Groundwater
	23112078-011	11/29/23 1000	HNO3	Groundwater

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Relinquished By

Date/Time

Received By

Date/Time

Teklab maintains a strict policy of client confidentiality and as such does not provide client/sampler information without proper authorization, and proprietary rights, Teklab, Inc. protects clients' confidential information as directed by local, state or federal laws. (Tektlab QAM Section 9.1, TNI V1 M2 Section 4.1.5 c)

3.2.12 7.4.3 - 5.20f

5445 Horseshoe Lake Road, Collinsville, IL 62234 Phone (618) 344-1004 Fax (618) 344-1005

Sample Log-In Check List

Client Name: TEK-IL-62234-A

Work Order Number: 23120232

RcptNo: 1

Logged by: Jacqueline Rasile 12/4/2023 12:05:00 PM

Jackie Rasile

Completed By: Jacqueline Rasile 12/5/2023 1:21:38 PM

Jackie Rasile

Reviewed By: Jennifer Woolf 12/5/2023 4:15:42 PM

Jennifer Woolf

Chain of Custody

1. Is Chain of Custody complete? Yes ☒ No ☐ Not Present ☐
2. How was the sample delivered? FedEx

Log In

3. Coolers are present? Yes ☒ No ☐ NA ☐
4. Shipping container/cooler in good condition? Yes ☒ No ☐
Custody seals intact on shipping container/cooler? Yes ☐ No ☐ Not Present ☒
No. Seal Date: Signed By:
5. Was an attempt made to cool the samples? Yes ☐ No ☐ NA ☒
6. Were all samples received at a temperature of >0° C to 6.0°C Yes ☐ No ☐ NA ☒
7. Sample(s) in proper container(s)? Yes ☒ No ☐
8. Sufficient sample volume for indicated test(s)? Yes ☒ No ☐
9. Are samples (except VOA and ONG) properly preserved? Yes ☒ No ☐
10. Was preservative added to bottles? Yes ☐ No ☒ NA ☐
11. Is the headspace in the VOA vials less than 1/4 inch or 6 mm? Yes ☐ No ☐ No VOA Vials ☒
12. Were any sample containers received broken? Yes ☐ No ☒
13. Does paperwork match bottle labels? Yes ☒ No ☐
(Note discrepancies on chain of custody)
14. Are matrices correctly identified on Chain of Custody? Yes ☒ No ☐
15. Is it clear what analyses were requested? Yes ☒ No ☐
16. Were all holding times able to be met? Yes ☒ No ☐
(If no, notify customer for authorization.)

Special Handling (if applicable)

17. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☒

Person Notified:

Date:

By Whom:

Via:

☐ eMail

☐ Phone

☐ Fax

☐ In Person

Regarding:

Client Instructions:

18. Additional remarks:

Cooler Information

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	13.1	Good	Not Present			



Summit Environmental Technologies, Inc.
3310 Win St.
Cuyahoga Falls, Ohio 44223
TEL: (330) 253-8211 FAX: (330) 253-4489
Website: <http://www.settek.com>

Sample Log-In Check List

Client Name: TEK-IL-62234-A

Work Order Number: 23120232

RcptNo: 1

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
2	13.0	Good	Not Present			
3	13.5	Good	Not Present			
4	14.1	Good	Not Present			



APPENDIX E STATISTICAL EVALUATION

APPENDIX E1. TABLES

Table E1. Descriptive Statistics
Annual Groundwater Monitoring Report
Grand Tower Energy Center

Analyte	Well Type	Well ID	Samples	Detects	Minimum	Maximum	Median	Mean	KM Mean	Std. Dev.	KM Std. Dev.
Antimony [ug/L]	Downgradient	APW-02	16	2 (12%)	1	4	1	1.256		0.7814	
		APW-03	16	0 (0%)	1	4	1	1.188		0.75	
		APW-05/05R	16	1 (6%)	1	4	1	1.194		0.7487	
		APW-06D	15	0 (0%)	1	4	1	1.2		0.7746	
		APW-06S	16	0 (0%)	1	4	1	1.188		0.75	
		APW-07	16	0 (0%)	1	4	1	1.188		0.75	
		APW-08	16	0 (0%)	1	4	1	1.188		0.75	
		APW-10D	16	0 (0%)	1	4	1	1.188		0.75	
		APW-10S	16	0 (0%)	1	4	1	1.188		0.75	
	Upgradient	APW-01R	16	0 (0%)	1	4	1	1.188		0.75	
		APW-04	16	0 (0%)	1	4	1	1.188		0.75	
		APW-09	16	1 (6%)	1	4	1	1.188		0.75	
		POOLED	48	1 (2%)	1	4	1	1.188		0.7339	
Arsenic [ug/L]	Downgradient	APW-02	16	16 (100%)	9.3	26	16.95	17.86		4.702	
		APW-03	16	15 (94%)	1.7	5.9	2.25	2.719	2.704	1.173	1.146
		APW-05/05R	16	16 (100%)	1.5	4.8	2.3	2.525		0.9154	
		APW-06D	15	15 (100%)	6.8	13.5	10.2	9.92		1.735	
		APW-06S	16	14 (88%)	1	2	1.2	1.369	1.324	0.3572	0.3126
		APW-07	16	9 (56%)	1	2.3	1.3	1.4	1.351	0.4546	0.4184
		APW-08	16	9 (56%)	1	2.5	1.3	1.462	1.414	0.5175	0.4901
		APW-10D	16	8 (50%)	1	5.7	1.2	1.631	1.585	1.161	1.127
		APW-10S	16	16 (100%)	174	276	190	197.1		24.77	
	Upgradient	APW-01R	16	13 (81%)	1	3.3	1.25	1.619	1.575	0.693	0.672
		APW-04	16	15 (94%)	1.4	2.9	1.75	1.888	1.865	0.4603	0.45
		APW-09	16	16 (100%)	1.8	3.1	2.2	2.284		0.3171	
		POOLED	48	44 (92%)	1	3.3	1.95	1.93	1.908	0.5739	0.578
Barium [ug/L]	Downgradient	APW-02	16	16 (100%)	149	739	344.5	355.4		174.7	
		APW-03	16	16 (100%)	80.6	190	136	133.8		33.02	
		APW-05/05R	16	16 (100%)	140	233	190	188.8		31.03	
		APW-06D	15	15 (100%)	115	173	148	148.7		16.07	
		APW-06S	16	16 (100%)	190	305	217.5	221.8		26.64	
		APW-07	16	16 (100%)	303	522	377	387.2		53.83	
		APW-08	16	16 (100%)	167	261	218	214.3		27.92	
		APW-10D	16	16 (100%)	276	485	350	360.2		58.91	
		APW-10S	16	16 (100%)	536	804	594	611.8		66.52	
	Upgradient	APW-01R	16	16 (100%)	165	259	179	185.6		22.81	
		APW-04	16	16 (100%)	123	165	139	140.1		10.88	
		APW-09	16	16 (100%)	118	227	130	139.7		29.8	
		POOLED	48	48 (100%)	118	259	143.5	155.1		31.02	
Beryllium [ug/L]	Downgradient	APW-02	16	1 (6%)	1	2	1	1.131		0.34	
		APW-03	16	0 (0%)	1	2	1	1.062		0.25	
		APW-05/05R	16	0 (0%)	1	2	1	1.125		0.3416	
		APW-06D	15	0 (0%)	1	2	1	1.067		0.2582	
		APW-06S	16	0 (0%)	1	2	1	1.062		0.25	
		APW-07	16	0 (0%)	1	2	1	1.062		0.25	
		APW-08	16	0 (0%)	1	2	1	1.062		0.25	
		APW-10D	16	0 (0%)	1	2	1	1.062		0.25	
		APW-10S	16	0 (0%)	1	2	1	1.062		0.25	
	Upgradient	APW-01R	16	0 (0%)	1	2	1	1.062		0.25	
		APW-04	16	0 (0%)	1	2	1	1.062		0.25	
		APW-09	16	0 (0%)	1	2	1	1.062		0.25	
		POOLED	48	0 (0%)	1	2	1	1.062		0.2446	
Boron [mg/L]	Downgradient	APW-02	15	15 (100%)	7.75	9.62	8.73	8.661		0.5443	
		APW-03	15	15 (100%)	1.84	4.94	4.27	4.095		0.9116	
		APW-05/05R	15	15 (100%)	7.12	10.3	8.89	8.743		1.032	
		APW-06D	14	14 (100%)	3.09	5.51	3.825	3.943		0.6328	
		APW-06S	15	15 (100%)	4.65	9.19	5.93	6.281		1.105	
		APW-07	15	15 (100%)	0.168	0.342	0.274	0.2608		0.05232	
		APW-08	15	15 (100%)	0.095	0.155	0.132	0.1283		0.01991	
		APW-10D	15	15 (100%)	0.0522	0.118	0.0843	0.083		0.01684	
		APW-10S	15	15 (100%)	0.525	0.683	0.569	0.5763		0.0416	
	Upgradient	APW-01R	15	15 (100%)	0.176	0.357	0.228	0.2448		0.05144	
		APW-04	15	15 (100%)	0.559	2.37	1.33	1.418		0.6777	
		APW-09	15	15 (100%)	0.191	1.61	0.369	0.5089		0.3736	
		POOLED	45	45 (100%)	0.176	2.37	0.369	0.7237		0.6704	

Table E1. Descriptive Statistics
Annual Groundwater Monitoring Report
Grand Tower Energy Center

Analyte	Well Type	Well ID	Samples	Detects	Minimum	Maximum	Median	Mean	KM Mean	Std. Dev.	KM Std. Dev.
Cadmium [ug/L]	Downgradient	APW-02	16	1 (6%)	1	1	1	1		0	
		APW-03	16	1 (6%)	1	1	1	1		0	
		APW-05/05R	16	0 (0%)	1	1	1	1		0	
		APW-06D	15	0 (0%)	1	1	1	1		0	
		APW-06S	16	0 (0%)	1	1	1	1		0	
		APW-07	16	0 (0%)	1	1	1	1		0	
		APW-08	16	1 (6%)	1	1	1	1		0	
		APW-10D	16	1 (6%)	1	1.1	1	1.006		0.025	
		APW-10S	16	0 (0%)	1	1	1	1		0	
	Upgradient	APW-01R	16	0 (0%)	1	1	1	1		0	
		APW-04	16	0 (0%)	1	1	1	1		0	
		APW-09	16	0 (0%)	1	1	1	1		0	
		POOLED	48	0 (0%)	1	1	1	1		0	
Calcium [mg/L]	Downgradient	APW-02	15	15 (100%)	132	198	148	154.9		20.67	
		APW-03	15	15 (100%)	74.9	153	111	109.5		23.54	
		APW-05/05R	15	15 (100%)	97.1	142	124	122.8		11.87	
		APW-06D	14	14 (100%)	96.7	128	106.5	108.2		9.084	
		APW-06S	15	15 (100%)	87.5	115	98.1	99.2		6.968	
		APW-07	15	15 (100%)	161	238	192	193.1		18.36	
		APW-08	15	15 (100%)	79.4	105	95	93.13		8.202	
		APW-10D	15	15 (100%)	115	611	123	174		137.1	
		APW-10S	15	15 (100%)	129	171	145	145.9		11.17	
	Upgradient	APW-01R	15	15 (100%)	59.2	97.1	88.2	84.93		10.58	
		APW-04	15	15 (100%)	87.9	124	102	103.3		9.315	
		APW-09	15	15 (100%)	69.5	110	81.9	84.44		8.904	
		POOLED	45	45 (100%)	59.2	124	89.5	90.9		12.95	
Chloride [mg/L]	Downgradient	APW-02	16	16 (100%)	7	13	11	10.24		2.001	
		APW-03	16	16 (100%)	8.04	23	20	18.32		4.136	
		APW-05/05R	16	16 (100%)	14	19	16	16.12		1.54	
		APW-06D	15	15 (100%)	14	22	16	16.88		2.095	
		APW-06S	16	16 (100%)	20	31	25	25.01		2.762	
		APW-07	16	16 (100%)	9	16	14	13.16		2.189	
		APW-08	16	16 (100%)	9	13	10.3	10.6		1.083	
		APW-10D	16	16 (100%)	10	24	15.7	15.4		3.262	
		APW-10S	16	16 (100%)	6	21	11	11.58		5.61	
	Upgradient	APW-01R	16	10 (62%)	2	11	6	6.442	5.379	2.399	3.262
		APW-04	16	16 (100%)	9	12	11	10.76		0.9058	
		APW-09	16	16 (100%)	11	768	13	59.76		188.9	
		POOLED	48	42 (88%)	2	768	11	25.65	25.3	109.5	108.4
Chromium [ug/L]	Downgradient	APW-02	16	15 (94%)	2	127	19.15	33.73	33.73	37.87	36.67
		APW-03	16	10 (62%)	1	24.1	2.55	5.125	5.009	5.971	5.855
		APW-05/05R	16	7 (44%)	1	13.7	1.75	3.1		3.384	
		APW-06D	15	8 (53%)	1	72.7	1.5	7.281	7.204	18.25	17.66
		APW-06S	16	9 (56%)	1	17.3	1.95	3.244	3.107	4.045	3.98
		APW-07	16	9 (56%)	1	32.9	2.05	4.388	4.269	7.777	7.577
		APW-08	16	11 (69%)	1	8.2	2.2	2.975	2.927	2.113	2.079
		APW-10D	16	10 (62%)	1	14.8	2.05	3.244	3.128	3.557	3.504
		APW-10S	16	13 (81%)	1	15	1.9	3.494	3.46	3.951	3.842
	Upgradient	APW-01R	16	13 (81%)	1	8.5	2.25	2.792	2.761	1.88	1.847
		APW-04	16	11 (69%)	1	25.1	2.4	3.748	3.686	5.797	5.64
		APW-09	16	7 (44%)	1	14.8	1.5	2.275		3.358	
		POOLED	48	31 (65%)	1	25.1	1.75	2.939	2.851	3.979	3.972
Cobalt [ug/L]	Downgradient	APW-02	16	12 (75%)	1	11	2.5	3.55	3.504	2.983	2.92
		APW-03	16	5 (31%)	1	2.1	1	1.212		0.3704	
		APW-05/05R	16	1 (6%)	1	2	1	1.125		0.3416	
		APW-06D	15	7 (47%)	1	5.4	1	1.747		1.329	
		APW-06S	16	1 (6%)	1	2	1	1.062		0.25	
		APW-07	16	2 (12%)	1	2	1	1.081		0.2562	
		APW-08	16	11 (69%)	1	2.1	1.3	1.419	1.374	0.407	0.3723
		APW-10D	16	16 (100%)	1.3	7	3.05	3.213		1.328	
		APW-10S	16	5 (31%)	1	2.1	1	1.238		0.4241	
	Upgradient	APW-01R	16	7 (44%)	1	4.1	1.15	1.625		0.927	
		APW-04	16	4 (25%)	1	2.5	1	1.188		0.4334	
		APW-09	16	3 (19%)	1	3.1	1	1.219		0.5659	
		POOLED	48	14 (29%)	1	4.1	1	1.344		0.6906	

Table E1. Descriptive Statistics
Annual Groundwater Monitoring Report
Grand Tower Energy Center

Analyte	Well Type	Well ID	Samples	Detects	Minimum	Maximum	Median	Mean	KM Mean	Std. Dev.	KM Std. Dev.
Dissolved Solids, Total [mg/L]	Downgradient	APW-02	16	16 (100%)	820	934	882.5	880.8		35.82	
		APW-03	16	16 (100%)	450	724	519	542.6		76.63	
		APW-05/05R	16	16 (100%)	552	842	745	740.9		79.41	
		APW-06D	14	14 (100%)	482	735	564.5	580.6		59.4	
		APW-06S	16	16 (100%)	500	666	599	593.6		45.29	
		APW-07	16	16 (100%)	624	824	741	749.2		52.44	
		APW-08	16	16 (100%)	370	466	415	413.8		33.47	
		APW-10D	16	16 (100%)	436	512	460	462.5		19.3	
		APW-10S	15	15 (100%)	678	900	735	747.1		52.73	
	Upgradient	APW-01R	15	15 (100%)	300	474	385	387.7		44.4	
		APW-04	16	16 (100%)	416	528	449	456.9		34.45	
		APW-09	15	15 (100%)	278	3380	372	565.9		779.2	
		POOLED	46	46 (100%)	278	3380	406	469.8		441.9	
Fluoride [ug/L]	Downgradient	APW-02	16	16 (100%)	220	260	240	242.5		12.91	
		APW-03	16	16 (100%)	200	340	265	264.5		38.24	
		APW-05/05R	16	16 (100%)	298	380	330	334.9		23.01	
		APW-06D	15	15 (100%)	200	240	220	218.1		12.57	
		APW-06S	16	16 (100%)	240	410	273.5	283.6		42.43	
		APW-07	16	16 (100%)	170	350	190	197.6		42.42	
		APW-08	16	16 (100%)	232	300	280	278.2		19.07	
		APW-10D	16	13 (81%)	100	150	110	113.1	110.7	14.93	11.23
		APW-10S	16	15 (94%)	150	210	160	166.2	166.2	16.28	15.76
	Upgradient	APW-01R	16	16 (100%)	120	210	165	162.7		21.31	
		APW-04	16	16 (100%)	150	200	170	171.9		13.28	
		APW-09	16	16 (100%)	190	230	200	201.7		12.28	
		POOLED	48	48 (100%)	120	230	180	178.8		23.07	
Iron [mg/L]	Downgradient	APW-02	2	2 (100%)	7.63	11.7	9.665	9.665		2.878	
		APW-03	2	2 (100%)	0.367	1.66	1.0135	1.014		0.9143	
		APW-05/05R	2	2 (100%)	2.77	5.89	4.33	4.33		2.206	
		APW-06D	1	1 (100%)	3.65	3.65	3.65	3.65			
		APW-06S	2	2 (100%)	9.18	9.35	9.265	9.265		0.1202	
		APW-07	2	2 (100%)	17.3	18.9	18.1	18.1		1.131	
		APW-08	2	2 (100%)	0.44	3.14	1.79	1.79		1.909	
		APW-10D	2	2 (100%)	0.175	0.758	0.4665	0.4665		0.4122	
		APW-10S	2	2 (100%)	17.2	19.6	18.4	18.4		1.697	
	Upgradient	APW-01R	2	2 (100%)	0.405	1.42	0.9125	0.9125		0.7177	
		APW-04	2	2 (100%)	0.563	0.709	0.636	0.636		0.1032	
		APW-09	2	2 (100%)	0.179	0.496	0.3375	0.3375		0.2242	
		POOLED	6	6 (100%)	0.179	1.42	0.5295	0.6287		0.4259	
Lead [ug/L]	Downgradient	APW-02	16	16 (100%)	2	23.9	5.1	7.409		6.594	
		APW-03	16	6 (38%)	1	4.4	1	1.762		1.158	
		APW-05/05R	16	3 (19%)	1	2.6	1	1.231		0.4976	
		APW-06D	15	2 (13%)	1	2	1	1.12		0.2908	
		APW-06S	16	1 (6%)	1	2.8	1	1.175		0.5	
		APW-07	16	1 (6%)	1	7.4	1	1.462		1.603	
		APW-08	16	5 (31%)	1	2.8	1	1.356		0.5831	
		APW-10D	16	2 (12%)	1	2	1	1.125		0.3416	
		APW-10S	16	5 (31%)	1	4.3	1	1.462		0.9451	
	Upgradient	APW-01R	16	5 (31%)	1	6.2	1	1.594		1.322	
		APW-04	16	1 (6%)	1	2	1	1.1		0.2828	
		APW-09	16	1 (6%)	1	3.9	1	1.244		0.751	
		POOLED	48	7 (15%)	1	6.2	1	1.312		0.8984	
Lithium [ug/L]	Downgradient	APW-02	16	16 (100%)	38.6	64.7	48.7	49.49		7.36	
		APW-03	16	16 (100%)	23.9	36.1	29.9	29.69		3.989	
		APW-05/05R	16	16 (100%)	33.1	52.3	40.15	40.41		4.228	
		APW-06D	15	15 (100%)	16	19.9	17.3	17.35		1.087	
		APW-06S	16	16 (100%)	33.5	56.4	41.25	41.54		4.997	
		APW-07	16	16 (100%)	14.1	23.1	17.7	17.36		2.241	
		APW-08	16	16 (100%)	14.2	22.3	19.4	18.51		2.775	
		APW-10D	16	16 (100%)	12.6	18	15	15.02		1.119	
		APW-10S	16	16 (100%)	26.3	40.1	30.4	30.94		3.375	
	Upgradient	APW-01R	16	16 (100%)	14.2	18.9	16.65	16.55		1.35	
		APW-04	16	16 (100%)	29	42.4	37.85	36.09		5.258	
		APW-09	16	16 (100%)	13.1	24.6	15.6	16.07		2.836	
		POOLED	48	48 (100%)	13.1	42.4	17.45	22.9		10.04	

Table E1. Descriptive Statistics
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Analyte	Well Type	Well ID	Samples	Detects	Minimum	Maximum	Median	Mean	KM Mean	Std. Dev.	KM Std. Dev.
Manganese [mg/L]	Downgradient	APW-02	2	2 (100%)	0.669	0.752	0.7105	0.7105		0.05869	
		APW-03	2	2 (100%)	0.321	0.435	0.378	0.378		0.08061	
		APW-05/05R	2	2 (100%)	0.554	0.9	0.727	0.727		0.2447	
		APW-06D	1	1 (100%)	0.622	0.622	0.622	0.622			
		APW-06S	2	2 (100%)	0.512	0.53	0.521	0.521		0.01273	
		APW-07	2	2 (100%)	1.11	1.19	1.15	1.15		0.05657	
		APW-08	2	2 (100%)	0.0435	0.202	0.12275	0.1228		0.1121	
		APW-10D	2	2 (100%)	0.88	1.16	1.02	1.02		0.198	
		APW-10S	2	2 (100%)	0.174	0.243	0.2085	0.2085		0.04879	
	Upgradient	APW-01R	2	2 (100%)	0.0791	0.139	0.10905	0.109		0.04236	
		APW-04	2	2 (100%)	0.192	0.21	0.201	0.201		0.01273	
		APW-09	2	2 (100%)	0.124	0.599	0.3615	0.3615		0.3359	
		POOLED	6	6 (100%)	0.0791	0.599	0.1655	0.2238		0.1898	
Mercury [ug/L]	Downgradient	APW-02	16	1 (6%)	0.2	0.43	0.2	0.2144		0.0575	
		APW-03	16	0 (0%)	0.2	0.2	0.2	0.2		0	
		APW-05/05R	16	0 (0%)	0.2	0.2	0.2	0.2		0	
		APW-06D	15	0 (0%)	0.2	0.2	0.2	0.2		0	
		APW-06S	16	0 (0%)	0.2	0.2	0.2	0.2		0	
		APW-07	16	0 (0%)	0.2	0.2	0.2	0.2		0	
		APW-08	16	0 (0%)	0.2	0.2	0.2	0.2		0	
		APW-10D	16	0 (0%)	0.2	0.2	0.2	0.2		0	
		APW-10S	16	0 (0%)	0.2	0.2	0.2	0.2		0	
	Upgradient	APW-01R	16	0 (0%)	0.2	0.2	0.2	0.2		0	
		APW-04	16	0 (0%)	0.2	0.2	0.2	0.2		0	
		APW-09	16	0 (0%)	0.2	0.2	0.2	0.2		0	
		POOLED	48	0 (0%)	0.2	0.2	0.2	0.2		0	
Molybdenum [ug/L]	Downgradient	APW-02	16	16 (100%)	95.1	240	165	165.6		40.38	
		APW-03	16	16 (100%)	26.2	84.9	65.25	62.29		17.6	
		APW-05/05R	16	16 (100%)	168	249	214.5	213.2		24.52	
		APW-06D	15	15 (100%)	46.3	71.9	60.2	60.46		7.409	
		APW-06S	16	16 (100%)	207	324	262	265		34.08	
		APW-07	16	15 (94%)	2.3	5	3.4	3.494	3.393	0.738	0.6191
		APW-08	16	3 (19%)	1	5	1.3	1.481		0.9683	
		APW-10D	16	1 (6%)	1	5	1.5	1.556		0.9919	
		APW-10S	16	3 (19%)	1	5	1.5	1.588		0.9674	
	Upgradient	APW-01R	16	0 (0%)	1	5	1.25	1.469		0.9741	
		APW-04	16	16 (100%)	29.9	89.1	58.1	59.08		20.69	
		APW-09	16	16 (100%)	15	45.5	22.3	23.24		7.743	
		POOLED	48	32 (67%)	1	89.1	22.3	27.93	27.77	27.06	26.92
Nickel [ug/L]	Downgradient	APW-02	10	10 (100%)	4.5	72.5	27.55	31.38		21.84	
		APW-03	10	8 (80%)	1	10	2.55	3.39	3.39	2.825	2.68
		APW-05/05R	10	7 (70%)	1	7.4	2.05	2.6	2.6	2.041	1.936
		APW-06D	9	9 (100%)	1.7	9.3	2.5	3.189		2.359	
		APW-06S	10	9 (90%)	1	9	2.1	2.63	2.63	2.34	2.22
		APW-07	10	5 (50%)	1	15	1.15	3.02	3.02	4.359	4.135
		APW-08	10	10 (100%)	2.6	7.7	3.4	4.09		1.804	
		APW-10D	10	10 (100%)	2.5	9.5	6.4	6.12		2.024	
		APW-10S	10	6 (60%)	1	5.1	1.3	1.77	1.77	1.329	1.261
	Upgradient	APW-01R	10	10 (100%)	3.8	12	5.2	5.94		2.497	
		APW-04	10	10 (100%)	2	6.5	3.2	3.59		1.436	
		APW-09	10	6 (60%)	1	12	1.1	2.73	2.73	3.428	3.252
		POOLED	30	26 (87%)	1	12	3.85	4.087	4.087	2.851	2.803
pH, Lab [SU]	Downgradient	APW-02	16	16 (100%)	6.9	7.52	7.075	7.106		0.1485	
		APW-03	16	16 (100%)	7.21	7.93	7.49	7.572		0.2426	
		APW-05/05R	16	16 (100%)	7.18	7.55	7.305	7.315		0.08656	
		APW-06D	15	15 (100%)	7.19	7.73	7.23	7.295		0.1409	
		APW-06S	16	16 (100%)	7.02	7.67	7.125	7.174		0.1611	
		APW-07	16	16 (100%)	6.78	7.31	6.875	6.929		0.1487	
		APW-08	16	16 (100%)	7	7.68	7.17	7.208		0.1815	
		APW-10D	16	16 (100%)	6.98	7.66	7.115	7.173		0.1907	
		APW-10S	16	16 (100%)	6.91	7.58	7	7.063		0.1653	
	Upgradient	APW-01R	16	16 (100%)	6.43	7.19	6.65	6.758		0.2465	
		APW-04	16	16 (100%)	7.2	8.17	7.33	7.398		0.2271	
		APW-09	16	16 (100%)	7.31	8.03	7.45	7.488		0.1875	
		POOLED	48	48 (100%)	6.43	8.17	7.32	7.214		0.3937	

Table E1. Descriptive Statistics
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Analyte	Well Type	Well ID	Samples	Detects	Minimum	Maximum	Median	Mean	KM Mean	Std. Dev.	KM Std. Dev.
Radium-226/228 [pCi/L]	Downgradient	APW-02	15	15 (100%)	0.476	4.09	2	1.967		0.8623	
		APW-03	16	16 (100%)	0.776	3.18	2	2		0.4921	
		APW-05/05R	15	15 (100%)	0.798	6.34	2	2.282		1.278	
		APW-06D	15	15 (100%)	1.38	2.8	2	1.985		0.2811	
		APW-06S	16	16 (100%)	0.497	2.93	2	1.869		0.5163	
		APW-07	16	16 (100%)	1.1	2.7	2	1.949		0.3438	
		APW-08	16	16 (100%)	0.611	2.39	2	1.839		0.4779	
		APW-10D	16	16 (100%)	1.03	2	2	1.833		0.314	
		APW-10S	16	16 (100%)	1.24	4.83	2	2.199		0.8366	
	Upgradient	APW-01R	16	16 (100%)	0.691	2.54	2	1.838		0.5036	
		APW-04	16	16 (100%)	0.497	2.65	2	1.809		0.5181	
		APW-09	16	16 (100%)	0.503	2	2	1.742		0.5216	
		POOLED	48	48 (100%)	0.497	2.65	2	1.796		0.5051	
Selenium [ug/L]	Downgradient	APW-02	16	1 (6%)	1	2	1	1.094		0.272	
		APW-03	16	2 (12%)	1	2	1	1.125		0.3235	
		APW-05/05R	16	0 (0%)	1	2	1	1.062		0.25	
		APW-06D	15	0 (0%)	1	2	1	1.067		0.2582	
		APW-06S	16	0 (0%)	1	2	1	1.062		0.25	
		APW-07	16	0 (0%)	1	2	1	1.062		0.25	
		APW-08	16	16 (100%)	3.6	22.1	13.35	12.93		4.141	
		APW-10D	16	13 (81%)	1	3.3	1.35	1.637	1.637	0.6984	0.6762
		APW-10S	16	0 (0%)	1	2	1	1.062		0.25	
	Upgradient	APW-01R	16	16 (100%)	2.8	5.4	3.8	3.921		0.644	
		APW-04	16	16 (100%)	8.5	16.5	13.15	12.68		2.742	
		APW-09	16	16 (100%)	12.6	22.5	15.2	16.73		3.378	
		POOLED	48	48 (100%)	2.8	22.5	12.8	11.11		5.947	
Sulfate [mg/L]	Downgradient	APW-02	16	16 (100%)	411	500	460	456.6		28.6	
		APW-03	16	16 (100%)	80.1	393	202.5	212.4		77.93	
		APW-05/05R	16	16 (100%)	224	460	378.5	364.8		57.99	
		APW-06D	15	15 (100%)	180	272	222	225.6		30.33	
		APW-06S	16	16 (100%)	127	247	214	205.5		35.34	
		APW-07	16	16 (100%)	40	78	60	58.42		10.84	
		APW-08	16	16 (100%)	23	43	38	34.86		6.449	
		APW-10D	16	16 (100%)	26	44	42	40.16		5.246	
		APW-10S	16	2 (12%)	5	21	10	10.38		3.096	
	Upgradient	APW-01R	16	16 (100%)	33	88	68.95	64.68		16.09	
		APW-04	16	16 (100%)	50.9	126	93	88.24		24.52	
		APW-09	16	16 (100%)	25	104	40.5	46.27		19.32	
		POOLED	48	48 (100%)	25	126	65	66.4		26.36	
Thallium [ug/L]	Downgradient	APW-02	16	0 (0%)	1	2	1.5	1.5		0.5164	
		APW-03	16	0 (0%)	1	2	1.5	1.5		0.5164	
		APW-05/05R	16	0 (0%)	1	2	1.5	1.5		0.5164	
		APW-06D	15	0 (0%)	1	2	1	1.467		0.5164	
		APW-06S	16	0 (0%)	1	2	1.5	1.5		0.5164	
		APW-07	16	0 (0%)	1	2	1.5	1.5		0.5164	
		APW-08	16	0 (0%)	1	2	1.5	1.5		0.5164	
		APW-10D	16	0 (0%)	1	2	1.5	1.5		0.5164	
		APW-10S	16	0 (0%)	1	2	1.5	1.5		0.5164	
	Upgradient	APW-01R	16	1 (6%)	1	2	1.7	1.525		0.5	
		APW-04	16	0 (0%)	1	2	1.5	1.5		0.5164	
		APW-09	16	1 (6%)	1	2	1.5	1.5		0.5164	
		POOLED	48	2 (4%)	1	2	1.7	1.508		0.5001	

Table E1. Descriptive Statistics
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Analyte	Well Type	Well ID	Samples	Detects	Minimum	Maximum	Median	Mean	KM Mean	Std. Dev.	KM Std. Dev.
Turbidity, Field [NTU]	Downgradient	APW-02	8	8 (100%)	19.2	169	100.5	94.64		47.83	
		APW-03	8	8 (100%)	2.72	103	23.71	33.75		35.76	
		APW-05/05R	8	8 (100%)	4.65	76.1	36.3	33.14		24.85	
		APW-06D	7	7 (100%)	3.02	181	26.9	55.36		61.29	
		APW-06S	8	8 (100%)	1.26	30.5	7.83	10.06		9.258	
		APW-07	8	8 (100%)	4.36	79.2	27.9	34.22		27.07	
		APW-08	8	8 (100%)	23.1	305	140	134.4		88.53	
		APW-10D	8	8 (100%)	4.76	196	46.1	87.03		78.77	
		APW-10S	8	8 (100%)	3.78	63.6	44.95	40.42		22.51	
	Upgradient	APW-01R	8	8 (100%)	25.6	133	58.55	65.53		40.05	
		APW-04	8	8 (100%)	18.3	38.7	24.65	26.76		7.888	
		APW-09	8	8 (100%)	3.82	34.2	10.35	14.99		11.15	
		POOLED	24	24 (100%)	3.82	133	26.05	35.76		32.11	

Notes:

ug/L = microgram per liter

pCi/L = picocuries per liter

SU = standard units

KM = Kaplan-Meier; these values are only provided for groups with <50% non-detects

Table E2. Summary of Potential Statistical Outliers
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Well Type	Well ID	Analyte	Potential Outlier(s)	Max Upgradient Concentration
Downgradient	APW-03	Arsenic [ug/L]	5.9	3.3
Downgradient	APW-10D	Arsenic [ug/L]	5.7	3.3
Downgradient	APW-10S	Arsenic [ug/L]	276	3.3
Downgradient	APW-06S	Barium [ug/L]	305	259
Downgradient	APW-07	Barium [ug/L]	522	259
Downgradient	APW-10S	Barium [ug/L]	804	259
Downgradient	APW-06D	Boron [mg/L]	4.99; 5.51	2.37
Downgradient	APW-10D	Calcium [mg/L]	374; 611	124
Downgradient	APW-06D	Chloride [mg/L]	21.2; 22	768
Downgradient	APW-03	Chromium [ug/L]	24.1	25.1
Downgradient	APW-06D	Chromium [ug/L]	72.7	25.1
Downgradient	APW-06S	Chromium [ug/L]	17.3	25.1
Downgradient	APW-07	Chromium [ug/L]	32.9	25.1
Downgradient	APW-10D	Chromium [ug/L]	14.8	25.1
Downgradient	APW-10S	Chromium [ug/L]	8.7; 9.1; 15	25.1
Downgradient	APW-03	Cobalt [ug/L]	2.1	4.1
Downgradient	APW-10D	Cobalt [ug/L]	7	4.1
Downgradient	APW-06D	Dissolved Solids, Total [mg/L]	670; 735	3380
Downgradient	APW-06S	Fluoride [ug/L]	410	230
Downgradient	APW-07	Fluoride [ug/L]	350	230
Downgradient	APW-10S	Fluoride [ug/L]	210	230
Downgradient	APW-05/05R	Lithium [ug/L]	52.3	42.4
Downgradient	APW-06S	Lithium [ug/L]	56.4	42.4
Downgradient	APW-06D	Nickel [ug/L]	9.3	12
Downgradient	APW-06S	Nickel [ug/L]	9	12
Downgradient	APW-07	Nickel [ug/L]	15	12
Downgradient	APW-02	pH, Lab [SU]	7.52	8.17
Downgradient	APW-06D	pH, Lab [SU]	7.73	8.17
Downgradient	APW-06S	pH, Lab [SU]	7.67	8.17
Downgradient	APW-10S	pH, Lab [SU]	7.58	8.17
Downgradient	APW-02	Radium-226/228 [pCi/L]	3.04; 4.09	2.65
Downgradient	APW-03	Radium-226/228 [pCi/L]	2.09; 2.58; 3	2.65
Downgradient	APW-05/05R	Radium-226/228 [pCi/L]	3.86; 6.34	2.65
Downgradient	APW-06D	Radium-226/228 [pCi/L]	2.8	2.65
Downgradient	APW-06S	Radium-226/228 [pCi/L]	2.93	2.65
Downgradient	APW-07	Radium-226/228 [pCi/L]	2.1; 2.7	2.65
Downgradient	APW-08	Radium-226/228 [pCi/L]	2.08; 2.39	2.65
Downgradient	APW-10S	Radium-226/228 [pCi/L]	2.82; 3; 4.83	2.65
Downgradient	APW-06S	Turbidity, Field [NTU]	30.5	133
Upgradient	APW-09	Barium [ug/L]	186; 227	259
Upgradient	APW-09	Calcium [mg/L]	110	124
Upgradient	(POOLED)	Chloride [mg/L]	768	768
Upgradient	APW-09	Chloride [mg/L]	768	768
Upgradient	(POOLED)	Chromium [ug/L]	14.8; 25.1	25.1
Upgradient	APW-01R	Chromium [ug/L]	8.5	25.1
Upgradient	APW-04	Chromium [ug/L]	25.1	25.1
Upgradient	APW-09	Chromium [ug/L]	14.8	25.1
Upgradient	(POOLED)	Dissolved Solids, Total [mg/L]	3380	3380
Upgradient	APW-09	Dissolved Solids, Total [mg/L]	3380	3380
Upgradient	(POOLED)	Iron [mg/L]	1.42	1.42
Upgradient	(POOLED)	Manganese [mg/L]	0.599	0.599
Upgradient	APW-09	Molybdenum [ug/L]	45.5	89.1

Table E2. Summary of Potential Statistical Outliers
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Well Type	Well ID	Analyte	Potential Outlier(s)	Max Upgradient Concentration
Upgradient	APW-01R	Nickel [ug/L]	12	12
Upgradient	APW-09	Nickel [ug/L]	12	12
Upgradient	APW-04	pH, Lab [SU]	8.17	8.17
Upgradient	(POOLED)	Radium-226/228 [pCi/L]	2.18; 2.54; 2	2.65
Upgradient	APW-01R	Radium-226/228 [pCi/L]	2.18; 2.54	2.65
Upgradient	APW-04	Radium-226/228 [pCi/L]	2.65	2.65
Upgradient	APW-01R	Selenium [ug/L]	5.4	22.5
Upgradient	APW-09	Sulfate [mg/L]	104	126
Upgradient	(POOLED)	Turbidity, Field [NTU]	83.2; 89.5; 9	133

Notes:

ug/L = microgram per liter

pCi/L = picocuries per liter

SU = Standard Units

Potential outliers were analyzed with Tukey's outlier test. Only detected values from well/analyte pairs with ≥ 4 detections were tested.

Table E3. Summary of Background Concentrations
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Analyte	Distribution	Background Concentration (95/95 UTL)
Antimony [ug/L]	Insufficient Data	1
Arsenic [ug/L]	Normal	3.11
Barium [ug/L]	No Distribution Detected	241.9
Beryllium [ug/L]	Insufficient Data	2
Boron [mg/L]	Gamma	1.354
Cadmium [ug/L]	Insufficient Data	1
Calcium [mg/L]	Normal	118.3
Chloride [mg/L]	No Distribution Detected	12.84
Chromium [ug/L]	No Distribution Detected	25.1
Cobalt [ug/L]	Normal	2.685
Dissolved Solids, Total [mg/L]	Normal	514.7
Fluoride [ug/L]	Normal	226.1
Iron [mg/L]	Normal	2.208
Lead [ug/L]	Normal	3.086
Lithium [ug/L]	No Distribution Detected	32.42
Manganese [mg/L]	Normal	0.928
Mercury [ug/L]	Insufficient Data	0.2
Molybdenum [ug/L]	Normal	55.02
Nickel [ug/L]	Normal	10.42
pH, Lab [SU]	Normal	8.113
Radium-226/228 [pCi/L]	No Distribution Detected	2.54
Selenium [ug/L]	No Distribution Detected	22.95
Sulfate [mg/L]	Normal	93.25
Thallium [ug/L]	No Distribution Detected	2
Turbidity, Field [NTU]	Gamma	132

Notes:

ug/L = microgram per liter

pCi/L = picocuries per liter

SU = standard units

95/95 UTL = upper tolerance limit with 95% coverage and 95% confidence

Table E4. Summary of Downgradient Confidence Limits
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Analyte	Well	Distribution	95% LCL	95% UCL
Antimony [ug/L]	APW-02	No Distribution Detected		1.249
Antimony [ug/L]	APW-03	Insufficient Data		
Antimony [ug/L]	APW-05/05R	Insufficient Data		
Antimony [ug/L]	APW-06D	Insufficient Data		
Antimony [ug/L]	APW-06S	Insufficient Data		
Antimony [ug/L]	APW-07	Insufficient Data		
Antimony [ug/L]	APW-08	Insufficient Data		
Antimony [ug/L]	APW-10D	Insufficient Data		
Antimony [ug/L]	APW-10S	Insufficient Data		
Arsenic [ug/L]	APW-02	Normal		19.92
Arsenic [ug/L]	APW-03	Normal		3.224
Arsenic [ug/L]	APW-05/05R	Normal		2.926
Arsenic [ug/L]	APW-06D	Normal		10.71
Arsenic [ug/L]	APW-06S	Normal		1.469
Arsenic [ug/L]	APW-07	Normal		1.548
Arsenic [ug/L]	APW-08	Normal		1.645
Arsenic [ug/L]	APW-10D	No Distribution Detected		2.114
Arsenic [ug/L]	APW-10S	No Distribution Detected		207.9
Barium [ug/L]	APW-02	Normal		431.9
Barium [ug/L]	APW-03	Normal		148.2
Barium [ug/L]	APW-05/05R	Normal		202.4
Barium [ug/L]	APW-06D	Normal		156
Barium [ug/L]	APW-06S	No Distribution Detected		233.4
Barium [ug/L]	APW-07	Normal		410.8
Barium [ug/L]	APW-08	Normal		226.5
Barium [ug/L]	APW-10D	Normal		386
Barium [ug/L]	APW-10S	Normal		640.9
Beryllium [ug/L]	APW-02	Insufficient Data		
Beryllium [ug/L]	APW-03	Insufficient Data		
Beryllium [ug/L]	APW-05/05R	Insufficient Data		
Beryllium [ug/L]	APW-06D	Insufficient Data		
Beryllium [ug/L]	APW-06S	Insufficient Data		
Beryllium [ug/L]	APW-07	Insufficient Data		
Beryllium [ug/L]	APW-08	Insufficient Data		
Beryllium [ug/L]	APW-10D	Insufficient Data		
Beryllium [ug/L]	APW-10S	Insufficient Data		
Boron [mg/L]	APW-02	Normal		8.908
Boron [mg/L]	APW-03	No Distribution Detected		4.509
Boron [mg/L]	APW-05/05R	Normal		9.212
Boron [mg/L]	APW-06D	Normal		4.242
Boron [mg/L]	APW-06S	Normal		6.783
Boron [mg/L]	APW-07	Normal		0.285
Boron [mg/L]	APW-08	Normal		0.137
Boron [mg/L]	APW-10D	Normal		0.0907

Table E4. Summary of Downgradient Confidence Limits
Annual Groundwater Monitoring Report
Grand Tower Energy Center

Analyte	Well	Distribution	95% LCL	95% UCL
Boron [mg/L]	APW-10S	Normal		0.595
Cadmium [ug/L]	APW-02	Insufficient Data		
Cadmium [ug/L]	APW-03	Insufficient Data		
Cadmium [ug/L]	APW-05/05R	Insufficient Data		
Cadmium [ug/L]	APW-06D	Insufficient Data		
Cadmium [ug/L]	APW-06S	Insufficient Data		
Cadmium [ug/L]	APW-07	Insufficient Data		
Cadmium [ug/L]	APW-08	Insufficient Data		
Cadmium [ug/L]	APW-10D	Insufficient Data		
Cadmium [ug/L]	APW-10S	Insufficient Data		
Calcium [mg/L]	APW-02	Normal		164.3
Calcium [mg/L]	APW-03	Normal		120.2
Calcium [mg/L]	APW-05/05R	Normal		128.2
Calcium [mg/L]	APW-06D	Normal		112.5
Calcium [mg/L]	APW-06S	Normal		102.4
Calcium [mg/L]	APW-07	Normal		201.5
Calcium [mg/L]	APW-08	Normal		96.86
Calcium [mg/L]	APW-10D	No Distribution Detected		236.4
Calcium [mg/L]	APW-10S	Normal		151
Chloride [mg/L]	APW-02	Normal		11.11
Chloride [mg/L]	APW-03	Normal		20.13
Chloride [mg/L]	APW-05/05R	Normal		16.79
Chloride [mg/L]	APW-06D	No Distribution Detected		17.83
Chloride [mg/L]	APW-06S	Normal		26.22
Chloride [mg/L]	APW-07	Normal		14.12
Chloride [mg/L]	APW-08	Normal		11.07
Chloride [mg/L]	APW-10D	Normal		16.83
Chloride [mg/L]	APW-10S	Normal		14.03
Chromium [ug/L]	APW-02	Normal		50.36
Chromium [ug/L]	APW-03	Normal		7.715
Chromium [ug/L]	APW-05/05R	Normal		4.508
Chromium [ug/L]	APW-06D	Lognormal		
Chromium [ug/L]	APW-06S	Normal		4.957
Chromium [ug/L]	APW-07	Lognormal		
Chromium [ug/L]	APW-08	Normal		3.883
Chromium [ug/L]	APW-10D	Gamma		
Chromium [ug/L]	APW-10S	No Distribution Detected		5.213
Cobalt [ug/L]	APW-02	Normal		4.841
Cobalt [ug/L]	APW-03	Normal		1.304
Cobalt [ug/L]	APW-05/05R	Insufficient Data		
Cobalt [ug/L]	APW-06D	Normal		2.32
Cobalt [ug/L]	APW-06S	Insufficient Data		
Cobalt [ug/L]	APW-07	No Distribution Detected		1.068
Cobalt [ug/L]	APW-08	Normal		1.548

Table E4. Summary of Downgradient Confidence Limits
Annual Groundwater Monitoring Report
Grand Tower Energy Center

Analyte	Well	Distribution	95% LCL	95% UCL
Cobalt [ug/L]	APW-10D	Normal		3.795
Cobalt [ug/L]	APW-10S	Normal		1.356
Dissolved Solids, Total [mg/L]	APW-02	Normal		896.4
Dissolved Solids, Total [mg/L]	APW-03	Normal		576.1
Dissolved Solids, Total [mg/L]	APW-05/05R	Normal		775.7
Dissolved Solids, Total [mg/L]	APW-06D	No Distribution Detected		608.7
Dissolved Solids, Total [mg/L]	APW-06S	Normal		613.5
Dissolved Solids, Total [mg/L]	APW-07	Normal		772.2
Dissolved Solids, Total [mg/L]	APW-08	Normal		428.5
Dissolved Solids, Total [mg/L]	APW-10D	Normal		471
Dissolved Solids, Total [mg/L]	APW-10S	Normal		771.1
Fluoride [ug/L]	APW-02	Normal		248.2
Fluoride [ug/L]	APW-03	Normal		281.3
Fluoride [ug/L]	APW-05/05R	Normal		345
Fluoride [ug/L]	APW-06D	Normal		223.8
Fluoride [ug/L]	APW-06S	Normal		302.2
Fluoride [ug/L]	APW-07	No Distribution Detected		216.2
Fluoride [ug/L]	APW-08	Normal		286.6
Fluoride [ug/L]	APW-10D	Normal		116
Fluoride [ug/L]	APW-10S	Normal		173.4
Iron [mg/L]	APW-02	Insufficient Data		
Iron [mg/L]	APW-03	Insufficient Data		
Iron [mg/L]	APW-05/05R	Insufficient Data		
Iron [mg/L]	APW-06D	Insufficient Data		
Iron [mg/L]	APW-06S	Insufficient Data		
Iron [mg/L]	APW-07	Insufficient Data		
Iron [mg/L]	APW-08	Insufficient Data		
Iron [mg/L]	APW-10D	Insufficient Data		
Iron [mg/L]	APW-10S	Insufficient Data		
Lead [ug/L]	APW-02	Normal		10.3
Lead [ug/L]	APW-03	Normal		2.246
Lead [ug/L]	APW-05/05R	Normal		1.406
Lead [ug/L]	APW-06D	No Distribution Detected		1.163
Lead [ug/L]	APW-06S	Insufficient Data		
Lead [ug/L]	APW-07	Insufficient Data		
Lead [ug/L]	APW-08	Normal		1.57
Lead [ug/L]	APW-10D	No Distribution Detected		1.213
Lead [ug/L]	APW-10S	Normal		1.851
Lithium [ug/L]	APW-02	Normal		52.72
Lithium [ug/L]	APW-03	Normal		31.44
Lithium [ug/L]	APW-05/05R	Normal		42.26
Lithium [ug/L]	APW-06D	Normal		17.85
Lithium [ug/L]	APW-06S	No Distribution Detected		43.73
Lithium [ug/L]	APW-07	Normal		18.34

Table E4. Summary of Downgradient Confidence Limits
Annual Groundwater Monitoring Report
Grand Tower Energy Center

Analyte	Well	Distribution	95% LCL	95% UCL
Lithium [ug/L]	APW-08	Normal		19.72
Lithium [ug/L]	APW-10D	Normal		15.52
Lithium [ug/L]	APW-10S	Normal		32.42
Manganese [mg/L]	APW-02	Insufficient Data		
Manganese [mg/L]	APW-03	Insufficient Data		
Manganese [mg/L]	APW-05/05R	Insufficient Data		
Manganese [mg/L]	APW-06D	Insufficient Data		
Manganese [mg/L]	APW-06S	Insufficient Data		
Manganese [mg/L]	APW-07	Insufficient Data		
Manganese [mg/L]	APW-08	Insufficient Data		
Manganese [mg/L]	APW-10D	Insufficient Data		
Manganese [mg/L]	APW-10S	Insufficient Data		
Mercury [ug/L]	APW-02	Insufficient Data		
Mercury [ug/L]	APW-03	Insufficient Data		
Mercury [ug/L]	APW-05/05R	Insufficient Data		
Mercury [ug/L]	APW-06D	Insufficient Data		
Mercury [ug/L]	APW-06S	Insufficient Data		
Mercury [ug/L]	APW-07	Insufficient Data		
Mercury [ug/L]	APW-08	Insufficient Data		
Mercury [ug/L]	APW-10D	Insufficient Data		
Mercury [ug/L]	APW-10S	Insufficient Data		
Molybdenum [ug/L]	APW-02	Normal		183.3
Molybdenum [ug/L]	APW-03	Normal		70
Molybdenum [ug/L]	APW-05/05R	Normal		223.9
Molybdenum [ug/L]	APW-06D	Normal		63.83
Molybdenum [ug/L]	APW-06S	Normal		279.9
Molybdenum [ug/L]	APW-07	Normal		3.683
Molybdenum [ug/L]	APW-08	Normal		1.129
Molybdenum [ug/L]	APW-10D	Insufficient Data		
Molybdenum [ug/L]	APW-10S	Normal		1.345
Nickel [ug/L]	APW-02	Normal		44.04
Nickel [ug/L]	APW-03	Normal		5.051
Nickel [ug/L]	APW-05/05R	Normal		3.812
Nickel [ug/L]	APW-06D	No Distribution Detected		
Nickel [ug/L]	APW-06S	Gamma		
Nickel [ug/L]	APW-07	Normal		5.7
Nickel [ug/L]	APW-08	Normal		5.136
Nickel [ug/L]	APW-10D	Normal		7.293
Nickel [ug/L]	APW-10S	Normal		2.571
pH, Lab [SU]	APW-02	Normal	7.041	7.171
pH, Lab [SU]	APW-03	Normal	7.467	7.679
pH, Lab [SU]	APW-05/05R	Normal	7.277	7.353
pH, Lab [SU]	APW-06D	Normal	7.231	7.359
pH, Lab [SU]	APW-06S	Normal	7.103	7.245

Table E4. Summary of Downgradient Confidence Limits
Annual Groundwater Monitoring Report
Grand Tower Energy Center

Analyte	Well	Distribution	95% LCL	95% UCL
pH, Lab [SU]	APW-07	No Distribution Detected	6.864	6.994
pH, Lab [SU]	APW-08	Normal	7.129	7.288
pH, Lab [SU]	APW-10D	Normal	7.089	7.257
pH, Lab [SU]	APW-10S	No Distribution Detected	6.991	7.136
Radium-226/228 [pCi/L]	APW-02	Normal		2.359
Radium-226/228 [pCi/L]	APW-03	No Distribution Detected		2.215
Radium-226/228 [pCi/L]	APW-05/05R	No Distribution Detected		2.863
Radium-226/228 [pCi/L]	APW-06D	No Distribution Detected		2.112
Radium-226/228 [pCi/L]	APW-06S	No Distribution Detected		2.095
Radium-226/228 [pCi/L]	APW-07	No Distribution Detected		2.1
Radium-226/228 [pCi/L]	APW-08	No Distribution Detected		2.049
Radium-226/228 [pCi/L]	APW-10D	No Distribution Detected		1.971
Radium-226/228 [pCi/L]	APW-10S	No Distribution Detected		2.566
Selenium [ug/L]	APW-02	Insufficient Data		
Selenium [ug/L]	APW-03	No Distribution Detected		1.21
Selenium [ug/L]	APW-05/05R	Insufficient Data		
Selenium [ug/L]	APW-06D	Insufficient Data		
Selenium [ug/L]	APW-06S	Insufficient Data		
Selenium [ug/L]	APW-07	Insufficient Data		
Selenium [ug/L]	APW-08	Normal		14.75
Selenium [ug/L]	APW-10D	Normal		1.945
Selenium [ug/L]	APW-10S	Insufficient Data		
Sulfate [mg/L]	APW-02	Normal		469.1
Sulfate [mg/L]	APW-03	Normal		246.6
Sulfate [mg/L]	APW-05/05R	Normal		390.2
Sulfate [mg/L]	APW-06D	Normal		239.4
Sulfate [mg/L]	APW-06S	Normal		221
Sulfate [mg/L]	APW-07	Normal		63.17
Sulfate [mg/L]	APW-08	Normal		37.68
Sulfate [mg/L]	APW-10D	No Distribution Detected		42.46
Sulfate [mg/L]	APW-10S	No Distribution Detected		8.779
Thallium [ug/L]	APW-02	Insufficient Data		
Thallium [ug/L]	APW-03	Insufficient Data		
Thallium [ug/L]	APW-05/05R	Insufficient Data		
Thallium [ug/L]	APW-06D	Insufficient Data		
Thallium [ug/L]	APW-06S	Insufficient Data		
Thallium [ug/L]	APW-07	Insufficient Data		
Thallium [ug/L]	APW-08	Insufficient Data		
Thallium [ug/L]	APW-10D	Insufficient Data		
Thallium [ug/L]	APW-10S	Insufficient Data		
Turbidity, Field [NTU]	APW-02	Normal		126.7
Turbidity, Field [NTU]	APW-03	Normal		57.7
Turbidity, Field [NTU]	APW-05/05R	Normal		49.79
Turbidity, Field [NTU]	APW-06D	Normal		100.4

Table E4. Summary of Downgradient Confidence Limits
Annual Groundwater Monitoring Report
Grand Tower Energy Center

Analyte	Well	Distribution	95% LCL	95% UCL
Turbidity, Field [NTU]	APW-06S	Normal		16.26
Turbidity, Field [NTU]	APW-07	Normal		52.35
Turbidity, Field [NTU]	APW-08	Normal		193.7
Turbidity, Field [NTU]	APW-10D	Normal		139.8
Turbidity, Field [NTU]	APW-10S	Normal		55.5

Notes:

ug/L = microgram per liter

pCi/L = picocuries per liter

SU = standard units

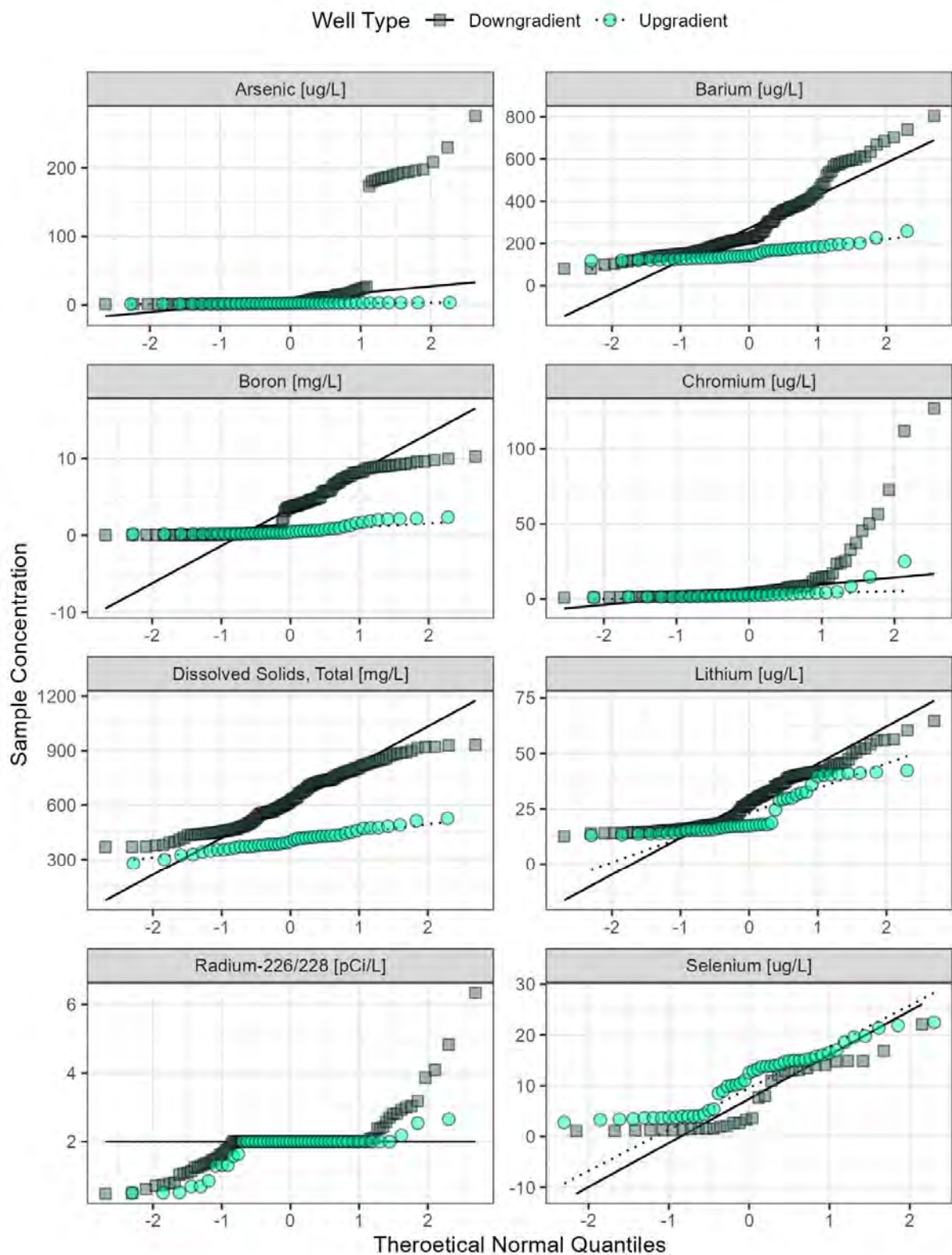
95% LCL = 95% lower confidence limit of the mean

95% UCL = 95% upper confidence limit of the mean

APPENDIX E2. FIGURES

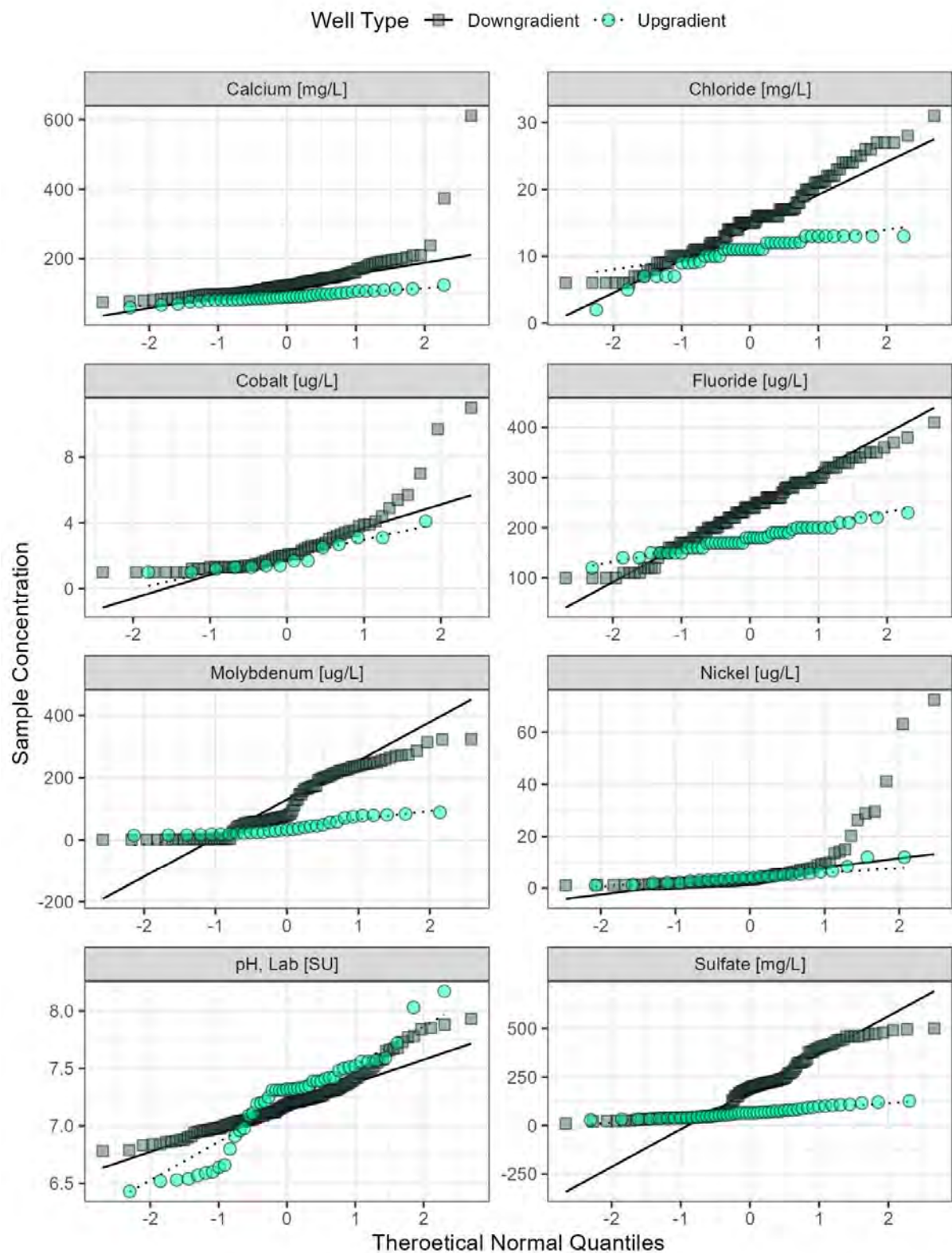


Figure E1. Summary of Analyte Detections by Well.



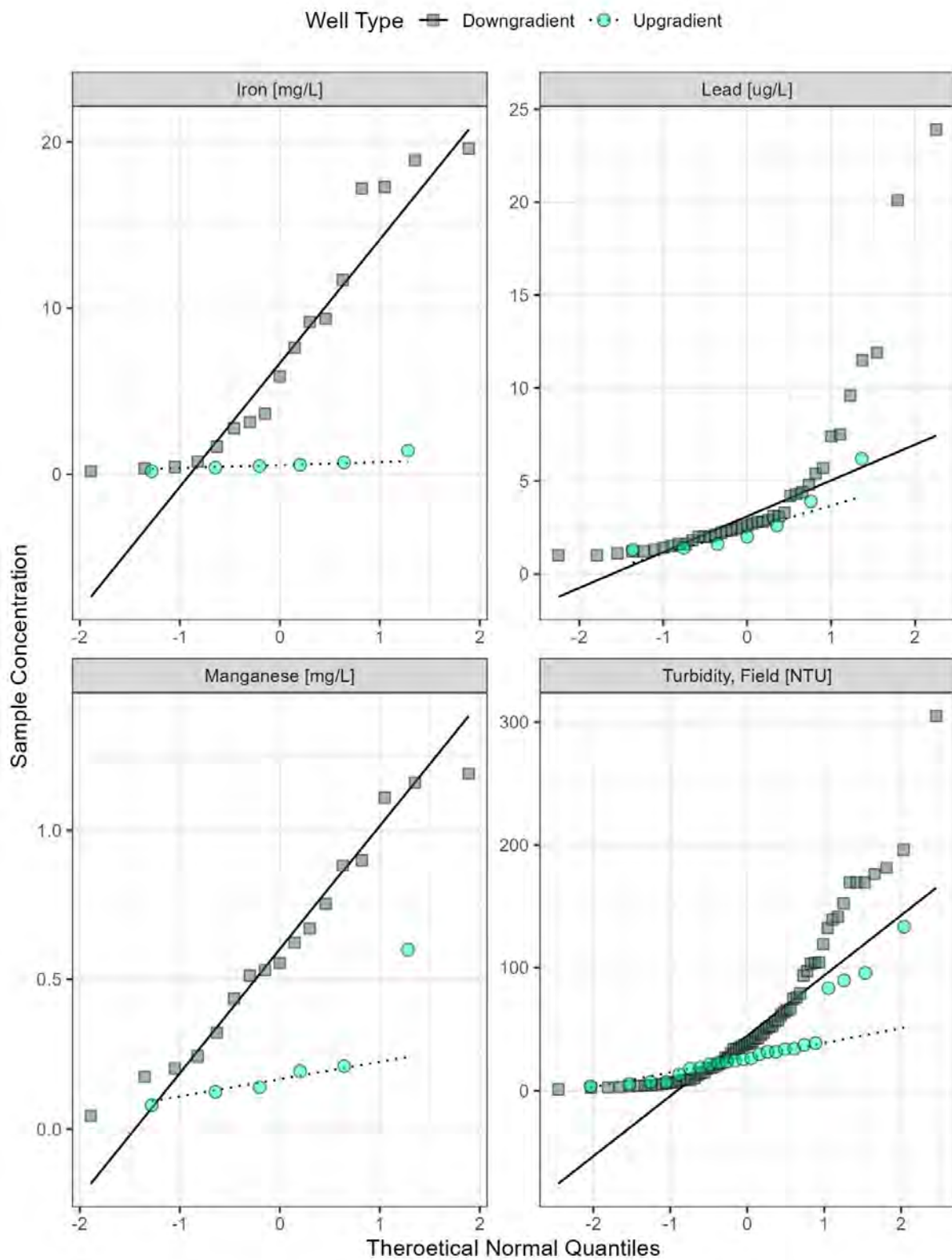
Note: This figure shows detected values only; groups with fewer than 5 detections are not shown.

Figure E2-A. Probability Plots.



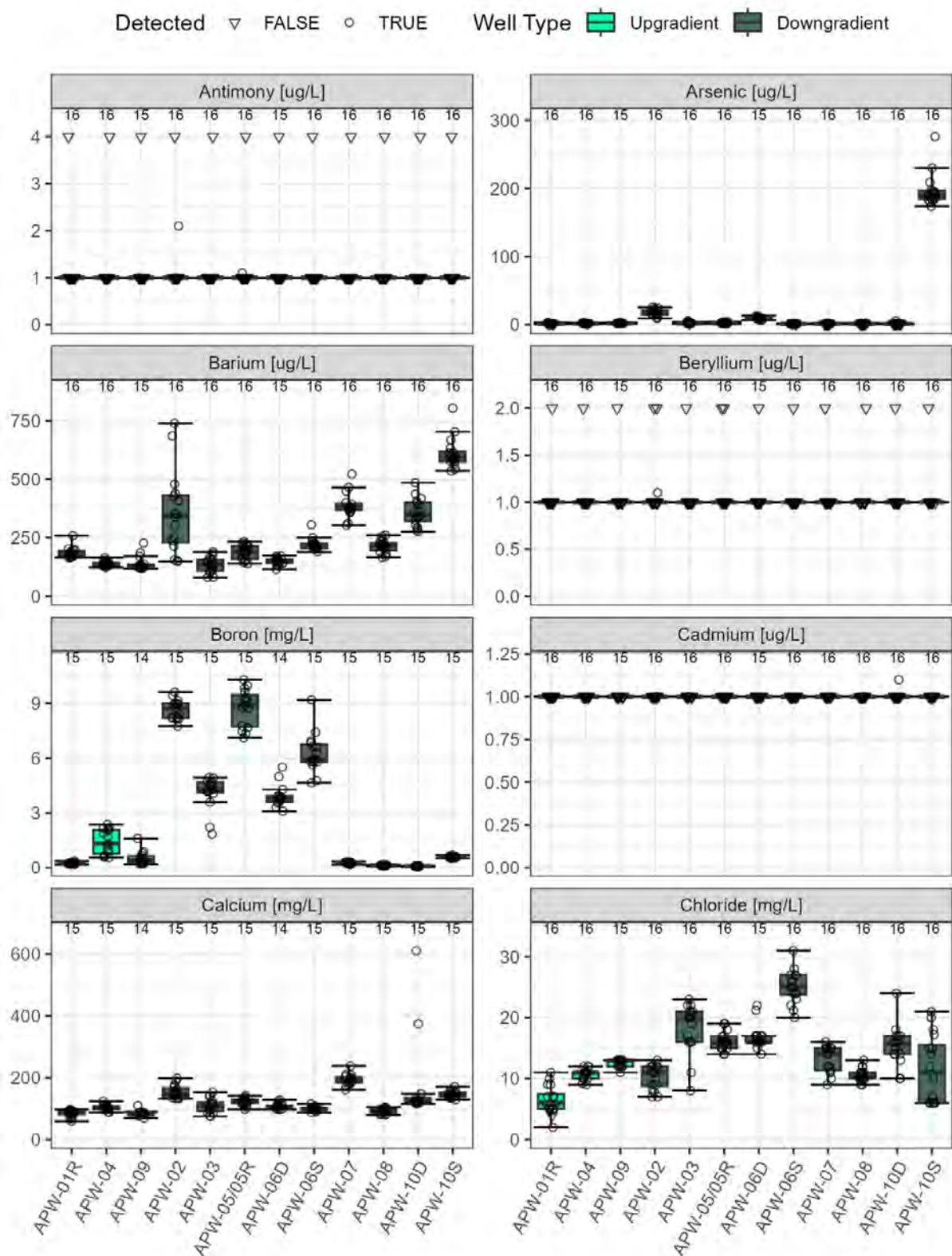
Note: This figure shows detected values only; groups with fewer than 5 detections are not shown.

Figure E2-B. Probability Plots.



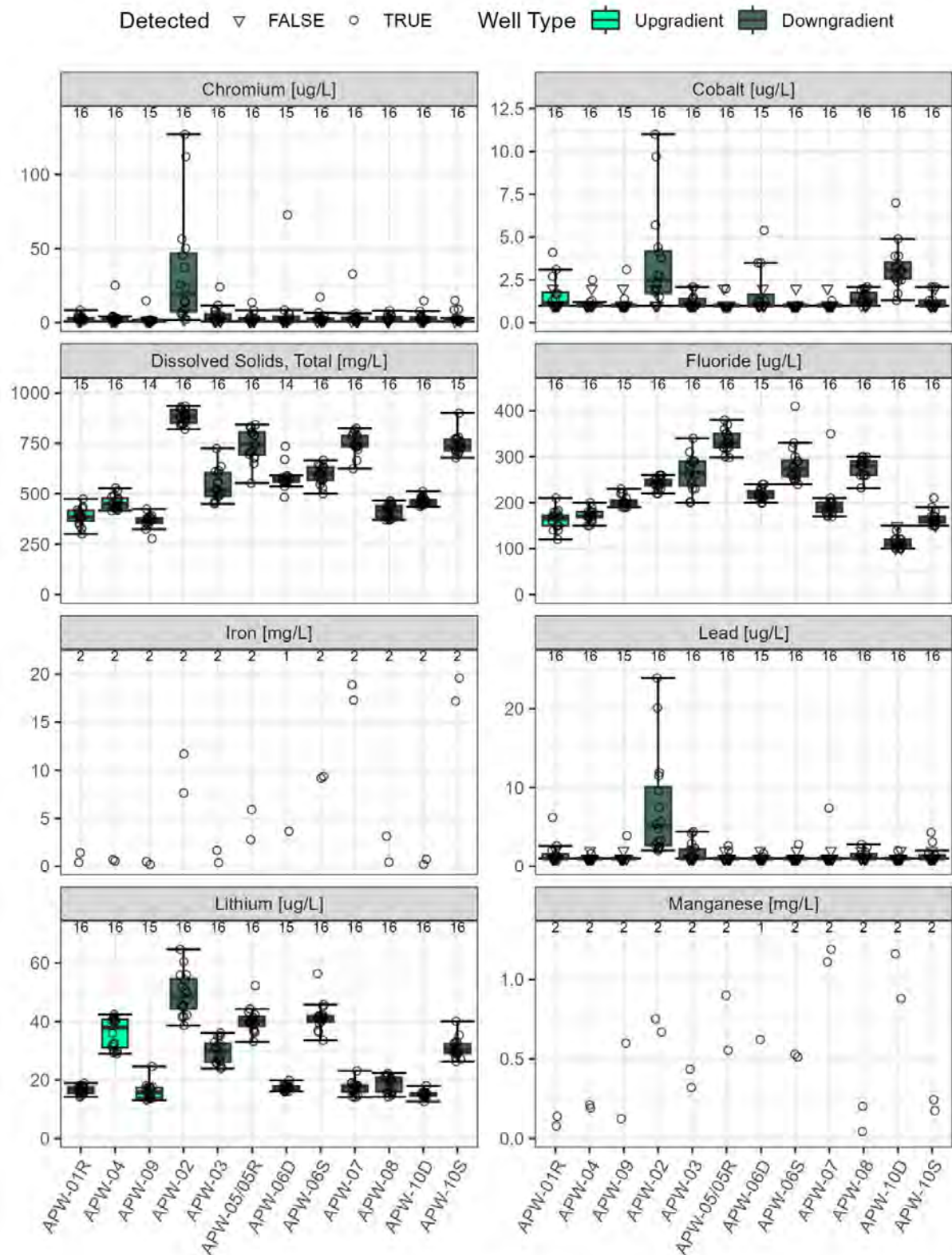
Note: This figure shows detected values only; groups with fewer than 5 detections are not shown.

Figure E2-C. Probability Plots.



Note: Values above each box indicate the number of samples

Figure E3-A. Box Plots.



Note: Values above each box indicate the number of samples

Figure E3-B. Box Plots.

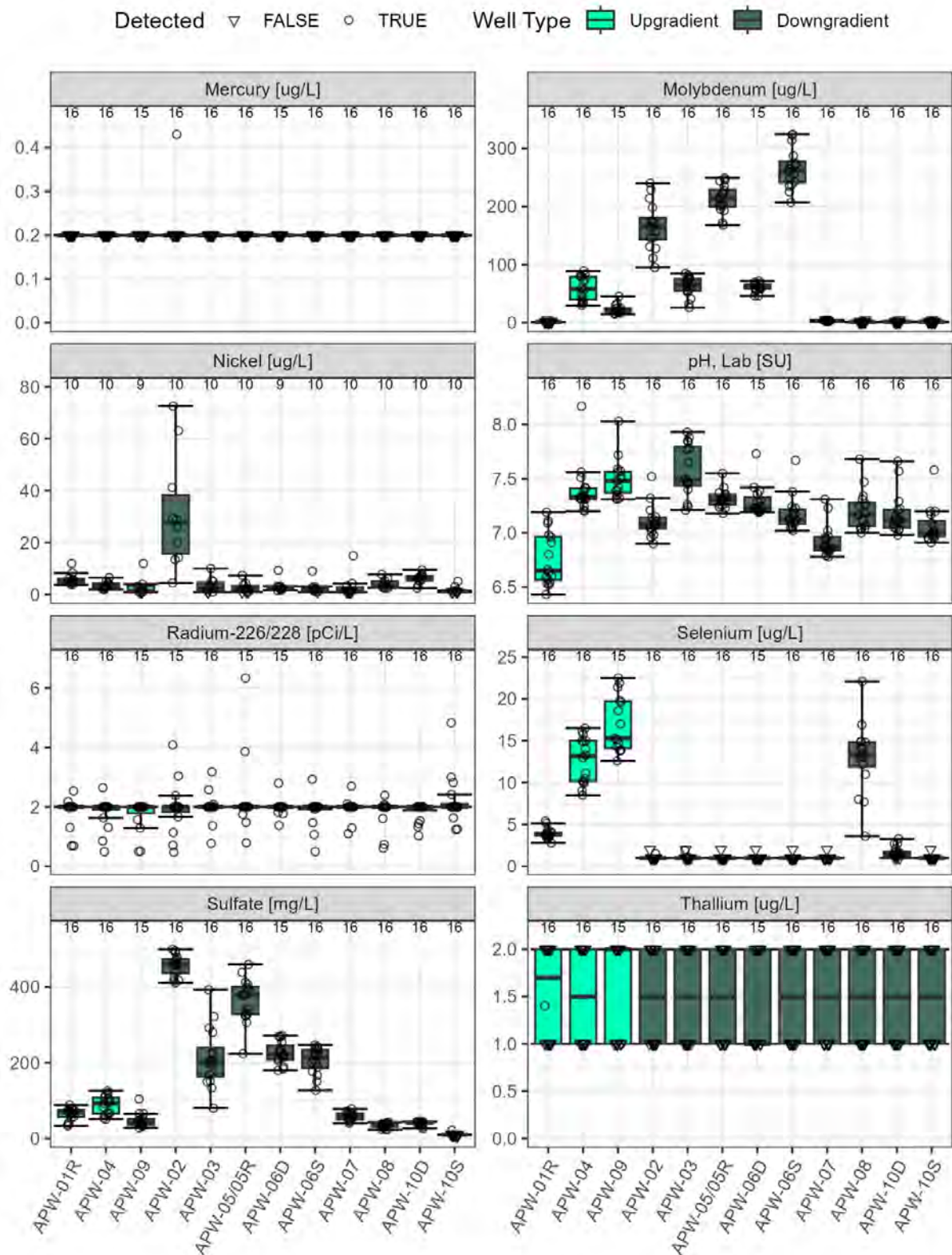


Figure E3-C. Box Plots.

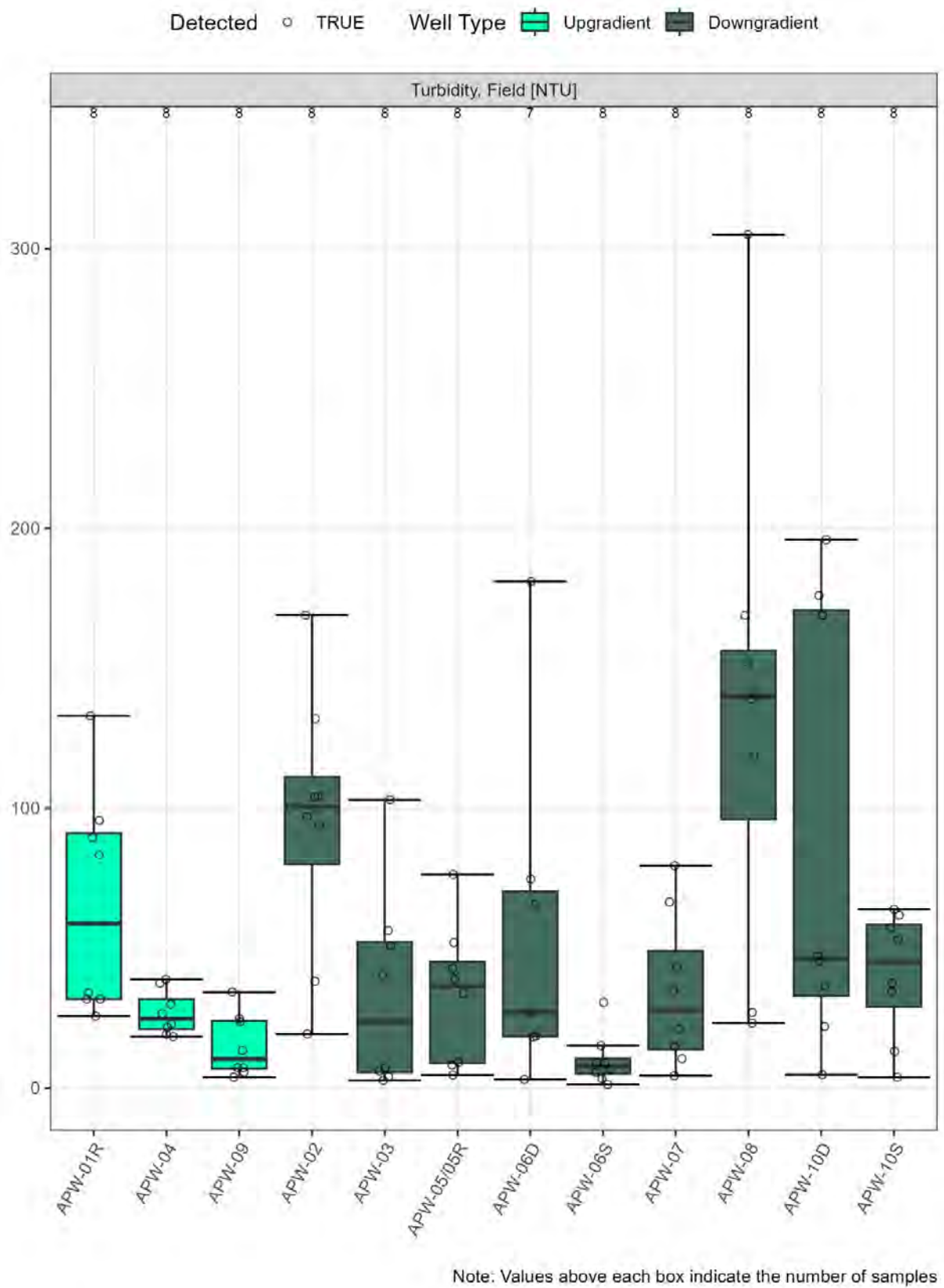


Figure E3-D. Box Plots.

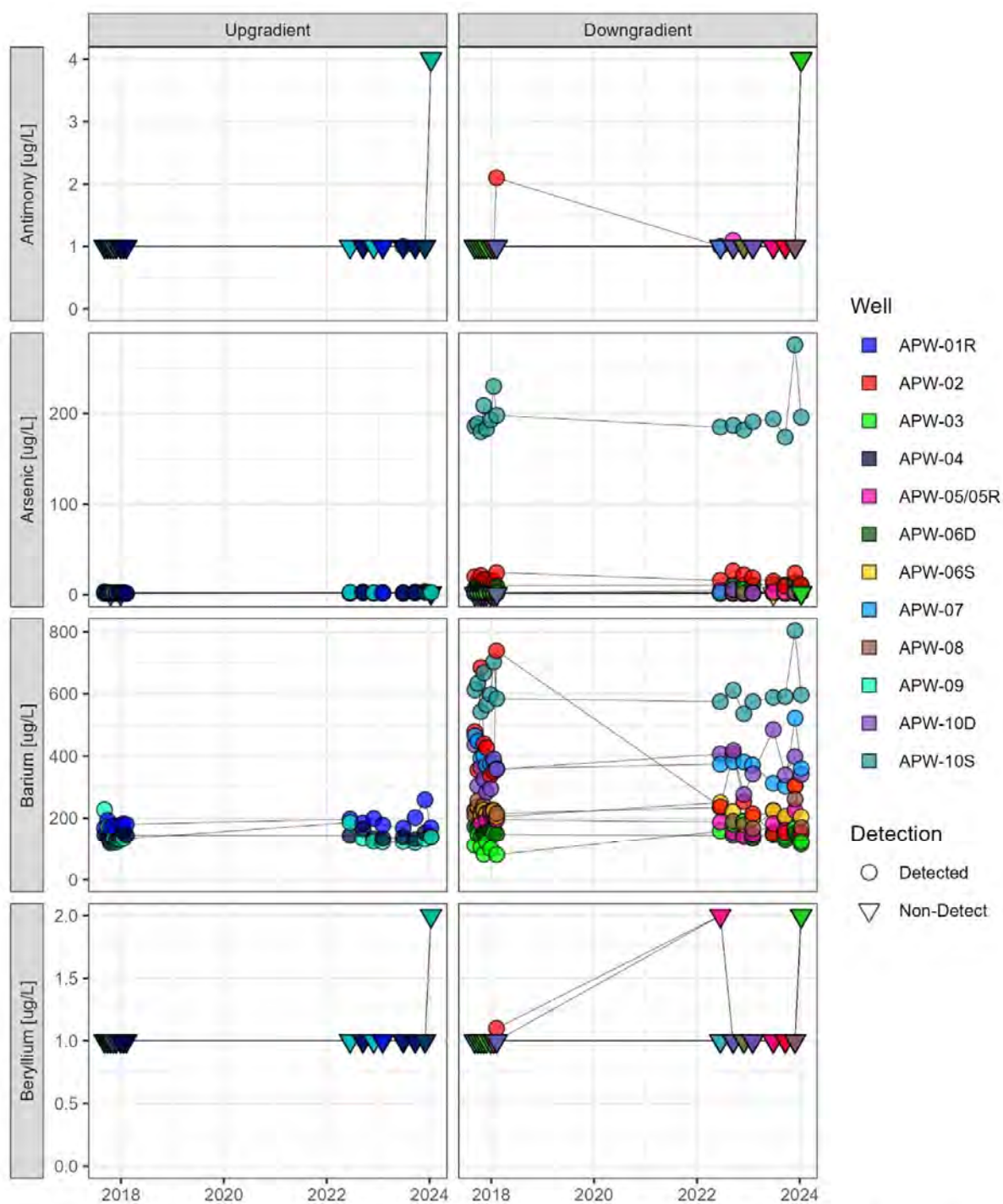
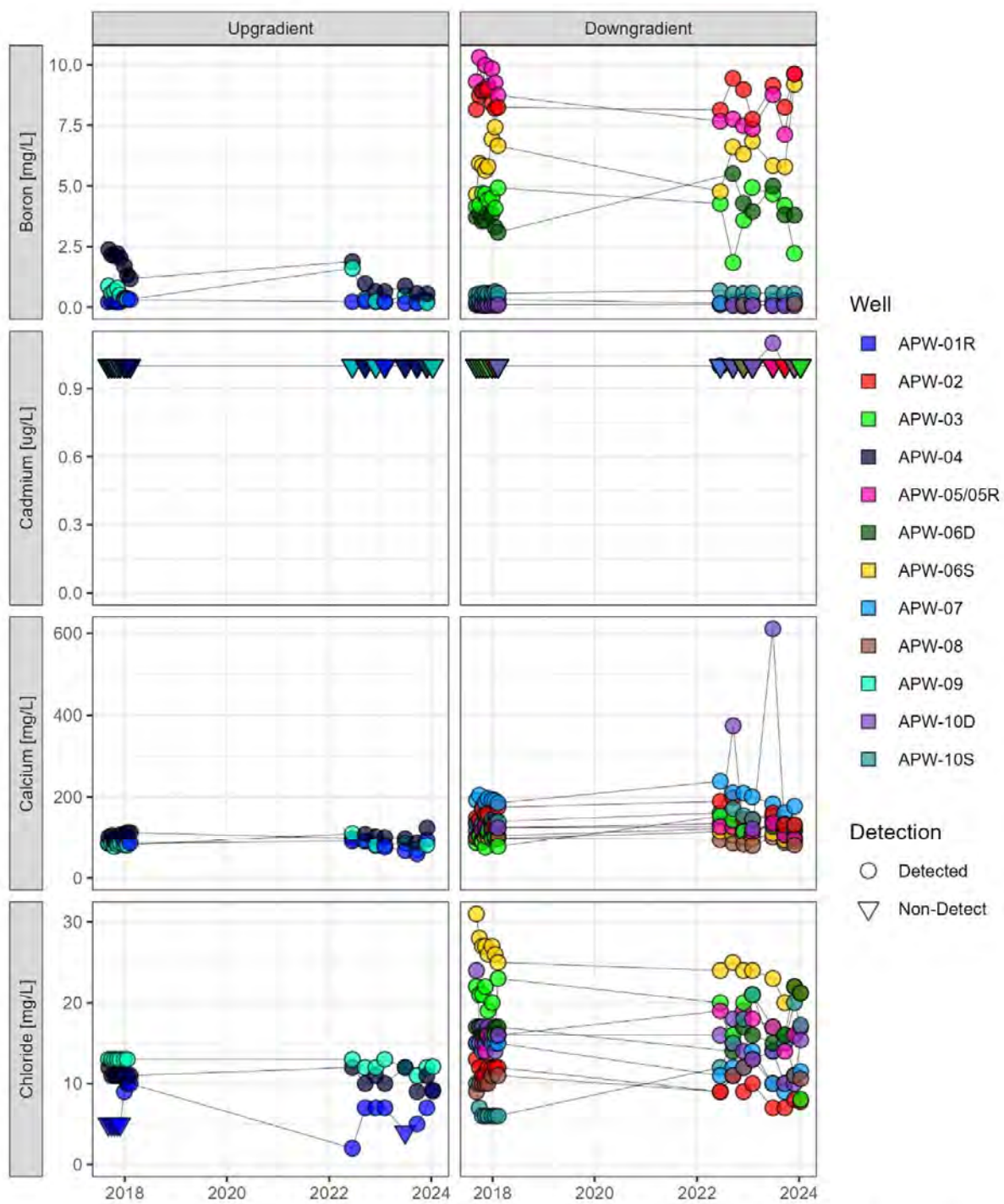
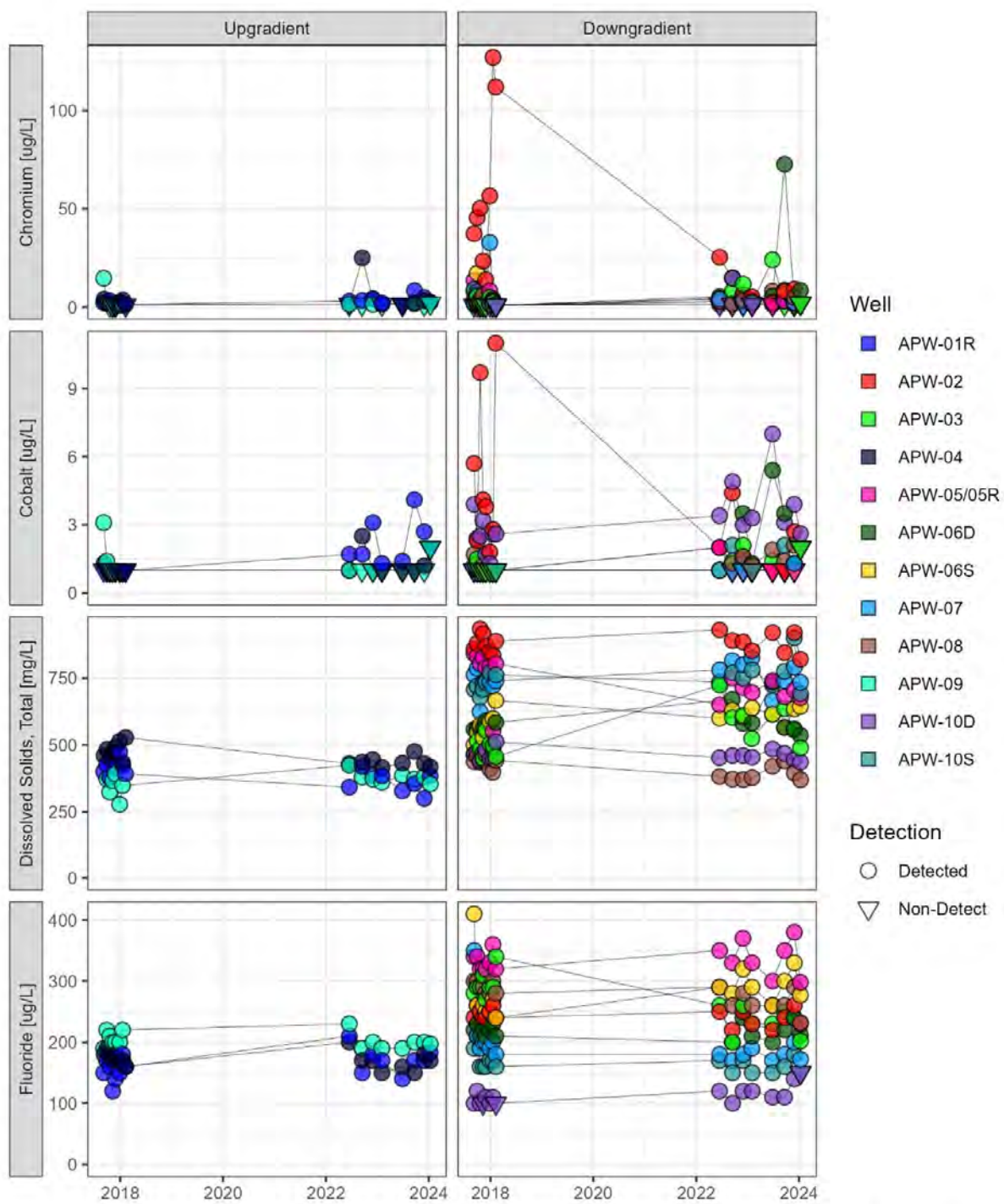


Figure E4-A. Time Series Figures.



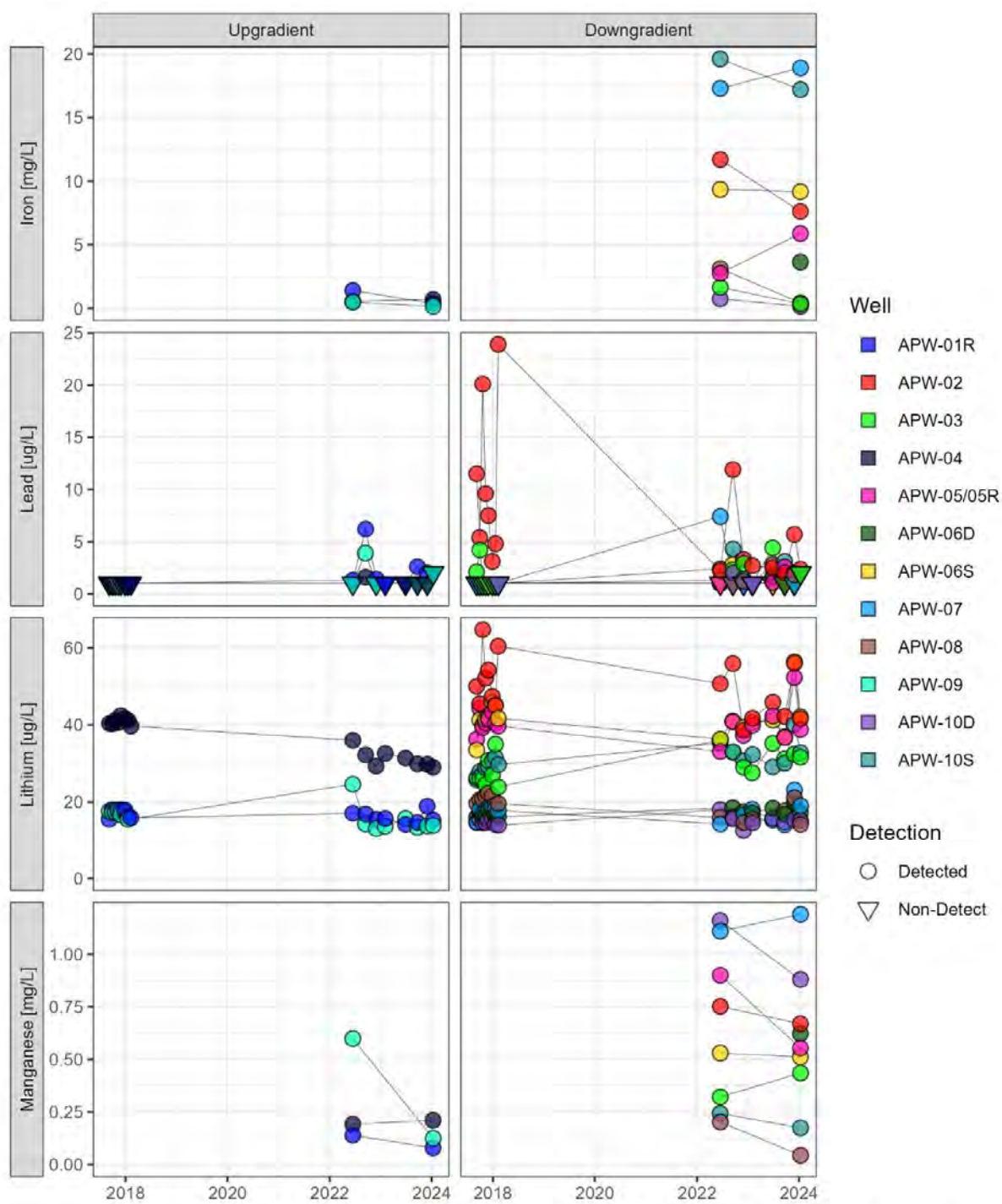
Note: Non-detects are shown at the reporting limit

Figure E4-B. Time Series Figures.



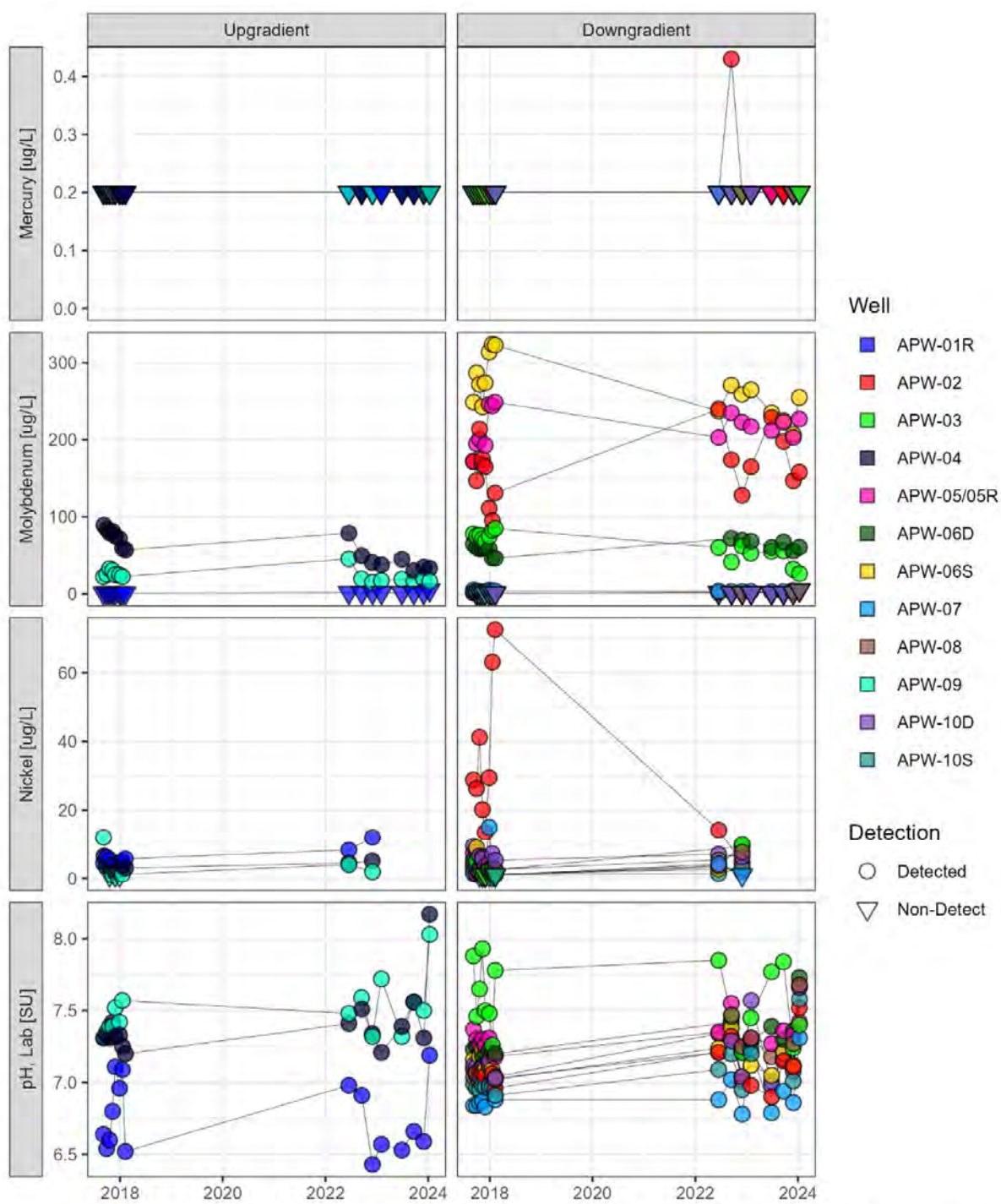
Note: Non-detects are shown at the reporting limit

Figure E4-C. Time Series Figures.



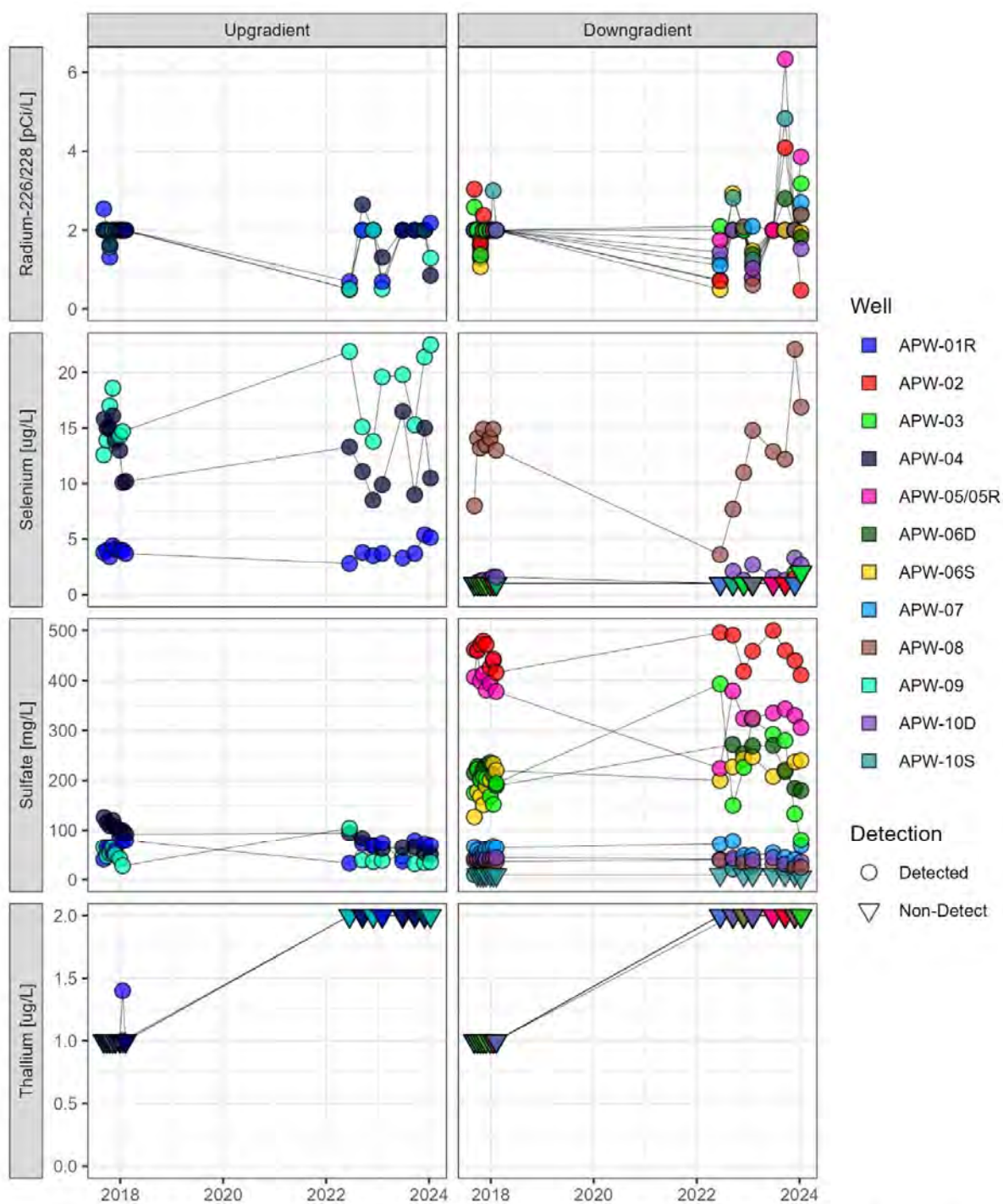
Note: Non-detects are shown at the reporting limit

Figure E4-D. Time Series Figures.



Note: Non-detects are shown at the reporting limit

Figure E4-E. Time Series Figures.



Note: Non-detects are shown at the reporting limit

Figure E4-F. Time Series Figures.

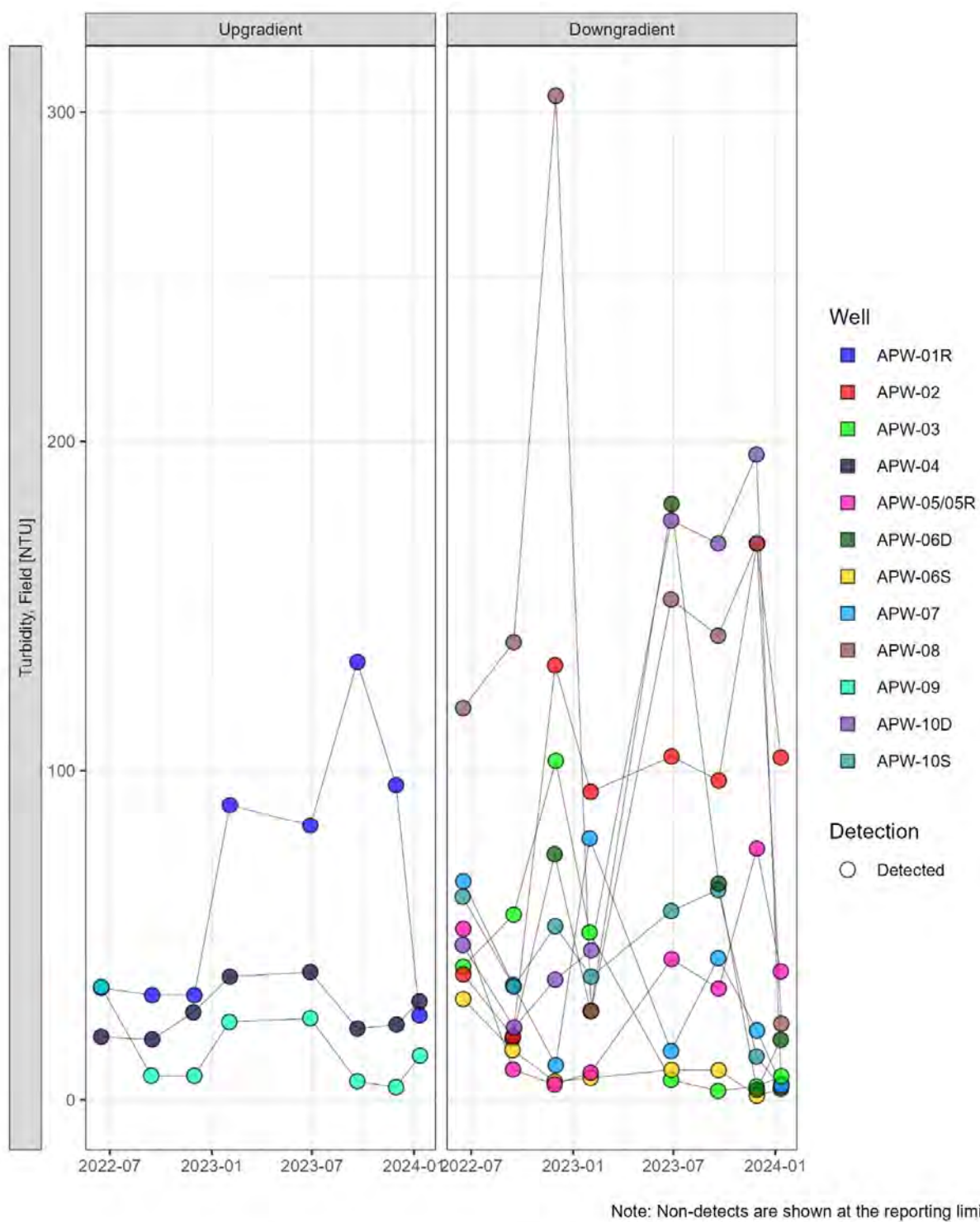


Figure E4-G. Time Series Figures.

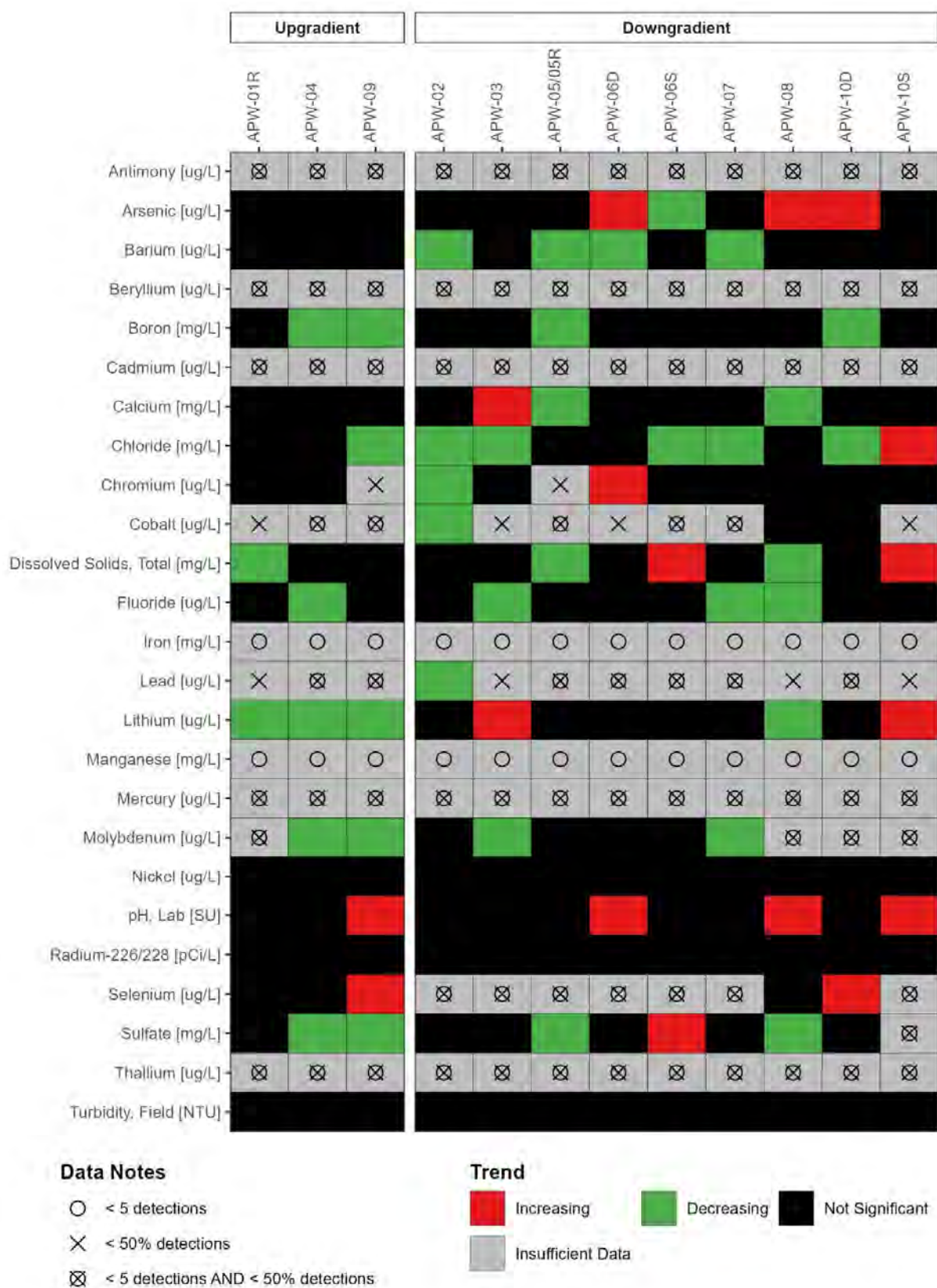


Figure E5. Trend Analysis Summary.



Note:
GWPS = Illinois Groundwater Protection Standards from Title 35, Section 845.600 of the Illinois Administrative Code

Figure E6. Summary of Background Concentration or Groundwater Protection Standard Exceedances.

APPENDIX E3. PROUCL INPUT AND OUTPUT

Background Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:33:36 PM
From File	filea1b841356b96.xls
Full Precision	OFF
Confidence Coefficient	95%
Coverage	95%
Different or Future K Observations	1
Number of Bootstrap Operations	2000

x_ols (antimony [ug/l]_interwell_pooled-upgradient)

General Statistics

Total Number of Observations	47	Number of Missing Observations	0
Number of Distinct Observations	2		
Number of Detects	1	Number of Non-Detects	46
Number of Distinct Detects	1	Number of Distinct Non-Detects	2
Minimum Detect	1	Minimum Non-Detect	1
Maximum Detect	1	Maximum Non-Detect	4
Variance Detected	N/A	Percent Non-Detects	97.87%
Mean Detected	1	SD Detected	N/A
Mean of Detected Logged Data	0	SD of Detected Logged Data	N/A

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set! It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable x_ols (antimony [ug/l]_interwell_pooled-upgradient) was not processed!

x_ols (arsenic [ug/l]_interwell_pooled-upgradient)

General Statistics

Total Number of Observations	47	Number of Missing Observations	0
Number of Distinct Observations	21		
Number of Detects	43	Number of Non-Detects	4
Number of Distinct Detects	20	Number of Distinct Non-Detects	2
Minimum Detect	1.1	Minimum Non-Detect	1
Maximum Detect	3.3	Maximum Non-Detect	2
Variance Detected	0.324	Percent Non-Detects	8.511%
Mean Detected	1.964	SD Detected	0.569
Mean of Detected Logged Data	0.633	SD of Detected Logged Data	0.296

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.074	d2max (for USL)	2.933

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.961	Shapiro Wilk GOF Test	
1% Shapiro Wilk Critical Value	0.923	Detected Data appear Normal at 1% Significance Level	
Lilliefors Test Statistic	0.0875	Lilliefors GOF Test	
1% Lilliefors Critical Value	0.156	Detected Data appear Normal at 1% Significance Level	

Detected Data appear Normal at 1% Significance Level

Kaplan Meier (KM) Background Statistics Assuming Normal Distribution

KM Mean	1.902	KM SD	0.583
95% UTL95% Coverage	3.11	95% KM UPL (t)	2.89
90% KM Percentile (z)	2.649	95% KM Percentile (z)	2.86
99% KM Percentile (z)	3.257	95% KM USL	3.611

DL/2 Substitution Background Statistics Assuming Normal Distribution

Mean	1.861	SD	0.647
95% UTL95% Coverage	3.203	95% UPL (t)	2.958
90% Percentile (z)	2.69	95% Percentile (z)	2.925

Background Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:33:36 PM
From File	filea1b841356b96.xls
Full Precision	OFF
Confidence Coefficient	95%
Coverage	95%
Different or Future K Observations	1
Number of Bootstrap Operations	2000

99% Percentile (z)	3.366	95% USL	3.758

DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.258	Anderson-Darling GOF Test
5% A-D Critical Value	0.748	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.0718	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.135	Detected data appear Gamma Distributed at 5% Significance Level
Detected data appear Gamma Distributed at 5% Significance Level		

Gamma Statistics on Detected Data Only

k hat (MLE)	12.09	k star (bias corrected MLE)	11.26
Theta hat (MLE)	0.162	Theta star (bias corrected MLE)	0.174
nu hat (MLE)	1040	nu star (bias corrected)	968.8
MLE Mean (bias corrected)	1.964		
MLE Sd (bias corrected)	0.585	95% Percentile of Chisquare (2kstar)	34.59

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
For such situations, GROS method may yield incorrect values of UCLs and BTVs
This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.767	Mean	1.895
Maximum	3.3	Median	1.9
SD	0.599	CV	0.316
k hat (MLE)	9.816	k star (bias corrected MLE)	9.204
Theta hat (MLE)	0.193	Theta star (bias corrected MLE)	0.206
nu hat (MLE)	922.7	nu star (bias corrected)	865.2
MLE Mean (bias corrected)	1.895	MLE Sd (bias corrected)	0.625
95% Percentile of Chisquare (2kstar)	29.39	90% Percentile	2.727
95% Percentile	3.026	99% Percentile	3.642

The following statistics are computed using Gamma ROS Statistics on Imputed Data

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	3.372	3.418	95% Approx. Gamma UPL	3.045	3.07
95% Gamma USL	4.204	4.318			

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	1.902	SD (KM)	0.583
Variance (KM)	0.339	SE of Mean (KM)	0.0865
k hat (KM)	10.66	k star (KM)	9.995
nu hat (KM)	1002	nu star (KM)	939.5
theta hat (KM)	0.178	theta star (KM)	0.19
80% gamma percentile (KM)	2.381	90% gamma percentile (KM)	2.702
95% gamma percentile (KM)	2.988	99% gamma percentile (KM)	3.573

The following statistics are computed using gamma distribution and KM estimates

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	3.307	3.344	95% Approx. Gamma UPL	2.998	3.017
95% KM Gamma Percentile	2.957	2.975	95% Gamma USL	4.09	4.185

Background Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:33:36 PM
From File	filea1b841356b96.xls
Full Precision	OFF
Confidence Coefficient	95%
Coverage	95%
Different or Future K Observations	1
Number of Bootstrap Operations	2000

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.963	Shapiro Wilk GOF Test
10% Shapiro Wilk Critical Value	0.951	Detected Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.0756	Lilliefors GOF Test
10% Lilliefors Critical Value	0.123	Detected Data appear Lognormal at 10% Significance Level

Detected Data appear Lognormal at 10% Significance Level

Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects

Mean in Original Scale	1.899	Mean in Log Scale	0.592
SD in Original Scale	0.592	SD in Log Scale	0.322
95% UTL95% Coverage	3.526	95% BCA UTL95% Coverage	3.1
95% Bootstrap (%) UTL95% Coverage	3.24	95% UPL (t)	3.122
90% Percentile (z)	2.732	95% Percentile (z)	3.071
99% Percentile (z)	3.825	95% USL	4.65

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean of Logged Data	0.595	95% KM UTL (Lognormal)95% Coverage	3.479
KM SD of Logged Data	0.314	95% KM UPL (Lognormal)	3.09
95% KM Percentile Lognormal (z)	3.04	95% KM USL (Lognormal)	4.557

Background DL/2 Statistics Assuming Lognormal Distribution

Mean in Original Scale	1.861	Mean in Log Scale	0.55
SD in Original Scale	0.647	SD in Log Scale	0.408
95% UTL95% Coverage	4.042	95% UPL (t)	3.465
90% Percentile (z)	2.924	95% Percentile (z)	3.392
99% Percentile (z)	4.481	95% USL	5.74

DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.

Nonparametric Distribution Free Background Statistics

Data appear to follow a Discernible Distribution

Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)

Order of Statistic, r	47	95% UTL with95% Coverage	3.3
Approx, f used to compute achieved CC	2.474	Approximate Actual Confidence Coefficient achieved by UTL	0.91
Approximate Sample Size needed to achieve specified CC	59	95% UPL	3.02
95% USL	3.3	95% KM Chebyshev UPL	4.468

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.

Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers and consists of observations collected from clean unimpacted locations.

The use of USL tends to provide a balance between false positives and false negatives provided the data represents a background data set and when many onsite observations need to be compared with the BTV.

x_ols (barium [ug/l]_interwell_pooled-upgradient)

General Statistics

Total Number of Observations	47	Number of Distinct Observations	36
Minimum	118	First Quartile	132
Second Largest	227	Median	144
Maximum	259	Third Quartile	177
Mean	155.8	SD	31.03
Coefficient of Variation	0.199	Skewness	1.092
Mean of logged Data	5.031	SD of logged Data	0.187

Background Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:33:36 PM
From File	filea1b841356b96.xls
Full Precision	OFF
Confidence Coefficient	95%
Coverage	95%
Different or Future K Observations	1
Number of Bootstrap Operations	2000

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.074	d2max (for USL)	2.933

Normal GOF Test

Shapiro Wilk Test Statistic	0.898	Shapiro Wilk GOF Test
1% Shapiro Wilk Critical Value	0.928	Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.168	Lilliefors GOF Test
1% Lilliefors Critical Value	0.15	Data Not Normal at 1% Significance Level

Data Not Normal at 1% Significance Level

Background Statistics Assuming Normal Distribution

95% UTL with 95% Coverage	220.1	90% Percentile (z)	195.5
95% UPL (t)	208.4	95% Percentile (z)	206.8
95% USL	246.8	99% Percentile (z)	228

Gamma GOF Test

A-D Test Statistic	1.145	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.748	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.155	Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value	0.129	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	28.19	k star (bias corrected MLE)	26.4
Theta hat (MLE)	5.526	Theta star (bias corrected MLE)	5.9
nu hat (MLE)	2650	nu star (bias corrected)	2482
MLE Mean (bias corrected)	155.8	MLE Sd (bias corrected)	30.31

Background Statistics Assuming Gamma Distribution

95% Wilson Hilferty (WH) Approx. Gamma UPL	209.4	90% Percentile	195.7
95% Hawkins Wixley (HW) Approx. Gamma UPL	209.6	95% Percentile	208.8
95% WH Approx. Gamma UTL with 95% Coverage	223.3	99% Percentile	234.8
95% HW Approx. Gamma UTL with 95% Coverage	223.9		
95% WH USL	257.3	95% HW USL	259.1

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.929	Shapiro Wilk Lognormal GOF Test
10% Shapiro Wilk Critical Value	0.954	Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.145	Lilliefors Lognormal GOF Test
10% Lilliefors Critical Value	0.118	Data Not Lognormal at 10% Significance Level

Data Not Lognormal at 10% Significance Level

Background Statistics assuming Lognormal Distribution

95% UTL with 95% Coverage	225.7	90% Percentile (z)	194.6
95% UPL (t)	210.3	95% Percentile (z)	208.3
95% USL	265.1	99% Percentile (z)	236.6

Nonparametric Distribution Free Background Statistics

Data do not follow a Discernible Distribution

Nonparametric Upper Limits for Background Threshold Values

Order of Statistic, order	47	95% UTL with 95% Coverage	259

Background Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:33:36 PM
 From File filea1b841356b96.xls
 Full Precision OFF
 Confidence Coefficient 95%
 Coverage 95%
 Different or Future K Observations 1
 Number of Bootstrap Operations 2000

Approx, f used to compute achieved CC	2.474	Approximate Actual Confidence Coefficient achieved by UTL	0.91
		Approximate Sample Size needed to achieve specified CC	59
95% Percentile Bootstrap UTL with 95% Coverage	249.4	95% BCA Bootstrap UTL with 95% Coverage	241.9
95% UPL	217	90% Percentile	194.6
90% Chebyshev UPL	249.9	95% Percentile	201.1
95% Chebyshev UPL	292.5	99% Percentile	244.3
95% USL	259		

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20. Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers and consists of observations collected from clean unimpacted locations.

The use of USL tends to provide a balance between false positives and false negatives provided the data represents a background data set and when many onsite observations need to be compared with the BTV.

x_ols (beryllium [ug/l]_interwell_pooled-upgradient)

General Statistics

Total Number of Observations	47	Number of Missing Observations	0
Number of Distinct Observations	2		
Number of Detects	0	Number of Non-Detects	47
Number of Distinct Detects	0	Number of Distinct Non-Detects	2
Minimum Detect	N/A	Minimum Non-Detect	1
Maximum Detect	N/A	Maximum Non-Detect	2
Variance Detected	N/A	Percent Non-Detects	100%
Mean Detected	N/A	SD Detected	N/A
Mean of Detected Logged Data	N/A	SD of Detected Logged Data	N/A

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
 Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
 The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable x_ols (beryllium [ug/l]_interwell_pooled-upgradient) was not processed!

x_ols (boron [mg/l]_interwell_pooled-upgradient)

General Statistics

Total Number of Observations	44	Number of Distinct Observations	44
Minimum	0.025	First Quartile	0.216
Second Largest	1.562	Median	0.309
Maximum	1.586	Third Quartile	0.567
Mean	0.455	SD	0.358
Coefficient of Variation	0.787	Skewness	1.662
Mean of logged Data	-1.057	SD of logged Data	0.77

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.091	d2max (for USL)	2.906

Normal GOF Test

Shapiro Wilk Test Statistic	0.811
1% Shapiro Wilk Critical Value	0.924
Lilliefors Test Statistic	0.19
1% Lilliefors Critical Value	0.154

Shapiro Wilk GOF Test

Data Not Normal at 1% Significance Level

Lilliefors GOF Test

Data Not Normal at 1% Significance Level

Background Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:33:36 PM
From File	filea1b841356b96.xls
Full Precision	OFF
Confidence Coefficient	95%
Coverage	95%
Different or Future K Observations	1
Number of Bootstrap Operations	2000

Data Not Normal at 1% Significance Level

Background Statistics Assuming Normal Distribution

95% UTL with 95% Coverage	1.205	90% Percentile (z)	0.915
95% UPL (t)	1.065	95% Percentile (z)	1.045
95% USL	1.497	99% Percentile (z)	1.289

Gamma GOF Test

A-D Test Statistic	1.061
5% A-D Critical Value	0.76
K-S Test Statistic	0.134
5% K-S Critical Value	0.135

Anderson-Darling Gamma GOF Test

Data Not Gamma Distributed at 5% Significance Level

Kolmogorov-Smirnov Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

Detected data follow Appr. Gamma Distribution at 5% Significance Level

Gamma Statistics

k hat (MLE)	2.001	k star (bias corrected MLE)	1.88
Theta hat (MLE)	0.228	Theta star (bias corrected MLE)	0.242
nu hat (MLE)	176.1	nu star (bias corrected)	165.4
MLE Mean (bias corrected)	0.455	MLE Sd (bias corrected)	0.332

Background Statistics Assuming Gamma Distribution

95% Wilson Hilferty (WH) Approx. Gamma UPL	1.109	90% Percentile	0.899
95% Hawkins Wixley (HW) Approx. Gamma UPL	1.133	95% Percentile	1.102
95% WH Approx. Gamma UTL with 95% Coverage	1.354	99% Percentile	1.553
95% HW Approx. Gamma UTL with 95% Coverage	1.408		
95% WH USL	1.976	95% HW USL	2.14

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.944
10% Shapiro Wilk Critical Value	0.952
Lilliefors Test Statistic	0.115
10% Lilliefors Critical Value	0.122

Shapiro Wilk Lognormal GOF Test

Data Not Lognormal at 10% Significance Level

Lilliefors Lognormal GOF Test

Data appear Lognormal at 10% Significance Level

Data appear Approximate Lognormal at 10% Significance Level

Background Statistics assuming Lognormal Distribution

95% UTL with 95% Coverage	1.739	90% Percentile (z)	0.932
95% UPL (t)	1.287	95% Percentile (z)	1.233
95% USL	3.258	99% Percentile (z)	2.084

Nonparametric Distribution Free Background Statistics

Data appear Approximate Gamma Distribution at 5% Significance Level

Nonparametric Upper Limits for Background Threshold Values

Order of Statistic, order	44	95% UTL with 95% Coverage	1.586
Approx, f used to compute achieved CC	2.316	Approximate Actual Confidence Coefficient achieved by UTL	0.895
		Approximate Sample Size needed to achieve specified CC	59
95% Percentile Bootstrap UTL with 95% Coverage	1.583	95% BCA Bootstrap UTL with 95% Coverage	1.562
95% UPL	1.451	90% Percentile	0.91
90% Chebyshev UPL	1.543	95% Percentile	1.098
95% Chebyshev UPL	2.036	99% Percentile	1.576
95% USL	1.586		

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.

Background Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:33:36 PM
From File	filea1b841356b96.xls
Full Precision	OFF
Confidence Coefficient	95%
Coverage	95%
Different or Future K Observations	1
Number of Bootstrap Operations	2000

Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers and consists of observations collected from clean unimpacted locations.

The use of USL tends to provide a balance between false positives and false negatives provided the data represents a background data set and when many onsite observations need to be compared with the BTV.

x_ols (cadmium [ug/l]_interwell_pooled-upgradient)

General Statistics

Total Number of Observations	47	Number of Missing Observations	0
Number of Distinct Observations	1		
Number of Detects	0	Number of Non-Detects	47
Number of Distinct Detects	0	Number of Distinct Non-Detects	1
Minimum Detect	N/A	Minimum Non-Detect	1
Maximum Detect	N/A	Maximum Non-Detect	1
Variance Detected	N/A	Percent Non-Detects	100%
Mean Detected	N/A	SD Detected	N/A
Mean of Detected Logged Data	N/A	SD of Detected Logged Data	N/A

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable x_ols (cadmium [ug/l]_interwell_pooled-upgradient) was not processed!

x_ols (calcium [mg/l]_interwell_pooled-upgradient)

General Statistics

Total Number of Observations	44	Number of Distinct Observations	40
Minimum	59.2	First Quartile	81.8
Second Largest	113	Median	89.45
Maximum	124	Third Quartile	98.35
Mean	90.88	SD	13.09
Coefficient of Variation	0.144	Skewness	0.162
Mean of logged Data	4.499	SD of logged Data	0.146

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.091	d2max (for USL)	2.906

Normal GOF Test

Shapiro Wilk Test Statistic	0.986
1% Shapiro Wilk Critical Value	0.924
Lilliefors Test Statistic	0.0978
1% Lilliefors Critical Value	0.154

Shapiro Wilk GOF Test

Data appear Normal at 1% Significance Level

Lilliefors GOF Test

Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Background Statistics Assuming Normal Distribution

95% UTL with 95% Coverage	118.3	90% Percentile (z)	107.7
95% UPL (t)	113.1	95% Percentile (z)	112.4
95% USL	128.9	99% Percentile (z)	121.3

Gamma GOF Test

A-D Test Statistic	0.267

Anderson-Darling Gamma GOF Test

Background Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:33:36 PM
 From File filea1b841356b96.xls
 Full Precision OFF
 Confidence Coefficient 95%
 Coverage 95%
 Different or Future K Observations 1
 Number of Bootstrap Operations 2000

5% A-D Critical Value 0.747 Detected data appear Gamma Distributed at 5% Significance Level
 K-S Test Statistic 0.0849 **Kolmogorov-Smirnov Gamma GOF Test**
 5% K-S Critical Value 0.133 Detected data appear Gamma Distributed at 5% Significance Level
Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	48.58	k star (bias corrected MLE)	45.28
Theta hat (MLE)	1.871	Theta star (bias corrected MLE)	2.007
nu hat (MLE)	4275	nu star (bias corrected)	3985
MLE Mean (bias corrected)	90.88	MLE Sd (bias corrected)	13.51

Background Statistics Assuming Gamma Distribution

95% Wilson Hilferty (WH) Approx. Gamma UPL	114.5	90% Percentile	108.6
95% Hawkins Wixley (HW) Approx. Gamma UPL	114.7	95% Percentile	114.2
95% WH Approx. Gamma UTL with 95% Coverage	120.6	99% Percentile	125.2
95% HW Approx. Gamma UTL with 95% Coverage	121		
95% WH USL	134	95% HW USL	134.9

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.982	Shapiro Wilk Lognormal GOF Test
10% Shapiro Wilk Critical Value	0.952	Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.0909	Lilliefors Lognormal GOF Test
10% Lilliefors Critical Value	0.122	Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Background Statistics assuming Lognormal Distribution

95% UTL with 95% Coverage	122.2	90% Percentile (z)	108.5
95% UPL (t)	115.4	95% Percentile (z)	114.5
95% USL	137.7	99% Percentile (z)	126.5

Nonparametric Distribution Free Background Statistics

Data appear Normal at 1% Significance Level

Nonparametric Upper Limits for Background Threshold Values

Order of Statistic, order	44	95% UTL with 95% Coverage	124
Approx, f used to compute achieved CC	2.316	Approximate Actual Confidence Coefficient achieved by UTL	0.895
		Approximate Sample Size needed to achieve specified CC	59
95% Percentile Bootstrap UTL with 95% Coverage	122.4	95% BCA Bootstrap UTL with 95% Coverage	122.4
95% UPL	113	90% Percentile	107.7
90% Chebyshev UPL	130.6	95% Percentile	112.6
95% Chebyshev UPL	148.6	99% Percentile	119.3
95% USL	124		

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20. Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers and consists of observations collected from clean unperturbed locations.

The use of USL tends to provide a balance between false positives and false negatives provided the data represents a background data set and when many onsite observations need to be compared with the BTV.

x_ols (chloride [mg/l]_interwell_pooled-upgradient)

General Statistics

Total Number of Observations	47	Number of Missing Observations	0

Background Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:33:36 PM
 From File filea1b841356b96.xls
 Full Precision OFF
 Confidence Coefficient 95%
 Coverage 95%
 Different or Future K Observations 1
 Number of Bootstrap Operations 2000

Number of Distinct Observations	25		
Number of Detects	41	Number of Non-Detects	6
Number of Distinct Detects	24	Number of Distinct Non-Detects	2
Minimum Detect	2	Minimum Non-Detect	4
Maximum Detect	12.84	Maximum Non-Detect	5
Variance Detected	5.126	Percent Non-Detects	12.77%
Mean Detected	10.39	SD Detected	2.264
Mean of Detected Logged Data	2.303	SD of Detected Logged Data	0.328

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.074	d2max (for USL)	2.933

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.79		
1% Shapiro Wilk Critical Value	0.92	Shapiro Wilk GOF Test	
Lilliefors Test Statistic	0.255	Data Not Normal at 1% Significance Level	
1% Lilliefors Critical Value	0.16	Lilliefors GOF Test	
		Data Not Normal at 1% Significance Level	

Data Not Normal at 1% Significance Level

Kaplan Meier (KM) Background Statistics Assuming Normal Distribution

KM Mean	9.322	KM SD	3.494
95% UTL95% Coverage	16.57	95% KM UPL (t)	15.25
90% KM Percentile (z)	13.8	95% KM Percentile (z)	15.07
99% KM Percentile (z)	17.45	95% KM USL	19.57

DL/2 Substitution Background Statistics Assuming Normal Distribution

Mean	9.375	SD	3.421
95% UTL95% Coverage	16.47	95% UPL (t)	15.18
90% Percentile (z)	13.76	95% Percentile (z)	15
99% Percentile (z)	17.33	95% USL	19.41

DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	4.066		
5% A-D Critical Value	0.748	Anderson-Darling GOF Test	
K-S Test Statistic	0.269	Data Not Gamma Distributed at 5% Significance Level	
5% K-S Critical Value	0.138	Kolmogorov-Smirnov GOF	
		Data Not Gamma Distributed at 5% Significance Level	

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	13.11	k star (bias corrected MLE)	12.17
Theta hat (MLE)	0.793	Theta star (bias corrected MLE)	0.854
nu hat (MLE)	1075	nu star (bias corrected)	997.6
MLE Mean (bias corrected)	10.39		
MLE Sd (bias corrected)	2.98	95% Percentile of Chisquare (2kstar)	36.83

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
 GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	2	Mean	9.965

Background Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:33:36 PM
From File	filea1b841356b96.xls
Full Precision	OFF
Confidence Coefficient	95%
Coverage	95%
Different or Future K Observations	1
Number of Bootstrap Operations	2000

Maximum	12.84	Median	11
SD	2.401	CV	0.241
k hat (MLE)	12.18	k star (bias corrected MLE)	11.41
Theta hat (MLE)	0.818	Theta star (bias corrected MLE)	0.873
nu hat (MLE)	1145	nu star (bias corrected)	1073
MLE Mean (bias corrected)	9.965	MLE Sd (bias corrected)	2.95
95% Percentile of Chisquare (2kstar)	34.95	90% Percentile	13.88
95% Percentile	15.26	99% Percentile	18.07

The following statistics are computed using Gamma ROS Statistics on Imputed Data

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	16.81	17.22	95% Approx. Gamma UPL	15.32	15.6
95% Gamma USL	20.55	21.37			

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	9.322	SD (KM)	3.494
Variance (KM)	12.21	SE of Mean (KM)	0.516
k hat (KM)	7.118	k star (KM)	6.678
nu hat (KM)	669.1	nu star (KM)	627.7
theta hat (KM)	1.31	theta star (KM)	1.396
80% gamma percentile (KM)	12.15	90% gamma percentile (KM)	14.14
95% gamma percentile (KM)	15.94	99% gamma percentile (KM)	19.69

The following statistics are computed using gamma distribution and KM estimates

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	21.62	22.91	95% Approx. Gamma UPL	18.65	19.46
95% KM Gamma Percentile	18.27	19.02	95% Gamma USL	29.52	32.44

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.624	Shapiro Wilk GOF Test
10% Shapiro Wilk Critical Value	0.95	Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.267	Lilliefors GOF Test
10% Lilliefors Critical Value	0.126	Data Not Lognormal at 10% Significance Level

Data Not Lognormal at 10% Significance Level

Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects

Mean in Original Scale	9.832	Mean in Log Scale	2.237
SD in Original Scale	2.586	SD in Log Scale	0.353
95% UTL95% Coverage	19.47	95% BCA UTL95% Coverage	12.74
95% Bootstrap (%) UTL95% Coverage	12.81	95% UPL (t)	17.04
90% Percentile (z)	14.72	95% Percentile (z)	16.74
99% Percentile (z)	21.29	95% USL	26.37

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean of Logged Data	2.097	95% KM UTL (Lognormal)95% Coverage	29.25
KM SD of Logged Data	0.617	95% KM UPL (Lognormal)	23.17
95% KM Percentile Lognormal (z)	22.45	95% KM USL (Lognormal)	49.66

Background DL/2 Statistics Assuming Lognormal Distribution

Mean in Original Scale	9.375	Mean in Log Scale	2.121
SD in Original Scale	3.421	SD in Log Scale	0.57
95% UTL95% Coverage	27.2	95% UPL (t)	21.94

Background Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:33:36 PM
From File	filea1b841356b96.xls
Full Precision	OFF
Confidence Coefficient	95%
Coverage	95%
Different or Future K Observations	1
Number of Bootstrap Operations	2000

90% Percentile (z)	17.32	95% Percentile (z)	21.3
99% Percentile (z)	31.42	95% USL	44.39

DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.

Nonparametric Distribution Free Background Statistics

Data do not follow a Discernible Distribution

Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)

Order of Statistic, r	47	95% UTL with 95% Coverage	12.84
Approx, f used to compute achieved CC	2.474	Approximate Actual Confidence Coefficient achieved by UTL	0.91
Approximate Sample Size needed to achieve specified CC	59	95% UPL	12.48
95% USL	12.84	95% KM Chebyshev UPL	24.71

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.

Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers and consists of observations collected from clean unimpacted locations.

The use of USL tends to provide a balance between false positives and false negatives provided the data represents a background data set and when many onsite observations need to be compared with the BTV.

x_ols (chromium [ug/l]_interwell_pooled-upgradient)

General Statistics

Total Number of Observations	47	Number of Missing Observations	0
Number of Distinct Observations	24	Number of Non-Detects	16
Number of Detects	31	Number of Distinct Non-Detects	3
Number of Distinct Detects	22	Minimum Non-Detect	1
Minimum Detect	1.1	Maximum Non-Detect	2
Maximum Detect	25.1	Percent Non-Detects	34.04%
Variance Detected	22.29	SD Detected	4.722
Mean Detected	3.856	SD of Detected Logged Data	0.679
Mean of Detected Logged Data	1.035		

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.074	d2max (for USL)	2.933

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.512	Shapiro Wilk GOF Test
1% Shapiro Wilk Critical Value	0.902	Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.334	Lilliefors GOF Test
1% Lilliefors Critical Value	0.182	Data Not Normal at 1% Significance Level

Data Not Normal at 1% Significance Level

Kaplan Meier (KM) Background Statistics Assuming Normal Distribution

KM Mean	2.891	KM SD	4.005
95% UTL 95% Coverage	11.2	95% KM UPL (t)	9.685
90% KM Percentile (z)	8.023	95% KM Percentile (z)	9.478
99% KM Percentile (z)	12.21	95% KM USL	14.64

DL/2 Substitution Background Statistics Assuming Normal Distribution

Mean	2.762	SD	4.113
95% UTL 95% Coverage	11.29	95% UPL (t)	9.74
90% Percentile (z)	8.033	95% Percentile (z)	9.527
99% Percentile (z)	12.33	95% USL	14.82

Background Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:33:36 PM
From File	filea1b841356b96.xls
Full Precision	OFF
Confidence Coefficient	95%
Coverage	95%
Different or Future K Observations	1
Number of Bootstrap Operations	2000

DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	2.582	Anderson-Darling GOF Test
5% A-D Critical Value	0.761	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.216	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.16	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.736	k star (bias corrected MLE)	1.589
Theta hat (MLE)	2.222	Theta star (bias corrected MLE)	2.426
nu hat (MLE)	107.6	nu star (bias corrected)	98.54
MLE Mean (bias corrected)	3.856		
MLE Sd (bias corrected)	3.059	95% Percentile of Chisquare (2kstar)	8.122

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	2.547
Maximum	25.1	Median	1.7
SD	4.235	CV	1.663
k hat (MLE)	0.367	k star (bias corrected MLE)	0.357
Theta hat (MLE)	6.946	Theta star (bias corrected MLE)	7.126
nu hat (MLE)	34.47	nu star (bias corrected)	33.6
MLE Mean (bias corrected)	2.547	MLE Sd (bias corrected)	4.26
95% Percentile of Chisquare (2kstar)	3.087	90% Percentile	7.331
95% Percentile	11	99% Percentile	20.33

The following statistics are computed using Gamma ROS Statistics on Imputed Data

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	14.3	17.87	95% Approx. Gamma UPL	10.26	11.95
95% Gamma USL	27.14	39.3			

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	2.891	SD (KM)	4.005
Variance (KM)	16.04	SE of Mean (KM)	0.594
k hat (KM)	0.521	k star (KM)	0.502
nu hat (KM)	48.96	nu star (KM)	47.17
theta hat (KM)	5.549	theta star (KM)	5.76
80% gamma percentile (KM)	4.748	90% gamma percentile (KM)	7.815
95% gamma percentile (KM)	11.09	99% gamma percentile (KM)	19.14

The following statistics are computed using gamma distribution and KM estimates

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	9.133	9.017	95% Approx. Gamma UPL	7.374	7.191
95% KM Gamma Percentile	7.153	6.965	95% Gamma USL	14.13	14.45

Lognormal GOF Test on Detected Observations Only

Background Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:33:36 PM
 From File filea1b841356b96.xls
 Full Precision OFF
 Confidence Coefficient 95%
 Coverage 95%
 Different or Future K Observations 1
 Number of Bootstrap Operations 2000

Shapiro Wilk Test Statistic 0.861	Shapiro Wilk GOF Test
10% Shapiro Wilk Critical Value 0.94	Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic 0.145	Lilliefors GOF Test
10% Lilliefors Critical Value 0.143	Data Not Lognormal at 10% Significance Level

Data Not Lognormal at 10% Significance Level

Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects

Mean in Original Scale 2.761	Mean in Log Scale 0.506
SD in Original Scale 4.115	SD in Log Scale 0.954
95% UTL95% Coverage 11.98	95% BCA UTL95% Coverage 20.12
95% Bootstrap (%) UTL95% Coverage 22.01	95% UPL (t) 8.361
90% Percentile (z) 5.629	95% Percentile (z) 7.96
99% Percentile (z) 15.25	95% USL 27.18

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean of Logged Data 0.688	95% KM UTL (Lognormal)95% Coverage 8.99
KM SD of Logged Data 0.727	95% KM UPL (Lognormal) 6.832
95% KM Percentile Lognormal (z) 6.581	95% KM USL (Lognormal) 16.79

Background DL/2 Statistics Assuming Lognormal Distribution

Mean in Original Scale 2.762	Mean in Log Scale 0.522
SD in Original Scale 4.113	SD in Log Scale 0.917
95% UTL95% Coverage 11.27	95% UPL (t) 7.977
90% Percentile (z) 5.454	95% Percentile (z) 7.608
99% Percentile (z) 14.21	95% USL 24.77

DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.

Nonparametric Distribution Free Background Statistics

Data do not follow a Discernible Distribution

Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)

Order of Statistic, r 47	95% UTL with95% Coverage 25.1	
Approx, f used to compute achieved CC 2.474	Approximate Actual Confidence Coefficient achieved by UTL 0.91	
Approximate Sample Size needed to achieve specified CC 59	95% UPL 12.28	
95% USL 25.1	95% KM Chebyshev UPL 20.53	

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20. Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers and consists of observations collected from clean unimpacted locations.

The use of USL tends to provide a balance between false positives and false negatives provided the data represents a background data set and when many onsite observations need to be compared with the BTV.

x_ols (cobalt [ug/l]_interwell_pooled-upgradient)

General Statistics

Total Number of Observations 47	Number of Missing Observations 0
Number of Distinct Observations 10	
Number of Detects 14	Number of Non-Detects 33
Number of Distinct Detects 9	Number of Distinct Non-Detects 2
Minimum Detect 1	Minimum Non-Detect 1
Maximum Detect 4.1	Maximum Non-Detect 2
Variance Detected 0.929	Percent Non-Detects 70.21%
Mean Detected 1.964	SD Detected 0.964

Background Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:33:36 PM
 From File filea1b841356b96.xls
 Full Precision OFF
 Confidence Coefficient 95%
 Coverage 95%
 Different or Future K Observations 1
 Number of Bootstrap Operations 2000

Mean of Detected Logged Data 0.573 SD of Detected Logged Data 0.459

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL) 2.074 d2max (for USL) 2.933

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.86	Shapiro Wilk GOF Test
1% Shapiro Wilk Critical Value	0.825	Detected Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.251	Lilliefors GOF Test
1% Lilliefors Critical Value	0.263	Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level

Kaplan Meier (KM) Background Statistics Assuming Normal Distribution

KM Mean	1.292	KM SD	0.672
95% UTL95% Coverage	2.685	95% KM UPL (t)	2.431
90% KM Percentile (z)	2.153	95% KM Percentile (z)	2.397
99% KM Percentile (z)	2.854	95% KM USL	3.262

DL/2 Substitution Background Statistics Assuming Normal Distribution

Mean	0.968	SD	0.841
95% UTL95% Coverage	2.712	95% UPL (t)	2.395
90% Percentile (z)	2.046	95% Percentile (z)	2.352
99% Percentile (z)	2.925	95% USL	3.435

DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.658	Anderson-Darling GOF Test
5% A-D Critical Value	0.738	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.215	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.229	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	5.065	k star (bias corrected MLE)	4.028
Theta hat (MLE)	0.388	Theta star (bias corrected MLE)	0.488
nu hat (MLE)	141.8	nu star (bias corrected)	112.8
MLE Mean (bias corrected)	1.964		
MLE Sd (bias corrected)	0.979	95% Percentile of Chisquare (2kstar)	15.59

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
 GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.67
Maximum	4.1	Median	0.0108
SD	1.01	CV	1.507
k hat (MLE)	0.341	k star (bias corrected MLE)	0.333
Theta hat (MLE)	1.966	Theta star (bias corrected MLE)	2.011
nu hat (MLE)	32.05	nu star (bias corrected)	31.34
MLE Mean (bias corrected)	0.67	MLE Sd (bias corrected)	1.161
95% Percentile of Chisquare (2kstar)	2.947	90% Percentile	1.95

Background Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:33:36 PM
From File	filea1b841356b96.xls
Full Precision	OFF
Confidence Coefficient	95%
Coverage	95%
Different or Future K Observations	1
Number of Bootstrap Operations	2000

95% Percentile	2.962	99% Percentile	5.561

The following statistics are computed using Gamma ROS Statistics on Imputed Data

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	3.867	4.504	95% Approx. Gamma UPL	2.717	2.956
95% Gamma USL	7.596	10.22			

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	1.292	SD (KM)	0.672
Variance (KM)	0.451	SE of Mean (KM)	0.102
k hat (KM)	3.702	k star (KM)	3.48
nu hat (KM)	348	nu star (KM)	327.1
theta hat (KM)	0.349	theta star (KM)	0.371
80% gamma percentile (KM)	1.811	90% gamma percentile (KM)	2.221
95% gamma percentile (KM)	2.601	99% gamma percentile (KM)	3.418

The following statistics are computed using gamma distribution and KM estimates

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	2.555	2.54	95% Approx. Gamma UPL	2.262	2.241
95% KM Gamma Percentile	2.224	2.203	95% Gamma USL	3.314	3.329

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.913	Shapiro Wilk GOF Test
10% Shapiro Wilk Critical Value	0.895	Detected Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.197	Lilliefors GOF Test
10% Lilliefors Critical Value	0.208	Detected Data appear Lognormal at 10% Significance Level

Detected Data appear Lognormal at 10% Significance Level

Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects

Mean in Original Scale	0.909	Mean in Log Scale	-0.483
SD in Original Scale	0.886	SD in Log Scale	0.893
95% UTL95% Coverage	3.937	95% BCA UTL95% Coverage	3.8
95% Bootstrap (%) UTL95% Coverage	3.8	95% UPL (t)	2.81
90% Percentile (z)	1.94	95% Percentile (z)	2.683
99% Percentile (z)	4.933	95% USL	8.48

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean of Logged Data	0.175	95% KM UTL (Lognormal)95% Coverage	2.495
KM SD of Logged Data	0.357	95% KM UPL (Lognormal)	2.181
95% KM Percentile Lognormal (z)	2.141	95% KM USL (Lognormal)	3.389

Background DL/2 Statistics Assuming Lognormal Distribution

Mean in Original Scale	0.968	Mean in Log Scale	-0.272
SD in Original Scale	0.841	SD in Log Scale	0.63
95% UTL95% Coverage	2.817	95% UPL (t)	2.221
90% Percentile (z)	1.71	95% Percentile (z)	2.15
99% Percentile (z)	3.303	95% USL	4.841

DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.

Nonparametric Distribution Free Background Statistics

Data appear to follow a Discernible Distribution

Background Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:33:36 PM
From File	filea1b841356b96.xls
Full Precision	OFF
Confidence Coefficient	95%
Coverage	95%
Different or Future K Observations	1
Number of Bootstrap Operations	2000

Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)

Order of Statistic, r	47	95% UTL with 95% Coverage	4.1
Approx. f used to compute achieved CC	2.474	Approximate Actual Confidence Coefficient achieved by UTL	0.91
Approximate Sample Size needed to achieve specified CC	59	95% UPL	3.1
95% USL	4.1	95% KM Chebyshev UPL	4.25

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20. Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers and consists of observations collected from clean unimpacted locations.

The use of USL tends to provide a balance between false positives and false negatives provided the data represents a background data set and when many onsite observations need to be compared with the BTV.

x_ols (dissolved solids, total [mg/l]_interwell_pooled-upgradient)

General Statistics

Total Number of Observations	45	Number of Distinct Observations	40
Minimum	278	First Quartile	354
Second Largest	514	Median	380
Maximum	528	Third Quartile	430
Mean	394	SD	57.9
Coefficient of Variation	0.147	Skewness	0.345
Mean of logged Data	5.966	SD of logged Data	0.147

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.085	d2max (for USL)	2.915

Normal GOF Test

Shapiro Wilk Test Statistic	0.976
1% Shapiro Wilk Critical Value	0.926
Lilliefors Test Statistic	0.111
1% Lilliefors Critical Value	0.153

Shapiro Wilk GOF Test

Data appear Normal at 1% Significance Level

Lilliefors GOF Test

Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Background Statistics Assuming Normal Distribution

95% UTL with 95% Coverage	514.7	90% Percentile (z)	468.2
95% UPL (t)	492.4	95% Percentile (z)	489.2
95% USL	562.8	99% Percentile (z)	528.7

Gamma GOF Test

A-D Test Statistic	0.239
5% A-D Critical Value	0.747
K-S Test Statistic	0.0927
5% K-S Critical Value	0.131

Anderson-Darling Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

Kolmogorov-Smirnov Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	47.82	k star (bias corrected MLE)	44.65
Theta hat (MLE)	8.24	Theta star (bias corrected MLE)	8.825
nu hat (MLE)	4304	nu star (bias corrected)	4018
MLE Mean (bias corrected)	394	MLE Sd (bias corrected)	58.97

Background Statistics Assuming Gamma Distribution

95% Wilson Hilferty (WH) Approx. Gamma UPL	497	90% Percentile	471.2

Background Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:33:36 PM
From File	filea1b841356b96.xls
Full Precision	OFF
Confidence Coefficient	95%
Coverage	95%
Different or Future K Observations	1
Number of Bootstrap Operations	2000

95% Hawkins Wixley (HW) Approx. Gamma UPL	497.7	95% Percentile	495.8
95% WH Approx. Gamma UTL with 95% Coverage	523.5	99% Percentile	544
95% HW Approx. Gamma UTL with 95% Coverage	524.8		
95% WH USL	583.4	95% HW USL	586.7

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.985	Shapiro Wilk Lognormal GOF Test
10% Shapiro Wilk Critical Value	0.953	Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.0829	Lilliefors Lognormal GOF Test
10% Lilliefors Critical Value	0.12	Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Background Statistics assuming Lognormal Distribution

95% UTL with 95% Coverage	529.2	90% Percentile (z)	470.4
95% UPL (t)	500.1	95% Percentile (z)	496.2
95% USL	597.7	99% Percentile (z)	548.3

Nonparametric Distribution Free Background Statistics

Data appear Normal at 1% Significance Level

Nonparametric Upper Limits for Background Threshold Values

Order of Statistic, order	45	95% UTL with 95% Coverage	528
Approx, f used to compute achieved CC	2.368	Approximate Actual Confidence Coefficient achieved by UTL	0.901
		Approximate Sample Size needed to achieve specified CC	59
95% Percentile Bootstrap UTL with 95% Coverage	525.2	95% BCA Bootstrap UTL with 95% Coverage	520.8
95% UPL	507.4	90% Percentile	474.4
90% Chebyshev UPL	569.6	95% Percentile	490.4
95% Chebyshev UPL	649.2	99% Percentile	521.8
95% USL	528		

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20. Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers and consists of observations collected from clean unimpacted locations.

The use of USL tends to provide a balance between false positives and false negatives provided the data represents a background data set and when many onsite observations need to be compared with the BTV.

x_ols (fluoride [ug/l]_interwell_pooled-upgradient)

General Statistics

Total Number of Observations	47	Number of Distinct Observations	28
Minimum	120	First Quartile	160.6
Second Largest	220	Median	171.2
Maximum	230	Third Quartile	197.4
Mean	176.9	SD	23.75
Coefficient of Variation	0.134	Skewness	0.0922
Mean of logged Data	5.166	SD of logged Data	0.136

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.074	d2max (for USL)	2.933

Normal GOF Test

Shapiro Wilk Test Statistic	0.978	Shapiro Wilk GOF Test
1% Shapiro Wilk Critical Value	0.928	Data appear Normal at 1% Significance Level

Background Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:33:36 PM
From File	filea1b841356b96.xls
Full Precision	OFF
Confidence Coefficient	95%
Coverage	95%
Different or Future K Observations	1
Number of Bootstrap Operations	2000

Lilliefors Test Statistic	0.124	Lilliefors GOF Test
1% Lilliefors Critical Value	0.15	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Background Statistics Assuming Normal Distribution

95% UTL with 95% Coverage	226.1	90% Percentile (z)	207.3
95% UPL (t)	217.1	95% Percentile (z)	215.9
95% USL	246.5	99% Percentile (z)	232.1

Gamma GOF Test

A-D Test Statistic	0.386	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.747	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.108	Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value	0.129	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	55.95	k star (bias corrected MLE)	52.39
Theta hat (MLE)	3.161	Theta star (bias corrected MLE)	3.376
nu hat (MLE)	5259	nu star (bias corrected)	4925
MLE Mean (bias corrected)	176.9	MLE Sd (bias corrected)	24.43

Background Statistics Assuming Gamma Distribution

95% Wilson Hilferty (WH) Approx. Gamma UPL	219.4	90% Percentile	208.8
95% Hawkins Wixley (HW) Approx. Gamma UPL	219.7	95% Percentile	218.9
95% WH Approx. Gamma UTL with 95% Coverage	229.9	99% Percentile	238.6
95% HW Approx. Gamma UTL with 95% Coverage	230.5		
95% WH USL	255.3	95% HW USL	256.6

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.977	Shapiro Wilk Lognormal GOF Test
10% Shapiro Wilk Critical Value	0.954	Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.098	Lilliefors Lognormal GOF Test
10% Lilliefors Critical Value	0.118	Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Background Statistics assuming Lognormal Distribution

95% UTL with 95% Coverage	232.5	90% Percentile (z)	208.7
95% UPL (t)	220.8	95% Percentile (z)	219.3
95% USL	261.3	99% Percentile (z)	240.6

Nonparametric Distribution Free Background Statistics

Data appear Normal at 1% Significance Level

Nonparametric Upper Limits for Background Threshold Values

Order of Statistic, order	47	95% UTL with 95% Coverage	230
Approx, f used to compute achieved CC	2.474	Approximate Actual Confidence Coefficient achieved by UTL	0.91
		Approximate Sample Size needed to achieve specified CC	59
95% Percentile Bootstrap UTL with 95% Coverage	227	95% BCA Bootstrap UTL with 95% Coverage	220
95% UPL	220	90% Percentile	204
90% Chebyshev UPL	248.8	95% Percentile	217
95% Chebyshev UPL	281.5	99% Percentile	225.4
95% USL	230		

Background Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:33:36 PM
From File	filea1b841356b96.xls
Full Precision	OFF
Confidence Coefficient	95%
Coverage	95%
Different or Future K Observations	1
Number of Bootstrap Operations	2000

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20. Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers and consists of observations collected from clean unimpacted locations.

The use of USL tends to provide a balance between false positives and false negatives provided the data represents a background data set and when many onsite observations need to be compared with the BTV.

x_ols (iron [mg/l]_interwell_pooled-upgradient)

General Statistics

Total Number of Observations	6	Number of Distinct Observations	6
Minimum	0.179	First Quartile	0.428
Second Largest	0.709	Median	0.53
Maximum	1.42	Third Quartile	0.673
Mean	0.629	SD	0.426
Coefficient of Variation	0.677	Skewness	1.52
Mean of logged Data	-0.649	SD of logged Data	0.68

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach, refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance.

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	3.708	d2max (for USL)	1.822

Normal GOF Test

Shapiro Wilk Test Statistic	0.872	Shapiro Wilk GOF Test	
1% Shapiro Wilk Critical Value	0.713	Data appear Normal at 1% Significance Level	
Lilliefors Test Statistic	0.259	Lilliefors GOF Test	
1% Lilliefors Critical Value	0.373	Data appear Normal at 1% Significance Level	

Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Background Statistics Assuming Normal Distribution

95% UTL with 95% Coverage	2.208	90% Percentile (z)	1.174
95% UPL (t)	1.556	95% Percentile (z)	1.329
95% USL	1.405	99% Percentile (z)	1.619

Gamma GOF Test

A-D Test Statistic	0.248	Anderson-Darling Gamma GOF Test	
5% A-D Critical Value	0.702	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.176	Kolmogorov-Smirnov Gamma GOF Test	
5% K-S Critical Value	0.335	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics

k hat (MLE)	2.863	k star (bias corrected MLE)	1.543
Theta hat (MLE)	0.22	Theta star (bias corrected MLE)	0.408
nu hat (MLE)	34.35	nu star (bias corrected)	18.51
MLE Mean (bias corrected)	0.629	MLE Sd (bias corrected)	0.506

Background Statistics Assuming Gamma Distribution

95% Wilson Hilferty (WH) Approx. Gamma UPL	1.837	90% Percentile	1.301

Background Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:33:36 PM
 From File filea1b841356b96.xls
 Full Precision OFF
 Confidence Coefficient 95%
 Coverage 95%
 Different or Future K Observations 1
 Number of Bootstrap Operations 2000

95% Hawkins Wixley (HW) Approx. Gamma UPL	1.914	95% Percentile	1.622
95% WH Approx. Gamma UTL with 95% Coverage	3.426	99% Percentile	2.347
95% HW Approx. Gamma UTL with 95% Coverage	3.824		
95% WH USL	1.558	95% HW USL	1.601

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.973	Shapiro Wilk Lognormal GOF Test
10% Shapiro Wilk Critical Value	0.826	Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.187	Lilliefors Lognormal GOF Test
10% Lilliefors Critical Value	0.298	Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Background Statistics assuming Lognormal Distribution

95% UTL with 95% Coverage	6.51	90% Percentile (z)	1.25
95% UPL (t)	2.297	95% Percentile (z)	1.6
95% USL	1.805	99% Percentile (z)	2.544

Nonparametric Distribution Free Background Statistics

Data appear Normal at 1% Significance Level

Nonparametric Upper Limits for Background Threshold Values

Order of Statistic, order	6	95% UTL with 95% Coverage	1.42
Approx, f used to compute achieved CC	0.316	Approximate Actual Confidence Coefficient achieved by UTL	0.265
		Approximate Sample Size needed to achieve specified CC	59
95% Percentile Bootstrap UTL with 95% Coverage	1.42	95% BCA Bootstrap UTL with 95% Coverage	1.42
95% UPL	1.42	90% Percentile	1.065
90% Chebyshev UPL	2.009	95% Percentile	1.242
95% Chebyshev UPL	2.634	99% Percentile	1.384
95% USL	1.42		

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20. Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers and consists of observations collected from clean unimpacted locations.

The use of USL tends to provide a balance between false positives and false negatives provided the data represents a background data set and when many onsite observations need to be compared with the BTV.

x_ols (lead [ug/l]_interwell_pooled-upgradient)

General Statistics

Total Number of Observations	47	Number of Missing Observations	0
Number of Distinct Observations	8		
Number of Detects	7	Number of Non-Detects	40
Number of Distinct Detects	7	Number of Distinct Non-Detects	2
Minimum Detect	1.3	Minimum Non-Detect	1
Maximum Detect	6.2	Maximum Non-Detect	2
Variance Detected	3.175	Percent Non-Detects	85.11%
Mean Detected	2.714	SD Detected	1.782
Mean of Detected Logged Data	0.843	SD of Detected Logged Data	0.577

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.074	d2max (for USL)	2.933

Background Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:33:36 PM
From File	filea1b841356b96.xls
Full Precision	OFF
Confidence Coefficient	95%
Coverage	95%
Different or Future K Observations	1
Number of Bootstrap Operations	2000

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.82	Shapiro Wilk GOF Test
1% Shapiro Wilk Critical Value	0.73	Detected Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.24	Lilliefors GOF Test
1% Lilliefors Critical Value	0.35	Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level

Kaplan Meier (KM) Background Statistics Assuming Normal Distribution

KM Mean	1.257	KM SD	0.882
95% UTL95% Coverage	3.086	95% KM UPL (t)	2.753
90% KM Percentile (z)	2.388	95% KM Percentile (z)	2.708
99% KM Percentile (z)	3.309	95% KM USL	3.844

DL/2 Substitution Background Statistics Assuming Normal Distribution

Mean	0.862	SD	1.021
95% UTL95% Coverage	2.98	95% UPL (t)	2.594
90% Percentile (z)	2.17	95% Percentile (z)	2.541
99% Percentile (z)	3.237	95% USL	3.856

DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.415	Anderson-Darling GOF Test
5% A-D Critical Value	0.711	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.207	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.313	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	3.378	k star (bias corrected MLE)	2.026
Theta hat (MLE)	0.803	Theta star (bias corrected MLE)	1.34
nu hat (MLE)	47.3	nu star (bias corrected)	28.36
MLE Mean (bias corrected)	2.714		
MLE Sd (bias corrected)	1.907	95% Percentile of Chisquare (2kstar)	9.571

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
 GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
 For such situations, GROS method may yield incorrect values of UCLs and BTVs
 This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.417
Maximum	6.2	Median	0.01
SD	1.166	CV	2.797
k hat (MLE)	0.249	k star (bias corrected MLE)	0.247
Theta hat (MLE)	1.674	Theta star (bias corrected MLE)	1.685
nu hat (MLE)	23.4	nu star (bias corrected)	23.24
MLE Mean (bias corrected)	0.417	MLE Sd (bias corrected)	0.838
95% Percentile of Chisquare (2kstar)	2.401	90% Percentile	1.252
95% Percentile	2.024	99% Percentile	4.082

The following statistics are computed using Gamma ROS Statistics on Imputed Data

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	2.004	1.884	95% Approx. Gamma UPL	1.34	1.181

Background Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:33:36 PM
From File	filea1b841356b96.xls
Full Precision	OFF
Confidence Coefficient	95%
Coverage	95%
Different or Future K Observations	1
Number of Bootstrap Operations	2000

95% Gamma USL 4.256 4.612

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	1.257	SD (KM)	0.882
Variance (KM)	0.778	SE of Mean (KM)	0.139
k hat (KM)	2.033	k star (KM)	1.917
nu hat (KM)	191.1	nu star (KM)	180.2
theta hat (KM)	0.619	theta star (KM)	0.656
80% gamma percentile (KM)	1.892	90% gamma percentile (KM)	2.47
95% gamma percentile (KM)	3.023	99% gamma percentile (KM)	4.252

The following statistics are computed using gamma distribution and KM estimates

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	2.621	2.568	95% Approx. Gamma UPL	2.297	2.247
95% KM Gamma Percentile	2.254	2.205	95% Gamma USL	3.47	3.428

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.914	Shapiro Wilk GOF Test
10% Shapiro Wilk Critical Value	0.838	Detected Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.174	Lilliefors GOF Test
10% Lilliefors Critical Value	0.28	Detected Data appear Lognormal at 10% Significance Level

Detected Data appear Lognormal at 10% Significance Level

Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects

Mean in Original Scale	0.62	Mean in Log Scale	-1.485
SD in Original Scale	1.117	SD in Log Scale	1.454
95% UTL95% Coverage	4.622	95% BCA UTL95% Coverage	3.9
95% Bootstrap (%) UTL95% Coverage	5.51	95% UPL (t)	2.67
90% Percentile (z)	1.46	95% Percentile (z)	2.477
99% Percentile (z)	6.673	95% USL	16.11

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean of Logged Data	0.127	95% KM UTL (Lognormal)95% Coverage	2.419
KM SD of Logged Data	0.365	95% KM UPL (Lognormal)	2.108
95% KM Percentile Lognormal (z)	2.069	95% KM USL (Lognormal)	3.308

Background DL/2 Statistics Assuming Lognormal Distribution

Mean in Original Scale	0.862	Mean in Log Scale	-0.42
SD in Original Scale	1.021	SD in Log Scale	0.598
95% UTL95% Coverage	2.272	95% UPL (t)	1.813
90% Percentile (z)	1.414	95% Percentile (z)	1.757
99% Percentile (z)	2.642	95% USL	3.797

DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.

Nonparametric Distribution Free Background Statistics

Data appear to follow a Discernible Distribution

Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)

Order of Statistic, r	47	95% UTL with 95% Coverage	6.2
Approx, f used to compute achieved CC	2.474	Approximate Actual Confidence Coefficient achieved by UTL	0.91
Approximate Sample Size needed to achieve specified CC	59	95% UPL	3.38
95% USL	6.2	95% KM Chebyshev UPL	5.142

Background Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:33:36 PM
From File	filea1b841356b96.xls
Full Precision	OFF
Confidence Coefficient	95%
Coverage	95%
Different or Future K Observations	1
Number of Bootstrap Operations	2000

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20. Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers and consists of observations collected from clean unimpacted locations.

The use of USL tends to provide a balance between false positives and false negatives provided the data represents a background data set and when many onsite observations need to be compared with the BTV.

x_ols (lithium [ug/l]_interwell_pooled-upgradient)

General Statistics

Total Number of Observations	47	Number of Distinct Observations	47
Minimum	12.65	First Quartile	14.75
Second Largest	31.34	Median	16.31
Maximum	33.16	Third Quartile	29
Mean	20.31	SD	7.193
Coefficient of Variation	0.354	Skewness	0.593
Mean of logged Data	2.953	SD of logged Data	0.337

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.074	d2max (for USL)	2.933

Normal GOF Test

Shapiro Wilk Test Statistic	0.762	Shapiro Wilk GOF Test
1% Shapiro Wilk Critical Value	0.928	Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.304	Lilliefors GOF Test
1% Lilliefors Critical Value	0.15	Data Not Normal at 1% Significance Level

Data Not Normal at 1% Significance Level

Background Statistics Assuming Normal Distribution

95% UTL with 95% Coverage	35.23	90% Percentile (z)	29.53
95% UPL (t)	32.51	95% Percentile (z)	32.14
95% USL	41.4	99% Percentile (z)	37.04

Gamma GOF Test

A-D Test Statistic	4.496	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.75	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.283	Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value	0.129	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	8.817	k star (bias corrected MLE)	8.268
Theta hat (MLE)	2.304	Theta star (bias corrected MLE)	2.457
nu hat (MLE)	828.8	nu star (bias corrected)	777.2
MLE Mean (bias corrected)	20.31	MLE Sd (bias corrected)	7.064

Background Statistics Assuming Gamma Distribution

95% Wilson Hilferty (WH) Approx. Gamma UPL	33.36	90% Percentile	29.73
95% Hawkins Wixley (HW) Approx. Gamma UPL	33.5	95% Percentile	33.15
95% WH Approx. Gamma UTL with 95% Coverage	37.14	99% Percentile	40.23
95% HW Approx. Gamma UTL with 95% Coverage	37.46		
95% WH USL	46.76	95% HW USL	47.76

Background Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:33:36 PM
 From File filea1b841356b96.xls
 Full Precision OFF
 Confidence Coefficient 95%
 Coverage 95%
 Different or Future K Observations 1
 Number of Bootstrap Operations 2000

Lognormal GOF Test

Shapiro Wilk Test Statistic 0.79	Shapiro Wilk Lognormal GOF Test
10% Shapiro Wilk Critical Value 0.954	Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic 0.268	Lilliefors Lognormal GOF Test
10% Lilliefors Critical Value 0.118	Data Not Lognormal at 10% Significance Level

Data Not Lognormal at 10% Significance Level

Background Statistics assuming Lognormal Distribution

95% UTL with 95% Coverage	38.6	90% Percentile (z)	29.54
95% UPL (t)	33.98	95% Percentile (z)	33.4
95% USL	51.57	99% Percentile (z)	42.03

Nonparametric Distribution Free Background Statistics

Data do not follow a Discernible Distribution

Nonparametric Upper Limits for Background Threshold Values

Order of Statistic, order	47	95% UTL with 95% Coverage	33.16
Approx, f used to compute achieved CC	2.474	Approximate Actual Confidence Coefficient achieved by UTL	0.91
		Approximate Sample Size needed to achieve specified CC	59
95% Percentile Bootstrap UTL with 95% Coverage	32.61	95% BCA Bootstrap UTL with 95% Coverage	32.61
95% UPL	31.17	90% Percentile	30.35
90% Chebyshev UPL	42.12	95% Percentile	30.84
95% Chebyshev UPL	51.99	99% Percentile	32.32
95% USL	33.16		

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20. Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers and consists of observations collected from clean unimpacted locations.

The use of USL tends to provide a balance between false positives and false negatives provided the data represents a background data set and when many onsite observations need to be compared with the BTV.

x_ols (manganese [mg/l]_interwell_pooled-upgradient)

General Statistics

Total Number of Observations	6	Number of Distinct Observations	6
Minimum	0.0791	First Quartile	0.128
Second Largest	0.21	Median	0.166
Maximum	0.599	Third Quartile	0.206
Mean	0.224	SD	0.19
Coefficient of Variation	0.848	Skewness	2.112
Mean of logged Data	-1.72	SD of logged Data	0.686

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach, refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance.

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	3.708	d2max (for USL)	1.822

Normal GOF Test

Shapiro Wilk Test Statistic 0.732	Shapiro Wilk GOF Test
1% Shapiro Wilk Critical Value 0.713	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic 0.362	Lilliefors GOF Test
1% Lilliefors Critical Value 0.373	Data appear Normal at 1% Significance Level

Background Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:33:36 PM
From File	filea1b841356b96.xls
Full Precision	OFF
Confidence Coefficient	95%
Coverage	95%
Different or Future K Observations	1
Number of Bootstrap Operations	2000

Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Background Statistics Assuming Normal Distribution

95% UTL with 95% Coverage	0.928	90% Percentile (z)	0.467
95% UPL (t)	0.637	95% Percentile (z)	0.536
95% USL	0.57	99% Percentile (z)	0.665

Gamma GOF Test

A-D Test Statistic	0.483	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.703	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.285	Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value	0.335	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics

k hat (MLE)	2.391	k star (bias corrected MLE)	1.307
Theta hat (MLE)	0.0936	Theta star (bias corrected MLE)	0.171
nu hat (MLE)	28.7	nu star (bias corrected)	15.68
MLE Mean (bias corrected)	0.224	MLE Sd (bias corrected)	0.196

Background Statistics Assuming Gamma Distribution

95% Wilson Hilferty (WH) Approx. Gamma UPL	0.701	90% Percentile	0.482
95% Hawkins Wixley (HW) Approx. Gamma UPL	0.718	95% Percentile	0.611
95% WH Approx. Gamma UTL with 95% Coverage	1.359	99% Percentile	0.904
95% HW Approx. Gamma UTL with 95% Coverage	1.489		
95% WH USL	0.588	95% HW USL	0.594

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.928	Shapiro Wilk Lognormal GOF Test
10% Shapiro Wilk Critical Value	0.826	Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.241	Lilliefors Lognormal GOF Test
10% Lilliefors Critical Value	0.298	Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Background Statistics assuming Lognormal Distribution

95% UTL with 95% Coverage	2.281	90% Percentile (z)	0.431
95% UPL (t)	0.797	95% Percentile (z)	0.554
95% USL	0.625	99% Percentile (z)	0.884

Nonparametric Distribution Free Background Statistics

Data appear Normal at 1% Significance Level

Nonparametric Upper Limits for Background Threshold Values

Order of Statistic, order	6	95% UTL with 95% Coverage	0.599
Approx. f used to compute achieved CC	0.316	Approximate Actual Confidence Coefficient achieved by UTL	0.265
		Approximate Sample Size needed to achieve specified CC	59
95% Percentile Bootstrap UTL with 95% Coverage	0.599	95% BCA Bootstrap UTL with 95% Coverage	0.599
95% UPL	0.599	90% Percentile	0.405
90% Chebyshev UPL	0.839	95% Percentile	0.502
95% Chebyshev UPL	1.117	99% Percentile	0.58

Background Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:33:36 PM
From File	filea1b841356b96.xls
Full Precision	OFF
Confidence Coefficient	95%
Coverage	95%
Different or Future K Observations	1
Number of Bootstrap Operations	2000

95% USL 0.599

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20. Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers and consists of observations collected from clean unimpacted locations.

The use of USL tends to provide a balance between false positives and false negatives provided the data represents a background data set and when many onsite observations need to be compared with the BTV.

x_ols (mercury [ug/l]_interwell_pooled-upgradient)

General Statistics

Total Number of Observations	47	Number of Missing Observations	0
Number of Distinct Observations	1		
Number of Detects	0	Number of Non-Detects	47
Number of Distinct Detects	0	Number of Distinct Non-Detects	1
Minimum Detect	N/A	Minimum Non-Detect	0.2
Maximum Detect	N/A	Maximum Non-Detect	0.2
Variance Detected	N/A	Percent Non-Detects	100%
Mean Detected	N/A	SD Detected	N/A
Mean of Detected Logged Data	N/A	SD of Detected Logged Data	N/A

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable x_ols (mercury [ug/l]_interwell_pooled-upgradient) was not processed!

x_ols (molybdenum [ug/l]_interwell_pooled-upgradient)

General Statistics

Total Number of Observations	47	Number of Missing Observations	0
Number of Distinct Observations	34		
Number of Detects	31	Number of Non-Detects	16
Number of Distinct Detects	31	Number of Distinct Non-Detects	3
Minimum Detect	13.74	Minimum Non-Detect	1
Maximum Detect	69.2	Maximum Non-Detect	5
Variance Detected	179.6	Percent Non-Detects	34.04%
Mean Detected	29.14	SD Detected	13.4
Mean of Detected Logged Data	3.276	SD of Detected Logged Data	0.443

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.074	d2max (for USL)	2.933

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.889	Shapiro Wilk GOF Test
1% Shapiro Wilk Critical Value	0.902	Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.17	Lilliefors GOF Test
1% Lilliefors Critical Value	0.182	Detected Data appear Normal at 1% Significance Level

Detected Data appear Approximate Normal at 1% Significance Level

Kaplan Meier (KM) Background Statistics Assuming Normal Distribution

KM Mean	19.56	KM SD	17.1

Background Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:33:36 PM
From File	filea1b841356b96.xls
Full Precision	OFF
Confidence Coefficient	95%
Coverage	95%
Different or Future K Observations	1
Number of Bootstrap Operations	2000

95% UTL95% Coverage	55.02	95% KM UPL (t)	48.57
90% KM Percentile (z)	41.47	95% KM Percentile (z)	47.68
99% KM Percentile (z)	59.34	95% KM USL	69.71

DL/2 Substitution Background Statistics Assuming Normal Distribution

Mean	19.47	SD	17.39
95% UTL95% Coverage	55.52	95% UPL (t)	48.96
90% Percentile (z)	41.75	95% Percentile (z)	48.07
99% Percentile (z)	59.91	95% USL	70.45

DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.934	Anderson-Darling GOF Test
5% A-D Critical Value	0.747	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.178	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.158	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	5.348	k star (bias corrected MLE)	4.852
Theta hat (MLE)	5.448	Theta star (bias corrected MLE)	6.005
nu hat (MLE)	331.6	nu star (bias corrected)	300.8
MLE Mean (bias corrected)	29.14		
MLE Sd (bias corrected)	13.23	95% Percentile of Chisquare (2kstar)	17.9

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	20.74
Maximum	69.2	Median	17.76
SD	16.16	CV	0.779
k hat (MLE)	0.712	k star (bias corrected MLE)	0.681
Theta hat (MLE)	29.11	Theta star (bias corrected MLE)	30.45
nu hat (MLE)	66.95	nu star (bias corrected)	64.01
MLE Mean (bias corrected)	20.74	MLE Sd (bias corrected)	25.13
95% Percentile of Chisquare (2kstar)	4.682	90% Percentile	52.39
95% Percentile	71.29	99% Percentile	116.5

The following statistics are computed using Gamma ROS Statistics on Imputed Data

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	88.47	110.8	95% Approx. Gamma UPL	68.48	81.38
95% Gamma USL	147.6	207			

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	19.56	SD (KM)	17.1
Variance (KM)	292.4	SE of Mean (KM)	2.535
k hat (KM)	1.308	k star (KM)	1.239
nu hat (KM)	123	nu star (KM)	116.5
theta hat (KM)	14.95	theta star (KM)	15.79
80% gamma percentile (KM)	30.87	90% gamma percentile (KM)	42.71

Background Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:33:36 PM
From File	filea1b841356b96.xls
Full Precision	OFF
Confidence Coefficient	95%
Coverage	95%
Different or Future K Observations	1
Number of Bootstrap Operations	2000

95% gamma percentile (KM)	54.37	99% gamma percentile (KM)	81.02

The following statistics are computed using gamma distribution and KM estimates

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	87.56	101.5	95% Approx. Gamma UPL	66.72	73.92
95% KM Gamma Percentile	64.16	70.65	95% Gamma USL	150.2	192.4

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.926	Shapiro Wilk GOF Test
10% Shapiro Wilk Critical Value	0.94	Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.172	Lilliefors GOF Test
10% Lilliefors Critical Value	0.143	Data Not Lognormal at 10% Significance Level

Data Not Lognormal at 10% Significance Level

Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects

Mean in Original Scale	22.42	Mean in Log Scale	2.912
SD in Original Scale	14.43	SD in Log Scale	0.642
95% UTL95% Coverage	69.74	95% BCA UTL95% Coverage	62.13
95% Bootstrap (%) UTL95% Coverage	63.55	95% UPL (t)	54.72
90% Percentile (z)	41.92	95% Percentile (z)	52.94
99% Percentile (z)	82.02	95% USL	121.1

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean of Logged Data	2.161	95% KM UTL (Lognormal)95% Coverage	235.6
KM SD of Logged Data	1.592	95% KM UPL (Lognormal)	129.2
95% KM Percentile Lognormal (z)	119	95% KM USL (Lognormal)	924.4

Background DL/2 Statistics Assuming Lognormal Distribution

Mean in Original Scale	19.47	Mean in Log Scale	2.019
SD in Original Scale	17.39	SD in Log Scale	1.819
95% UTL95% Coverage	327.3	95% UPL (t)	164.7
90% Percentile (z)	77.47	95% Percentile (z)	150
99% Percentile (z)	518	95% USL	1560

DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.

Nonparametric Distribution Free Background Statistics

Data appear to follow a Discernible Distribution

Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)

Order of Statistic, r	47	95% UTL with95% Coverage	69.2
Approx, f used to compute achieved CC	2.474	Approximate Actual Confidence Coefficient achieved by UTL	0.91
Approximate Sample Size needed to achieve specified CC	59	95% UPL	48.48
95% USL	69.2	95% KM Chebyshev UPL	94.88

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20. Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers and consists of observations collected from clean unimpacted locations.

The use of USL tends to provide a balance between false positives and false negatives provided the data represents a background data set and when many onsite observations need to be compared with the BTV.

x_ols (nickel [ug/l]_interwell_pooled-upgradient)

Background Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:33:36 PM
From File	filea1b841356b96.xls
Full Precision	OFF
Confidence Coefficient	95%
Coverage	95%
Different or Future K Observations	1
Number of Bootstrap Operations	2000

General Statistics

Total Number of Observations	29	Number of Missing Observations	0
Number of Distinct Observations	23		
Number of Detects	26	Number of Non-Detects	3
Number of Distinct Detects	23	Number of Distinct Non-Detects	1
Minimum Detect	1	Minimum Non-Detect	1
Maximum Detect	12	Maximum Non-Detect	1
Variance Detected	7.667	Percent Non-Detects	10.34%
Mean Detected	4.562	SD Detected	2.769
Mean of Detected Logged Data	1.352	SD of Detected Logged Data	0.602

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.232	d2max (for USL)	2.73

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.858	Shapiro Wilk GOF Test
1% Shapiro Wilk Critical Value	0.891	Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.154	Lilliefors GOF Test
1% Lilliefors Critical Value	0.199	Detected Data appear Normal at 1% Significance Level

Detected Data appear Approximate Normal at 1% Significance Level

Kaplan Meier (KM) Background Statistics Assuming Normal Distribution

KM Mean	4.193	KM SD	2.79
95% UTL95% Coverage	10.42	95% KM UPL (t)	9.021
90% KM Percentile (z)	7.769	95% KM Percentile (z)	8.783
99% KM Percentile (z)	10.68	95% KM USL	11.81

DL/2 Substitution Background Statistics Assuming Normal Distribution

Mean	4.141	SD	2.904
95% UTL95% Coverage	10.62	95% UPL (t)	9.165
90% Percentile (z)	7.862	95% Percentile (z)	8.917
99% Percentile (z)	10.9	95% USL	12.07

DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.299	Anderson-Darling GOF Test
5% A-D Critical Value	0.75	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.083	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.172	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	3.17	k star (bias corrected MLE)	2.83
Theta hat (MLE)	1.439	Theta star (bias corrected MLE)	1.612
nu hat (MLE)	164.8	nu star (bias corrected)	147.1
MLE Mean (bias corrected)	4.562		
MLE Sd (bias corrected)	2.712	95% Percentile of Chisquare (2kstar)	12.08

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
 GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
 For such situations, GROS method may yield incorrect values of UCLs and BTVs
 This is especially true when the sample size is small.

Background Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:33:36 PM
From File	filea1b841356b96.xls
Full Precision	OFF
Confidence Coefficient	95%
Coverage	95%
Different or Future K Observations	1
Number of Bootstrap Operations	2000

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	4.112
Maximum	12	Median	3.9
SD	2.943	CV	0.716
k hat (MLE)	1.257	k star (bias corrected MLE)	1.15
Theta hat (MLE)	3.27	Theta star (bias corrected MLE)	3.575
nu hat (MLE)	72.93	nu star (bias corrected)	66.72
MLE Mean (bias corrected)	4.112	MLE Sd (bias corrected)	3.834
95% Percentile of Chisquare (2kstar)	6.562	90% Percentile	9.147
95% Percentile	11.73	99% Percentile	17.66

The following statistics are computed using Gamma ROS Statistics on Imputed Data

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	15.7	18.34	95% Approx. Gamma UPL	11.78	13.13
95% Gamma USL	20.37	24.91			

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	4.193	SD (KM)	2.79
Variance (KM)	7.786	SE of Mean (KM)	0.528
k hat (KM)	2.258	k star (KM)	2.048
nu hat (KM)	131	nu star (KM)	118.8
theta hat (KM)	1.857	theta star (KM)	2.048
80% gamma percentile (KM)	6.26	90% gamma percentile (KM)	8.11
95% gamma percentile (KM)	9.872	99% gamma percentile (KM)	13.78

The following statistics are computed using gamma distribution and KM estimates

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	12.3	12.87	95% Approx. Gamma UPL	9.734	9.975
95% KM Gamma Percentile	9.336	9.536	95% Gamma USL	15.26	16.33

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.971	Shapiro Wilk GOF Test
10% Shapiro Wilk Critical Value	0.933	Detected Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.104	Lilliefors GOF Test
10% Lilliefors Critical Value	0.156	Detected Data appear Lognormal at 10% Significance Level

Detected Data appear Lognormal at 10% Significance Level

Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects

Mean in Original Scale	4.191	Mean in Log Scale	1.209
SD in Original Scale	2.842	SD in Log Scale	0.713
95% UTL95% Coverage	16.47	95% BCA UTL95% Coverage	12
95% Bootstrap (%) UTL95% Coverage	12	95% UPL (t)	11.51
90% Percentile (z)	8.358	95% Percentile (z)	10.83
99% Percentile (z)	17.61	95% USL	23.49

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean of Logged Data	1.212	95% KM UTL (Lognormal)95% Coverage	15.81
KM SD of Logged Data	0.694	95% KM UPL (Lognormal)	11.16
95% KM Percentile Lognormal (z)	10.52	95% KM USL (Lognormal)	22.34

Background DL/2 Statistics Assuming Lognormal Distribution

Mean in Original Scale	4.141	Mean in Log Scale	1.14

Background Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:33:36 PM
From File	filea1b841356b96.xls
Full Precision	OFF
Confidence Coefficient	95%
Coverage	95%
Different or Future K Observations	1
Number of Bootstrap Operations	2000

SD in Original Scale	2.904	SD in Log Scale	0.851
95% UTL	20.91	95% UPL (t)	13.64
90% Percentile (z)	9.311	95% Percentile (z)	12.69
99% Percentile (z)	22.66	95% USL	31.96

DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.

Nonparametric Distribution Free Background Statistics

Data appear to follow a Discernible Distribution

Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)

Order of Statistic, r	29	95% UTL with 95% Coverage	12
Approx, f used to compute achieved CC	1.526	Approximate Actual Confidence Coefficient achieved by UTL	0.774
Approximate Sample Size needed to achieve specified CC	59	95% UPL	12
95% USL	12	95% KM Chebyshev UPL	16.56

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.

Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers and consists of observations collected from clean unimpacted locations.

The use of USL tends to provide a balance between false positives and false negatives provided the data represents a background data set and when many onsite observations need to be compared with the BTV.

x_ols (ph, lab [su]_interwell_pooled-upgradient)

General Statistics

Total Number of Observations	47	Number of Distinct Observations	44
Minimum	6.43	First Quartile	6.97
Second Largest	8.03	Median	7.33
Maximum	8.17	Third Quartile	7.532
Mean	7.243	SD	0.42
Coefficient of Variation	0.058	Skewness	-0.326
Mean of logged Data	1.978	SD of logged Data	0.0587

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.074	d2max (for USL)	2.933

Normal GOF Test

Shapiro Wilk Test Statistic	0.937
1% Shapiro Wilk Critical Value	0.928
Lilliefors Test Statistic	0.159
1% Lilliefors Critical Value	0.15

Shapiro Wilk GOF Test

Data appear Normal at 1% Significance Level

Lilliefors GOF Test

Data Not Normal at 1% Significance Level

Data appear Approximate Normal at 1% Significance Level

Background Statistics Assuming Normal Distribution

95% UTL with 95% Coverage	8.113	90% Percentile (z)	7.781
95% UPL (t)	7.955	95% Percentile (z)	7.933
95% USL	8.474	99% Percentile (z)	8.219

Gamma GOF Test

A-D Test Statistic	1.267
5% A-D Critical Value	0.748
K-S Test Statistic	0.167
5% K-S Critical Value	0.129

Anderson-Darling Gamma GOF Test

Data Not Gamma Distributed at 5% Significance Level

Kolmogorov-Smirnov Gamma GOF Test

Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Background Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:33:36 PM
From File	filea1b841356b96.xls
Full Precision	OFF
Confidence Coefficient	95%
Coverage	95%
Different or Future K Observations	1
Number of Bootstrap Operations	2000

Gamma Statistics

k hat (MLE)	299.5	k star (bias corrected MLE)	280.4
Theta hat (MLE)	0.0242	Theta star (bias corrected MLE)	0.0258
nu hat (MLE)	28157	nu star (bias corrected)	26361
MLE Mean (bias corrected)	7.243	MLE Sd (bias corrected)	0.433

Background Statistics Assuming Gamma Distribution

95% Wilson Hilferty (WH) Approx. Gamma UPL	7.976	90% Percentile	7.802
95% Hawkins Wixley (HW) Approx. Gamma UPL	7.979	95% Percentile	7.969
95% WH Approx. Gamma UTL with 95% Coverage	8.147	99% Percentile	8.287
95% HW Approx. Gamma UTL with 95% Coverage	8.152		
95% WH USL	8.547	95% HW USL	8.557

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.929	Shapiro Wilk Lognormal GOF Test
10% Shapiro Wilk Critical Value	0.954	Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.169	Lilliefors Lognormal GOF Test
10% Lilliefors Critical Value	0.118	Data Not Lognormal at 10% Significance Level

Data Not Lognormal at 10% Significance Level

Background Statistics assuming Lognormal Distribution

95% UTL with 95% Coverage	8.166	90% Percentile (z)	7.796
95% UPL (t)	7.988	95% Percentile (z)	7.963
95% USL	8.588	99% Percentile (z)	8.288

Nonparametric Distribution Free Background Statistics

Data appear Approximate Normal at 1% Significance Level

Nonparametric Upper Limits for Background Threshold Values

Order of Statistic, order	47	95% UTL with 95% Coverage	8.17
Approx, f used to compute achieved CC	2.474	Approximate Actual Confidence Coefficient achieved by UTL	0.91
		Approximate Sample Size needed to achieve specified CC	59
95% Percentile Bootstrap UTL with 95% Coverage	8.128	95% BCA Bootstrap UTL with 95% Coverage	8.043
95% UPL	7.917	90% Percentile	7.658
90% Chebyshev UPL	8.516	95% Percentile	7.748
95% Chebyshev UPL	9.092	99% Percentile	8.106
95% USL	8.17		

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20. Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers and consists of observations collected from clean unimpacted locations.

The use of USL tends to provide a balance between false positives and false negatives provided the data represents a background data set and when many onsite observations need to be compared with the BTV.

x_ols (radium-226/228 [pci/l]_interwell_pooled-upgradient)

General Statistics

Total Number of Observations	47	Number of Distinct Observations	14
Minimum	0.497	First Quartile	2
Second Largest	2.54	Median	2
Maximum	2.65	Third Quartile	2
Mean	1.792	SD	0.51

Background Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:33:36 PM
From File	filea1b841356b96.xls
Full Precision	OFF
Confidence Coefficient	95%
Coverage	95%
Different or Future K Observations	1
Number of Bootstrap Operations	2000

Coefficient of Variation	0.284	Skewness	-1.521
Mean of logged Data	0.518	SD of logged Data	0.418

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.074	d2max (for USL)	2.933

Normal GOF Test

Shapiro Wilk Test Statistic	0.671
1% Shapiro Wilk Critical Value	0.928
Lilliefors Test Statistic	0.424
1% Lilliefors Critical Value	0.15

Shapiro Wilk GOF Test

Data Not Normal at 1% Significance Level

Lilliefors GOF Test

Data Not Normal at 1% Significance Level

Data Not Normal at 1% Significance Level

Background Statistics Assuming Normal Distribution

95% UTL with 95% Coverage	2.849	90% Percentile (z)	2.445
95% UPL (t)	2.657	95% Percentile (z)	2.63
95% USL	3.287	99% Percentile (z)	2.978

Gamma GOF Test

A-D Test Statistic	8.73
5% A-D Critical Value	0.751
K-S Test Statistic	0.433
5% K-S Critical Value	0.129

Anderson-Darling Gamma GOF Test

Data Not Gamma Distributed at 5% Significance Level

Kolmogorov-Smirnov Gamma GOF Test

Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	7.801	k star (bias corrected MLE)	7.317
Theta hat (MLE)	0.23	Theta star (bias corrected MLE)	0.245
nu hat (MLE)	733.3	nu star (bias corrected)	687.8
MLE Mean (bias corrected)	1.792	MLE Sd (bias corrected)	0.663

Background Statistics Assuming Gamma Distribution

95% Wilson Hilferty (WH) Approx. Gamma UPL	3.024	90% Percentile	2.676
95% Hawkins Wixley (HW) Approx. Gamma UPL	3.101	95% Percentile	3.002
95% WH Approx. Gamma UTL with 95% Coverage	3.383	99% Percentile	3.68
95% HW Approx. Gamma UTL with 95% Coverage	3.499		
95% WH USL	4.302	95% HW USL	4.548

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.596
10% Shapiro Wilk Critical Value	0.954
Lilliefors Test Statistic	0.428
10% Lilliefors Critical Value	0.118

Shapiro Wilk Lognormal GOF Test

Data Not Lognormal at 10% Significance Level

Lilliefors Lognormal GOF Test

Data Not Lognormal at 10% Significance Level

Data Not Lognormal at 10% Significance Level

Background Statistics assuming Lognormal Distribution

95% UTL with 95% Coverage	3.993	90% Percentile (z)	2.868
95% UPL (t)	3.41	95% Percentile (z)	3.338
95% USL	5.717	99% Percentile (z)	4.437

Nonparametric Distribution Free Background Statistics

Data do not follow a Discernible Distribution

Background Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:33:36 PM
From File	filea1b841356b96.xls
Full Precision	OFF
Confidence Coefficient	95%
Coverage	95%
Different or Future K Observations	1
Number of Bootstrap Operations	2000

Nonparametric Upper Limits for Background Threshold Values

Order of Statistic, order	47	95% UTL with 95% Coverage	2.65
Approx, f used to compute achieved CC	2.474	Approximate Actual Confidence Coefficient achieved by UTL	0.91
		Approximate Sample Size needed to achieve specified CC	59
95% Percentile Bootstrap UTL with 95% Coverage	2.617	95% BCA Bootstrap UTL with 95% Coverage	2.54
95% UPL	2.396	90% Percentile	2
90% Chebyshev UPL	3.337	95% Percentile	2.126
95% Chebyshev UPL	4.037	99% Percentile	2.599
95% USL	2.65		

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20. Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers and consists of observations collected from clean unimpacted locations.

The use of USL tends to provide a balance between false positives and false negatives provided the data represents a background data set and when many onsite observations need to be compared with the BTV.

x_ols (selenium [ug/l]_interwell_pooled-upgradient)

General Statistics

Total Number of Observations	47	Number of Distinct Observations	41
Minimum	2.8	First Quartile	4.05
Second Largest	22.95	Median	13
Maximum	23.01	Third Quartile	16.79
Mean	11.8	SD	6.697
Coefficient of Variation	0.568	Skewness	0.0621
Mean of logged Data	2.259	SD of logged Data	0.703

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.074	d2max (for USL)	2.933

Normal GOF Test

Shapiro Wilk Test Statistic	0.888
1% Shapiro Wilk Critical Value	0.928
Lilliefors Test Statistic	0.171
1% Lilliefors Critical Value	0.15

Shapiro Wilk GOF Test

Data Not Normal at 1% Significance Level

Lilliefors GOF Test

Data Not Normal at 1% Significance Level

Data Not Normal at 1% Significance Level

Background Statistics Assuming Normal Distribution

95% UTL with 95% Coverage	25.69	90% Percentile (z)	20.38
95% UPL (t)	23.16	95% Percentile (z)	22.82
95% USL	31.44	99% Percentile (z)	27.38

Gamma GOF Test

A-D Test Statistic	2.174
5% A-D Critical Value	0.759
K-S Test Statistic	0.168
5% K-S Critical Value	0.13

Anderson-Darling Gamma GOF Test

Data Not Gamma Distributed at 5% Significance Level

Kolmogorov-Smirnov Gamma GOF Test

Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	2.546
Theta hat (MLE)	4.634
nu hat (MLE)	239.3

k star (bias corrected MLE)	2.398
Theta star (bias corrected MLE)	4.921
nu star (bias corrected)	225.4

Background Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:33:36 PM
 From File filea1b841356b96.xls
 Full Precision OFF
 Confidence Coefficient 95%
 Coverage 95%
 Different or Future K Observations 1
 Number of Bootstrap Operations 2000

MLE Mean (bias corrected) 11.8 MLE Sd (bias corrected) 7.62

Background Statistics Assuming Gamma Distribution

95% Wilson Hilferty (WH) Approx. Gamma UPL	26.89	90% Percentile	22
95% Hawkins Wixley (HW) Approx. Gamma UPL	27.75	95% Percentile	26.46
95% WH Approx. Gamma UTL with 95% Coverage	32.08	99% Percentile	36.23
95% HW Approx. Gamma UTL with 95% Coverage	33.66		
95% WH USL	46.31	95% HW USL	50.59

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.848	Shapiro Wilk Lognormal GOF Test
10% Shapiro Wilk Critical Value	0.954	Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.179	Lilliefors Lognormal GOF Test
10% Lilliefors Critical Value	0.118	Data Not Lognormal at 10% Significance Level

Data Not Lognormal at 10% Significance Level

Background Statistics assuming Lognormal Distribution

95% UTL with 95% Coverage	41.11	90% Percentile (z)	23.56
95% UPL (t)	31.54	95% Percentile (z)	30.41
95% USL	75.18	99% Percentile (z)	49.1

Nonparametric Distribution Free Background Statistics

Data do not follow a Discernible Distribution

Nonparametric Upper Limits for Background Threshold Values

Order of Statistic, order	47	95% UTL with 95% Coverage	23.01
Approx, f used to compute achieved CC	2.474	Approximate Actual Confidence Coefficient achieved by UTL	0.91
		Approximate Sample Size needed to achieve specified CC	59
95% Percentile Bootstrap UTL with 95% Coverage	22.99	95% BCA Bootstrap UTL with 95% Coverage	22.95
95% UPL	22.77	90% Percentile	20.72
90% Chebyshev UPL	32.1	95% Percentile	22.19
95% Chebyshev UPL	41.3	99% Percentile	22.98
95% USL	23.01		

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20. Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers and consists of observations collected from clean unimpacted locations.

The use of USL tends to provide a balance between false positives and false negatives provided the data represents a background data set and when many onsite observations need to be compared with the BTV.

x_ols (sulfate [mg/l]_interwell_pooled-upgradient)

General Statistics

Total Number of Observations	47	Number of Distinct Observations	44
Minimum	19.71	First Quartile	41.26
Second Largest	88	Median	56.45
Maximum	101.8	Third Quartile	70.04
Mean	56.56	SD	17.69
Coefficient of Variation	0.313	Skewness	0.176
Mean of logged Data	3.983	SD of logged Data	0.338

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.074	d2max (for USL)	2.933

Background Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:33:36 PM
From File	filea1b841356b96.xls
Full Precision	OFF
Confidence Coefficient	95%
Coverage	95%
Different or Future K Observations	1
Number of Bootstrap Operations	2000

Normal GOF Test

Shapiro Wilk Test Statistic	0.977
1% Shapiro Wilk Critical Value	0.928
Lilliefors Test Statistic	0.0832
1% Lilliefors Critical Value	0.15

Shapiro Wilk GOF Test

Data appear Normal at 1% Significance Level

Lilliefors GOF Test

Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Background Statistics Assuming Normal Distribution

95% UTL with 95% Coverage	93.25	90% Percentile (z)	79.24
95% UPL (t)	86.58	95% Percentile (z)	85.66
95% USL	108.4	99% Percentile (z)	97.72

Gamma GOF Test

A-D Test Statistic	0.489
5% A-D Critical Value	0.749
K-S Test Statistic	0.0826
5% K-S Critical Value	0.129

Anderson-Darling Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

Kolmogorov-Smirnov Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	9.694
Theta hat (MLE)	5.835
nu hat (MLE)	911.2
MLE Mean (bias corrected)	56.56

k star (bias corrected MLE)	9.089
Theta star (bias corrected MLE)	6.223
nu star (bias corrected)	854.4
MLE Sd (bias corrected)	18.76

Background Statistics Assuming Gamma Distribution

95% Wilson Hilferty (WH) Approx. Gamma UPL	91.11	90% Percentile	81.54
95% Hawkins Wixley (HW) Approx. Gamma UPL	91.99	95% Percentile	90.54
95% WH Approx. Gamma UTL with 95% Coverage	101	99% Percentile	109.1
95% HW Approx. Gamma UTL with 95% Coverage	102.5		
95% WH USL	126	95% HW USL	129.7

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.96
10% Shapiro Wilk Critical Value	0.954
Lilliefors Test Statistic	0.0973
10% Lilliefors Critical Value	0.118

Shapiro Wilk Lognormal GOF Test

Data appear Lognormal at 10% Significance Level

Lilliefors Lognormal GOF Test

Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Background Statistics assuming Lognormal Distribution

95% UTL with 95% Coverage	108.2	90% Percentile (z)	82.8
95% UPL (t)	95.27	95% Percentile (z)	93.62
95% USL	144.7	99% Percentile (z)	117.9

Nonparametric Distribution Free Background Statistics

Data appear Normal at 1% Significance Level

Nonparametric Upper Limits for Background Threshold Values

Order of Statistic, order	47	95% UTL with 95% Coverage	101.8
Approx, f used to compute achieved CC	2.474	Approximate Actual Confidence Coefficient achieved by UTL	0.91
		Approximate Sample Size needed to achieve specified CC	59
95% Percentile Bootstrap UTL with 95% Coverage	97.67	95% BCA Bootstrap UTL with 95% Coverage	88

Background Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:33:36 PM
From File	filea1b841356b96.xls
Full Precision	OFF
Confidence Coefficient	95%
Coverage	95%
Different or Future K Observations	1
Number of Bootstrap Operations	2000

95% UPL	85.42	90% Percentile	78.4
90% Chebyshev UPL	110.2	95% Percentile	80.78
95% Chebyshev UPL	134.5	99% Percentile	95.46
95% USL	101.8		

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20. Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers and consists of observations collected from clean unimpacted locations.

The use of USL tends to provide a balance between false positives and false negatives provided the data represents a background data set and when many onsite observations need to be compared with the BTV.

x_ols (thallium [ug/l]_interwell_pooled-upgradient)

General Statistics

Total Number of Observations	47	Number of Missing Observations	0
Number of Distinct Observations	3		
Number of Detects	2	Number of Non-Detects	45
Number of Distinct Detects	2	Number of Distinct Non-Detects	2
Minimum Detect	1	Minimum Non-Detect	1
Maximum Detect	1.4	Maximum Non-Detect	2
Variance Detected	0.08	Percent Non-Detects	95.74%
Mean Detected	1.2	SD Detected	0.283
Mean of Detected Logged Data	0.168	SD of Detected Logged Data	0.238

Warning: Data set has only 2 Detected Values.

This is not enough to compute meaningful or reliable statistics and estimates.

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.074	d2max (for USL)	2.933

Normal GOF Test on Detects Only Not Enough Data to Perform GOF Test

Kaplan Meier (KM) Background Statistics Assuming Normal Distribution

KM Mean	1.017	KM SD	0.0816
95% UTL95% Coverage	1.187	95% KM UPL (t)	1.156
90% KM Percentile (z)	1.122	95% KM Percentile (z)	1.152
99% KM Percentile (z)	1.207	95% KM USL	1.257

DL/2 Substitution Background Statistics Assuming Normal Distribution

Mean	0.785	SD	0.265
95% UTL95% Coverage	1.335	95% UPL (t)	1.235
90% Percentile (z)	1.125	95% Percentile (z)	1.222
99% Percentile (z)	1.402	95% USL	1.563

DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons

Gamma GOF Tests on Detected Observations Only Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	35.66	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.0336	Theta star (bias corrected MLE)	N/A

Background Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:33:36 PM
From File	filea1b841356b96.xls
Full Precision	OFF
Confidence Coefficient	95%
Coverage	95%
Different or Future K Observations	1
Number of Bootstrap Operations	2000

nu hat (MLE)	142.7	nu star (bias corrected)	N/A
MLE Mean (bias corrected)	N/A		
MLE Sd (bias corrected)	N/A	95% Percentile of Chisquare (2kstar)	N/A

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	1.017	SD (KM)	0.0816
Variance (KM)	0.00665	SE of Mean (KM)	0.0241
k hat (KM)	155.6	k star (KM)	145.6
nu hat (KM)	14622	nu star (KM)	13690
theta hat (KM)	0.00654	theta star (KM)	0.00699
80% gamma percentile (KM)	1.088	90% gamma percentile (KM)	1.127
95% gamma percentile (KM)	1.16	99% gamma percentile (KM)	1.224

The following statistics are computed using gamma distribution and KM estimates

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW	WH	HW
95% Approx. Gamma UTL with 95% Coverage	1.175	1.174	95% Approx. Gamma UPL	1.145
95% KM Gamma Percentile	1.141	1.14	95% Gamma USL	1.245

Lognormal GOF Test on Detected Observations Only

Not Enough Data to Perform GOF Test

Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects

Mean in Original Scale	0.3	Mean in Log Scale	-1.628
SD in Original Scale	0.303	SD in Log Scale	0.941
95% UTL95% Coverage	1.381	95% BCA UTL95% Coverage	1.232
95% Bootstrap (%) UTL95% Coverage	1.341	95% UPL (t)	0.968
90% Percentile (z)	0.655	95% Percentile (z)	0.923
99% Percentile (z)	1.752	95% USL	3.098

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean of Logged Data	0.0146	95% KM UTL (Lognormal)95% Coverage	1.17
KM SD of Logged Data	0.0686	95% KM UPL (Lognormal)	1.14
95% KM Percentile Lognormal (z)	1.136	95% KM USL (Lognormal)	1.241

Background DL/2 Statistics Assuming Lognormal Distribution

Mean in Original Scale	0.785	Mean in Log Scale	-0.303
SD in Original Scale	0.265	SD in Log Scale	0.358
95% UTL95% Coverage	1.553	95% UPL (t)	1.357
90% Percentile (z)	1.169	95% Percentile (z)	1.332
99% Percentile (z)	1.7	95% USL	2.112

DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.

Nonparametric Distribution Free Background Statistics

Data do not follow a Discernible Distribution

Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)

Order of Statistic, r	47	95% UTL with 95% Coverage	2
Approx, f used to compute achieved CC	2.474	Approximate Actual Confidence Coefficient achieved by UTL	0.91
Approximate Sample Size needed to achieve specified CC	59	95% UPL	2
95% USL	2	95% KM Chebyshev UPL	1.377

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.

Background Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:33:36 PM
From File	filea1b841356b96.xls
Full Precision	OFF
Confidence Coefficient	95%
Coverage	95%
Different or Future K Observations	1
Number of Bootstrap Operations	2000

Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers and consists of observations collected from clean unimpacted locations.

The use of USL tends to provide a balance between false positives and false negatives provided the data represents a background data set and when many onsite observations need to be compared with the BTV.

x_ols (turbidity, field [ntu]_interwell_pooled-upgradient)

General Statistics

Total Number of Observations	24	Number of Distinct Observations	23
Minimum	3.82	First Quartile	18.9
Second Largest	95.6	Median	26.05
Maximum	133	Third Quartile	34.98
Mean	35.76	SD	32.11
Coefficient of Variation	0.898	Skewness	1.802
Mean of logged Data	3.233	SD of logged Data	0.878

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.309	d2max (for USL)	2.644

Normal GOF Test

Shapiro Wilk Test Statistic	0.769
1% Shapiro Wilk Critical Value	0.884
Lilliefors Test Statistic	0.297
1% Lilliefors Critical Value	0.205

Shapiro Wilk GOF Test

Data Not Normal at 1% Significance Level

Lilliefors GOF Test

Data Not Normal at 1% Significance Level

Data Not Normal at 1% Significance Level

Background Statistics Assuming Normal Distribution

95% UTL with 95% Coverage	109.9	90% Percentile (z)	76.91
95% UPL (t)	91.93	95% Percentile (z)	88.58
95% USL	120.7	99% Percentile (z)	110.5

Gamma GOF Test

A-D Test Statistic	0.746
5% A-D Critical Value	0.76
K-S Test Statistic	0.191
5% K-S Critical Value	0.181

Anderson-Darling Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

Kolmogorov-Smirnov Gamma GOF Test

Data Not Gamma Distributed at 5% Significance Level

Detected data follow Appr. Gamma Distribution at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.599	k star (bias corrected MLE)	1.427
Theta hat (MLE)	22.36	Theta star (bias corrected MLE)	25.05
nu hat (MLE)	76.77	nu star (bias corrected)	68.51
MLE Mean (bias corrected)	35.76	MLE Sd (bias corrected)	29.93

Background Statistics Assuming Gamma Distribution

95% Wilson Hilferty (WH) Approx. Gamma UPL	97.22	90% Percentile	75.43
95% Hawkins Wixley (HW) Approx. Gamma UPL	100.1	95% Percentile	94.72
95% WH Approx. Gamma UTL with 95% Coverage	132	99% Percentile	138.4
95% HW Approx. Gamma UTL with 95% Coverage	140.2		
95% WH USL	156.2	95% HW USL	169.3

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.948

Shapiro Wilk Lognormal GOF Test

Background Statistics for Data Sets with Non-Detects

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From File	filea1b841356b96.xls
Full Precision	OFF
Confidence Coefficient	95%
Coverage	95%
Different or Future K Observations	1
Number of Bootstrap Operations	2000

10% Shapiro Wilk Critical Value	0.93	Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.148	Lilliefors Lognormal GOF Test
10% Lilliefors Critical Value	0.162	Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Background Statistics assuming Lognormal Distribution

95% UTL with 95% Coverage	192.4	90% Percentile (z)	78.09
95% UPL (t)	117.7	95% Percentile (z)	107.4
95% USL	258.2	99% Percentile (z)	195.4

Nonparametric Distribution Free Background Statistics

Data appear Approximate Gamma Distribution at 5% Significance Level

Nonparametric Upper Limits for Background Threshold Values

Order of Statistic, order	24	95% UTL with 95% Coverage	133
Approx, f used to compute achieved CC	1.263	Approximate Actual Confidence Coefficient achieved by UTL	0.708
		Approximate Sample Size needed to achieve specified CC	59
95% Percentile Bootstrap UTL with 95% Coverage	133	95% BCA Bootstrap UTL with 95% Coverage	127.4
95% UPL	123.7	90% Percentile	87.61
90% Chebyshev UPL	134.1	95% Percentile	94.69
95% Chebyshev UPL	178.6	99% Percentile	124.4
95% USL	133		

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.

Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers and consists of observations collected from clean unimpacted locations.

The use of USL tends to provide a balance between false positives and false negatives provided the data represents a background data set and when many onsite observations need to be compared with the BTV.

group	D	x	ols	x	ols
Radium-226/228 [pCi/L] Interwell POOLED-Upgradient		1			2.54
Radium-226/228 [pCi/L] Interwell POOLED-Upgradient		1			2
Radium-226/228 [pCi/L] Interwell POOLED-Upgradient		1			1.31
Radium-226/228 [pCi/L] Interwell POOLED-Upgradient		1			2
Radium-226/228 [pCi/L] Interwell POOLED-Upgradient		1			2
Radium-226/228 [pCi/L] Interwell POOLED-Upgradient		1			2
Radium-226/228 [pCi/L] Interwell POOLED-Upgradient		1			2
Radium-226/228 [pCi/L] Interwell POOLED-Upgradient		1			2
Radium-226/228 [pCi/L] Interwell POOLED-Upgradient		1			0.693
Radium-226/228 [pCi/L] Interwell POOLED-Upgradient		1			2
Radium-226/228 [pCi/L] Interwell POOLED-Upgradient		1			2
Radium-226/228 [pCi/L] Interwell POOLED-Upgradient		1			0.691
Radium-226/228 [pCi/L] Interwell POOLED-Upgradient		1			2
Radium-226/228 [pCi/L] Interwell POOLED-Upgradient		1			2
Radium-226/228 [pCi/L] Interwell POOLED-Upgradient		1			2
Radium-226/228 [pCi/L] Interwell POOLED-Upgradient		1			2.18
Dissolved Solids, Total [mg/L] Interwell POOLED-Upgradient		1			334.667949
Dissolved Solids, Total [mg/L] Interwell POOLED-Upgradient		1			363.2880116
Dissolved Solids, Total [mg/L] Interwell POOLED-Upgradient		1			311.8798895
Dissolved Solids, Total [mg/L] Interwell POOLED-Upgradient		1			349.0072761
Dissolved Solids, Total [mg/L] Interwell POOLED-Upgradient		1			411.8810007
Dissolved Solids, Total [mg/L] Interwell POOLED-Upgradient		1			372.444694
Dissolved Solids, Total [mg/L] Interwell POOLED-Upgradient		1			331.0365719
Dissolved Solids, Total [mg/L] Interwell POOLED-Upgradient		1			325.8220029
Dissolved Solids, Total [mg/L] Interwell POOLED-Upgradient		1			406.414992
Dissolved Solids, Total [mg/L] Interwell POOLED-Upgradient		1			373.5570264
Dissolved Solids, Total [mg/L] Interwell POOLED-Upgradient		1			374.3608449
Dissolved Solids, Total [mg/L] Interwell POOLED-Upgradient		1			322.4476212
Dissolved Solids, Total [mg/L] Interwell POOLED-Upgradient		1			351.8433176
Dissolved Solids, Total [mg/L] Interwell POOLED-Upgradient		1			298.8162441
Dissolved Solids, Total [mg/L] Interwell POOLED-Upgradient		1			385
Lead [ug/L] Interwell POOLED-Upgradient		0			1
Lead [ug/L] Interwell POOLED-Upgradient		0			1
Lead [ug/L] Interwell POOLED-Upgradient		0			1
Lead [ug/L] Interwell POOLED-Upgradient		0			1
Lead [ug/L] Interwell POOLED-Upgradient		0			1
Lead [ug/L] Interwell POOLED-Upgradient		0			1
Lead [ug/L] Interwell POOLED-Upgradient		0			1
Lead [ug/L] Interwell POOLED-Upgradient		0			1
Lead [ug/L] Interwell POOLED-Upgradient		1			1.3
Lead [ug/L] Interwell POOLED-Upgradient		1			6.2
Lead [ug/L] Interwell POOLED-Upgradient		1			1.4
Lead [ug/L] Interwell POOLED-Upgradient		0			1
Lead [ug/L] Interwell POOLED-Upgradient		0			1
Lead [ug/L] Interwell POOLED-Upgradient		1			2.6
Lead [ug/L] Interwell POOLED-Upgradient		1			2
Lead [ug/L] Interwell POOLED-Upgradient		0			2
Lithium [ug/L] Interwell POOLED-Upgradient		1			14.27138183
Lithium [ug/L] Interwell POOLED-Upgradient		1			16.78304257
Lithium [ug/L] Interwell POOLED-Upgradient		1			16.09417328
Lithium [ug/L] Interwell POOLED-Upgradient		1			16.30530399
Lithium [ug/L] Interwell POOLED-Upgradient		1			16.81537463
Lithium [ug/L] Interwell POOLED-Upgradient		1			16.73180567
Lithium [ug/L] Interwell POOLED-Upgradient		1			15.24240635
Lithium [ug/L] Interwell POOLED-Upgradient		1			14.75353706
Lithium [ug/L] Interwell POOLED-Upgradient		1			16.79576064
Lithium [ug/L] Interwell POOLED-Upgradient		1			16.64452375
Lithium [ug/L] Interwell POOLED-Upgradient		1			15.28480631
Lithium [ug/L] Interwell POOLED-Upgradient		1			15.51872847
Lithium [ug/L] Interwell POOLED-Upgradient		1			14.09558336
Lithium [ug/L] Interwell POOLED-Upgradient		1			14.64063622
Lithium [ug/L] Interwell POOLED-Upgradient		1			18.87773858
Lithium [ug/L] Interwell POOLED-Upgradient		1			15.3
Thallium [ug/L] Interwell POOLED-Upgradient		0			1
Thallium [ug/L] Interwell POOLED-Upgradient		0			1

[illegible]

[illegible]

group	D x ols	x ols
Cobalt [ug/L] Interwell_POOLED-Upgradient	0	1
Cobalt [ug/L] Interwell_POOLED-Upgradient	0	1
Cobalt [ug/L] Interwell_POOLED-Upgradient	0	1
Cobalt [ug/L] Interwell_POOLED-Upgradient	1	1.7
Cobalt [ug/L] Interwell_POOLED-Upgradient	1	1.7
Cobalt [ug/L] Interwell_POOLED-Upgradient	1	3.1
Cobalt [ug/L] Interwell_POOLED-Upgradient	1	1.3
Cobalt [ug/L] Interwell_POOLED-Upgradient	1	1.4
Cobalt [ug/L] Interwell_POOLED-Upgradient	1	4.1
Cobalt [ug/L] Interwell_POOLED-Upgradient	1	2.7
Cobalt [ug/L] Interwell_POOLED-Upgradient	0	2
Selenium [ug/L] Interwell_POOLED-Upgradient	1	3.8
Selenium [ug/L] Interwell_POOLED-Upgradient	1	4
Selenium [ug/L] Interwell_POOLED-Upgradient	1	3.4
Selenium [ug/L] Interwell_POOLED-Upgradient	1	4.4
Selenium [ug/L] Interwell_POOLED-Upgradient	1	4.1
Selenium [ug/L] Interwell_POOLED-Upgradient	1	4
Selenium [ug/L] Interwell_POOLED-Upgradient	1	4
Selenium [ug/L] Interwell_POOLED-Upgradient	1	3.7
Selenium [ug/L] Interwell_POOLED-Upgradient	1	2.8
Selenium [ug/L] Interwell_POOLED-Upgradient	1	3.8
Selenium [ug/L] Interwell_POOLED-Upgradient	1	3.5
Selenium [ug/L] Interwell_POOLED-Upgradient	1	3.7
Selenium [ug/L] Interwell_POOLED-Upgradient	1	3.3
Selenium [ug/L] Interwell_POOLED-Upgradient	1	3.7
Selenium [ug/L] Interwell_POOLED-Upgradient	1	5.4
Selenium [ug/L] Interwell_POOLED-Upgradient	1	5.14
Molybdenum [ug/L] Interwell_POOLED-Upgradient	0	1
Molybdenum [ug/L] Interwell_POOLED-Upgradient	0	1
Molybdenum [ug/L] Interwell_POOLED-Upgradient	0	1
Molybdenum [ug/L] Interwell_POOLED-Upgradient	0	1
Molybdenum [ug/L] Interwell_POOLED-Upgradient	0	1
Molybdenum [ug/L] Interwell_POOLED-Upgradient	0	1
Molybdenum [ug/L] Interwell_POOLED-Upgradient	0	1
Molybdenum [ug/L] Interwell_POOLED-Upgradient	0	1
Molybdenum [ug/L] Interwell_POOLED-Upgradient	0	1
Molybdenum [ug/L] Interwell_POOLED-Upgradient	0	1.5
Molybdenum [ug/L] Interwell_POOLED-Upgradient	0	1.5
Molybdenum [ug/L] Interwell_POOLED-Upgradient	0	1.5
Molybdenum [ug/L] Interwell_POOLED-Upgradient	0	1.5
Molybdenum [ug/L] Interwell_POOLED-Upgradient	0	1.5
Molybdenum [ug/L] Interwell_POOLED-Upgradient	0	1.5
Nickel [ug/L] Interwell_POOLED-Upgradient	1	4.4
Nickel [ug/L] Interwell_POOLED-Upgradient	1	6.2
Nickel [ug/L] Interwell_POOLED-Upgradient	1	5.4
Nickel [ug/L] Interwell_POOLED-Upgradient	1	4
Nickel [ug/L] Interwell_POOLED-Upgradient	1	3.8
Nickel [ug/L] Interwell_POOLED-Upgradient	1	4.6
Nickel [ug/L] Interwell_POOLED-Upgradient	1	5
Nickel [ug/L] Interwell_POOLED-Upgradient	1	5.7
Nickel [ug/L] Interwell_POOLED-Upgradient	1	8.3
Nickel [ug/L] Interwell_POOLED-Upgradient	1	12
Calcium [mg/L] Interwell_POOLED-Upgradient	1	84.3
Calcium [mg/L] Interwell_POOLED-Upgradient	1	93
Calcium [mg/L] Interwell_POOLED-Upgradient	1	86.2
Calcium [mg/L] Interwell_POOLED-Upgradient	1	88.2
Calcium [mg/L] Interwell_POOLED-Upgradient	1	91.2
Calcium [mg/L] Interwell_POOLED-Upgradient	1	91
Calcium [mg/L] Interwell_POOLED-Upgradient	1	97.1
Calcium [mg/L] Interwell_POOLED-Upgradient	1	85.8
Calcium [mg/L] Interwell_POOLED-Upgradient	1	90.3
Calcium [mg/L] Interwell_POOLED-Upgradient	1	91.4
Calcium [mg/L] Interwell_POOLED-Upgradient	1	79.7
Calcium [mg/L] Interwell_POOLED-Upgradient	1	75.5

group	D	x_ols	x_ols
Calcium [mg/L] Interwell POOLED-Upgradient		1	66.8
Calcium [mg/L] Interwell POOLED-Upgradient		1	59.2
Calcium [mg/L] Interwell POOLED-Upgradient		1	94.3
Mercury [ug/L] Interwell POOLED-Upgradient		0	0.2
Mercury [ug/L] Interwell POOLED-Upgradient		0	0.2
Mercury [ug/L] Interwell POOLED-Upgradient		0	0.2
Mercury [ug/L] Interwell POOLED-Upgradient		0	0.2
Mercury [ug/L] Interwell POOLED-Upgradient		0	0.2
Mercury [ug/L] Interwell POOLED-Upgradient		0	0.2
Mercury [ug/L] Interwell POOLED-Upgradient		0	0.2
Mercury [ug/L] Interwell POOLED-Upgradient		0	0.2
Mercury [ug/L] Interwell POOLED-Upgradient		0	0.2
Mercury [ug/L] Interwell POOLED-Upgradient		0	0.2
Mercury [ug/L] Interwell POOLED-Upgradient		0	0.2
Mercury [ug/L] Interwell POOLED-Upgradient		0	0.2
Mercury [ug/L] Interwell POOLED-Upgradient		0	0.2
Mercury [ug/L] Interwell POOLED-Upgradient		0	0.2
Sulfate [mg/L] Interwell POOLED-Upgradient		1	41
Sulfate [mg/L] Interwell POOLED-Upgradient		1	65
Sulfate [mg/L] Interwell POOLED-Upgradient		1	65
Sulfate [mg/L] Interwell POOLED-Upgradient		1	54
Sulfate [mg/L] Interwell POOLED-Upgradient		1	58
Sulfate [mg/L] Interwell POOLED-Upgradient		1	88
Sulfate [mg/L] Interwell POOLED-Upgradient		1	78
Sulfate [mg/L] Interwell POOLED-Upgradient		1	79
Sulfate [mg/L] Interwell POOLED-Upgradient		1	33
Sulfate [mg/L] Interwell POOLED-Upgradient		1	73
Sulfate [mg/L] Interwell POOLED-Upgradient		1	69
Sulfate [mg/L] Interwell POOLED-Upgradient		1	74
Sulfate [mg/L] Interwell POOLED-Upgradient		1	37
Sulfate [mg/L] Interwell POOLED-Upgradient		1	79
Sulfate [mg/L] Interwell POOLED-Upgradient		1	73
Sulfate [mg/L] Interwell POOLED-Upgradient		1	68.9
pH, Lab [SU] Interwell POOLED-Upgradient		1	6.64
pH, Lab [SU] Interwell POOLED-Upgradient		1	6.54
pH, Lab [SU] Interwell POOLED-Upgradient		1	6.6
pH, Lab [SU] Interwell POOLED-Upgradient		1	6.8
pH, Lab [SU] Interwell POOLED-Upgradient		1	7.11
pH, Lab [SU] Interwell POOLED-Upgradient		1	6.96
pH, Lab [SU] Interwell POOLED-Upgradient		1	7.09
pH, Lab [SU] Interwell POOLED-Upgradient		1	6.52
pH, Lab [SU] Interwell POOLED-Upgradient		1	6.98
pH, Lab [SU] Interwell POOLED-Upgradient		1	6.91
pH, Lab [SU] Interwell POOLED-Upgradient		1	6.43
pH, Lab [SU] Interwell POOLED-Upgradient		1	6.57
pH, Lab [SU] Interwell POOLED-Upgradient		1	6.53
pH, Lab [SU] Interwell POOLED-Upgradient		1	6.66
pH, Lab [SU] Interwell POOLED-Upgradient		1	6.59
pH, Lab [SU] Interwell POOLED-Upgradient		1	7.19
Fluoride [ug/L] Interwell POOLED-Upgradient		1	150
Fluoride [ug/L] Interwell POOLED-Upgradient		1	170
Fluoride [ug/L] Interwell POOLED-Upgradient		1	160
Fluoride [ug/L] Interwell POOLED-Upgradient		1	120
Fluoride [ug/L] Interwell POOLED-Upgradient		1	140
Fluoride [ug/L] Interwell POOLED-Upgradient		1	150
Fluoride [ug/L] Interwell POOLED-Upgradient		1	180
Fluoride [ug/L] Interwell POOLED-Upgradient		1	160
Fluoride [ug/L] Interwell POOLED-Upgradient		1	210
Fluoride [ug/L] Interwell POOLED-Upgradient		1	150
Fluoride [ug/L] Interwell POOLED-Upgradient		1	180
Fluoride [ug/L] Interwell POOLED-Upgradient		1	170
Fluoride [ug/L] Interwell POOLED-Upgradient		1	140
Fluoride [ug/L] Interwell POOLED-Upgradient		1	170

group	D	x_ols	x_ols
Fluoride [ug/L] Interwell POOLED-Upgradient	1		170
Fluoride [ug/L] Interwell POOLED-Upgradient	1		183
Chloride [mg/L] Interwell POOLED-Upgradient	0		5
Chloride [mg/L] Interwell POOLED-Upgradient	0		5
Chloride [mg/L] Interwell POOLED-Upgradient	0		5
Chloride [mg/L] Interwell POOLED-Upgradient	0		5
Chloride [mg/L] Interwell POOLED-Upgradient	0		5
Chloride [mg/L] Interwell POOLED-Upgradient	1		9
Chloride [mg/L] Interwell POOLED-Upgradient	1		11
Chloride [mg/L] Interwell POOLED-Upgradient	1		10
Chloride [mg/L] Interwell POOLED-Upgradient	1		2
Chloride [mg/L] Interwell POOLED-Upgradient	1		7
Chloride [mg/L] Interwell POOLED-Upgradient	1		7
Chloride [mg/L] Interwell POOLED-Upgradient	1		7
Chloride [mg/L] Interwell POOLED-Upgradient	0		4
Chloride [mg/L] Interwell POOLED-Upgradient	1		5
Chloride [mg/L] Interwell POOLED-Upgradient	1		7
Chloride [mg/L] Interwell POOLED-Upgradient	1		9.07
Radium-226/228 [pCi/L] Interwell POOLED-Upgradient	1		2
Radium-226/228 [pCi/L] Interwell POOLED-Upgradient	1		2
Radium-226/228 [pCi/L] Interwell POOLED-Upgradient	1		1.57
Radium-226/228 [pCi/L] Interwell POOLED-Upgradient	1		2
Radium-226/228 [pCi/L] Interwell POOLED-Upgradient	1		2
Radium-226/228 [pCi/L] Interwell POOLED-Upgradient	1		2
Radium-226/228 [pCi/L] Interwell POOLED-Upgradient	1		2
Radium-226/228 [pCi/L] Interwell POOLED-Upgradient	1		0.503
Radium-226/228 [pCi/L] Interwell POOLED-Upgradient	1		2
Radium-226/228 [pCi/L] Interwell POOLED-Upgradient	1		2
Radium-226/228 [pCi/L] Interwell POOLED-Upgradient	1		0.512
Radium-226/228 [pCi/L] Interwell POOLED-Upgradient	1		2
Radium-226/228 [pCi/L] Interwell POOLED-Upgradient	1		2
Radium-226/228 [pCi/L] Interwell POOLED-Upgradient	1		2
Radium-226/228 [pCi/L] Interwell POOLED-Upgradient	1		1.29
Chloride [mg/L] Interwell POOLED-Upgradient	1		11.93494218
Chloride [mg/L] Interwell POOLED-Upgradient	1		11.94504622
Chloride [mg/L] Interwell POOLED-Upgradient	1		11.95469099
Chloride [mg/L] Interwell POOLED-Upgradient	1		11.96433575
Chloride [mg/L] Interwell POOLED-Upgradient	1		11.97306197
Chloride [mg/L] Interwell POOLED-Upgradient	1		11.98729948
Chloride [mg/L] Interwell POOLED-Upgradient	1		11.99648498
Chloride [mg/L] Interwell POOLED-Upgradient	1		12.7359171
Chloride [mg/L] Interwell POOLED-Upgradient	1		11.77725181
Chloride [mg/L] Interwell POOLED-Upgradient	1		11.81307523
Chloride [mg/L] Interwell POOLED-Upgradient	1		12.84200953
Chloride [mg/L] Interwell POOLED-Upgradient	1		11.90906363
Chloride [mg/L] Interwell POOLED-Upgradient	1		10.94810197
Chloride [mg/L] Interwell POOLED-Upgradient	1		11.98025119
Chloride [mg/L] Interwell POOLED-Upgradient	1		12.1
Lead [ug/L] Interwell POOLED-Upgradient	0		1
Lead [ug/L] Interwell POOLED-Upgradient	0		1
Lead [ug/L] Interwell POOLED-Upgradient	0		1
Lead [ug/L] Interwell POOLED-Upgradient	0		1
Lead [ug/L] Interwell POOLED-Upgradient	0		1
Lead [ug/L] Interwell POOLED-Upgradient	0		1
Lead [ug/L] Interwell POOLED-Upgradient	0		1
Lead [ug/L] Interwell POOLED-Upgradient	0		1
Lead [ug/L] Interwell POOLED-Upgradient	1		3.9
Lead [ug/L] Interwell POOLED-Upgradient	0		1
Lead [ug/L] Interwell POOLED-Upgradient	0		1
Lead [ug/L] Interwell POOLED-Upgradient	0		1
Lead [ug/L] Interwell POOLED-Upgradient	0		1
Lead [ug/L] Interwell POOLED-Upgradient	0		1
Lead [ug/L] Interwell POOLED-Upgradient	0		1
Lead [ug/L] Interwell POOLED-Upgradient	0		2
Lithium [ug/L] Interwell POOLED-Upgradient	1		15.02209572
Lithium [ug/L] Interwell POOLED-Upgradient	1		14.7465519

group	D_x_ols	x_ols
Lithium [ug/L] Interwell POOLED-Upgradient	1	14.86989644
Lithium [ug/L] Interwell POOLED-Upgradient	1	15.49324098
Lithium [ug/L] Interwell POOLED-Upgradient	1	14.21436224
Lithium [ug/L] Interwell POOLED-Upgradient	1	14.84882322
Lithium [ug/L] Interwell POOLED-Upgradient	1	13.07105612
Lithium [ug/L] Interwell POOLED-Upgradient	1	23.96080424
Lithium [ug/L] Interwell POOLED-Upgradient	1	13.76085227
Lithium [ug/L] Interwell POOLED-Upgradient	1	12.64756057
Lithium [ug/L] Interwell POOLED-Upgradient	1	13.31759419
Lithium [ug/L] Interwell POOLED-Upgradient	1	15.47989433
Lithium [ug/L] Interwell POOLED-Upgradient	1	13.27438414
Lithium [ug/L] Interwell POOLED-Upgradient	1	13.75219927
Lithium [ug/L] Interwell POOLED-Upgradient	1	13.9
Thallium [ug/L] Interwell POOLED-Upgradient	0	1
Thallium [ug/L] Interwell POOLED-Upgradient	0	1
Thallium [ug/L] Interwell POOLED-Upgradient	0	1
Thallium [ug/L] Interwell POOLED-Upgradient	0	1
Thallium [ug/L] Interwell POOLED-Upgradient	0	1
Thallium [ug/L] Interwell POOLED-Upgradient	0	1
Thallium [ug/L] Interwell POOLED-Upgradient	0	1
Thallium [ug/L] Interwell POOLED-Upgradient	1	1
Thallium [ug/L] Interwell POOLED-Upgradient	0	2
Thallium [ug/L] Interwell POOLED-Upgradient	0	2
Thallium [ug/L] Interwell POOLED-Upgradient	0	2
Thallium [ug/L] Interwell POOLED-Upgradient	0	2
Thallium [ug/L] Interwell POOLED-Upgradient	0	2
Thallium [ug/L] Interwell POOLED-Upgradient	0	2
Thallium [ug/L] Interwell POOLED-Upgradient	0	2
Thallium [ug/L] Interwell POOLED-Upgradient	0	2
Antimony [ug/L] Interwell POOLED-Upgradient	0	1
Antimony [ug/L] Interwell POOLED-Upgradient	0	1
Antimony [ug/L] Interwell POOLED-Upgradient	0	1
Antimony [ug/L] Interwell POOLED-Upgradient	0	1
Antimony [ug/L] Interwell POOLED-Upgradient	0	1
Antimony [ug/L] Interwell POOLED-Upgradient	0	1
Antimony [ug/L] Interwell POOLED-Upgradient	0	1
Antimony [ug/L] Interwell POOLED-Upgradient	0	1
Antimony [ug/L] Interwell POOLED-Upgradient	0	1
Antimony [ug/L] Interwell POOLED-Upgradient	0	1
Antimony [ug/L] Interwell POOLED-Upgradient	0	1
Antimony [ug/L] Interwell POOLED-Upgradient	0	1
Antimony [ug/L] Interwell POOLED-Upgradient	0	1
Antimony [ug/L] Interwell POOLED-Upgradient	1	1
Antimony [ug/L] Interwell POOLED-Upgradient	0	1
Antimony [ug/L] Interwell POOLED-Upgradient	0	1
Antimony [ug/L] Interwell POOLED-Upgradient	0	4
Arsenic [ug/L] Interwell POOLED-Upgradient	1	3.1
Arsenic [ug/L] Interwell POOLED-Upgradient	1	2.4
Arsenic [ug/L] Interwell POOLED-Upgradient	1	1.8
Arsenic [ug/L] Interwell POOLED-Upgradient	1	2.2
Arsenic [ug/L] Interwell POOLED-Upgradient	1	2
Arsenic [ug/L] Interwell POOLED-Upgradient	1	2
Arsenic [ug/L] Interwell POOLED-Upgradient	1	2.2
Arsenic [ug/L] Interwell POOLED-Upgradient	1	2.6
Arsenic [ug/L] Interwell POOLED-Upgradient	1	2.5
Arsenic [ug/L] Interwell POOLED-Upgradient	1	2.1
Arsenic [ug/L] Interwell POOLED-Upgradient	1	2.4
Arsenic [ug/L] Interwell POOLED-Upgradient	1	2.1
Arsenic [ug/L] Interwell POOLED-Upgradient	1	2
Arsenic [ug/L] Interwell POOLED-Upgradient	1	2.6
Arsenic [ug/L] Interwell POOLED-Upgradient	1	2.35
Barium [ug/L] Interwell POOLED-Upgradient	1	227
Barium [ug/L] Interwell POOLED-Upgradient	1	171
Barium [ug/L] Interwell POOLED-Upgradient	1	118
Barium [ug/L] Interwell POOLED-Upgradient	1	133
Barium [ug/L] Interwell POOLED-Upgradient	1	121
Barium [ug/L] Interwell POOLED-Upgradient	1	129
Barium [ug/L] Interwell POOLED-Upgradient	1	133

group	D	x_ols	x_ols
Barium [ug/L] Interwell POOLED-Upgradient		1	186
Barium [ug/L] Interwell POOLED-Upgradient		1	134
Barium [ug/L] Interwell POOLED-Upgradient		1	124
Barium [ug/L] Interwell POOLED-Upgradient		1	122
Barium [ug/L] Interwell POOLED-Upgradient		1	123
Barium [ug/L] Interwell POOLED-Upgradient		1	120
Barium [ug/L] Interwell POOLED-Upgradient		1	131
Barium [ug/L] Interwell POOLED-Upgradient		1	138
Beryllium [ug/L] Interwell POOLED-Upgradient		0	1
Beryllium [ug/L] Interwell POOLED-Upgradient		0	1
Beryllium [ug/L] Interwell POOLED-Upgradient		0	1
Beryllium [ug/L] Interwell POOLED-Upgradient		0	1
Beryllium [ug/L] Interwell POOLED-Upgradient		0	1
Beryllium [ug/L] Interwell POOLED-Upgradient		0	1
Beryllium [ug/L] Interwell POOLED-Upgradient		0	1
Beryllium [ug/L] Interwell POOLED-Upgradient		0	1
Beryllium [ug/L] Interwell POOLED-Upgradient		0	1
Beryllium [ug/L] Interwell POOLED-Upgradient		0	1
Beryllium [ug/L] Interwell POOLED-Upgradient		0	1
Beryllium [ug/L] Interwell POOLED-Upgradient		0	1
Beryllium [ug/L] Interwell POOLED-Upgradient		0	1
Beryllium [ug/L] Interwell POOLED-Upgradient		0	1
Beryllium [ug/L] Interwell POOLED-Upgradient		0	2
Boron [mg/L] Interwell POOLED-Upgradient		1	0.671179066
Boron [mg/L] Interwell POOLED-Upgradient		1	0.365168548
Boron [mg/L] Interwell POOLED-Upgradient		1	0.466067599
Boron [mg/L] Interwell POOLED-Upgradient		1	0.59196665
Boron [mg/L] Interwell POOLED-Upgradient		1	0.307684839
Boron [mg/L] Interwell POOLED-Upgradient		1	0.173488199
Boron [mg/L] Interwell POOLED-Upgradient		1	0.123296819
Boron [mg/L] Interwell POOLED-Upgradient		1	1.561890713
Boron [mg/L] Interwell POOLED-Upgradient		1	0.289029502
Boron [mg/L] Interwell POOLED-Upgradient		1	0.21008312
Boron [mg/L] Interwell POOLED-Upgradient		1	0.197780272
Boron [mg/L] Interwell POOLED-Upgradient		1	0.458983197
Boron [mg/L] Interwell POOLED-Upgradient		1	0.202669831
Boron [mg/L] Interwell POOLED-Upgradient		1	0.191
Cadmium [ug/L] Interwell POOLED-Upgradient		0	1
Cadmium [ug/L] Interwell POOLED-Upgradient		0	1
Cadmium [ug/L] Interwell POOLED-Upgradient		0	1
Cadmium [ug/L] Interwell POOLED-Upgradient		0	1
Cadmium [ug/L] Interwell POOLED-Upgradient		0	1
Cadmium [ug/L] Interwell POOLED-Upgradient		0	1
Cadmium [ug/L] Interwell POOLED-Upgradient		0	1
Cadmium [ug/L] Interwell POOLED-Upgradient		0	1
Cadmium [ug/L] Interwell POOLED-Upgradient		0	1
Cadmium [ug/L] Interwell POOLED-Upgradient		0	1
Cadmium [ug/L] Interwell POOLED-Upgradient		0	1
Cadmium [ug/L] Interwell POOLED-Upgradient		0	1
Cadmium [ug/L] Interwell POOLED-Upgradient		0	1
Cadmium [ug/L] Interwell POOLED-Upgradient		0	1
Cadmium [ug/L] Interwell POOLED-Upgradient		0	1
Chromium [ug/L] Interwell POOLED-Upgradient		1	14.8
Chromium [ug/L] Interwell POOLED-Upgradient		1	2.1
Chromium [ug/L] Interwell POOLED-Upgradient		0	1
Chromium [ug/L] Interwell POOLED-Upgradient		0	1
Chromium [ug/L] Interwell POOLED-Upgradient		0	1
Chromium [ug/L] Interwell POOLED-Upgradient		1	1.1
Chromium [ug/L] Interwell POOLED-Upgradient		1	1.6
Chromium [ug/L] Interwell POOLED-Upgradient		1	1.5
Chromium [ug/L] Interwell POOLED-Upgradient		0	1.5
Chromium [ug/L] Interwell POOLED-Upgradient		1	1.5
Chromium [ug/L] Interwell POOLED-Upgradient		0	1.5
Chromium [ug/L] Interwell POOLED-Upgradient		0	1.5
Chromium [ug/L] Interwell POOLED-Upgradient		1	1.8

group	D	x_ols	x_ols
Chromium [ug/L] Interwell_POOLED-Upgradient	0		1.5
Chromium [ug/L] Interwell_POOLED-Upgradient	0		2
Cobalt [ug/L] Interwell_POOLED-Upgradient	1		3.1
Cobalt [ug/L] Interwell_POOLED-Upgradient	1		1.4
Cobalt [ug/L] Interwell_POOLED-Upgradient	0		1
Cobalt [ug/L] Interwell_POOLED-Upgradient	0		1
Cobalt [ug/L] Interwell_POOLED-Upgradient	0		1
Cobalt [ug/L] Interwell_POOLED-Upgradient	0		1
Cobalt [ug/L] Interwell_POOLED-Upgradient	0		1
Cobalt [ug/L] Interwell_POOLED-Upgradient	1		1
Cobalt [ug/L] Interwell_POOLED-Upgradient	0		1
Cobalt [ug/L] Interwell_POOLED-Upgradient	0		1
Cobalt [ug/L] Interwell_POOLED-Upgradient	0		1
Cobalt [ug/L] Interwell_POOLED-Upgradient	0		1
Cobalt [ug/L] Interwell_POOLED-Upgradient	0		1
Cobalt [ug/L] Interwell_POOLED-Upgradient	0		1
Cobalt [ug/L] Interwell_POOLED-Upgradient	0		2
Calcium [mg/L] Interwell_POOLED-Upgradient	1		85.9
Calcium [mg/L] Interwell_POOLED-Upgradient	1		85.3
Calcium [mg/L] Interwell_POOLED-Upgradient	1		76.5
Calcium [mg/L] Interwell_POOLED-Upgradient	1		81.9
Calcium [mg/L] Interwell_POOLED-Upgradient	1		85.6
Calcium [mg/L] Interwell_POOLED-Upgradient	1		81.5
Calcium [mg/L] Interwell_POOLED-Upgradient	1		80.3
Calcium [mg/L] Interwell_POOLED-Upgradient	1		110
Calcium [mg/L] Interwell_POOLED-Upgradient	1		89.5
Calcium [mg/L] Interwell_POOLED-Upgradient	1		80.5
Calcium [mg/L] Interwell_POOLED-Upgradient	1		80.3
Calcium [mg/L] Interwell_POOLED-Upgradient	1		86.9
Calcium [mg/L] Interwell_POOLED-Upgradient	1		69.5
Calcium [mg/L] Interwell_POOLED-Upgradient	1		80.9
Selenium [ug/L] Interwell_POOLED-Upgradient	1		17.07717972
Selenium [ug/L] Interwell_POOLED-Upgradient	1		18.3347054
Selenium [ug/L] Interwell_POOLED-Upgradient	1		21.39416173
Selenium [ug/L] Interwell_POOLED-Upgradient	1		22.95361806
Selenium [ug/L] Interwell_POOLED-Upgradient	1		18.11693569
Selenium [ug/L] Interwell_POOLED-Upgradient	1		18.55708551
Selenium [ug/L] Interwell_POOLED-Upgradient	1		18.91847249
Selenium [ug/L] Interwell_POOLED-Upgradient	1		23.01012434
Selenium [ug/L] Interwell_POOLED-Upgradient	1		16.03636575
Selenium [ug/L] Interwell_POOLED-Upgradient	1		14.58577497
Selenium [ug/L] Interwell_POOLED-Upgradient	1		20.26414395
Selenium [ug/L] Interwell_POOLED-Upgradient	1		20.1822689
Selenium [ug/L] Interwell_POOLED-Upgradient	1		15.51816357
Selenium [ug/L] Interwell_POOLED-Upgradient	1		21.48301799
Selenium [ug/L] Interwell_POOLED-Upgradient	1		22.5
Molybdenum [ug/L] Interwell_POOLED-Upgradient	1		15.0989984
Molybdenum [ug/L] Interwell_POOLED-Upgradient	1		18.06731321
Molybdenum [ug/L] Interwell_POOLED-Upgradient	1		25.63252279
Molybdenum [ug/L] Interwell_POOLED-Upgradient	1		23.29773238
Molybdenum [ug/L] Interwell_POOLED-Upgradient	1		17.75673153
Molybdenum [ug/L] Interwell_POOLED-Upgradient	1		17.7529933
Molybdenum [ug/L] Interwell_POOLED-Upgradient	1		15.51509767
Molybdenum [ug/L] Interwell_POOLED-Upgradient	1		43.71449939
Molybdenum [ug/L] Interwell_POOLED-Upgradient	1		17.89396905
Molybdenum [ug/L] Interwell_POOLED-Upgradient	1		13.73617609
Molybdenum [ug/L] Interwell_POOLED-Upgradient	1		16.23180485
Molybdenum [ug/L] Interwell_POOLED-Upgradient	1		18.28516675
Molybdenum [ug/L] Interwell_POOLED-Upgradient	1		15.84911031
Molybdenum [ug/L] Interwell_POOLED-Upgradient	1		18.66647561
Molybdenum [ug/L] Interwell_POOLED-Upgradient	1		16.3
Nickel [ug/L] Interwell_POOLED-Upgradient	1		12
Nickel [ug/L] Interwell_POOLED-Upgradient	1		3.2
Nickel [ug/L] Interwell_POOLED-Upgradient	0		1
Nickel [ug/L] Interwell_POOLED-Upgradient	1		1

group	D	x_ols	x_ols
Nickel [ug/L] Interwell POOLED-Upgradient		0	1
Nickel [ug/L] Interwell POOLED-Upgradient		0	1
Nickel [ug/L] Interwell POOLED-Upgradient		1	1.2
Nickel [ug/L] Interwell POOLED-Upgradient		1	4
Nickel [ug/L] Interwell POOLED-Upgradient		1	1.9
Mercury [ug/L] Interwell POOLED-Upgradient		0	0.2
Mercury [ug/L] Interwell POOLED-Upgradient		0	0.2
Mercury [ug/L] Interwell POOLED-Upgradient		0	0.2
Mercury [ug/L] Interwell POOLED-Upgradient		0	0.2
Mercury [ug/L] Interwell POOLED-Upgradient		0	0.2
Mercury [ug/L] Interwell POOLED-Upgradient		0	0.2
Mercury [ug/L] Interwell POOLED-Upgradient		0	0.2
Mercury [ug/L] Interwell POOLED-Upgradient		0	0.2
Mercury [ug/L] Interwell POOLED-Upgradient		0	0.2
Mercury [ug/L] Interwell POOLED-Upgradient		0	0.2
Mercury [ug/L] Interwell POOLED-Upgradient		0	0.2
Mercury [ug/L] Interwell POOLED-Upgradient		0	0.2
Mercury [ug/L] Interwell POOLED-Upgradient		0	0.2
Sulfate [mg/L] Interwell POOLED-Upgradient		1	56.20653365
Sulfate [mg/L] Interwell POOLED-Upgradient		1	38.28995592
Sulfate [mg/L] Interwell POOLED-Upgradient		1	44.36958628
Sulfate [mg/L] Interwell POOLED-Upgradient		1	56.44921663
Sulfate [mg/L] Interwell POOLED-Upgradient		1	41.52126314
Sulfate [mg/L] Interwell POOLED-Upgradient		1	33.63881272
Sulfate [mg/L] Interwell POOLED-Upgradient		1	19.71465115
Sulfate [mg/L] Interwell POOLED-Upgradient		1	101.819645
Sulfate [mg/L] Interwell POOLED-Upgradient		1	37.16091799
Sulfate [mg/L] Interwell POOLED-Upgradient		1	34.45668788
Sulfate [mg/L] Interwell POOLED-Upgradient		1	36.69557895
Sulfate [mg/L] Interwell POOLED-Upgradient		1	46.24919951
Sulfate [mg/L] Interwell POOLED-Upgradient		1	31.57151285
Sulfate [mg/L] Interwell POOLED-Upgradient		1	33.83694737
Sulfate [mg/L] Interwell POOLED-Upgradient		1	35.3
pH, Lab [SU] Interwell POOLED-Upgradient		1	7.498630361
pH, Lab [SU] Interwell POOLED-Upgradient		1	7.536840854
pH, Lab [SU] Interwell POOLED-Upgradient		1	7.575132687
pH, Lab [SU] Interwell POOLED-Upgradient		1	7.573424521
pH, Lab [SU] Interwell POOLED-Upgradient		1	7.701879037
pH, Lab [SU] Interwell POOLED-Upgradient		1	7.599357459
pH, Lab [SU] Interwell POOLED-Upgradient		1	7.747730634
pH, Lab [SU] Interwell POOLED-Upgradient		1	7.526771219
pH, Lab [SU] Interwell POOLED-Upgradient		1	7.629450507
pH, Lab [SU] Interwell POOLED-Upgradient		1	7.353105889
pH, Lab [SU] Interwell POOLED-Upgradient		1	7.74798139
pH, Lab [SU] Interwell POOLED-Upgradient		1	7.336105568
pH, Lab [SU] Interwell POOLED-Upgradient		1	7.569191561
pH, Lab [SU] Interwell POOLED-Upgradient		1	7.503497674
pH, Lab [SU] Interwell POOLED-Upgradient		1	8.03
Fluoride [ug/L] Interwell POOLED-Upgradient		1	190
Fluoride [ug/L] Interwell POOLED-Upgradient		1	220
Fluoride [ug/L] Interwell POOLED-Upgradient		1	210
Fluoride [ug/L] Interwell POOLED-Upgradient		1	200
Fluoride [ug/L] Interwell POOLED-Upgradient		1	200
Fluoride [ug/L] Interwell POOLED-Upgradient		1	200
Fluoride [ug/L] Interwell POOLED-Upgradient		1	220
Fluoride [ug/L] Interwell POOLED-Upgradient		1	230
Fluoride [ug/L] Interwell POOLED-Upgradient		1	190
Fluoride [ug/L] Interwell POOLED-Upgradient		1	200
Fluoride [ug/L] Interwell POOLED-Upgradient		1	190
Fluoride [ug/L] Interwell POOLED-Upgradient		1	190
Fluoride [ug/L] Interwell POOLED-Upgradient		1	200
Fluoride [ug/L] Interwell POOLED-Upgradient		1	200
Fluoride [ug/L] Interwell POOLED-Upgradient		1	197

group	D	x	ols	x	ols
Radium-226/228 [pCi/L] Interwell POOLED-Upgradient		1			2
Radium-226/228 [pCi/L] Interwell POOLED-Upgradient		1			2
Radium-226/228 [pCi/L] Interwell POOLED-Upgradient		1			1.63
Radium-226/228 [pCi/L] Interwell POOLED-Upgradient		1			2
Radium-226/228 [pCi/L] Interwell POOLED-Upgradient		1			2
Radium-226/228 [pCi/L] Interwell POOLED-Upgradient		1			2
Radium-226/228 [pCi/L] Interwell POOLED-Upgradient		1			2
Radium-226/228 [pCi/L] Interwell POOLED-Upgradient		1			2
Radium-226/228 [pCi/L] Interwell POOLED-Upgradient		1			0.497
Radium-226/228 [pCi/L] Interwell POOLED-Upgradient		1			2.65
Radium-226/228 [pCi/L] Interwell POOLED-Upgradient		1			2
Radium-226/228 [pCi/L] Interwell POOLED-Upgradient		1			1.31
Radium-226/228 [pCi/L] Interwell POOLED-Upgradient		1			2
Radium-226/228 [pCi/L] Interwell POOLED-Upgradient		1			2
Radium-226/228 [pCi/L] Interwell POOLED-Upgradient		1			2
Radium-226/228 [pCi/L] Interwell POOLED-Upgradient		1			0.852
Dissolved Solids, Total [mg/L] Interwell POOLED-Upgradient		1			460
Dissolved Solids, Total [mg/L] Interwell POOLED-Upgradient		1			484
Dissolved Solids, Total [mg/L] Interwell POOLED-Upgradient		1			452
Dissolved Solids, Total [mg/L] Interwell POOLED-Upgradient		1			472
Dissolved Solids, Total [mg/L] Interwell POOLED-Upgradient		1			492
Dissolved Solids, Total [mg/L] Interwell POOLED-Upgradient		1			514
Dissolved Solids, Total [mg/L] Interwell POOLED-Upgradient		1			424
Dissolved Solids, Total [mg/L] Interwell POOLED-Upgradient		1			528
Dissolved Solids, Total [mg/L] Interwell POOLED-Upgradient		1			430
Dissolved Solids, Total [mg/L] Interwell POOLED-Upgradient		1			436
Dissolved Solids, Total [mg/L] Interwell POOLED-Upgradient		1			446
Dissolved Solids, Total [mg/L] Interwell POOLED-Upgradient		1			416
Dissolved Solids, Total [mg/L] Interwell POOLED-Upgradient		1			432
Dissolved Solids, Total [mg/L] Interwell POOLED-Upgradient		1			476
Dissolved Solids, Total [mg/L] Interwell POOLED-Upgradient		1			430
Dissolved Solids, Total [mg/L] Interwell POOLED-Upgradient		1			418
Lead [ug/L] Interwell POOLED-Upgradient		0			1
Lead [ug/L] Interwell POOLED-Upgradient		0			1
Lead [ug/L] Interwell POOLED-Upgradient		0			1
Lead [ug/L] Interwell POOLED-Upgradient		0			1
Lead [ug/L] Interwell POOLED-Upgradient		0			1
Lead [ug/L] Interwell POOLED-Upgradient		0			1
Lead [ug/L] Interwell POOLED-Upgradient		0			1
Lead [ug/L] Interwell POOLED-Upgradient		0			1
Lead [ug/L] Interwell POOLED-Upgradient		0			1
Lead [ug/L] Interwell POOLED-Upgradient		1			1.6
Lead [ug/L] Interwell POOLED-Upgradient		0			1
Lead [ug/L] Interwell POOLED-Upgradient		0			1
Lead [ug/L] Interwell POOLED-Upgradient		0			1
Lead [ug/L] Interwell POOLED-Upgradient		0			1
Lead [ug/L] Interwell POOLED-Upgradient		0			2
Lithium [ug/L] Interwell POOLED-Upgradient		1			28.93874805
Lithium [ug/L] Interwell POOLED-Upgradient		1			28.94271621
Lithium [ug/L] Interwell POOLED-Upgradient		1			29.9417335
Lithium [ug/L] Interwell POOLED-Upgradient		1			29.4407508
Lithium [ug/L] Interwell POOLED-Upgradient		1			31.33976809
Lithium [ug/L] Interwell POOLED-Upgradient		1			30.68829404
Lithium [ug/L] Interwell POOLED-Upgradient		1			30.29721306
Lithium [ug/L] Interwell POOLED-Upgradient		1			28.99623036
Lithium [ug/L] Interwell POOLED-Upgradient		1			33.15820362
Lithium [ug/L] Interwell POOLED-Upgradient		1			29.81368318
Lithium [ug/L] Interwell POOLED-Upgradient		1			27.28004717
Lithium [ug/L] Interwell POOLED-Upgradient		1			30.90680425
Lithium [ug/L] Interwell POOLED-Upgradient		1			30.42467964
Lithium [ug/L] Interwell POOLED-Upgradient		1			29.34550315
Lithium [ug/L] Interwell POOLED-Upgradient		1			29.59701454
Lithium [ug/L] Interwell POOLED-Upgradient		1			29
Thallium [ug/L] Interwell POOLED-Upgradient		0			1

[illegible]

[illegible]

group	D	x_ols	x_ols
Selenium [ug/L] Interwell_POOLED-Upgradient		1	16.1
Selenium [ug/L] Interwell_POOLED-Upgradient		1	14
Selenium [ug/L] Interwell_POOLED-Upgradient		1	13
Selenium [ug/L] Interwell_POOLED-Upgradient		1	10.1
Selenium [ug/L] Interwell_POOLED-Upgradient		1	10.2
Selenium [ug/L] Interwell_POOLED-Upgradient		1	13.3
Selenium [ug/L] Interwell_POOLED-Upgradient		1	11.1
Selenium [ug/L] Interwell_POOLED-Upgradient		1	8.5
Selenium [ug/L] Interwell_POOLED-Upgradient		1	9.9
Selenium [ug/L] Interwell_POOLED-Upgradient		1	16.5
Selenium [ug/L] Interwell_POOLED-Upgradient		1	9
Selenium [ug/L] Interwell_POOLED-Upgradient		1	15
Selenium [ug/L] Interwell_POOLED-Upgradient		1	10.5
Molybdenum [ug/L] Interwell_POOLED-Upgradient		1	50.3820988
Molybdenum [ug/L] Interwell_POOLED-Upgradient		1	45.6333195
Molybdenum [ug/L] Interwell_POOLED-Upgradient		1	41.26781541
Molybdenum [ug/L] Interwell_POOLED-Upgradient		1	43.50231131
Molybdenum [ug/L] Interwell_POOLED-Upgradient		1	37.43680722
Molybdenum [ug/L] Interwell_POOLED-Upgradient		1	34.53855108
Molybdenum [ug/L] Interwell_POOLED-Upgradient		1	22.70649658
Molybdenum [ug/L] Interwell_POOLED-Upgradient		1	20.84099248
Molybdenum [ug/L] Interwell_POOLED-Upgradient		1	69.19996748
Molybdenum [ug/L] Interwell_POOLED-Upgradient		1	41.33864865
Molybdenum [ug/L] Interwell_POOLED-Upgradient		1	33.7762835
Molybdenum [ug/L] Interwell_POOLED-Upgradient		1	31.98012
Molybdenum [ug/L] Interwell_POOLED-Upgradient		1	41.60521532
Molybdenum [ug/L] Interwell_POOLED-Upgradient		1	28.02682292
Molybdenum [ug/L] Interwell_POOLED-Upgradient		1	34.01428339
Molybdenum [ug/L] Interwell_POOLED-Upgradient		1	33.2
Nickel [ug/L] Interwell_POOLED-Upgradient		1	6.5
Nickel [ug/L] Interwell_POOLED-Upgradient		1	3.4
Nickel [ug/L] Interwell_POOLED-Upgradient		1	2.9
Nickel [ug/L] Interwell_POOLED-Upgradient		1	2
Nickel [ug/L] Interwell_POOLED-Upgradient		1	2
Nickel [ug/L] Interwell_POOLED-Upgradient		1	2.6
Nickel [ug/L] Interwell_POOLED-Upgradient		1	3.9
Nickel [ug/L] Interwell_POOLED-Upgradient		1	3
Nickel [ug/L] Interwell_POOLED-Upgradient		1	4.5
Nickel [ug/L] Interwell_POOLED-Upgradient		1	5.1
Boron [mg/L] Interwell_POOLED-Upgradient		1	1.116938204
Boron [mg/L] Interwell_POOLED-Upgradient		1	0.918510015
Boron [mg/L] Interwell_POOLED-Upgradient		1	0.889530787
Boron [mg/L] Interwell_POOLED-Upgradient		1	0.990551559
Boron [mg/L] Interwell_POOLED-Upgradient		1	0.821572331
Boron [mg/L] Interwell_POOLED-Upgradient		1	0.50810349
Boron [mg/L] Interwell_POOLED-Upgradient		1	0.150226339
Boron [mg/L] Interwell_POOLED-Upgradient		1	0.025
Boron [mg/L] Interwell_POOLED-Upgradient		1	1.586296422
Boron [mg/L] Interwell_POOLED-Upgradient		1	0.729991974
Boron [mg/L] Interwell_POOLED-Upgradient		1	0.450768831
Boron [mg/L] Interwell_POOLED-Upgradient		1	0.484137379
Boron [mg/L] Interwell_POOLED-Upgradient		1	0.790037977
Boron [mg/L] Interwell_POOLED-Upgradient		1	0.532876259
Boron [mg/L] Interwell_POOLED-Upgradient		1	0.559
Calcium [mg/L] Interwell_POOLED-Upgradient		1	101
Calcium [mg/L] Interwell_POOLED-Upgradient		1	105
Calcium [mg/L] Interwell_POOLED-Upgradient		1	89.4
Calcium [mg/L] Interwell_POOLED-Upgradient		1	97.5
Calcium [mg/L] Interwell_POOLED-Upgradient		1	107
Calcium [mg/L] Interwell_POOLED-Upgradient		1	107
Calcium [mg/L] Interwell_POOLED-Upgradient		1	113
Calcium [mg/L] Interwell_POOLED-Upgradient		1	113
Calcium [mg/L] Interwell_POOLED-Upgradient		1	97.8
Calcium [mg/L] Interwell_POOLED-Upgradient		1	108
Calcium [mg/L] Interwell_POOLED-Upgradient		1	102

group	D	x_ols	x_ols
Calcium [mg/L] Interwell POOLED-Upgradient		1	100
Calcium [mg/L] Interwell POOLED-Upgradient		1	97.5
Calcium [mg/L] Interwell POOLED-Upgradient		1	87.9
Calcium [mg/L] Interwell POOLED-Upgradient		1	124
Mercury [ug/L] Interwell POOLED-Upgradient		0	0.2
Mercury [ug/L] Interwell POOLED-Upgradient		0	0.2
Mercury [ug/L] Interwell POOLED-Upgradient		0	0.2
Mercury [ug/L] Interwell POOLED-Upgradient		0	0.2
Mercury [ug/L] Interwell POOLED-Upgradient		0	0.2
Mercury [ug/L] Interwell POOLED-Upgradient		0	0.2
Mercury [ug/L] Interwell POOLED-Upgradient		0	0.2
Mercury [ug/L] Interwell POOLED-Upgradient		0	0.2
Mercury [ug/L] Interwell POOLED-Upgradient		0	0.2
Mercury [ug/L] Interwell POOLED-Upgradient		0	0.2
Mercury [ug/L] Interwell POOLED-Upgradient		0	0.2
Mercury [ug/L] Interwell POOLED-Upgradient		0	0.2
Mercury [ug/L] Interwell POOLED-Upgradient		0	0.2
Mercury [ug/L] Interwell POOLED-Upgradient		0	0.2
Mercury [ug/L] Interwell POOLED-Upgradient		0	0.2
Sulfate [mg/L] Interwell POOLED-Upgradient		1	75.76376116
Sulfate [mg/L] Interwell POOLED-Upgradient		1	66.21946786
Sulfate [mg/L] Interwell POOLED-Upgradient		1	59.65347424
Sulfate [mg/L] Interwell POOLED-Upgradient		1	71.08748063
Sulfate [mg/L] Interwell POOLED-Upgradient		1	58.52148701
Sulfate [mg/L] Interwell POOLED-Upgradient		1	52.17249658
Sulfate [mg/L] Interwell POOLED-Upgradient		1	51.6499036
Sulfate [mg/L] Interwell POOLED-Upgradient		1	45.08390999
Sulfate [mg/L] Interwell POOLED-Upgradient		1	81.54401681
Sulfate [mg/L] Interwell POOLED-Upgradient		1	72.54044617
Sulfate [mg/L] Interwell POOLED-Upgradient		1	59.14626978
Sulfate [mg/L] Interwell POOLED-Upgradient		1	54.57849085
Sulfate [mg/L] Interwell POOLED-Upgradient		1	60.72503713
Sulfate [mg/L] Interwell POOLED-Upgradient		1	63.56956425
Sulfate [mg/L] Interwell POOLED-Upgradient		1	53.11028691
Sulfate [mg/L] Interwell POOLED-Upgradient		1	50.9
pH, Lab [SU] Interwell POOLED-Upgradient		1	7.31
pH, Lab [SU] Interwell POOLED-Upgradient		1	7.33
pH, Lab [SU] Interwell POOLED-Upgradient		1	7.31
pH, Lab [SU] Interwell POOLED-Upgradient		1	7.42
pH, Lab [SU] Interwell POOLED-Upgradient		1	7.32
pH, Lab [SU] Interwell POOLED-Upgradient		1	7.33
pH, Lab [SU] Interwell POOLED-Upgradient		1	7.25
pH, Lab [SU] Interwell POOLED-Upgradient		1	7.2
pH, Lab [SU] Interwell POOLED-Upgradient		1	7.41
pH, Lab [SU] Interwell POOLED-Upgradient		1	7.51
pH, Lab [SU] Interwell POOLED-Upgradient		1	7.34
pH, Lab [SU] Interwell POOLED-Upgradient		1	7.21
pH, Lab [SU] Interwell POOLED-Upgradient		1	7.39
pH, Lab [SU] Interwell POOLED-Upgradient		1	7.56
pH, Lab [SU] Interwell POOLED-Upgradient		1	7.31
pH, Lab [SU] Interwell POOLED-Upgradient		1	8.17
Fluoride [ug/L] Interwell POOLED-Upgradient		1	171.0376639
Fluoride [ug/L] Interwell POOLED-Upgradient		1	181.1189637
Fluoride [ug/L] Interwell POOLED-Upgradient		1	171.1963921
Fluoride [ug/L] Interwell POOLED-Upgradient		1	161.2738205
Fluoride [ug/L] Interwell POOLED-Upgradient		1	171.3512488
Fluoride [ug/L] Interwell POOLED-Upgradient		1	161.4673914
Fluoride [ug/L] Interwell POOLED-Upgradient		1	161.5525627
Fluoride [ug/L] Interwell POOLED-Upgradient		1	151.6299911
Fluoride [ug/L] Interwell POOLED-Upgradient		1	197.7778052
Fluoride [ug/L] Interwell POOLED-Upgradient		1	168.1339758
Fluoride [ug/L] Interwell POOLED-Upgradient		1	168.4204608
Fluoride [ug/L] Interwell POOLED-Upgradient		1	148.6759745
Fluoride [ug/L] Interwell POOLED-Upgradient		1	159.2373304

group	D x ols	x ols
Fluoride [ug/L] Interwell POOLED-Upgradient	1	149.566401
Fluoride [ug/L] Interwell POOLED-Upgradient	1	179.8412718
Fluoride [ug/L] Interwell POOLED-Upgradient	1	170
Chloride [mg/L] Interwell POOLED-Upgradient	1	12
Chloride [mg/L] Interwell POOLED-Upgradient	1	11
Chloride [mg/L] Interwell POOLED-Upgradient	1	11
Chloride [mg/L] Interwell POOLED-Upgradient	1	11
Chloride [mg/L] Interwell POOLED-Upgradient	1	11
Chloride [mg/L] Interwell POOLED-Upgradient	1	11
Chloride [mg/L] Interwell POOLED-Upgradient	1	10
Chloride [mg/L] Interwell POOLED-Upgradient	1	11
Chloride [mg/L] Interwell POOLED-Upgradient	1	12
Chloride [mg/L] Interwell POOLED-Upgradient	1	10
Chloride [mg/L] Interwell POOLED-Upgradient	1	11
Chloride [mg/L] Interwell POOLED-Upgradient	1	10
Chloride [mg/L] Interwell POOLED-Upgradient	1	12
Chloride [mg/L] Interwell POOLED-Upgradient	1	9
Chloride [mg/L] Interwell POOLED-Upgradient	1	11
Chloride [mg/L] Interwell POOLED-Upgradient	1	9.21
Dissolved Solids, Total [mg/L] Interwell POOLED-Upgradient	1	372
Dissolved Solids, Total [mg/L] Interwell POOLED-Upgradient	1	324
Dissolved Solids, Total [mg/L] Interwell POOLED-Upgradient	1	366
Dissolved Solids, Total [mg/L] Interwell POOLED-Upgradient	1	392
Dissolved Solids, Total [mg/L] Interwell POOLED-Upgradient	1	278
Dissolved Solids, Total [mg/L] Interwell POOLED-Upgradient	1	348
Dissolved Solids, Total [mg/L] Interwell POOLED-Upgradient	1	424
Dissolved Solids, Total [mg/L] Interwell POOLED-Upgradient	1	380
Dissolved Solids, Total [mg/L] Interwell POOLED-Upgradient	1	372
Dissolved Solids, Total [mg/L] Interwell POOLED-Upgradient	1	360
Dissolved Solids, Total [mg/L] Interwell POOLED-Upgradient	1	386
Dissolved Solids, Total [mg/L] Interwell POOLED-Upgradient	1	372
Dissolved Solids, Total [mg/L] Interwell POOLED-Upgradient	1	380
Dissolved Solids, Total [mg/L] Interwell POOLED-Upgradient	1	354
Iron [mg/L] Interwell POOLED-Upgradient	1	0.563
Iron [mg/L] Interwell POOLED-Upgradient	1	0.709
Manganese [mg/L] Interwell POOLED-Upgradient	1	0.192
Manganese [mg/L] Interwell POOLED-Upgradient	1	0.21
Turbidity, Field [NTU] Interwell POOLED-Upgradient	1	19.1
Turbidity, Field [NTU] Interwell POOLED-Upgradient	1	18.3
Turbidity, Field [NTU] Interwell POOLED-Upgradient	1	26.5
Turbidity, Field [NTU] Interwell POOLED-Upgradient	1	37.3
Turbidity, Field [NTU] Interwell POOLED-Upgradient	1	38.7
Turbidity, Field [NTU] Interwell POOLED-Upgradient	1	21.6
Turbidity, Field [NTU] Interwell POOLED-Upgradient	1	22.8
Turbidity, Field [NTU] Interwell POOLED-Upgradient	1	29.8
Iron [mg/L] Interwell POOLED-Upgradient	1	1.42
Iron [mg/L] Interwell POOLED-Upgradient	1	0.405
Manganese [mg/L] Interwell POOLED-Upgradient	1	0.139
Manganese [mg/L] Interwell POOLED-Upgradient	1	0.0791
Turbidity, Field [NTU] Interwell POOLED-Upgradient	1	33.9
Turbidity, Field [NTU] Interwell POOLED-Upgradient	1	31.7
Turbidity, Field [NTU] Interwell POOLED-Upgradient	1	31.7
Turbidity, Field [NTU] Interwell POOLED-Upgradient	1	89.5
Turbidity, Field [NTU] Interwell POOLED-Upgradient	1	83.2
Turbidity, Field [NTU] Interwell POOLED-Upgradient	1	133
Turbidity, Field [NTU] Interwell POOLED-Upgradient	1	95.6
Turbidity, Field [NTU] Interwell POOLED-Upgradient	1	25.6
Iron [mg/L] Interwell POOLED-Upgradient	1	0.496
Iron [mg/L] Interwell POOLED-Upgradient	1	0.179
Manganese [mg/L] Interwell POOLED-Upgradient	1	0.599
Manganese [mg/L] Interwell POOLED-Upgradient	1	0.124
Turbidity, Field [NTU] Interwell POOLED-Upgradient	1	34.2
Turbidity, Field [NTU] Interwell POOLED-Upgradient	1	7.3
Turbidity, Field [NTU] Interwell POOLED-Upgradient	1	7.28
Turbidity, Field [NTU] Interwell POOLED-Upgradient	1	23.6

group	D_x_ols	x_ols
Turbidity, Field [NTU]_Interwell_POOLED-Upgradient	1	24.7
Turbidity, Field [NTU]_Interwell_POOLED-Upgradient	1	5.64
Turbidity, Field [NTU]_Interwell_POOLED-Upgradient	1	3.82
Turbidity, Field [NTU]_Interwell_POOLED-Upgradient	1	13.4

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

report_result_value (antimony [ug/l]_intrawell_apw-02)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	3
Number of Detects	2	Number of Non-Detects	14
Number of Distinct Detects	2	Number of Distinct Non-Detects	2
Minimum Detect	1	Minimum Non-Detect	1
Maximum Detect	2.1	Maximum Non-Detect	4
Variance Detects	0.605	Percent Non-Detects	87.5%
Mean Detects	1.55	SD Detects	0.778
Median Detects	1.55	CV Detects	0.502
Skewness Detects	N/A	Kurtosis Detects	N/A
Mean of Logged Detects	0.371	SD of Logged Detects	0.525

Warning: Data set has only 2 Detected Values.

This is not enough to compute meaningful or reliable statistics and estimates.

Normal GOF Test on Detects Only

Not Enough Data to Perform GOF Test

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	1.073	KM Standard Error of Mean	0.1
90KM SD	0.274	95% KM (BCA) UCL	N/A
95% KM (t) UCL	1.249	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	1.238	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	1.374	95% KM Chebyshev UCL	1.51
97.5% KM Chebyshev UCL	1.699	99% KM Chebyshev UCL	2.07

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	7.594	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.204	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	30.38	nu star (bias corrected)	N/A
Mean (detects)	1.55		

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	1.073	SD (KM)	0.274
Variance (KM)	0.0753	SE of Mean (KM)	0.1
k hat (KM)	15.3	k star (KM)	12.47
nu hat (KM)	489.7	nu star (KM)	399.2
theta hat (KM)	0.0701	theta star (KM)	0.086
80% gamma percentile (KM)	1.317	90% gamma percentile (KM)	1.477
95% gamma percentile (KM)	1.617	99% gamma percentile (KM)	1.904

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (399.18, α)	353.9	Adjusted Level of Significance (β)	0.0335
95% KM Approximate Gamma UCL	1.211	Adjusted Chi Square Value (399.18, β)	349
		95% KM Adjusted Gamma UCL	1.228

Lognormal GOF Test on Detected Observations Only

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
From File filea1b878952361.xls
Full Precision OFF
Confidence Coefficient 95%
Number of Bootstrap Operations 2000

Not Enough Data to Perform GOF Test

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.268	Mean in Log Scale	-2.801
SD in Original Scale	0.548	SD in Log Scale	1.841
95% t UCL (assumes normality of ROS data)	0.508	95% Percentile Bootstrap UCL	0.513
95% BCA Bootstrap UCL	0.631	95% Bootstrap t UCL	1.372
95% H-UCL (Log ROS)	2.405		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	0.0495	KM Geo Mean	1.051
KM SD (logged)	0.185	95% Critical H Value (KM-Log)	1.791
KM Standard Error of Mean (logged)	0.0676	95% H-UCL (KM -Log)	1.164
KM SD (logged)	0.185	95% Critical H Value (KM-Log)	1.791
KM Standard Error of Mean (logged)	0.0676		

DL/2 Statistics

DL/2 Normal

Mean in Original Scale	0.725
SD in Original Scale	0.532
95% t UCL (Assumes normality)	0.958

DL/2 Log-Transformed

Mean in Log Scale	-0.473
SD in Log Scale	0.496
95% H-Stat UCL	0.915

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Suggested UCL to Use

95% KM (t) UCL	1.249

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (antimony [ug/l]_intraWell_apw-03)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	2
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	2

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!

Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable report_result_value (antimony [ug/l]_intraWell_apw-03) was not processed!

report_result_value (antimony [ug/l]_intraWell_apw-05/05r)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	3
Number of Detects	1	Number of Non-Detects	15
Number of Distinct Detects	1	Number of Distinct Non-Detects	2

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
From File filea1b878952361.xls
Full Precision OFF
Confidence Coefficient 95%
Number of Bootstrap Operations 2000

**Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!
It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).**

The data set for variable report_result_value (antimony [ug/l]_intrawell_apw-05/05r) was not processed!

report_result_value (antimony [ug/l]_intrawell_apw-06d)

General Statistics

Total Number of Observations	15	Number of Distinct Observations	2
Number of Detects	0	Number of Non-Detects	15
Number of Distinct Detects	0	Number of Distinct Non-Detects	2

**Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).**

The data set for variable report_result_value (antimony [ug/l]_intrawell_apw-06d) was not processed!

report_result_value (antimony [ug/l]_intrawell_apw-06s)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	2
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	2

**Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).**

The data set for variable report_result_value (antimony [ug/l]_intrawell_apw-06s) was not processed!

report_result_value (antimony [ug/l]_intrawell_apw-07)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	2
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	2

**Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).**

The data set for variable report_result_value (antimony [ug/l]_intrawell_apw-07) was not processed!

report_result_value (antimony [ug/l]_intrawell_apw-08)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	2
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	2

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
From File filea1b878952361.xls
Full Precision OFF
Confidence Coefficient 95%
Number of Bootstrap Operations 2000

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable report_result_value (antimony [ug/l]_inrawell_apw-08) was not processed!

report_result_value (antimony [ug/l]_inrawell_apw-10d)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	2
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	2

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable report_result_value (antimony [ug/l]_inrawell_apw-10d) was not processed!

report_result_value (antimony [ug/l]_inrawell_apw-10s)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	2
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	2

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable report_result_value (antimony [ug/l]_inrawell_apw-10s) was not processed!

report_result_value (arsenic [ug/l]_inrawell_apw-02)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	15
		Number of Missing Observations	0
Minimum	9.3	Mean	17.86
Maximum	26	Median	16.95
SD	4.702	Std. Error of Mean	1.175
Coefficient of Variation	0.263	Skewness	0.0647

Normal GOF Test

Shapiro Wilk Test Statistic	0.969
1% Shapiro Wilk Critical Value	0.844
Lilliefors Test Statistic	0.135
1% Lilliefors Critical Value	0.248

Shapiro Wilk GOF Test

Data appear Normal at 1% Significance Level

Lilliefors GOF Test

Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Assuming Normal Distribution

95% Normal UCL

95% Student's-t UCL 19.92

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995) 19.82

95% Modified-t UCL (Johnson-1978) 19.93

Gamma GOF Test

A-D Test Statistic 0.26

5% A-D Critical Value 0.738

K-S Test Statistic 0.14

5% K-S Critical Value 0.215

Anderson-Darling Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

Kolmogorov-Smirnov Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE) 14.49

Theta hat (MLE) 1.233

nu hat (MLE) 463.7

MLE Mean (bias corrected) 17.86

Adjusted Level of Significance 0.0335

k star (bias corrected MLE) 11.81

Theta star (bias corrected MLE) 1.512

nu star (bias corrected) 378.1

MLE Sd (bias corrected) 5.197

Approximate Chi Square Value (0.05) 334

Adjusted Chi Square Value 329.3

Assuming Gamma Distribution

95% Approximate Gamma UCL 20.22

95% Adjusted Gamma UCL 20.51

Lognormal GOF Test

Shapiro Wilk Test Statistic 0.954

10% Shapiro Wilk Critical Value 0.906

Lilliefors Test Statistic 0.159

10% Lilliefors Critical Value 0.196

Shapiro Wilk Lognormal GOF Test

Data appear Lognormal at 10% Significance Level

Lilliefors Lognormal GOF Test

Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data 2.23

Maximum of Logged Data 3.258

Mean of logged Data 2.848

SD of logged Data 0.279

Assuming Lognormal Distribution

95% H-UCL 20.51

95% Chebyshev (MVUE) UCL 23.4

99% Chebyshev (MVUE) UCL 30.46

90% Chebyshev (MVUE) UCL 21.68

97.5% Chebyshev (MVUE) UCL 25.78

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL 19.8

95% Standard Bootstrap UCL 19.78

95% Hall's Bootstrap UCL 19.92

90% Chebyshev(Mean, Sd) UCL 21.39

97.5% Chebyshev(Mean, Sd) UCL 25.2

95% BCA Bootstrap UCL 19.87

95% Bootstrap-t UCL 20.13

95% Percentile Bootstrap UCL 19.78

95% Chebyshev(Mean, Sd) UCL 22.99

99% Chebyshev(Mean, Sd) UCL 29.56

Suggested UCL to Use

95% Student's-t UCL 19.92

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
 From File filea1b878952361.xls
 Full Precision OFF
 Confidence Coefficient 95%
 Number of Bootstrap Operations 2000

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (arsenic [ug/l]_intrawell_apw-03)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	13
Number of Detects	15	Number of Non-Detects	1
Number of Distinct Detects	13	Number of Distinct Non-Detects	1
Minimum Detect	1.7	Minimum Non-Detect	2
Maximum Detect	5.9	Maximum Non-Detect	2
Variance Detects	1.434	Percent Non-Detects	6.25%
Mean Detects	2.767	SD Detects	1.197
Median Detects	2.3	CV Detects	0.433
Skewness Detects	1.645	Kurtosis Detects	2.33
Mean of Logged Detects	0.947	SD of Logged Detects	0.369

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.804	Shapiro Wilk GOF Test
1% Shapiro Wilk Critical Value	0.835	Detected Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.223	Lilliefors GOF Test
1% Lilliefors Critical Value	0.255	Detected Data appear Normal at 1% Significance Level

Detected Data appear Approximate Normal at 1% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	2.704	KM Standard Error of Mean	0.297
90KM SD	1.146	95% KM (BCA) UCL	3.269
95% KM (t) UCL	3.224	95% KM (Percentile Bootstrap) UCL	3.213
95% KM (z) UCL	3.192	95% KM Bootstrap t UCL	3.504
90% KM Chebyshev UCL	3.594	95% KM Chebyshev UCL	3.997
97.5% KM Chebyshev UCL	4.556	99% KM Chebyshev UCL	5.655

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.778	Anderson-Darling GOF Test
5% A-D Critical Value	0.738	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.199	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.222	Detected data appear Gamma Distributed at 5% Significance Level

Detected data follow Appr. Gamma Distribution at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	7.284	k star (bias corrected MLE)	5.872
Theta hat (MLE)	0.38	Theta star (bias corrected MLE)	0.471
nu hat (MLE)	218.5	nu star (bias corrected)	176.2
Mean (detects)	2.767		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
 GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	1.331	Mean	2.677
Maximum	5.9	Median	2.25
SD	1.211	CV	0.452
k hat (MLE)	6.524	k star (bias corrected MLE)	5.342

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
 From File filea1b878952361.xls
 Full Precision OFF
 Confidence Coefficient 95%
 Number of Bootstrap Operations 2000

Theta hat (MLE)	0.41	Theta star (bias corrected MLE)	0.501
nu hat (MLE)	208.8	nu star (bias corrected)	171
Adjusted Level of Significance (β)	0.0335		
Approximate Chi Square Value (170.96, α)	141.7	Adjusted Chi Square Value (170.96, β)	138.7
95% Gamma Approximate UCL	3.229	95% Gamma Adjusted UCL	3.3

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	2.704	SD (KM)	1.146
Variance (KM)	1.313	SE of Mean (KM)	0.297
k hat (KM)	5.568	k star (KM)	4.566
nu hat (KM)	178.2	nu star (KM)	146.1
theta hat (KM)	0.486	theta star (KM)	0.592
80% gamma percentile (KM)	3.672	90% gamma percentile (KM)	4.399
95% gamma percentile (KM)	5.065	99% gamma percentile (KM)	6.477

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (146.10, α)	119.2	Adjusted Chi Square Value (146.10, β)	116.4
95% KM Approximate Gamma UCL	3.315	95% KM Adjusted Gamma UCL	3.394

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.896	Shapiro Wilk GOF Test	
10% Shapiro Wilk Critical Value	0.901	Detected Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.177	Lilliefors GOF Test	
10% Lilliefors Critical Value	0.202	Detected Data appear Lognormal at 10% Significance Level	

Detected Data appear Approximate Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	2.693	Mean in Log Scale	0.917
SD in Original Scale	1.194	SD in Log Scale	0.376
95% t UCL (assumes normality of ROS data)	3.216	95% Percentile Bootstrap UCL	3.186
95% BCA Bootstrap UCL	3.294	95% Bootstrap t UCL	3.562
95% H-UCL (Log ROS)	3.24		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	0.924	KM Geo Mean	2.519
KM SD (logged)	0.357	95% Critical H Value (KM-Log)	1.917
KM Standard Error of Mean (logged)	0.0924	95% H-UCL (KM -Log)	3.203
KM SD (logged)	0.357	95% Critical H Value (KM-Log)	1.917
KM Standard Error of Mean (logged)	0.0924		

DL/2 Statistics

DL/2 Normal

Mean in Original Scale	2.656
SD in Original Scale	1.238
95% t UCL (Assumes normality)	3.199

DL/2 Log-Transformed

Mean in Log Scale	0.888
SD in Log Scale	0.428
95% H-Stat UCL	3.315

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	3.224

When a data set follows an approximate distribution passing only one of the GOF tests,

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

it is suggested to use a UCL based upon a distribution passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (arsenic [ug/l]_intraWell_apw-05/05r)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	13
		Number of Missing Observations	0
Minimum	1.5	Mean	2.525
Maximum	4.8	Median	2.3
SD	0.915	Std. Error of Mean	0.229
Coefficient of Variation	0.363	Skewness	1.341

Normal GOF Test

Shapiro Wilk Test Statistic	0.876
1% Shapiro Wilk Critical Value	0.844
Lilliefors Test Statistic	0.155
1% Lilliefors Critical Value	0.248

Shapiro Wilk GOF Test

Data appear Normal at 1% Significance Level

Lilliefors GOF Test

Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL

95% Student's-t UCL	2.926

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	2.983
95% Modified-t UCL (Johnson-1978)	2.939

Gamma GOF Test

A-D Test Statistic	0.37
5% A-D Critical Value	0.739
K-S Test Statistic	0.12
5% K-S Critical Value	0.215

Anderson-Darling Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

Kolmogorov-Smirnov Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	9.453	k star (bias corrected MLE)	7.722
Theta hat (MLE)	0.267	Theta star (bias corrected MLE)	0.327
nu hat (MLE)	302.5	nu star (bias corrected)	247.1
MLE Mean (bias corrected)	2.525	MLE Sd (bias corrected)	0.909
		Approximate Chi Square Value (0.05)	211.7
Adjusted Level of Significance	0.0335	Adjusted Chi Square Value	208

Assuming Gamma Distribution

95% Approximate Gamma UCL	2.947

95% Adjusted Gamma UCL	3

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.954
10% Shapiro Wilk Critical Value	0.906
Lilliefors Test Statistic	0.1
10% Lilliefors Critical Value	0.196

Shapiro Wilk Lognormal GOF Test

Data appear Lognormal at 10% Significance Level

Lilliefors Lognormal GOF Test

Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Lognormal Statistics

Minimum of Logged Data	0.405	Mean of logged Data	0.872
Maximum of Logged Data	1.569	SD of logged Data	0.33

Assuming Lognormal Distribution

95% H-UCL	2.969	90% Chebyshev (MVUE) UCL	3.149
95% Chebyshev (MVUE) UCL	3.436	97.5% Chebyshev (MVUE) UCL	3.833
99% Chebyshev (MVUE) UCL	4.613		

Nonparametric Distribution Free UCL Statistics Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	2.901	95% BCA Bootstrap UCL	3.006
95% Standard Bootstrap UCL	2.886	95% Bootstrap-t UCL	3.09
95% Hall's Bootstrap UCL	3.3	95% Percentile Bootstrap UCL	2.894
90% Chebyshev(Mean, Sd) UCL	3.212	95% Chebyshev(Mean, Sd) UCL	3.523
97.5% Chebyshev(Mean, Sd) UCL	3.954	99% Chebyshev(Mean, Sd) UCL	4.802

Suggested UCL to Use

95% Student's-t UCL	2.926

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (arsenic [ug/l]_intrawell_apw-06d)

General Statistics

Total Number of Observations	15	Number of Distinct Observations	15
		Number of Missing Observations	0
Minimum	6.8	Mean	9.92
Maximum	13.5	Median	10.2
SD	1.735	Std. Error of Mean	0.448
Coefficient of Variation	0.175	Skewness	-0.128

Normal GOF Test

Shapiro Wilk Test Statistic	0.949
1% Shapiro Wilk Critical Value	0.835
Lilliefors Test Statistic	0.141
1% Lilliefors Critical Value	0.255

Shapiro Wilk GOF Test

Data appear Normal at 1% Significance Level

Lilliefors GOF Test

Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL

95% Student's-t UCL	10.71

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	10.64
95% Modified-t UCL (Johnson-1978)	10.71

Gamma GOF Test

A-D Test Statistic	0.522
5% A-D Critical Value	0.735
K-S Test Statistic	0.164
5% K-S Critical Value	0.221

Anderson-Darling Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

Kolmogorov-Smirnov Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
From File filea1b878952361.xls
Full Precision OFF
Confidence Coefficient 95%
Number of Bootstrap Operations 2000

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics			
k hat (MLE)	33.33	k star (bias corrected MLE)	26.71
Theta hat (MLE)	0.298	Theta star (bias corrected MLE)	0.371
nu hat (MLE)	999.9	nu star (bias corrected)	801.3
MLE Mean (bias corrected)	9.92	MLE Sd (bias corrected)	1.919
		Approximate Chi Square Value (0.05)	736.6
Adjusted Level of Significance	0.0324	Adjusted Chi Square Value	729

Assuming Gamma Distribution

95% Approximate Gamma UCL	10.79	95% Adjusted Gamma UCL	10.9

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.928	Shapiro Wilk Lognormal GOF Test
10% Shapiro Wilk Critical Value	0.901	Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.172	Lilliefors Lognormal GOF Test
10% Lilliefors Critical Value	0.202	Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	1.917	Mean of logged Data	2.279
Maximum of Logged Data	2.603	SD of logged Data	0.183

Assuming Lognormal Distribution

95% H-UCL	10.85	90% Chebyshev (MVUE) UCL	11.34
95% Chebyshev (MVUE) UCL	11.97	97.5% Chebyshev (MVUE) UCL	12.86
99% Chebyshev (MVUE) UCL	14.6		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	10.66	95% BCA Bootstrap UCL	10.61
95% Standard Bootstrap UCL	10.64	95% Bootstrap-t UCL	10.7
95% Hall's Bootstrap UCL	10.7	95% Percentile Bootstrap UCL	10.63
90% Chebyshev(Mean, Sd) UCL	11.26	95% Chebyshev(Mean, Sd) UCL	11.87
97.5% Chebyshev(Mean, Sd) UCL	12.72	99% Chebyshev(Mean, Sd) UCL	14.38

Suggested UCL to Use

95% Student's-t UCL	10.71

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positively skewed data sets.

report_result_value (arsenic [ug/l]_intrawell_apw-06s)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	8
Number of Detects	14	Number of Non-Detects	2

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
 From File filea1b878952361.xls
 Full Precision OFF
 Confidence Coefficient 95%
 Number of Bootstrap Operations 2000

Number of Distinct Detects	8	Number of Distinct Non-Detects	2
Minimum Detect	1	Minimum Non-Detect	1
Maximum Detect	2	Maximum Non-Detect	2
Variance Detects	0.106	Percent Non-Detects	12.5%
Mean Detects	1.35	SD Detects	0.325
Median Detects	1.2	CV Detects	0.241
Skewness Detects	0.775	Kurtosis Detects	-0.717
Mean of Logged Detects	0.275	SD of Logged Detects	0.23

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.876	Shapiro Wilk GOF Test
1% Shapiro Wilk Critical Value	0.825	Detected Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.249	Lilliefors GOF Test
1% Lilliefors Critical Value	0.263	Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	1.324	KM Standard Error of Mean	0.0831
90KM SD	0.313	95% KM (BCA) UCL	1.469
95% KM (t) UCL	1.469	95% KM (Percentile Bootstrap) UCL	1.469
95% KM (z) UCL	1.46	95% KM Bootstrap t UCL	1.505
90% KM Chebyshev UCL	1.573	95% KM Chebyshev UCL	1.686
97.5% KM Chebyshev UCL	1.842	99% KM Chebyshev UCL	2.15

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.722	Anderson-Darling GOF Test
5% A-D Critical Value	0.734	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.241	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.228	Detected Data Not Gamma Distributed at 5% Significance Level

Detected data follow Appr. Gamma Distribution at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	19.9	k star (bias corrected MLE)	15.69
Theta hat (MLE)	0.0678	Theta star (bias corrected MLE)	0.0861
nu hat (MLE)	557.3	nu star (bias corrected)	439.2
Mean (detects)	1.35		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
 GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
 For such situations, GROS method may yield incorrect values of UCLs and BTVs
 This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.709	Mean	1.304
Maximum	2	Median	1.2
SD	0.343	CV	0.263
k hat (MLE)	15.63	k star (bias corrected MLE)	12.74
Theta hat (MLE)	0.0834	Theta star (bias corrected MLE)	0.102
nu hat (MLE)	500.2	nu star (bias corrected)	407.8
Adjusted Level of Significance (β)	0.0335		
Approximate Chi Square Value (407.75, α)	361.9	Adjusted Chi Square Value (407.75, β)	357
95% Gamma Approximate UCL	1.469	95% Gamma Adjusted UCL	1.489

Estimates of Gamma Parameters using KM Estimates

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
 From File filea1b878952361.xls
 Full Precision OFF
 Confidence Coefficient 95%
 Number of Bootstrap Operations 2000

Mean (KM)	1.324	SD (KM)	0.313
Variance (KM)	0.0977	SE of Mean (KM)	0.0831
k hat (KM)	17.93	k star (KM)	14.61
nu hat (KM)	573.9	nu star (KM)	467.6
theta hat (KM)	0.0738	theta star (KM)	0.0906
80% gamma percentile (KM)	1.603	90% gamma percentile (KM)	1.782
95% gamma percentile (KM)	1.94	99% gamma percentile (KM)	2.259

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (467.60, α)	418.5	Adjusted Chi Square Value (467.60, β)	413.2
95% KM Approximate Gamma UCL	1.479	95% KM Adjusted Gamma UCL	1.498

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.898	Shapiro Wilk GOF Test	
10% Shapiro Wilk Critical Value	0.895	Detected Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.228	Lilliefors GOF Test	
10% Lilliefors Critical Value	0.208	Detected Data Not Lognormal at 10% Significance Level	

Detected Data appear Approximate Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	1.307	Mean in Log Scale	0.238
SD in Original Scale	0.335	SD in Log Scale	0.251
95% t UCL (assumes normality of ROS data)	1.454	95% Percentile Bootstrap UCL	1.444
95% BCA Bootstrap UCL	1.446	95% Bootstrap t UCL	1.476
95% H-UCL (Log ROS)	1.475		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	0.255	KM Geo Mean	1.29
KM SD (logged)	0.223	95% Critical H Value (KM-Log)	1.815
KM Standard Error of Mean (logged)	0.0595	95% H-UCL (KM -Log)	1.468
KM SD (logged)	0.223	95% Critical H Value (KM-Log)	1.815
KM Standard Error of Mean (logged)	0.0595		

DL/2 Statistics

DL/2 Normal

Mean in Original Scale	1.275
SD in Original Scale	0.377
95% t UCL (Assumes normality)	1.44

DL/2 Log-Transformed

Mean in Log Scale	0.197
SD in Log Scale	0.327
95% H-Stat UCL	1.507

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL 1.469

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (arsenic [ug/l]_intrawell_apw-07)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	9

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
 From File filea1b878952361.xls
 Full Precision OFF
 Confidence Coefficient 95%
 Number of Bootstrap Operations 2000

Number of Detects	9	Number of Non-Detects	7
Number of Distinct Detects	7	Number of Distinct Non-Detects	2
Minimum Detect	1.1	Minimum Non-Detect	1
Maximum Detect	2.3	Maximum Non-Detect	2
Variance Detects	0.178	Percent Non-Detects	43.75%
Mean Detects	1.6	SD Detects	0.421
Median Detects	1.4	CV Detects	0.263
Skewness Detects	0.761	Kurtosis Detects	-0.625
Mean of Logged Detects	0.441	SD of Logged Detects	0.254

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.898	Shapiro Wilk GOF Test
1% Shapiro Wilk Critical Value	0.764	Detected Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.238	Lilliefors GOF Test
1% Lilliefors Critical Value	0.316	Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level
Note GOF tests may be unreliable for small sample sizes

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	1.351	KM Standard Error of Mean	0.112
90KM SD	0.418	95% KM (BCA) UCL	1.525
95% KM (t) UCL	1.548	95% KM (Percentile Bootstrap) UCL	1.531
95% KM (z) UCL	1.536	95% KM Bootstrap t UCL	1.591
90% KM Chebyshev UCL	1.689	95% KM Chebyshev UCL	1.841
97.5% KM Chebyshev UCL	2.053	99% KM Chebyshev UCL	2.47

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.395	Anderson-Darling GOF Test
5% A-D Critical Value	0.721	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.233	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.279	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level
Note GOF tests may be unreliable for small sample sizes

Gamma Statistics on Detected Data Only

k hat (MLE)	17.22	k star (bias corrected MLE)	11.56
Theta hat (MLE)	0.0929	Theta star (bias corrected MLE)	0.138
nu hat (MLE)	310	nu star (bias corrected)	208
Mean (detects)	1.6		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
 GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.353	Mean	1.225
Maximum	2.3	Median	1.15
SD	0.559	CV	0.456
k hat (MLE)	4.696	k star (bias corrected MLE)	3.857
Theta hat (MLE)	0.261	Theta star (bias corrected MLE)	0.318
nu hat (MLE)	150.3	nu star (bias corrected)	123.4
Adjusted Level of Significance (β)	0.0335		
Approximate Chi Square Value (123.43, α)	98.77	Adjusted Chi Square Value (123.43, β)	96.27

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
 From File filea1b878952361.xls
 Full Precision OFF
 Confidence Coefficient 95%
 Number of Bootstrap Operations 2000

95% Gamma Approximate UCL 1.531 95% Gamma Adjusted UCL 1.571

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	1.351	SD (KM)	0.418
Variance (KM)	0.175	SE of Mean (KM)	0.112
k hat (KM)	10.43	k star (KM)	8.517
nu hat (KM)	333.8	nu star (KM)	272.5
theta hat (KM)	0.13	theta star (KM)	0.159
80% gamma percentile (KM)	1.718	90% gamma percentile (KM)	1.968
95% gamma percentile (KM)	2.192	99% gamma percentile (KM)	2.654

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (272.54, α)	235.3	Adjusted Chi Square Value (272.54, β)	231.4
95% KM Approximate Gamma UCL	1.565	95% KM Adjusted Gamma UCL	1.592

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.932	Shapiro Wilk GOF Test
10% Shapiro Wilk Critical Value	0.859	Detected Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.215	Lilliefors GOF Test
10% Lilliefors Critical Value	0.252	Detected Data appear Lognormal at 10% Significance Level

Detected Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	1.285	Mean in Log Scale	0.184
SD in Original Scale	0.493	SD in Log Scale	0.375
95% t UCL (assumes normality of ROS data)	1.5	95% Percentile Bootstrap UCL	1.481
95% BCA Bootstrap UCL	1.494	95% Bootstrap t UCL	1.539
95% H-UCL (Log ROS)	1.555		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	0.259	KM Geo Mean	1.296
KM SD (logged)	0.281	95% Critical H Value (KM-Log)	1.856
KM Standard Error of Mean (logged)	0.0757	95% H-UCL (KM -Log)	1.542
KM SD (logged)	0.281	95% Critical H Value (KM-Log)	1.856
KM Standard Error of Mean (logged)	0.0757		

DL/2 Statistics

DL/2 Normal

Mean in Original Scale	1.15
SD in Original Scale	0.622
95% t UCL (Assumes normality)	1.423

DL/2 Log-Transformed

Mean in Log Scale	-0.012
SD in Log Scale	0.586
95% H-Stat UCL	1.622

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL 1.548

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
 From File filea1b878952361.xls
 Full Precision OFF
 Confidence Coefficient 95%
 Number of Bootstrap Operations 2000

report_result_value (arsenic [ug/l]_intrawell_apw-08)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	9
Number of Detects	9	Number of Non-Detects	7
Number of Distinct Detects	9	Number of Distinct Non-Detects	2
Minimum Detect	1	Minimum Non-Detect	1
Maximum Detect	2.5	Maximum Non-Detect	2
Variance Detects	0.236	Percent Non-Detects	43.75%
Mean Detects	1.711	SD Detects	0.486
Median Detects	1.7	CV Detects	0.284
Skewness Detects	0.0477	Kurtosis Detects	-0.493
Mean of Logged Detects	0.499	SD of Logged Detects	0.301

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.976	Shapiro Wilk GOF Test
1% Shapiro Wilk Critical Value	0.764	Detected Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.118	Lilliefors GOF Test
1% Lilliefors Critical Value	0.316	Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	1.414	KM Standard Error of Mean	0.132
90KM SD	0.49	95% KM (BCA) UCL	1.631
95% KM (t) UCL	1.645	95% KM (Percentile Bootstrap) UCL	1.625
95% KM (z) UCL	1.631	95% KM Bootstrap t UCL	1.663
90% KM Chebyshev UCL	1.809	95% KM Chebyshev UCL	1.988
97.5% KM Chebyshev UCL	2.236	99% KM Chebyshev UCL	2.724

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.209	Anderson-Darling GOF Test
5% A-D Critical Value	0.722	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.141	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.279	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics on Detected Data Only

k hat (MLE)	13.13	k star (bias corrected MLE)	8.824
Theta hat (MLE)	0.13	Theta star (bias corrected MLE)	0.194
nu hat (MLE)	236.3	nu star (bias corrected)	158.8
Mean (detects)	1.711		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
 GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.303	Mean	1.281
Maximum	2.5	Median	1.083
SD	0.639	CV	0.499
k hat (MLE)	3.785	k star (bias corrected MLE)	3.117

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Theta hat (MLE)	0.338	Theta star (bias corrected MLE)	0.411
nu hat (MLE)	121.1	nu star (bias corrected)	99.75
Adjusted Level of Significance (β)	0.0335		
Approximate Chi Square Value (99.75, α)	77.71	Adjusted Chi Square Value (99.75, β)	75.49
95% Gamma Approximate UCL	1.644	95% Gamma Adjusted UCL	1.693

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	1.414	SD (KM)	0.49
Variance (KM)	0.24	SE of Mean (KM)	0.132
k hat (KM)	8.326	k star (KM)	6.806
nu hat (KM)	266.4	nu star (KM)	217.8
theta hat (KM)	0.17	theta star (KM)	0.208
80% gamma percentile (KM)	1.839	90% gamma percentile (KM)	2.138
95% gamma percentile (KM)	2.407	99% gamma percentile (KM)	2.969

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (217.80, α)	184.6	Adjusted Chi Square Value (217.80, β)	181.2
95% KM Approximate Gamma UCL	1.668	95% KM Adjusted Gamma UCL	1.7

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.954	Shapiro Wilk GOF Test
10% Shapiro Wilk Critical Value	0.859	Detected Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.156	Lilliefors GOF Test
10% Lilliefors Critical Value	0.252	Detected Data appear Lognormal at 10% Significance Level

Detected Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	1.334	Mean in Log Scale	0.2
SD in Original Scale	0.578	SD in Log Scale	0.436
95% t UCL (assumes normality of ROS data)	1.587	95% Percentile Bootstrap UCL	1.567
95% BCA Bootstrap UCL	1.584	95% Bootstrap t UCL	1.631
95% H-UCL (Log ROS)	1.68		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	0.291	KM Geo Mean	1.338
KM SD (logged)	0.325	95% Critical H Value (KM-Log)	1.891
KM Standard Error of Mean (logged)	0.0877	95% H-UCL (KM -Log)	1.653
KM SD (logged)	0.325	95% Critical H Value (KM-Log)	1.891
KM Standard Error of Mean (logged)	0.0877		

DL/2 Statistics

DL/2 Normal

Mean in Original Scale	1.213
SD in Original Scale	0.694
95% t UCL (Assumes normality)	1.517

DL/2 Log-Transformed

Mean in Log Scale	0.0205
SD in Log Scale	0.624
95% H-Stat UCL	1.764

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	1.645

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
 From File filea1b878952361.xls
 Full Precision OFF
 Confidence Coefficient 95%
 Number of Bootstrap Operations 2000

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (arsenic [ug/l]_intrawell_apw-10d)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	8
Number of Detects	8	Number of Non-Detects	8
Number of Distinct Detects	7	Number of Distinct Non-Detects	2
Minimum Detect	1	Minimum Non-Detect	1
Maximum Detect	5.7	Maximum Non-Detect	2
Variance Detects	2.18	Percent Non-Detects	50%
Mean Detects	2.138	SD Detects	1.476
Median Detects	1.7	CV Detects	0.691
Skewness Detects	2.545	Kurtosis Detects	6.876
Mean of Logged Detects	0.624	SD of Logged Detects	0.503

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.637	Shapiro Wilk GOF Test
1% Shapiro Wilk Critical Value	0.749	Detected Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.385	Lilliefors GOF Test
1% Lilliefors Critical Value	0.333	Detected Data Not Normal at 1% Significance Level

Detected Data Not Normal at 1% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	1.585	KM Standard Error of Mean	0.302
90KM SD	1.127	95% KM (BCA) UCL	2.15
95% KM (t) UCL	2.114	95% KM (Percentile Bootstrap) UCL	2.111
95% KM (z) UCL	2.082	95% KM Bootstrap t UCL	2.794
90% KM Chebyshev UCL	2.491	95% KM Chebyshev UCL	2.901
97.5% KM Chebyshev UCL	3.471	99% KM Chebyshev UCL	4.59

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.941	Anderson-Darling GOF Test
5% A-D Critical Value	0.719	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.321	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.295	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	3.845	k star (bias corrected MLE)	2.486
Theta hat (MLE)	0.556	Theta star (bias corrected MLE)	0.86
nu hat (MLE)	61.52	nu star (bias corrected)	39.78
Mean (detects)	2.138		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	1.127
Maximum	5.7	Median	0.718

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

SD	1.456	CV	1.292
k hat (MLE)	0.432	k star (bias corrected MLE)	0.393
Theta hat (MLE)	2.607	Theta star (bias corrected MLE)	2.869
nu hat (MLE)	13.84	nu star (bias corrected)	12.57
Adjusted Level of Significance (β)	0.0335		
Approximate Chi Square Value (12.57, α)	5.608	Adjusted Chi Square Value (12.57, β)	5.087
95% Gamma Approximate UCL	2.528	95% Gamma Adjusted UCL	2.786

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	1.585	SD (KM)	1.127
Variance (KM)	1.27	SE of Mean (KM)	0.302
k hat (KM)	1.977	k star (KM)	1.648
nu hat (KM)	63.27	nu star (KM)	52.74
theta hat (KM)	0.801	theta star (KM)	0.961
80% gamma percentile (KM)	2.426	90% gamma percentile (KM)	3.227
95% gamma percentile (KM)	4.001	99% gamma percentile (KM)	5.737

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (52.74, α)	37.06	Adjusted Chi Square Value (52.74, β)	35.57
95% KM Approximate Gamma UCL	2.255	95% KM Adjusted Gamma UCL	2.35

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.827	Shapiro Wilk GOF Test
10% Shapiro Wilk Critical Value	0.851	Detected Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.282	Lilliefors GOF Test
10% Lilliefors Critical Value	0.265	Detected Data Not Lognormal at 10% Significance Level

Detected Data Not Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	1.385	Mean in Log Scale	0.0519
SD in Original Scale	1.282	SD in Log Scale	0.733
95% t UCL (assumes normality of ROS data)	1.947	95% Percentile Bootstrap UCL	1.922
95% BCA Bootstrap UCL	2.213	95% Bootstrap t UCL	2.429
95% H-UCL (Log ROS)	2.138		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	0.324	KM Geo Mean	1.383
KM SD (logged)	0.455	95% Critical H Value (KM-Log)	2.005
KM Standard Error of Mean (logged)	0.123	95% H-UCL (KM -Log)	1.94
KM SD (logged)	0.455	95% Critical H Value (KM-Log)	2.005
KM Standard Error of Mean (logged)	0.123		

DL/2 Statistics

DL/2 Normal

Mean in Original Scale	1.35
SD in Original Scale	1.301
95% t UCL (Assumes normality)	1.92

DL/2 Log-Transformed

Mean in Log Scale	0.00875
SD in Log Scale	0.742
95% H-Stat UCL	2.076

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Suggested UCL to Use

95% KM (t) UCL	2.114

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
From File filea1b878952361.xls
Full Precision OFF
Confidence Coefficient 95%
Number of Bootstrap Operations 2000

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. Recommendations are based upon data size, data distribution, and skewness using results from simulation studies. However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (arsenic [ug/l]_intraWell_apw-10s)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	16
		Number of Missing Observations	0
Minimum	174	Mean	197.1
Maximum	276	Median	190
SD	24.77	Std. Error of Mean	6.193
Coefficient of Variation	0.126	Skewness	2.51

Normal GOF Test

Shapiro Wilk Test Statistic	0.704
1% Shapiro Wilk Critical Value	0.844
Lilliefors Test Statistic	0.297
1% Lilliefors Critical Value	0.248

Shapiro Wilk GOF Test

Data Not Normal at 1% Significance Level

Lilliefors GOF Test

Data Not Normal at 1% Significance Level

Data Not Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL

95% Student's-t UCL	207.9

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	211.4
95% Modified-t UCL (Johnson-1978)	208.6

Gamma GOF Test

A-D Test Statistic	1.527
5% A-D Critical Value	0.736
K-S Test Statistic	0.281
5% K-S Critical Value	0.214

Anderson-Darling Gamma GOF Test

Data Not Gamma Distributed at 5% Significance Level

Kolmogorov-Smirnov Gamma GOF Test

Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	78.71	k star (bias corrected MLE)	63.99
Theta hat (MLE)	2.504	Theta star (bias corrected MLE)	3.079
nu hat (MLE)	2519	nu star (bias corrected)	2048
MLE Mean (bias corrected)	197.1	MLE Sd (bias corrected)	24.63
		Approximate Chi Square Value (0.05)	1944
Adjusted Level of Significance	0.0335	Adjusted Chi Square Value	1932

Assuming Gamma Distribution

95% Approximate Gamma UCL	207.6

95% Adjusted Gamma UCL	208.9

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.758
10% Shapiro Wilk Critical Value	0.906
Lilliefors Test Statistic	0.273
10% Lilliefors Critical Value	0.196

Shapiro Wilk Lognormal GOF Test

Data Not Lognormal at 10% Significance Level

Lilliefors Lognormal GOF Test

Data Not Lognormal at 10% Significance Level

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Minimum of Logged Data	5.159	Mean of logged Data	5.277
Maximum of Logged Data	5.62	SD of logged Data	0.112

Assuming Lognormal Distribution

95% H-UCL	207.3	90% Chebyshev (MVUE) UCL	213.6
95% Chebyshev (MVUE) UCL	221.1	97.5% Chebyshev (MVUE) UCL	231.6
99% Chebyshev (MVUE) UCL	252.1		

Nonparametric Distribution Free UCL Statistics Data do not follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	207.2	95% BCA Bootstrap UCL	211.1
95% Standard Bootstrap UCL	206.9	95% Bootstrap-t UCL	222.7
95% Hall's Bootstrap UCL	257.1	95% Percentile Bootstrap UCL	207.7
90% Chebyshev(Mean, Sd) UCL	215.6	95% Chebyshev(Mean, Sd) UCL	224.1
97.5% Chebyshev(Mean, Sd) UCL	235.7	99% Chebyshev(Mean, Sd) UCL	258.7

Suggested UCL to Use

95% Student's-t UCL 207.9

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. Recommendations are based upon data size, data distribution, and skewness using results from simulation studies. However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (barium [ug/l]_intrawell_apw-02)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	16
		Number of Missing Observations	0
Minimum	149	Mean	355.4
Maximum	739	Median	344.5
SD	174.7	Std. Error of Mean	43.67
Coefficient of Variation	0.491	Skewness	0.92

Normal GOF Test

Shapiro Wilk Test Statistic	0.91	Shapiro Wilk GOF Test
1% Shapiro Wilk Critical Value	0.844	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.127	Lilliefors GOF Test
1% Lilliefors Critical Value	0.248	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	431.9	95% Adjusted-CLT UCL (Chen-1995)	437.9
		95% Modified-t UCL (Johnson-1978)	433.6

Gamma GOF Test

A-D Test Statistic	0.262	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.742	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.107	Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value	0.216	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
From File filea1b878952361.xls
Full Precision OFF
Confidence Coefficient 95%
Number of Bootstrap Operations 2000

Gamma Statistics

k hat (MLE)	4.611	k star (bias corrected MLE)	3.788
Theta hat (MLE)	77.06	Theta star (bias corrected MLE)	93.8
nu hat (MLE)	147.6	nu star (bias corrected)	121.2
MLE Mean (bias corrected)	355.4	MLE Sd (bias corrected)	182.6
		Approximate Chi Square Value (0.05)	96.8
Adjusted Level of Significance	0.0335	Adjusted Chi Square Value	94.32

Assuming Gamma Distribution

95% Approximate Gamma UCL	445	95% Adjusted Gamma UCL	456.8

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.952	Shapiro Wilk Lognormal GOF Test
10% Shapiro Wilk Critical Value	0.906	Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.114	Lilliefors Lognormal GOF Test
10% Lilliefors Critical Value	0.196	Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	5.004	Mean of logged Data	5.761
Maximum of Logged Data	6.605	SD of logged Data	0.495

Assuming Lognormal Distribution

95% H-UCL	466.4	90% Chebyshev (MVUE) UCL	492.4
95% Chebyshev (MVUE) UCL	554.2	97.5% Chebyshev (MVUE) UCL	639.9
99% Chebyshev (MVUE) UCL	808.3		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	427.2	95% BCA Bootstrap UCL	434.6
95% Standard Bootstrap UCL	425.3	95% Bootstrap-t UCL	460.2
95% Hall's Bootstrap UCL	484.3	95% Percentile Bootstrap UCL	424.1
90% Chebyshev(Mean, Sd) UCL	486.4	95% Chebyshev(Mean, Sd) UCL	545.7
97.5% Chebyshev(Mean, Sd) UCL	628.1	99% Chebyshev(Mean, Sd) UCL	789.8

Suggested UCL to Use

95% Student's-t UCL	431.9

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (barium [ug/l]_inrawell_apw-03)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	16
		Number of Missing Observations	0
Minimum	80.6	Mean	133.8
Maximum	190	Median	136
SD	33.02	Std. Error of Mean	8.255

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Coefficient of Variation	0.247	Skewness	-0.0492

Normal GOF Test

Shapiro Wilk Test Statistic	0.973
1% Shapiro Wilk Critical Value	0.844
Lilliefors Test Statistic	0.0822
1% Lilliefors Critical Value	0.248

Shapiro Wilk GOF Test

Data appear Normal at 1% Significance Level

Lilliefors GOF Test

Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL

95% Student's-t UCL	148.2

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	147.2
95% Modified-t UCL (Johnson-1978)	148.2

Gamma GOF Test

A-D Test Statistic	0.223
5% A-D Critical Value	0.737
K-S Test Statistic	0.11
5% K-S Critical Value	0.215

Anderson-Darling Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

Kolmogorov-Smirnov Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	16.47
Theta hat (MLE)	8.12
nu hat (MLE)	527.1
MLE Mean (bias corrected)	133.8
Adjusted Level of Significance	0.0335

k star (bias corrected MLE)	13.43
Theta star (bias corrected MLE)	9.963
nu star (bias corrected)	429.6
MLE Sd (bias corrected)	36.5
Approximate Chi Square Value (0.05)	382.6
Adjusted Chi Square Value	377.5

Assuming Gamma Distribution

95% Approximate Gamma UCL	150.2

95% Adjusted Gamma UCL	152.2

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.953
10% Shapiro Wilk Critical Value	0.906
Lilliefors Test Statistic	0.123
10% Lilliefors Critical Value	0.196

Shapiro Wilk Lognormal GOF Test

Data appear Lognormal at 10% Significance Level

Lilliefors Lognormal GOF Test

Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	4.389
Maximum of Logged Data	5.247

Mean of logged Data	4.865
SD of logged Data	0.261

Assuming Lognormal Distribution

95% H-UCL	152
95% Chebyshev (MVUE) UCL	172.4
99% Chebyshev (MVUE) UCL	221.7

90% Chebyshev (MVUE) UCL	160.4
97.5% Chebyshev (MVUE) UCL	189

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	147.3
95% Standard Bootstrap UCL	146.9

95% BCA Bootstrap UCL	146.8
95% Bootstrap-t UCL	148

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

95% Hall's Bootstrap UCL	147.2	95% Percentile Bootstrap UCL	147.1
90% Chebyshev(Mean, Sd) UCL	158.5	95% Chebyshev(Mean, Sd) UCL	169.7
97.5% Chebyshev(Mean, Sd) UCL	185.3	99% Chebyshev(Mean, Sd) UCL	215.9

Suggested UCL to Use

95% Student's-t UCL 148.2

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. Recommendations are based upon data size, data distribution, and skewness using results from simulation studies. However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positively skewed data sets.

report_result_value (barium [ug/l]_intraWell_apw-05/05r)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	14
		Number of Missing Observations	0
Minimum	140	Mean	188.8
Maximum	233	Median	190
SD	31.03	Std. Error of Mean	7.757
Coefficient of Variation	0.164	Skewness	-0.201

Normal GOF Test

Shapiro Wilk Test Statistic	0.929	Shapiro Wilk GOF Test
1% Shapiro Wilk Critical Value	0.844	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.167	Lilliefors GOF Test
1% Lilliefors Critical Value	0.248	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL

95% Student's-t UCL 202.4

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	201.2
95% Modified-t UCL (Johnson-1978)	202.3

Gamma GOF Test

A-D Test Statistic	0.491	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.736	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.175	Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value	0.215	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	38.05	k star (bias corrected MLE)	30.95
Theta hat (MLE)	4.963	Theta star (bias corrected MLE)	6.1
nu hat (MLE)	1217	nu star (bias corrected)	990.5
MLE Mean (bias corrected)	188.8	MLE Sd (bias corrected)	33.94
		Approximate Chi Square Value (0.05)	918.5
Adjusted Level of Significance	0.0335	Adjusted Chi Square Value	910.6

Assuming Gamma Distribution

95% Approximate Gamma UCL	203.6	95% Adjusted Gamma UCL	205.4

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
From File filea1b878952361.xls
Full Precision OFF
Confidence Coefficient 95%
Number of Bootstrap Operations 2000

Lognormal GOF Test

Shapiro Wilk Test Statistic 0.92
10% Shapiro Wilk Critical Value 0.906
Lilliefors Test Statistic 0.168
10% Lilliefors Critical Value 0.196

Shapiro Wilk Lognormal GOF Test

Data appear Lognormal at 10% Significance Level

Lilliefors Lognormal GOF Test

Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data 4.942
Maximum of Logged Data 5.451

Mean of logged Data 5.228
SD of logged Data 0.17

Assuming Lognormal Distribution

95% H-UCL 204.4
95% Chebyshev (MVUE) UCL 223.9
99% Chebyshev (MVUE) UCL 268.9

90% Chebyshev (MVUE) UCL 213
97.5% Chebyshev (MVUE) UCL 239.1

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL 201.6
95% Standard Bootstrap UCL 201.2
95% Hall's Bootstrap UCL 200.8
90% Chebyshev(Mean, Sd) UCL 212.1
97.5% Chebyshev(Mean, Sd) UCL 237.3

95% BCA Bootstrap UCL 200.2
95% Bootstrap-t UCL 202
95% Percentile Bootstrap UCL 200.9
95% Chebyshev(Mean, Sd) UCL 222.6
99% Chebyshev(Mean, Sd) UCL 266

Suggested UCL to Use

95% Student's-t UCL 202.4

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positively skewed data sets.

report_result_value (barium [ug/l]_intrawell_apw-06d)

General Statistics

Total Number of Observations 15
Minimum 115
Maximum 173
SD 16.07
Coefficient of Variation 0.108

Number of Distinct Observations 14
Number of Missing Observations 0
Mean 148.7
Median 148
Std. Error of Mean 4.15
Skewness -0.305

Normal GOF Test

Shapiro Wilk Test Statistic 0.97
1% Shapiro Wilk Critical Value 0.835
Lilliefors Test Statistic 0.139
1% Lilliefors Critical Value 0.255

Shapiro Wilk GOF Test

Data appear Normal at 1% Significance Level

Lilliefors GOF Test

Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Assuming Normal Distribution

95% Normal UCL

95% Student's-t UCL 156

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995) 155.1

95% Modified-t UCL (Johnson-1978) 155.9

Gamma GOF Test

A-D Test Statistic 0.219

5% A-D Critical Value 0.734

K-S Test Statistic 0.147

5% K-S Critical Value 0.221

Anderson-Darling Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

Kolmogorov-Smirnov Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE) 88.73

Theta hat (MLE) 1.676

nu hat (MLE) 2662

MLE Mean (bias corrected) 148.7

Adjusted Level of Significance 0.0324

k star (bias corrected MLE) 71.03

Theta star (bias corrected MLE) 2.093

nu star (bias corrected) 2131

MLE Sd (bias corrected) 17.64

Approximate Chi Square Value (0.05) 2025

Adjusted Chi Square Value 2012

Assuming Gamma Distribution

95% Approximate Gamma UCL 156.5

95% Adjusted Gamma UCL 157.5

Lognormal GOF Test

Shapiro Wilk Test Statistic 0.959

10% Shapiro Wilk Critical Value 0.901

Lilliefors Test Statistic 0.159

10% Lilliefors Critical Value 0.202

Shapiro Wilk Lognormal GOF Test

Data appear Lognormal at 10% Significance Level

Lilliefors Lognormal GOF Test

Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data 4.745

Maximum of Logged Data 5.153

Mean of logged Data 4.996

SD of logged Data 0.111

Assuming Lognormal Distribution

95% H-UCL 156.7

95% Chebyshev (MVUE) UCL 167.3

99% Chebyshev (MVUE) UCL 191.2

90% Chebyshev (MVUE) UCL 161.5

97.5% Chebyshev (MVUE) UCL 175.4

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL 155.5

95% Standard Bootstrap UCL 155.2

95% Hall's Bootstrap UCL 155.5

90% Chebyshev(Mean, Sd) UCL 161.1

97.5% Chebyshev(Mean, Sd) UCL 174.6

95% BCA Bootstrap UCL 154.7

95% Bootstrap-t UCL 155.7

95% Percentile Bootstrap UCL 155.2

95% Chebyshev(Mean, Sd) UCL 166.8

99% Chebyshev(Mean, Sd) UCL 190

Suggested UCL to Use

95% Student's-t UCL 156

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies. However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positively skewed data sets.

report_result_value (barium [ug/l]_intrawell_apw-06s)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	14
		Number of Missing Observations	0
Minimum	190	Mean	221.8
Maximum	305	Median	217.5
SD	26.64	Std. Error of Mean	6.661
Coefficient of Variation	0.12	Skewness	2.189

Normal GOF Test

Shapiro Wilk Test Statistic	0.787	Shapiro Wilk GOF Test
1% Shapiro Wilk Critical Value	0.844	Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.249	Lilliefors GOF Test
1% Lilliefors Critical Value	0.248	Data Not Normal at 1% Significance Level

Data Not Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL

95% Student's-t UCL 233.4

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	236.6
95% Modified-t UCL (Johnson-1978)	234

Gamma GOF Test

A-D Test Statistic	0.913	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.736	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.229	Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value	0.214	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	83.73	k star (bias corrected MLE)	68.07
Theta hat (MLE)	2.648	Theta star (bias corrected MLE)	3.258
nu hat (MLE)	2679	nu star (bias corrected)	2178
MLE Mean (bias corrected)	221.8	MLE Sd (bias corrected)	26.88
		Approximate Chi Square Value (0.05)	2071
Adjusted Level of Significance	0.0335	Adjusted Chi Square Value	2059

Assuming Gamma Distribution

95% Approximate Gamma UCL	233.3	95% Adjusted Gamma UCL	234.6

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.844	Shapiro Wilk Lognormal GOF Test
10% Shapiro Wilk Critical Value	0.906	Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.223	Lilliefors Lognormal GOF Test
10% Lilliefors Critical Value	0.196	Data Not Lognormal at 10% Significance Level

Data Not Lognormal at 10% Significance Level

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
From File filea1b878952361.xls
Full Precision OFF
Confidence Coefficient 95%
Number of Bootstrap Operations 2000

Lognormal Statistics

Minimum of Logged Data	5.247	Mean of logged Data	5.396
Maximum of Logged Data	5.72	SD of logged Data	0.11

Assuming Lognormal Distribution

95% H-UCL	233	90% Chebyshev (MVUE) UCL	239.9
95% Chebyshev (MVUE) UCL	248.2	97.5% Chebyshev (MVUE) UCL	259.7
99% Chebyshev (MVUE) UCL	282.3		

Nonparametric Distribution Free UCL Statistics Data do not follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	232.7	95% BCA Bootstrap UCL	235.8
95% Standard Bootstrap UCL	232.3	95% Bootstrap-t UCL	242.5
95% Hall's Bootstrap UCL	289.1	95% Percentile Bootstrap UCL	233.3
90% Chebyshev(Mean, Sd) UCL	241.7	95% Chebyshev(Mean, Sd) UCL	250.8
97.5% Chebyshev(Mean, Sd) UCL	263.3	99% Chebyshev(Mean, Sd) UCL	288

Suggested UCL to Use

95% Student's-t UCL 233.4

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (barium [ug/l]_intrawell_apw-07)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	15
		Number of Missing Observations	0
Minimum	303	Mean	387.3
Maximum	522	Median	377
SD	53.83	Std. Error of Mean	13.46
Coefficient of Variation	0.139	Skewness	1.007

Normal GOF Test

Shapiro Wilk Test Statistic	0.889
1% Shapiro Wilk Critical Value	0.844
Lilliefors Test Statistic	0.226
1% Lilliefors Critical Value	0.248

Shapiro Wilk GOF Test

Data appear Normal at 1% Significance Level

Lilliefors GOF Test

Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL

95% Student's-t UCL 410.8

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	413
95% Modified-t UCL (Johnson-1978)	411.4

Gamma GOF Test

A-D Test Statistic	0.777
5% A-D Critical Value	0.735
K-S Test Statistic	0.212
5% K-S Critical Value	0.214

Anderson-Darling Gamma GOF Test

Data Not Gamma Distributed at 5% Significance Level

Kolmogorov-Smirnov Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
From File filea1b878952361.xls
Full Precision OFF
Confidence Coefficient 95%
Number of Bootstrap Operations 2000

Detected data follow Appr. Gamma Distribution at 5% Significance Level

Gamma Statistics			
k hat (MLE)	58.33	k star (bias corrected MLE)	47.43
Theta hat (MLE)	6.639	Theta star (bias corrected MLE)	8.164
nu hat (MLE)	1867	nu star (bias corrected)	1518
MLE Mean (bias corrected)	387.3	MLE Sd (bias corrected)	56.23
		Approximate Chi Square Value (0.05)	1428
Adjusted Level of Significance	0.0335	Adjusted Chi Square Value	1419

Assuming Gamma Distribution

95% Approximate Gamma UCL	411.5	95% Adjusted Gamma UCL	414.4

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.915	Shapiro Wilk Lognormal GOF Test
10% Shapiro Wilk Critical Value	0.906	Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.203	Lilliefors Lognormal GOF Test
10% Lilliefors Critical Value	0.196	Data Not Lognormal at 10% Significance Level

Data appear Approximate Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	5.714	Mean of logged Data	5.95
Maximum of Logged Data	6.258	SD of logged Data	0.134

Assuming Lognormal Distribution

95% H-UCL	411.7	90% Chebyshev (MVUE) UCL	426.2
95% Chebyshev (MVUE) UCL	443.8	97.5% Chebyshev (MVUE) UCL	468.4
99% Chebyshev (MVUE) UCL	516.5		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	409.4	95% BCA Bootstrap UCL	411.1
95% Standard Bootstrap UCL	408.5	95% Bootstrap-t UCL	418.6
95% Hall's Bootstrap UCL	430.3	95% Percentile Bootstrap UCL	408.3
90% Chebyshev(Mean, Sd) UCL	427.6	95% Chebyshev(Mean, Sd) UCL	445.9
97.5% Chebyshev(Mean, Sd) UCL	471.3	99% Chebyshev(Mean, Sd) UCL	521.1

Suggested UCL to Use

95% Student's-t UCL	410.8

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (barium [ug/l]_intrawell_apw-08)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	16
		Number of Missing Observations	0
Minimum	167	Mean	214.3
Maximum	261	Median	218

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

SD	27.92	Std. Error of Mean	6.979
Coefficient of Variation	0.13	Skewness	-0.181

Normal GOF Test

Shapiro Wilk Test Statistic	0.964	Shapiro Wilk GOF Test
1% Shapiro Wilk Critical Value	0.844	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.135	Lilliefors GOF Test
1% Lilliefors Critical Value	0.248	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL

95% Student's-t UCL 226.5

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	225.5
95% Modified-t UCL (Johnson-1978)	226.5

Gamma GOF Test

A-D Test Statistic	0.298	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.736	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.152	Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value	0.214	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	61.05	k star (bias corrected MLE)	49.64
Theta hat (MLE)	3.511	Theta star (bias corrected MLE)	4.317
nu hat (MLE)	1954	nu star (bias corrected)	1589
MLE Mean (bias corrected)	214.3	MLE Sd (bias corrected)	30.42
		Approximate Chi Square Value (0.05)	1497
Adjusted Level of Significance	0.0335	Adjusted Chi Square Value	1487

Assuming Gamma Distribution

95% Approximate Gamma UCL 227.4

95% Adjusted Gamma UCL 229

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.952	Shapiro Wilk Lognormal GOF Test
10% Shapiro Wilk Critical Value	0.906	Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.159	Lilliefors Lognormal GOF Test
10% Lilliefors Critical Value	0.196	Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	5.118	Mean of logged Data	5.359
Maximum of Logged Data	5.565	SD of logged Data	0.134

Assuming Lognormal Distribution

95% H-UCL	227.9	90% Chebyshev (MVUE) UCL	235.9
95% Chebyshev (MVUE) UCL	245.6	97.5% Chebyshev (MVUE) UCL	259.1
99% Chebyshev (MVUE) UCL	285.7		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL 225.8

95% BCA Bootstrap UCL 224.6

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

95% Standard Bootstrap UCL	225.6	95% Bootstrap-t UCL	226.2
95% Hall's Bootstrap UCL	225.9	95% Percentile Bootstrap UCL	225.3
90% Chebyshev(Mean, Sd) UCL	235.2	95% Chebyshev(Mean, Sd) UCL	244.7
97.5% Chebyshev(Mean, Sd) UCL	257.9	99% Chebyshev(Mean, Sd) UCL	283.8

Suggested UCL to Use

95% Student's-t UCL 226.5

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. Recommendations are based upon data size, data distribution, and skewness using results from simulation studies. However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positively skewed data sets.

report_result_value (barium [ug/l]_intrawell_apw-10d)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	16
		Number of Missing Observations	0
Minimum	276	Mean	360.2
Maximum	485	Median	350
SD	58.91	Std. Error of Mean	14.73
Coefficient of Variation	0.164	Skewness	0.454

Normal GOF Test

Shapiro Wilk Test Statistic	0.967
1% Shapiro Wilk Critical Value	0.844
Lilliefors Test Statistic	0.115
1% Lilliefors Critical Value	0.248

Shapiro Wilk GOF Test

Data appear Normal at 1% Significance Level

Lilliefors GOF Test

Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL

95% Student's-t UCL 386

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	386.2
95% Modified-t UCL (Johnson-1978)	386.3

Gamma GOF Test

A-D Test Statistic	0.184
5% A-D Critical Value	0.736
K-S Test Statistic	0.101
5% K-S Critical Value	0.214

Anderson-Darling Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

Kolmogorov-Smirnov Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	40.67	k star (bias corrected MLE)	33.09
Theta hat (MLE)	8.856	Theta star (bias corrected MLE)	10.89
nu hat (MLE)	1301	nu star (bias corrected)	1059
MLE Mean (bias corrected)	360.2	MLE Sd (bias corrected)	62.62
		Approximate Chi Square Value (0.05)	984.3
Adjusted Level of Significance	0.0335	Adjusted Chi Square Value	976.1

Assuming Gamma Distribution

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
From File filea1b878952361.xls
Full Precision OFF
Confidence Coefficient 95%
Number of Bootstrap Operations 2000

95% Approximate Gamma UCL 387.5

95% Adjusted Gamma UCL 390.7

Lognormal GOF Test

Shapiro Wilk Test Statistic 0.976
10% Shapiro Wilk Critical Value 0.906
Lilliefors Test Statistic 0.0952
10% Lilliefors Critical Value 0.196

Shapiro Wilk Lognormal GOF Test

Data appear Lognormal at 10% Significance Level

Lilliefors Lognormal GOF Test

Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data 5.62
Maximum of Logged Data 6.184

Mean of logged Data 5.874
SD of logged Data 0.162

Assuming Lognormal Distribution

95% H-UCL 388.2
95% Chebyshev (MVUE) UCL 423.9
99% Chebyshev (MVUE) UCL 505.7

90% Chebyshev (MVUE) UCL 404
97.5% Chebyshev (MVUE) UCL 451.5

Nonparametric Distribution Free UCL Statistics Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL 384.4
95% Standard Bootstrap UCL 382.8
95% Hall's Bootstrap UCL 386.6
90% Chebyshev(Mean, Sd) UCL 404.4
97.5% Chebyshev(Mean, Sd) UCL 452.2

95% BCA Bootstrap UCL 384.6
95% Bootstrap-t UCL 388.1
95% Percentile Bootstrap UCL 382.4
95% Chebyshev(Mean, Sd) UCL 424.4
99% Chebyshev(Mean, Sd) UCL 506.7

Suggested UCL to Use

95% Student's-t UCL 386

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (barium [ug/l]_intrawell_apw-10s)

General Statistics

Total Number of Observations 16
Minimum 536
Maximum 804
SD 66.52
Coefficient of Variation 0.109

Number of Distinct Observations 15
Number of Missing Observations 0
Mean 611.8
Median 594
Std. Error of Mean 16.63
Skewness 1.824

Normal GOF Test

Shapiro Wilk Test Statistic 0.828
1% Shapiro Wilk Critical Value 0.844
Lilliefors Test Statistic 0.243
1% Lilliefors Critical Value 0.248

Shapiro Wilk GOF Test

Data Not Normal at 1% Significance Level

Lilliefors GOF Test

Data appear Normal at 1% Significance Level

Data appear Approximate Normal at 1% Significance Level

Assuming Normal Distribution

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

95% Normal UCL

95% Student's-t UCL 640.9

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995) 647.2

95% Modified-t UCL (Johnson-1978) 642.2

Gamma GOF Test

A-D Test Statistic 0.851

5% A-D Critical Value 0.736

K-S Test Statistic 0.229

5% K-S Critical Value 0.214

Anderson-Darling Gamma GOF Test

Data Not Gamma Distributed at 5% Significance Level

Kolmogorov-Smirnov Gamma GOF Test

Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE) 99.4

Theta hat (MLE) 6.154

nu hat (MLE) 3181

MLE Mean (bias corrected) 611.8

Adjusted Level of Significance 0.0335

k star (bias corrected MLE) 80.8

Theta star (bias corrected MLE) 7.571

nu star (bias corrected) 2586

MLE Sd (bias corrected) 68.05

Approximate Chi Square Value (0.05) 2469

Adjusted Chi Square Value 2456

Assuming Gamma Distribution

95% Approximate Gamma UCL 640.8

95% Adjusted Gamma UCL 644.2

Lognormal GOF Test

Shapiro Wilk Test Statistic 0.87

10% Shapiro Wilk Critical Value 0.906

Lilliefors Test Statistic 0.222

10% Lilliefors Critical Value 0.196

Shapiro Wilk Lognormal GOF Test

Data Not Lognormal at 10% Significance Level

Lilliefors Lognormal GOF Test

Data Not Lognormal at 10% Significance Level

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data 6.284

Maximum of Logged Data 6.69

Mean of logged Data 6.411

SD of logged Data 0.101

Assuming Lognormal Distribution

95% H-UCL 640.4

95% Chebyshev (MVUE) UCL 679.2

99% Chebyshev (MVUE) UCL 766

90% Chebyshev (MVUE) UCL 658.2

97.5% Chebyshev (MVUE) UCL 708.5

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL 639.1

95% Standard Bootstrap UCL 638

95% Hall's Bootstrap UCL 769.2

90% Chebyshev(Mean, Sd) UCL 661.6

97.5% Chebyshev(Mean, Sd) UCL 715.6

95% BCA Bootstrap UCL 644.2

95% Bootstrap-t UCL 658

95% Percentile Bootstrap UCL 639.9

95% Chebyshev(Mean, Sd) UCL 684.2

99% Chebyshev(Mean, Sd) UCL 777.2

Suggested UCL to Use

95% Student's-t UCL 640.9

When a data set follows an approximate distribution passing only one of the GOF tests, it is suggested to use a UCL based upon a distribution passing both GOF tests in ProUCL

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
From File filea1b878952361.xls
Full Precision OFF
Confidence Coefficient 95%
Number of Bootstrap Operations 2000

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. Recommendations are based upon data size, data distribution, and skewness using results from simulation studies. However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (beryllium [ug/l]_intrawell_apw-02)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	3
Number of Detects	1	Number of Non-Detects	15
Number of Distinct Detects	1	Number of Distinct Non-Detects	2

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set! It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable report_result_value (beryllium [ug/l]_intrawell_apw-02) was not processed!

report_result_value (beryllium [ug/l]_intrawell_apw-03)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	2
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	2

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs! Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit! The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable report_result_value (beryllium [ug/l]_intrawell_apw-03) was not processed!

report_result_value (beryllium [ug/l]_intrawell_apw-05/05r)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	2
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	2

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs! Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit! The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable report_result_value (beryllium [ug/l]_intrawell_apw-05/05r) was not processed!

report_result_value (beryllium [ug/l]_intrawell_apw-06d)

General Statistics

Total Number of Observations	15	Number of Distinct Observations	2
Number of Detects	0	Number of Non-Detects	15
Number of Distinct Detects	0	Number of Distinct Non-Detects	2

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs! Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
From File filea1b878952361.xls
Full Precision OFF
Confidence Coefficient 95%
Number of Bootstrap Operations 2000

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable report_result_value (beryllium [ug/l]_inrawell_apw-06d) was not processed!

report_result_value (beryllium [ug/l]_inrawell_apw-06s)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	2
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	2

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable report_result_value (beryllium [ug/l]_inrawell_apw-06s) was not processed!

report_result_value (beryllium [ug/l]_inrawell_apw-07)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	2
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	2

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable report_result_value (beryllium [ug/l]_inrawell_apw-07) was not processed!

report_result_value (beryllium [ug/l]_inrawell_apw-08)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	2
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	2

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable report_result_value (beryllium [ug/l]_inrawell_apw-08) was not processed!

report_result_value (beryllium [ug/l]_inrawell_apw-10d)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	2
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	2

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
From File filea1b878952361.xls
Full Precision OFF
Confidence Coefficient 95%
Number of Bootstrap Operations 2000

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable report_result_value (beryllium [ug/l]_intrawell_apw-10d) was not processed!

report_result_value (beryllium [ug/l]_intrawell_apw-10s)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	2
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	2

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable report_result_value (beryllium [ug/l]_intrawell_apw-10s) was not processed!

report_result_value (boron [mg/l]_intrawell_apw-02)

General Statistics

Total Number of Observations	15	Number of Distinct Observations	14
		Number of Missing Observations	0
Minimum	7.75	Mean	8.661
Maximum	9.62	Median	8.73
SD	0.544	Std. Error of Mean	0.141
Coefficient of Variation	0.0628	Skewness	0.137

Normal GOF Test

Shapiro Wilk Test Statistic	0.943	Shapiro Wilk GOF Test
1% Shapiro Wilk Critical Value	0.835	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.18	Lilliefors GOF Test
1% Lilliefors Critical Value	0.255	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL

95% Student's-t UCL 8.908

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	8.897
95% Modified-t UCL (Johnson-1978)	8.909

Gamma GOF Test

A-D Test Statistic	0.492	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.734	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.186	Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value	0.221	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	271.8	k star (bias corrected MLE)	217.5
Theta hat (MLE)	0.0319	Theta star (bias corrected MLE)	0.0398

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
 From File filea1b878952361.xls
 Full Precision OFF
 Confidence Coefficient 95%
 Number of Bootstrap Operations 2000

nu hat (MLE)	8154	nu star (bias corrected)	6525
MLE Mean (bias corrected)	8.661	MLE Sd (bias corrected)	0.587
		Approximate Chi Square Value (0.05)	6338
Adjusted Level of Significance	0.0324	Adjusted Chi Square Value	6315

Assuming Gamma Distribution

95% Approximate Gamma UCL	8.916	95% Adjusted Gamma UCL	8.948

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.944	Shapiro Wilk Lognormal GOF Test	
10% Shapiro Wilk Critical Value	0.901	Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.177	Lilliefors Lognormal GOF Test	
10% Lilliefors Critical Value	0.202	Data appear Lognormal at 10% Significance Level	

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	2.048	Mean of logged Data	2.157
Maximum of Logged Data	2.264	SD of logged Data	0.0628

Assuming Lognormal Distribution

95% H-UCL	N/A	90% Chebyshev (MVUE) UCL	9.082
95% Chebyshev (MVUE) UCL	9.273	97.5% Chebyshev (MVUE) UCL	9.538
99% Chebyshev (MVUE) UCL	10.06		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	8.892	95% BCA Bootstrap UCL	8.911
95% Standard Bootstrap UCL	8.885	95% Bootstrap-t UCL	8.907
95% Hall's Bootstrap UCL	8.882	95% Percentile Bootstrap UCL	8.889
90% Chebyshev(Mean, Sd) UCL	9.082	95% Chebyshev(Mean, Sd) UCL	9.273
97.5% Chebyshev(Mean, Sd) UCL	9.538	99% Chebyshev(Mean, Sd) UCL	10.06

Suggested UCL to Use

95% Student's-t UCL	8.908

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (boron [mg/l]_intraWell_apw-03)

General Statistics

Total Number of Observations	15	Number of Distinct Observations	14
		Number of Missing Observations	0
Minimum	1.84	Mean	4.095
Maximum	4.94	Median	4.27
SD	0.912	Std. Error of Mean	0.235
Coefficient of Variation	0.223	Skewness	-1.771

Normal GOF Test

Shapiro Wilk Test Statistic	0.766

Shapiro Wilk GOF Test

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

1% Shapiro Wilk Critical Value	0.835	Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.294	Lilliefors GOF Test
1% Lilliefors Critical Value	0.255	Data Not Normal at 1% Significance Level

Data Not Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL

95% Student's-t UCL	4.509

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	4.367
95% Modified-t UCL (Johnson-1978)	4.491

Gamma GOF Test

A-D Test Statistic	1.837
5% A-D Critical Value	0.736
K-S Test Statistic	0.328
5% K-S Critical Value	0.221

Anderson-Darling Gamma GOF Test

Data Not Gamma Distributed at 5% Significance Level

Kolmogorov-Smirnov Gamma GOF Test

Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	15.57	k star (bias corrected MLE)	12.5
Theta hat (MLE)	0.263	Theta star (bias corrected MLE)	0.327
nu hat (MLE)	467.2	nu star (bias corrected)	375.1
MLE Mean (bias corrected)	4.095	MLE Sd (bias corrected)	1.158
		Approximate Chi Square Value (0.05)	331.2
Adjusted Level of Significance	0.0324	Adjusted Chi Square Value	326.1

Assuming Gamma Distribution

95% Approximate Gamma UCL	4.637	95% Adjusted Gamma UCL	4.709

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.682
10% Shapiro Wilk Critical Value	0.901
Lilliefors Test Statistic	0.34
10% Lilliefors Critical Value	0.202

Shapiro Wilk Lognormal GOF Test

Data Not Lognormal at 10% Significance Level

Lilliefors Lognormal GOF Test

Data Not Lognormal at 10% Significance Level

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	0.61	Mean of logged Data	1.377
Maximum of Logged Data	1.597	SD of logged Data	0.288

Assuming Lognormal Distribution

95% H-UCL	4.771	90% Chebyshev (MVUE) UCL	5.047
95% Chebyshev (MVUE) UCL	5.467	97.5% Chebyshev (MVUE) UCL	6.05
99% Chebyshev (MVUE) UCL	7.196		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	4.482	95% BCA Bootstrap UCL	4.379
95% Standard Bootstrap UCL	4.468	95% Bootstrap-t UCL	4.425
95% Hall's Bootstrap UCL	4.391	95% Percentile Bootstrap UCL	4.444
90% Chebyshev(Mean, Sd) UCL	4.801	95% Chebyshev(Mean, Sd) UCL	5.121
97.5% Chebyshev(Mean, Sd) UCL	5.565	99% Chebyshev(Mean, Sd) UCL	6.437

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Suggested UCL to Use

95% Student's-t UCL 4.509

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. Recommendations are based upon data size, data distribution, and skewness using results from simulation studies. However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positively skewed data sets.

report_result_value (boron [mg/l]_intraWell_apw-05/05r)

General Statistics

Total Number of Observations	15	Number of Distinct Observations	15
		Number of Missing Observations	0
Minimum	7.12	Mean	8.743
Maximum	10.3	Median	8.89
SD	1.032	Std. Error of Mean	0.266
Coefficient of Variation	0.118	Skewness	-0.239

Normal GOF Test

Shapiro Wilk Test Statistic	0.932	Shapiro Wilk GOF Test
1% Shapiro Wilk Critical Value	0.835	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.163	Lilliefors GOF Test
1% Lilliefors Critical Value	0.255	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	9.212	95% Adjusted-CLT UCL (Chen-1995)	9.163
		95% Modified-t UCL (Johnson-1978)	9.209

Gamma GOF Test

A-D Test Statistic	0.509	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.734	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.177	Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value	0.221	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	74.96	k star (bias corrected MLE)	60.01
Theta hat (MLE)	0.117	Theta star (bias corrected MLE)	0.146
nu hat (MLE)	2249	nu star (bias corrected)	1800
MLE Mean (bias corrected)	8.743	MLE Sd (bias corrected)	1.129
		Approximate Chi Square Value (0.05)	1703
Adjusted Level of Significance	0.0324	Adjusted Chi Square Value	1691

Assuming Gamma Distribution

95% Approximate Gamma UCL	9.244	95% Adjusted Gamma UCL	9.307

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.923	Shapiro Wilk Lognormal GOF Test
10% Shapiro Wilk Critical Value	0.901	Data appear Lognormal at 10% Significance Level

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
From File filea1b878952361.xls
Full Precision OFF
Confidence Coefficient 95%
Number of Bootstrap Operations 2000

Lilliefors Test Statistic 0.184

10% Lilliefors Critical Value 0.202

Lilliefors Lognormal GOF Test

Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data 1.963

Maximum of Logged Data 2.332

Mean of logged Data 2.162

SD of logged Data 0.121

Assuming Lognormal Distribution

95% H-UCL 9.258

95% Chebyshev (MVUE) UCL 9.932

99% Chebyshev (MVUE) UCL 11.46

90% Chebyshev (MVUE) UCL 9.561

97.5% Chebyshev (MVUE) UCL 10.45

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL 9.181

95% Standard Bootstrap UCL 9.172

95% Hall's Bootstrap UCL 9.155

90% Chebyshev(Mean, Sd) UCL 9.542

97.5% Chebyshev(Mean, Sd) UCL 10.41

95% BCA Bootstrap UCL 9.179

95% Bootstrap-t UCL 9.207

95% Percentile Bootstrap UCL 9.172

95% Chebyshev(Mean, Sd) UCL 9.904

99% Chebyshev(Mean, Sd) UCL 11.39

Suggested UCL to Use

95% Student's-t UCL 9.212

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positively skewed data sets.

report_result_value (boron [mg/l]_intraWell_apw-06d)

General Statistics

Total Number of Observations 14

Minimum 3.09

Maximum 5.51

SD 0.633

Coefficient of Variation 0.16

Number of Distinct Observations 14

Number of Missing Observations 0

Mean 3.943

Median 3.825

Std. Error of Mean 0.169

Skewness 1.426

Normal GOF Test

Shapiro Wilk Test Statistic 0.854

1% Shapiro Wilk Critical Value 0.825

Lilliefors Test Statistic 0.281

1% Lilliefors Critical Value 0.263

Shapiro Wilk GOF Test

Data appear Normal at 1% Significance Level

Lilliefors GOF Test

Data Not Normal at 1% Significance Level

Data appear Approximate Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL

95% Student's-t UCL 4.242

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995) 4.29

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

95% Modified-t UCL (Johnson-1978) 4.253

Gamma GOF Test

A-D Test Statistic	0.772
5% A-D Critical Value	0.733
K-S Test Statistic	0.261
5% K-S Critical Value	0.228

Anderson-Darling Gamma GOF Test

Data Not Gamma Distributed at 5% Significance Level

Kolmogorov-Smirnov Gamma GOF Test

Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	46.15	k star (bias corrected MLE)	36.31
Theta hat (MLE)	0.0854	Theta star (bias corrected MLE)	0.109
nu hat (MLE)	1292	nu star (bias corrected)	1017
MLE Mean (bias corrected)	3.943	MLE Sd (bias corrected)	0.654
		Approximate Chi Square Value (0.05)	943.7
Adjusted Level of Significance	0.0312	Adjusted Chi Square Value	934.4

Assuming Gamma Distribution

95% Approximate Gamma UCL	4.248	95% Adjusted Gamma UCL	4.29

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.902
10% Shapiro Wilk Critical Value	0.895
Lilliefors Test Statistic	0.252
10% Lilliefors Critical Value	0.208

Shapiro Wilk Lognormal GOF Test

Data appear Lognormal at 10% Significance Level

Lilliefors Lognormal GOF Test

Data Not Lognormal at 10% Significance Level

Data appear Approximate Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	1.128	Mean of logged Data	1.361
Maximum of Logged Data	1.707	SD of logged Data	0.15

Assuming Lognormal Distribution

95% H-UCL	4.248	90% Chebyshev (MVUE) UCL	4.415
95% Chebyshev (MVUE) UCL	4.63	97.5% Chebyshev (MVUE) UCL	4.929
99% Chebyshev (MVUE) UCL	5.514		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	4.221	95% BCA Bootstrap UCL	4.3
95% Standard Bootstrap UCL	4.212	95% Bootstrap-t UCL	4.432
95% Hall's Bootstrap UCL	6.091	95% Percentile Bootstrap UCL	4.229
90% Chebyshev(Mean, Sd) UCL	4.45	95% Chebyshev(Mean, Sd) UCL	4.68
97.5% Chebyshev(Mean, Sd) UCL	4.999	99% Chebyshev(Mean, Sd) UCL	5.626

Suggested UCL to Use

95% Student's-t UCL 4.242

When a data set follows an approximate distribution passing only one of the GOF tests, it is suggested to use a UCL based upon a distribution passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (boron [mg/l]_intraWell_apw-06s)

General Statistics

Total Number of Observations	15	Number of Distinct Observations	15
		Number of Missing Observations	0
Minimum	4.65	Mean	6.281
Maximum	9.19	Median	5.93
SD	1.105	Std. Error of Mean	0.285
Coefficient of Variation	0.176	Skewness	1.109

Normal GOF Test

Shapiro Wilk Test Statistic	0.907	Shapiro Wilk GOF Test
1% Shapiro Wilk Critical Value	0.835	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.158	Lilliefors GOF Test
1% Lilliefors Critical Value	0.255	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL

95% Student's-t UCL 6.783

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	6.837
95% Modified-t UCL (Johnson-1978)	6.797

Gamma GOF Test

A-D Test Statistic	0.43	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.735	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.148	Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value	0.221	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	37.02	k star (bias corrected MLE)	29.66
Theta hat (MLE)	0.17	Theta star (bias corrected MLE)	0.212
nu hat (MLE)	1111	nu star (bias corrected)	889.8
MLE Mean (bias corrected)	6.281	MLE Sd (bias corrected)	1.153
		Approximate Chi Square Value (0.05)	821.6
Adjusted Level of Significance	0.0324	Adjusted Chi Square Value	813.5

Assuming Gamma Distribution

95% Approximate Gamma UCL	6.802	95% Adjusted Gamma UCL	6.87

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.944	Shapiro Wilk Lognormal GOF Test
10% Shapiro Wilk Critical Value	0.901	Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.155	Lilliefors Lognormal GOF Test
10% Lilliefors Critical Value	0.202	Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	1.537	Mean of logged Data	1.824
Maximum of Logged Data	2.218	SD of logged Data	0.169

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
 From File filea1b878952361.xls
 Full Precision OFF
 Confidence Coefficient 95%
 Number of Bootstrap Operations 2000

Assuming Lognormal Distribution

95% H-UCL	6.812	90% Chebyshev (MVUE) UCL	7.101
95% Chebyshev (MVUE) UCL	7.474	97.5% Chebyshev (MVUE) UCL	7.991
99% Chebyshev (MVUE) UCL	9.007		

Nonparametric Distribution Free UCL Statistics Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	6.75	95% BCA Bootstrap UCL	6.833
95% Standard Bootstrap UCL	6.728	95% Bootstrap-t UCL	6.897
95% Hall's Bootstrap UCL	7.139	95% Percentile Bootstrap UCL	6.732
90% Chebyshev(Mean, Sd) UCL	7.137	95% Chebyshev(Mean, Sd) UCL	7.524
97.5% Chebyshev(Mean, Sd) UCL	8.062	99% Chebyshev(Mean, Sd) UCL	9.119

Suggested UCL to Use

95% Student's-t UCL 6.783

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. Recommendations are based upon data size, data distribution, and skewness using results from simulation studies. However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (boron [mg/l]_intrawell_apw-07)

General Statistics

Total Number of Observations	15	Number of Distinct Observations	15
		Number of Missing Observations	0
Minimum	0.168	Mean	0.261
Maximum	0.342	Median	0.274
SD	0.0523	Std. Error of Mean	0.0135
Coefficient of Variation	0.201	Skewness	-0.32

Normal GOF Test

Shapiro Wilk Test Statistic	0.956	Shapiro Wilk GOF Test	
1% Shapiro Wilk Critical Value	0.835	Data appear Normal at 1% Significance Level	
Lilliefors Test Statistic	0.161	Lilliefors GOF Test	
1% Lilliefors Critical Value	0.255	Data appear Normal at 1% Significance Level	

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	0.285	95% Adjusted-CLT UCL (Chen-1995)	0.282
		95% Modified-t UCL (Johnson-1978)	0.284

Gamma GOF Test

A-D Test Statistic	0.385	Anderson-Darling Gamma GOF Test	
5% A-D Critical Value	0.735	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.172	Kolmogorov-Smirnov Gamma GOF Test	
5% K-S Critical Value	0.221	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	24.8	k star (bias corrected MLE)	19.89

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
 From File filea1b878952361.xls
 Full Precision OFF
 Confidence Coefficient 95%
 Number of Bootstrap Operations 2000

Theta hat (MLE)	0.0105	Theta star (bias corrected MLE)	0.0131
nu hat (MLE)	744.1	nu star (bias corrected)	596.6
MLE Mean (bias corrected)	0.261	MLE Sd (bias corrected)	0.0585
		Approximate Chi Square Value (0.05)	540.9
Adjusted Level of Significance	0.0324	Adjusted Chi Square Value	534.4

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.288	95% Adjusted Gamma UCL	0.291

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.936	Shapiro Wilk Lognormal GOF Test	
10% Shapiro Wilk Critical Value	0.901	Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.165	Lilliefors Lognormal GOF Test	
10% Lilliefors Critical Value	0.202	Data appear Lognormal at 10% Significance Level	

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	-1.784	Mean of logged Data	-1.364
Maximum of Logged Data	-1.073	SD of logged Data	0.213

Assuming Lognormal Distribution

95% H-UCL	0.29	90% Chebyshev (MVUE) UCL	0.304
95% Chebyshev (MVUE) UCL	0.324	97.5% Chebyshev (MVUE) UCL	0.351
99% Chebyshev (MVUE) UCL	0.405		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	0.283	95% BCA Bootstrap UCL	0.282
95% Standard Bootstrap UCL	0.282	95% Bootstrap-t UCL	0.284
95% Hall's Bootstrap UCL	0.282	95% Percentile Bootstrap UCL	0.282
90% Chebyshev(Mean, Sd) UCL	0.301	95% Chebyshev(Mean, Sd) UCL	0.32
97.5% Chebyshev(Mean, Sd) UCL	0.345	99% Chebyshev(Mean, Sd) UCL	0.395

Suggested UCL to Use

95% Student's-t UCL	0.285

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. Recommendations are based upon data size, data distribution, and skewness using results from simulation studies. However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positively skewed data sets.

report_result_value (boron [mg/l]_intrawell_apw-08)

General Statistics

Total Number of Observations	15	Number of Distinct Observations	13
		Number of Missing Observations	0
Minimum	0.095	Mean	0.128
Maximum	0.155	Median	0.132
SD	0.0199	Std. Error of Mean	0.00514

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Coefficient of Variation	0.155	Skewness	-0.256

Normal GOF Test

Shapiro Wilk Test Statistic	0.932	Shapiro Wilk GOF Test
1% Shapiro Wilk Critical Value	0.835	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.173	Lilliefors GOF Test
1% Lilliefors Critical Value	0.255	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL

95% Student's-t UCL	0.137

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	0.136
95% Modified-t UCL (Johnson-1978)	0.137

Gamma GOF Test

A-D Test Statistic	0.466	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.735	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.193	Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value	0.221	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	42.82	k star (bias corrected MLE)	34.3
Theta hat (MLE)	0.003	Theta star (bias corrected MLE)	0.00374
nu hat (MLE)	1285	nu star (bias corrected)	1029
MLE Mean (bias corrected)	0.128	MLE Sd (bias corrected)	0.0219
Adjusted Level of Significance	0.0324	Approximate Chi Square Value (0.05)	955.5
		Adjusted Chi Square Value	946.8

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.138	95% Adjusted Gamma UCL	0.139

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.923	Shapiro Wilk Lognormal GOF Test
10% Shapiro Wilk Critical Value	0.901	Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.198	Lilliefors Lognormal GOF Test
10% Lilliefors Critical Value	0.202	Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	-2.354	Mean of logged Data	-2.065
Maximum of Logged Data	-1.864	SD of logged Data	0.16

Assuming Lognormal Distribution

95% H-UCL	0.139	90% Chebyshev (MVUE) UCL	0.144
95% Chebyshev (MVUE) UCL	0.152	97.5% Chebyshev (MVUE) UCL	0.162
99% Chebyshev (MVUE) UCL	0.181		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	0.137	95% BCA Bootstrap UCL	0.136
95% Standard Bootstrap UCL	0.137	95% Bootstrap-t UCL	0.138

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

95% Hall's Bootstrap UCL	0.136	95% Percentile Bootstrap UCL	0.136
90% Chebyshev(Mean, Sd) UCL	0.144	95% Chebyshev(Mean, Sd) UCL	0.151
97.5% Chebyshev(Mean, Sd) UCL	0.16	99% Chebyshev(Mean, Sd) UCL	0.179

Suggested UCL to Use

95% Student's-t UCL	0.137

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. Recommendations are based upon data size, data distribution, and skewness using results from simulation studies. However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positively skewed data sets.

report_result_value (boron [mg/l]_intrawell_apw-10d)

General Statistics

Total Number of Observations	15	Number of Distinct Observations	15
		Number of Missing Observations	0
Minimum	0.0522	Mean	0.083
Maximum	0.118	Median	0.0843
SD	0.0168	Std. Error of Mean	0.00435
Coefficient of Variation	0.203	Skewness	0.235

Normal GOF Test

Shapiro Wilk Test Statistic	0.975	Shapiro Wilk GOF Test
1% Shapiro Wilk Critical Value	0.835	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.141	Lilliefors GOF Test
1% Lilliefors Critical Value	0.255	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL

95% Student's-t UCL	0.0907

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	0.0904
95% Modified-t UCL (Johnson-1978)	0.0907

Gamma GOF Test

A-D Test Statistic	0.248	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.735	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.127	Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value	0.221	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	25.6	k star (bias corrected MLE)	20.53
Theta hat (MLE)	0.00324	Theta star (bias corrected MLE)	0.00404
nu hat (MLE)	768.1	nu star (bias corrected)	615.8
MLE Mean (bias corrected)	0.083	MLE Sd (bias corrected)	0.0183
		Approximate Chi Square Value (0.05)	559.3
Adjusted Level of Significance	0.0324	Adjusted Chi Square Value	552.6

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.0914	95% Adjusted Gamma UCL	0.0925

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
From File filea1b878952361.xls
Full Precision OFF
Confidence Coefficient 95%
Number of Bootstrap Operations 2000

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.973	Shapiro Wilk Lognormal GOF Test
10% Shapiro Wilk Critical Value	0.901	Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.123	Lilliefors Lognormal GOF Test
10% Lilliefors Critical Value	0.202	Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	-2.953	Mean of logged Data	-2.508
Maximum of Logged Data	-2.137	SD of logged Data	0.207

Assuming Lognormal Distribution

95% H-UCL	0.092	90% Chebyshev (MVUE) UCL	0.0964
95% Chebyshev (MVUE) UCL	0.103	97.5% Chebyshev (MVUE) UCL	0.111
99% Chebyshev (MVUE) UCL	0.127		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	0.0902	95% BCA Bootstrap UCL	0.0905
95% Standard Bootstrap UCL	0.09	95% Bootstrap-t UCL	0.0911
95% Hall's Bootstrap UCL	0.0911	95% Percentile Bootstrap UCL	0.0901
90% Chebyshev(Mean, Sd) UCL	0.0961	95% Chebyshev(Mean, Sd) UCL	0.102
97.5% Chebyshev(Mean, Sd) UCL	0.11	99% Chebyshev(Mean, Sd) UCL	0.126

Suggested UCL to Use

95% Student's-t UCL 0.0907

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (boron [mg/l]_intrawell_apw-10s)

General Statistics

Total Number of Observations	15	Number of Distinct Observations	14
		Number of Missing Observations	0
Minimum	0.525	Mean	0.576
Maximum	0.683	Median	0.569
SD	0.0416	Std. Error of Mean	0.0107
Coefficient of Variation	0.0722	Skewness	1.446

Normal GOF Test

Shapiro Wilk Test Statistic	0.875	Shapiro Wilk GOF Test
1% Shapiro Wilk Critical Value	0.835	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.193	Lilliefors GOF Test
1% Lilliefors Critical Value	0.255	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL

95% UCLs (Adjusted for Skewness)

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

95% Student's-t UCL	0.595	95% Adjusted-CLT UCL (Chen-1995)	0.598
		95% Modified-t UCL (Johnson-1978)	0.596

Gamma GOF Test

A-D Test Statistic	0.607	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.734	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.177	Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value	0.221	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	216.8	k star (bias corrected MLE)	173.5
Theta hat (MLE)	0.00266	Theta star (bias corrected MLE)	0.00332
nu hat (MLE)	6504	nu star (bias corrected)	5205
MLE Mean (bias corrected)	0.576	MLE Sd (bias corrected)	0.0437
		Approximate Chi Square Value (0.05)	5038
Adjusted Level of Significance	0.0324	Adjusted Chi Square Value	5018

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.595	95% Adjusted Gamma UCL	0.598

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.899	Shapiro Wilk Lognormal GOF Test
10% Shapiro Wilk Critical Value	0.901	Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.177	Lilliefors Lognormal GOF Test
10% Lilliefors Critical Value	0.202	Data appear Lognormal at 10% Significance Level

Data appear Approximate Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	-0.644	Mean of logged Data	-0.553
Maximum of Logged Data	-0.381	SD of logged Data	0.0694

Assuming Lognormal Distribution

95% H-UCL	N/A	90% Chebyshev (MVUE) UCL	0.607
95% Chebyshev (MVUE) UCL	0.621	97.5% Chebyshev (MVUE) UCL	0.641
99% Chebyshev (MVUE) UCL	0.679		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	0.594	95% BCA Bootstrap UCL	0.598
95% Standard Bootstrap UCL	0.594	95% Bootstrap-t UCL	0.604
95% Hall's Bootstrap UCL	0.643	95% Percentile Bootstrap UCL	0.594
90% Chebyshev(Mean, Sd) UCL	0.608	95% Chebyshev(Mean, Sd) UCL	0.623
97.5% Chebyshev(Mean, Sd) UCL	0.643	99% Chebyshev(Mean, Sd) UCL	0.683

Suggested UCL to Use

95% Student's-t UCL	0.595

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
From File filea1b878952361.xls
Full Precision OFF
Confidence Coefficient 95%
Number of Bootstrap Operations 2000

report_result_value (cadmium [ug/l]_intrawell_apw-02)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	1
Number of Detects	1	Number of Non-Detects	15
Number of Distinct Detects	1	Number of Distinct Non-Detects	1

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!
It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable report_result_value (cadmium [ug/l]_intrawell_apw-02) was not processed!

report_result_value (cadmium [ug/l]_intrawell_apw-03)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	1
Number of Detects	1	Number of Non-Detects	15
Number of Distinct Detects	1	Number of Distinct Non-Detects	1

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!
It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable report_result_value (cadmium [ug/l]_intrawell_apw-03) was not processed!

report_result_value (cadmium [ug/l]_intrawell_apw-05/05r)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	1
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	1

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable report_result_value (cadmium [ug/l]_intrawell_apw-05/05r) was not processed!

report_result_value (cadmium [ug/l]_intrawell_apw-06d)

General Statistics

Total Number of Observations	15	Number of Distinct Observations	1
Number of Detects	0	Number of Non-Detects	15
Number of Distinct Detects	0	Number of Distinct Non-Detects	1

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable report_result_value (cadmium [ug/l]_intrawell_apw-06d) was not processed!

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
From File filea1b878952361.xls
Full Precision OFF
Confidence Coefficient 95%
Number of Bootstrap Operations 2000

report_result_value (cadmium [ug/l]_intrawell_apw-06s)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	1
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	1

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable report_result_value (cadmium [ug/l]_intrawell_apw-06s) was not processed!

report_result_value (cadmium [ug/l]_intrawell_apw-07)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	1
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	1

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable report_result_value (cadmium [ug/l]_intrawell_apw-07) was not processed!

report_result_value (cadmium [ug/l]_intrawell_apw-08)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	1
Number of Detects	1	Number of Non-Detects	15
Number of Distinct Detects	1	Number of Distinct Non-Detects	1

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!
It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable report_result_value (cadmium [ug/l]_intrawell_apw-08) was not processed!

report_result_value (cadmium [ug/l]_intrawell_apw-10d)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	2
Number of Detects	1	Number of Non-Detects	15
Number of Distinct Detects	1	Number of Distinct Non-Detects	1

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!
It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable report_result_value (cadmium [ug/l]_intrawell_apw-10d) was not processed!

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
 From File filea1b878952361.xls
 Full Precision OFF
 Confidence Coefficient 95%
 Number of Bootstrap Operations 2000

report_result_value (cadmium [ug/l]_inrawell_apw-10s)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	1
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	1

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable report_result_value (cadmium [ug/l]_inrawell_apw-10s) was not processed!

report_result_value (calcium [mg/l]_inrawell_apw-02)

General Statistics

Total Number of Observations	15	Number of Distinct Observations	13
		Number of Missing Observations	0
Minimum	132	Mean	154.9
Maximum	198	Median	148
SD	20.67	Std. Error of Mean	5.336
Coefficient of Variation	0.133	Skewness	0.813

Normal GOF Test

Shapiro Wilk Test Statistic	0.911	Shapiro Wilk GOF Test
1% Shapiro Wilk Critical Value	0.835	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.165	Lilliefors GOF Test
1% Lilliefors Critical Value	0.255	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL

95% Student's-t UCL 164.3

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995) 164.9
 95% Modified-t UCL (Johnson-1978) 164.5

Gamma GOF Test

A-D Test Statistic	0.431	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.734	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.158	Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value	0.221	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	63.19	k star (bias corrected MLE)	50.6
Theta hat (MLE)	2.452	Theta star (bias corrected MLE)	3.062
nu hat (MLE)	1896	nu star (bias corrected)	1518
MLE Mean (bias corrected)	154.9	MLE Sd (bias corrected)	21.78
		Approximate Chi Square Value (0.05)	1428
Adjusted Level of Significance	0.0324	Adjusted Chi Square Value	1418

Assuming Gamma Distribution

95% Approximate Gamma UCL	164.6	95% Adjusted Gamma UCL	165.9

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
From File filea1b878952361.xls
Full Precision OFF
Confidence Coefficient 95%
Number of Bootstrap Operations 2000

Lognormal GOF Test

Shapiro Wilk Test Statistic 0.927
10% Shapiro Wilk Critical Value 0.901
Lilliefors Test Statistic 0.149
10% Lilliefors Critical Value 0.202

Shapiro Wilk Lognormal GOF Test

Data appear Lognormal at 10% Significance Level

Lilliefors Lognormal GOF Test

Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data 4.883
Maximum of Logged Data 5.288

Mean of logged Data 5.035
SD of logged Data 0.129

Assuming Lognormal Distribution

95% H-UCL 164.7
95% Chebyshev (MVUE) UCL 177.4
99% Chebyshev (MVUE) UCL 206.3

90% Chebyshev (MVUE) UCL 170.4
97.5% Chebyshev (MVUE) UCL 187.2

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL 163.7
95% Standard Bootstrap UCL 163.5
95% Hall's Bootstrap UCL 165.6
90% Chebyshev(Mean, Sd) UCL 170.9
97.5% Chebyshev(Mean, Sd) UCL 188.3

95% BCA Bootstrap UCL 164.5
95% Bootstrap-t UCL 166.2
95% Percentile Bootstrap UCL 163.8
95% Chebyshev(Mean, Sd) UCL 178.2
99% Chebyshev(Mean, Sd) UCL 208

Suggested UCL to Use

95% Student's-t UCL 164.3

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (calcium [mg/l]_intrawell_apw-03)

General Statistics

Total Number of Observations 15
Minimum 74.9
Maximum 153
SD 23.54
Coefficient of Variation 0.215

Number of Distinct Observations 14
Number of Missing Observations 0
Mean 109.5
Median 111
Std. Error of Mean 6.077
Skewness 0.302

Normal GOF Test

Shapiro Wilk Test Statistic 0.964
1% Shapiro Wilk Critical Value 0.835
Lilliefors Test Statistic 0.124
1% Lilliefors Critical Value 0.255

Shapiro Wilk GOF Test

Data appear Normal at 1% Significance Level

Lilliefors GOF Test

Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL

95% UCLs (Adjusted for Skewness)

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

95% Student's-t UCL	120.2	95% Adjusted-CLT UCL (Chen-1995)	120
		95% Modified-t UCL (Johnson-1978)	120.3

Gamma GOF Test

A-D Test Statistic	0.197	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.735	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.0969	Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value	0.221	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	23.17	k star (bias corrected MLE)	18.58
Theta hat (MLE)	4.725	Theta star (bias corrected MLE)	5.892
nu hat (MLE)	695.2	nu star (bias corrected)	557.5
MLE Mean (bias corrected)	109.5	MLE Sd (bias corrected)	25.4
		Approximate Chi Square Value (0.05)	503.7
Adjusted Level of Significance	0.0324	Adjusted Chi Square Value	497.4

Assuming Gamma Distribution

95% Approximate Gamma UCL	121.2	95% Adjusted Gamma UCL	122.7

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.969	Shapiro Wilk Lognormal GOF Test
10% Shapiro Wilk Critical Value	0.901	Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.0982	Lilliefors Lognormal GOF Test
10% Lilliefors Critical Value	0.202	Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	4.316	Mean of logged Data	4.674
Maximum of Logged Data	5.03	SD of logged Data	0.217

Assuming Lognormal Distribution

95% H-UCL	121.9	90% Chebyshev (MVUE) UCL	128
95% Chebyshev (MVUE) UCL	136.4	97.5% Chebyshev (MVUE) UCL	148
99% Chebyshev (MVUE) UCL	170.8		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	119.5	95% BCA Bootstrap UCL	119.6
95% Standard Bootstrap UCL	119.2	95% Bootstrap-t UCL	120.6
95% Hall's Bootstrap UCL	120	95% Percentile Bootstrap UCL	119.6
90% Chebyshev(Mean, Sd) UCL	127.7	95% Chebyshev(Mean, Sd) UCL	136
97.5% Chebyshev(Mean, Sd) UCL	147.4	99% Chebyshev(Mean, Sd) UCL	170

Suggested UCL to Use

95% Student's-t UCL	120.2

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

report_result_value (calcium [mg/l]_intrawell_apw-05/05r)

General Statistics

Total Number of Observations	15	Number of Distinct Observations	13
		Number of Missing Observations	0
Minimum	97.1	Mean	122.8
Maximum	142	Median	124
SD	11.87	Std. Error of Mean	3.064
Coefficient of Variation	0.0966	Skewness	-0.581

Normal GOF Test

Shapiro Wilk Test Statistic	0.968
1% Shapiro Wilk Critical Value	0.835
Lilliefors Test Statistic	0.112
1% Lilliefors Critical Value	0.255

Shapiro Wilk GOF Test

Data appear Normal at 1% Significance Level

Lilliefors GOF Test

Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL

95% Student's-t UCL	128.2

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	127.4
95% Modified-t UCL (Johnson-1978)	128.1

Gamma GOF Test

A-D Test Statistic	0.299
5% A-D Critical Value	0.734
K-S Test Statistic	0.119
5% K-S Critical Value	0.221

Anderson-Darling Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

Kolmogorov-Smirnov Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	109.8	k star (bias corrected MLE)	87.91
Theta hat (MLE)	1.118	Theta star (bias corrected MLE)	1.397
nu hat (MLE)	3295	nu star (bias corrected)	2637
MLE Mean (bias corrected)	122.8	MLE Sd (bias corrected)	13.1
		Approximate Chi Square Value (0.05)	2519
Adjusted Level of Significance	0.0324	Adjusted Chi Square Value	2505

Assuming Gamma Distribution

95% Approximate Gamma UCL	128.6

95% Adjusted Gamma UCL	129.3

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.949
10% Shapiro Wilk Critical Value	0.901
Lilliefors Test Statistic	0.131
10% Lilliefors Critical Value	0.202

Shapiro Wilk Lognormal GOF Test

Data appear Lognormal at 10% Significance Level

Lilliefors Lognormal GOF Test

Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	4.576	Mean of logged Data	4.806
Maximum of Logged Data	4.956	SD of logged Data	0.1

Assuming Lognormal Distribution

95% H-UCL	128.7

90% Chebyshev (MVUE) UCL	132.4

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
 From File filea1b878952361.xls
 Full Precision OFF
 Confidence Coefficient 95%
 Number of Bootstrap Operations 2000

95% Chebyshev (MVUE) UCL 136.7	97.5% Chebyshev (MVUE) UCL 142.7
99% Chebyshev (MVUE) UCL 154.4	

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL 127.8	95% BCA Bootstrap UCL 127.2
95% Standard Bootstrap UCL 127.6	95% Bootstrap-t UCL 127.7
95% Hall's Bootstrap UCL 127.6	95% Percentile Bootstrap UCL 127.6
90% Chebyshev(Mean, Sd) UCL 132	95% Chebyshev(Mean, Sd) UCL 136.2
97.5% Chebyshev(Mean, Sd) UCL 141.9	99% Chebyshev(Mean, Sd) UCL 153.3

Suggested UCL to Use

95% Student's-t UCL 128.2

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positively skewed data sets.

report_result_value (calcium [mg/l]_intrawell_apw-06d)

General Statistics

Total Number of Observations 14	Number of Distinct Observations 11
	Number of Missing Observations 0
Minimum 96.7	Mean 108.2
Maximum 128	Median 106.5
SD 9.084	Std. Error of Mean 2.428
Coefficient of Variation 0.0839	Skewness 0.932

Normal GOF Test

Shapiro Wilk Test Statistic 0.917
 1% Shapiro Wilk Critical Value 0.825
 Lilliefors Test Statistic 0.208
 1% Lilliefors Critical Value 0.263

Shapiro Wilk GOF Test

Data appear Normal at 1% Significance Level

Lilliefors GOF Test

Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL

95% Student's-t UCL 112.5

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995) 112.9
 95% Modified-t UCL (Johnson-1978) 112.6

Gamma GOF Test

A-D Test Statistic 0.423
 5% A-D Critical Value 0.733
 K-S Test Statistic 0.194
 5% K-S Critical Value 0.228

Anderson-Darling Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

Kolmogorov-Smirnov Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
 From File filea1b878952361.xls
 Full Precision OFF
 Confidence Coefficient 95%
 Number of Bootstrap Operations 2000

k hat (MLE) 158.7	k star (bias corrected MLE) 124.7
Theta hat (MLE) 0.682	Theta star (bias corrected MLE) 0.868
nu hat (MLE) 4443	nu star (bias corrected) 3492
MLE Mean (bias corrected) 108.2	MLE Sd (bias corrected) 9.689
	Approximate Chi Square Value (0.05) 3356
Adjusted Level of Significance 0.0312	Adjusted Chi Square Value 3338

Assuming Gamma Distribution

95% Approximate Gamma UCL 112.6	95% Adjusted Gamma UCL 113.2

Lognormal GOF Test

Shapiro Wilk Test Statistic 0.933	Shapiro Wilk Lognormal GOF Test
10% Shapiro Wilk Critical Value 0.895	Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic 0.191	Lilliefors Lognormal GOF Test
10% Lilliefors Critical Value 0.208	Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data 4.572	Mean of logged Data 4.681
Maximum of Logged Data 4.852	SD of logged Data 0.0817

Assuming Lognormal Distribution

95% H-UCL N/A	90% Chebyshev (MVUE) UCL 115.3
95% Chebyshev (MVUE) UCL 118.5	97.5% Chebyshev (MVUE) UCL 123
99% Chebyshev (MVUE) UCL 131.7	

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL 112.2	95% BCA Bootstrap UCL 112.6
95% Standard Bootstrap UCL 112.1	95% Bootstrap-t UCL 113.7
95% Hall's Bootstrap UCL 115	95% Percentile Bootstrap UCL 112.2
90% Chebyshev(Mean, Sd) UCL 115.5	95% Chebyshev(Mean, Sd) UCL 118.8
97.5% Chebyshev(Mean, Sd) UCL 123.4	99% Chebyshev(Mean, Sd) UCL 132.4

Suggested UCL to Use

95% Student's-t UCL 112.5

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (calcium [mg/l]_intrawell_apw-06s)

General Statistics

Total Number of Observations 15	Number of Distinct Observations 15
	Number of Missing Observations 0
Minimum 87.5	Mean 99.2
Maximum 115	Median 98.1
SD 6.968	Std. Error of Mean 1.799
Coefficient of Variation 0.0702	Skewness 0.596

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Normal GOF Test

Shapiro Wilk Test Statistic	0.954	Shapiro Wilk GOF Test
1% Shapiro Wilk Critical Value	0.835	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.165	Lilliefors GOF Test
1% Lilliefors Critical Value	0.255	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL

95% Student's-t UCL 102.4

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995) 102.5
95% Modified-t UCL (Johnson-1978) 102.4

Gamma GOF Test

A-D Test Statistic	0.354	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.734	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.167	Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value	0.221	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	221.1	k star (bias corrected MLE)	176.9
Theta hat (MLE)	0.449	Theta star (bias corrected MLE)	0.561
nu hat (MLE)	6633	nu star (bias corrected)	5308
MLE Mean (bias corrected)	99.2	MLE Sd (bias corrected)	7.458
Adjusted Level of Significance	0.0324	Approximate Chi Square Value (0.05)	5139
		Adjusted Chi Square Value	5119

Assuming Gamma Distribution

95% Approximate Gamma UCL 102.4 95% Adjusted Gamma UCL 102.9

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.963	Shapiro Wilk Lognormal GOF Test
10% Shapiro Wilk Critical Value	0.901	Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.174	Lilliefors Lognormal GOF Test
10% Lilliefors Critical Value	0.202	Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	4.472	Mean of logged Data	4.595
Maximum of Logged Data	4.745	SD of logged Data	0.0694

Assuming Lognormal Distribution

95% H-UCL	N/A	90% Chebyshev (MVUE) UCL	104.5
95% Chebyshev (MVUE) UCL	106.9	97.5% Chebyshev (MVUE) UCL	110.3
99% Chebyshev (MVUE) UCL	116.9		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	102.2	95% BCA Bootstrap UCL	102.3
95% Standard Bootstrap UCL	102.1	95% Bootstrap-t UCL	102.8
95% Hall's Bootstrap UCL	103.3	95% Percentile Bootstrap UCL	102.2
90% Chebyshev(Mean, Sd) UCL	104.6	95% Chebyshev(Mean, Sd) UCL	107

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

97.5% Chebyshev(Mean, Sd) UCL 110.4

99% Chebyshev(Mean, Sd) UCL 117.1

Suggested UCL to Use

95% Student's-t UCL 102.4

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (calcium [mg/l]_intrawell_apw-07)

General Statistics

Total Number of Observations	15	Number of Distinct Observations	15
		Number of Missing Observations	0
Minimum	161	Mean	193.1
Maximum	238	Median	192
SD	18.36	Std. Error of Mean	4.74
Coefficient of Variation	0.095	Skewness	0.675

Normal GOF Test

Shapiro Wilk Test Statistic	0.962
1% Shapiro Wilk Critical Value	0.835
Lilliefors Test Statistic	0.112
1% Lilliefors Critical Value	0.255

Shapiro Wilk GOF Test

Data appear Normal at 1% Significance Level

Lilliefors GOF Test

Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL

95% Student's-t UCL 201.5

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995) 201.8

95% Modified-t UCL (Johnson-1978) 201.6

Gamma GOF Test

A-D Test Statistic	0.204
5% A-D Critical Value	0.734
K-S Test Statistic	0.1
5% K-S Critical Value	0.221

Anderson-Darling Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

Kolmogorov-Smirnov Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	121.5	k star (bias corrected MLE)	97.23
Theta hat (MLE)	1.59	Theta star (bias corrected MLE)	1.986
nu hat (MLE)	3645	nu star (bias corrected)	2917
MLE Mean (bias corrected)	193.1	MLE Sd (bias corrected)	19.59
		Approximate Chi Square Value (0.05)	2793
Adjusted Level of Significance	0.0324	Adjusted Chi Square Value	2778

Assuming Gamma Distribution

95% Approximate Gamma UCL 201.7

95% Adjusted Gamma UCL 202.8

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.978
10% Shapiro Wilk Critical Value	0.901
Lilliefors Test Statistic	0.107

Shapiro Wilk Lognormal GOF Test

Data appear Lognormal at 10% Significance Level

Lilliefors Lognormal GOF Test

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
From File filea1b878952361.xls
Full Precision OFF
Confidence Coefficient 95%
Number of Bootstrap Operations 2000

10% Lilliefors Critical Value 0.202 Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	5.081	Mean of logged Data	5.259
Maximum of Logged Data	5.472	SD of logged Data	0.0936

Assuming Lognormal Distribution

95% H-UCL	N/A	90% Chebyshev (MVUE) UCL	207.1
95% Chebyshev (MVUE) UCL	213.5	97.5% Chebyshev (MVUE) UCL	222.3
99% Chebyshev (MVUE) UCL	239.6		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	200.9	95% BCA Bootstrap UCL	201.5
95% Standard Bootstrap UCL	200.7	95% Bootstrap-t UCL	202.5
95% Hall's Bootstrap UCL	204.6	95% Percentile Bootstrap UCL	201.3
90% Chebyshev(Mean, Sd) UCL	207.4	95% Chebyshev(Mean, Sd) UCL	213.8
97.5% Chebyshev(Mean, Sd) UCL	222.7	99% Chebyshev(Mean, Sd) UCL	240.3

Suggested UCL to Use

95% Student's-t UCL 201.5

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (calcium [mg/l]_intrawell_apw-08)

General Statistics

Total Number of Observations	15	Number of Distinct Observations	15
		Number of Missing Observations	0
Minimum	79.4	Mean	93.13
Maximum	105	Median	95
SD	8.202	Std. Error of Mean	2.118
Coefficient of Variation	0.0881	Skewness	-0.413

Normal GOF Test

Shapiro Wilk Test Statistic	0.928	Shapiro Wilk GOF Test
1% Shapiro Wilk Critical Value	0.835	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.165	Lilliefors GOF Test
1% Lilliefors Critical Value	0.255	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	96.86	95% Adjusted-CLT UCL (Chen-1995)	96.38
		95% Modified-t UCL (Johnson-1978)	96.83

Gamma GOF Test

A-D Test Statistic 0.538

Anderson-Darling Gamma GOF Test

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

5% A-D Critical Value	0.734	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.176	Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value	0.221	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	134.5	k star (bias corrected MLE)	107.7
Theta hat (MLE)	0.692	Theta star (bias corrected MLE)	0.865
nu hat (MLE)	4036	nu star (bias corrected)	3230
MLE Mean (bias corrected)	93.13	MLE Sd (bias corrected)	8.975
		Approximate Chi Square Value (0.05)	3099
Adjusted Level of Significance	0.0324	Adjusted Chi Square Value	3084

Assuming Gamma Distribution

95% Approximate Gamma UCL	97.07	95% Adjusted Gamma UCL	97.57

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.919	Shapiro Wilk Lognormal GOF Test
10% Shapiro Wilk Critical Value	0.901	Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.172	Lilliefors Lognormal GOF Test
10% Lilliefors Critical Value	0.202	Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	4.374	Mean of logged Data	4.53
Maximum of Logged Data	4.654	SD of logged Data	0.0899

Assuming Lognormal Distribution

95% H-UCL	N/A	90% Chebyshev (MVUE) UCL	99.63
95% Chebyshev (MVUE) UCL	102.6	97.5% Chebyshev (MVUE) UCL	106.7
99% Chebyshev (MVUE) UCL	114.7		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	96.62	95% BCA Bootstrap UCL	96.41
95% Standard Bootstrap UCL	96.46	95% Bootstrap-t UCL	96.51
95% Hall's Bootstrap UCL	96.18	95% Percentile Bootstrap UCL	96.41
90% Chebyshev(Mean, Sd) UCL	99.49	95% Chebyshev(Mean, Sd) UCL	102.4
97.5% Chebyshev(Mean, Sd) UCL	106.4	99% Chebyshev(Mean, Sd) UCL	114.2

Suggested UCL to Use

95% Student's-t UCL	96.86

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positively skewed data sets.

report_result_value (calcium [mg/l]_intrawell_apw-10d)

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

General Statistics

Total Number of Observations	15	Number of Distinct Observations	13
		Number of Missing Observations	0
Minimum	115	Mean	174
Maximum	611	Median	123
SD	137.1	Std. Error of Mean	35.4
Coefficient of Variation	0.788	Skewness	2.871

Normal GOF Test

Shapiro Wilk Test Statistic	0.474	Shapiro Wilk GOF Test
1% Shapiro Wilk Critical Value	0.835	Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.442	Lilliefors GOF Test
1% Lilliefors Critical Value	0.255	Data Not Normal at 1% Significance Level

Data Not Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	236.4	95% Adjusted-CLT UCL (Chen-1995)	260.3
		95% Modified-t UCL (Johnson-1978)	240.7

Gamma GOF Test

A-D Test Statistic	3.436	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.743	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.409	Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value	0.223	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	3.405	k star (bias corrected MLE)	2.769
Theta hat (MLE)	51.1	Theta star (bias corrected MLE)	62.85
nu hat (MLE)	102.2	nu star (bias corrected)	83.06
MLE Mean (bias corrected)	174	MLE Sd (bias corrected)	104.6
		Approximate Chi Square Value (0.05)	63.05
Adjusted Level of Significance	0.0324	Adjusted Chi Square Value	60.91

Assuming Gamma Distribution

95% Approximate Gamma UCL	229.2	95% Adjusted Gamma UCL	237.3

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.543	Shapiro Wilk Lognormal GOF Test
10% Shapiro Wilk Critical Value	0.901	Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.375	Lilliefors Lognormal GOF Test
10% Lilliefors Critical Value	0.202	Data Not Lognormal at 10% Significance Level

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	4.745	Mean of logged Data	5.005
Maximum of Logged Data	6.415	SD of logged Data	0.486

Assuming Lognormal Distribution

95% H-UCL	219.2	90% Chebyshev (MVUE) UCL	230.9
95% Chebyshev (MVUE) UCL	260.1	97.5% Chebyshev (MVUE) UCL	300.7
99% Chebyshev (MVUE) UCL	380.3		

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Nonparametric Distribution Free UCL Statistics Data do not follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	232.2	95% BCA Bootstrap UCL	273
95% Standard Bootstrap UCL	230.8	95% Bootstrap-t UCL	1002
95% Hall's Bootstrap UCL	683.4	95% Percentile Bootstrap UCL	238.4
90% Chebyshev(Mean, Sd) UCL	280.2	95% Chebyshev(Mean, Sd) UCL	328.3
97.5% Chebyshev(Mean, Sd) UCL	395.1	99% Chebyshev(Mean, Sd) UCL	526.3

Suggested UCL to Use

95% Student's-t UCL	236.4

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (calcium [mg/l]_intrawell_apw-10s)

General Statistics

Total Number of Observations	15	Number of Distinct Observations	13
		Number of Missing Observations	0
Minimum	129	Mean	145.9
Maximum	171	Median	145
SD	11.17	Std. Error of Mean	2.884
Coefficient of Variation	0.0765	Skewness	0.655

Normal GOF Test

Shapiro Wilk Test Statistic	0.964
1% Shapiro Wilk Critical Value	0.835
Lilliefors Test Statistic	0.133
1% Lilliefors Critical Value	0.255

Shapiro Wilk GOF Test

Data appear Normal at 1% Significance Level

Lilliefors GOF Test

Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL

95% Student's-t UCL	151

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	151.2
95% Modified-t UCL (Johnson-1978)	151.1

Gamma GOF Test

A-D Test Statistic	0.208
5% A-D Critical Value	0.734
K-S Test Statistic	0.125
5% K-S Critical Value	0.221

Anderson-Darling Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

Kolmogorov-Smirnov Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	187.1	k star (bias corrected MLE)	149.7
Theta hat (MLE)	0.78	Theta star (bias corrected MLE)	0.975
nu hat (MLE)	5612	nu star (bias corrected)	4491
MLE Mean (bias corrected)	145.9	MLE Sd (bias corrected)	11.93
		Approximate Chi Square Value (0.05)	4336

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
 From File filea1b878952361.xls
 Full Precision OFF
 Confidence Coefficient 95%
 Number of Bootstrap Operations 2000

Adjusted Level of Significance 0.0324 Adjusted Chi Square Value 4318

Assuming Gamma Distribution

95% Approximate Gamma UCL 151.1 95% Adjusted Gamma UCL 151.8

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.975	Shapiro Wilk Lognormal GOF Test
10% Shapiro Wilk Critical Value	0.901	Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.12	Lilliefors Lognormal GOF Test
10% Lilliefors Critical Value	0.202	Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	4.86	Mean of logged Data	4.98
Maximum of Logged Data	5.142	SD of logged Data	0.0753

Assuming Lognormal Distribution

95% H-UCL	N/A	90% Chebyshev (MVUE) UCL	154.5
95% Chebyshev (MVUE) UCL	158.3	97.5% Chebyshev (MVUE) UCL	163.7
99% Chebyshev (MVUE) UCL	174.2		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	150.7	95% BCA Bootstrap UCL	150.9
95% Standard Bootstrap UCL	150.6	95% Bootstrap-t UCL	151.3
95% Hall's Bootstrap UCL	151.6	95% Percentile Bootstrap UCL	150.8
90% Chebyshev(Mean, Sd) UCL	154.6	95% Chebyshev(Mean, Sd) UCL	158.5
97.5% Chebyshev(Mean, Sd) UCL	163.9	99% Chebyshev(Mean, Sd) UCL	174.6

Suggested UCL to Use

95% Student's-t UCL 151

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (chloride [mg/l]_intrawell_apw-02)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	8
		Number of Missing Observations	0
Minimum	7	Mean	10.24
Maximum	13	Median	11
SD	2.001	Std. Error of Mean	0.5
Coefficient of Variation	0.195	Skewness	-0.454

Normal GOF Test

Shapiro Wilk Test Statistic	0.891	Shapiro Wilk GOF Test
1% Shapiro Wilk Critical Value	0.844	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.211	Lilliefors GOF Test
1% Lilliefors Critical Value	0.248	Data appear Normal at 1% Significance Level

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL

95% Student's-t UCL	11.11

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	11
95% Modified-t UCL (Johnson-1978)	11.1

Gamma GOF Test

A-D Test Statistic	0.842
5% A-D Critical Value	0.736
K-S Test Statistic	0.231
5% K-S Critical Value	0.215

Anderson-Darling Gamma GOF Test

Data Not Gamma Distributed at 5% Significance Level

Kolmogorov-Smirnov Gamma GOF Test

Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	25.81
Theta hat (MLE)	0.397
nu hat (MLE)	826
MLE Mean (bias corrected)	10.24
Adjusted Level of Significance	0.0335

k star (bias corrected MLE)	21.01
Theta star (bias corrected MLE)	0.487
nu star (bias corrected)	672.4
MLE Sd (bias corrected)	2.233
Approximate Chi Square Value (0.05)	613.3
Adjusted Chi Square Value	606.8

Assuming Gamma Distribution

95% Approximate Gamma UCL	11.22

95% Adjusted Gamma UCL	11.34

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.873
10% Shapiro Wilk Critical Value	0.906
Lilliefors Test Statistic	0.232
10% Lilliefors Critical Value	0.196

Shapiro Wilk Lognormal GOF Test

Data Not Lognormal at 10% Significance Level

Lilliefors Lognormal GOF Test

Data Not Lognormal at 10% Significance Level

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	1.946
Maximum of Logged Data	2.565

Mean of logged Data	2.306
SD of logged Data	0.208

Assuming Lognormal Distribution

95% H-UCL	11.31
95% Chebyshev (MVUE) UCL	12.59
99% Chebyshev (MVUE) UCL	15.59

90% Chebyshev (MVUE) UCL	11.86
97.5% Chebyshev (MVUE) UCL	13.6

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	11.06
95% Standard Bootstrap UCL	11.02
95% Hall's Bootstrap UCL	10.99
90% Chebyshev(Mean, Sd) UCL	11.74
97.5% Chebyshev(Mean, Sd) UCL	13.36

95% BCA Bootstrap UCL	10.94
95% Bootstrap-t UCL	11.08
95% Percentile Bootstrap UCL	11
95% Chebyshev(Mean, Sd) UCL	12.42
99% Chebyshev(Mean, Sd) UCL	15.21

Suggested UCL to Use

95% Student's-t UCL	11.11

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
From File filea1b878952361.xls
Full Precision OFF
Confidence Coefficient 95%
Number of Bootstrap Operations 2000

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. Recommendations are based upon data size, data distribution, and skewness using results from simulation studies. However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positively skewed data sets.

report_result_value (chloride [mg/l]_inrawell_apw-03)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	9
		Number of Missing Observations	0
Minimum	8.04	Mean	18.32
Maximum	23	Median	20
SD	4.136	Std. Error of Mean	1.034
Coefficient of Variation	0.226	Skewness	-1.335

Normal GOF Test

Shapiro Wilk Test Statistic	0.859	Shapiro Wilk GOF Test
1% Shapiro Wilk Critical Value	0.844	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.221	Lilliefors GOF Test
1% Lilliefors Critical Value	0.248	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	20.13	95% Adjusted-CLT UCL (Chen-1995)	19.65
		95% Modified-t UCL (Johnson-1978)	20.07

Gamma GOF Test

A-D Test Statistic	1.185	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.738	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.232	Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value	0.215	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	15.93	k star (bias corrected MLE)	12.99
Theta hat (MLE)	1.15	Theta star (bias corrected MLE)	1.41
nu hat (MLE)	509.8	nu star (bias corrected)	415.5
MLE Mean (bias corrected)	18.32	MLE Sd (bias corrected)	5.083
		Approximate Chi Square Value (0.05)	369.3
Adjusted Level of Significance	0.0335	Adjusted Chi Square Value	364.3

Assuming Gamma Distribution

95% Approximate Gamma UCL	20.61	95% Adjusted Gamma UCL	20.89

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.774	Shapiro Wilk Lognormal GOF Test
10% Shapiro Wilk Critical Value	0.906	Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.231	Lilliefors Lognormal GOF Test
10% Lilliefors Critical Value	0.196	Data Not Lognormal at 10% Significance Level

Data Not Lognormal at 10% Significance Level

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
From File filea1b878952361.xls
Full Precision OFF
Confidence Coefficient 95%
Number of Bootstrap Operations 2000

Lognormal Statistics

Minimum of Logged Data	2.084	Mean of logged Data	2.876
Maximum of Logged Data	3.135	SD of logged Data	0.281

Assuming Lognormal Distribution

95% H-UCL	21.11	90% Chebyshev (MVUE) UCL	22.33
95% Chebyshev (MVUE) UCL	24.1	97.5% Chebyshev (MVUE) UCL	26.56
99% Chebyshev (MVUE) UCL	31.4		

Nonparametric Distribution Free UCL Statistics Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	20.02	95% BCA Bootstrap UCL	19.69
95% Standard Bootstrap UCL	19.96	95% Bootstrap-t UCL	19.87
95% Hall's Bootstrap UCL	19.73	95% Percentile Bootstrap UCL	19.88
90% Chebyshev(Mean, Sd) UCL	21.42	95% Chebyshev(Mean, Sd) UCL	22.82
97.5% Chebyshev(Mean, Sd) UCL	24.77	99% Chebyshev(Mean, Sd) UCL	28.6

Suggested UCL to Use

95% Student's-t UCL 20.13

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positively skewed data sets.

report_result_value (chloride [mg/l]_intrawell_apw-05/05r)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	7
		Number of Missing Observations	0
Minimum	14	Mean	16.12
Maximum	19	Median	16
SD	1.54	Std. Error of Mean	0.385
Coefficient of Variation	0.0956	Skewness	0.647

Normal GOF Test

Shapiro Wilk Test Statistic	0.911
1% Shapiro Wilk Critical Value	0.844
Lilliefors Test Statistic	0.218
1% Lilliefors Critical Value	0.248

Shapiro Wilk GOF Test

Data appear Normal at 1% Significance Level

Lilliefors GOF Test

Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL

95% Student's-t UCL 16.79

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	16.82
95% Modified-t UCL (Johnson-1978)	16.8

Gamma GOF Test

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
From File filea1b878952361.xls
Full Precision OFF
Confidence Coefficient 95%
Number of Bootstrap Operations 2000

A-D Test Statistic 0.549

5% A-D Critical Value 0.736

K-S Test Statistic 0.208

5% K-S Critical Value 0.214

Anderson-Darling Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

Kolmogorov-Smirnov Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE) 120.1

Theta hat (MLE) 0.134

nu hat (MLE) 3844

MLE Mean (bias corrected) 16.12

Adjusted Level of Significance 0.0335

k star (bias corrected MLE) 97.64

Theta star (bias corrected MLE) 0.165

nu star (bias corrected) 3124

MLE Sd (bias corrected) 1.631

Approximate Chi Square Value (0.05) 2995

Adjusted Chi Square Value 2981

Assuming Gamma Distribution

95% Approximate Gamma UCL 16.81

95% Adjusted Gamma UCL 16.89

Lognormal GOF Test

Shapiro Wilk Test Statistic 0.924

10% Shapiro Wilk Critical Value 0.906

Lilliefors Test Statistic 0.201

10% Lilliefors Critical Value 0.196

Shapiro Wilk Lognormal GOF Test

Data appear Lognormal at 10% Significance Level

Lilliefors Lognormal GOF Test

Data Not Lognormal at 10% Significance Level

Data appear Approximate Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data 2.639

Maximum of Logged Data 2.944

Mean of logged Data 2.776

SD of logged Data 0.0937

Assuming Lognormal Distribution

95% H-UCL N/A

95% Chebyshev (MVUE) UCL 17.77

99% Chebyshev (MVUE) UCL 19.88

90% Chebyshev (MVUE) UCL 17.25

97.5% Chebyshev (MVUE) UCL 18.48

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL 16.75

95% Standard Bootstrap UCL 16.73

95% Hall's Bootstrap UCL 16.85

90% Chebyshev(Mean, Sd) UCL 17.27

97.5% Chebyshev(Mean, Sd) UCL 18.52

95% BCA Bootstrap UCL 16.75

95% Bootstrap-t UCL 16.88

95% Percentile Bootstrap UCL 16.75

95% Chebyshev(Mean, Sd) UCL 17.8

99% Chebyshev(Mean, Sd) UCL 19.95

Suggested UCL to Use

95% Student's-t UCL 16.79

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (chloride [mg/l]_intrawell_apw-06d)

General Statistics

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
 From File filea1b878952361.xls
 Full Precision OFF
 Confidence Coefficient 95%
 Number of Bootstrap Operations 2000

Total Number of Observations	15	Number of Distinct Observations	6
		Number of Missing Observations	0
Minimum	14	Mean	16.88
Maximum	22	Median	16
SD	2.095	Std. Error of Mean	0.541
Coefficient of Variation	0.124	Skewness	1.616

Normal GOF Test

Shapiro Wilk Test Statistic 0.769
 1% Shapiro Wilk Critical Value 0.835
 Lilliefors Test Statistic 0.344
 1% Lilliefors Critical Value 0.255

Shapiro Wilk GOF Test

Data Not Normal at 1% Significance Level

Lilliefors GOF Test

Data Not Normal at 1% Significance Level

Data Not Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL

95% Student's-t UCL 17.83

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995) 18.01

95% Modified-t UCL (Johnson-1978) 17.87

Gamma GOF Test

A-D Test Statistic 1.461
 5% A-D Critical Value 0.734
 K-S Test Statistic 0.327
 5% K-S Critical Value 0.221

Anderson-Darling Gamma GOF Test

Data Not Gamma Distributed at 5% Significance Level

Kolmogorov-Smirnov Gamma GOF Test

Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE) 76.55
 Theta hat (MLE) 0.221
 nu hat (MLE) 2296
 MLE Mean (bias corrected) 16.88
 Adjusted Level of Significance 0.0324

k star (bias corrected MLE) 61.28
 Theta star (bias corrected MLE) 0.275
 nu star (bias corrected) 1838
 MLE Sd (bias corrected) 2.156
 Approximate Chi Square Value (0.05) 1740
 Adjusted Chi Square Value 1728

Assuming Gamma Distribution

95% Approximate Gamma UCL 17.84

95% Adjusted Gamma UCL 17.96

Lognormal GOF Test

Shapiro Wilk Test Statistic 0.809
 10% Shapiro Wilk Critical Value 0.901
 Lilliefors Test Statistic 0.32
 10% Lilliefors Critical Value 0.202

Shapiro Wilk Lognormal GOF Test

Data Not Lognormal at 10% Significance Level

Lilliefors Lognormal GOF Test

Data Not Lognormal at 10% Significance Level

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data 2.639
 Maximum of Logged Data 3.091

Mean of logged Data 2.82
 SD of logged Data 0.116

Assuming Lognormal Distribution

95% H-UCL 17.83
 95% Chebyshev (MVUE) UCL 19.08
 99% Chebyshev (MVUE) UCL 21.91

90% Chebyshev (MVUE) UCL 18.39
 97.5% Chebyshev (MVUE) UCL 20.03

Nonparametric Distribution Free UCL Statistics

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Data do not follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	17.77	95% BCA Bootstrap UCL	17.91
95% Standard Bootstrap UCL	17.75	95% Bootstrap-t UCL	18.77
95% Hall's Bootstrap UCL	24.38	95% Percentile Bootstrap UCL	17.81
90% Chebyshev(Mean, Sd) UCL	18.5	95% Chebyshev(Mean, Sd) UCL	19.24
97.5% Chebyshev(Mean, Sd) UCL	20.26	99% Chebyshev(Mean, Sd) UCL	22.26

Suggested UCL to Use

95% Student's-t UCL	17.83

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (chloride [mg/l]_intrawell_apw-06s)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	10
		Number of Missing Observations	0
Minimum	20	Mean	25.01
Maximum	31	Median	25
SD	2.762	Std. Error of Mean	0.691
Coefficient of Variation	0.11	Skewness	0.169

Normal GOF Test

Shapiro Wilk Test Statistic	0.98
1% Shapiro Wilk Critical Value	0.844
Lilliefors Test Statistic	0.111
1% Lilliefors Critical Value	0.248

Shapiro Wilk GOF Test

Data appear Normal at 1% Significance Level

Lilliefors GOF Test

Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL

95% Student's-t UCL	26.22

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	26.18
95% Modified-t UCL (Johnson-1978)	26.23

Gamma GOF Test

A-D Test Statistic	0.206
5% A-D Critical Value	0.736
K-S Test Statistic	0.114
5% K-S Critical Value	0.214

Anderson-Darling Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

Kolmogorov-Smirnov Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	87.19	k star (bias corrected MLE)	70.88
Theta hat (MLE)	0.287	Theta star (bias corrected MLE)	0.353
nu hat (MLE)	2790	nu star (bias corrected)	2268
MLE Mean (bias corrected)	25.01	MLE Sd (bias corrected)	2.971
		Approximate Chi Square Value (0.05)	2159
Adjusted Level of Significance	0.0335	Adjusted Chi Square Value	2146

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
From File filea1b878952361.xls
Full Precision OFF
Confidence Coefficient 95%
Number of Bootstrap Operations 2000

Assuming Gamma Distribution

95% Approximate Gamma UCL 26.28 95% Adjusted Gamma UCL 26.43

Lognormal GOF Test

Shapiro Wilk Test Statistic 0.981
10% Shapiro Wilk Critical Value 0.906
Lilliefors Test Statistic 0.124
10% Lilliefors Critical Value 0.196

Shapiro Wilk Lognormal GOF Test

Data appear Lognormal at 10% Significance Level

Lilliefors Lognormal GOF Test

Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data 2.996 Mean of logged Data 3.214
Maximum of Logged Data 3.434 SD of logged Data 0.111

Assuming Lognormal Distribution

95% H-UCL 26.31 90% Chebyshev (MVUE) UCL 27.1
95% Chebyshev (MVUE) UCL 28.04 97.5% Chebyshev (MVUE) UCL 29.35
99% Chebyshev (MVUE) UCL 31.93

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL 26.15 95% BCA Bootstrap UCL 26.14
95% Standard Bootstrap UCL 26.12 95% Bootstrap-t UCL 26.23
95% Hall's Bootstrap UCL 26.29 95% Percentile Bootstrap UCL 26.13
90% Chebyshev(Mean, Sd) UCL 27.08 95% Chebyshev(Mean, Sd) UCL 28.02
97.5% Chebyshev(Mean, Sd) UCL 29.32 99% Chebyshev(Mean, Sd) UCL 31.88

Suggested UCL to Use

95% Student's-t UCL 26.22

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (chloride [mg/l]_intrawell_apw-07)

General Statistics

Total Number of Observations 16 Number of Distinct Observations 8
Number of Missing Observations 0
Minimum 9 Mean 13.16
Maximum 16 Median 14
SD 2.189 Std. Error of Mean 0.547
Coefficient of Variation 0.166 Skewness -0.502

Normal GOF Test

Shapiro Wilk Test Statistic 0.88
1% Shapiro Wilk Critical Value 0.844
Lilliefors Test Statistic 0.238
1% Lilliefors Critical Value 0.248

Shapiro Wilk GOF Test

Data appear Normal at 1% Significance Level

Lilliefors GOF Test

Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Assuming Normal Distribution

95% Normal UCL

95% Student's-t UCL 14.12

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995) 13.98

95% Modified-t UCL (Johnson-1978) 14.1

Gamma GOF Test

A-D Test Statistic 0.959

5% A-D Critical Value 0.736

K-S Test Statistic 0.242

5% K-S Critical Value 0.215

Anderson-Darling Gamma GOF Test

Data Not Gamma Distributed at 5% Significance Level

Kolmogorov-Smirnov Gamma GOF Test

Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE) 35.95

Theta hat (MLE) 0.366

nu hat (MLE) 1150

MLE Mean (bias corrected) 13.16

Adjusted Level of Significance 0.0335

k star (bias corrected MLE) 29.25

Theta star (bias corrected MLE) 0.45

nu star (bias corrected) 935.9

MLE Sd (bias corrected) 2.433

Approximate Chi Square Value (0.05) 865.9

Adjusted Chi Square Value 858.3

Assuming Gamma Distribution

95% Approximate Gamma UCL 14.22

95% Adjusted Gamma UCL 14.35

Lognormal GOF Test

Shapiro Wilk Test Statistic 0.873

10% Shapiro Wilk Critical Value 0.906

Lilliefors Test Statistic 0.233

10% Lilliefors Critical Value 0.196

Shapiro Wilk Lognormal GOF Test

Data Not Lognormal at 10% Significance Level

Lilliefors Lognormal GOF Test

Data Not Lognormal at 10% Significance Level

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data 2.197

Maximum of Logged Data 2.773

Mean of logged Data 2.563

SD of logged Data 0.176

Assuming Lognormal Distribution

95% H-UCL 14.29

95% Chebyshev (MVUE) UCL 15.7

99% Chebyshev (MVUE) UCL 18.95

90% Chebyshev (MVUE) UCL 14.91

97.5% Chebyshev (MVUE) UCL 16.8

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL 14.06

95% Standard Bootstrap UCL 14.02

95% Hall's Bootstrap UCL 13.95

90% Chebyshev(Mean, Sd) UCL 14.8

97.5% Chebyshev(Mean, Sd) UCL 16.57

95% BCA Bootstrap UCL 13.94

95% Bootstrap-t UCL 14.03

95% Percentile Bootstrap UCL 14

95% Chebyshev(Mean, Sd) UCL 15.54

99% Chebyshev(Mean, Sd) UCL 18.6

Suggested UCL to Use

95% Student's-t UCL 14.12

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
From File filea1b878952361.xls
Full Precision OFF
Confidence Coefficient 95%
Number of Bootstrap Operations 2000

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positively skewed data sets.

report_result_value (chloride [mg/l]_inrawell_apw-08)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	6
		Number of Missing Observations	0
Minimum	9	Mean	10.6
Maximum	13	Median	10.3
SD	1.083	Std. Error of Mean	0.271
Coefficient of Variation	0.102	Skewness	0.604

Normal GOF Test

Shapiro Wilk Test Statistic	0.92	Shapiro Wilk GOF Test
1% Shapiro Wilk Critical Value	0.844	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.21	Lilliefors GOF Test
1% Lilliefors Critical Value	0.248	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL

95% Student's-t UCL 11.07

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	11.09
95% Modified-t UCL (Johnson-1978)	11.08

Gamma GOF Test

A-D Test Statistic	0.597	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.736	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.212	Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value	0.214	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	104.7	k star (bias corrected MLE)	85.14
Theta hat (MLE)	0.101	Theta star (bias corrected MLE)	0.125
nu hat (MLE)	3351	nu star (bias corrected)	2724
MLE Mean (bias corrected)	10.6	MLE Sd (bias corrected)	1.149
		Approximate Chi Square Value (0.05)	2604
Adjusted Level of Significance	0.0335	Adjusted Chi Square Value	2591

Assuming Gamma Distribution

95% Approximate Gamma UCL	11.09	95% Adjusted Gamma UCL	11.15

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.929	Shapiro Wilk Lognormal GOF Test
10% Shapiro Wilk Critical Value	0.906	Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.203	Lilliefors Lognormal GOF Test
10% Lilliefors Critical Value	0.196	Data Not Lognormal at 10% Significance Level

Data appear Approximate Lognormal at 10% Significance Level

Lognormal Statistics

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Minimum of Logged Data	2.197	Mean of logged Data	2.356
Maximum of Logged Data	2.565	SD of logged Data	0.1

Assuming Lognormal Distribution

95% H-UCL	11.09	90% Chebyshev (MVUE) UCL	11.4
95% Chebyshev (MVUE) UCL	11.76	97.5% Chebyshev (MVUE) UCL	12.26
99% Chebyshev (MVUE) UCL	13.25		

Nonparametric Distribution Free UCL Statistics Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	11.05	95% BCA Bootstrap UCL	11.06
95% Standard Bootstrap UCL	11.04	95% Bootstrap-t UCL	11.14
95% Hall's Bootstrap UCL	11.14	95% Percentile Bootstrap UCL	11.06
90% Chebyshev(Mean, Sd) UCL	11.41	95% Chebyshev(Mean, Sd) UCL	11.78
97.5% Chebyshev(Mean, Sd) UCL	12.29	99% Chebyshev(Mean, Sd) UCL	13.29

Suggested UCL to Use

95% Student's-t UCL 11.07

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (chloride [mg/l]_inrawell_apw-10d)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	9
		Number of Missing Observations	0
Minimum	10	Mean	15.4
Maximum	24	Median	15.7
SD	3.262	Std. Error of Mean	0.815
Coefficient of Variation	0.212	Skewness	0.723

Normal GOF Test

Shapiro Wilk Test Statistic	0.903
1% Shapiro Wilk Critical Value	0.844
Lilliefors Test Statistic	0.187
1% Lilliefors Critical Value	0.248

Shapiro Wilk GOF Test

Data appear Normal at 1% Significance Level

Lilliefors GOF Test

Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL

95% Student's-t UCL 16.83

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	16.9
95% Modified-t UCL (Johnson-1978)	16.85

Gamma GOF Test

A-D Test Statistic	0.589
5% A-D Critical Value	0.736
K-S Test Statistic	0.162
5% K-S Critical Value	0.215

Anderson-Darling Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

Kolmogorov-Smirnov Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Gamma Statistics

k hat (MLE)	24.09	k star (bias corrected MLE)	19.62
Theta hat (MLE)	0.639	Theta star (bias corrected MLE)	0.785
nu hat (MLE)	771	nu star (bias corrected)	627.8
MLE Mean (bias corrected)	15.4	MLE Sd (bias corrected)	3.477
		Approximate Chi Square Value (0.05)	570.6
Adjusted Level of Significance	0.0335	Adjusted Chi Square Value	564.4

Assuming Gamma Distribution

95% Approximate Gamma UCL	16.94	95% Adjusted Gamma UCL	17.13

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.915	Shapiro Wilk Lognormal GOF Test
10% Shapiro Wilk Critical Value	0.906	Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.176	Lilliefors Lognormal GOF Test
10% Lilliefors Critical Value	0.196	Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	2.303	Mean of logged Data	2.713
Maximum of Logged Data	3.178	SD of logged Data	0.213

Assuming Lognormal Distribution

95% H-UCL	17.03	90% Chebyshev (MVUE) UCL	17.87
95% Chebyshev (MVUE) UCL	18.99	97.5% Chebyshev (MVUE) UCL	20.55
99% Chebyshev (MVUE) UCL	23.6		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	16.74	95% BCA Bootstrap UCL	16.85
95% Standard Bootstrap UCL	16.7	95% Bootstrap-t UCL	17.03
95% Hall's Bootstrap UCL	17.55	95% Percentile Bootstrap UCL	16.71
90% Chebyshev(Mean, Sd) UCL	17.85	95% Chebyshev(Mean, Sd) UCL	18.95
97.5% Chebyshev(Mean, Sd) UCL	20.49	99% Chebyshev(Mean, Sd) UCL	23.51

Suggested UCL to Use

95% Student's-t UCL	16.83

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (chloride [mg/l]_inrawell_apw-10s)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	10
		Number of Missing Observations	0
Minimum	6	Mean	11.58
Maximum	21	Median	11
SD	5.61	Std. Error of Mean	1.403

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Coefficient of Variation	0.485	Skewness	0.36

Normal GOF Test

Shapiro Wilk Test Statistic	0.851	Shapiro Wilk GOF Test
1% Shapiro Wilk Critical Value	0.844	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.23	Lilliefors GOF Test
1% Lilliefors Critical Value	0.248	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL

95% Student's-t UCL	14.03

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	14.02
95% Modified-t UCL (Johnson-1978)	14.05

Gamma GOF Test

A-D Test Statistic	1.086	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.742	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.236	Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value	0.216	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	4.445	k star (bias corrected MLE)	3.653
Theta hat (MLE)	2.604	Theta star (bias corrected MLE)	3.168
nu hat (MLE)	142.2	nu star (bias corrected)	116.9
MLE Mean (bias corrected)	11.58	MLE Sd (bias corrected)	6.056
		Approximate Chi Square Value (0.05)	92.94
Adjusted Level of Significance	0.0335	Adjusted Chi Square Value	90.51

Assuming Gamma Distribution

95% Approximate Gamma UCL	14.56	95% Adjusted Gamma UCL	14.95

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.828	Shapiro Wilk Lognormal GOF Test
10% Shapiro Wilk Critical Value	0.906	Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.233	Lilliefors Lognormal GOF Test
10% Lilliefors Critical Value	0.196	Data Not Lognormal at 10% Significance Level

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	1.792	Mean of logged Data	2.332
Maximum of Logged Data	3.045	SD of logged Data	0.505

Assuming Lognormal Distribution

95% H-UCL	15.3	90% Chebyshev (MVUE) UCL	16.13
95% Chebyshev (MVUE) UCL	18.19	97.5% Chebyshev (MVUE) UCL	21.04
99% Chebyshev (MVUE) UCL	26.63		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	13.88	95% BCA Bootstrap UCL	13.81
95% Standard Bootstrap UCL	13.82	95% Bootstrap-t UCL	14.28

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

95% Hall's Bootstrap UCL	13.86	95% Percentile Bootstrap UCL	13.83
90% Chebyshev(Mean, Sd) UCL	15.78	95% Chebyshev(Mean, Sd) UCL	17.69
97.5% Chebyshev(Mean, Sd) UCL	20.33	99% Chebyshev(Mean, Sd) UCL	25.53

Suggested UCL to Use

95% Student's-t UCL 14.03

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. Recommendations are based upon data size, data distribution, and skewness using results from simulation studies. However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (chromium [ug/l]_intrawell_apw-02)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	16
Number of Detects	15	Number of Non-Detects	1
Number of Distinct Detects	15	Number of Distinct Non-Detects	1
Minimum Detect	2.4	Minimum Non-Detect	2
Maximum Detect	127	Maximum Non-Detect	2
Variance Detects	1460	Percent Non-Detects	6.25%
Mean Detects	35.85	SD Detects	38.21
Median Detects	23.5	CV Detects	1.066
Skewness Detects	1.562	Kurtosis Detects	1.768
Mean of Logged Detects	3.024	SD of Logged Detects	1.157

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.794	Shapiro Wilk GOF Test
1% Shapiro Wilk Critical Value	0.835	Detected Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.208	Lilliefors GOF Test
1% Lilliefors Critical Value	0.255	Detected Data appear Normal at 1% Significance Level

Detected Data appear Approximate Normal at 1% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	33.73	KM Standard Error of Mean	9.488
90KM SD	36.67	95% KM (BCA) UCL	49.48
95% KM (t) UCL	50.36	95% KM (Percentile Bootstrap) UCL	49.48
95% KM (z) UCL	49.34	95% KM Bootstrap t UCL	63.07
90% KM Chebyshev UCL	62.2	95% KM Chebyshev UCL	75.09
97.5% KM Chebyshev UCL	92.98	99% KM Chebyshev UCL	128.1

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.275	Anderson-Darling GOF Test
5% A-D Critical Value	0.762	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.136	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.228	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.035	k star (bias corrected MLE)	0.873
Theta hat (MLE)	34.62	Theta star (bias corrected MLE)	41.07
nu hat (MLE)	31.06	nu star (bias corrected)	26.18
Mean (detects)	35.85		

Gamma ROS Statistics using Imputed Non-Detects

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
 From File filea1b878952361.xls
 Full Precision OFF
 Confidence Coefficient 95%
 Number of Bootstrap Operations 2000

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	33.61
Maximum	127	Median	19.15
SD	37.98	CV	1.13
k hat (MLE)	0.634	k star (bias corrected MLE)	0.556
Theta hat (MLE)	53.04	Theta star (bias corrected MLE)	60.4
nu hat (MLE)	20.27	nu star (bias corrected)	17.81
Adjusted Level of Significance (β)	0.0335		
Approximate Chi Square Value (17.81, α)	9.251	Adjusted Chi Square Value (17.81, β)	8.555
95% Gamma Approximate UCL	64.69	95% Gamma Adjusted UCL	69.94

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	33.73	SD (KM)	36.67
Variance (KM)	1344	SE of Mean (KM)	9.488
k hat (KM)	0.846	k star (KM)	0.729
nu hat (KM)	27.08	nu star (KM)	23.34
theta hat (KM)	39.86	theta star (KM)	46.25
80% gamma percentile (KM)	55.36	90% gamma percentile (KM)	83.86
95% gamma percentile (KM)	113.1	99% gamma percentile (KM)	182.8

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (23.34, α)	13.35	Adjusted Chi Square Value (23.34, β)	12.49
95% KM Approximate Gamma UCL	58.98	95% KM Adjusted Gamma UCL	63.02

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.976	Shapiro Wilk GOF Test
10% Shapiro Wilk Critical Value	0.901	Detected Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.0973	Lilliefors GOF Test
10% Lilliefors Critical Value	0.202	Detected Data appear Lognormal at 10% Significance Level

Detected Data appear Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	33.68	Mean in Log Scale	2.846
SD in Original Scale	37.91	SD in Log Scale	1.326
95% t UCL (assumes normality of ROS data)	50.3	95% Percentile Bootstrap UCL	49.36
95% BCA Bootstrap UCL	53.03	95% Bootstrap t UCL	61.34
95% H-UCL (Log ROS)	125.6		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	2.878	KM Geo Mean	17.79
KM SD (logged)	1.22	95% Critical H Value (KM-Log)	3.058
KM Standard Error of Mean (logged)	0.316	95% H-UCL (KM -Log)	98.12
KM SD (logged)	1.22	95% Critical H Value (KM-Log)	3.058
KM Standard Error of Mean (logged)	0.316		

DL/2 Statistics

DL/2 Normal

Mean in Original Scale	33.67
SD in Original Scale	37.92
95% t UCL (Assumes normality)	50.29

DL/2 Log-Transformed

Mean in Log Scale	2.835
SD in Log Scale	1.349
95% H-Stat UCL	132.5

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
From File filea1b878952361.xls
Full Precision OFF
Confidence Coefficient 95%
Number of Bootstrap Operations 2000

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL 50.36

The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.

Please verify the data were collected from random locations.

**If the data were collected using judgmental or other non-random methods,
then contact a statistician to correctly calculate UCLs.**

When a data set follows an approximate distribution passing only one of the GOF tests,
it is suggested to use a UCL based upon a distribution passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (chromium [ug/l]_intrawell_apw-03)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	13
Number of Detects	10	Number of Non-Detects	6
Number of Distinct Detects	10	Number of Distinct Non-Detects	3
Minimum Detect	1.9	Minimum Non-Detect	1
Maximum Detect	24.1	Maximum Non-Detect	2
Variance Detects	44	Percent Non-Detects	37.5%
Mean Detects	7.4	SD Detects	6.633
Median Detects	5.15	CV Detects	0.896
Skewness Detects	2.046	Kurtosis Detects	4.714
Mean of Logged Detects	1.713	SD of Logged Detects	0.779

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.772	Shapiro Wilk GOF Test
1% Shapiro Wilk Critical Value	0.781	Detected Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.246	Lilliefors GOF Test
1% Lilliefors Critical Value	0.304	Detected Data appear Normal at 1% Significance Level

Detected Data appear Approximate Normal at 1% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	5.009	KM Standard Error of Mean	1.543
90KM SD	5.855	95% KM (BCA) UCL	7.844
95% KM (t) UCL	7.715	95% KM (Percentile Bootstrap) UCL	7.652
95% KM (z) UCL	7.548	95% KM Bootstrap t UCL	9.916
90% KM Chebyshev UCL	9.639	95% KM Chebyshev UCL	11.74
97.5% KM Chebyshev UCL	14.65	99% KM Chebyshev UCL	20.36

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.338	Anderson-Darling GOF Test
5% A-D Critical Value	0.736	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.173	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.27	Detected data appear Gamma Distributed at 5% Significance Level

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.883	k star (bias corrected MLE)	1.385
Theta hat (MLE)	3.929	Theta star (bias corrected MLE)	5.343
nu hat (MLE)	37.67	nu star (bias corrected)	27.7
Mean (detects)	7.4		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
 GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
 For such situations, GROS method may yield incorrect values of UCLs and BTVs
 This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	4.629
Maximum	24.1	Median	2.55
SD	6.329	CV	1.367
k hat (MLE)	0.313	k star (bias corrected MLE)	0.296
Theta hat (MLE)	14.79	Theta star (bias corrected MLE)	15.64
nu hat (MLE)	10.01	nu star (bias corrected)	9.469
Adjusted Level of Significance (β)	0.0335		
Approximate Chi Square Value (9.47, α)	3.613	Adjusted Chi Square Value (9.47, β)	3.212
95% Gamma Approximate UCL	12.13	95% Gamma Adjusted UCL	13.65

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	5.009	SD (KM)	5.855
Variance (KM)	34.28	SE of Mean (KM)	1.543
k hat (KM)	0.732	k star (KM)	0.636
nu hat (KM)	23.42	nu star (KM)	20.36
theta hat (KM)	6.844	theta star (KM)	7.872
80% gamma percentile (KM)	8.253	90% gamma percentile (KM)	12.86
95% gamma percentile (KM)	17.65	99% gamma percentile (KM)	29.18

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (20.36, α)	11.12	Adjusted Chi Square Value (20.36, β)	10.35
95% KM Approximate Gamma UCL	9.174	95% KM Adjusted Gamma UCL	9.858

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.964
10% Shapiro Wilk Critical Value	0.869
Lilliefors Test Statistic	0.135
10% Lilliefors Critical Value	0.241

Shapiro Wilk GOF Test

Detected Data appear Lognormal at 10% Significance Level

Lilliefors GOF Test

Detected Data appear Lognormal at 10% Significance Level

Detected Data appear Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	4.928	Mean in Log Scale	0.969
SD in Original Scale	6.107	SD in Log Scale	1.182
95% t UCL (assumes normality of ROS data)	7.604	95% Percentile Bootstrap UCL	7.467
95% BCA Bootstrap UCL	8.347	95% Bootstrap t UCL	9.896
95% H-UCL (Log ROS)	13.21		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	1.077	KM Geo Mean	2.937
KM SD (logged)	1.009	95% Critical H Value (KM-Log)	2.718

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
 From File filea1b878952361.xls
 Full Precision OFF
 Confidence Coefficient 95%
 Number of Bootstrap Operations 2000

KM Standard Error of Mean (logged)	0.267	95% H-UCL (KM -Log)	9.927
KM SD (logged)	1.009	95% Critical H Value (KM-Log)	2.718
KM Standard Error of Mean (logged)	0.267		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	4.875	Mean in Log Scale	0.905
SD in Original Scale	6.144	SD in Log Scale	1.247
95% t UCL (Assumes normality)	7.568	95% H-Stat UCL	14.6

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL 7.715

When a data set follows an approximate distribution passing only one of the GOF tests,
 it is suggested to use a UCL based upon a distribution passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (chromium [ug/l]_inrawell_apw-05/05r)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	9
Number of Detects	7	Number of Non-Detects	9
Number of Distinct Detects	7	Number of Distinct Non-Detects	3
Minimum Detect	2	Minimum Non-Detect	1
Maximum Detect	13.7	Maximum Non-Detect	2
Variance Detects	17.77	Percent Non-Detects	56.25%
Mean Detects	5.371	SD Detects	4.215
Median Detects	3.3	CV Detects	0.785
Skewness Detects	1.655	Kurtosis Detects	2.147
Mean of Logged Detects	1.468	SD of Logged Detects	0.669

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.772	Shapiro Wilk GOF Test	
1% Shapiro Wilk Critical Value	0.73	Detected Data appear Normal at 1% Significance Level	
Lilliefors Test Statistic	0.333	Lilliefors GOF Test	
1% Lilliefors Critical Value	0.35	Detected Data appear Normal at 1% Significance Level	

Detected Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	2.913	KM Standard Error of Mean	0.91
90KM SD	3.371	95% KM (BCA) UCL	4.5
95% KM (t) UCL	4.508	95% KM (Percentile Bootstrap) UCL	4.419
95% KM (z) UCL	4.41	95% KM Bootstrap t UCL	6.476
90% KM Chebyshev UCL	5.643	95% KM Chebyshev UCL	6.881
97.5% KM Chebyshev UCL	8.597	99% KM Chebyshev UCL	11.97

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.599	Anderson-Darling GOF Test
5% A-D Critical Value	0.714	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.29	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.314	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics on Detected Data Only

k hat (MLE)	2.497	k star (bias corrected MLE)	1.522
Theta hat (MLE)	2.151	Theta star (bias corrected MLE)	3.529
nu hat (MLE)	34.96	nu star (bias corrected)	21.31
Mean (detects)	5.371		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	2.356
Maximum	13.7	Median	0.01
SD	3.828	CV	1.625
k hat (MLE)	0.253	k star (bias corrected MLE)	0.247
Theta hat (MLE)	9.319	Theta star (bias corrected MLE)	9.535
nu hat (MLE)	8.088	nu star (bias corrected)	7.905
Adjusted Level of Significance (β)	0.0335		
Approximate Chi Square Value (7.91, α)	2.68	Adjusted Chi Square Value (7.91, β)	2.346
95% Gamma Approximate UCL	6.948	95% Gamma Adjusted UCL	7.937

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	2.913	SD (KM)	3.371
Variance (KM)	11.36	SE of Mean (KM)	0.91
k hat (KM)	0.746	k star (KM)	0.648
nu hat (KM)	23.88	nu star (KM)	20.74
theta hat (KM)	3.902	theta star (KM)	4.494
80% gamma percentile (KM)	4.797	90% gamma percentile (KM)	7.443
95% gamma percentile (KM)	10.19	99% gamma percentile (KM)	16.8

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (20.74, α)	11.4	Adjusted Chi Square Value (20.74, β)	10.62
95% KM Approximate Gamma UCL	5.299	95% KM Adjusted Gamma UCL	5.69

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.895	Shapiro Wilk GOF Test
10% Shapiro Wilk Critical Value	0.838	Detected Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.248	Lilliefors GOF Test
10% Lilliefors Critical Value	0.28	Detected Data appear Lognormal at 10% Significance Level

Detected Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	2.697	Mean in Log Scale	0.294
SD in Original Scale	3.619	SD in Log Scale	1.224

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

95% t UCL (assumes normality of ROS data)	4.283	95% Percentile Bootstrap UCL	4.204
95% BCA Bootstrap UCL	4.733	95% Bootstrap t UCL	6.309
95% H-UCL (Log ROS)	7.471		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	0.642	KM Geo Mean	1.9
KM SD (logged)	0.835	95% Critical H Value (KM-Log)	2.461
KM Standard Error of Mean (logged)	0.226	95% H-UCL (KM -Log)	4.581
KM SD (logged)	0.835	95% Critical H Value (KM-Log)	2.461
KM Standard Error of Mean (logged)	0.226		

DL/2 Statistics

DL/2 Normal

Mean in Original Scale	2.725
SD in Original Scale	3.596
95% t UCL (Assumes normality)	4.301

DL/2 Log-Transformed

Mean in Log Scale	0.397
SD in Log Scale	1.08
95% H-Stat UCL	5.865

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	4.508

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (chromium [ug/l]_intrawell_apw-06d)

General Statistics

Total Number of Observations	15	Number of Distinct Observations	10
Number of Detects	8	Number of Non-Detects	7
Number of Distinct Detects	8	Number of Distinct Non-Detects	2
Minimum Detect	1.3	Minimum Non-Detect	1
Maximum Detect	72.7	Maximum Non-Detect	1.5
Variance Detects	597	Percent Non-Detects	46.67%
Mean Detects	12.59	SD Detects	24.43
Median Detects	4.35	CV Detects	1.941
Skewness Detects	2.762	Kurtosis Detects	7.714
Mean of Logged Detects	1.531	SD of Logged Detects	1.328

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.516
1% Shapiro Wilk Critical Value	0.749
Lilliefors Test Statistic	0.44
1% Lilliefors Critical Value	0.333

Shapiro Wilk GOF Test

Detected Data Not Normal at 1% Significance Level

Lilliefors GOF Test

Detected Data Not Normal at 1% Significance Level

Detected Data Not Normal at 1% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	7.204	KM Standard Error of Mean	4.874
90KM SD	17.66	95% KM (BCA) UCL	16.4
95% KM (t) UCL	15.79	95% KM (Percentile Bootstrap) UCL	16.28
95% KM (z) UCL	15.22	95% KM Bootstrap t UCL	62.42

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

90% KM Chebyshev UCL	21.83	95% KM Chebyshev UCL	28.45
97.5% KM Chebyshev UCL	37.64	99% KM Chebyshev UCL	55.7

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.941	Anderson-Darling GOF Test
5% A-D Critical Value	0.754	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.312	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.307	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.615	k star (bias corrected MLE)	0.467
Theta hat (MLE)	20.48	Theta star (bias corrected MLE)	26.93
nu hat (MLE)	9.834	nu star (bias corrected)	7.479
Mean (detects)	12.59		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
 GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
 For such situations, GROS method may yield incorrect values of UCLs and BTVs
 This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	6.719
Maximum	72.7	Median	1.3
SD	18.46	CV	2.747
k hat (MLE)	0.223	k star (bias corrected MLE)	0.223
Theta hat (MLE)	30.08	Theta star (bias corrected MLE)	30.11
nu hat (MLE)	6.702	nu star (bias corrected)	6.695
Adjusted Level of Significance (β)	0.0324		
Approximate Chi Square Value (6.69, α)	2.005	Adjusted Chi Square Value (6.69, β)	1.705
95% Gamma Approximate UCL	22.44	95% Gamma Adjusted UCL	26.39

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	7.204	SD (KM)	17.66
Variance (KM)	311.8	SE of Mean (KM)	4.874
k hat (KM)	0.166	k star (KM)	0.178
nu hat (KM)	4.994	nu star (KM)	5.328
theta hat (KM)	43.28	theta star (KM)	40.56
80% gamma percentile (KM)	8.863	90% gamma percentile (KM)	21.71
95% gamma percentile (KM)	38.23	99% gamma percentile (KM)	84.64

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (5.33, α)	1.307	Adjusted Chi Square Value (5.33, β)	1.08
95% KM Approximate Gamma UCL	29.37	95% KM Adjusted Gamma UCL	35.54

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.869	Shapiro Wilk GOF Test
10% Shapiro Wilk Critical Value	0.851	Detected Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.195	Lilliefors GOF Test
10% Lilliefors Critical Value	0.265	Detected Data appear Lognormal at 10% Significance Level

Detected Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal ROS Statistics Using Imputed Non-Detects

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
 From File filea1b878952361.xls
 Full Precision OFF
 Confidence Coefficient 95%
 Number of Bootstrap Operations 2000

Mean in Original Scale	6.839	Mean in Log Scale	0.0318
SD in Original Scale	18.41	SD in Log Scale	2.007
95% t UCL (assumes normality of ROS data)	15.21	95% Percentile Bootstrap UCL	15.9
95% BCA Bootstrap UCL	21.92	95% Bootstrap t UCL	55.86
95% H-UCL (Log ROS)	90.02		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	0.837	KM Geo Mean	2.308
KM SD (logged)	1.174	95% Critical H Value (KM-Log)	3.032
KM Standard Error of Mean (logged)	0.325	95% H-UCL (KM -Log)	11.91
KM SD (logged)	1.174	95% Critical H Value (KM-Log)	3.032
KM Standard Error of Mean (logged)	0.325		

DL/2 Statistics

DL/2 Normal

Mean in Original Scale	6.997
SD in Original Scale	18.35
95% t UCL (Assumes normality)	15.34

DL/2 Log-Transformed

Mean in Log Scale	0.574
SD in Log Scale	1.422
95% H-Stat UCL	18.25

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Lognormal Distributed at 10% Significance Level

Suggested UCL to Use

KM H-UCL 11.91

The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.

Please verify the data were collected from random locations.

**If the data were collected using judgmental or other non-random methods,
then contact a statistician to correctly calculate UCLs.**

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (chromium [ug/l]_intraWell_apw-06s)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	11
Number of Detects	9	Number of Non-Detects	7
Number of Distinct Detects	8	Number of Distinct Non-Detects	3
Minimum Detect	1.2	Minimum Non-Detect	1
Maximum Detect	17.3	Maximum Non-Detect	2
Variance Detects	25.04	Percent Non-Detects	43.75%
Mean Detects	4.711	SD Detects	5.004
Median Detects	2.8	CV Detects	1.062
Skewness Detects	2.436	Kurtosis Detects	6.291
Mean of Logged Detects	1.221	SD of Logged Detects	0.788

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.667
1% Shapiro Wilk Critical Value	0.764
Lilliefors Test Statistic	0.315
1% Lilliefors Critical Value	0.316

Shapiro Wilk GOF Test

Detected Data Not Normal at 1% Significance Level

Lilliefors GOF Test

Detected Data appear Normal at 1% Significance Level

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Detected Data appear Approximate Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	3.107	KM Standard Error of Mean	1.056
90KM SD	3.98	95% KM (BCA) UCL	5.005
95% KM (t) UCL	4.957	95% KM (Percentile Bootstrap) UCL	4.95
95% KM (z) UCL	4.843	95% KM Bootstrap t UCL	8.842
90% KM Chebyshev UCL	6.273	95% KM Chebyshev UCL	7.708
97.5% KM Chebyshev UCL	9.699	99% KM Chebyshev UCL	13.61

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.683	Anderson-Darling GOF Test
5% A-D Critical Value	0.733	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.303	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.283	Detected Data Not Gamma Distributed at 5% Significance Level

Detected data follow Appr. Gamma Distribution at 5% Significance Level

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics on Detected Data Only

k hat (MLE)	1.666	k star (bias corrected MLE)	1.185
Theta hat (MLE)	2.828	Theta star (bias corrected MLE)	3.976
nu hat (MLE)	29.99	nu star (bias corrected)	21.33
Mean (detects)	4.711		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	2.654
Maximum	17.3	Median	1.55
SD	4.377	CV	1.649
k hat (MLE)	0.299	k star (bias corrected MLE)	0.285
Theta hat (MLE)	8.867	Theta star (bias corrected MLE)	9.317
nu hat (MLE)	9.579	nu star (bias corrected)	9.117
Adjusted Level of Significance (β)	0.0335		
Approximate Chi Square Value (9.12, α)	3.398	Adjusted Chi Square Value (9.12, β)	3.011
95% Gamma Approximate UCL	7.122	95% Gamma Adjusted UCL	8.037

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	3.107	SD (KM)	3.98
Variance (KM)	15.84	SE of Mean (KM)	1.056
k hat (KM)	0.609	k star (KM)	0.537
nu hat (KM)	19.5	nu star (KM)	17.18
theta hat (KM)	5.098	theta star (KM)	5.788
80% gamma percentile (KM)	5.115	90% gamma percentile (KM)	8.28
95% gamma percentile (KM)	11.64	99% gamma percentile (KM)	19.83

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (17.18, α)	8.799	Adjusted Chi Square Value (17.18, β)	8.123
95% KM Approximate Gamma UCL	6.065	95% KM Adjusted Gamma UCL	6.569

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
From File filea1b878952361.xls
Full Precision OFF
Confidence Coefficient 95%
Number of Bootstrap Operations 2000

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.92	Shapiro Wilk GOF Test
10% Shapiro Wilk Critical Value	0.859	Detected Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.262	Lilliefors GOF Test
10% Lilliefors Critical Value	0.252	Detected Data Not Lognormal at 10% Significance Level

Detected Data appear Approximate Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	2.882	Mean in Log Scale	0.37
SD in Original Scale	4.239	SD in Log Scale	1.189
95% t UCL (assumes normality of ROS data)	4.739	95% Percentile Bootstrap UCL	4.703
95% BCA Bootstrap UCL	5.617	95% Bootstrap t UCL	7.68
95% H-UCL (Log ROS)	7.386		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	0.703	KM Geo Mean	2.019
KM SD (logged)	0.812	95% Critical H Value (KM-Log)	2.429
KM Standard Error of Mean (logged)	0.216	95% H-UCL (KM -Log)	4.676
KM SD (logged)	0.812	95% Critical H Value (KM-Log)	2.429
KM Standard Error of Mean (logged)	0.216		

DL/2 Statistics

DL/2 Normal

Mean in Original Scale	2.947
SD in Original Scale	4.2
95% t UCL (Assumes normality)	4.787

DL/2 Log-Transformed

Mean in Log Scale	0.503
SD in Log Scale	1.034
95% H-Stat UCL	5.885

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL 4.957

The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.

Please verify the data were collected from random locations.

**If the data were collected using judgmental or other non-random methods,
then contact a statistician to correctly calculate UCLs.**

When a data set follows an approximate distribution passing only one of the GOF tests,
it is suggested to use a UCL based upon a distribution passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (chromium [ug/l]_intrawell_apw-07)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	12
Number of Detects	9	Number of Non-Detects	7
Number of Distinct Detects	9	Number of Distinct Non-Detects	3
Minimum Detect	1.7	Minimum Non-Detect	1

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Maximum Detect	32.9	Maximum Non-Detect	2
Variance Detects	98.33	Percent Non-Detects	43.75%
Mean Detects	6.8	SD Detects	9.916
Median Detects	3.4	CV Detects	1.458
Skewness Detects	2.855	Kurtosis Detects	8.341
Mean of Logged Detects	1.424	SD of Logged Detects	0.893

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.536	Shapiro Wilk GOF Test
1% Shapiro Wilk Critical Value	0.764	Detected Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.409	Lilliefors GOF Test
1% Lilliefors Critical Value	0.316	Detected Data Not Normal at 1% Significance Level

Detected Data Not Normal at 1% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	4.269	KM Standard Error of Mean	2.009
90KM SD	7.577	95% KM (BCA) UCL	8.244
95% KM (t) UCL	7.791	95% KM (Percentile Bootstrap) UCL	8.006
95% KM (z) UCL	7.573	95% KM Bootstrap t UCL	18.41
90% KM Chebyshev UCL	10.3	95% KM Chebyshev UCL	13.03
97.5% KM Chebyshev UCL	16.82	99% KM Chebyshev UCL	24.26

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.07	Anderson-Darling GOF Test
5% A-D Critical Value	0.741	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.296	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.286	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.152	k star (bias corrected MLE)	0.842
Theta hat (MLE)	5.904	Theta star (bias corrected MLE)	8.077
nu hat (MLE)	20.73	nu star (bias corrected)	15.15
Mean (detects)	6.8		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
 GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
 For such situations, GROS method may yield incorrect values of UCLs and BTVs
 This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	3.829
Maximum	32.9	Median	1.9
SD	8.034	CV	2.098
k hat (MLE)	0.274	k star (bias corrected MLE)	0.264
Theta hat (MLE)	13.99	Theta star (bias corrected MLE)	14.5
nu hat (MLE)	8.76	nu star (bias corrected)	8.451
Adjusted Level of Significance (β)	0.0335		
Approximate Chi Square Value (8.45, α)	2.999	Adjusted Chi Square Value (8.45, β)	2.641
95% Gamma Approximate UCL	10.79	95% Gamma Adjusted UCL	12.25

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	4.269	SD (KM)	7.577
Variance (KM)	57.41	SE of Mean (KM)	2.009

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

k hat (KM)	0.317	k star (KM)	0.3
nu hat (KM)	10.16	nu star (KM)	9.586
theta hat (KM)	13.45	theta star (KM)	14.25
80% gamma percentile (KM)	6.544	90% gamma percentile (KM)	12.59
95% gamma percentile (KM)	19.54	99% gamma percentile (KM)	37.59

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (9.59, α)	3.685	Adjusted Chi Square Value (9.59, β)	3.279
95% KM Approximate Gamma UCL	11.11	95% KM Adjusted Gamma UCL	12.48

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.84	Shapiro Wilk GOF Test
10% Shapiro Wilk Critical Value	0.859	Detected Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.209	Lilliefors GOF Test
10% Lilliefors Critical Value	0.252	Detected Data appear Lognormal at 10% Significance Level

Detected Data appear Approximate Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	4.031	Mean in Log Scale	0.425
SD in Original Scale	7.936	SD in Log Scale	1.378
95% t UCL (assumes normality of ROS data)	7.509	95% Percentile Bootstrap UCL	7.683
95% BCA Bootstrap UCL	9.998	95% Bootstrap t UCL	16.17
95% H-UCL (Log ROS)	12.93		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	0.806	KM Geo Mean	2.238
KM SD (logged)	0.945	95% Critical H Value (KM-Log)	2.62
KM Standard Error of Mean (logged)	0.251	95% H-UCL (KM -Log)	6.625
KM SD (logged)	0.945	95% Critical H Value (KM-Log)	2.62
KM Standard Error of Mean (logged)	0.251		

DL/2 Statistics

DL/2 Normal

Mean in Original Scale	4.106
SD in Original Scale	7.9
95% t UCL (Assumes normality)	7.568

DL/2 Log-Transformed

Mean in Log Scale	0.592
SD in Log Scale	1.186
95% H-Stat UCL	9.158

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Lognormal Distributed at 10% Significance Level

Suggested UCL to Use

KM H-UCL 6.625

The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.

Please verify the data were collected from random locations.

**If the data were collected using judgmental or other non-random methods,
then contact a statistician to correctly calculate UCLs.**

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
 From File filea1b878952361.xls
 Full Precision OFF
 Confidence Coefficient 95%
 Number of Bootstrap Operations 2000

report_result_value (chromium [ug/l]_intrawell_apw-08)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	13
Number of Detects	11	Number of Non-Detects	5
Number of Distinct Detects	11	Number of Distinct Non-Detects	2
Minimum Detect	1.6	Minimum Non-Detect	1
Maximum Detect	8.2	Maximum Non-Detect	2
Variance Detects	4.326	Percent Non-Detects	31.25%
Mean Detects	3.782	SD Detects	2.08
Median Detects	3.1	CV Detects	0.55
Skewness Detects	1	Kurtosis Detects	0.361
Mean of Logged Detects	1.199	SD of Logged Detects	0.533

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.899	Shapiro Wilk GOF Test
1% Shapiro Wilk Critical Value	0.792	Detected Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.174	Lilliefors GOF Test
1% Lilliefors Critical Value	0.291	Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	2.927	KM Standard Error of Mean	0.546
90KM SD	2.079	95% KM (BCA) UCL	3.894
95% KM (t) UCL	3.883	95% KM (Percentile Bootstrap) UCL	3.806
95% KM (z) UCL	3.824	95% KM Bootstrap t UCL	4.163
90% KM Chebyshev UCL	4.564	95% KM Chebyshev UCL	5.305
97.5% KM Chebyshev UCL	6.334	99% KM Chebyshev UCL	8.355

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.292	Anderson-Darling GOF Test
5% A-D Critical Value	0.733	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.135	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.256	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	3.98	k star (bias corrected MLE)	2.955
Theta hat (MLE)	0.95	Theta star (bias corrected MLE)	1.28
nu hat (MLE)	87.57	nu star (bias corrected)	65.02
Mean (detects)	3.782		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
 GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
 For such situations, GROS method may yield incorrect values of UCLs and BTVs
 This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	2.657
Maximum	8.2	Median	2.2
SD	2.422	CV	0.911
k hat (MLE)	0.607	k star (bias corrected MLE)	0.535
Theta hat (MLE)	4.378	Theta star (bias corrected MLE)	4.969
nu hat (MLE)	19.42	nu star (bias corrected)	17.11

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Adjusted Level of Significance (β)	0.0335		
Approximate Chi Square Value (17.11, α)	8.753	Adjusted Chi Square Value (17.11, β)	8.079
95% Gamma Approximate UCL	5.195	95% Gamma Adjusted UCL	5.628

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	2.927	SD (KM)	2.079
Variance (KM)	4.321	SE of Mean (KM)	0.546
k hat (KM)	1.983	k star (KM)	1.653
nu hat (KM)	63.46	nu star (KM)	52.89
theta hat (KM)	1.476	theta star (KM)	1.771
80% gamma percentile (KM)	4.48	90% gamma percentile (KM)	5.957
95% gamma percentile (KM)	7.383	99% gamma percentile (KM)	10.58

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (52.89, α)	37.19	Adjusted Chi Square Value (52.89, β)	35.69
95% KM Approximate Gamma UCL	4.163	95% KM Adjusted Gamma UCL	4.338

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.958	Shapiro Wilk GOF Test
10% Shapiro Wilk Critical Value	0.876	Detected Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.131	Lilliefors GOF Test
10% Lilliefors Critical Value	0.231	Detected Data appear Lognormal at 10% Significance Level

Detected Data appear Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	2.896	Mean in Log Scale	0.797
SD in Original Scale	2.178	SD in Log Scale	0.769
95% t UCL (assumes normality of ROS data)	3.85	95% Percentile Bootstrap UCL	3.772
95% BCA Bootstrap UCL	3.896	95% Bootstrap t UCL	4.155
95% H-UCL (Log ROS)	4.778		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	0.836	KM Geo Mean	2.306
KM SD (logged)	0.689	95% Critical H Value (KM-Log)	2.266
KM Standard Error of Mean (logged)	0.181	95% H-UCL (KM -Log)	4.374
KM SD (logged)	0.689	95% Critical H Value (KM-Log)	2.266
KM Standard Error of Mean (logged)	0.181		

DL/2 Statistics

DL/2 Normal

Mean in Original Scale	2.788
SD in Original Scale	2.284
95% t UCL (Assumes normality)	3.789

DL/2 Log-Transformed

Mean in Log Scale	0.651
SD in Log Scale	0.959
95% H-Stat UCL	5.845

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	3.883

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

report_result_value (chromium [ug/l]_intrawell_apw-10d)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	11
Number of Detects	10	Number of Non-Detects	6
Number of Distinct Detects	9	Number of Distinct Non-Detects	3
Minimum Detect	1.1	Minimum Non-Detect	1
Maximum Detect	14.8	Maximum Non-Detect	2
Variance Detects	17.1	Percent Non-Detects	37.5%
Mean Detects	4.39	SD Detects	4.135
Median Detects	3	CV Detects	0.942
Skewness Detects	2.116	Kurtosis Detects	4.72
Mean of Logged Detects	1.181	SD of Logged Detects	0.776

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.741	Shapiro Wilk GOF Test
1% Shapiro Wilk Critical Value	0.781	Detected Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.318	Lilliefors GOF Test
1% Lilliefors Critical Value	0.304	Detected Data Not Normal at 1% Significance Level

Detected Data Not Normal at 1% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	3.128	KM Standard Error of Mean	0.923
90KM SD	3.504	95% KM (BCA) UCL	4.633
95% KM (t) UCL	4.746	95% KM (Percentile Bootstrap) UCL	4.613
95% KM (z) UCL	4.646	95% KM Bootstrap t UCL	6.931
90% KM Chebyshev UCL	5.898	95% KM Chebyshev UCL	7.153
97.5% KM Chebyshev UCL	8.894	99% KM Chebyshev UCL	12.32

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.46	Anderson-Darling GOF Test
5% A-D Critical Value	0.737	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.224	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.27	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.823	k star (bias corrected MLE)	1.343
Theta hat (MLE)	2.408	Theta star (bias corrected MLE)	3.269
nu hat (MLE)	36.46	nu star (bias corrected)	26.86
Mean (detects)	4.39		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
 GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
 For such situations, GROS method may yield incorrect values of UCLs and BTVs
 This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	2.748
Maximum	14.8	Median	1.8
SD	3.88	CV	1.412
k hat (MLE)	0.338	k star (bias corrected MLE)	0.316
Theta hat (MLE)	8.125	Theta star (bias corrected MLE)	8.683

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

nu hat (MLE)	10.82	nu star (bias corrected)	10.13
Adjusted Level of Significance (β)	0.0335		
Approximate Chi Square Value (10.13, α)	4.02	Adjusted Chi Square Value (10.13, β)	3.593
95% Gamma Approximate UCL	6.92	95% Gamma Adjusted UCL	7.744

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	3.128	SD (KM)	3.504
Variance (KM)	12.28	SE of Mean (KM)	0.923
k hat (KM)	0.797	k star (KM)	0.689
nu hat (KM)	25.5	nu star (KM)	22.05
theta hat (KM)	3.925	theta star (KM)	4.538
80% gamma percentile (KM)	5.144	90% gamma percentile (KM)	7.88
95% gamma percentile (KM)	10.71	99% gamma percentile (KM)	17.46

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (22.05, α)	12.38	Adjusted Chi Square Value (22.05, β)	11.56
95% KM Approximate Gamma UCL	5.572	95% KM Adjusted Gamma UCL	5.967

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.959	Shapiro Wilk GOF Test
10% Shapiro Wilk Critical Value	0.869	Detected Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.171	Lilliefors GOF Test
10% Lilliefors Critical Value	0.241	Detected Data appear Lognormal at 10% Significance Level

Detected Data appear Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	2.943	Mean in Log Scale	0.476
SD in Original Scale	3.741	SD in Log Scale	1.139
95% t UCL (assumes normality of ROS data)	4.582	95% Percentile Bootstrap UCL	4.528
95% BCA Bootstrap UCL	5.071	95% Bootstrap t UCL	6.433
95% H-UCL (Log ROS)	7.274		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	0.746	KM Geo Mean	2.108
KM SD (logged)	0.809	95% Critical H Value (KM-Log)	2.425
KM Standard Error of Mean (logged)	0.214	95% H-UCL (KM -Log)	4.856
KM SD (logged)	0.809	95% Critical H Value (KM-Log)	2.425
KM Standard Error of Mean (logged)	0.214		

DL/2 Statistics

DL/2 Normal

Mean in Original Scale	2.994
SD in Original Scale	3.706
95% t UCL (Assumes normality)	4.618

DL/2 Log-Transformed

Mean in Log Scale	0.572
SD in Log Scale	1.024
95% H-Stat UCL	6.176

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM Adjusted Gamma UCL	5.967	95% GROS Adjusted Gamma UCL	7.744

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
 From File filea1b878952361.xls
 Full Precision OFF
 Confidence Coefficient 95%
 Number of Bootstrap Operations 2000

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (chromium [ug/l]_intrawell_apw-10s)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	11
Number of Detects	13	Number of Non-Detects	3
Number of Distinct Detects	10	Number of Distinct Non-Detects	2
Minimum Detect	1	Minimum Non-Detect	1
Maximum Detect	15	Maximum Non-Detect	2
Variance Detects	18.02	Percent Non-Detects	18.75%
Mean Detects	3.992	SD Detects	4.245
Median Detects	1.9	CV Detects	1.063
Skewness Detects	1.881	Kurtosis Detects	2.919
Mean of Logged Detects	1.007	SD of Logged Detects	0.829

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.681	Shapiro Wilk GOF Test
1% Shapiro Wilk Critical Value	0.814	Detected Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.343	Lilliefors GOF Test
1% Lilliefors Critical Value	0.271	Detected Data Not Normal at 1% Significance Level

Detected Data Not Normal at 1% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	3.46	KM Standard Error of Mean	1
90KM SD	3.842	95% KM (BCA) UCL	5.16
95% KM (t) UCL	5.213	95% KM (Percentile Bootstrap) UCL	5.119
95% KM (z) UCL	5.105	95% KM Bootstrap t UCL	6.421
90% KM Chebyshev UCL	6.46	95% KM Chebyshev UCL	7.818
97.5% KM Chebyshev UCL	9.704	99% KM Chebyshev UCL	13.41

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.352	Anderson-Darling GOF Test
5% A-D Critical Value	0.751	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.287	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.241	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.469	k star (bias corrected MLE)	1.182
Theta hat (MLE)	2.717	Theta star (bias corrected MLE)	3.379
nu hat (MLE)	38.21	nu star (bias corrected)	30.72
Mean (detects)	3.992		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
 GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	3.271
Maximum	15	Median	1.75
SD	4.102	CV	1.254
k hat (MLE)	0.617	k star (bias corrected MLE)	0.543

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
 From File filea1b878952361.xls
 Full Precision OFF
 Confidence Coefficient 95%
 Number of Bootstrap Operations 2000

Theta hat (MLE)	5.299	Theta star (bias corrected MLE)	6.022
nu hat (MLE)	19.75	nu star (bias corrected)	17.38
Adjusted Level of Significance (β)	0.0335		
Approximate Chi Square Value (17.38, α)	8.947	Adjusted Chi Square Value (17.38, β)	8.265
95% Gamma Approximate UCL	6.356	95% Gamma Adjusted UCL	6.881

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	3.46	SD (KM)	3.842
Variance (KM)	14.76	SE of Mean (KM)	1
k hat (KM)	0.811	k star (KM)	0.701
nu hat (KM)	25.95	nu star (KM)	22.42
theta hat (KM)	4.266	theta star (KM)	4.938
80% gamma percentile (KM)	5.687	90% gamma percentile (KM)	8.683
95% gamma percentile (KM)	11.77	99% gamma percentile (KM)	19.15

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (22.42, α)	12.65	Adjusted Chi Square Value (22.42, β)	11.82
95% KM Approximate Gamma UCL	6.13	95% KM Adjusted Gamma UCL	6.56

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.843	Shapiro Wilk GOF Test	
10% Shapiro Wilk Critical Value	0.889	Detected Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.236	Lilliefors GOF Test	
10% Lilliefors Critical Value	0.215	Detected Data Not Lognormal at 10% Significance Level	

Detected Data Not Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	3.38	Mean in Log Scale	0.732
SD in Original Scale	4.022	SD in Log Scale	0.975
95% t UCL (assumes normality of ROS data)	5.143	95% Percentile Bootstrap UCL	5.121
95% BCA Bootstrap UCL	5.628	95% Bootstrap t UCL	6.416
95% H-UCL (Log ROS)	6.543		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	0.84	KM Geo Mean	2.316
KM SD (logged)	0.803	95% Critical H Value (KM-Log)	2.417
KM Standard Error of Mean (logged)	0.21	95% H-UCL (KM -Log)	5.28
KM SD (logged)	0.803	95% Critical H Value (KM-Log)	2.417
KM Standard Error of Mean (logged)	0.21		

DL/2 Statistics

DL/2 Normal

Mean in Original Scale	3.369
SD in Original Scale	4.028
95% t UCL (Assumes normality)	5.134

DL/2 Log-Transformed

Mean in Log Scale	0.732
SD in Log Scale	0.96
95% H-Stat UCL	6.344

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Suggested UCL to Use

95% KM (t) UCL	5.213

The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
 From File filea1b878952361.xls
 Full Precision OFF
 Confidence Coefficient 95%
 Number of Bootstrap Operations 2000

Please verify the data were collected from random locations.

**If the data were collected using judgmental or other non-random methods,
 then contact a statistician to correctly calculate UCLs.**

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (cobalt [ug/l]_intrawell_apw-02)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	13
Number of Detects	12	Number of Non-Detects	4
Number of Distinct Detects	12	Number of Distinct Non-Detects	2
Minimum Detect	1.5	Minimum Non-Detect	1
Maximum Detect	11	Maximum Non-Detect	2
Variance Detects	9.5	Percent Non-Detects	25%
Mean Detects	4.317	SD Detects	3.082
Median Detects	3.3	CV Detects	0.714
Skewness Detects	1.455	Kurtosis Detects	1.204
Mean of Logged Detects	1.265	SD of Logged Detects	0.635

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.808	Shapiro Wilk GOF Test
1% Shapiro Wilk Critical Value	0.805	Detected Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.239	Lilliefors GOF Test
1% Lilliefors Critical Value	0.281	Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	3.504	KM Standard Error of Mean	0.763
90KM SD	2.92	95% KM (BCA) UCL	4.7
95% KM (t) UCL	4.841	95% KM (Percentile Bootstrap) UCL	4.713
95% KM (z) UCL	4.758	95% KM Bootstrap t UCL	6.015
90% KM Chebyshev UCL	5.792	95% KM Chebyshev UCL	6.828
97.5% KM Chebyshev UCL	8.267	99% KM Chebyshev UCL	11.09

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.464	Anderson-Darling GOF Test
5% A-D Critical Value	0.74	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.174	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.248	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	2.687	k star (bias corrected MLE)	2.071
Theta hat (MLE)	1.606	Theta star (bias corrected MLE)	2.084
nu hat (MLE)	64.49	nu star (bias corrected)	49.7
Mean (detects)	4.317		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	3.24
Maximum	11	Median	2.5
SD	3.267	CV	1.008
k hat (MLE)	0.466	k star (bias corrected MLE)	0.42
Theta hat (MLE)	6.953	Theta star (bias corrected MLE)	7.709
nu hat (MLE)	14.91	nu star (bias corrected)	13.45
Adjusted Level of Significance (β)	0.0335		
Approximate Chi Square Value (13.45, α)	6.196	Adjusted Chi Square Value (13.45, β)	5.644
95% Gamma Approximate UCL	7.033	95% Gamma Adjusted UCL	7.721

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	3.504	SD (KM)	2.92
Variance (KM)	8.524	SE of Mean (KM)	0.763
k hat (KM)	1.44	k star (KM)	1.212
nu hat (KM)	46.09	nu star (KM)	38.78
theta hat (KM)	2.433	theta star (KM)	2.891
80% gamma percentile (KM)	5.543	90% gamma percentile (KM)	7.694
95% gamma percentile (KM)	9.814	99% gamma percentile (KM)	14.67

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (38.78, α)	25.52	Adjusted Chi Square Value (38.78, β)	24.3
95% KM Approximate Gamma UCL	5.325	95% KM Adjusted Gamma UCL	5.593

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.945	Shapiro Wilk GOF Test
10% Shapiro Wilk Critical Value	0.883	Detected Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.145	Lilliefors GOF Test
10% Lilliefors Critical Value	0.223	Detected Data appear Lognormal at 10% Significance Level

Detected Data appear Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	3.45	Mean in Log Scale	0.9
SD in Original Scale	3.063	SD in Log Scale	0.86
95% t UCL (assumes normality of ROS data)	4.792	95% Percentile Bootstrap UCL	4.725
95% BCA Bootstrap UCL	4.999	95% Bootstrap t UCL	5.678
95% H-UCL (Log ROS)	6.201		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	0.961	KM Geo Mean	2.615
KM SD (logged)	0.748	95% Critical H Value (KM-Log)	2.342
KM Standard Error of Mean (logged)	0.196	95% H-UCL (KM -Log)	5.44
KM SD (logged)	0.748	95% Critical H Value (KM-Log)	2.342
KM Standard Error of Mean (logged)	0.196		

DL/2 Statistics

DL/2 Normal

Mean in Original Scale	3.394
SD in Original Scale	3.115
95% t UCL (Assumes normality)	4.759

DL/2 Log-Transformed

Mean in Log Scale	0.819
SD in Log Scale	0.978
95% H-Stat UCL	7.184

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
From File filea1b878952361.xls
Full Precision OFF
Confidence Coefficient 95%
Number of Bootstrap Operations 2000

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL 4.841

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (cobalt [ug/l]_intrawell_apw-03)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	5
Number of Detects	5	Number of Non-Detects	11
Number of Distinct Detects	4	Number of Distinct Non-Detects	2
Minimum Detect	1	Minimum Non-Detect	1
Maximum Detect	2.1	Maximum Non-Detect	2
Variance Detects	0.157	Percent Non-Detects	68.75%
Mean Detects	1.48	SD Detects	0.396
Median Detects	1.4	CV Detects	0.268
Skewness Detects	0.849	Kurtosis Detects	2.19
Mean of Logged Detects	0.364	SD of Logged Detects	0.264

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.908	Shapiro Wilk GOF Test
1% Shapiro Wilk Critical Value	0.686	Detected Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.28	Lilliefors GOF Test
1% Lilliefors Critical Value	0.396	Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	1.156	KM Standard Error of Mean	0.0846
90KM SD	0.299	95% KM (BCA) UCL	N/A
95% KM (t) UCL	1.304	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	1.295	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	1.41	95% KM Chebyshev UCL	1.525
97.5% KM Chebyshev UCL	1.684	99% KM Chebyshev UCL	1.998

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.372	Anderson-Darling GOF Test
5% A-D Critical Value	0.679	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.246	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.357	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics on Detected Data Only

k hat (MLE)	18.04	k star (bias corrected MLE)	7.349
Theta hat (MLE)	0.082	Theta star (bias corrected MLE)	0.201
nu hat (MLE)	180.4	nu star (bias corrected)	73.49
Mean (detects)	1.48		

Gamma ROS Statistics using Imputed Non-Detects

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
 From File filea1b878952361.xls
 Full Precision OFF
 Confidence Coefficient 95%
 Number of Bootstrap Operations 2000

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
 GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
 For such situations, GROS method may yield incorrect values of UCLs and BTVs
 This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.784
Maximum	2.1	Median	0.688
SD	0.581	CV	0.741
k hat (MLE)	1.133	k star (bias corrected MLE)	0.962
Theta hat (MLE)	0.692	Theta star (bias corrected MLE)	0.815
nu hat (MLE)	36.26	nu star (bias corrected)	30.79
Adjusted Level of Significance (β)	0.0335		
Approximate Chi Square Value (30.79, α)	19.12	Adjusted Chi Square Value (30.79, β)	18.07
95% Gamma Approximate UCL	1.263	95% Gamma Adjusted UCL	1.336

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	1.156	SD (KM)	0.299
Variance (KM)	0.0895	SE of Mean (KM)	0.0846
k hat (KM)	14.92	k star (KM)	12.17
nu hat (KM)	477.5	nu star (KM)	389.3
theta hat (KM)	0.0775	theta star (KM)	0.095
80% gamma percentile (KM)	1.422	90% gamma percentile (KM)	1.596
95% gamma percentile (KM)	1.749	99% gamma percentile (KM)	2.063

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (389.32, α)	344.6	Adjusted Chi Square Value (389.32, β)	339.8
95% KM Approximate Gamma UCL	1.306	95% KM Adjusted Gamma UCL	1.324

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.933	Shapiro Wilk GOF Test	
10% Shapiro Wilk Critical Value	0.806	Detected Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.258	Lilliefors GOF Test	
10% Lilliefors Critical Value	0.319	Detected Data appear Lognormal at 10% Significance Level	

Detected Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.938	Mean in Log Scale	-0.163
SD in Original Scale	0.454	SD in Log Scale	0.455
95% t UCL (assumes normality of ROS data)	1.137	95% Percentile Bootstrap UCL	1.124
95% BCA Bootstrap UCL	1.153	95% Bootstrap t UCL	1.191
95% H-UCL (Log ROS)	1.193		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	0.119	KM Geo Mean	1.126
KM SD (logged)	0.216	95% Critical H Value (KM-Log)	1.81
KM Standard Error of Mean (logged)	0.0612	95% H-UCL (KM -Log)	1.275
KM SD (logged)	0.216	95% Critical H Value (KM-Log)	1.81
KM Standard Error of Mean (logged)	0.0612		

DL/2 Statistics

DL/2 Normal

Mean in Original Scale	0.838
SD in Original Scale	0.507

DL/2 Log-Transformed

Mean in Log Scale	-0.319
SD in Log Scale	0.524

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
From File filea1b878952361.xls
Full Precision OFF
Confidence Coefficient 95%
Number of Bootstrap Operations 2000

95% t UCL (Assumes normality) 1.06

95% H-Stat UCL 1.103

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL 1.304

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (cobalt [ug/l]_intrawell_apw-05/05r)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	2
Number of Detects	1	Number of Non-Detects	15
Number of Distinct Detects	1	Number of Distinct Non-Detects	2

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!

It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable report_result_value (cobalt [ug/l]_intrawell_apw-05/05r) was not processed!

report_result_value (cobalt [ug/l]_intrawell_apw-06d)

General Statistics

Total Number of Observations	15	Number of Distinct Observations	6
Number of Detects	7	Number of Non-Detects	8
Number of Distinct Detects	5	Number of Distinct Non-Detects	2
Minimum Detect	1	Minimum Non-Detect	1
Maximum Detect	5.4	Maximum Non-Detect	2
Variance Detects	2.87	Percent Non-Detects	53.33%
Mean Detects	2.457	SD Detects	1.694
Median Detects	1.3	CV Detects	0.689
Skewness Detects	0.94	Kurtosis Detects	-0.415
Mean of Logged Detects	0.7	SD of Logged Detects	0.674

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.816	Shapiro Wilk GOF Test
1% Shapiro Wilk Critical Value	0.73	Detected Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.324	Lilliefors GOF Test
1% Lilliefors Critical Value	0.35	Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	1.685	KM Standard Error of Mean	0.361
90KM SD	1.293	95% KM (BCA) UCL	2.29
95% KM (t) UCL	2.32	95% KM (Percentile Bootstrap) UCL	2.273
95% KM (z) UCL	2.278	95% KM Bootstrap t UCL	2.624
90% KM Chebyshev UCL	2.767	95% KM Chebyshev UCL	3.257

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
 From File filea1b878952361.xls
 Full Precision OFF
 Confidence Coefficient 95%
 Number of Bootstrap Operations 2000

97.5% KM Chebyshev UCL 3.937 99% KM Chebyshev UCL 5.273

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic 0.691	Anderson-Darling GOF Test
5% A-D Critical Value 0.713	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic 0.337	Kolmogorov-Smirnov GOF
5% K-S Critical Value 0.314	Detected Data Not Gamma Distributed at 5% Significance Level

Detected data follow Appr. Gamma Distribution at 5% Significance Level

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics on Detected Data Only

k hat (MLE) 2.666	k star (bias corrected MLE) 1.618
Theta hat (MLE) 0.922	Theta star (bias corrected MLE) 1.518
nu hat (MLE) 37.32	nu star (bias corrected) 22.66
Mean (detects) 2.457	

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
 GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
 For such situations, GROS method may yield incorrect values of UCLs and BTVs
 This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum 0.01	Mean 1.153
Maximum 5.4	Median 0.025
SD 1.681	CV 1.458
k hat (MLE) 0.31	k star (bias corrected MLE) 0.293
Theta hat (MLE) 3.717	Theta star (bias corrected MLE) 3.94
nu hat (MLE) 9.307	nu star (bias corrected) 8.779
Adjusted Level of Significance (β) 0.0324	
Approximate Chi Square Value (8.78, α) 3.194	Adjusted Chi Square Value (8.78, β) 2.792
95% Gamma Approximate UCL 3.169	95% Gamma Adjusted UCL 3.625

Estimates of Gamma Parameters using KM Estimates

Mean (KM) 1.685	SD (KM) 1.293
Variance (KM) 1.671	SE of Mean (KM) 0.361
k hat (KM) 1.699	k star (KM) 1.404
nu hat (KM) 50.96	nu star (KM) 42.11
theta hat (KM) 0.992	theta star (KM) 1.2
80% gamma percentile (KM) 2.626	90% gamma percentile (KM) 3.568
95% gamma percentile (KM) 4.488	99% gamma percentile (KM) 6.574

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (42.11, α) 28.23	Adjusted Chi Square Value (42.11, β) 26.84
95% KM Approximate Gamma UCL 2.513	95% KM Adjusted Gamma UCL 2.643

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic 0.842	Shapiro Wilk GOF Test
10% Shapiro Wilk Critical Value 0.838	Detected Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic 0.313	Lilliefors GOF Test
10% Lilliefors Critical Value 0.28	Detected Data Not Lognormal at 10% Significance Level

Detected Data appear Approximate Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal ROS Statistics Using Imputed Non-Detects

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
 From File filea1b878952361.xls
 Full Precision OFF
 Confidence Coefficient 95%
 Number of Bootstrap Operations 2000

Mean in Original Scale	1.354	Mean in Log Scale	-0.248
SD in Original Scale	1.546	SD in Log Scale	1.099
95% t UCL (assumes normality of ROS data)	2.057	95% Percentile Bootstrap UCL	2.018
95% BCA Bootstrap UCL	2.208	95% Bootstrap t UCL	2.475
95% H-UCL (Log ROS)	3.349		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	0.331	KM Geo Mean	1.392
KM SD (logged)	0.549	95% Critical H Value (KM-Log)	2.122
KM Standard Error of Mean (logged)	0.153	95% H-UCL (KM -Log)	2.211
KM SD (logged)	0.549	95% Critical H Value (KM-Log)	2.122
KM Standard Error of Mean (logged)	0.153		

DL/2 Statistics

DL/2 Normal

Mean in Original Scale	1.447
SD in Original Scale	1.484
95% t UCL (Assumes normality)	2.122

DL/2 Log-Transformed

Mean in Log Scale	0.00313
SD in Log Scale	0.824
95% H-Stat UCL	2.433

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL 2.32

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (cobalt [ug/l]_intrawell_apw-06s)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	2
Number of Detects	1	Number of Non-Detects	15
Number of Distinct Detects	1	Number of Distinct Non-Detects	2

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!

It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable report_result_value (cobalt [ug/l]_intrawell_apw-06s) was not processed!

report_result_value (cobalt [ug/l]_intrawell_apw-07)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	3
Number of Detects	2	Number of Non-Detects	14
Number of Distinct Detects	2	Number of Distinct Non-Detects	2
Minimum Detect	1	Minimum Non-Detect	1
Maximum Detect	1.3	Maximum Non-Detect	2
Variance Detects	0.045	Percent Non-Detects	87.5%
Mean Detects	1.15	SD Detects	0.212
Median Detects	1.15	CV Detects	0.184

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Skewness Detects	N/A	Kurtosis Detects	N/A
Mean of Logged Detects	0.131	SD of Logged Detects	0.186

Warning: Data set has only 2 Detected Values.
This is not enough to compute meaningful or reliable statistics and estimates.

Normal GOF Test on Detects Only Not Enough Data to Perform GOF Test

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	1.02	KM Standard Error of Mean	0.0273
90KM SD	0.0748	95% KM (BCA) UCL	N/A
95% KM (t) UCL	1.068	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	1.065	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	1.102	95% KM Chebyshev UCL	1.139
97.5% KM Chebyshev UCL	1.191	99% KM Chebyshev UCL	1.292

Gamma GOF Tests on Detected Observations Only Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	58.44	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.0197	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	233.8	nu star (bias corrected)	N/A
Mean (detects)	1.15		

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	1.02	SD (KM)	0.0748
Variance (KM)	0.0056	SE of Mean (KM)	0.0273
k hat (KM)	185.8	k star (KM)	151
nu hat (KM)	5945	nu star (KM)	4832
theta hat (KM)	0.00549	theta star (KM)	0.00676
80% gamma percentile (KM)	1.089	90% gamma percentile (KM)	1.128
95% gamma percentile (KM)	1.16	99% gamma percentile (KM)	1.223

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (N/A, α)	4671	Adjusted Level of Significance (β)	0.0335
95% KM Approximate Gamma UCL	1.055	Adjusted Chi Square Value (N/A, β)	4653
		95% KM Adjusted Gamma UCL	1.059

Lognormal GOF Test on Detected Observations Only Not Enough Data to Perform GOF Test

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.454	Mean in Log Scale	-0.99
SD in Original Scale	0.319	SD in Log Scale	0.651
95% t UCL (assumes normality of ROS data)	0.594	95% Percentile Bootstrap UCL	0.592
95% BCA Bootstrap UCL	0.614	95% Bootstrap t UCL	0.674
95% H-UCL (Log ROS)	0.667		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	0.0175	KM Geo Mean	1.018
KM SD (logged)	0.0654	95% Critical H Value (KM-Log)	N/A

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

KM Standard Error of Mean (logged)	0.0239	95% H-UCL (KM -Log)	N/A
KM SD (logged)	0.0654	95% Critical H Value (KM-Log)	N/A
KM Standard Error of Mean (logged)	0.0239		

DL/2 Statistics

DL/2 Normal

Mean in Original Scale	0.613
SD in Original Scale	0.25
95% t UCL (Assumes normality)	0.722

DL/2 Log-Transformed

Mean in Log Scale	-0.547
SD in Log Scale	0.319
95% H-Stat UCL	0.712

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Suggested UCL to Use

95% KM (t) UCL 1.068

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (cobalt [ug/l]_intrawell_apw-08)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	9
Number of Detects	11	Number of Non-Detects	5
Number of Distinct Detects	9	Number of Distinct Non-Detects	2
Minimum Detect	1	Minimum Non-Detect	1
Maximum Detect	2.1	Maximum Non-Detect	2
Variance Detects	0.134	Percent Non-Detects	31.25%
Mean Detects	1.518	SD Detects	0.366
Median Detects	1.4	CV Detects	0.241
Skewness Detects	0.363	Kurtosis Detects	-1.208
Mean of Logged Detects	0.391	SD of Logged Detects	0.241

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.935	Shapiro Wilk GOF Test
1% Shapiro Wilk Critical Value	0.792	Detected Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.179	Lilliefors GOF Test
1% Lilliefors Critical Value	0.291	Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	1.374	KM Standard Error of Mean	0.0996
90KM SD	0.372	95% KM (BCA) UCL	1.531
95% KM (t) UCL	1.548	95% KM (Percentile Bootstrap) UCL	1.531
95% KM (z) UCL	1.537	95% KM Bootstrap t UCL	1.557
90% KM Chebyshev UCL	1.672	95% KM Chebyshev UCL	1.808
97.5% KM Chebyshev UCL	1.995	99% KM Chebyshev UCL	2.364

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.329	Anderson-Darling GOF Test
5% A-D Critical Value	0.729	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.175	Kolmogorov-Smirnov GOF

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

5% K-S Critical Value 0.255 Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	19.18	k star (bias corrected MLE)	14.01
Theta hat (MLE)	0.0792	Theta star (bias corrected MLE)	0.108
nu hat (MLE)	422	nu star (bias corrected)	308.2
Mean (detects)	1.518		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.614	Mean	1.316
Maximum	2.1	Median	1.255
SD	0.445	CV	0.338
k hat (MLE)	8.993	k star (bias corrected MLE)	7.349
Theta hat (MLE)	0.146	Theta star (bias corrected MLE)	0.179
nu hat (MLE)	287.8	nu star (bias corrected)	235.2
Adjusted Level of Significance (β)	0.0335		
Approximate Chi Square Value (235.16, α)	200.7	Adjusted Chi Square Value (235.16, β)	197
95% Gamma Approximate UCL	1.543	95% Gamma Adjusted UCL	1.571

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	1.374	SD (KM)	0.372
Variance (KM)	0.139	SE of Mean (KM)	0.0996
k hat (KM)	13.61	k star (KM)	11.1
nu hat (KM)	435.7	nu star (KM)	355.3
theta hat (KM)	0.101	theta star (KM)	0.124
80% gamma percentile (KM)	1.703	90% gamma percentile (KM)	1.921
95% gamma percentile (KM)	2.114	99% gamma percentile (KM)	2.509

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (355.30, α)	312.6	Adjusted Chi Square Value (355.30, β)	308.1
95% KM Approximate Gamma UCL	1.561	95% KM Adjusted Gamma UCL	1.584

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.949	Shapiro Wilk GOF Test
10% Shapiro Wilk Critical Value	0.876	Detected Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.158	Lilliefors GOF Test
10% Lilliefors Critical Value	0.231	Detected Data appear Lognormal at 10% Significance Level

Detected Data appear Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	1.334	Mean in Log Scale	0.242
SD in Original Scale	0.42	SD in Log Scale	0.316
95% t UCL (assumes normality of ROS data)	1.519	95% Percentile Bootstrap UCL	1.499
95% BCA Bootstrap UCL	1.504	95% Bootstrap t UCL	1.532
95% H-UCL (Log ROS)	1.562		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	0.283	KM Geo Mean	1.327

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
 From File filea1b878952361.xls
 Full Precision OFF
 Confidence Coefficient 95%
 Number of Bootstrap Operations 2000

KM SD (logged)	0.26	95% Critical H Value (KM-Log)	1.841
KM Standard Error of Mean (logged)	0.0696	95% H-UCL (KM -Log)	1.552
KM SD (logged)	0.26	95% Critical H Value (KM-Log)	1.841
KM Standard Error of Mean (logged)	0.0696		

DL/2 Statistics

DL/2 Normal

Mean in Original Scale	1.231
SD in Original Scale	0.544
95% t UCL (Assumes normality)	1.47

DL/2 Log-Transformed

Mean in Log Scale	0.0957
SD in Log Scale	0.519
95% H-Stat UCL	1.661

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL 1.548

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. Recommendations are based upon data size, data distribution, and skewness using results from simulation studies. However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (cobalt [ug/l]_intrawell_apw-10d)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	14
		Number of Missing Observations	0
Minimum	1.3	Mean	3.213
Maximum	7	Median	3.05
SD	1.328	Std. Error of Mean	0.332
Coefficient of Variation	0.413	Skewness	1.551

Normal GOF Test

Shapiro Wilk Test Statistic	0.873
1% Shapiro Wilk Critical Value	0.844
Lilliefors Test Statistic	0.194
1% Lilliefors Critical Value	0.248

Shapiro Wilk GOF Test

Data appear Normal at 1% Significance Level

Lilliefors GOF Test

Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL

95% Student's-t UCL	3.795

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	3.897
95% Modified-t UCL (Johnson-1978)	3.817

Gamma GOF Test

A-D Test Statistic	0.406
5% A-D Critical Value	0.74
K-S Test Statistic	0.145
5% K-S Critical Value	0.216

Anderson-Darling Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

Kolmogorov-Smirnov Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	7.102	k star (bias corrected MLE)	5.812

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
 From File filea1b878952361.xls
 Full Precision OFF
 Confidence Coefficient 95%
 Number of Bootstrap Operations 2000

Theta hat (MLE)	0.452	Theta star (bias corrected MLE)	0.553
nu hat (MLE)	227.3	nu star (bias corrected)	186
MLE Mean (bias corrected)	3.213	MLE Sd (bias corrected)	1.333
		Approximate Chi Square Value (0.05)	155.4
Adjusted Level of Significance	0.0335	Adjusted Chi Square Value	152.3

Assuming Gamma Distribution

95% Approximate Gamma UCL	3.845	95% Adjusted Gamma UCL	3.925

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.961	Shapiro Wilk Lognormal GOF Test
10% Shapiro Wilk Critical Value	0.906	Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.162	Lilliefors Lognormal GOF Test
10% Lilliefors Critical Value	0.196	Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	0.262	Mean of logged Data	1.095
Maximum of Logged Data	1.946	SD of logged Data	0.391

Assuming Lognormal Distribution

95% H-UCL	3.927	90% Chebyshev (MVUE) UCL	4.171
95% Chebyshev (MVUE) UCL	4.606	97.5% Chebyshev (MVUE) UCL	5.209
99% Chebyshev (MVUE) UCL	6.395		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	3.759	95% BCA Bootstrap UCL	3.863
95% Standard Bootstrap UCL	3.734	95% Bootstrap-t UCL	4.012
95% Hall's Bootstrap UCL	5.069	95% Percentile Bootstrap UCL	3.763
90% Chebyshev(Mean, Sd) UCL	4.209	95% Chebyshev(Mean, Sd) UCL	4.661
97.5% Chebyshev(Mean, Sd) UCL	5.287	99% Chebyshev(Mean, Sd) UCL	6.517

Suggested UCL to Use

95% Student's-t UCL	3.795

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (cobalt [ug/l]_intrawell_apw-10s)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	4
Number of Detects	5	Number of Non-Detects	11
Number of Distinct Detects	3	Number of Distinct Non-Detects	2
Minimum Detect	1	Minimum Non-Detect	1
Maximum Detect	2.1	Maximum Non-Detect	2
Variance Detects	0.258	Percent Non-Detects	68.75%
Mean Detects	1.56	SD Detects	0.508
Median Detects	1.3	CV Detects	0.326
Skewness Detects	0.331	Kurtosis Detects	-2.788

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
 From File filea1b878952361.xls
 Full Precision OFF
 Confidence Coefficient 95%
 Number of Bootstrap Operations 2000

Mean of Logged Detects 0.402 SD of Logged Detects 0.329

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.827	Shapiro Wilk GOF Test
1% Shapiro Wilk Critical Value	0.686	Detected Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.296	Lilliefors GOF Test
1% Lilliefors Critical Value	0.396	Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	1.178	KM Standard Error of Mean	0.102
90KM SD	0.363	95% KM (BCA) UCL	N/A
95% KM (t) UCL	1.356	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	1.345	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	1.483	95% KM Chebyshev UCL	1.621
97.5% KM Chebyshev UCL	1.813	99% KM Chebyshev UCL	2.19

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.525	Anderson-Darling GOF Test
5% A-D Critical Value	0.679	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.295	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.358	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics on Detected Data Only

k hat (MLE)	11.8	k star (bias corrected MLE)	4.854
Theta hat (MLE)	0.132	Theta star (bias corrected MLE)	0.321
nu hat (MLE)	118	nu star (bias corrected)	48.54
Mean (detects)	1.56		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
 GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.693
Maximum	2.1	Median	0.477
SD	0.698	CV	1.006
k hat (MLE)	0.609	k star (bias corrected MLE)	0.537
Theta hat (MLE)	1.138	Theta star (bias corrected MLE)	1.292
nu hat (MLE)	19.5	nu star (bias corrected)	17.18
Adjusted Level of Significance (β)	0.0335		
Approximate Chi Square Value (17.18, α)	8.8	Adjusted Chi Square Value (17.18, β)	8.124
95% Gamma Approximate UCL	1.354	95% Gamma Adjusted UCL	1.466

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	1.178	SD (KM)	0.363
Variance (KM)	0.132	SE of Mean (KM)	0.102
k hat (KM)	10.53	k star (KM)	8.6
nu hat (KM)	337.1	nu star (KM)	275.2
theta hat (KM)	0.112	theta star (KM)	0.137

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
 From File filea1b878952361.xls
 Full Precision OFF
 Confidence Coefficient 95%
 Number of Bootstrap Operations 2000

80% gamma percentile (KM)	1.496	90% gamma percentile (KM)	1.713
95% gamma percentile (KM)	1.907	99% gamma percentile (KM)	2.307

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (275.19, α)	237.8	Adjusted Chi Square Value (275.19, β)	233.8
95% KM Approximate Gamma UCL	1.363	95% KM Adjusted Gamma UCL	1.386

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.859	Shapiro Wilk GOF Test
10% Shapiro Wilk Critical Value	0.806	Detected Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.264	Lilliefors GOF Test
10% Lilliefors Critical Value	0.319	Detected Data appear Lognormal at 10% Significance Level

Detected Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.879	Mean in Log Scale	-0.303
SD in Original Scale	0.565	SD in Log Scale	0.603
95% t UCL (assumes normality of ROS data)	1.126	95% Percentile Bootstrap UCL	1.108
95% BCA Bootstrap UCL	1.14	95% Bootstrap t UCL	1.209
95% H-UCL (Log ROS)	1.241		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	0.128	KM Geo Mean	1.137
KM SD (logged)	0.248	95% Critical H Value (KM-Log)	1.833
KM Standard Error of Mean (logged)	0.0698	95% H-UCL (KM -Log)	1.318
KM SD (logged)	0.248	95% Critical H Value (KM-Log)	1.833
KM Standard Error of Mean (logged)	0.0698		

DL/2 Statistics

DL/2 Normal

Mean in Original Scale	0.863
SD in Original Scale	0.566
95% t UCL (Assumes normality)	1.11

DL/2 Log-Transformed

Mean in Log Scale	-0.308
SD in Log Scale	0.549
95% H-Stat UCL	1.152

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	1.356

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (dissolved solids, total [mg/l]_intrawell_apw-02)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	15
		Number of Missing Observations	0
Minimum	820	Mean	880.8
Maximum	934	Median	882.5

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

SD	35.82	Std. Error of Mean	8.955
Coefficient of Variation	0.0407	Skewness	0.00833

Normal GOF Test

Shapiro Wilk Test Statistic	0.948	Shapiro Wilk GOF Test
1% Shapiro Wilk Critical Value	0.844	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.15	Lilliefors GOF Test
1% Lilliefors Critical Value	0.248	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL

95% Student's-t UCL 896.4

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	895.5
95% Modified-t UCL (Johnson-1978)	896.5

Gamma GOF Test

A-D Test Statistic	0.347	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.736	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.158	Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value	0.214	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	644.3	k star (bias corrected MLE)	523.5
Theta hat (MLE)	1.367	Theta star (bias corrected MLE)	1.682
nu hat (MLE)	20618	nu star (bias corrected)	16753
MLE Mean (bias corrected)	880.8	MLE Sd (bias corrected)	38.49
		Approximate Chi Square Value (0.05)	16454
Adjusted Level of Significance	0.0335	Adjusted Chi Square Value	16420

Assuming Gamma Distribution

95% Approximate Gamma UCL	896.8	95% Adjusted Gamma UCL	898.7

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.949	Shapiro Wilk Lognormal GOF Test
10% Shapiro Wilk Critical Value	0.906	Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.15	Lilliefors Lognormal GOF Test
10% Lilliefors Critical Value	0.196	Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	6.709	Mean of logged Data	6.78
Maximum of Logged Data	6.839	SD of logged Data	0.0407

Assuming Lognormal Distribution

95% H-UCL	N/A	90% Chebyshev (MVUE) UCL	907.6
95% Chebyshev (MVUE) UCL	919.8	97.5% Chebyshev (MVUE) UCL	936.7
99% Chebyshev (MVUE) UCL	970		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	895.5	95% BCA Bootstrap UCL	895.6

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
 From File filea1b878952361.xls
 Full Precision OFF
 Confidence Coefficient 95%
 Number of Bootstrap Operations 2000

95% Standard Bootstrap UCL	894.9	95% Bootstrap-t UCL	896
95% Hall's Bootstrap UCL	894.5	95% Percentile Bootstrap UCL	895.3
90% Chebyshev(Mean, Sd) UCL	907.6	95% Chebyshev(Mean, Sd) UCL	919.8
97.5% Chebyshev(Mean, Sd) UCL	936.7	99% Chebyshev(Mean, Sd) UCL	969.8

Suggested UCL to Use

95% Student's-t UCL 896.4

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. Recommendations are based upon data size, data distribution, and skewness using results from simulation studies. However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (dissolved solids, total [mg/l]_inrawell_apw-03)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	16
		Number of Missing Observations	0
Minimum	450	Mean	542.6
Maximum	724	Median	519
SD	76.63	Std. Error of Mean	19.16
Coefficient of Variation	0.141	Skewness	0.887

Normal GOF Test

Shapiro Wilk Test Statistic	0.922	Shapiro Wilk GOF Test	
1% Shapiro Wilk Critical Value	0.844	Data appear Normal at 1% Significance Level	
Lilliefors Test Statistic	0.158	Lilliefors GOF Test	
1% Lilliefors Critical Value	0.248	Data appear Normal at 1% Significance Level	

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	576.1	95% Adjusted-CLT UCL (Chen-1995)	578.6
		95% Modified-t UCL (Johnson-1978)	576.9

Gamma GOF Test

A-D Test Statistic	0.399	Anderson-Darling Gamma GOF Test	
5% A-D Critical Value	0.735	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.148	Kolmogorov-Smirnov Gamma GOF Test	
5% K-S Critical Value	0.214	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	56.45	k star (bias corrected MLE)	45.91
Theta hat (MLE)	9.611	Theta star (bias corrected MLE)	11.82
nu hat (MLE)	1806	nu star (bias corrected)	1469
MLE Mean (bias corrected)	542.6	MLE Sd (bias corrected)	80.08
		Approximate Chi Square Value (0.05)	1381
Adjusted Level of Significance	0.0335	Adjusted Chi Square Value	1371

Assuming Gamma Distribution

95% Approximate Gamma UCL	577.1	95% Adjusted Gamma UCL	581.2

Lognormal GOF Test

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
From File filea1b878952361.xls
Full Precision OFF
Confidence Coefficient 95%
Number of Bootstrap Operations 2000

Shapiro Wilk Test Statistic	0.943	Shapiro Wilk Lognormal GOF Test
10% Shapiro Wilk Critical Value	0.906	Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.138	Lilliefors Lognormal GOF Test
10% Lilliefors Critical Value	0.196	Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Lognormal Statistics			
Minimum of Logged Data	6.109	Mean of logged Data	6.287
Maximum of Logged Data	6.585	SD of logged Data	0.136

Assuming Lognormal Distribution			
95% H-UCL	577.4	90% Chebyshev (MVUE) UCL	597.9
95% Chebyshev (MVUE) UCL	623.1	97.5% Chebyshev (MVUE) UCL	657.9
99% Chebyshev (MVUE) UCL	726.5		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs			
95% CLT UCL	574.1	95% BCA Bootstrap UCL	577.4
95% Standard Bootstrap UCL	573.2	95% Bootstrap-t UCL	581.4
95% Hall's Bootstrap UCL	580.9	95% Percentile Bootstrap UCL	574.6
90% Chebyshev(Mean, Sd) UCL	600	95% Chebyshev(Mean, Sd) UCL	626.1
97.5% Chebyshev(Mean, Sd) UCL	662.2	99% Chebyshev(Mean, Sd) UCL	733.2

Suggested UCL to Use

95% Student's-t UCL 576.1

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. Recommendations are based upon data size, data distribution, and skewness using results from simulation studies. However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (dissolved solids, total [mg/l]_intrawell_apw-05/05r)

General Statistics			
Total Number of Observations	16	Number of Distinct Observations	15
		Number of Missing Observations	0
Minimum	552	Mean	740.9
Maximum	842	Median	745
SD	79.41	Std. Error of Mean	19.85
Coefficient of Variation	0.107	Skewness	-0.756

Normal GOF Test			
Shapiro Wilk Test Statistic	0.934	Shapiro Wilk GOF Test	
1% Shapiro Wilk Critical Value	0.844	Data appear Normal at 1% Significance Level	
Lilliefors Test Statistic	0.169	Lilliefors GOF Test	
1% Lilliefors Critical Value	0.248	Data appear Normal at 1% Significance Level	

Data appear Normal at 1% Significance Level

Assuming Normal Distribution		95% UCLs (Adjusted for Skewness)	
95% Normal UCL		95% Adjusted-CLT UCL (Chen-1995)	769.5
95% Student's-t UCL	775.7	95% Modified-t UCL (Johnson-1978)	775.1

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Gamma GOF Test

A-D Test Statistic	0.421
5% A-D Critical Value	0.736
K-S Test Statistic	0.177
5% K-S Critical Value	0.214

Anderson-Darling Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

Kolmogorov-Smirnov Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	87.24
Theta hat (MLE)	8.492
nu hat (MLE)	2792
MLE Mean (bias corrected)	740.9
Adjusted Level of Significance	0.0335

k star (bias corrected MLE)	70.93
Theta star (bias corrected MLE)	10.45
nu star (bias corrected)	2270
MLE Sd (bias corrected)	87.97
Approximate Chi Square Value (0.05)	2160
Adjusted Chi Square Value	2148

Assuming Gamma Distribution

95% Approximate Gamma UCL 778.5

95% Adjusted Gamma UCL 782.9

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.911
10% Shapiro Wilk Critical Value	0.906
Lilliefors Test Statistic	0.17
10% Lilliefors Critical Value	0.196

Shapiro Wilk Lognormal GOF Test

Data appear Lognormal at 10% Significance Level

Lilliefors Lognormal GOF Test

Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	6.314
Maximum of Logged Data	6.736

Mean of logged Data	6.602
SD of logged Data	0.113

Assuming Lognormal Distribution

95% H-UCL	780
95% Chebyshev (MVUE) UCL	832.1
99% Chebyshev (MVUE) UCL	948.9

90% Chebyshev (MVUE) UCL	803.7
97.5% Chebyshev (MVUE) UCL	871.5

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	773.5
95% Standard Bootstrap UCL	772.3
95% Hall's Bootstrap UCL	771.6
90% Chebyshev(Mean, Sd) UCL	800.4
97.5% Chebyshev(Mean, Sd) UCL	864.9

95% BCA Bootstrap UCL	768.6
95% Bootstrap-t UCL	774
95% Percentile Bootstrap UCL	770.1
95% Chebyshev(Mean, Sd) UCL	827.4
99% Chebyshev(Mean, Sd) UCL	938.4

Suggested UCL to Use

95% Student's-t UCL 775.7

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positively skewed data sets.

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

report_result_value (dissolved solids, total [mg/l]_intrawell_apw-06d)

General Statistics

Total Number of Observations	14	Number of Distinct Observations	13
		Number of Missing Observations	0
Minimum	482	Mean	580.6
Maximum	735	Median	564.5
SD	59.4	Std. Error of Mean	15.88
Coefficient of Variation	0.102	Skewness	1.417

Normal GOF Test

Shapiro Wilk Test Statistic	0.817	Shapiro Wilk GOF Test
1% Shapiro Wilk Critical Value	0.825	Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.294	Lilliefors GOF Test
1% Lilliefors Critical Value	0.263	Data Not Normal at 1% Significance Level

Data Not Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	608.7	95% Adjusted-CLT UCL (Chen-1995)	613.1
		95% Modified-t UCL (Johnson-1978)	609.7

Gamma GOF Test

A-D Test Statistic	1.169	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.733	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.277	Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value	0.228	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	109.9	k star (bias corrected MLE)	86.36
Theta hat (MLE)	5.285	Theta star (bias corrected MLE)	6.722
nu hat (MLE)	3076	nu star (bias corrected)	2418
MLE Mean (bias corrected)	580.6	MLE Sd (bias corrected)	62.47
		Approximate Chi Square Value (0.05)	2305
Adjusted Level of Significance	0.0312	Adjusted Chi Square Value	2290

Assuming Gamma Distribution

95% Approximate Gamma UCL	609.1	95% Adjusted Gamma UCL	613

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.847	Shapiro Wilk Lognormal GOF Test
10% Shapiro Wilk Critical Value	0.895	Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.273	Lilliefors Lognormal GOF Test
10% Lilliefors Critical Value	0.208	Data Not Lognormal at 10% Significance Level

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	6.178	Mean of logged Data	6.359
Maximum of Logged Data	6.6	SD of logged Data	0.0977

Assuming Lognormal Distribution

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

95% H-UCL	N/A	90% Chebyshev (MVUE) UCL	626
95% Chebyshev (MVUE) UCL	646.6	97.5% Chebyshev (MVUE) UCL	675.2
99% Chebyshev (MVUE) UCL	731.4		

Nonparametric Distribution Free UCL Statistics Data do not follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	606.7	95% BCA Bootstrap UCL	611.1
95% Standard Bootstrap UCL	606.1	95% Bootstrap-t UCL	629.6
95% Hall's Bootstrap UCL	815.7	95% Percentile Bootstrap UCL	608.1
90% Chebyshev(Mean, Sd) UCL	628.2	95% Chebyshev(Mean, Sd) UCL	649.8
97.5% Chebyshev(Mean, Sd) UCL	679.7	99% Chebyshev(Mean, Sd) UCL	738.5

Suggested UCL to Use

95% Student's-t UCL	608.7

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. Recommendations are based upon data size, data distribution, and skewness using results from simulation studies. However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (dissolved solids, total [mg/l]_intrawell_apw-06s)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	16
		Number of Missing Observations	0
Minimum	500	Mean	593.6
Maximum	666	Median	599
SD	45.29	Std. Error of Mean	11.32
Coefficient of Variation	0.0763	Skewness	-0.442

Normal GOF Test

Shapiro Wilk Test Statistic	0.976
1% Shapiro Wilk Critical Value	0.844
Lilliefors Test Statistic	0.102
1% Lilliefors Critical Value	0.248

Shapiro Wilk GOF Test

Data appear Normal at 1% Significance Level

Lilliefors GOF Test

Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL

95% Student's-t UCL	613.5

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	610.9
95% Modified-t UCL (Johnson-1978)	613.3

Gamma GOF Test

A-D Test Statistic	0.216
5% A-D Critical Value	0.736
K-S Test Statistic	0.112
5% K-S Critical Value	0.214

Anderson-Darling Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

Kolmogorov-Smirnov Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	178.6	k star (bias corrected MLE)	145.2
Theta hat (MLE)	3.323	Theta star (bias corrected MLE)	4.089

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
 From File filea1b878952361.xls
 Full Precision OFF
 Confidence Coefficient 95%
 Number of Bootstrap Operations 2000

nu hat (MLE)	5717	nu star (bias corrected)	4646
MLE Mean (bias corrected)	593.6	MLE Sd (bias corrected)	49.27
		Approximate Chi Square Value (0.05)	4489
Adjusted Level of Significance	0.0335	Adjusted Chi Square Value	4471

Assuming Gamma Distribution

95% Approximate Gamma UCL	614.4	95% Adjusted Gamma UCL	616.9

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.966	Shapiro Wilk Lognormal GOF Test	
10% Shapiro Wilk Critical Value	0.906	Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.114	Lilliefors Lognormal GOF Test	
10% Lilliefors Critical Value	0.196	Data appear Lognormal at 10% Significance Level	

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	6.215	Mean of logged Data	6.383
Maximum of Logged Data	6.501	SD of logged Data	0.0778

Assuming Lognormal Distribution

95% H-UCL	N/A	90% Chebyshev (MVUE) UCL	628.3
95% Chebyshev (MVUE) UCL	644.1	97.5% Chebyshev (MVUE) UCL	665.9
99% Chebyshev (MVUE) UCL	708.7		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	612.2	95% BCA Bootstrap UCL	611.1
95% Standard Bootstrap UCL	612.1	95% Bootstrap-t UCL	613.3
95% Hall's Bootstrap UCL	612	95% Percentile Bootstrap UCL	612.1
90% Chebyshev(Mean, Sd) UCL	627.6	95% Chebyshev(Mean, Sd) UCL	643
97.5% Chebyshev(Mean, Sd) UCL	664.3	99% Chebyshev(Mean, Sd) UCL	706.3

Suggested UCL to Use

95% Student's-t UCL 613.5

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positively skewed data sets.

report_result_value (dissolved solids, total [mg/l]_intrawell_apw-07)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	15
		Number of Missing Observations	0
Minimum	624	Mean	749.3
Maximum	824	Median	741
SD	52.44	Std. Error of Mean	13.11
Coefficient of Variation	0.07	Skewness	-0.857

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Normal GOF Test

Shapiro Wilk Test Statistic	0.927
1% Shapiro Wilk Critical Value	0.844
Lilliefors Test Statistic	0.169
1% Lilliefors Critical Value	0.248

Shapiro Wilk GOF Test

Data appear Normal at 1% Significance Level

Lilliefors GOF Test

Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL

95% Student's-t UCL	772.2

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	767.8
95% Modified-t UCL (Johnson-1978)	771.8

Gamma GOF Test

A-D Test Statistic	0.525
5% A-D Critical Value	0.736
K-S Test Statistic	0.175
5% K-S Critical Value	0.214

Anderson-Darling Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

Kolmogorov-Smirnov Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	208.8
Theta hat (MLE)	3.588
nu hat (MLE)	6682
MLE Mean (bias corrected)	749.3
Adjusted Level of Significance	0.0335

k star (bias corrected MLE)	169.7
Theta star (bias corrected MLE)	4.415
nu star (bias corrected)	5431
MLE Sd (bias corrected)	57.51
Approximate Chi Square Value (0.05)	5260
Adjusted Chi Square Value	5241

Assuming Gamma Distribution

95% Approximate Gamma UCL	773.5

95% Adjusted Gamma UCL	776.3

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.908
10% Shapiro Wilk Critical Value	0.906
Lilliefors Test Statistic	0.184
10% Lilliefors Critical Value	0.196

Shapiro Wilk Lognormal GOF Test

Data appear Lognormal at 10% Significance Level

Lilliefors Lognormal GOF Test

Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	6.436
Maximum of Logged Data	6.714

Mean of logged Data	6.617
SD of logged Data	0.0723

Assuming Lognormal Distribution

95% H-UCL	N/A
95% Chebyshev (MVUE) UCL	808.4
99% Chebyshev (MVUE) UCL	884.2

90% Chebyshev (MVUE) UCL	790
97.5% Chebyshev (MVUE) UCL	833.9

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	770.8
95% Standard Bootstrap UCL	770.5
95% Hall's Bootstrap UCL	769.4

95% BCA Bootstrap UCL	767.3
95% Bootstrap-t UCL	770.2
95% Percentile Bootstrap UCL	769.4

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
 From File filea1b878952361.xls
 Full Precision OFF
 Confidence Coefficient 95%
 Number of Bootstrap Operations 2000

90% Chebyshev(Mean, Sd) UCL 788.6	95% Chebyshev(Mean, Sd) UCL 806.4
97.5% Chebyshev(Mean, Sd) UCL 831.1	99% Chebyshev(Mean, Sd) UCL 879.7

Suggested UCL to Use

95% Student's-t UCL 772.2

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. Recommendations are based upon data size, data distribution, and skewness using results from simulation studies. However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positively skewed data sets.

report_result_value (dissolved solids, total [mg/l]_intrawell_apw-08)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	15
		Number of Missing Observations	0
Minimum	370	Mean	413.8
Maximum	466	Median	415
SD	33.47	Std. Error of Mean	8.369
Coefficient of Variation	0.0809	Skewness	-0.00542

Normal GOF Test

Shapiro Wilk Test Statistic 0.911	Shapiro Wilk GOF Test
1% Shapiro Wilk Critical Value 0.844	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic 0.184	Lilliefors GOF Test
1% Lilliefors Critical Value 0.248	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL	95% UCLs (Adjusted for Skewness)
95% Student's-t UCL 428.5	95% Adjusted-CLT UCL (Chen-1995) 427.6
	95% Modified-t UCL (Johnson-1978) 428.5

Gamma GOF Test

A-D Test Statistic 0.594	Anderson-Darling Gamma GOF Test
5% A-D Critical Value 0.736	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic 0.195	Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value 0.214	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE) 162.4	k star (bias corrected MLE) 132
Theta hat (MLE) 2.549	Theta star (bias corrected MLE) 3.136
nu hat (MLE) 5196	nu star (bias corrected) 4223
MLE Mean (bias corrected) 413.8	MLE Sd (bias corrected) 36.02
	Approximate Chi Square Value (0.05) 4073
Adjusted Level of Significance 0.0335	Adjusted Chi Square Value 4056

Assuming Gamma Distribution

95% Approximate Gamma UCL 429.1	95% Adjusted Gamma UCL 430.8

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
From File filea1b878952361.xls
Full Precision OFF
Confidence Coefficient 95%
Number of Bootstrap Operations 2000

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.908	Shapiro Wilk Lognormal GOF Test
10% Shapiro Wilk Critical Value	0.906	Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.19	Lilliefors Lognormal GOF Test
10% Lilliefors Critical Value	0.196	Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	5.914	Mean of logged Data	6.022
Maximum of Logged Data	6.144	SD of logged Data	0.0812

Assuming Lognormal Distribution

95% H-UCL	N/A	90% Chebyshev (MVUE) UCL	439
95% Chebyshev (MVUE) UCL	450.5	97.5% Chebyshev (MVUE) UCL	466.3
99% Chebyshev (MVUE) UCL	497.5		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	427.6	95% BCA Bootstrap UCL	427.2
95% Standard Bootstrap UCL	427.1	95% Bootstrap-t UCL	428.5
95% Hall's Bootstrap UCL	426.9	95% Percentile Bootstrap UCL	427.1
90% Chebyshev(Mean, Sd) UCL	438.9	95% Chebyshev(Mean, Sd) UCL	450.3
97.5% Chebyshev(Mean, Sd) UCL	466.1	99% Chebyshev(Mean, Sd) UCL	497.1

Suggested UCL to Use

95% Student's-t UCL 428.5

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positively skewed data sets.

report_result_value (dissolved solids, total [mg/l]_intrawell_apw-10d)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	13
		Number of Missing Observations	0
Minimum	436	Mean	462.5
Maximum	512	Median	460
SD	19.3	Std. Error of Mean	4.824
Coefficient of Variation	0.0417	Skewness	1.076

Normal GOF Test

Shapiro Wilk Test Statistic	0.932	Shapiro Wilk GOF Test
1% Shapiro Wilk Critical Value	0.844	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.138	Lilliefors GOF Test
1% Lilliefors Critical Value	0.248	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Assuming Normal Distribution

95% Normal UCL

95% Student's-t UCL 471

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995) 471.8

95% Modified-t UCL (Johnson-1978) 471.2

Gamma GOF Test

A-D Test Statistic 0.324

5% A-D Critical Value 0.736

K-S Test Statistic 0.128

5% K-S Critical Value 0.214

Anderson-Darling Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

Kolmogorov-Smirnov Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE) 627.5

Theta hat (MLE) 0.737

nu hat (MLE) 20080

MLE Mean (bias corrected) 462.5

Adjusted Level of Significance 0.0335

k star (bias corrected MLE) 509.9

Theta star (bias corrected MLE) 0.907

nu star (bias corrected) 16316

MLE Sd (bias corrected) 20.48

Approximate Chi Square Value (0.05) 16020

Adjusted Chi Square Value 15987

Assuming Gamma Distribution

95% Approximate Gamma UCL 471

95% Adjusted Gamma UCL 472

Lognormal GOF Test

Shapiro Wilk Test Statistic 0.943

10% Shapiro Wilk Critical Value 0.906

Lilliefors Test Statistic 0.129

10% Lilliefors Critical Value 0.196

Shapiro Wilk Lognormal GOF Test

Data appear Lognormal at 10% Significance Level

Lilliefors Lognormal GOF Test

Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data 6.078

Maximum of Logged Data 6.238

Mean of logged Data 6.136

SD of logged Data 0.041

Assuming Lognormal Distribution

95% H-UCL N/A

95% Chebyshev (MVUE) UCL 483.2

99% Chebyshev (MVUE) UCL 509.7

90% Chebyshev (MVUE) UCL 476.7

97.5% Chebyshev (MVUE) UCL 492.1

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL 470.4

95% Standard Bootstrap UCL 470

95% Hall's Bootstrap UCL 474.2

90% Chebyshev(Mean, Sd) UCL 477

97.5% Chebyshev(Mean, Sd) UCL 492.6

95% BCA Bootstrap UCL 471.2

95% Bootstrap-t UCL 472.8

95% Percentile Bootstrap UCL 470.2

95% Chebyshev(Mean, Sd) UCL 483.5

99% Chebyshev(Mean, Sd) UCL 510.5

Suggested UCL to Use

95% Student's-t UCL 471

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (dissolved solids, total [mg/l]_intrawell_apw-10s)

General Statistics

Total Number of Observations	15	Number of Distinct Observations	13
		Number of Missing Observations	0
Minimum	678	Mean	747.1
Maximum	900	Median	735
SD	52.73	Std. Error of Mean	13.62
Coefficient of Variation	0.0706	Skewness	1.689

Normal GOF Test

Shapiro Wilk Test Statistic	0.856	Shapiro Wilk GOF Test
1% Shapiro Wilk Critical Value	0.835	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.2	Lilliefors GOF Test
1% Lilliefors Critical Value	0.255	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL

95% Student's-t UCL 771.1

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995) 775.9
95% Modified-t UCL (Johnson-1978) 772.1

Gamma GOF Test

A-D Test Statistic	0.547	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.734	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.182	Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value	0.221	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	228.3	k star (bias corrected MLE)	182.7
Theta hat (MLE)	3.273	Theta star (bias corrected MLE)	4.09
nu hat (MLE)	6848	nu star (bias corrected)	5480
MLE Mean (bias corrected)	747.1	MLE Sd (bias corrected)	55.28
		Approximate Chi Square Value (0.05)	5309
Adjusted Level of Significance	0.0324	Adjusted Chi Square Value	5288

Assuming Gamma Distribution

95% Approximate Gamma UCL 771.2

95% Adjusted Gamma UCL 774.2

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.887	Shapiro Wilk Lognormal GOF Test
10% Shapiro Wilk Critical Value	0.901	Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.185	Lilliefors Lognormal GOF Test
10% Lilliefors Critical Value	0.202	Data appear Lognormal at 10% Significance Level

Data appear Approximate Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	6.519	Mean of logged Data	6.614
Maximum of Logged Data	6.802	SD of logged Data	0.0676

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
From File filea1b878952361.xls
Full Precision OFF
Confidence Coefficient 95%
Number of Bootstrap Operations 2000

Assuming Lognormal Distribution

95% H-UCL	N/A	90% Chebyshev (MVUE) UCL	786.2
95% Chebyshev (MVUE) UCL	803.9	97.5% Chebyshev (MVUE) UCL	828.5
99% Chebyshev (MVUE) UCL	876.9		

Nonparametric Distribution Free UCL Statistics Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	769.5	95% BCA Bootstrap UCL	775.5
95% Standard Bootstrap UCL	769.2	95% Bootstrap-t UCL	780.2
95% Hall's Bootstrap UCL	874.9	95% Percentile Bootstrap UCL	772
90% Chebyshev(Mean, Sd) UCL	788	95% Chebyshev(Mean, Sd) UCL	806.5
97.5% Chebyshev(Mean, Sd) UCL	832.2	99% Chebyshev(Mean, Sd) UCL	882.6

Suggested UCL to Use

95% Student's-t UCL 771.1

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (fluoride [ug/l]_intrawell_apw-02)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	5
		Number of Missing Observations	0
Minimum	220	Mean	242.5
Maximum	260	Median	240
SD	12.91	Std. Error of Mean	3.227
Coefficient of Variation	0.0532	Skewness	-0.319

Normal GOF Test

Shapiro Wilk Test Statistic	0.917	Shapiro Wilk GOF Test
1% Shapiro Wilk Critical Value	0.844	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.173	Lilliefors GOF Test
1% Lilliefors Critical Value	0.248	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL

95% Student's-t UCL 248.2

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	247.5
95% Modified-t UCL (Johnson-1978)	248.1

Gamma GOF Test

A-D Test Statistic	0.553	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.736	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.178	Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value	0.214	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	371.7	k star (bias corrected MLE)	302.1

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
 From File filea1b878952361.xls
 Full Precision OFF
 Confidence Coefficient 95%
 Number of Bootstrap Operations 2000

Theta hat (MLE)	0.652	Theta star (bias corrected MLE)	0.803
nu hat (MLE)	11895	nu star (bias corrected)	9666
MLE Mean (bias corrected)	242.5	MLE Sd (bias corrected)	13.95
		Approximate Chi Square Value (0.05)	9439
Adjusted Level of Significance	0.0335	Adjusted Chi Square Value	9413

Assuming Gamma Distribution

95% Approximate Gamma UCL	248.3	95% Adjusted Gamma UCL	249

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.913	Shapiro Wilk Lognormal GOF Test	
10% Shapiro Wilk Critical Value	0.906	Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.183	Lilliefors Lognormal GOF Test	
10% Lilliefors Critical Value	0.196	Data appear Lognormal at 10% Significance Level	

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	5.394	Mean of logged Data	5.49
Maximum of Logged Data	5.561	SD of logged Data	0.0538

Assuming Lognormal Distribution

95% H-UCL	N/A	90% Chebyshev (MVUE) UCL	252.3
95% Chebyshev (MVUE) UCL	256.7	97.5% Chebyshev (MVUE) UCL	262.9
99% Chebyshev (MVUE) UCL	274.9		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	247.8	95% BCA Bootstrap UCL	246.9
95% Standard Bootstrap UCL	247.7	95% Bootstrap-t UCL	247.7
95% Hall's Bootstrap UCL	247.5	95% Percentile Bootstrap UCL	247.5
90% Chebyshev(Mean, Sd) UCL	252.2	95% Chebyshev(Mean, Sd) UCL	256.6
97.5% Chebyshev(Mean, Sd) UCL	262.7	99% Chebyshev(Mean, Sd) UCL	274.6

Suggested UCL to Use

95% Student's-t UCL	248.2

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. Recommendations are based upon data size, data distribution, and skewness using results from simulation studies. However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positively skewed data sets.

report_result_value (fluoride [ug/l]_intrawell_apw-03)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	11
		Number of Missing Observations	0
Minimum	200	Mean	264.5
Maximum	340	Median	265
SD	38.24	Std. Error of Mean	9.561

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Coefficient of Variation	0.145	Skewness	-0.0242

Normal GOF Test

Shapiro Wilk Test Statistic	0.968	Shapiro Wilk GOF Test
1% Shapiro Wilk Critical Value	0.844	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.127	Lilliefors GOF Test
1% Lilliefors Critical Value	0.248	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL

95% Student's-t UCL	281.3

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	280.2
95% Modified-t UCL (Johnson-1978)	281.3

Gamma GOF Test

A-D Test Statistic	0.298	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.735	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.135	Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value	0.214	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	49.86	k star (bias corrected MLE)	40.55
Theta hat (MLE)	5.305	Theta star (bias corrected MLE)	6.523
nu hat (MLE)	1595	nu star (bias corrected)	1298
MLE Mean (bias corrected)	264.5	MLE Sd (bias corrected)	41.54
Adjusted Level of Significance	0.0335	Approximate Chi Square Value (0.05)	1215
		Adjusted Chi Square Value	1206

Assuming Gamma Distribution

95% Approximate Gamma UCL	282.5	95% Adjusted Gamma UCL	284.6

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.958	Shapiro Wilk Lognormal GOF Test
10% Shapiro Wilk Critical Value	0.906	Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.13	Lilliefors Lognormal GOF Test
10% Lilliefors Critical Value	0.196	Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	5.298	Mean of logged Data	5.568
Maximum of Logged Data	5.829	SD of logged Data	0.148

Assuming Lognormal Distribution

95% H-UCL	283.2	90% Chebyshev (MVUE) UCL	293.9
95% Chebyshev (MVUE) UCL	307.3	97.5% Chebyshev (MVUE) UCL	325.7
99% Chebyshev (MVUE) UCL	362		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	280.2	95% BCA Bootstrap UCL	278.8
95% Standard Bootstrap UCL	279.7	95% Bootstrap-t UCL	281.1

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

95% Hall's Bootstrap UCL	280.8	95% Percentile Bootstrap UCL	279
90% Chebyshev(Mean, Sd) UCL	293.2	95% Chebyshev(Mean, Sd) UCL	306.2
97.5% Chebyshev(Mean, Sd) UCL	324.2	99% Chebyshev(Mean, Sd) UCL	359.6

Suggested UCL to Use

95% Student's-t UCL 281.3

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. Recommendations are based upon data size, data distribution, and skewness using results from simulation studies. However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positively skewed data sets.

report_result_value (fluoride [ug/l]_intrawell_apw-05/05r)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	9
		Number of Missing Observations	0
Minimum	298	Mean	334.9
Maximum	380	Median	330
SD	23.01	Std. Error of Mean	5.753
Coefficient of Variation	0.0687	Skewness	0.326

Normal GOF Test

Shapiro Wilk Test Statistic	0.96	Shapiro Wilk GOF Test
1% Shapiro Wilk Critical Value	0.844	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.146	Lilliefors GOF Test
1% Lilliefors Critical Value	0.248	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL

95% Student's-t UCL 345

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	344.8
95% Modified-t UCL (Johnson-1978)	345

Gamma GOF Test

A-D Test Statistic	0.298	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.736	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.141	Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value	0.214	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	227.8	k star (bias corrected MLE)	185.1
Theta hat (MLE)	1.47	Theta star (bias corrected MLE)	1.809
nu hat (MLE)	7290	nu star (bias corrected)	5924
MLE Mean (bias corrected)	334.9	MLE Sd (bias corrected)	24.61
		Approximate Chi Square Value (0.05)	5746
Adjusted Level of Significance	0.0335	Adjusted Chi Square Value	5726

Assuming Gamma Distribution

95% Approximate Gamma UCL	345.2	95% Adjusted Gamma UCL	346.4

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
From File filea1b878952361.xls
Full Precision OFF
Confidence Coefficient 95%
Number of Bootstrap Operations 2000

Lognormal GOF Test

Shapiro Wilk Test Statistic 0.963
10% Shapiro Wilk Critical Value 0.906
Lilliefors Test Statistic 0.138
10% Lilliefors Critical Value 0.196

Shapiro Wilk Lognormal GOF Test

Data appear Lognormal at 10% Significance Level

Lilliefors Lognormal GOF Test

Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data 5.697
Maximum of Logged Data 5.94

Mean of logged Data 5.812
SD of logged Data 0.0683

Assuming Lognormal Distribution

95% H-UCL N/A
95% Chebyshev (MVUE) UCL 359.8
99% Chebyshev (MVUE) UCL 391.8

90% Chebyshev (MVUE) UCL 352
97.5% Chebyshev (MVUE) UCL 370.6

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL 344.3
95% Standard Bootstrap UCL 344.2
95% Hall's Bootstrap UCL 345.3
90% Chebyshev(Mean, Sd) UCL 352.1
97.5% Chebyshev(Mean, Sd) UCL 370.8

95% BCA Bootstrap UCL 344.4
95% Bootstrap-t UCL 345.6
95% Percentile Bootstrap UCL 344.4
95% Chebyshev(Mean, Sd) UCL 360
99% Chebyshev(Mean, Sd) UCL 392.1

Suggested UCL to Use

95% Student's-t UCL 345

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (fluoride [ug/l]_intraWell_apw-06d)

General Statistics

Total Number of Observations 15
Minimum 200
Maximum 240
SD 12.57
Coefficient of Variation 0.0576

Number of Distinct Observations 6
Number of Missing Observations 0
Mean 218.1
Median 220
Std. Error of Mean 3.245
Skewness 0.414

Normal GOF Test

Shapiro Wilk Test Statistic 0.922
1% Shapiro Wilk Critical Value 0.835
Lilliefors Test Statistic 0.174
1% Lilliefors Critical Value 0.255

Shapiro Wilk GOF Test

Data appear Normal at 1% Significance Level

Lilliefors GOF Test

Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL

95% UCLs (Adjusted for Skewness)

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

95% Student's-t UCL	223.8	95% Adjusted-CLT UCL (Chen-1995)	223.8
		95% Modified-t UCL (Johnson-1978)	223.9

Gamma GOF Test

A-D Test Statistic	0.495	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.734	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.165	Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value	0.221	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	326.3	k star (bias corrected MLE)	261.1
Theta hat (MLE)	0.669	Theta star (bias corrected MLE)	0.836
nu hat (MLE)	9788	nu star (bias corrected)	7832
MLE Mean (bias corrected)	218.1	MLE Sd (bias corrected)	13.5
		Approximate Chi Square Value (0.05)	7627
Adjusted Level of Significance	0.0324	Adjusted Chi Square Value	7602

Assuming Gamma Distribution

95% Approximate Gamma UCL	224	95% Adjusted Gamma UCL	224.7

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.927	Shapiro Wilk Lognormal GOF Test
10% Shapiro Wilk Critical Value	0.901	Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.164	Lilliefors Lognormal GOF Test
10% Lilliefors Critical Value	0.202	Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	5.298	Mean of logged Data	5.384
Maximum of Logged Data	5.481	SD of logged Data	0.0572

Assuming Lognormal Distribution

95% H-UCL	N/A	90% Chebyshev (MVUE) UCL	227.8
95% Chebyshev (MVUE) UCL	232.2	97.5% Chebyshev (MVUE) UCL	238.3
99% Chebyshev (MVUE) UCL	250.2		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	223.5	95% BCA Bootstrap UCL	223.3
95% Standard Bootstrap UCL	223.2	95% Bootstrap-t UCL	224.5
95% Hall's Bootstrap UCL	224.1	95% Percentile Bootstrap UCL	223.3
90% Chebyshev(Mean, Sd) UCL	227.9	95% Chebyshev(Mean, Sd) UCL	232.3
97.5% Chebyshev(Mean, Sd) UCL	238.4	99% Chebyshev(Mean, Sd) UCL	250.4

Suggested UCL to Use

95% Student's-t UCL	223.8

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

report_result_value (fluoride [ug/l]_intrawell_apw-06s)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	11
		Number of Missing Observations	0
Minimum	240	Mean	283.6
Maximum	410	Median	273.5
SD	42.43	Std. Error of Mean	10.61
Coefficient of Variation	0.15	Skewness	1.931

Normal GOF Test

Shapiro Wilk Test Statistic	0.814
1% Shapiro Wilk Critical Value	0.844
Lilliefors Test Statistic	0.19
1% Lilliefors Critical Value	0.248

Shapiro Wilk GOF Test

Data Not Normal at 1% Significance Level

Lilliefors GOF Test

Data appear Normal at 1% Significance Level

Data appear Approximate Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL

95% Student's-t UCL	302.2

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	306.5
95% Modified-t UCL (Johnson-1978)	303

Gamma GOF Test

A-D Test Statistic	0.744
5% A-D Critical Value	0.735
K-S Test Statistic	0.166
5% K-S Critical Value	0.214

Anderson-Darling Gamma GOF Test

Data Not Gamma Distributed at 5% Significance Level

Kolmogorov-Smirnov Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

Detected data follow Appr. Gamma Distribution at 5% Significance Level

Gamma Statistics

k hat (MLE)	54.4	k star (bias corrected MLE)	44.24
Theta hat (MLE)	5.213	Theta star (bias corrected MLE)	6.409
nu hat (MLE)	1741	nu star (bias corrected)	1416
MLE Mean (bias corrected)	283.6	MLE Sd (bias corrected)	42.63
		Approximate Chi Square Value (0.05)	1329
Adjusted Level of Significance	0.0335	Adjusted Chi Square Value	1320

Assuming Gamma Distribution

95% Approximate Gamma UCL	302

95% Adjusted Gamma UCL	304.2

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.87
10% Shapiro Wilk Critical Value	0.906
Lilliefors Test Statistic	0.158
10% Lilliefors Critical Value	0.196

Shapiro Wilk Lognormal GOF Test

Data Not Lognormal at 10% Significance Level

Lilliefors Lognormal GOF Test

Data appear Lognormal at 10% Significance Level

Data appear Approximate Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	5.481	Mean of logged Data	5.638
Maximum of Logged Data	6.016	SD of logged Data	0.136

Assuming Lognormal Distribution

95% H-UCL	301.7

90% Chebyshev (MVUE) UCL	312.4

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
From File filea1b878952361.xls
Full Precision OFF
Confidence Coefficient 95%
Number of Bootstrap Operations 2000

95% Chebyshev (MVUE) UCL 325.5 97.5% Chebyshev (MVUE) UCL 343.7
99% Chebyshev (MVUE) UCL 379.5

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	301	95% BCA Bootstrap UCL	305.9
95% Standard Bootstrap UCL	300.3	95% Bootstrap-t UCL	314.5
95% Hall's Bootstrap UCL	375.6	95% Percentile Bootstrap UCL	300.6
90% Chebyshev(Mean, Sd) UCL	315.4	95% Chebyshev(Mean, Sd) UCL	329.8
97.5% Chebyshev(Mean, Sd) UCL	349.8	99% Chebyshev(Mean, Sd) UCL	389.1

Suggested UCL to Use

95% Student's-t UCL 302.2

When a data set follows an approximate distribution passing only one of the GOF tests,
it is suggested to use a UCL based upon a distribution passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (fluoride [ug/l]_intrawell_apw-07)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	7
		Number of Missing Observations	0
Minimum	170	Mean	197.6
Maximum	350	Median	190
SD	42.42	Std. Error of Mean	10.61
Coefficient of Variation	0.215	Skewness	3.451

Normal GOF Test

Shapiro Wilk Test Statistic 0.539
1% Shapiro Wilk Critical Value 0.844
Lilliefors Test Statistic 0.353
1% Lilliefors Critical Value 0.248

Shapiro Wilk GOF Test

Data Not Normal at 1% Significance Level

Lilliefors GOF Test

Data Not Normal at 1% Significance Level

Data Not Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL

95% Student's-t UCL 216.2

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995) 224.8
95% Modified-t UCL (Johnson-1978) 217.7

Gamma GOF Test

A-D Test Statistic 2.144
5% A-D Critical Value 0.736
K-S Test Statistic 0.325
5% K-S Critical Value 0.215

Anderson-Darling Gamma GOF Test

Data Not Gamma Distributed at 5% Significance Level

Kolmogorov-Smirnov Gamma GOF Test

Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
 From File filea1b878952361.xls
 Full Precision OFF
 Confidence Coefficient 95%
 Number of Bootstrap Operations 2000

k hat (MLE)	31.96	k star (bias corrected MLE)	26.01
Theta hat (MLE)	6.184	Theta star (bias corrected MLE)	7.599
nu hat (MLE)	1023	nu star (bias corrected)	832.2
MLE Mean (bias corrected)	197.6	MLE Sd (bias corrected)	38.75
		Approximate Chi Square Value (0.05)	766.3
Adjusted Level of Significance	0.0335	Adjusted Chi Square Value	759.1

Assuming Gamma Distribution

95% Approximate Gamma UCL	214.6	95% Adjusted Gamma UCL	216.7

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.632	Shapiro Wilk Lognormal GOF Test	
10% Shapiro Wilk Critical Value	0.906	Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.31	Lilliefors Lognormal GOF Test	
10% Lilliefors Critical Value	0.196	Data Not Lognormal at 10% Significance Level	

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	5.136	Mean of logged Data	5.271
Maximum of Logged Data	5.858	SD of logged Data	0.17

Assuming Lognormal Distribution

95% H-UCL	213.4	90% Chebyshev (MVUE) UCL	222.3
95% Chebyshev (MVUE) UCL	233.8	97.5% Chebyshev (MVUE) UCL	249.6
99% Chebyshev (MVUE) UCL	280.7		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	215.1	95% BCA Bootstrap UCL	227.6
95% Standard Bootstrap UCL	214.3	95% Bootstrap-t UCL	246.8
95% Hall's Bootstrap UCL	285.8	95% Percentile Bootstrap UCL	217
90% Chebyshev(Mean, Sd) UCL	229.4	95% Chebyshev(Mean, Sd) UCL	243.9
97.5% Chebyshev(Mean, Sd) UCL	263.9	99% Chebyshev(Mean, Sd) UCL	303.1

Suggested UCL to Use

95% Student's-t UCL 216.2

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (fluoride [ug/l]_intrawell_apw-08)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	5
		Number of Missing Observations	0
Minimum	232	Mean	278.3
Maximum	300	Median	280
SD	19.07	Std. Error of Mean	4.768
Coefficient of Variation	0.0685	Skewness	-0.943

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Normal GOF Test

Shapiro Wilk Test Statistic	0.882	Shapiro Wilk GOF Test
1% Shapiro Wilk Critical Value	0.844	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.224	Lilliefors GOF Test
1% Lilliefors Critical Value	0.248	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL

95% Student's-t UCL 286.6

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	284.9
95% Modified-t UCL (Johnson-1978)	286.4

Gamma GOF Test

A-D Test Statistic	0.801	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.736	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.233	Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value	0.214	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	217.4	k star (bias corrected MLE)	176.7
Theta hat (MLE)	1.28	Theta star (bias corrected MLE)	1.575
nu hat (MLE)	6957	nu star (bias corrected)	5654
MLE Mean (bias corrected)	278.3	MLE Sd (bias corrected)	20.93
		Approximate Chi Square Value (0.05)	5480
Adjusted Level of Significance	0.0335	Adjusted Chi Square Value	5461

Assuming Gamma Distribution

95% Approximate Gamma UCL	287.1	95% Adjusted Gamma UCL	288.1

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.868	Shapiro Wilk Lognormal GOF Test
10% Shapiro Wilk Critical Value	0.906	Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.236	Lilliefors Lognormal GOF Test
10% Lilliefors Critical Value	0.196	Data Not Lognormal at 10% Significance Level

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	5.447	Mean of logged Data	5.626
Maximum of Logged Data	5.704	SD of logged Data	0.0709

Assuming Lognormal Distribution

95% H-UCL	N/A	90% Chebyshev (MVUE) UCL	293.1
95% Chebyshev (MVUE) UCL	299.8	97.5% Chebyshev (MVUE) UCL	309.1
99% Chebyshev (MVUE) UCL	327.4		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	286.1	95% BCA Bootstrap UCL	285
95% Standard Bootstrap UCL	286	95% Bootstrap-t UCL	285.6
95% Hall's Bootstrap UCL	285.1	95% Percentile Bootstrap UCL	285.6
90% Chebyshev(Mean, Sd) UCL	292.6	95% Chebyshev(Mean, Sd) UCL	299

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
 From File filea1b878952361.xls
 Full Precision OFF
 Confidence Coefficient 95%
 Number of Bootstrap Operations 2000

97.5% Chebyshev(Mean, Sd) UCL 308

99% Chebyshev(Mean, Sd) UCL 325.7

Suggested UCL to Use

95% Student's-t UCL 286.6

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positively skewed data sets.

report_result_value (fluoride [ug/l]_intrawell_apw-10d)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	5
Number of Detects	13	Number of Non-Detects	3
Number of Distinct Detects	4	Number of Distinct Non-Detects	2
Minimum Detect	100	Minimum Non-Detect	100
Maximum Detect	140	Maximum Non-Detect	150
Variance Detects	135.9	Percent Non-Detects	18.75%
Mean Detects	112.3	SD Detects	11.66
Median Detects	110	CV Detects	0.104
Skewness Detects	0.967	Kurtosis Detects	1.254
Mean of Logged Detects	4.716	SD of Logged Detects	0.101

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.859	Shapiro Wilk GOF Test	
1% Shapiro Wilk Critical Value	0.814	Detected Data appear Normal at 1% Significance Level	
Lilliefors Test Statistic	0.194	Lilliefors GOF Test	
1% Lilliefors Critical Value	0.271	Detected Data appear Normal at 1% Significance Level	

Detected Data appear Normal at 1% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	110.7	KM Standard Error of Mean	3.019
90KM SD	11.23	95% KM (BCA) UCL	N/A
95% KM (t) UCL	116	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	115.6	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	119.7	95% KM Chebyshev UCL	123.8
97.5% KM Chebyshev UCL	129.5	99% KM Chebyshev UCL	140.7

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.7	Anderson-Darling GOF Test	
5% A-D Critical Value	0.732	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.187	Kolmogorov-Smirnov GOF	
5% K-S Critical Value	0.236	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	105.1	k star (bias corrected MLE)	80.9
Theta hat (MLE)	1.068	Theta star (bias corrected MLE)	1.388
nu hat (MLE)	2733	nu star (bias corrected)	2103
Mean (detects)	112.3		

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
 GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
 For such situations, GROS method may yield incorrect values of UCLs and BTVs
 This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	84.71	Mean	108.9
Maximum	140	Median	110
SD	13.52	CV	0.124
k hat (MLE)	69.55	k star (bias corrected MLE)	56.55
Theta hat (MLE)	1.566	Theta star (bias corrected MLE)	1.926
nu hat (MLE)	2225	nu star (bias corrected)	1810
Adjusted Level of Significance (β)	0.0335		
Approximate Chi Square Value (N/A, α)	1712	Adjusted Chi Square Value (N/A, β)	1701
95% Gamma Approximate UCL	115.2	95% Gamma Adjusted UCL	115.9

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	110.7	SD (KM)	11.23
Variance (KM)	126.2	SE of Mean (KM)	3.019
k hat (KM)	97.03	k star (KM)	78.88
nu hat (KM)	3105	nu star (KM)	2524
theta hat (KM)	1.141	theta star (KM)	1.403
80% gamma percentile (KM)	121	90% gamma percentile (KM)	126.9
95% gamma percentile (KM)	131.9	99% gamma percentile (KM)	141.7

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (N/A, α)	2408	Adjusted Chi Square Value (N/A, β)	2395
95% KM Approximate Gamma UCL	116	95% KM Adjusted Gamma UCL	116.6

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.873	Shapiro Wilk GOF Test
10% Shapiro Wilk Critical Value	0.889	Detected Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.179	Lilliefors GOF Test
10% Lilliefors Critical Value	0.215	Detected Data appear Lognormal at 10% Significance Level

Detected Data appear Approximate Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	109.1	Mean in Log Scale	4.686
SD in Original Scale	13.17	SD in Log Scale	0.12
95% t UCL (assumes normality of ROS data)	114.9	95% Percentile Bootstrap UCL	114.4
95% BCA Bootstrap UCL	114.4	95% Bootstrap t UCL	115.6
95% H-UCL (Log ROS)	115.3		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	4.702	KM Geo Mean	110.1
KM SD (logged)	0.0976	95% Critical H Value (KM-Log)	N/A
KM Standard Error of Mean (logged)	0.0262	95% H-UCL (KM -Log)	N/A
KM SD (logged)	0.0976	95% Critical H Value (KM-Log)	N/A
KM Standard Error of Mean (logged)	0.0262		

DL/2 Statistics

DL/2 Normal

Mean in Original Scale	102.2
SD in Original Scale	24.7

DL/2 Log-Transformed

Mean in Log Scale	4.591
SD in Log Scale	0.297

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
From File filea1b878952361.xls
Full Precision OFF
Confidence Coefficient 95%
Number of Bootstrap Operations 2000

95% t UCL (Assumes normality) 113

95% H-Stat UCL 118.9

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL 116

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (fluoride [ug/l]_intrawell_apw-10s)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	6
Number of Detects	15	Number of Non-Detects	1
Number of Distinct Detects	6	Number of Distinct Non-Detects	1
Minimum Detect	150	Minimum Non-Detect	150
Maximum Detect	210	Maximum Non-Detect	150
Variance Detects	263.8	Percent Non-Detects	6.25%
Mean Detects	167.3	SD Detects	16.24
Median Detects	160	CV Detects	0.0971
Skewness Detects	1.42	Kurtosis Detects	2.372
Mean of Logged Detects	5.116	SD of Logged Detects	0.0925

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.854	Shapiro Wilk GOF Test
1% Shapiro Wilk Critical Value	0.835	Detected Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.235	Lilliefors GOF Test
1% Lilliefors Critical Value	0.255	Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	166.3	KM Standard Error of Mean	4.079
90KM SD	15.76	95% KM (BCA) UCL	172.5
95% KM (t) UCL	173.4	95% KM (Percentile Bootstrap) UCL	173.1
95% KM (z) UCL	173	95% KM Bootstrap t UCL	176.7
90% KM Chebyshev UCL	178.5	95% KM Chebyshev UCL	184
97.5% KM Chebyshev UCL	191.7	99% KM Chebyshev UCL	206.8

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.739	Anderson-Darling GOF Test
5% A-D Critical Value	0.734	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.219	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.221	Detected data appear Gamma Distributed at 5% Significance Level

Detected data follow Appr. Gamma Distribution at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	121.6	k star (bias corrected MLE)	97.33
Theta hat (MLE)	1.376	Theta star (bias corrected MLE)	1.719
nu hat (MLE)	3648	nu star (bias corrected)	2920
Mean (detects)	167.3		

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
 GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
 For such situations, GROS method may yield incorrect values of UCLs and BTVs
 This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	131.4	Mean	165.1
Maximum	210	Median	160
SD	18.07	CV	0.109
k hat (MLE)	91.88	k star (bias corrected MLE)	74.69
Theta hat (MLE)	1.797	Theta star (bias corrected MLE)	2.21
nu hat (MLE)	2940	nu star (bias corrected)	2390
Adjusted Level of Significance (β)	0.0335		
Approximate Chi Square Value (N/A, α)	2278	Adjusted Chi Square Value (N/A, β)	2265
95% Gamma Approximate UCL	173.3	95% Gamma Adjusted UCL	174.2

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	166.3	SD (KM)	15.76
Variance (KM)	248.4	SE of Mean (KM)	4.079
k hat (KM)	111.3	k star (KM)	90.43
nu hat (KM)	3560	nu star (KM)	2894
theta hat (KM)	1.494	theta star (KM)	1.838
80% gamma percentile (KM)	180.8	90% gamma percentile (KM)	189
95% gamma percentile (KM)	196	99% gamma percentile (KM)	209.6

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (N/A, α)	2770	Adjusted Chi Square Value (N/A, β)	2756
95% KM Approximate Gamma UCL	173.7	95% KM Adjusted Gamma UCL	174.6

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.879	Shapiro Wilk GOF Test
10% Shapiro Wilk Critical Value	0.901	Detected Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.215	Lilliefors GOF Test
10% Lilliefors Critical Value	0.202	Detected Data Not Lognormal at 10% Significance Level

Detected Data Not Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	165.3	Mean in Log Scale	5.102
SD in Original Scale	17.76	SD in Log Scale	0.105
95% t UCL (assumes normality of ROS data)	173	95% Percentile Bootstrap UCL	172.5
95% BCA Bootstrap UCL	172.8	95% Bootstrap t UCL	174.9
95% H-UCL (Log ROS)	173.3		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	5.109	KM Geo Mean	165.6
KM SD (logged)	0.0902	95% Critical H Value (KM-Log)	N/A
KM Standard Error of Mean (logged)	0.0233	95% H-UCL (KM -Log)	N/A
KM SD (logged)	0.0902	95% Critical H Value (KM-Log)	N/A
KM Standard Error of Mean (logged)	0.0233		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	161.6	Mean in Log Scale	5.066

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
From File filea1b878952361.xls
Full Precision OFF
Confidence Coefficient 95%
Number of Bootstrap Operations 2000

SD in Original Scale	27.91	SD in Log Scale	0.219
95% t UCL (Assumes normality)	173.8	95% H-Stat UCL	179.9

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL 173.4

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (iron [mg/l]_inrawell_apw-02)

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	0
Minimum	7.63	Mean	9.665
Maximum	11.7	Median	9.665

Warning: This data set only has 2 observations!

Data set is too small to compute reliable and meaningful statistics and estimates!

The data set for variable report_result_value (iron [mg/l]_inrawell_apw-02) was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!

If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

report_result_value (iron [mg/l]_inrawell_apw-03)

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	0
Minimum	0.367	Mean	1.014
Maximum	1.66	Median	1.014

Warning: This data set only has 2 observations!

Data set is too small to compute reliable and meaningful statistics and estimates!

The data set for variable report_result_value (iron [mg/l]_inrawell_apw-03) was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!

If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

report_result_value (iron [mg/l]_inrawell_apw-05/05r)

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	0

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
From File filea1b878952361.xls
Full Precision OFF
Confidence Coefficient 95%
Number of Bootstrap Operations 2000

Minimum	2.77	Mean	4.33
Maximum	5.89	Median	4.33

Warning: This data set only has 2 observations!

Data set is too small to compute reliable and meaningful statistics and estimates!

The data set for variable report_result_value (iron [mg/l]_inrawell_apw-05/05r) was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

report_result_value (iron [mg/l]_inrawell_apw-06d)

General Statistics

Total Number of Observations	1	Number of Distinct Observations	1
		Number of Missing Observations	0
Minimum	3.65	Mean	3.65
Maximum	3.65	Median	3.65

Warning: This data set only has 1 observations!

Data set is too small to compute reliable and meaningful statistics and estimates!

The data set for variable report_result_value (iron [mg/l]_inrawell_apw-06d) was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

report_result_value (iron [mg/l]_inrawell_apw-06s)

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	0
Minimum	9.18	Mean	9.265
Maximum	9.35	Median	9.265

Warning: This data set only has 2 observations!

Data set is too small to compute reliable and meaningful statistics and estimates!

The data set for variable report_result_value (iron [mg/l]_inrawell_apw-06s) was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

report_result_value (iron [mg/l]_inrawell_apw-07)

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	0
Minimum	17.3	Mean	18.1
Maximum	18.9	Median	18.1

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
From File filea1b878952361.xls
Full Precision OFF
Confidence Coefficient 95%
Number of Bootstrap Operations 2000

Warning: This data set only has 2 observations!

Data set is too small to compute reliable and meaningful statistics and estimates!

The data set for variable report_result_value (iron [mg/l]_inrawell_apw-07) was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!

If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

report_result_value (iron [mg/l]_inrawell_apw-08)

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	0
Minimum	0.44	Mean	1.79
Maximum	3.14	Median	1.79

Warning: This data set only has 2 observations!

Data set is too small to compute reliable and meaningful statistics and estimates!

The data set for variable report_result_value (iron [mg/l]_inrawell_apw-08) was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!

If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

report_result_value (iron [mg/l]_inrawell_apw-10d)

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	0
Minimum	0.175	Mean	0.467
Maximum	0.758	Median	0.467

Warning: This data set only has 2 observations!

Data set is too small to compute reliable and meaningful statistics and estimates!

The data set for variable report_result_value (iron [mg/l]_inrawell_apw-10d) was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!

If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

report_result_value (iron [mg/l]_inrawell_apw-10s)

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	0
Minimum	17.2	Mean	18.4
Maximum	19.6	Median	18.4

Warning: This data set only has 2 observations!

Data set is too small to compute reliable and meaningful statistics and estimates!

The data set for variable report_result_value (iron [mg/l]_inrawell_apw-10s) was not processed!

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
From File filea1b878952361.xls
Full Precision OFF
Confidence Coefficient 95%
Number of Bootstrap Operations 2000

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

report_result_value (lead [ug/l]_intrawell_apw-02)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	16
		Number of Missing Observations	0
Minimum	2	Mean	7.409
Maximum	23.9	Median	5.1
SD	6.594	Std. Error of Mean	1.648
Coefficient of Variation	0.89	Skewness	1.559

Normal GOF Test

Shapiro Wilk Test Statistic	0.791
1% Shapiro Wilk Critical Value	0.844
Lilliefors Test Statistic	0.227
1% Lilliefors Critical Value	0.248

Shapiro Wilk GOF Test

Data Not Normal at 1% Significance Level

Lilliefors GOF Test

Data appear Normal at 1% Significance Level

Data appear Approximate Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL

95% Student's-t UCL	10.3

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	10.81
95% Modified-t UCL (Johnson-1978)	10.41

Gamma GOF Test

A-D Test Statistic	0.627
5% A-D Critical Value	0.753
K-S Test Statistic	0.184
5% K-S Critical Value	0.218

Anderson-Darling Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

Kolmogorov-Smirnov Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.714	k star (bias corrected MLE)	1.434
Theta hat (MLE)	4.323	Theta star (bias corrected MLE)	5.166
nu hat (MLE)	54.85	nu star (bias corrected)	45.9
MLE Mean (bias corrected)	7.409	MLE Sd (bias corrected)	6.187
		Approximate Chi Square Value (0.05)	31.36
Adjusted Level of Significance	0.0335	Adjusted Chi Square Value	29.99

Assuming Gamma Distribution

95% Approximate Gamma UCL	10.85	95% Adjusted Gamma UCL	11.34

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.924
10% Shapiro Wilk Critical Value	0.906
Lilliefors Test Statistic	0.166
10% Lilliefors Critical Value	0.196

Shapiro Wilk Lognormal GOF Test

Data appear Lognormal at 10% Significance Level

Lilliefors Lognormal GOF Test

Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
 From File filea1b878952361.xls
 Full Precision OFF
 Confidence Coefficient 95%
 Number of Bootstrap Operations 2000

Minimum of Logged Data	0.693	Mean of logged Data	1.684
Maximum of Logged Data	3.174	SD of logged Data	0.804

Assuming Lognormal Distribution

95% H-UCL	12.29	90% Chebyshev (MVUE) UCL	11.94
95% Chebyshev (MVUE) UCL	14.06	97.5% Chebyshev (MVUE) UCL	17.01
99% Chebyshev (MVUE) UCL	22.8		

Nonparametric Distribution Free UCL Statistics Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	10.12	95% BCA Bootstrap UCL	10.63
95% Standard Bootstrap UCL	10.03	95% Bootstrap-t UCL	12.37
95% Hall's Bootstrap UCL	12.9	95% Percentile Bootstrap UCL	10.03
90% Chebyshev(Mean, Sd) UCL	12.35	95% Chebyshev(Mean, Sd) UCL	14.59
97.5% Chebyshev(Mean, Sd) UCL	17.7	99% Chebyshev(Mean, Sd) UCL	23.81

Suggested UCL to Use

95% Student's-t UCL 10.3

When a data set follows an approximate distribution passing only one of the GOF tests,
it is suggested to use a UCL based upon a distribution passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (lead [ug/l]_intrawell_apw-03)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	8
Number of Detects	6	Number of Non-Detects	10
Number of Distinct Detects	6	Number of Distinct Non-Detects	2
Minimum Detect	1.3	Minimum Non-Detect	1
Maximum Detect	4.4	Maximum Non-Detect	2
Variance Detects	1.499	Percent Non-Detects	62.5%
Mean Detects	2.867	SD Detects	1.224
Median Detects	2.6	CV Detects	0.427
Skewness Detects	0.245	Kurtosis Detects	-1.525
Mean of Logged Detects	0.97	SD of Logged Detects	0.46

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.927	Shapiro Wilk GOF Test	
1% Shapiro Wilk Critical Value	0.713	Detected Data appear Normal at 1% Significance Level	
Lilliefors Test Statistic	0.195	Lilliefors GOF Test	
1% Lilliefors Critical Value	0.373	Detected Data appear Normal at 1% Significance Level	

Detected Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	1.702	KM Standard Error of Mean	0.31
90KM SD	1.133	95% KM (BCA) UCL	2.238
95% KM (t) UCL	2.246	95% KM (Percentile Bootstrap) UCL	2.218

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
 From File filea1b878952361.xls
 Full Precision OFF
 Confidence Coefficient 95%
 Number of Bootstrap Operations 2000

95% KM (z) UCL	2.212	95% KM Bootstrap t UCL	2.265
90% KM Chebyshev UCL	2.633	95% KM Chebyshev UCL	3.054
97.5% KM Chebyshev UCL	3.639	99% KM Chebyshev UCL	4.789

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.266	Anderson-Darling GOF Test	
5% A-D Critical Value	0.698	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.207	Kolmogorov-Smirnov GOF	
5% K-S Critical Value	0.333	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics on Detected Data Only

k hat (MLE)	6.158	k star (bias corrected MLE)	3.19
Theta hat (MLE)	0.465	Theta star (bias corrected MLE)	0.899
nu hat (MLE)	73.9	nu star (bias corrected)	38.28
Mean (detects)	2.867		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
 GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
 For such situations, GROS method may yield incorrect values of UCLs and BTVs
 This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	1.182
Maximum	4.4	Median	0.383
SD	1.54	CV	1.303
k hat (MLE)	0.344	k star (bias corrected MLE)	0.321
Theta hat (MLE)	3.432	Theta star (bias corrected MLE)	3.676
nu hat (MLE)	11.02	nu star (bias corrected)	10.29
Adjusted Level of Significance (β)	0.0335		
Approximate Chi Square Value (10.29, α)	4.121	Adjusted Chi Square Value (10.29, β)	3.687
95% Gamma Approximate UCL	2.949	95% Gamma Adjusted UCL	3.296

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	1.702	SD (KM)	1.133
Variance (KM)	1.283	SE of Mean (KM)	0.31
k hat (KM)	2.258	k star (KM)	1.876
nu hat (KM)	72.24	nu star (KM)	60.03
theta hat (KM)	0.754	theta star (KM)	0.907
80% gamma percentile (KM)	2.567	90% gamma percentile (KM)	3.36
95% gamma percentile (KM)	4.12	99% gamma percentile (KM)	5.811

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (60.03, α)	43.21	Adjusted Chi Square Value (60.03, β)	41.59
95% KM Approximate Gamma UCL	2.364	95% KM Adjusted Gamma UCL	2.456

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.943	Shapiro Wilk GOF Test	
10% Shapiro Wilk Critical Value	0.826	Detected Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.177	Lilliefors GOF Test	
10% Lilliefors Critical Value	0.298	Detected Data appear Lognormal at 10% Significance Level	

Detected Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
From File filea1b878952361.xls
Full Precision OFF
Confidence Coefficient 95%
Number of Bootstrap Operations 2000

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	1.482	Mean in Log Scale	0.0256
SD in Original Scale	1.335	SD in Log Scale	0.898
95% t UCL (assumes normality of ROS data)	2.067	95% Percentile Bootstrap UCL	2.018
95% BCA Bootstrap UCL	2.105	95% Bootstrap t UCL	2.306
95% H-UCL (Log ROS)	2.772		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	0.365	KM Geo Mean	1.441
KM SD (logged)	0.535	95% Critical H Value (KM-Log)	2.086
KM Standard Error of Mean (logged)	0.147	95% H-UCL (KM -Log)	2.217
KM SD (logged)	0.535	95% Critical H Value (KM-Log)	2.086
KM Standard Error of Mean (logged)	0.147		

DL/2 Statistics

DL/2 Normal

Mean in Original Scale	1.419
SD in Original Scale	1.362
95% t UCL (Assumes normality)	2.016

DL/2 Log-Transformed

Mean in Log Scale	-0.0262
SD in Log Scale	0.857
95% H-Stat UCL	2.44

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	2.246

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (lead [ug/l]_intraWell_apw-05/05r)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	4
Number of Detects	3	Number of Non-Detects	13
Number of Distinct Detects	3	Number of Distinct Non-Detects	2
Minimum Detect	1.1	Minimum Non-Detect	1
Maximum Detect	2.6	Maximum Non-Detect	2
Variance Detects	0.57	Percent Non-Detects	81.25%
Mean Detects	1.9	SD Detects	0.755
Median Detects	2	CV Detects	0.397
Skewness Detects	-0.586	Kurtosis Detects	N/A
Mean of Logged Detects	0.581	SD of Logged Detects	0.441

Warning: Data set has only 3 Detected Values.

This is not enough to compute meaningful or reliable statistics and estimates.

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.987
1% Shapiro Wilk Critical Value	0.753
Lilliefors Test Statistic	0.219

Shapiro Wilk GOF Test

Detected Data appear Normal at 1% Significance Level

Lilliefors GOF Test

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

1% Lilliefors Critical Value 0.429 Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	1.169	KM Standard Error of Mean	0.135
90KM SD	0.441	95% KM (BCA) UCL	N/A
95% KM (t) UCL	1.406	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	1.391	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	1.574	95% KM Chebyshev UCL	1.758
97.5% KM Chebyshev UCL	2.013	99% KM Chebyshev UCL	2.513

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.295	Anderson-Darling GOF Test
5% A-D Critical Value	0.636	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.271	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.433	Detected data appear Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	8.423	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.226	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	50.54	nu star (bias corrected)	N/A
Mean (detects)	1.9		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.408
Maximum	2.6	Median	0.01
SD	0.801	CV	1.961
k hat (MLE)	0.3	k star (bias corrected MLE)	0.285
Theta hat (MLE)	1.363	Theta star (bias corrected MLE)	1.432
nu hat (MLE)	9.587	nu star (bias corrected)	9.123
Adjusted Level of Significance (β)	0.0335		
Approximate Chi Square Value (9.12, α)	3.402	Adjusted Chi Square Value (9.12, β)	3.015
95% Gamma Approximate UCL	1.095	95% Gamma Adjusted UCL	N/A

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	1.169	SD (KM)	0.441
Variance (KM)	0.195	SE of Mean (KM)	0.135
k hat (KM)	7.028	k star (KM)	5.752
nu hat (KM)	224.9	nu star (KM)	184.1
theta hat (KM)	0.166	theta star (KM)	0.203
80% gamma percentile (KM)	1.548	90% gamma percentile (KM)	1.821
95% gamma percentile (KM)	2.069	99% gamma percentile (KM)	2.59

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (184.05, α)	153.7	Adjusted Chi Square Value (184.05, β)	150.5
95% KM Approximate Gamma UCL	1.4	95% KM Adjusted Gamma UCL	1.43

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
 From File filea1b878952361.xls
 Full Precision OFF
 Confidence Coefficient 95%
 Number of Bootstrap Operations 2000

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic 0.952	Shapiro Wilk GOF Test
10% Shapiro Wilk Critical Value 0.789	Detected Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic 0.267	Lilliefors GOF Test
10% Lilliefors Critical Value 0.389	Detected Data appear Lognormal at 10% Significance Level

Detected Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale 0.614	Mean in Log Scale -1.018
SD in Original Scale 0.721	SD in Log Scale 1.059
95% t UCL (assumes normality of ROS data) 0.93	95% Percentile Bootstrap UCL 0.915
95% BCA Bootstrap UCL 0.982	95% Bootstrap t UCL 1.265
95% H-UCL (Log ROS) 1.361	

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged) 0.109	KM Geo Mean 1.116
KM SD (logged) 0.275	95% Critical H Value (KM-Log) 1.852
KM Standard Error of Mean (logged) 0.0843	95% H-UCL (KM -Log) 1.322
KM SD (logged) 0.275	95% Critical H Value (KM-Log) 1.852
KM Standard Error of Mean (logged) 0.0843	

DL/2 Statistics

DL/2 Normal

Mean in Original Scale 0.794
 SD in Original Scale 0.627
 95% t UCL (Assumes normality) 1.068

DL/2 Log-Transformed

Mean in Log Scale -0.411
 SD in Log Scale 0.546
 95% H-Stat UCL 1.034

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL 1.406

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (lead [ug/l]_intraWell_apw-06d)

General Statistics

Total Number of Observations 15	Number of Distinct Observations 4
Number of Detects 2	Number of Non-Detects 13
Number of Distinct Detects 2	Number of Distinct Non-Detects 2
Minimum Detect 1.2	Minimum Non-Detect 1
Maximum Detect 1.6	Maximum Non-Detect 2
Variance Detects 0.08	Percent Non-Detects 86.67%
Mean Detects 1.4	SD Detects 0.283
Median Detects 1.4	CV Detects 0.202
Skewness Detects N/A	Kurtosis Detects N/A
Mean of Logged Detects 0.326	SD of Logged Detects 0.203

Warning: Data set has only 2 Detected Values.

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
From File filea1b878952361.xls
Full Precision OFF
Confidence Coefficient 95%
Number of Bootstrap Operations 2000

This is not enough to compute meaningful or reliable statistics and estimates.

Normal GOF Test on Detects Only

Not Enough Data to Perform GOF Test

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	1.057	KM Standard Error of Mean	0.0601
90KM SD	0.159	95% KM (BCA) UCL	N/A
95% KM (t) UCL	1.163	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	1.156	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	1.238	95% KM Chebyshev UCL	1.319
97.5% KM Chebyshev UCL	1.433	99% KM Chebyshev UCL	1.655

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	48.66	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.0288	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	194.7	nu star (bias corrected)	N/A
Mean (detects)	1.4		

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	1.057	SD (KM)	0.159
Variance (KM)	0.0253	SE of Mean (KM)	0.0601
k hat (KM)	44.16	k star (KM)	35.37
nu hat (KM)	1325	nu star (KM)	1061
theta hat (KM)	0.0239	theta star (KM)	0.0299
80% gamma percentile (KM)	1.203	90% gamma percentile (KM)	1.29
95% gamma percentile (KM)	1.365	99% gamma percentile (KM)	1.514

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (N/A, α)	986.6	Adjusted Level of Significance (β)	0.0324
95% KM Approximate Gamma UCL	1.137	Adjusted Chi Square Value (N/A, β)	977.7
		95% KM Adjusted Gamma UCL	1.147

Lognormal GOF Test on Detected Observations Only

Not Enough Data to Perform GOF Test

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.535	Mean in Log Scale	-0.856
SD in Original Scale	0.405	SD in Log Scale	0.699
95% t UCL (assumes normality of ROS data)	0.719	95% Percentile Bootstrap UCL	0.722
95% BCA Bootstrap UCL	0.748	95% Bootstrap t UCL	0.823
95% H-UCL (Log ROS)	0.834		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	0.0466	KM Geo Mean	1.048
KM SD (logged)	0.126	95% Critical H Value (KM-Log)	1.764
KM Standard Error of Mean (logged)	0.0478	95% H-UCL (KM -Log)	1.121
KM SD (logged)	0.126	95% Critical H Value (KM-Log)	1.764
KM Standard Error of Mean (logged)	0.0478		

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
From File filea1b878952361.xls
Full Precision OFF
Confidence Coefficient 95%
Number of Bootstrap Operations 2000

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.653	Mean in Log Scale	-0.511
SD in Original Scale	0.338	SD in Log Scale	0.388
95% t UCL (Assumes normality)	0.807	95% H-Stat UCL	0.792

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Suggested UCL to Use

95% KM (t) UCL 1.163

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. Recommendations are based upon data size, data distribution, and skewness using results from simulation studies. However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (lead [ug/l]_intrawell_apw-06s)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	3
Number of Detects	1	Number of Non-Detects	15
Number of Distinct Detects	1	Number of Distinct Non-Detects	2

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set! It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable report_result_value (lead [ug/l]_intrawell_apw-06s) was not processed!

report_result_value (lead [ug/l]_intrawell_apw-07)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	3
Number of Detects	1	Number of Non-Detects	15
Number of Distinct Detects	1	Number of Distinct Non-Detects	2

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set! It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable report_result_value (lead [ug/l]_intrawell_apw-07) was not processed!

report_result_value (lead [ug/l]_intrawell_apw-08)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	7
Number of Detects	5	Number of Non-Detects	11
Number of Distinct Detects	5	Number of Distinct Non-Detects	2
Minimum Detect	1.2	Minimum Non-Detect	1
Maximum Detect	2.8	Maximum Non-Detect	2
Variance Detects	0.428	Percent Non-Detects	68.75%
Mean Detects	1.94	SD Detects	0.654
Median Detects	1.8	CV Detects	0.337

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Skewness Detects	0.357	Kurtosis Detects	-1.657
Mean of Logged Detects	0.616	SD of Logged Detects	0.343

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.958	Shapiro Wilk GOF Test
1% Shapiro Wilk Critical Value	0.686	Detected Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.185	Lilliefors GOF Test
1% Lilliefors Critical Value	0.396	Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level
Note GOF tests may be unreliable for small sample sizes

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	1.301	KM Standard Error of Mean	0.153
90KM SD	0.545	95% KM (BCA) UCL	1.55
95% KM (t) UCL	1.57	95% KM (Percentile Bootstrap) UCL	1.537
95% KM (z) UCL	1.553	95% KM Bootstrap t UCL	1.541
90% KM Chebyshev UCL	1.761	95% KM Chebyshev UCL	1.969
97.5% KM Chebyshev UCL	2.259	99% KM Chebyshev UCL	2.827

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.22	Anderson-Darling GOF Test
5% A-D Critical Value	0.679	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.196	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.358	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level
Note GOF tests may be unreliable for small sample sizes

Gamma Statistics on Detected Data Only

k hat (MLE)	10.9	k star (bias corrected MLE)	4.495
Theta hat (MLE)	0.178	Theta star (bias corrected MLE)	0.432
nu hat (MLE)	109	nu star (bias corrected)	44.95
Mean (detects)	1.94		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
 GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
 For such situations, GROS method may yield incorrect values of UCLs and BTVs
 This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.814
Maximum	2.8	Median	0.488
SD	0.894	CV	1.097
k hat (MLE)	0.524	k star (bias corrected MLE)	0.468
Theta hat (MLE)	1.553	Theta star (bias corrected MLE)	1.742
nu hat (MLE)	16.78	nu star (bias corrected)	14.97
Adjusted Level of Significance (β)	0.0335		
Approximate Chi Square Value (14.97, α)	7.238	Adjusted Chi Square Value (14.97, β)	6.633
95% Gamma Approximate UCL	1.684	95% Gamma Adjusted UCL	1.838

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	1.301	SD (KM)	0.545
Variance (KM)	0.297	SE of Mean (KM)	0.153
k hat (KM)	5.698	k star (KM)	4.672
nu hat (KM)	182.3	nu star (KM)	149.5

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
 From File filea1b878952361.xls
 Full Precision OFF
 Confidence Coefficient 95%
 Number of Bootstrap Operations 2000

theta hat (KM)	0.228	theta star (KM)	0.278
80% gamma percentile (KM)	1.762	90% gamma percentile (KM)	2.107
95% gamma percentile (KM)	2.423	99% gamma percentile (KM)	3.091

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (149.49, α)	122.2	Adjusted Chi Square Value (149.49, β)	119.4
95% KM Approximate Gamma UCL	1.591	95% KM Adjusted Gamma UCL	1.628

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.97	Shapiro Wilk GOF Test
10% Shapiro Wilk Critical Value	0.806	Detected Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.175	Lilliefors GOF Test
10% Lilliefors Critical Value	0.319	Detected Data appear Lognormal at 10% Significance Level

Detected Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	1.058	Mean in Log Scale	-0.144
SD in Original Scale	0.728	SD in Log Scale	0.649
95% t UCL (assumes normality of ROS data)	1.377	95% Percentile Bootstrap UCL	1.349
95% BCA Bootstrap UCL	1.389	95% Bootstrap t UCL	1.484
95% H-UCL (Log ROS)	1.55		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	0.198	KM Geo Mean	1.219
KM SD (logged)	0.334	95% Critical H Value (KM-Log)	1.898
KM Standard Error of Mean (logged)	0.0942	95% H-UCL (KM -Log)	1.518
KM SD (logged)	0.334	95% Critical H Value (KM-Log)	1.898
KM Standard Error of Mean (logged)	0.0942		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.981	Mean in Log Scale	-0.241
SD in Original Scale	0.758	SD in Log Scale	0.645
95% t UCL (Assumes normality)	1.314	95% H-Stat UCL	1.4

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL 1.57

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (lead [ug/l]_intrawell_apw-10d)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	2
Number of Detects	2	Number of Non-Detects	14
Number of Distinct Detects	2	Number of Distinct Non-Detects	2
Minimum Detect	1	Minimum Non-Detect	1

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Maximum Detect	2	Maximum Non-Detect	2
Variance Detects	0.5	Percent Non-Detects	87.5%
Mean Detects	1.5	SD Detects	0.707
Median Detects	1.5	CV Detects	0.471
Skewness Detects	N/A	Kurtosis Detects	N/A
Mean of Logged Detects	0.347	SD of Logged Detects	0.49

Warning: Data set has only 2 Detected Values.
This is not enough to compute meaningful or reliable statistics and estimates.

Normal GOF Test on Detects Only Not Enough Data to Perform GOF Test

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	1.063	KM Standard Error of Mean	0.0856
90KM SD	0.242	95% KM (BCA) UCL	N/A
95% KM (t) UCL	1.213	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	1.203	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	1.319	95% KM Chebyshev UCL	1.436
97.5% KM Chebyshev UCL	1.597	99% KM Chebyshev UCL	1.914

Gamma GOF Tests on Detected Observations Only Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	8.653	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.173	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	34.61	nu star (bias corrected)	N/A
Mean (detects)	1.5		

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	1.063	SD (KM)	0.242
Variance (KM)	0.0586	SE of Mean (KM)	0.0856
k hat (KM)	19.27	k star (KM)	15.7
nu hat (KM)	616.5	nu star (KM)	502.3
theta hat (KM)	0.0551	theta star (KM)	0.0677
80% gamma percentile (KM)	1.279	90% gamma percentile (KM)	1.417
95% gamma percentile (KM)	1.539	99% gamma percentile (KM)	1.784

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (502.27, α)	451.3	Adjusted Level of Significance (β)	0.0335
95% KM Approximate Gamma UCL	1.183	Adjusted Chi Square Value (502.27, β)	445.8
		95% KM Adjusted Gamma UCL	1.197

Lognormal GOF Test on Detected Observations Only Not Enough Data to Perform GOF Test

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.37	Mean in Log Scale	-1.596
SD in Original Scale	0.501	SD in Log Scale	1.113
95% t UCL (assumes normality of ROS data)	0.59	95% Percentile Bootstrap UCL	0.587
95% BCA Bootstrap UCL	0.688	95% Bootstrap t UCL	0.934
95% H-UCL (Log ROS)	0.862		

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
From File filea1b878952361.xls
Full Precision OFF
Confidence Coefficient 95%
Number of Bootstrap Operations 2000

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	0.0433	KM Geo Mean	1.044
KM SD (logged)	0.168	95% Critical H Value (KM-Log)	1.78
KM Standard Error of Mean (logged)	0.0593	95% H-UCL (KM -Log)	1.144
KM SD (logged)	0.168	95% Critical H Value (KM-Log)	1.78
KM Standard Error of Mean (logged)	0.0593		

DL/2 Statistics

DL/2 Normal

Mean in Original Scale	0.656
SD in Original Scale	0.397
95% t UCL (Assumes normality)	0.83

DL/2 Log-Transformed

Mean in Log Scale	-0.52
SD in Log Scale	0.4
95% H-Stat UCL	0.788

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Suggested UCL to Use

95% KM (t) UCL 1.213

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (lead [ug/l]_intrawell_apw-10s)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	6
Number of Detects	5	Number of Non-Detects	11
Number of Distinct Detects	5	Number of Distinct Non-Detects	2
Minimum Detect	1	Minimum Non-Detect	1
Maximum Detect	4.3	Maximum Non-Detect	2
Variance Detects	1.907	Percent Non-Detects	68.75%
Mean Detects	2.28	SD Detects	1.381
Median Detects	1.6	CV Detects	0.606
Skewness Detects	0.902	Kurtosis Detects	-0.919
Mean of Logged Detects	0.679	SD of Logged Detects	0.599

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.889
1% Shapiro Wilk Critical Value	0.686
Lilliefors Test Statistic	0.289
1% Lilliefors Critical Value	0.396

Shapiro Wilk GOF Test

Detected Data appear Normal at 1% Significance Level

Lilliefors GOF Test

Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	1.405	KM Standard Error of Mean	0.255
90KM SD	0.91	95% KM (BCA) UCL	1.837
95% KM (t) UCL	1.851	95% KM (Percentile Bootstrap) UCL	1.806
95% KM (z) UCL	1.824	95% KM Bootstrap t UCL	2.418
90% KM Chebyshev UCL	2.169	95% KM Chebyshev UCL	2.515
97.5% KM Chebyshev UCL	2.995	99% KM Chebyshev UCL	3.938

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.333	Anderson-Darling GOF Test
5% A-D Critical Value	0.682	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.275	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.359	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics on Detected Data Only

k hat (MLE)	3.609	k star (bias corrected MLE)	1.577
Theta hat (MLE)	0.632	Theta star (bias corrected MLE)	1.446
nu hat (MLE)	36.09	nu star (bias corrected)	15.77
Mean (detects)	2.28		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.731
Maximum	4.3	Median	0.01
SD	1.294	CV	1.77
k hat (MLE)	0.284	k star (bias corrected MLE)	0.272
Theta hat (MLE)	2.578	Theta star (bias corrected MLE)	2.687
nu hat (MLE)	9.075	nu star (bias corrected)	8.707
Adjusted Level of Significance (β)	0.0335		
Approximate Chi Square Value (8.71, α)	3.151	Adjusted Chi Square Value (8.71, β)	2.782
95% Gamma Approximate UCL	2.02	95% Gamma Adjusted UCL	2.288

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	1.405	SD (KM)	0.91
Variance (KM)	0.827	SE of Mean (KM)	0.255
k hat (KM)	2.385	k star (KM)	1.98
nu hat (KM)	76.33	nu star (KM)	63.35
theta hat (KM)	0.589	theta star (KM)	0.71
80% gamma percentile (KM)	2.106	90% gamma percentile (KM)	2.739
95% gamma percentile (KM)	3.343	99% gamma percentile (KM)	4.684

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (63.35, α)	46.04	Adjusted Chi Square Value (63.35, β)	44.36
95% KM Approximate Gamma UCL	1.933	95% KM Adjusted Gamma UCL	2.006

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.94	Shapiro Wilk GOF Test
10% Shapiro Wilk Critical Value	0.806	Detected Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.237	Lilliefors GOF Test
10% Lilliefors Critical Value	0.319	Detected Data appear Lognormal at 10% Significance Level

Detected Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.947	Mean in Log Scale	-0.665

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

SD in Original Scale	1.182	SD in Log Scale	1.146
95% t UCL (assumes normality of ROS data)	1.465	95% Percentile Bootstrap UCL	1.437
95% BCA Bootstrap UCL	1.547	95% Bootstrap t UCL	1.996
95% H-UCL (Log ROS)	2.365		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	0.216	KM Geo Mean	1.241
KM SD (logged)	0.434	95% Critical H Value (KM-Log)	1.986
KM Standard Error of Mean (logged)	0.122	95% H-UCL (KM -Log)	1.704
KM SD (logged)	0.434	95% Critical H Value (KM-Log)	1.986
KM Standard Error of Mean (logged)	0.122		

DL/2 Statistics

DL/2 Normal

Mean in Original Scale	1.088
SD in Original Scale	1.101
95% t UCL (Assumes normality)	1.57

DL/2 Log-Transformed

Mean in Log Scale	-0.221
SD in Log Scale	0.72
95% H-Stat UCL	1.594

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	1.851

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (lithium [ug/l]_intrawell_apw-02)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	16
		Number of Missing Observations	0
Minimum	38.6	Mean	49.49
Maximum	64.7	Median	48.7
SD	7.36	Std. Error of Mean	1.84
Coefficient of Variation	0.149	Skewness	0.501

Normal GOF Test

Shapiro Wilk Test Statistic	0.963
1% Shapiro Wilk Critical Value	0.844
Lilliefors Test Statistic	0.125
1% Lilliefors Critical Value	0.248

Shapiro Wilk GOF Test

Data appear Normal at 1% Significance Level

Lilliefors GOF Test

Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL

95% Student's-t UCL	52.72

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	52.77
95% Modified-t UCL (Johnson-1978)	52.76

Gamma GOF Test

A-D Test Statistic	0.216

Anderson-Darling Gamma GOF Test

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
 From File filea1b878952361.xls
 Full Precision OFF
 Confidence Coefficient 95%
 Number of Bootstrap Operations 2000

5% A-D Critical Value 0.735 Detected data appear Gamma Distributed at 5% Significance Level
 K-S Test Statistic 0.12 **Kolmogorov-Smirnov Gamma GOF Test**
 5% K-S Critical Value 0.214 Detected data appear Gamma Distributed at 5% Significance Level
Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	49.44	k star (bias corrected MLE)	40.21
Theta hat (MLE)	1.001	Theta star (bias corrected MLE)	1.231
nu hat (MLE)	1582	nu star (bias corrected)	1287
MLE Mean (bias corrected)	49.49	MLE Sd (bias corrected)	7.805
		Approximate Chi Square Value (0.05)	1205
Adjusted Level of Significance	0.0335	Adjusted Chi Square Value	1196

Assuming Gamma Distribution

95% Approximate Gamma UCL	52.88	95% Adjusted Gamma UCL	53.28

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.975	Shapiro Wilk Lognormal GOF Test
10% Shapiro Wilk Critical Value	0.906	Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.109	Lilliefors Lognormal GOF Test
10% Lilliefors Critical Value	0.196	Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	3.653	Mean of logged Data	3.892
Maximum of Logged Data	4.17	SD of logged Data	0.146

Assuming Lognormal Distribution

95% H-UCL	52.95	90% Chebyshev (MVUE) UCL	54.94
95% Chebyshev (MVUE) UCL	57.41	97.5% Chebyshev (MVUE) UCL	60.84
99% Chebyshev (MVUE) UCL	67.58		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	52.52	95% BCA Bootstrap UCL	52.73
95% Standard Bootstrap UCL	52.42	95% Bootstrap-t UCL	53.07
95% Hall's Bootstrap UCL	52.97	95% Percentile Bootstrap UCL	52.31
90% Chebyshev(Mean, Sd) UCL	55.01	95% Chebyshev(Mean, Sd) UCL	57.51
97.5% Chebyshev(Mean, Sd) UCL	60.98	99% Chebyshev(Mean, Sd) UCL	67.8

Suggested UCL to Use

95% Student's-t UCL	52.72

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (lithium [ug/l]_intrawell_apw-03)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	16

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

		Number of Missing Observations	0
Minimum	23.9	Mean	29.69
Maximum	36.1	Median	29.9
SD	3.989	Std. Error of Mean	0.997
Coefficient of Variation	0.134	Skewness	0.149
Normal GOF Test			
Shapiro Wilk Test Statistic	0.939	Shapiro Wilk GOF Test	
1% Shapiro Wilk Critical Value	0.844	Data appear Normal at 1% Significance Level	
Lilliefors Test Statistic	0.138	Lilliefors GOF Test	
1% Lilliefors Critical Value	0.248	Data appear Normal at 1% Significance Level	
Data appear Normal at 1% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	31.44	95% Adjusted-CLT UCL (Chen-1995)	31.37
		95% Modified-t UCL (Johnson-1978)	31.45
Gamma GOF Test			
A-D Test Statistic	0.385	Anderson-Darling Gamma GOF Test	
5% A-D Critical Value	0.735	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.133	Kolmogorov-Smirnov Gamma GOF Test	
5% K-S Critical Value	0.214	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	59.12	k star (bias corrected MLE)	48.08
Theta hat (MLE)	0.502	Theta star (bias corrected MLE)	0.618
nu hat (MLE)	1892	nu star (bias corrected)	1538
MLE Mean (bias corrected)	29.69	MLE Sd (bias corrected)	4.283
		Approximate Chi Square Value (0.05)	1448
Adjusted Level of Significance	0.0335	Adjusted Chi Square Value	1438
Assuming Gamma Distribution			
95% Approximate Gamma UCL	31.54	95% Adjusted Gamma UCL	31.76
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.942	Shapiro Wilk Lognormal GOF Test	
10% Shapiro Wilk Critical Value	0.906	Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.131	Lilliefors Lognormal GOF Test	
10% Lilliefors Critical Value	0.196	Data appear Lognormal at 10% Significance Level	
Data appear Lognormal at 10% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	3.174	Mean of logged Data	3.382
Maximum of Logged Data	3.586	SD of logged Data	0.135
Assuming Lognormal Distribution			
90% H-UCL	31.59	90% Chebyshev (MVUE) UCL	32.7
95% Chebyshev (MVUE) UCL	34.06	97.5% Chebyshev (MVUE) UCL	35.95
99% Chebyshev (MVUE) UCL	39.66		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution			

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Nonparametric Distribution Free UCLs

95% CLT UCL	31.33	95% BCA Bootstrap UCL	31.38
95% Standard Bootstrap UCL	31.28	95% Bootstrap-t UCL	31.44
95% Hall's Bootstrap UCL	31.26	95% Percentile Bootstrap UCL	31.38
90% Chebyshev(Mean, Sd) UCL	32.69	95% Chebyshev(Mean, Sd) UCL	34.04
97.5% Chebyshev(Mean, Sd) UCL	35.92	99% Chebyshev(Mean, Sd) UCL	39.62

Suggested UCL to Use

95% Student's-t UCL	31.44

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. Recommendations are based upon data size, data distribution, and skewness using results from simulation studies. However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (lithium [ug/l]_intrawell_apw-05/05r)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	16
		Number of Missing Observations	0
Minimum	33.1	Mean	40.41
Maximum	52.3	Median	40.15
SD	4.228	Std. Error of Mean	1.057
Coefficient of Variation	0.105	Skewness	1.238

Normal GOF Test

Shapiro Wilk Test Statistic	0.904
1% Shapiro Wilk Critical Value	0.844
Lilliefors Test Statistic	0.15
1% Lilliefors Critical Value	0.248

Shapiro Wilk GOF Test

Data appear Normal at 1% Significance Level

Lilliefors GOF Test

Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL

95% Student's-t UCL	42.26

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	42.49
95% Modified-t UCL (Johnson-1978)	42.31

Gamma GOF Test

A-D Test Statistic	0.446
5% A-D Critical Value	0.736
K-S Test Statistic	0.135
5% K-S Critical Value	0.214

Anderson-Darling Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

Kolmogorov-Smirnov Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	103	k star (bias corrected MLE)	83.69
Theta hat (MLE)	0.392	Theta star (bias corrected MLE)	0.483
nu hat (MLE)	3295	nu star (bias corrected)	2678
MLE Mean (bias corrected)	40.41	MLE Sd (bias corrected)	4.417
		Approximate Chi Square Value (0.05)	2559
Adjusted Level of Significance	0.0335	Adjusted Chi Square Value	2546

Assuming Gamma Distribution

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
 From File filea1b878952361.xls
 Full Precision OFF
 Confidence Coefficient 95%
 Number of Bootstrap Operations 2000

95% Approximate Gamma UCL 42.29 95% Adjusted Gamma UCL 42.51

Lognormal GOF Test

Shapiro Wilk Test Statistic 0.938	Shapiro Wilk Lognormal GOF Test
10% Shapiro Wilk Critical Value 0.906	Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic 0.13	Lilliefors Lognormal GOF Test
10% Lilliefors Critical Value 0.196	Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data 3.5	Mean of logged Data 3.694
Maximum of Logged Data 3.957	SD of logged Data 0.101

Assuming Lognormal Distribution

95% H-UCL 42.29	90% Chebyshev (MVUE) UCL 43.46
95% Chebyshev (MVUE) UCL 44.84	97.5% Chebyshev (MVUE) UCL 46.76
99% Chebyshev (MVUE) UCL 50.54	

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL 42.14	95% BCA Bootstrap UCL 42.26
95% Standard Bootstrap UCL 42.07	95% Bootstrap-t UCL 42.81
95% Hall's Bootstrap UCL 44.3	95% Percentile Bootstrap UCL 42.1
90% Chebyshev(Mean, Sd) UCL 43.58	95% Chebyshev(Mean, Sd) UCL 45.01
97.5% Chebyshev(Mean, Sd) UCL 47.01	99% Chebyshev(Mean, Sd) UCL 50.92

Suggested UCL to Use

95% Student's-t UCL 42.26

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (lithium [ug/l]_intrawell_apw-06d)

General Statistics

Total Number of Observations 15	Number of Distinct Observations 15
	Number of Missing Observations 0
Minimum 16	Mean 17.35
Maximum 19.9	Median 17.3
SD 1.087	Std. Error of Mean 0.281
Coefficient of Variation 0.0626	Skewness 0.759

Normal GOF Test

Shapiro Wilk Test Statistic 0.938	Shapiro Wilk GOF Test
1% Shapiro Wilk Critical Value 0.835	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic 0.117	Lilliefors GOF Test
1% Lilliefors Critical Value 0.255	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

95% Normal UCL

95% Student's-t UCL 17.85

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995) 17.87

95% Modified-t UCL (Johnson-1978) 17.86

Gamma GOF Test

A-D Test Statistic 0.277

5% A-D Critical Value 0.734

K-S Test Statistic 0.126

5% K-S Critical Value 0.221

Anderson-Darling Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

Kolmogorov-Smirnov Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE) 279.6

Theta hat (MLE) 0.0621

nu hat (MLE) 8387

MLE Mean (bias corrected) 17.35

Adjusted Level of Significance 0.0324

k star (bias corrected MLE) 223.7

Theta star (bias corrected MLE) 0.0776

nu star (bias corrected) 6711

MLE Sd (bias corrected) 1.16

Approximate Chi Square Value (0.05) 6521

Adjusted Chi Square Value 6498

Assuming Gamma Distribution

95% Approximate Gamma UCL 17.86

95% Adjusted Gamma UCL 17.92

Lognormal GOF Test

Shapiro Wilk Test Statistic 0.947

10% Shapiro Wilk Critical Value 0.901

Lilliefors Test Statistic 0.118

10% Lilliefors Critical Value 0.202

Shapiro Wilk Lognormal GOF Test

Data appear Lognormal at 10% Significance Level

Lilliefors Lognormal GOF Test

Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data 2.773

Maximum of Logged Data 2.991

Mean of logged Data 2.852

SD of logged Data 0.0616

Assuming Lognormal Distribution

95% H-UCL N/A

95% Chebyshev (MVUE) UCL 18.56

99% Chebyshev (MVUE) UCL 20.1

90% Chebyshev (MVUE) UCL 18.18

97.5% Chebyshev (MVUE) UCL 19.08

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL 17.81

95% Standard Bootstrap UCL 17.8

95% Hall's Bootstrap UCL 17.95

90% Chebyshev(Mean, Sd) UCL 18.2

97.5% Chebyshev(Mean, Sd) UCL 19.11

95% BCA Bootstrap UCL 17.82

95% Bootstrap-t UCL 17.91

95% Percentile Bootstrap UCL 17.83

95% Chebyshev(Mean, Sd) UCL 18.58

99% Chebyshev(Mean, Sd) UCL 20.15

Suggested UCL to Use

95% Student's-t UCL 17.85

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

report_result_value (lithium [ug/l]_intraWell_apw-06s)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	16
		Number of Missing Observations	0
Minimum	33.5	Mean	41.54
Maximum	56.4	Median	41.25
SD	4.997	Std. Error of Mean	1.249
Coefficient of Variation	0.12	Skewness	1.6

Normal GOF Test

Shapiro Wilk Test Statistic	0.841	Shapiro Wilk GOF Test
1% Shapiro Wilk Critical Value	0.844	Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.268	Lilliefors GOF Test
1% Lilliefors Critical Value	0.248	Data Not Normal at 1% Significance Level

Data Not Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	43.73	95% Adjusted-CLT UCL (Chen-1995)	44.13
		95% Modified-t UCL (Johnson-1978)	43.82

Gamma GOF Test

A-D Test Statistic	0.841	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.736	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.25	Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value	0.214	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	80.1	k star (bias corrected MLE)	65.12
Theta hat (MLE)	0.519	Theta star (bias corrected MLE)	0.638
nu hat (MLE)	2563	nu star (bias corrected)	2084
MLE Mean (bias corrected)	41.54	MLE Sd (bias corrected)	5.148
		Approximate Chi Square Value (0.05)	1979
Adjusted Level of Significance	0.0335	Adjusted Chi Square Value	1967

Assuming Gamma Distribution

95% Approximate Gamma UCL	43.75	95% Adjusted Gamma UCL	44.01

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.888	Shapiro Wilk Lognormal GOF Test
10% Shapiro Wilk Critical Value	0.906	Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.244	Lilliefors Lognormal GOF Test
10% Lilliefors Critical Value	0.196	Data Not Lognormal at 10% Significance Level

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	3.512	Mean of logged Data	3.72
Maximum of Logged Data	4.032	SD of logged Data	0.114

Assuming Lognormal Distribution

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

95% H-UCL	43.74	90% Chebyshev (MVUE) UCL	45.08
95% Chebyshev (MVUE) UCL	46.68	97.5% Chebyshev (MVUE) UCL	48.91
99% Chebyshev (MVUE) UCL	53.28		

Nonparametric Distribution Free UCL Statistics Data do not follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	43.6	95% BCA Bootstrap UCL	44.04
95% Standard Bootstrap UCL	43.52	95% Bootstrap-t UCL	44.48
95% Hall's Bootstrap UCL	55.65	95% Percentile Bootstrap UCL	43.64
90% Chebyshev(Mean, Sd) UCL	45.29	95% Chebyshev(Mean, Sd) UCL	46.99
97.5% Chebyshev(Mean, Sd) UCL	49.35	99% Chebyshev(Mean, Sd) UCL	53.97

Suggested UCL to Use

95% Student's-t UCL	43.73

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. Recommendations are based upon data size, data distribution, and skewness using results from simulation studies. However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (lithium [ug/l]_intraWell_apw-07)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	14
		Number of Missing Observations	0
Minimum	14.1	Mean	17.36
Maximum	23.1	Median	17.7
SD	2.241	Std. Error of Mean	0.56
Coefficient of Variation	0.129	Skewness	0.738

Normal GOF Test

Shapiro Wilk Test Statistic	0.921
1% Shapiro Wilk Critical Value	0.844
Lilliefors Test Statistic	0.156
1% Lilliefors Critical Value	0.248

Shapiro Wilk GOF Test

Data appear Normal at 1% Significance Level

Lilliefors GOF Test

Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL

95% Student's-t UCL	18.34

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	18.39
95% Modified-t UCL (Johnson-1978)	18.36

Gamma GOF Test

A-D Test Statistic	0.422
5% A-D Critical Value	0.736
K-S Test Statistic	0.14
5% K-S Critical Value	0.214

Anderson-Darling Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

Kolmogorov-Smirnov Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	66.06	k star (bias corrected MLE)	53.71
Theta hat (MLE)	0.263	Theta star (bias corrected MLE)	0.323

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

nu hat (MLE)	2114	nu star (bias corrected)	1719
MLE Mean (bias corrected)	17.36	MLE Sd (bias corrected)	2.368
Adjusted Level of Significance	0.0335	Approximate Chi Square Value (0.05)	1624
		Adjusted Chi Square Value	1613

Assuming Gamma Distribution

95% Approximate Gamma UCL	18.37	95% Adjusted Gamma UCL	18.49

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.94	Shapiro Wilk Lognormal GOF Test
10% Shapiro Wilk Critical Value	0.906	Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.145	Lilliefors Lognormal GOF Test
10% Lilliefors Critical Value	0.196	Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	2.646	Mean of logged Data	2.846
Maximum of Logged Data	3.14	SD of logged Data	0.127

Assuming Lognormal Distribution

95% H-UCL	18.39	90% Chebyshev (MVUE) UCL	19.01
95% Chebyshev (MVUE) UCL	19.75	97.5% Chebyshev (MVUE) UCL	20.79
99% Chebyshev (MVUE) UCL	22.83		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	18.28	95% BCA Bootstrap UCL	18.37
95% Standard Bootstrap UCL	18.23	95% Bootstrap-t UCL	18.44
95% Hall's Bootstrap UCL	18.66	95% Percentile Bootstrap UCL	18.26
90% Chebyshev(Mean, Sd) UCL	19.04	95% Chebyshev(Mean, Sd) UCL	19.8
97.5% Chebyshev(Mean, Sd) UCL	20.86	99% Chebyshev(Mean, Sd) UCL	22.93

Suggested UCL to Use

95% Student's-t UCL	18.34

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (lithium [ug/l]_inrawell_apw-08)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	13
		Number of Missing Observations	0
Minimum	14.2	Mean	18.51
Maximum	22.3	Median	19.4
SD	2.775	Std. Error of Mean	0.694
Coefficient of Variation	0.15	Skewness	-0.222

Normal GOF Test

Shapiro Wilk Test Statistic	0.903

Shapiro Wilk GOF Test

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

1% Shapiro Wilk Critical Value	0.844	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.192	Lilliefors GOF Test
1% Lilliefors Critical Value	0.248	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL

95% Student's-t UCL	19.72

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	19.61
95% Modified-t UCL (Johnson-1978)	19.72

Gamma GOF Test

A-D Test Statistic	0.723
5% A-D Critical Value	0.736
K-S Test Statistic	0.194
5% K-S Critical Value	0.214

Anderson-Darling Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

Kolmogorov-Smirnov Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	45.94	k star (bias corrected MLE)	37.37
Theta hat (MLE)	0.403	Theta star (bias corrected MLE)	0.495
nu hat (MLE)	1470	nu star (bias corrected)	1196
MLE Mean (bias corrected)	18.51	MLE Sd (bias corrected)	3.027
		Approximate Chi Square Value (0.05)	1117
Adjusted Level of Significance	0.0335	Adjusted Chi Square Value	1108

Assuming Gamma Distribution

95% Approximate Gamma UCL	19.82	95% Adjusted Gamma UCL	19.98

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.897
10% Shapiro Wilk Critical Value	0.906
Lilliefors Test Statistic	0.184
10% Lilliefors Critical Value	0.196

Shapiro Wilk Lognormal GOF Test

Data Not Lognormal at 10% Significance Level

Lilliefors Lognormal GOF Test

Data appear Lognormal at 10% Significance Level

Data appear Approximate Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	2.653	Mean of logged Data	2.907
Maximum of Logged Data	3.105	SD of logged Data	0.154

Assuming Lognormal Distribution

95% H-UCL	19.88	90% Chebyshev (MVUE) UCL	20.65
95% Chebyshev (MVUE) UCL	21.63	97.5% Chebyshev (MVUE) UCL	22.98
99% Chebyshev (MVUE) UCL	25.62		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	19.65	95% BCA Bootstrap UCL	19.58
95% Standard Bootstrap UCL	19.61	95% Bootstrap-t UCL	19.63
95% Hall's Bootstrap UCL	19.51	95% Percentile Bootstrap UCL	19.59
90% Chebyshev(Mean, Sd) UCL	20.59	95% Chebyshev(Mean, Sd) UCL	21.53
97.5% Chebyshev(Mean, Sd) UCL	22.84	99% Chebyshev(Mean, Sd) UCL	25.41

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
From File filea1b878952361.xls
Full Precision OFF
Confidence Coefficient 95%
Number of Bootstrap Operations 2000

Suggested UCL to Use

95% Student's-t UCL 19.72

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. Recommendations are based upon data size, data distribution, and skewness using results from simulation studies. However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positively skewed data sets.

report_result_value (lithium [ug/l]_intraWell_apw-10d)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	13
		Number of Missing Observations	0
Minimum	12.6	Mean	15.03
Maximum	18	Median	15
SD	1.119	Std. Error of Mean	0.28
Coefficient of Variation	0.0745	Skewness	0.603

Normal GOF Test

Shapiro Wilk Test Statistic	0.896	Shapiro Wilk GOF Test
1% Shapiro Wilk Critical Value	0.844	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.182	Lilliefors GOF Test
1% Lilliefors Critical Value	0.248	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	15.52	95% Adjusted-CLT UCL (Chen-1995)	15.53
		95% Modified-t UCL (Johnson-1978)	15.52

Gamma GOF Test

A-D Test Statistic	0.652	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.736	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.17	Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value	0.214	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	195	k star (bias corrected MLE)	158.5
Theta hat (MLE)	0.0771	Theta star (bias corrected MLE)	0.0948
nu hat (MLE)	6240	nu star (bias corrected)	5071
MLE Mean (bias corrected)	15.03	MLE Sd (bias corrected)	1.194
		Approximate Chi Square Value (0.05)	4906
Adjusted Level of Significance	0.0335	Adjusted Chi Square Value	4888

Assuming Gamma Distribution

95% Approximate Gamma UCL	15.53	95% Adjusted Gamma UCL	15.59

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.907	Shapiro Wilk Lognormal GOF Test
10% Shapiro Wilk Critical Value	0.906	Data appear Lognormal at 10% Significance Level

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
From File filea1b878952361.xls
Full Precision OFF
Confidence Coefficient 95%
Number of Bootstrap Operations 2000

Lilliefors Test Statistic 0.175

10% Lilliefors Critical Value 0.196

Lilliefors Lognormal GOF Test

Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data 2.534

Maximum of Logged Data 2.89

Mean of logged Data 2.707

SD of logged Data 0.0739

Assuming Lognormal Distribution

95% H-UCL N/A

95% Chebyshev (MVUE) UCL 16.23

99% Chebyshev (MVUE) UCL 17.79

90% Chebyshev (MVUE) UCL 15.86

97.5% Chebyshev (MVUE) UCL 16.76

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL 15.49

95% Standard Bootstrap UCL 15.47

95% Hall's Bootstrap UCL 15.79

90% Chebyshev(Mean, Sd) UCL 15.86

97.5% Chebyshev(Mean, Sd) UCL 16.77

95% BCA Bootstrap UCL 15.53

95% Bootstrap-t UCL 15.57

95% Percentile Bootstrap UCL 15.48

95% Chebyshev(Mean, Sd) UCL 16.24

99% Chebyshev(Mean, Sd) UCL 17.81

Suggested UCL to Use

95% Student's-t UCL 15.52

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (lithium [ug/l]_intraWell_apw-10s)

General Statistics

Total Number of Observations 16

Minimum 26.3

Maximum 40.1

SD 3.375

Coefficient of Variation 0.109

Number of Distinct Observations 16

Number of Missing Observations 0

Mean 30.94

Median 30.4

Std. Error of Mean 0.844

Skewness 1.32

Normal GOF Test

Shapiro Wilk Test Statistic 0.912

1% Shapiro Wilk Critical Value 0.844

Lilliefors Test Statistic 0.146

1% Lilliefors Critical Value 0.248

Shapiro Wilk GOF Test

Data appear Normal at 1% Significance Level

Lilliefors GOF Test

Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL

95% Student's-t UCL 32.42

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995) 32.62

95% Modified-t UCL (Johnson-1978) 32.46

Gamma GOF Test

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
From File filea1b878952361.xls
Full Precision OFF
Confidence Coefficient 95%
Number of Bootstrap Operations 2000

A-D Test Statistic 0.341

5% A-D Critical Value 0.736

K-S Test Statistic 0.129

5% K-S Critical Value 0.214

Anderson-Darling Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

Kolmogorov-Smirnov Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE) 95.81

Theta hat (MLE) 0.323

nu hat (MLE) 3066

MLE Mean (bias corrected) 30.94

Adjusted Level of Significance 0.0335

k star (bias corrected MLE) 77.89

Theta star (bias corrected MLE) 0.397

nu star (bias corrected) 2492

MLE Sd (bias corrected) 3.506

Approximate Chi Square Value (0.05) 2377

Adjusted Chi Square Value 2365

Assuming Gamma Distribution

95% Approximate Gamma UCL 32.43

95% Adjusted Gamma UCL 32.61

Lognormal GOF Test

Shapiro Wilk Test Statistic 0.946

10% Shapiro Wilk Critical Value 0.906

Lilliefors Test Statistic 0.126

10% Lilliefors Critical Value 0.196

Shapiro Wilk Lognormal GOF Test

Data appear Lognormal at 10% Significance Level

Lilliefors Lognormal GOF Test

Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data 3.27

Maximum of Logged Data 3.691

Mean of logged Data 3.427

SD of logged Data 0.104

Assuming Lognormal Distribution

95% H-UCL 32.43

95% Chebyshev (MVUE) UCL 34.45

99% Chebyshev (MVUE) UCL 38.95

90% Chebyshev (MVUE) UCL 33.35

97.5% Chebyshev (MVUE) UCL 35.96

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL 32.33

95% Standard Bootstrap UCL 32.29

95% Hall's Bootstrap UCL 33.66

90% Chebyshev(Mean, Sd) UCL 33.47

97.5% Chebyshev(Mean, Sd) UCL 36.21

95% BCA Bootstrap UCL 32.55

95% Bootstrap-t UCL 32.9

95% Percentile Bootstrap UCL 32.39

95% Chebyshev(Mean, Sd) UCL 34.62

99% Chebyshev(Mean, Sd) UCL 39.33

Suggested UCL to Use

95% Student's-t UCL 32.42

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (manganese [mg/l]_intrawell_apw-02)

General Statistics

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
From File filea1b878952361.xls
Full Precision OFF
Confidence Coefficient 95%
Number of Bootstrap Operations 2000

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	0
Minimum	0.669	Mean	0.711
Maximum	0.752	Median	0.711

Warning: This data set only has 2 observations!

Data set is too small to compute reliable and meaningful statistics and estimates!

The data set for variable report_result_value (manganese [mg/l]_intrawell_apw-02) was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

report_result_value (manganese [mg/l]_intrawell_apw-03)

General Statistics			
Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	0
Minimum	0.321	Mean	0.378
Maximum	0.435	Median	0.378

Warning: This data set only has 2 observations!

Data set is too small to compute reliable and meaningful statistics and estimates!

The data set for variable report_result_value (manganese [mg/l]_intrawell_apw-03) was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

report_result_value (manganese [mg/l]_intrawell_apw-05/05r)

General Statistics			
Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	0
Minimum	0.554	Mean	0.727
Maximum	0.9	Median	0.727

Warning: This data set only has 2 observations!

Data set is too small to compute reliable and meaningful statistics and estimates!

The data set for variable report_result_value (manganese [mg/l]_intrawell_apw-05/05r) was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

report_result_value (manganese [mg/l]_intrawell_apw-06d)

General Statistics			
Total Number of Observations	1	Number of Distinct Observations	1
		Number of Missing Observations	0
Minimum	0.622	Mean	0.622

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
From File filea1b878952361.xls
Full Precision OFF
Confidence Coefficient 95%
Number of Bootstrap Operations 2000

Maximum 0.622

Median 0.622

Warning: This data set only has 1 observations!

Data set is too small to compute reliable and meaningful statistics and estimates!

The data set for variable report_result_value (manganese [mg/l]_inrawell_apw-06d) was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!

If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

report_result_value (manganese [mg/l]_inrawell_apw-06s)

General Statistics

Total Number of Observations

2

Number of Distinct Observations

2

Number of Missing Observations

0

Minimum 0.512

Mean 0.521

Maximum 0.53

Median 0.521

Warning: This data set only has 2 observations!

Data set is too small to compute reliable and meaningful statistics and estimates!

The data set for variable report_result_value (manganese [mg/l]_inrawell_apw-06s) was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!

If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

report_result_value (manganese [mg/l]_inrawell_apw-07)

General Statistics

Total Number of Observations

2

Number of Distinct Observations

2

Number of Missing Observations

0

Minimum 1.11

Mean 1.15

Maximum 1.19

Median 1.15

Warning: This data set only has 2 observations!

Data set is too small to compute reliable and meaningful statistics and estimates!

The data set for variable report_result_value (manganese [mg/l]_inrawell_apw-07) was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!

If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

report_result_value (manganese [mg/l]_inrawell_apw-08)

General Statistics

Total Number of Observations

2

Number of Distinct Observations

2

Number of Missing Observations

0

Minimum 0.0435

Mean 0.123

Maximum 0.202

Median 0.123

Warning: This data set only has 2 observations!

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
From File filea1b878952361.xls
Full Precision OFF
Confidence Coefficient 95%
Number of Bootstrap Operations 2000

Data set is too small to compute reliable and meaningful statistics and estimates!

The data set for variable report_result_value (manganese [mg/l]_intrawell_apw-08) was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

report_result_value (manganese [mg/l]_intrawell_apw-10d)

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	0
Minimum	0.88	Mean	1.02
Maximum	1.16	Median	1.02

Warning: This data set only has 2 observations!

Data set is too small to compute reliable and meaningful statistics and estimates!

The data set for variable report_result_value (manganese [mg/l]_intrawell_apw-10d) was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

report_result_value (manganese [mg/l]_intrawell_apw-10s)

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	0
Minimum	0.174	Mean	0.209
Maximum	0.243	Median	0.209

Warning: This data set only has 2 observations!

Data set is too small to compute reliable and meaningful statistics and estimates!

The data set for variable report_result_value (manganese [mg/l]_intrawell_apw-10s) was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

report_result_value (mercury [ug/l]_intrawell_apw-02)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	2
Number of Detects	1	Number of Non-Detects	15
Number of Distinct Detects	1	Number of Distinct Non-Detects	1

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!

It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTv).

The data set for variable report_result_value (mercury [ug/l]_intrawell_apw-02) was not processed!

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
From File filea1b878952361.xls
Full Precision OFF
Confidence Coefficient 95%
Number of Bootstrap Operations 2000

report_result_value (mercury [ug/l]_intrawell_apw-03)

General Statistics			
Total Number of Observations	16	Number of Distinct Observations	1
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	1

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable report_result_value (mercury [ug/l]_intrawell_apw-03) was not processed!

report_result_value (mercury [ug/l]_intrawell_apw-05/05r)

General Statistics			
Total Number of Observations	16	Number of Distinct Observations	1
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	1

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable report_result_value (mercury [ug/l]_intrawell_apw-05/05r) was not processed!

report_result_value (mercury [ug/l]_intrawell_apw-06d)

General Statistics			
Total Number of Observations	15	Number of Distinct Observations	1
Number of Detects	0	Number of Non-Detects	15
Number of Distinct Detects	0	Number of Distinct Non-Detects	1

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable report_result_value (mercury [ug/l]_intrawell_apw-06d) was not processed!

report_result_value (mercury [ug/l]_intrawell_apw-06s)

General Statistics			
Total Number of Observations	16	Number of Distinct Observations	1
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	1

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable report_result_value (mercury [ug/l]_intrawell_apw-06s) was not processed!

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
From File filea1b878952361.xls
Full Precision OFF
Confidence Coefficient 95%
Number of Bootstrap Operations 2000

report_result_value (mercury [ug/l]_intrawell_apw-07)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	1
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	1

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable report_result_value (mercury [ug/l]_intrawell_apw-07) was not processed!

report_result_value (mercury [ug/l]_intrawell_apw-08)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	1
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	1

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable report_result_value (mercury [ug/l]_intrawell_apw-08) was not processed!

report_result_value (mercury [ug/l]_intrawell_apw-10d)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	1
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	1

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable report_result_value (mercury [ug/l]_intrawell_apw-10d) was not processed!

report_result_value (mercury [ug/l]_intrawell_apw-10s)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	1
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	1

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

The data set for variable report_result_value (mercury [ug/l]_intrawell_apw-10s) was not processed!

report_result_value (molybdenum [ug/l]_intrawell_apw-02)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	14
		Number of Missing Observations	0
Minimum	95.1	Mean	165.6
Maximum	240	Median	165
SD	40.38	Std. Error of Mean	10.1
Coefficient of Variation	0.244	Skewness	0.228

Normal GOF Test

Shapiro Wilk Test Statistic	0.974	Shapiro Wilk GOF Test
1% Shapiro Wilk Critical Value	0.844	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.158	Lilliefors GOF Test
1% Lilliefors Critical Value	0.248	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL

95% Student's-t UCL 183.3

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	182.8
95% Modified-t UCL (Johnson-1978)	183.4

Gamma GOF Test

A-D Test Statistic	0.192	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.737	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.127	Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value	0.215	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	17.44	k star (bias corrected MLE)	14.21
Theta hat (MLE)	9.496	Theta star (bias corrected MLE)	11.65
nu hat (MLE)	558	nu star (bias corrected)	454.7
MLE Mean (bias corrected)	165.6	MLE Sd (bias corrected)	43.92
		Approximate Chi Square Value (0.05)	406.2
Adjusted Level of Significance	0.0335	Adjusted Chi Square Value	401

Assuming Gamma Distribution

95% Approximate Gamma UCL	185.3	95% Adjusted Gamma UCL	187.7

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.973	Shapiro Wilk Lognormal GOF Test
10% Shapiro Wilk Critical Value	0.906	Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.119	Lilliefors Lognormal GOF Test
10% Lilliefors Critical Value	0.196	Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	4.555	Mean of logged Data	5.08

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Maximum of Logged Data	5.481	SD of logged Data	0.252

Assuming Lognormal Distribution

95% H-UCL	187.1	90% Chebyshev (MVUE) UCL	197.3
95% Chebyshev (MVUE) UCL	211.6	97.5% Chebyshev (MVUE) UCL	231.5
99% Chebyshev (MVUE) UCL	270.5		

Nonparametric Distribution Free UCL Statistics Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	182.2	95% BCA Bootstrap UCL	181.3
95% Standard Bootstrap UCL	181.2	95% Bootstrap-t UCL	183.6
95% Hall's Bootstrap UCL	183.1	95% Percentile Bootstrap UCL	180.9
90% Chebyshev(Mean, Sd) UCL	195.9	95% Chebyshev(Mean, Sd) UCL	209.6
97.5% Chebyshev(Mean, Sd) UCL	228.6	99% Chebyshev(Mean, Sd) UCL	266

Suggested UCL to Use

95% Student's-t UCL 183.3

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (molybdenum [ug/l]_intrawell_apw-03)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	16
		Number of Missing Observations	0
Minimum	26.2	Mean	62.29
Maximum	84.9	Median	65.25
SD	17.6	Std. Error of Mean	4.4
Coefficient of Variation	0.283	Skewness	-0.762

Normal GOF Test

Shapiro Wilk Test Statistic	0.927
1% Shapiro Wilk Critical Value	0.844
Lilliefors Test Statistic	0.136
1% Lilliefors Critical Value	0.248

Shapiro Wilk GOF Test

Data appear Normal at 1% Significance Level

Lilliefors GOF Test

Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL

95% Student's-t UCL 70

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	68.63
95% Modified-t UCL (Johnson-1978)	69.86

Gamma GOF Test

A-D Test Statistic	0.707
5% A-D Critical Value	0.739
K-S Test Statistic	0.16
5% K-S Critical Value	0.215

Anderson-Darling Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

Kolmogorov-Smirnov Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
 From File filea1b878952361.xls
 Full Precision OFF
 Confidence Coefficient 95%
 Number of Bootstrap Operations 2000

Gamma Statistics

k hat (MLE)	10.64	k star (bias corrected MLE)	8.683
Theta hat (MLE)	5.857	Theta star (bias corrected MLE)	7.174
nu hat (MLE)	340.3	nu star (bias corrected)	277.9
MLE Mean (bias corrected)	62.29	MLE Sd (bias corrected)	21.14
		Approximate Chi Square Value (0.05)	240.2
Adjusted Level of Significance	0.0335	Adjusted Chi Square Value	236.3

Assuming Gamma Distribution

95% Approximate Gamma UCL	72.04	95% Adjusted Gamma UCL	73.25

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.858	Shapiro Wilk Lognormal GOF Test	
10% Shapiro Wilk Critical Value	0.906	Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.178	Lilliefors Lognormal GOF Test	
10% Lilliefors Critical Value	0.196	Data appear Lognormal at 10% Significance Level	
Data appear Approximate Lognormal at 10% Significance Level			

Lognormal Statistics

Minimum of Logged Data	3.266	Mean of logged Data	4.084
Maximum of Logged Data	4.441	SD of logged Data	0.341

Assuming Lognormal Distribution

95% H-UCL	74.43	90% Chebyshev (MVUE) UCL	78.99
95% Chebyshev (MVUE) UCL	86.37	97.5% Chebyshev (MVUE) UCL	96.61
99% Chebyshev (MVUE) UCL	116.7		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	69.52	95% BCA Bootstrap UCL	68.38
95% Standard Bootstrap UCL	69.24	95% Bootstrap-t UCL	68.95
95% Hall's Bootstrap UCL	68.56	95% Percentile Bootstrap UCL	68.88
90% Chebyshev(Mean, Sd) UCL	75.49	95% Chebyshev(Mean, Sd) UCL	81.47
97.5% Chebyshev(Mean, Sd) UCL	89.77	99% Chebyshev(Mean, Sd) UCL	106.1

Suggested UCL to Use

95% Student's-t UCL	70

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positively skewed data sets.

report_result_value (molybdenum [ug/l]_intrawell_apw-05/05r)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	14
		Number of Missing Observations	0
Minimum	168	Mean	213.2

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Maximum	249	Median	214.5
SD	24.52	Std. Error of Mean	6.129
Coefficient of Variation	0.115	Skewness	-0.284

Normal GOF Test

Shapiro Wilk Test Statistic	0.959	Shapiro Wilk GOF Test
1% Shapiro Wilk Critical Value	0.844	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.0986	Lilliefors GOF Test
1% Lilliefors Critical Value	0.248	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL

95% Student's-t UCL 223.9

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	222.8
95% Modified-t UCL (Johnson-1978)	223.9

Gamma GOF Test

A-D Test Statistic	0.264	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.736	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.107	Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value	0.214	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	78.16	k star (bias corrected MLE)	63.55
Theta hat (MLE)	2.728	Theta star (bias corrected MLE)	3.355
nu hat (MLE)	2501	nu star (bias corrected)	2033
MLE Mean (bias corrected)	213.2	MLE Sd (bias corrected)	26.74
		Approximate Chi Square Value (0.05)	1930
Adjusted Level of Significance	0.0335	Adjusted Chi Square Value	1918

Assuming Gamma Distribution

95% Approximate Gamma UCL 224.6

95% Adjusted Gamma UCL 226

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.948	Shapiro Wilk Lognormal GOF Test
10% Shapiro Wilk Critical Value	0.906	Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.106	Lilliefors Lognormal GOF Test
10% Lilliefors Critical Value	0.196	Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	5.124	Mean of logged Data	5.356
Maximum of Logged Data	5.517	SD of logged Data	0.118

Assuming Lognormal Distribution

95% H-UCL	225	90% Chebyshev (MVUE) UCL	232.1
95% Chebyshev (MVUE) UCL	240.7	97.5% Chebyshev (MVUE) UCL	252.6
99% Chebyshev (MVUE) UCL	275.9		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

95% CLT UCL	223.3	95% BCA Bootstrap UCL	222.4
95% Standard Bootstrap UCL	223.2	95% Bootstrap-t UCL	223.8
95% Hall's Bootstrap UCL	223.1	95% Percentile Bootstrap UCL	222.7
90% Chebyshev(Mean, Sd) UCL	231.6	95% Chebyshev(Mean, Sd) UCL	239.9
97.5% Chebyshev(Mean, Sd) UCL	251.5	99% Chebyshev(Mean, Sd) UCL	274.2

Suggested UCL to Use

95% Student's-t UCL 223.9

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. Recommendations are based upon data size, data distribution, and skewness using results from simulation studies. However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positively skewed data sets.

report_result_value (molybdenum [ug/l]_intravel_apw-06d)

General Statistics			
Total Number of Observations	15	Number of Distinct Observations	15
		Number of Missing Observations	0
Minimum	46.3	Mean	60.46
Maximum	71.9	Median	60.2
SD	7.409	Std. Error of Mean	1.913
Coefficient of Variation	0.123	Skewness	-0.521

Normal GOF Test		Shapiro Wilk GOF Test	
Shapiro Wilk Test Statistic	0.925		
1% Shapiro Wilk Critical Value	0.835	Data appear Normal at 1% Significance Level	
Lilliefors Test Statistic	0.18	Lilliefors GOF Test	
1% Lilliefors Critical Value	0.255	Data appear Normal at 1% Significance Level	

Data appear Normal at 1% Significance Level

Assuming Normal Distribution			
95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	63.83	95% Adjusted-CLT UCL (Chen-1995)	63.33
		95% Modified-t UCL (Johnson-1978)	63.79

Gamma GOF Test		Anderson-Darling Gamma GOF Test	
A-D Test Statistic	0.576		
5% A-D Critical Value	0.734	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.193	Kolmogorov-Smirnov Gamma GOF Test	
5% K-S Critical Value	0.221	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics			
k hat (MLE)	67.54	k star (bias corrected MLE)	54.08
Theta hat (MLE)	0.895	Theta star (bias corrected MLE)	1.118
nu hat (MLE)	2026	nu star (bias corrected)	1622
MLE Mean (bias corrected)	60.46	MLE Sd (bias corrected)	8.222
		Approximate Chi Square Value (0.05)	1530
Adjusted Level of Significance	0.0324	Adjusted Chi Square Value	1519

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
From File filea1b878952361.xls
Full Precision OFF
Confidence Coefficient 95%
Number of Bootstrap Operations 2000

Assuming Gamma Distribution

95% Approximate Gamma UCL 64.12 95% Adjusted Gamma UCL 64.58

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.899	Shapiro Wilk Lognormal GOF Test
10% Shapiro Wilk Critical Value	0.901	Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.205	Lilliefors Lognormal GOF Test
10% Lilliefors Critical Value	0.202	Data Not Lognormal at 10% Significance Level

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	3.835	Mean of logged Data	4.095
Maximum of Logged Data	4.275	SD of logged Data	0.128

Assuming Lognormal Distribution

95% H-UCL	64.28	90% Chebyshev (MVUE) UCL	66.49
95% Chebyshev (MVUE) UCL	69.21	97.5% Chebyshev (MVUE) UCL	72.99
99% Chebyshev (MVUE) UCL	80.42		

Nonparametric Distribution Free UCL Statistics Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	63.61	95% BCA Bootstrap UCL	63.19
95% Standard Bootstrap UCL	63.46	95% Bootstrap-t UCL	63.58
95% Hall's Bootstrap UCL	63.45	95% Percentile Bootstrap UCL	63.5
90% Chebyshev(Mean, Sd) UCL	66.2	95% Chebyshev(Mean, Sd) UCL	68.8
97.5% Chebyshev(Mean, Sd) UCL	72.41	99% Chebyshev(Mean, Sd) UCL	79.49

Suggested UCL to Use

95% Student's-t UCL 63.83

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positively skewed data sets.

report_result_value (molybdenum [ug/l]_intrawell_apw-06s)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	16
		Number of Missing Observations	0
Minimum	207	Mean	265
Maximum	324	Median	262
SD	34.08	Std. Error of Mean	8.52
Coefficient of Variation	0.129	Skewness	0.397

Normal GOF Test

Shapiro Wilk Test Statistic	0.953	Shapiro Wilk GOF Test
1% Shapiro Wilk Critical Value	0.844	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.146	Lilliefors GOF Test

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
From File filea1b878952361.xls
Full Precision OFF
Confidence Coefficient 95%
Number of Bootstrap Operations 2000

1% Lilliefors Critical Value 0.248 Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL

95% Student's-t UCL 279.9

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995) 279.9

95% Modified-t UCL (Johnson-1978) 280.1

Gamma GOF Test

A-D Test Statistic 0.253

5% A-D Critical Value 0.736

K-S Test Statistic 0.127

5% K-S Critical Value 0.214

Anderson-Darling Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

Kolmogorov-Smirnov Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE) 65.44

Theta hat (MLE) 4.049

nu hat (MLE) 2094

MLE Mean (bias corrected) 265

Adjusted Level of Significance 0.0335

k star (bias corrected MLE) 53.21

Theta star (bias corrected MLE) 4.98

nu star (bias corrected) 1703

MLE Sd (bias corrected) 36.33

Approximate Chi Square Value (0.05) 1608

Adjusted Chi Square Value 1598

Assuming Gamma Distribution

95% Approximate Gamma UCL 280.6

95% Adjusted Gamma UCL 282.5

Lognormal GOF Test

Shapiro Wilk Test Statistic 0.967

10% Shapiro Wilk Critical Value 0.906

Lilliefors Test Statistic 0.124

10% Lilliefors Critical Value 0.196

Shapiro Wilk Lognormal GOF Test

Data appear Lognormal at 10% Significance Level

Lilliefors Lognormal GOF Test

Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data 5.333

Maximum of Logged Data 5.781

Mean of logged Data 5.572

SD of logged Data 0.128

Assuming Lognormal Distribution

95% H-UCL 280.9

95% Chebyshev (MVUE) UCL 301.9

99% Chebyshev (MVUE) UCL 349.3

90% Chebyshev (MVUE) UCL 290.4

97.5% Chebyshev (MVUE) UCL 317.9

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL 279

95% Standard Bootstrap UCL 278.3

95% Hall's Bootstrap UCL 280.3

90% Chebyshev(Mean, Sd) UCL 290.6

97.5% Chebyshev(Mean, Sd) UCL 318.2

95% BCA Bootstrap UCL 279.3

95% Bootstrap-t UCL 281.1

95% Percentile Bootstrap UCL 278.5

95% Chebyshev(Mean, Sd) UCL 302.1

99% Chebyshev(Mean, Sd) UCL 349.8

Suggested UCL to Use

95% Student's-t UCL 279.9

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (molybdenum [ug/l]_intrawell_apw-07)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	13
Number of Detects	15	Number of Non-Detects	1
Number of Distinct Detects	12	Number of Distinct Non-Detects	1
Minimum Detect	2.3	Minimum Non-Detect	5
Maximum Detect	4.6	Maximum Non-Detect	5
Variance Detects	0.411	Percent Non-Detects	6.25%
Mean Detects	3.393	SD Detects	0.641
Median Detects	3.3	CV Detects	0.189
Skewness Detects	0.453	Kurtosis Detects	-0.309
Mean of Logged Detects	1.205	SD of Logged Detects	0.188

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.952	Shapiro Wilk GOF Test
1% Shapiro Wilk Critical Value	0.835	Detected Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.143	Lilliefors GOF Test
1% Lilliefors Critical Value	0.255	Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	3.393	KM Standard Error of Mean	0.165
90KM SD	0.619	95% KM (BCA) UCL	3.629
95% KM (t) UCL	3.683	95% KM (Percentile Bootstrap) UCL	3.656
95% KM (z) UCL	3.665	95% KM Bootstrap t UCL	3.727
90% KM Chebyshev UCL	3.89	95% KM Chebyshev UCL	4.115
97.5% KM Chebyshev UCL	4.427	99% KM Chebyshev UCL	5.04

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.306	Anderson-Darling GOF Test
5% A-D Critical Value	0.735	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.134	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.221	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	30.53	k star (bias corrected MLE)	24.47
Theta hat (MLE)	0.111	Theta star (bias corrected MLE)	0.139
nu hat (MLE)	916	nu star (bias corrected)	734.1
Mean (detects)	3.393		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	2.3	Mean	3.391

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Maximum	4.6	Median	3.331
SD	0.619	CV	0.183
k hat (MLE)	32.55	k star (bias corrected MLE)	26.49
Theta hat (MLE)	0.104	Theta star (bias corrected MLE)	0.128
nu hat (MLE)	1042	nu star (bias corrected)	847.7
Adjusted Level of Significance (β)	0.0335		
Approximate Chi Square Value (847.68, α)	781.1	Adjusted Chi Square Value (847.68, β)	773.8
95% Gamma Approximate UCL	3.68	95% Gamma Adjusted UCL	3.715

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	3.393	SD (KM)	0.619
Variance (KM)	0.383	SE of Mean (KM)	0.165
k hat (KM)	30.04	k star (KM)	24.45
nu hat (KM)	961.3	nu star (KM)	782.4
theta hat (KM)	0.113	theta star (KM)	0.139
80% gamma percentile (KM)	3.953	90% gamma percentile (KM)	4.297
95% gamma percentile (KM)	4.595	99% gamma percentile (KM)	5.19

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (782.42, α)	718.5	Adjusted Chi Square Value (782.42, β)	711.5
95% KM Approximate Gamma UCL	3.695	95% KM Adjusted Gamma UCL	3.731

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.966	Shapiro Wilk GOF Test
10% Shapiro Wilk Critical Value	0.901	Detected Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.12	Lilliefors GOF Test
10% Lilliefors Critical Value	0.202	Detected Data appear Lognormal at 10% Significance Level

Detected Data appear Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	3.39	Mean in Log Scale	1.205
SD in Original Scale	0.619	SD in Log Scale	0.181
95% t UCL (assumes normality of ROS data)	3.661	95% Percentile Bootstrap UCL	3.656
95% BCA Bootstrap UCL	3.656	95% Bootstrap t UCL	3.694
95% H-UCL (Log ROS)	3.69		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	1.205	KM Geo Mean	3.338
KM SD (logged)	0.181	95% Critical H Value (KM-Log)	1.788
KM Standard Error of Mean (logged)	0.0485	95% H-UCL (KM -Log)	3.69
KM SD (logged)	0.181	95% Critical H Value (KM-Log)	1.788
KM Standard Error of Mean (logged)	0.0485		

DL/2 Statistics

DL/2 Normal

Mean in Original Scale	3.338
SD in Original Scale	0.658
95% t UCL (Assumes normality)	3.626

DL/2 Log-Transformed

Mean in Log Scale	1.187
SD in Log Scale	0.195
95% H-Stat UCL	3.658

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
From File filea1b878952361.xls
Full Precision OFF
Confidence Coefficient 95%
Number of Bootstrap Operations 2000

95% KM (t) UCL 3.683

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (molybdenum [ug/l]_intrawell_apw-08)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	4
Number of Detects	3	Number of Non-Detects	13
Number of Distinct Detects	2	Number of Distinct Non-Detects	3
Minimum Detect	1.1	Minimum Non-Detect	1
Maximum Detect	1.5	Maximum Non-Detect	5
Variance Detects	0.0533	Percent Non-Detects	81.25%
Mean Detects	1.233	SD Detects	0.231
Median Detects	1.1	CV Detects	0.187
Skewness Detects	1.732	Kurtosis Detects	N/A
Mean of Logged Detects	0.199	SD of Logged Detects	0.179

Warning: Data set has only 3 Detected Values.

This is not enough to compute meaningful or reliable statistics and estimates.

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.75	Shapiro Wilk GOF Test
1% Shapiro Wilk Critical Value	0.753	Detected Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.385	Lilliefors GOF Test
1% Lilliefors Critical Value	0.429	Detected Data appear Normal at 1% Significance Level

Detected Data appear Approximate Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	1.057	KM Standard Error of Mean	0.0414
90KM SD	0.126	95% KM (BCA) UCL	N/A
95% KM (t) UCL	1.129	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	1.125	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	1.181	95% KM Chebyshev UCL	1.237
97.5% KM Chebyshev UCL	1.315	99% KM Chebyshev UCL	1.468

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.619	Anderson-Darling GOF Test
5% A-D Critical Value	0.634	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.427	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.431	Detected data appear Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	45.52	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.0271	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	273.1	nu star (bias corrected)	N/A
Mean (detects)	1.233		

Gamma ROS Statistics using Imputed Non-Detects

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.341	Mean	0.789
Maximum	1.5	Median	0.769
SD	0.303	CV	0.385
k hat (MLE)	7.174	k star (bias corrected MLE)	5.871
Theta hat (MLE)	0.11	Theta star (bias corrected MLE)	0.134
nu hat (MLE)	229.6	nu star (bias corrected)	187.9
Adjusted Level of Significance (β)	0.0335		
Approximate Chi Square Value (187.87, α)	157.2	Adjusted Chi Square Value (187.87, β)	154
95% Gamma Approximate UCL	0.943	95% Gamma Adjusted UCL	N/A

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	1.057	SD (KM)	0.126
Variance (KM)	0.0158	SE of Mean (KM)	0.0414
k hat (KM)	70.72	k star (KM)	57.5
nu hat (KM)	2263	nu star (KM)	1840
theta hat (KM)	0.0149	theta star (KM)	0.0184
80% gamma percentile (KM)	1.172	90% gamma percentile (KM)	1.239
95% gamma percentile (KM)	1.296	99% gamma percentile (KM)	1.408

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (N/A, α)	1741	Adjusted Chi Square Value (N/A, β)	1730
95% KM Approximate Gamma UCL	1.117	95% KM Adjusted Gamma UCL	1.124

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.75	Shapiro Wilk GOF Test
10% Shapiro Wilk Critical Value	0.789	Detected Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.385	Lilliefors GOF Test
10% Lilliefors Critical Value	0.389	Detected Data appear Lognormal at 10% Significance Level

Detected Data appear Approximate Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.868	Mean in Log Scale	-0.175
SD in Original Scale	0.241	SD in Log Scale	0.261
95% t UCL (assumes normality of ROS data)	0.973	95% Percentile Bootstrap UCL	0.969
95% BCA Bootstrap UCL	0.983	95% Bootstrap t UCL	0.999
95% H-UCL (Log ROS)	0.983		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	0.0493	KM Geo Mean	1.051
KM SD (logged)	0.103	95% Critical H Value (KM-Log)	1.745
KM Standard Error of Mean (logged)	0.0344	95% H-UCL (KM -Log)	1.106
KM SD (logged)	0.103	95% Critical H Value (KM-Log)	1.745
KM Standard Error of Mean (logged)	0.0344		

DL/2 Statistics

DL/2 Normal

Mean in Original Scale	0.856
SD in Original Scale	0.521

DL/2 Log-Transformed

Mean in Log Scale	-0.273
SD in Log Scale	0.462

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
From File filea1b878952361.xls
Full Precision OFF
Confidence Coefficient 95%
Number of Bootstrap Operations 2000

95% t UCL (Assumes normality) 1.084

95% H-Stat UCL 1.077

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL 1.129

When a data set follows an approximate distribution passing only one of the GOF tests,
it is suggested to use a UCL based upon a distribution passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (molybdenum [ug/l]_inrawell_apw-10d)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	4
Number of Detects	1	Number of Non-Detects	15
Number of Distinct Detects	1	Number of Distinct Non-Detects	3

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!

It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable report_result_value (molybdenum [ug/l]_inrawell_apw-10d) was not processed!

report_result_value (molybdenum [ug/l]_inrawell_apw-10s)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	6
Number of Detects	3	Number of Non-Detects	13
Number of Distinct Detects	3	Number of Distinct Non-Detects	3
Minimum Detect	1.6	Minimum Non-Detect	1
Maximum Detect	2.1	Maximum Non-Detect	5
Variance Detects	0.07	Percent Non-Detects	81.25%
Mean Detects	1.8	SD Detects	0.265
Median Detects	1.7	CV Detects	0.147
Skewness Detects	1.458	Kurtosis Detects	N/A
Mean of Logged Detects	0.581	SD of Logged Detects	0.143

Warning: Data set has only 3 Detected Values.

This is not enough to compute meaningful or reliable statistics and estimates.

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.893
1% Shapiro Wilk Critical Value	0.753
Lilliefors Test Statistic	0.314
1% Lilliefors Critical Value	0.429

Shapiro Wilk GOF Test

Detected Data appear Normal at 1% Significance Level

Lilliefors GOF Test

Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	1.16	KM Standard Error of Mean	0.106
90KM SD	0.334	95% KM (BCA) UCL	N/A
95% KM (t) UCL	1.345	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	1.334	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	1.477	95% KM Chebyshev UCL	1.621
97.5% KM Chebyshev UCL	1.82	99% KM Chebyshev UCL	2.212

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.385	Anderson-Darling GOF Test
5% A-D Critical Value	0.634	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.337	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.431	Detected data appear Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	72.31	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.0249	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	433.9	nu star (bias corrected)	N/A
Mean (detects)	1.8		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
 GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
 For such situations, GROS method may yield incorrect values of UCLs and BTVs
 This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.794
Maximum	2.1	Median	0.698
SD	0.614	CV	0.773
k hat (MLE)	0.934	k star (bias corrected MLE)	0.801
Theta hat (MLE)	0.85	Theta star (bias corrected MLE)	0.991
nu hat (MLE)	29.9	nu star (bias corrected)	25.63
Adjusted Level of Significance (β)	0.0335		
Approximate Chi Square Value (25.63, α)	15.09	Adjusted Chi Square Value (25.63, β)	14.18
95% Gamma Approximate UCL	1.348	95% Gamma Adjusted UCL	N/A

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	1.16	SD (KM)	0.334
Variance (KM)	0.112	SE of Mean (KM)	0.106
k hat (KM)	12.04	k star (KM)	9.827
nu hat (KM)	385.4	nu star (KM)	314.5
theta hat (KM)	0.0963	theta star (KM)	0.118
80% gamma percentile (KM)	1.455	90% gamma percentile (KM)	1.652
95% gamma percentile (KM)	1.828	99% gamma percentile (KM)	2.189

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (314.45, α)	274.4	Adjusted Chi Square Value (314.45, β)	270.1
95% KM Approximate Gamma UCL	1.329	95% KM Adjusted Gamma UCL	1.35

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.907	Shapiro Wilk GOF Test
10% Shapiro Wilk Critical Value	0.789	Detected Data appear Lognormal at 10% Significance Level

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
From File filea1b878952361.xls
Full Precision OFF
Confidence Coefficient 95%
Number of Bootstrap Operations 2000

Lilliefors Test Statistic 0.304

Lilliefors GOF Test

10% Lilliefors Critical Value 0.389

Detected Data appear Lognormal at 10% Significance Level

Detected Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	1.059	Mean in Log Scale	-0.0125
SD in Original Scale	0.429	SD in Log Scale	0.379
95% t UCL (assumes normality of ROS data)	1.247	95% Percentile Bootstrap UCL	1.242
95% BCA Bootstrap UCL	1.26	95% Bootstrap t UCL	1.3
95% H-UCL (Log ROS)	1.282		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	0.116	KM Geo Mean	1.123
KM SD (logged)	0.238	95% Critical H Value (KM-Log)	1.825
KM Standard Error of Mean (logged)	0.0753	95% H-UCL (KM -Log)	1.293
KM SD (logged)	0.238	95% Critical H Value (KM-Log)	1.825
KM Standard Error of Mean (logged)	0.0753		

DL/2 Statistics

DL/2 Normal

Mean in Original Scale 0.963
SD in Original Scale 0.641
95% t UCL (Assumes normality) 1.243

DL/2 Log-Transformed

Mean in Log Scale -0.202
SD in Log Scale 0.555
95% H-Stat UCL 1.29

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL 1.345

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (nickel [ug/l]_intraWell_apw-02)

General Statistics

Total Number of Observations	10	Number of Distinct Observations	10
		Number of Missing Observations	0
Minimum	4.5	Mean	31.38
Maximum	72.5	Median	27.55
SD	21.84	Std. Error of Mean	6.906
Coefficient of Variation	0.696	Skewness	0.942

Normal GOF Test

Shapiro Wilk Test Statistic 0.906
1% Shapiro Wilk Critical Value 0.781
Lilliefors Test Statistic 0.234
1% Lilliefors Critical Value 0.304

Shapiro Wilk GOF Test

Data appear Normal at 1% Significance Level

Lilliefors GOF Test

Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Assuming Normal Distribution

95% Normal UCL

95% Student's-t UCL 44.04

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995) 44.94

95% Modified-t UCL (Johnson-1978) 44.38

Gamma GOF Test

A-D Test Statistic 0.202

5% A-D Critical Value 0.735

K-S Test Statistic 0.143

5% K-S Critical Value 0.27

Anderson-Darling Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

Kolmogorov-Smirnov Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE) 2.124

Theta hat (MLE) 14.77

nu hat (MLE) 42.48

MLE Mean (bias corrected) 31.38

k star (bias corrected MLE) 1.554

Theta star (bias corrected MLE) 20.2

nu star (bias corrected) 31.07

MLE Sd (bias corrected) 25.18

Approximate Chi Square Value (0.05) 19.34

Adjusted Chi Square Value 17.74

Adjusted Level of Significance 0.0267

Assuming Gamma Distribution

95% Approximate Gamma UCL 50.42

95% Adjusted Gamma UCL 54.95

Lognormal GOF Test

Shapiro Wilk Test Statistic 0.949

10% Shapiro Wilk Critical Value 0.869

Lilliefors Test Statistic 0.138

10% Lilliefors Critical Value 0.241

Shapiro Wilk Lognormal GOF Test

Data appear Lognormal at 10% Significance Level

Lilliefors Lognormal GOF Test

Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data 1.504

Maximum of Logged Data 4.284

Mean of logged Data 3.193

SD of logged Data 0.814

Assuming Lognormal Distribution

95% H-UCL 71.32

95% Chebyshev (MVUE) UCL 70.54

99% Chebyshev (MVUE) UCL 119.2

90% Chebyshev (MVUE) UCL 58.7

97.5% Chebyshev (MVUE) UCL 86.97

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL 42.74

95% Standard Bootstrap UCL 42.51

95% Hall's Bootstrap UCL 60.5

90% Chebyshev(Mean, Sd) UCL 52.1

97.5% Chebyshev(Mean, Sd) UCL 74.51

95% BCA Bootstrap UCL 44.03

95% Bootstrap-t UCL 51.81

95% Percentile Bootstrap UCL 43.15

95% Chebyshev(Mean, Sd) UCL 61.48

99% Chebyshev(Mean, Sd) UCL 100.1

Suggested UCL to Use

95% Student's-t UCL 44.04

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
 From File filea1b878952361.xls
 Full Precision OFF
 Confidence Coefficient 95%
 Number of Bootstrap Operations 2000

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (nickel [ug/l]_intrawell_apw-03)

General Statistics

Total Number of Observations	10	Number of Distinct Observations	8
Number of Detects	8	Number of Non-Detects	2
Number of Distinct Detects	8	Number of Distinct Non-Detects	1
Minimum Detect	1	Minimum Non-Detect	1
Maximum Detect	10	Maximum Non-Detect	1
Variance Detects	8.224	Percent Non-Detects	20%
Mean Detects	3.988	SD Detects	2.868
Median Detects	2.95	CV Detects	0.719
Skewness Detects	1.455	Kurtosis Detects	2.304
Mean of Logged Detects	1.168	SD of Logged Detects	0.711

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.87	Shapiro Wilk GOF Test
1% Shapiro Wilk Critical Value	0.749	Detected Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.22	Lilliefors GOF Test
1% Lilliefors Critical Value	0.333	Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	3.39	KM Standard Error of Mean	0.906
90KM SD	2.68	95% KM (BCA) UCL	4.92
95% KM (t) UCL	5.051	95% KM (Percentile Bootstrap) UCL	4.87
95% KM (z) UCL	4.881	95% KM Bootstrap t UCL	6.169
90% KM Chebyshev UCL	6.108	95% KM Chebyshev UCL	7.34
97.5% KM Chebyshev UCL	9.049	99% KM Chebyshev UCL	12.41

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.217	Anderson-Darling GOF Test
5% A-D Critical Value	0.723	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.159	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.297	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics on Detected Data Only

k hat (MLE)	2.478	k star (bias corrected MLE)	1.632
Theta hat (MLE)	1.609	Theta star (bias corrected MLE)	2.443
nu hat (MLE)	39.65	nu star (bias corrected)	26.11
Mean (detects)	3.988		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
 GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	3.192
Maximum	10	Median	2.55

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

SD	3.035	CV	0.951
k hat (MLE)	0.546	k star (bias corrected MLE)	0.449
Theta hat (MLE)	5.844	Theta star (bias corrected MLE)	7.109
nu hat (MLE)	10.92	nu star (bias corrected)	8.98
Adjusted Level of Significance (β)	0.0267		
Approximate Chi Square Value (8.98, α)	3.315	Adjusted Chi Square Value (8.98, β)	2.745
95% Gamma Approximate UCL	8.647	95% Gamma Adjusted UCL	10.44

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	3.39	SD (KM)	2.68
Variance (KM)	7.185	SE of Mean (KM)	0.906
k hat (KM)	1.599	k star (KM)	1.186
nu hat (KM)	31.99	nu star (KM)	23.73
theta hat (KM)	2.119	theta star (KM)	2.858
80% gamma percentile (KM)	5.374	90% gamma percentile (KM)	7.483
95% gamma percentile (KM)	9.566	99% gamma percentile (KM)	14.34

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (23.73, α)	13.64	Adjusted Chi Square Value (23.73, β)	12.33
95% KM Approximate Gamma UCL	5.897	95% KM Adjusted Gamma UCL	6.523

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.986	Shapiro Wilk GOF Test
10% Shapiro Wilk Critical Value	0.851	Detected Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.117	Lilliefors GOF Test
10% Lilliefors Critical Value	0.265	Detected Data appear Lognormal at 10% Significance Level

Detected Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	3.304	Mean in Log Scale	0.817
SD in Original Scale	2.911	SD in Log Scale	0.975
95% t UCL (assumes normality of ROS data)	4.992	95% Percentile Bootstrap UCL	4.799
95% BCA Bootstrap UCL	5.205	95% Bootstrap t UCL	5.907
95% H-UCL (Log ROS)	9.808		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	0.934	KM Geo Mean	2.546
KM SD (logged)	0.756	95% Critical H Value (KM-Log)	2.631
KM Standard Error of Mean (logged)	0.256	95% H-UCL (KM -Log)	6.578
KM SD (logged)	0.756	95% Critical H Value (KM-Log)	2.631
KM Standard Error of Mean (logged)	0.256		

DL/2 Statistics

DL/2 Normal

Mean in Original Scale	3.29
SD in Original Scale	2.926
95% t UCL (Assumes normality)	4.986

DL/2 Log-Transformed

Mean in Log Scale	0.796
SD in Log Scale	1.004
95% H-Stat UCL	10.41

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

95% KM (t) UCL 5.051

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (nickel [ug/l]_inrawell_apw-05/05r)

General Statistics

Total Number of Observations	10	Number of Distinct Observations	8
Number of Detects	7	Number of Non-Detects	3
Number of Distinct Detects	7	Number of Distinct Non-Detects	1
Minimum Detect	1.2	Minimum Non-Detect	1
Maximum Detect	7.4	Maximum Non-Detect	1
Variance Detects	4.418	Percent Non-Detects	30%
Mean Detects	3.286	SD Detects	2.102
Median Detects	2.3	CV Detects	0.64
Skewness Detects	1.431	Kurtosis Detects	2.064
Mean of Logged Detects	1.031	SD of Logged Detects	0.6

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.864	Shapiro Wilk GOF Test
1% Shapiro Wilk Critical Value	0.73	Detected Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.252	Lilliefors GOF Test
1% Lilliefors Critical Value	0.35	Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	2.6	KM Standard Error of Mean	0.661
90KM SD	1.936	95% KM (BCA) UCL	3.7
95% KM (t) UCL	3.812	95% KM (Percentile Bootstrap) UCL	3.75
95% KM (z) UCL	3.688	95% KM Bootstrap t UCL	4.602
90% KM Chebyshev UCL	4.584	95% KM Chebyshev UCL	5.482
97.5% KM Chebyshev UCL	6.73	99% KM Chebyshev UCL	9.179

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.301	Anderson-Darling GOF Test
5% A-D Critical Value	0.711	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.236	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.313	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics on Detected Data Only

k hat (MLE)	3.315	k star (bias corrected MLE)	1.99
Theta hat (MLE)	0.991	Theta star (bias corrected MLE)	1.651
nu hat (MLE)	46.41	nu star (bias corrected)	27.86
Mean (detects)	3.286		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	2.303
Maximum	7.4	Median	2.05
SD	2.334	CV	1.014
k hat (MLE)	0.435	k star (bias corrected MLE)	0.371
Theta hat (MLE)	5.298	Theta star (bias corrected MLE)	6.209
nu hat (MLE)	8.693	nu star (bias corrected)	7.419
Adjusted Level of Significance (β)	0.0267		
Approximate Chi Square Value (7.42, α)	2.403	Adjusted Chi Square Value (7.42, β)	1.937
95% Gamma Approximate UCL	7.11	95% Gamma Adjusted UCL	8.818

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	2.6	SD (KM)	1.936
Variance (KM)	3.748	SE of Mean (KM)	0.661
k hat (KM)	1.804	k star (KM)	1.329
nu hat (KM)	36.07	nu star (KM)	26.58
theta hat (KM)	1.442	theta star (KM)	1.956
80% gamma percentile (KM)	4.075	90% gamma percentile (KM)	5.581
95% gamma percentile (KM)	7.055	99% gamma percentile (KM)	10.41

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (26.58, α)	15.83	Adjusted Chi Square Value (26.58, β)	14.41
95% KM Approximate Gamma UCL	4.366	95% KM Adjusted Gamma UCL	4.798

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.968	Shapiro Wilk GOF Test
10% Shapiro Wilk Critical Value	0.838	Detected Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.201	Lilliefors GOF Test
10% Lilliefors Critical Value	0.28	Detected Data appear Lognormal at 10% Significance Level

Detected Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	2.484	Mean in Log Scale	0.563
SD in Original Scale	2.15	SD in Log Scale	0.914
95% t UCL (assumes normality of ROS data)	3.73	95% Percentile Bootstrap UCL	3.59
95% BCA Bootstrap UCL	3.862	95% Bootstrap t UCL	4.434
95% H-UCL (Log ROS)	6.511		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	0.722	KM Geo Mean	2.058
KM SD (logged)	0.663	95% Critical H Value (KM-Log)	2.469
KM Standard Error of Mean (logged)	0.226	95% H-UCL (KM -Log)	4.423
KM SD (logged)	0.663	95% Critical H Value (KM-Log)	2.469
KM Standard Error of Mean (logged)	0.226		

DL/2 Statistics

DL/2 Normal

Mean in Original Scale	2.45
SD in Original Scale	2.181
95% t UCL (Assumes normality)	3.714

DL/2 Log-Transformed

Mean in Log Scale	0.514
SD in Log Scale	0.966
95% H-Stat UCL	7.086

DL/2 is not a recommended method, provided for comparisons and historical reasons

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
From File filea1b878952361.xls
Full Precision OFF
Confidence Coefficient 95%
Number of Bootstrap Operations 2000

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL 3.812

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (nickel [ug/l]_intrawell_apw-06d)

General Statistics

Total Number of Observations	9	Number of Distinct Observations	8
		Number of Missing Observations	0
Minimum	1.7	Mean	3.189
Maximum	9.3	Median	2.5
SD	2.359	Std. Error of Mean	0.786
Coefficient of Variation	0.74	Skewness	2.685

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach, refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance, but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes ($n < 7$).

The Chebyshev UCL often results in gross overestimates of the mean.

Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test

Shapiro Wilk Test Statistic	0.613	Shapiro Wilk GOF Test
1% Shapiro Wilk Critical Value	0.764	Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.387	Lilliefors GOF Test
1% Lilliefors Critical Value	0.316	Data Not Normal at 1% Significance Level

Data Not Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL

95% Student's-t UCL 4.651

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995) 5.234

95% Modified-t UCL (Johnson-1978) 4.768

Gamma GOF Test

A-D Test Statistic	0.968	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.726	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.316	Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value	0.281	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	3.529	k star (bias corrected MLE)	2.427
Theta hat (MLE)	0.904	Theta star (bias corrected MLE)	1.314
nu hat (MLE)	63.53	nu star (bias corrected)	43.68
MLE Mean (bias corrected)	3.189	MLE Sd (bias corrected)	2.047
		Approximate Chi Square Value (0.05)	29.53
Adjusted Level of Significance	0.0231	Adjusted Chi Square Value	27.09

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Assuming Gamma Distribution

95% Approximate Gamma UCL	4.718	95% Adjusted Gamma UCL	5.141

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.808	Shapiro Wilk Lognormal GOF Test
10% Shapiro Wilk Critical Value	0.859	Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.272	Lilliefors Lognormal GOF Test
10% Lilliefors Critical Value	0.252	Data Not Lognormal at 10% Significance Level

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	0.531	Mean of logged Data	1.011
Maximum of Logged Data	2.23	SD of logged Data	0.513

Assuming Lognormal Distribution

95% H-UCL	4.711	90% Chebyshev (MVUE) UCL	4.691
95% Chebyshev (MVUE) UCL	5.418	97.5% Chebyshev (MVUE) UCL	6.428
99% Chebyshev (MVUE) UCL	8.41		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	4.482	95% BCA Bootstrap UCL	4.978
95% Standard Bootstrap UCL	4.393	95% Bootstrap-t UCL	7.625
95% Hall's Bootstrap UCL	9.519	95% Percentile Bootstrap UCL	4.656
90% Chebyshev(Mean, Sd) UCL	5.548	95% Chebyshev(Mean, Sd) UCL	6.616
97.5% Chebyshev(Mean, Sd) UCL	8.099	99% Chebyshev(Mean, Sd) UCL	11.01

Suggested UCL to Use

Recommendation cannot be provided

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (nickel [ug/l]_intrawell_apw-06s)

General Statistics

Total Number of Observations	10	Number of Distinct Observations	8
Number of Detects	9	Number of Non-Detects	1
Number of Distinct Detects	7	Number of Distinct Non-Detects	1
Minimum Detect	1.2	Minimum Non-Detect	1
Maximum Detect	9	Maximum Non-Detect	1
Variance Detects	5.791	Percent Non-Detects	10%
Mean Detects	2.811	SD Detects	2.406
Median Detects	2.1	CV Detects	0.856
Skewness Detects	2.607	Kurtosis Detects	7.275
Mean of Logged Detects	0.83	SD of Logged Detects	0.609

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.64	Shapiro Wilk GOF Test
1% Shapiro Wilk Critical Value	0.764	Detected Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.341	Lilliefors GOF Test

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

1% Lilliefors Critical Value 0.316 Detected Data Not Normal at 1% Significance Level

Detected Data Not Normal at 1% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	2.63	KM Standard Error of Mean	0.745
90KM SD	2.22	95% KM (BCA) UCL	3.99
95% KM (t) UCL	3.995	95% KM (Percentile Bootstrap) UCL	3.94
95% KM (z) UCL	3.855	95% KM Bootstrap t UCL	6.378
90% KM Chebyshev UCL	4.864	95% KM Chebyshev UCL	5.876
97.5% KM Chebyshev UCL	7.28	99% KM Chebyshev UCL	10.04

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.766	Anderson-Darling GOF Test
5% A-D Critical Value	0.728	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.246	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.282	Detected data appear Gamma Distributed at 5% Significance Level

Detected data follow Appr. Gamma Distribution at 5% Significance Level

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics on Detected Data Only

k hat (MLE)	2.615	k star (bias corrected MLE)	1.818
Theta hat (MLE)	1.075	Theta star (bias corrected MLE)	1.547
nu hat (MLE)	47.07	nu star (bias corrected)	32.72
Mean (detects)	2.811		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	2.531
Maximum	9	Median	2.1
SD	2.436	CV	0.962
k hat (MLE)	0.91	k star (bias corrected MLE)	0.703
Theta hat (MLE)	2.782	Theta star (bias corrected MLE)	3.598
nu hat (MLE)	18.19	nu star (bias corrected)	14.07
Adjusted Level of Significance (β)	0.0267		
Approximate Chi Square Value (14.07, α)	6.619	Adjusted Chi Square Value (14.07, β)	5.754
95% Gamma Approximate UCL	5.38	95% Gamma Adjusted UCL	6.189

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	2.63	SD (KM)	2.22
Variance (KM)	4.928	SE of Mean (KM)	0.745
k hat (KM)	1.404	k star (KM)	1.049
nu hat (KM)	28.07	nu star (KM)	20.98
theta hat (KM)	1.874	theta star (KM)	2.507
80% gamma percentile (KM)	4.216	90% gamma percentile (KM)	5.985
95% gamma percentile (KM)	7.747	99% gamma percentile (KM)	11.82

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (20.98, α)	11.58	Adjusted Chi Square Value (20.98, β)	10.38
95% KM Approximate Gamma UCL	4.766	95% KM Adjusted Gamma UCL	5.314

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
 From File filea1b878952361.xls
 Full Precision OFF
 Confidence Coefficient 95%
 Number of Bootstrap Operations 2000

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.868	Shapiro Wilk GOF Test
10% Shapiro Wilk Critical Value	0.859	Detected Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.2	Lilliefors GOF Test
10% Lilliefors Critical Value	0.252	Detected Data appear Lognormal at 10% Significance Level

Detected Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	2.585	Mean in Log Scale	0.688
SD in Original Scale	2.379	SD in Log Scale	0.73
95% t UCL (assumes normality of ROS data)	3.964	95% Percentile Bootstrap UCL	3.93
95% BCA Bootstrap UCL	4.47	95% Bootstrap t UCL	5.866
95% H-UCL (Log ROS)	4.872		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	0.747	KM Geo Mean	2.111
KM SD (logged)	0.599	95% Critical H Value (KM-Log)	2.367
KM Standard Error of Mean (logged)	0.201	95% H-UCL (KM -Log)	4.054
KM SD (logged)	0.599	95% Critical H Value (KM-Log)	2.367
KM Standard Error of Mean (logged)	0.201		

DL/2 Statistics

DL/2 Normal

Mean in Original Scale	2.58
SD in Original Scale	2.384
95% t UCL (Assumes normality)	3.962

DL/2 Log-Transformed

Mean in Log Scale	0.678
SD in Log Scale	0.75
95% H-Stat UCL	5.021

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM Adjusted Gamma UCL	5.314	95% GROS Adjusted Gamma UCL	6.189

When a data set follows an approximate distribution passing only one of the GOF tests,
 it is suggested to use a UCL based upon a distribution passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (nickel [ug/l]_intravel_apw-07)

General Statistics

Total Number of Observations	10	Number of Distinct Observations	6
Number of Detects	5	Number of Non-Detects	5
Number of Distinct Detects	5	Number of Distinct Non-Detects	1
Minimum Detect	1.3	Minimum Non-Detect	1
Maximum Detect	15	Maximum Non-Detect	1
Variance Detects	32.54	Percent Non-Detects	50%
Mean Detects	5.04	SD Detects	5.705
Median Detects	3.3	CV Detects	1.132
Skewness Detects	1.979	Kurtosis Detects	4.065

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
 From File filea1b878952361.xls
 Full Precision OFF
 Confidence Coefficient 95%
 Number of Bootstrap Operations 2000

Mean of Logged Detects 1.187 SD of Logged Detects 0.994

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.735	Shapiro Wilk GOF Test
1% Shapiro Wilk Critical Value	0.686	Detected Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.359	Lilliefors GOF Test
1% Lilliefors Critical Value	0.396	Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	3.02	KM Standard Error of Mean	1.462
90KM SD	4.135	95% KM (BCA) UCL	5.59
95% KM (t) UCL	5.7	95% KM (Percentile Bootstrap) UCL	5.5
95% KM (z) UCL	5.425	95% KM Bootstrap t UCL	9.966
90% KM Chebyshev UCL	7.406	95% KM Chebyshev UCL	9.392
97.5% KM Chebyshev UCL	12.15	99% KM Chebyshev UCL	17.57

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.446	Anderson-Darling GOF Test
5% A-D Critical Value	0.688	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.261	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.363	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics on Detected Data Only

k hat (MLE)	1.304	k star (bias corrected MLE)	0.655
Theta hat (MLE)	3.866	Theta star (bias corrected MLE)	7.697
nu hat (MLE)	13.04	nu star (bias corrected)	6.548
Mean (detects)	5.04		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
 GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	2.525
Maximum	15	Median	0.655
SD	4.636	CV	1.836
k hat (MLE)	0.267	k star (bias corrected MLE)	0.253
Theta hat (MLE)	9.467	Theta star (bias corrected MLE)	9.965
nu hat (MLE)	5.335	nu star (bias corrected)	5.068
Adjusted Level of Significance (β)	0.0267		
Approximate Chi Square Value (5.07, α)	1.183	Adjusted Chi Square Value (5.07, β)	0.893
95% Gamma Approximate UCL	10.81	95% Gamma Adjusted UCL	14.33

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	3.02	SD (KM)	4.135
Variance (KM)	17.1	SE of Mean (KM)	1.462
k hat (KM)	0.533	k star (KM)	0.44
nu hat (KM)	10.67	nu star (KM)	8.801
theta hat (KM)	5.661	theta star (KM)	6.863

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
From File filea1b878952361.xls
Full Precision OFF
Confidence Coefficient 95%
Number of Bootstrap Operations 2000

80% gamma percentile (KM)	4.92	90% gamma percentile (KM)	8.382
95% gamma percentile (KM)	12.14	99% gamma percentile (KM)	21.49

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (8.80, α)	3.207	Adjusted Chi Square Value (8.80, β)	2.649
95% KM Approximate Gamma UCL	8.287	95% KM Adjusted Gamma UCL	10.03

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.904	Shapiro Wilk GOF Test
10% Shapiro Wilk Critical Value	0.806	Detected Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.204	Lilliefors GOF Test
10% Lilliefors Critical Value	0.319	Detected Data appear Lognormal at 10% Significance Level

Detected Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	2.622	Mean in Log Scale	-0.363
SD in Original Scale	4.579	SD in Log Scale	1.878
95% t UCL (assumes normality of ROS data)	5.277	95% Percentile Bootstrap UCL	5.21
95% BCA Bootstrap UCL	6.535	95% Bootstrap t UCL	10.59
95% H-UCL (Log ROS)	98.98		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	0.594	KM Geo Mean	1.81
KM SD (logged)	0.865	95% Critical H Value (KM-Log)	2.833
KM Standard Error of Mean (logged)	0.306	95% H-UCL (KM -Log)	5.953
KM SD (logged)	0.865	95% Critical H Value (KM-Log)	2.833
KM Standard Error of Mean (logged)	0.306		

DL/2 Statistics

DL/2 Normal

Mean in Original Scale	2.77
SD in Original Scale	4.493
95% t UCL (Assumes normality)	5.375

DL/2 Log-Transformed

Mean in Log Scale	0.247
SD in Log Scale	1.192
95% H-Stat UCL	10.52

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL 5.7

The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.

Please verify the data were collected from random locations.

**If the data were collected using judgmental or other non-random methods,
then contact a statistician to correctly calculate UCLs.**

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
 From File filea1b878952361.xls
 Full Precision OFF
 Confidence Coefficient 95%
 Number of Bootstrap Operations 2000

General Statistics

Total Number of Observations	10	Number of Distinct Observations	8
		Number of Missing Observations	0
Minimum	2.6	Mean	4.09
Maximum	7.7	Median	3.4
SD	1.804	Std. Error of Mean	0.57
Coefficient of Variation	0.441	Skewness	1.05

Normal GOF Test

Shapiro Wilk Test Statistic	0.836	Shapiro Wilk GOF Test
1% Shapiro Wilk Critical Value	0.781	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.245	Lilliefors GOF Test
1% Lilliefors Critical Value	0.304	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	5.136	95% Adjusted-CLT UCL (Chen-1995)	5.231
		95% Modified-t UCL (Johnson-1978)	5.167

Gamma GOF Test

A-D Test Statistic	0.664	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.728	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.256	Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value	0.267	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	6.498	k star (bias corrected MLE)	4.615
Theta hat (MLE)	0.629	Theta star (bias corrected MLE)	0.886
nu hat (MLE)	130	nu star (bias corrected)	92.3
MLE Mean (bias corrected)	4.09	MLE Sd (bias corrected)	1.904
		Approximate Chi Square Value (0.05)	71.15
Adjusted Level of Significance	0.0267	Adjusted Chi Square Value	67.93

Assuming Gamma Distribution

95% Approximate Gamma UCL	5.306	95% Adjusted Gamma UCL	5.558

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.858	Shapiro Wilk Lognormal GOF Test
10% Shapiro Wilk Critical Value	0.869	Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.242	Lilliefors Lognormal GOF Test
10% Lilliefors Critical Value	0.241	Data Not Lognormal at 10% Significance Level

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	0.956	Mean of logged Data	1.33
Maximum of Logged Data	2.041	SD of logged Data	0.408

Assuming Lognormal Distribution

95% H-UCL	5.466	90% Chebyshev (MVUE) UCL	5.668
95% Chebyshev (MVUE) UCL	6.391	97.5% Chebyshev (MVUE) UCL	7.395
99% Chebyshev (MVUE) UCL	9.366		

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
From File filea1b878952361.xls
Full Precision OFF
Confidence Coefficient 95%
Number of Bootstrap Operations 2000

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	5.028	95% BCA Bootstrap UCL	5.13
95% Standard Bootstrap UCL	4.991	95% Bootstrap-t UCL	5.636
95% Hall's Bootstrap UCL	5.303	95% Percentile Bootstrap UCL	5.01
90% Chebyshev(Mean, Sd) UCL	5.801	95% Chebyshev(Mean, Sd) UCL	6.577
97.5% Chebyshev(Mean, Sd) UCL	7.653	99% Chebyshev(Mean, Sd) UCL	9.766

Suggested UCL to Use

95% Student's-t UCL 5.136

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (nickel [ug/l]_intraWell_apw-10d)

General Statistics

Total Number of Observations	10	Number of Distinct Observations	10
		Number of Missing Observations	0
Minimum	2.5	Mean	6.12
Maximum	9.5	Median	6.4
SD	2.024	Std. Error of Mean	0.64
Coefficient of Variation	0.331	Skewness	-0.36

Normal GOF Test

Shapiro Wilk Test Statistic 0.968
1% Shapiro Wilk Critical Value 0.781
Lilliefors Test Statistic 0.143
1% Lilliefors Critical Value 0.304

Shapiro Wilk GOF Test

Data appear Normal at 1% Significance Level

Lilliefors GOF Test

Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL

95% Student's-t UCL 7.293

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995) 7.095
95% Modified-t UCL (Johnson-1978) 7.281

Gamma GOF Test

A-D Test Statistic 0.428
5% A-D Critical Value 0.727
K-S Test Statistic 0.187
5% K-S Critical Value 0.267

Anderson-Darling Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

Kolmogorov-Smirnov Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	8.313	k star (bias corrected MLE)	5.885
Theta hat (MLE)	0.736	Theta star (bias corrected MLE)	1.04
nu hat (MLE)	166.3	nu star (bias corrected)	117.7
MLE Mean (bias corrected)	6.12	MLE Sd (bias corrected)	2.523
		Approximate Chi Square Value (0.05)	93.66
Adjusted Level of Significance	0.0267	Adjusted Chi Square Value	89.94

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Assuming Gamma Distribution

95% Approximate Gamma UCL	7.692	95% Adjusted Gamma UCL	8.01

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.894	Shapiro Wilk Lognormal GOF Test
10% Shapiro Wilk Critical Value	0.869	Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.217	Lilliefors Lognormal GOF Test
10% Lilliefors Critical Value	0.241	Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	0.916	Mean of logged Data	1.75
Maximum of Logged Data	2.251	SD of logged Data	0.394

Assuming Lognormal Distribution

95% H-UCL	8.176	90% Chebyshev (MVUE) UCL	8.502
95% Chebyshev (MVUE) UCL	9.559	97.5% Chebyshev (MVUE) UCL	11.03
99% Chebyshev (MVUE) UCL	13.91		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	7.173	95% BCA Bootstrap UCL	7.1
95% Standard Bootstrap UCL	7.127	95% Bootstrap-t UCL	7.216
95% Hall's Bootstrap UCL	7.207	95% Percentile Bootstrap UCL	7.12
90% Chebyshev(Mean, Sd) UCL	8.04	95% Chebyshev(Mean, Sd) UCL	8.909
97.5% Chebyshev(Mean, Sd) UCL	10.12	99% Chebyshev(Mean, Sd) UCL	12.49

Suggested UCL to Use

95% Student's-t UCL	7.293

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positively skewed data sets.

report_result_value (nickel [ug/l]_intrawell_apw-10s)

General Statistics

Total Number of Observations	10	Number of Distinct Observations	6
Number of Detects	6	Number of Non-Detects	4
Number of Distinct Detects	5	Number of Distinct Non-Detects	1
Minimum Detect	1.2	Minimum Non-Detect	1
Maximum Detect	5.1	Maximum Non-Detect	1
Variance Detects	2.39	Percent Non-Detects	40%
Mean Detects	2.283	SD Detects	1.546
Median Detects	1.45	CV Detects	0.677
Skewness Detects	1.605	Kurtosis Detects	1.884
Mean of Logged Detects	0.67	SD of Logged Detects	0.577

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
 From File filea1b878952361.xls
 Full Precision OFF
 Confidence Coefficient 95%
 Number of Bootstrap Operations 2000

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.75	Shapiro Wilk GOF Test
1% Shapiro Wilk Critical Value	0.713	Detected Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.36	Lilliefors GOF Test
1% Lilliefors Critical Value	0.373	Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	1.77	KM Standard Error of Mean	0.437
90KM SD	1.261	95% KM (BCA) UCL	2.52
95% KM (t) UCL	2.571	95% KM (Percentile Bootstrap) UCL	2.52
95% KM (z) UCL	2.489	95% KM Bootstrap t UCL	5.313
90% KM Chebyshev UCL	3.08	95% KM Chebyshev UCL	3.674
97.5% KM Chebyshev UCL	4.498	99% KM Chebyshev UCL	6.116

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.74	Anderson-Darling GOF Test
5% A-D Critical Value	0.701	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.37	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.334	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	3.375	k star (bias corrected MLE)	1.799
Theta hat (MLE)	0.677	Theta star (bias corrected MLE)	1.27
nu hat (MLE)	40.5	nu star (bias corrected)	21.58
Mean (detects)	2.283		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
 GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
 For such situations, GROS method may yield incorrect values of UCLs and BTVs
 This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	1.374
Maximum	5.1	Median	1.3
SD	1.645	CV	1.197
k hat (MLE)	0.378	k star (bias corrected MLE)	0.331
Theta hat (MLE)	3.636	Theta star (bias corrected MLE)	4.149
nu hat (MLE)	7.557	nu star (bias corrected)	6.623
Adjusted Level of Significance (β)	0.0267		
Approximate Chi Square Value (6.62, α)	1.966	Adjusted Chi Square Value (6.62, β)	1.557
95% Gamma Approximate UCL	4.628	95% Gamma Adjusted UCL	5.845

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	1.77	SD (KM)	1.261
Variance (KM)	1.59	SE of Mean (KM)	0.437
k hat (KM)	1.97	k star (KM)	1.446
nu hat (KM)	39.41	nu star (KM)	28.92
theta hat (KM)	0.898	theta star (KM)	1.224
80% gamma percentile (KM)	2.75	90% gamma percentile (KM)	3.722
95% gamma percentile (KM)	4.668	99% gamma percentile (KM)	6.81

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
From File filea1b878952361.xls
Full Precision OFF
Confidence Coefficient 95%
Number of Bootstrap Operations 2000

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (28.92, α)	17.64	Adjusted Chi Square Value (28.92, β)	16.13
95% KM Approximate Gamma UCL	2.901	95% KM Adjusted Gamma UCL	3.173

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.808	Shapiro Wilk GOF Test
10% Shapiro Wilk Critical Value	0.826	Detected Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.344	Lilliefors GOF Test
10% Lilliefors Critical Value	0.298	Detected Data Not Lognormal at 10% Significance Level

Detected Data Not Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	1.546	Mean in Log Scale	0.0484
SD in Original Scale	1.498	SD in Log Scale	0.943
95% t UCL (assumes normality of ROS data)	2.414	95% Percentile Bootstrap UCL	2.305
95% BCA Bootstrap UCL	2.57	95% Bootstrap t UCL	3.433
95% H-UCL (Log ROS)	4.187		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	0.402	KM Geo Mean	1.495
KM SD (logged)	0.524	95% Critical H Value (KM-Log)	2.253
KM Standard Error of Mean (logged)	0.181	95% H-UCL (KM -Log)	2.541
KM SD (logged)	0.524	95% Critical H Value (KM-Log)	2.253
KM Standard Error of Mean (logged)	0.181		

DL/2 Statistics

DL/2 Normal

Mean in Original Scale	1.57
SD in Original Scale	1.475
95% t UCL (Assumes normality)	2.425

DL/2 Log-Transformed

Mean in Log Scale	0.125
SD in Log Scale	0.825
95% H-Stat UCL	3.398

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	2.571

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (ph, lab [su_intrawell_apw-02])

General Statistics

Total Number of Observations	16	Number of Distinct Observations	15
		Number of Missing Observations	0
Minimum	6.9	Mean	7.106
Maximum	7.52	Median	7.075
SD	0.148	Std. Error of Mean	0.0371
Coefficient of Variation	0.0209	Skewness	1.549

Normal GOF Test

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
 From File filea1b878952361.xls
 Full Precision OFF
 Confidence Coefficient 95%
 Number of Bootstrap Operations 2000

Shapiro Wilk Test Statistic 0.876	Shapiro Wilk GOF Test
1% Shapiro Wilk Critical Value 0.844	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic 0.197	Lilliefors GOF Test
1% Lilliefors Critical Value 0.248	Data appear Normal at 1% Significance Level
Data appear Normal at 1% Significance Level	

Assuming Normal Distribution

95% Normal UCL	95% UCLs (Adjusted for Skewness)
95% Student's-t UCL 7.171	95% Adjusted-CLT UCL (Chen-1995) 7.183
	95% Modified-t UCL (Johnson-1978) 7.174

Gamma GOF Test

A-D Test Statistic 0.742	Anderson-Darling Gamma GOF Test
5% A-D Critical Value 0.736	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic 0.19	Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value 0.214	Detected data appear Gamma Distributed at 5% Significance Level
Detected data follow Appr. Gamma Distribution at 5% Significance Level	

Gamma Statistics

k hat (MLE) 2489	k star (bias corrected MLE) 2022
Theta hat (MLE) 0.00286	Theta star (bias corrected MLE) 0.00351
nu hat (MLE) 79643	nu star (bias corrected) 64712
MLE Mean (bias corrected) 7.106	MLE Sd (bias corrected) 0.158
	Approximate Chi Square Value (0.05) 64121
Adjusted Level of Significance 0.0335	Adjusted Chi Square Value 64054

Assuming Gamma Distribution

95% Approximate Gamma UCL 7.172	95% Adjusted Gamma UCL 7.179

Lognormal GOF Test

Shapiro Wilk Test Statistic 0.884	Shapiro Wilk Lognormal GOF Test
10% Shapiro Wilk Critical Value 0.906	Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic 0.192	Lilliefors Lognormal GOF Test
10% Lilliefors Critical Value 0.196	Data appear Lognormal at 10% Significance Level
Data appear Approximate Lognormal at 10% Significance Level	

Lognormal Statistics

Minimum of Logged Data 1.932	Mean of logged Data 1.961
Maximum of Logged Data 2.018	SD of logged Data 0.0206

Assuming Lognormal Distribution

95% H-UCL N/A	90% Chebyshev (MVUE) UCL 7.216
95% Chebyshev (MVUE) UCL 7.266	97.5% Chebyshev (MVUE) UCL 7.335
99% Chebyshev (MVUE) UCL 7.471	

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL 7.167	95% BCA Bootstrap UCL 7.179
95% Standard Bootstrap UCL 7.165	95% Bootstrap-t UCL 7.208
95% Hall's Bootstrap UCL 7.535	95% Percentile Bootstrap UCL 7.166
90% Chebyshev(Mean, Sd) UCL 7.218	95% Chebyshev(Mean, Sd) UCL 7.268
97.5% Chebyshev(Mean, Sd) UCL 7.338	99% Chebyshev(Mean, Sd) UCL 7.476

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Suggested UCL to Use

95% Student's-t UCL 7.171

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. Recommendations are based upon data size, data distribution, and skewness using results from simulation studies. However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (ph, lab [su]_intrawell_apw-03)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	15
		Number of Missing Observations	0
Minimum	7.21	Mean	7.573
Maximum	7.93	Median	7.49
SD	0.243	Std. Error of Mean	0.0606
Coefficient of Variation	0.032	Skewness	0.0346

Normal GOF Test

Shapiro Wilk Test Statistic	0.916
1% Shapiro Wilk Critical Value	0.844
Lilliefors Test Statistic	0.18
1% Lilliefors Critical Value	0.248

Shapiro Wilk GOF Test

Data appear Normal at 1% Significance Level

Lilliefors GOF Test

Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL

95% Student's-t UCL 7.679

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995) 7.673

95% Modified-t UCL (Johnson-1978) 7.679

Gamma GOF Test

A-D Test Statistic	0.579
5% A-D Critical Value	0.736
K-S Test Statistic	0.181
5% K-S Critical Value	0.214

Anderson-Darling Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

Kolmogorov-Smirnov Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1040	k star (bias corrected MLE)	844.8
Theta hat (MLE)	0.00728	Theta star (bias corrected MLE)	0.00896
nu hat (MLE)	33269	nu star (bias corrected)	27032
MLE Mean (bias corrected)	7.573	MLE Sd (bias corrected)	0.261
Adjusted Level of Significance	0.0335	Approximate Chi Square Value (0.05)	26651
		Adjusted Chi Square Value	26608

Assuming Gamma Distribution

95% Approximate Gamma UCL 7.681

95% Adjusted Gamma UCL 7.693

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.917
10% Shapiro Wilk Critical Value	0.906
Lilliefors Test Statistic	0.175
10% Lilliefors Critical Value	0.196

Shapiro Wilk Lognormal GOF Test

Data appear Lognormal at 10% Significance Level

Lilliefors Lognormal GOF Test

Data appear Lognormal at 10% Significance Level

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
From File filea1b878952361.xls
Full Precision OFF
Confidence Coefficient 95%
Number of Bootstrap Operations 2000

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	1.975	Mean of logged Data	2.024
Maximum of Logged Data	2.071	SD of logged Data	0.032

Assuming Lognormal Distribution

95% H-UCL	N/A	90% Chebyshev (MVUE) UCL	7.754
95% Chebyshev (MVUE) UCL	7.837	97.5% Chebyshev (MVUE) UCL	7.951
99% Chebyshev (MVUE) UCL	8.176		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	7.672	95% BCA Bootstrap UCL	7.674
95% Standard Bootstrap UCL	7.668	95% Bootstrap-t UCL	7.678
95% Hall's Bootstrap UCL	7.666	95% Percentile Bootstrap UCL	7.669
90% Chebyshev(Mean, Sd) UCL	7.754	95% Chebyshev(Mean, Sd) UCL	7.837
97.5% Chebyshev(Mean, Sd) UCL	7.951	99% Chebyshev(Mean, Sd) UCL	8.176

Suggested UCL to Use

95% Student's-t UCL 7.679

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (ph, lab [su]_intrawell_apw-05/05r)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	13
		Number of Missing Observations	0
Minimum	7.18	Mean	7.315
Maximum	7.55	Median	7.305
SD	0.0866	Std. Error of Mean	0.0216
Coefficient of Variation	0.0118	Skewness	1.235

Normal GOF Test

Shapiro Wilk Test Statistic	0.92
1% Shapiro Wilk Critical Value	0.844
Lilliefors Test Statistic	0.148
1% Lilliefors Critical Value	0.248

Shapiro Wilk GOF Test

Data appear Normal at 1% Significance Level

Lilliefors GOF Test

Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL

95% Student's-t UCL 7.353

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	7.358
95% Modified-t UCL (Johnson-1978)	7.354

Gamma GOF Test

A-D Test Statistic	0.799
5% A-D Critical Value	0.736

Anderson-Darling Gamma GOF Test

Data Not Gamma Distributed at 5% Significance Level

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

K-S Test Statistic 0.261

5% K-S Critical Value 0.214

Data Not Gamma Distributed at 5% Significance Level

Kolmogorov-Smirnov Gamma GOF Test

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE) 7680

Theta hat (MLE) 9.5243E-4

nu hat (MLE) 245771

MLE Mean (bias corrected) 7.315

Adjusted Level of Significance 0.0335

k star (bias corrected MLE) 6240

Theta star (bias corrected MLE) 0.00117

nu star (bias corrected) 199690

MLE Sd (bias corrected) 0.0926

Approximate Chi Square Value (0.05) 198652

Adjusted Chi Square Value 198534

Assuming Gamma Distribution

95% Approximate Gamma UCL 7.353

95% Adjusted Gamma UCL 7.358

Lognormal GOF Test

Shapiro Wilk Test Statistic 0.924

10% Shapiro Wilk Critical Value 0.906

Lilliefors Test Statistic 0.146

10% Lilliefors Critical Value 0.196

Data appear Lognormal at 10% Significance Level

Shapiro Wilk Lognormal GOF Test

Data appear Lognormal at 10% Significance Level

Lilliefors Lognormal GOF Test

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data 1.971

Maximum of Logged Data 2.022

Mean of logged Data 1.99

SD of logged Data 0.0118

Assuming Lognormal Distribution

95% H-UCL N/A

95% Chebyshev (MVUE) UCL 7.409

99% Chebyshev (MVUE) UCL 7.529

90% Chebyshev (MVUE) UCL 7.38

97.5% Chebyshev (MVUE) UCL 7.449

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL 7.351

95% Standard Bootstrap UCL 7.349

95% Hall's Bootstrap UCL 7.385

90% Chebyshev(Mean, Sd) UCL 7.38

97.5% Chebyshev(Mean, Sd) UCL 7.45

95% BCA Bootstrap UCL 7.356

95% Bootstrap-t UCL 7.365

95% Percentile Bootstrap UCL 7.349

95% Chebyshev(Mean, Sd) UCL 7.409

99% Chebyshev(Mean, Sd) UCL 7.53

Suggested UCL to Use

95% Student's-t UCL 7.353

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (ph, lab [su]_intrawell_apw-06d)

General Statistics

Total Number of Observations 15

Number of Distinct Observations 12

Number of Missing Observations 0

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Minimum	7.19	Mean	7.295
Maximum	7.73	Median	7.23
SD	0.141	Std. Error of Mean	0.0364
Coefficient of Variation	0.0193	Skewness	2.358

Normal GOF Test

Shapiro Wilk Test Statistic	0.715
1% Shapiro Wilk Critical Value	0.835
Lilliefors Test Statistic	0.227
1% Lilliefors Critical Value	0.255

Shapiro Wilk GOF Test

Data Not Normal at 1% Significance Level

Lilliefors GOF Test

Data appear Normal at 1% Significance Level

Data appear Approximate Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL

95% Student's-t UCL	7.359

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	7.379
95% Modified-t UCL (Johnson-1978)	7.363

Gamma GOF Test

A-D Test Statistic	1.511
5% A-D Critical Value	0.734
K-S Test Statistic	0.245
5% K-S Critical Value	0.221

Anderson-Darling Gamma GOF Test

Data Not Gamma Distributed at 5% Significance Level

Kolmogorov-Smirnov Gamma GOF Test

Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	2948
Theta hat (MLE)	0.00247
nu hat (MLE)	88448
MLE Mean (bias corrected)	7.295
Adjusted Level of Significance	0.0324

k star (bias corrected MLE)	2359
Theta star (bias corrected MLE)	0.00309
nu star (bias corrected)	70760
MLE Sd (bias corrected)	0.15
Approximate Chi Square Value (0.05)	70142
Adjusted Chi Square Value	70066

Assuming Gamma Distribution

95% Approximate Gamma UCL	7.36

95% Adjusted Gamma UCL	7.368

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.723
10% Shapiro Wilk Critical Value	0.901
Lilliefors Test Statistic	0.226
10% Lilliefors Critical Value	0.202

Shapiro Wilk Lognormal GOF Test

Data Not Lognormal at 10% Significance Level

Lilliefors Lognormal GOF Test

Data Not Lognormal at 10% Significance Level

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	1.973
Maximum of Logged Data	2.045

Mean of logged Data	1.987
SD of logged Data	0.0189

Assuming Lognormal Distribution

95% H-UCL	N/A
95% Chebyshev (MVUE) UCL	7.451
99% Chebyshev (MVUE) UCL	7.65

90% Chebyshev (MVUE) UCL	7.402
97.5% Chebyshev (MVUE) UCL	7.518

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Nonparametric Distribution Free UCLs

95% CLT UCL	7.355	95% BCA Bootstrap UCL	7.382
95% Standard Bootstrap UCL	7.353	95% Bootstrap-t UCL	7.408
95% Hall's Bootstrap UCL	7.579	95% Percentile Bootstrap UCL	7.357
90% Chebyshev(Mean, Sd) UCL	7.404	95% Chebyshev(Mean, Sd) UCL	7.454
97.5% Chebyshev(Mean, Sd) UCL	7.522	99% Chebyshev(Mean, Sd) UCL	7.657

Suggested UCL to Use

95% Student's-t UCL 7.359

When a data set follows an approximate distribution passing only one of the GOF tests,
it is suggested to use a UCL based upon a distribution passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (ph, lab [su_intrawell_apw-06s])

General Statistics

Total Number of Observations	16	Number of Distinct Observations	14
		Number of Missing Observations	0
Minimum	7.02	Mean	7.174
Maximum	7.67	Median	7.125
SD	0.161	Std. Error of Mean	0.0403
Coefficient of Variation	0.0225	Skewness	2.182

Normal GOF Test

Shapiro Wilk Test Statistic	0.778
1% Shapiro Wilk Critical Value	0.844
Lilliefors Test Statistic	0.217
1% Lilliefors Critical Value	0.248

Shapiro Wilk GOF Test

Data Not Normal at 1% Significance Level

Lilliefors GOF Test

Data appear Normal at 1% Significance Level

Data appear Approximate Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL

95% Student's-t UCL 7.245

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	7.264
95% Modified-t UCL (Johnson-1978)	7.249

Gamma GOF Test

A-D Test Statistic	1.123
5% A-D Critical Value	0.736
K-S Test Statistic	0.208
5% K-S Critical Value	0.214

Anderson-Darling Gamma GOF Test

Data Not Gamma Distributed at 5% Significance Level

Kolmogorov-Smirnov Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

Detected data follow Appr. Gamma Distribution at 5% Significance Level

Gamma Statistics

k hat (MLE)	2174	k star (bias corrected MLE)	1766
Theta hat (MLE)	0.0033	Theta star (bias corrected MLE)	0.00406
nu hat (MLE)	69567	nu star (bias corrected)	56525
MLE Mean (bias corrected)	7.174	MLE Sd (bias corrected)	0.171
		Approximate Chi Square Value (0.05)	55973
Adjusted Level of Significance	0.0335	Adjusted Chi Square Value	55911

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Assuming Gamma Distribution

95% Approximate Gamma UCL	7.245	95% Adjusted Gamma UCL	7.253

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.788	Shapiro Wilk Lognormal GOF Test
10% Shapiro Wilk Critical Value	0.906	Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.211	Lilliefors Lognormal GOF Test
10% Lilliefors Critical Value	0.196	Data Not Lognormal at 10% Significance Level

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	1.949	Mean of logged Data	1.97
Maximum of Logged Data	2.037	SD of logged Data	0.022

Assuming Lognormal Distribution

95% H-UCL	N/A	90% Chebyshev (MVUE) UCL	7.293
95% Chebyshev (MVUE) UCL	7.346	97.5% Chebyshev (MVUE) UCL	7.421
99% Chebyshev (MVUE) UCL	7.567		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	7.241	95% BCA Bootstrap UCL	7.263
95% Standard Bootstrap UCL	7.238	95% Bootstrap-t UCL	7.307
95% Hall's Bootstrap UCL	7.582	95% Percentile Bootstrap UCL	7.242
90% Chebyshev(Mean, Sd) UCL	7.295	95% Chebyshev(Mean, Sd) UCL	7.35
97.5% Chebyshev(Mean, Sd) UCL	7.426	99% Chebyshev(Mean, Sd) UCL	7.575

Suggested UCL to Use

95% Student's-t UCL	7.245

When a data set follows an approximate distribution passing only one of the GOF tests, it is suggested to use a UCL based upon a distribution passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (ph, lab [su]_intrawell_apw-07)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	13
		Number of Missing Observations	0
Minimum	6.78	Mean	6.929
Maximum	7.31	Median	6.875
SD	0.149	Std. Error of Mean	0.0372
Coefficient of Variation	0.0215	Skewness	1.719

Normal GOF Test

Shapiro Wilk Test Statistic	0.792	Shapiro Wilk GOF Test
1% Shapiro Wilk Critical Value	0.844	Data Not Normal at 1% Significance Level

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Lilliefors Test Statistic	0.253	Lilliefors GOF Test
1% Lilliefors Critical Value	0.248	Data Not Normal at 1% Significance Level
Data Not Normal at 1% Significance Level		

Assuming Normal Distribution

95% Normal UCL

95% Student's-t UCL	6.994

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	7.007
95% Modified-t UCL (Johnson-1978)	6.997

Gamma GOF Test

A-D Test Statistic	1.322
5% A-D Critical Value	0.736
K-S Test Statistic	0.265
5% K-S Critical Value	0.214

Anderson-Darling Gamma GOF Test

Data Not Gamma Distributed at 5% Significance Level

Kolmogorov-Smirnov Gamma GOF Test

Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	2364
Theta hat (MLE)	0.00293
nu hat (MLE)	75649
MLE Mean (bias corrected)	6.929
Adjusted Level of Significance	0.0335

k star (bias corrected MLE)	1921
Theta star (bias corrected MLE)	0.00361
nu star (bias corrected)	61466
MLE Sd (bias corrected)	0.158
Approximate Chi Square Value (0.05)	60891
Adjusted Chi Square Value	60826

Assuming Gamma Distribution

95% Approximate Gamma UCL	6.994

95% Adjusted Gamma UCL	7.002

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.799
10% Shapiro Wilk Critical Value	0.906
Lilliefors Test Statistic	0.252
10% Lilliefors Critical Value	0.196

Shapiro Wilk Lognormal GOF Test

Data Not Lognormal at 10% Significance Level

Lilliefors Lognormal GOF Test

Data Not Lognormal at 10% Significance Level

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	1.914
Maximum of Logged Data	1.989

Mean of logged Data	1.935
SD of logged Data	0.0211

Assuming Lognormal Distribution

95% H-UCL	N/A
95% Chebyshev (MVUE) UCL	7.088
99% Chebyshev (MVUE) UCL	7.293

90% Chebyshev (MVUE) UCL	7.039
97.5% Chebyshev (MVUE) UCL	7.157

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	6.99
95% Standard Bootstrap UCL	6.988
95% Hall's Bootstrap UCL	7.337
90% Chebyshev(Mean, Sd) UCL	7.04
97.5% Chebyshev(Mean, Sd) UCL	7.161

95% BCA Bootstrap UCL	7.008
95% Bootstrap-t UCL	7.053
95% Percentile Bootstrap UCL	6.991
95% Chebyshev(Mean, Sd) UCL	7.091
99% Chebyshev(Mean, Sd) UCL	7.299

Suggested UCL to Use

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
From File filea1b878952361.xls
Full Precision OFF
Confidence Coefficient 95%
Number of Bootstrap Operations 2000

95% Student's-t UCL 6.994

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (ph, lab [su]_intrawell_apw-08)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	13
		Number of Missing Observations	0
Minimum	7	Mean	7.208
Maximum	7.68	Median	7.17
SD	0.181	Std. Error of Mean	0.0454
Coefficient of Variation	0.0252	Skewness	1.263

Normal GOF Test

Shapiro Wilk Test Statistic	0.893	Shapiro Wilk GOF Test
1% Shapiro Wilk Critical Value	0.844	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.126	Lilliefors GOF Test
1% Lilliefors Critical Value	0.248	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL

95% Student's-t UCL 7.288

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	7.298
95% Modified-t UCL (Johnson-1978)	7.29

Gamma GOF Test

A-D Test Statistic	0.532	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.736	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.131	Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value	0.214	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1713	k star (bias corrected MLE)	1392
Theta hat (MLE)	0.00421	Theta star (bias corrected MLE)	0.00518
nu hat (MLE)	54807	nu star (bias corrected)	44532
MLE Mean (bias corrected)	7.208	MLE Sd (bias corrected)	0.193
		Approximate Chi Square Value (0.05)	44042
Adjusted Level of Significance	0.0335	Adjusted Chi Square Value	43987

Assuming Gamma Distribution

95% Approximate Gamma UCL	7.288	95% Adjusted Gamma UCL	7.297

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.9	Shapiro Wilk Lognormal GOF Test
10% Shapiro Wilk Critical Value	0.906	Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.123	Lilliefors Lognormal GOF Test
10% Lilliefors Critical Value	0.196	Data appear Lognormal at 10% Significance Level

Data appear Approximate Lognormal at 10% Significance Level

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
From File filea1b878952361.xls
Full Precision OFF
Confidence Coefficient 95%
Number of Bootstrap Operations 2000

Lognormal Statistics

Minimum of Logged Data	1.946	Mean of logged Data	1.975
Maximum of Logged Data	2.039	SD of logged Data	0.0248

Assuming Lognormal Distribution

95% H-UCL	N/A	90% Chebyshev (MVUE) UCL	7.342
95% Chebyshev (MVUE) UCL	7.403	97.5% Chebyshev (MVUE) UCL	7.488
99% Chebyshev (MVUE) UCL	7.654		

Nonparametric Distribution Free UCL Statistics Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	7.283	95% BCA Bootstrap UCL	7.296
95% Standard Bootstrap UCL	7.28	95% Bootstrap-t UCL	7.315
95% Hall's Bootstrap UCL	7.341	95% Percentile Bootstrap UCL	7.283
90% Chebyshev(Mean, Sd) UCL	7.344	95% Chebyshev(Mean, Sd) UCL	7.406
97.5% Chebyshev(Mean, Sd) UCL	7.491	99% Chebyshev(Mean, Sd) UCL	7.66

Suggested UCL to Use

95% Student's-t UCL 7.288

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (ph, lab [su]_intrawell_apw-10d)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	13
		Number of Missing Observations	0
Minimum	6.98	Mean	7.173
Maximum	7.66	Median	7.115
SD	0.191	Std. Error of Mean	0.0477
Coefficient of Variation	0.0266	Skewness	1.765

Normal GOF Test

Shapiro Wilk Test Statistic	0.781
1% Shapiro Wilk Critical Value	0.844
Lilliefors Test Statistic	0.236
1% Lilliefors Critical Value	0.248

Shapiro Wilk GOF Test

Data Not Normal at 1% Significance Level

Lilliefors GOF Test

Data appear Normal at 1% Significance Level

Data appear Approximate Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL

95% Student's-t UCL 7.257

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	7.274
95% Modified-t UCL (Johnson-1978)	7.26

Gamma GOF Test

A-D Test Statistic	1.363
5% A-D Critical Value	0.736
K-S Test Statistic	0.239
5% K-S Critical Value	0.214

Anderson-Darling Gamma GOF Test

Data Not Gamma Distributed at 5% Significance Level

Kolmogorov-Smirnov Gamma GOF Test

Data Not Gamma Distributed at 5% Significance Level

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1549	k star (bias corrected MLE)	1258
Theta hat (MLE)	0.00463	Theta star (bias corrected MLE)	0.0057
nu hat (MLE)	49564	nu star (bias corrected)	40272
MLE Mean (bias corrected)	7.173	MLE Sd (bias corrected)	0.202
		Approximate Chi Square Value (0.05)	39806
Adjusted Level of Significance	0.0335	Adjusted Chi Square Value	39753

Assuming Gamma Distribution

95% Approximate Gamma UCL	7.257	95% Adjusted Gamma UCL	7.267

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.79
10% Shapiro Wilk Critical Value	0.906
Lilliefors Test Statistic	0.232
10% Lilliefors Critical Value	0.196

Shapiro Wilk Lognormal GOF Test

Data Not Lognormal at 10% Significance Level
Lilliefors Lognormal GOF Test
Data Not Lognormal at 10% Significance Level

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	1.943	Mean of logged Data	1.97
Maximum of Logged Data	2.036	SD of logged Data	0.0261

Assuming Lognormal Distribution

95% H-UCL	N/A	90% Chebyshev (MVUE) UCL	7.313
95% Chebyshev (MVUE) UCL	7.377	97.5% Chebyshev (MVUE) UCL	7.465
99% Chebyshev (MVUE) UCL	7.638		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	7.252	95% BCA Bootstrap UCL	7.274
95% Standard Bootstrap UCL	7.25	95% Bootstrap-t UCL	7.348
95% Hall's Bootstrap UCL	7.697	95% Percentile Bootstrap UCL	7.255
90% Chebyshev(Mean, Sd) UCL	7.316	95% Chebyshev(Mean, Sd) UCL	7.381
97.5% Chebyshev(Mean, Sd) UCL	7.471	99% Chebyshev(Mean, Sd) UCL	7.648

Suggested UCL to Use

95% Student's-t UCL	7.257

When a data set follows an approximate distribution passing only one of the GOF tests, it is suggested to use a UCL based upon a distribution passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (ph, lab [su_intrawell_apw-10s)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	12

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
 From File filea1b878952361.xls
 Full Precision OFF
 Confidence Coefficient 95%
 Number of Bootstrap Operations 2000

		Number of Missing Observations	0
Minimum	6.91	Mean	7.063
Maximum	7.58	Median	7
SD	0.165	Std. Error of Mean	0.0413
Coefficient of Variation	0.0234	Skewness	2.264
Normal GOF Test			
Shapiro Wilk Test Statistic	0.744	Shapiro Wilk GOF Test	
1% Shapiro Wilk Critical Value	0.844	Data Not Normal at 1% Significance Level	
Lilliefors Test Statistic	0.251	Lilliefors GOF Test	
1% Lilliefors Critical Value	0.248	Data Not Normal at 1% Significance Level	
Data Not Normal at 1% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	7.136	95% Adjusted-CLT UCL (Chen-1995)	7.156
		95% Modified-t UCL (Johnson-1978)	7.139
Gamma GOF Test			
A-D Test Statistic	1.389	Anderson-Darling Gamma GOF Test	
5% A-D Critical Value	0.736	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.259	Kolmogorov-Smirnov Gamma GOF Test	
5% K-S Critical Value	0.214	Data Not Gamma Distributed at 5% Significance Level	
Data Not Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	2006	k star (bias corrected MLE)	1630
Theta hat (MLE)	0.00352	Theta star (bias corrected MLE)	0.00433
nu hat (MLE)	64187	nu star (bias corrected)	52153
MLE Mean (bias corrected)	7.063	MLE Sd (bias corrected)	0.175
		Approximate Chi Square Value (0.05)	51623
Adjusted Level of Significance	0.0335	Adjusted Chi Square Value	51563
Assuming Gamma Distribution			
95% Approximate Gamma UCL	7.136	95% Adjusted Gamma UCL	7.144
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.755	Shapiro Wilk Lognormal GOF Test	
10% Shapiro Wilk Critical Value	0.906	Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.25	Lilliefors Lognormal GOF Test	
10% Lilliefors Critical Value	0.196	Data Not Lognormal at 10% Significance Level	
Data Not Lognormal at 10% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	1.933	Mean of logged Data	1.955
Maximum of Logged Data	2.026	SD of logged Data	0.0229
Assuming Lognormal Distribution			
95% H-UCL	N/A	90% Chebyshev (MVUE) UCL	7.184
95% Chebyshev (MVUE) UCL	7.239	97.5% Chebyshev (MVUE) UCL	7.316
99% Chebyshev (MVUE) UCL	7.465		
Nonparametric Distribution Free UCL Statistics			
Data do not follow a Discernible Distribution			

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Nonparametric Distribution Free UCLs

95% CLT UCL	7.131	95% BCA Bootstrap UCL	7.158
95% Standard Bootstrap UCL	7.129	95% Bootstrap-t UCL	7.196
95% Hall's Bootstrap UCL	7.395	95% Percentile Bootstrap UCL	7.133
90% Chebyshev(Mean, Sd) UCL	7.187	95% Chebyshev(Mean, Sd) UCL	7.243
97.5% Chebyshev(Mean, Sd) UCL	7.321	99% Chebyshev(Mean, Sd) UCL	7.474

Suggested UCL to Use

95% Student's-t UCL 7.136

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. Recommendations are based upon data size, data distribution, and skewness using results from simulation studies. However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (radium-226/228 [pci/l]_intrawell_apw-02)

General Statistics

Total Number of Observations	15	Number of Distinct Observations	8
		Number of Missing Observations	0
Minimum	0.476	Mean	1.967
Maximum	4.09	Median	2
SD	0.862	Std. Error of Mean	0.223
Coefficient of Variation	0.438	Skewness	0.64

Normal GOF Test

Shapiro Wilk Test Statistic	0.866
1% Shapiro Wilk Critical Value	0.835
Lilliefors Test Statistic	0.285
1% Lilliefors Critical Value	0.255

Shapiro Wilk GOF Test

Data appear Normal at 1% Significance Level

Lilliefors GOF Test

Data Not Normal at 1% Significance Level

Data appear Approximate Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL

95% Student's-t UCL 2.359

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	2.373
95% Modified-t UCL (Johnson-1978)	2.365

Gamma GOF Test

A-D Test Statistic	1.221
5% A-D Critical Value	0.739
K-S Test Statistic	0.309
5% K-S Critical Value	0.222

Anderson-Darling Gamma GOF Test

Data Not Gamma Distributed at 5% Significance Level

Kolmogorov-Smirnov Gamma GOF Test

Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	4.69	k star (bias corrected MLE)	3.797
Theta hat (MLE)	0.419	Theta star (bias corrected MLE)	0.518
nu hat (MLE)	140.7	nu star (bias corrected)	113.9
MLE Mean (bias corrected)	1.967	MLE Sd (bias corrected)	1.01
		Approximate Chi Square Value (0.05)	90.27
Adjusted Level of Significance	0.0324	Adjusted Chi Square Value	87.68

Assuming Gamma Distribution

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
From File filea1b878952361.xls
Full Precision OFF
Confidence Coefficient 95%
Number of Bootstrap Operations 2000

95% Approximate Gamma UCL 2.482 95% Adjusted Gamma UCL 2.556

Lognormal GOF Test

Shapiro Wilk Test Statistic 0.824
10% Shapiro Wilk Critical Value 0.901
Lilliefors Test Statistic 0.328
10% Lilliefors Critical Value 0.202

Shapiro Wilk Lognormal GOF Test

Data Not Lognormal at 10% Significance Level

Lilliefors Lognormal GOF Test

Data Not Lognormal at 10% Significance Level

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data -0.742
Maximum of Logged Data 1.409
Mean of logged Data 0.566
SD of logged Data 0.531

Assuming Lognormal Distribution

95% H-UCL 2.735
95% Chebyshev (MVUE) UCL 3.249
99% Chebyshev (MVUE) UCL 4.84
90% Chebyshev (MVUE) UCL 2.862
97.5% Chebyshev (MVUE) UCL 3.786

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL 2.333
95% Standard Bootstrap UCL 2.31
95% Hall's Bootstrap UCL 2.567
90% Chebyshev(Mean, Sd) UCL 2.635
97.5% Chebyshev(Mean, Sd) UCL 3.358
95% BCA Bootstrap UCL 2.342
95% Bootstrap-t UCL 2.397
95% Percentile Bootstrap UCL 2.319
95% Chebyshev(Mean, Sd) UCL 2.938
99% Chebyshev(Mean, Sd) UCL 4.182

Suggested UCL to Use

95% Student's-t UCL 2.359

When a data set follows an approximate distribution passing only one of the GOF tests,
it is suggested to use a UCL based upon a distribution passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (radium-226/228 [pci/l]_intrawell_apw-03)

General Statistics

Total Number of Observations 16
Minimum 0.776
Maximum 3.18
SD 0.492
Coefficient of Variation 0.246
Number of Distinct Observations 6
Number of Missing Observations 0
Mean 2
Median 2
Std. Error of Mean 0.123
Skewness -0.155

Normal GOF Test

Shapiro Wilk Test Statistic 0.737
1% Shapiro Wilk Critical Value 0.844
Lilliefors Test Statistic 0.375
1% Lilliefors Critical Value 0.248

Shapiro Wilk GOF Test

Data Not Normal at 1% Significance Level

Lilliefors GOF Test

Data Not Normal at 1% Significance Level

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Data Not Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL

95% Student's-t UCL	2.215

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	2.197
95% Modified-t UCL (Johnson-1978)	2.215

Gamma GOF Test

A-D Test Statistic	2.509
5% A-D Critical Value	0.738
K-S Test Statistic	0.41
5% K-S Critical Value	0.215

Anderson-Darling Gamma GOF Test

Data Not Gamma Distributed at 5% Significance Level

Kolmogorov-Smirnov Gamma GOF Test

Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	14.43
Theta hat (MLE)	0.139
nu hat (MLE)	461.8
MLE Mean (bias corrected)	2
Adjusted Level of Significance	0.0335

k star (bias corrected MLE)	11.77
Theta star (bias corrected MLE)	0.17
nu star (bias corrected)	376.6
MLE Sd (bias corrected)	0.583
Approximate Chi Square Value (0.05)	332.6
Adjusted Chi Square Value	327.9

Assuming Gamma Distribution

95% Approximate Gamma UCL	2.264

95% Adjusted Gamma UCL	2.297

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.668
10% Shapiro Wilk Critical Value	0.906
Lilliefors Test Statistic	0.423
10% Lilliefors Critical Value	0.196

Shapiro Wilk Lognormal GOF Test

Data Not Lognormal at 10% Significance Level

Lilliefors Lognormal GOF Test

Data Not Lognormal at 10% Significance Level

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	-0.254
Maximum of Logged Data	1.157

Mean of logged Data	0.658
SD of logged Data	0.295

Assuming Lognormal Distribution

95% H-UCL	2.324
95% Chebyshev (MVUE) UCL	2.664
99% Chebyshev (MVUE) UCL	3.501

90% Chebyshev (MVUE) UCL	2.46
97.5% Chebyshev (MVUE) UCL	2.946

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	2.202
95% Standard Bootstrap UCL	2.198
95% Hall's Bootstrap UCL	2.279
90% Chebyshev(Mean, Sd) UCL	2.369
97.5% Chebyshev(Mean, Sd) UCL	2.768

95% BCA Bootstrap UCL	2.183
95% Bootstrap-t UCL	2.214
95% Percentile Bootstrap UCL	2.187
95% Chebyshev(Mean, Sd) UCL	2.536
99% Chebyshev(Mean, Sd) UCL	3.224

Suggested UCL to Use

95% Student's-t UCL	2.215

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. Recommendations are based upon data size, data distribution, and skewness using results from simulation studies. However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positively skewed data sets.

report_result_value (radium-226/228 [pci/l]_intrawell_apw-05/05r)

General Statistics

Total Number of Observations	15	Number of Distinct Observations	6
		Number of Missing Observations	0
Minimum	0.798	Mean	2.282
Maximum	6.34	Median	2
SD	1.278	Std. Error of Mean	0.33
Coefficient of Variation	0.56	Skewness	2.627

Normal GOF Test

Shapiro Wilk Test Statistic	0.599	Shapiro Wilk GOF Test
1% Shapiro Wilk Critical Value	0.835	Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.454	Lilliefors GOF Test
1% Lilliefors Critical Value	0.255	Data Not Normal at 1% Significance Level

Data Not Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL

95% Student's-t UCL	2.863

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	3.064
95% Modified-t UCL (Johnson-1978)	2.901

Gamma GOF Test

A-D Test Statistic	2.319	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.739	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.423	Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value	0.222	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	5.095	k star (bias corrected MLE)	4.121
Theta hat (MLE)	0.448	Theta star (bias corrected MLE)	0.554
nu hat (MLE)	152.9	nu star (bias corrected)	123.6
MLE Mean (bias corrected)	2.282	MLE Sd (bias corrected)	1.124
		Approximate Chi Square Value (0.05)	98.95
Adjusted Level of Significance	0.0324	Adjusted Chi Square Value	96.23

Assuming Gamma Distribution

95% Approximate Gamma UCL	2.851	95% Adjusted Gamma UCL	2.931

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.744	Shapiro Wilk Lognormal GOF Test
10% Shapiro Wilk Critical Value	0.901	Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.394	Lilliefors Lognormal GOF Test
10% Lilliefors Critical Value	0.202	Data Not Lognormal at 10% Significance Level

Data Not Lognormal at 10% Significance Level

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Lognormal Statistics

Minimum of Logged Data	-0.226	Mean of logged Data	0.724
Maximum of Logged Data	1.847	SD of logged Data	0.439

Assuming Lognormal Distribution

95% H-UCL	2.874	90% Chebyshev (MVUE) UCL	3.041
95% Chebyshev (MVUE) UCL	3.397	97.5% Chebyshev (MVUE) UCL	3.89
99% Chebyshev (MVUE) UCL	4.861		

Nonparametric Distribution Free UCL Statistics Data do not follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	2.825	95% BCA Bootstrap UCL	3.141
95% Standard Bootstrap UCL	2.806	95% Bootstrap-t UCL	3.955
95% Hall's Bootstrap UCL	6.71	95% Percentile Bootstrap UCL	2.836
90% Chebyshev(Mean, Sd) UCL	3.272	95% Chebyshev(Mean, Sd) UCL	3.721
97.5% Chebyshev(Mean, Sd) UCL	4.343	99% Chebyshev(Mean, Sd) UCL	5.566

Suggested UCL to Use

95% Student's-t UCL	2.863

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. Recommendations are based upon data size, data distribution, and skewness using results from simulation studies. However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (radium-226/228 [pci/l]_intrawell_apw-06d)

General Statistics

Total Number of Observations	15	Number of Distinct Observations	5
		Number of Missing Observations	0
Minimum	1.38	Mean	1.985
Maximum	2.8	Median	2
SD	0.281	Std. Error of Mean	0.0726
Coefficient of Variation	0.142	Skewness	1.138

Normal GOF Test

Shapiro Wilk Test Statistic	0.657
1% Shapiro Wilk Critical Value	0.835
Lilliefors Test Statistic	0.412
1% Lilliefors Critical Value	0.255

Shapiro Wilk GOF Test

Data Not Normal at 1% Significance Level

Lilliefors GOF Test

Data Not Normal at 1% Significance Level

Data Not Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL

95% Student's-t UCL	2.112

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	2.127
95% Modified-t UCL (Johnson-1978)	2.116

Gamma GOF Test

A-D Test Statistic	2.542
5% A-D Critical Value	0.734
K-S Test Statistic	0.393

Anderson-Darling Gamma GOF Test

Data Not Gamma Distributed at 5% Significance Level

Kolmogorov-Smirnov Gamma GOF Test

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
From File filea1b878952361.xls
Full Precision OFF
Confidence Coefficient 95%
Number of Bootstrap Operations 2000

5% K-S Critical Value 0.221 Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	55.47	k star (bias corrected MLE)	44.42
Theta hat (MLE)	0.0358	Theta star (bias corrected MLE)	0.0447
nu hat (MLE)	1664	nu star (bias corrected)	1332
MLE Mean (bias corrected)	1.985	MLE Sd (bias corrected)	0.298
		Approximate Chi Square Value (0.05)	1249
Adjusted Level of Significance	0.0324	Adjusted Chi Square Value	1239

Assuming Gamma Distribution

95% Approximate Gamma UCL	2.118	95% Adjusted Gamma UCL	2.135

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.678	Shapiro Wilk Lognormal GOF Test
10% Shapiro Wilk Critical Value	0.901	Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.385	Lilliefors Lognormal GOF Test
10% Lilliefors Critical Value	0.202	Data Not Lognormal at 10% Significance Level

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	0.322	Mean of logged Data	0.676
Maximum of Logged Data	1.03	SD of logged Data	0.139

Assuming Lognormal Distribution

95% H-UCL	2.121	90% Chebyshev (MVUE) UCL	2.199
95% Chebyshev (MVUE) UCL	2.296	97.5% Chebyshev (MVUE) UCL	2.431
99% Chebyshev (MVUE) UCL	2.695		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	2.104	95% BCA Bootstrap UCL	2.121
95% Standard Bootstrap UCL	2.099	95% Bootstrap-t UCL	2.126
95% Hall's Bootstrap UCL	2.282	95% Percentile Bootstrap UCL	2.107
90% Chebyshev(Mean, Sd) UCL	2.202	95% Chebyshev(Mean, Sd) UCL	2.301
97.5% Chebyshev(Mean, Sd) UCL	2.438	99% Chebyshev(Mean, Sd) UCL	2.707

Suggested UCL to Use

95% Student's-t UCL	2.112

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (radium-226/228 [pci/l]_intrawell_apw-06s)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	6
		Number of Missing Observations	0
Minimum	0.497	Mean	1.869

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Maximum	2.93	Median	2
SD	0.516	Std. Error of Mean	0.129
Coefficient of Variation	0.276	Skewness	-1.069

Normal GOF Test

Shapiro Wilk Test Statistic	0.709
1% Shapiro Wilk Critical Value	0.844
Lilliefors Test Statistic	0.36
1% Lilliefors Critical Value	0.248

Shapiro Wilk GOF Test

Data Not Normal at 1% Significance Level

Lilliefors GOF Test

Data Not Normal at 1% Significance Level

Data Not Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL

95% Student's-t UCL	2.095

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	2.044
95% Modified-t UCL (Johnson-1978)	2.089

Gamma GOF Test

A-D Test Statistic	2.826
5% A-D Critical Value	0.739
K-S Test Statistic	0.395
5% K-S Critical Value	0.215

Anderson-Darling Gamma GOF Test

Data Not Gamma Distributed at 5% Significance Level

Kolmogorov-Smirnov Gamma GOF Test

Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	9.134
Theta hat (MLE)	0.205
nu hat (MLE)	292.3
MLE Mean (bias corrected)	1.869
Adjusted Level of Significance	0.0335

k star (bias corrected MLE)	7.463

Theta star (bias corrected MLE)	0.25

nu star (bias corrected)	238.8

MLE Sd (bias corrected)	0.684

Approximate Chi Square Value (0.05)	204

Adjusted Chi Square Value	200.4

Assuming Gamma Distribution

95% Approximate Gamma UCL	2.187

95% Adjusted Gamma UCL	2.227

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.606
10% Shapiro Wilk Critical Value	0.906
Lilliefors Test Statistic	0.401
10% Lilliefors Critical Value	0.196

Shapiro Wilk Lognormal GOF Test

Data Not Lognormal at 10% Significance Level

Lilliefors Lognormal GOF Test

Data Not Lognormal at 10% Significance Level

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	-0.699
Maximum of Logged Data	1.075

Mean of logged Data	0.569

SD of logged Data	0.394

Assuming Lognormal Distribution

95% H-UCL	2.328
95% Chebyshev (MVUE) UCL	2.732
99% Chebyshev (MVUE) UCL	3.799

90% Chebyshev (MVUE) UCL	2.473

97.5% Chebyshev (MVUE) UCL	3.092

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Nonparametric Distribution Free UCLs

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

95% CLT UCL	2.081	95% BCA Bootstrap UCL	2.021
95% Standard Bootstrap UCL	2.07	95% Bootstrap-t UCL	2.056
95% Hall's Bootstrap UCL	2.058	95% Percentile Bootstrap UCL	2.054
90% Chebyshev(Mean, Sd) UCL	2.256	95% Chebyshev(Mean, Sd) UCL	2.431
97.5% Chebyshev(Mean, Sd) UCL	2.675	99% Chebyshev(Mean, Sd) UCL	3.153

Suggested UCL to Use

95% Student's-t UCL 2.095

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. Recommendations are based upon data size, data distribution, and skewness using results from simulation studies. However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positively skewed data sets.

report_result_value (radium-226/228 [pci/l]_intrawell_apw-07)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	5
		Number of Missing Observations	0
Minimum	1.1	Mean	1.949
Maximum	2.7	Median	2
SD	0.344	Std. Error of Mean	0.086
Coefficient of Variation	0.176	Skewness	-0.884

Normal GOF Test

Shapiro Wilk Test Statistic	0.652	Shapiro Wilk GOF Test
1% Shapiro Wilk Critical Value	0.844	Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.434	Lilliefors GOF Test
1% Lilliefors Critical Value	0.248	Data Not Normal at 1% Significance Level

Data Not Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	2.1	95% Adjusted-CLT UCL (Chen-1995)	2.07
		95% Modified-t UCL (Johnson-1978)	2.097

Gamma GOF Test

A-D Test Statistic	3.26	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.736	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.454	Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value	0.215	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	29.02	k star (bias corrected MLE)	23.62
Theta hat (MLE)	0.0672	Theta star (bias corrected MLE)	0.0825
nu hat (MLE)	928.7	nu star (bias corrected)	755.9
MLE Mean (bias corrected)	1.949	MLE Sd (bias corrected)	0.401
		Approximate Chi Square Value (0.05)	693.1
Adjusted Level of Significance	0.0335	Adjusted Chi Square Value	686.3

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
 From File filea1b878952361.xls
 Full Precision OFF
 Confidence Coefficient 95%
 Number of Bootstrap Operations 2000

Assuming Gamma Distribution

95% Approximate Gamma UCL 2.126 95% Adjusted Gamma UCL 2.147

Lognormal GOF Test

Shapiro Wilk Test Statistic 0.616	Shapiro Wilk Lognormal GOF Test
10% Shapiro Wilk Critical Value 0.906	Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic 0.459	Lilliefors Lognormal GOF Test
10% Lilliefors Critical Value 0.196	Data Not Lognormal at 10% Significance Level

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data 0.0953	Mean of logged Data 0.65
Maximum of Logged Data 0.993	SD of logged Data 0.202

Assuming Lognormal Distribution

95% H-UCL 2.148	90% Chebyshev (MVUE) UCL 2.251
95% Chebyshev (MVUE) UCL 2.385	97.5% Chebyshev (MVUE) UCL 2.572
99% Chebyshev (MVUE) UCL 2.94	

Nonparametric Distribution Free UCL Statistics Data do not follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL 2.091	95% BCA Bootstrap UCL 2.056
95% Standard Bootstrap UCL 2.088	95% Bootstrap-t UCL 2.084
95% Hall's Bootstrap UCL 2.092	95% Percentile Bootstrap UCL 2.087
90% Chebyshev(Mean, Sd) UCL 2.207	95% Chebyshev(Mean, Sd) UCL 2.324
97.5% Chebyshev(Mean, Sd) UCL 2.486	99% Chebyshev(Mean, Sd) UCL 2.805

Suggested UCL to Use

95% Student's-t UCL 2.1

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positively skewed data sets.

report_result_value (radium-226/228 [pci/l]_intrawell_apw-08)

General Statistics

Total Number of Observations 16	Number of Distinct Observations 6
	Number of Missing Observations 0
Minimum 0.611	Mean 1.839
Maximum 2.39	Median 2
SD 0.478	Std. Error of Mean 0.119
Coefficient of Variation 0.26	Skewness -2.082

Normal GOF Test

Shapiro Wilk Test Statistic 0.605	Shapiro Wilk GOF Test
1% Shapiro Wilk Critical Value 0.844	Data Not Normal at 1% Significance Level
Lilliefors Test Statistic 0.444	Lilliefors GOF Test

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

1% Lilliefors Critical Value 0.248 Data Not Normal at 1% Significance Level

Data Not Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL

95% Student's-t UCL 2.049

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	1.969
95% Modified-t UCL (Johnson-1978)	2.038

Gamma GOF Test

A-D Test Statistic	3.55
5% A-D Critical Value	0.739
K-S Test Statistic	0.457
5% K-S Critical Value	0.215

Anderson-Darling Gamma GOF Test

Data Not Gamma Distributed at 5% Significance Level

Kolmogorov-Smirnov Gamma GOF Test

Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	9.635
Theta hat (MLE)	0.191
nu hat (MLE)	308.3
MLE Mean (bias corrected)	1.839
Adjusted Level of Significance	0.0335

k star (bias corrected MLE)	7.87
Theta star (bias corrected MLE)	0.234
nu star (bias corrected)	251.8
MLE Sd (bias corrected)	0.656
Approximate Chi Square Value (0.05)	216.1
Adjusted Chi Square Value	212.3

Assuming Gamma Distribution

95% Approximate Gamma UCL	2.143	95% Adjusted Gamma UCL	2.181

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.539
10% Shapiro Wilk Critical Value	0.906
Lilliefors Test Statistic	0.452
10% Lilliefors Critical Value	0.196

Shapiro Wilk Lognormal GOF Test

Data Not Lognormal at 10% Significance Level

Lilliefors Lognormal GOF Test

Data Not Lognormal at 10% Significance Level

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	-0.493
Maximum of Logged Data	0.871

Mean of logged Data	0.556
SD of logged Data	0.382

Assuming Lognormal Distribution

95% H-UCL	2.272
95% Chebyshev (MVUE) UCL	2.66
99% Chebyshev (MVUE) UCL	3.677

90% Chebyshev (MVUE) UCL	2.413
97.5% Chebyshev (MVUE) UCL	3.003

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	2.036
95% Standard Bootstrap UCL	2.031
95% Hall's Bootstrap UCL	1.981
90% Chebyshev(Mean, Sd) UCL	2.198
97.5% Chebyshev(Mean, Sd) UCL	2.585

95% BCA Bootstrap UCL	1.981
95% Bootstrap-t UCL	1.999
95% Percentile Bootstrap UCL	2.015
95% Chebyshev(Mean, Sd) UCL	2.36
99% Chebyshev(Mean, Sd) UCL	3.028

Suggested UCL to Use

95% Student's-t UCL 2.049

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. Recommendations are based upon data size, data distribution, and skewness using results from simulation studies. However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positively skewed data sets.

report_result_value (radium-226/228 [pci/l]_intrawell_apw-10d)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	5
		Number of Missing Observations	0
Minimum	1.03	Mean	1.833
Maximum	2	Median	2
SD	0.314	Std. Error of Mean	0.0785
Coefficient of Variation	0.171	Skewness	-1.669

Normal GOF Test

Shapiro Wilk Test Statistic	0.602	Shapiro Wilk GOF Test
1% Shapiro Wilk Critical Value	0.844	Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.452	Lilliefors GOF Test
1% Lilliefors Critical Value	0.248	Data Not Normal at 1% Significance Level

Data Not Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	1.971	95% Adjusted-CLT UCL (Chen-1995)	1.927
		95% Modified-t UCL (Johnson-1978)	1.965

Gamma GOF Test

A-D Test Statistic	3.193	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.736	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.455	Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value	0.215	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	29.37	k star (bias corrected MLE)	23.9
Theta hat (MLE)	0.0624	Theta star (bias corrected MLE)	0.0767
nu hat (MLE)	939.8	nu star (bias corrected)	764.9
MLE Mean (bias corrected)	1.833	MLE Sd (bias corrected)	0.375
		Approximate Chi Square Value (0.05)	701.8
Adjusted Level of Significance	0.0335	Adjusted Chi Square Value	694.9

Assuming Gamma Distribution

95% Approximate Gamma UCL	1.998	95% Adjusted Gamma UCL	2.018

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.597	Shapiro Wilk Lognormal GOF Test
10% Shapiro Wilk Critical Value	0.906	Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.447	Lilliefors Lognormal GOF Test
10% Lilliefors Critical Value	0.196	Data Not Lognormal at 10% Significance Level

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
From File filea1b878952361.xls
Full Precision OFF
Confidence Coefficient 95%
Number of Bootstrap Operations 2000

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	0.0296	Mean of logged Data	0.589
Maximum of Logged Data	0.693	SD of logged Data	0.202

Assuming Lognormal Distribution

95% H-UCL	2.02	90% Chebyshev (MVUE) UCL	2.117
95% Chebyshev (MVUE) UCL	2.244	97.5% Chebyshev (MVUE) UCL	2.42
99% Chebyshev (MVUE) UCL	2.765		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	1.962	95% BCA Bootstrap UCL	1.93
95% Standard Bootstrap UCL	1.955	95% Bootstrap-t UCL	1.94
95% Hall's Bootstrap UCL	1.929	95% Percentile Bootstrap UCL	1.941
90% Chebyshev(Mean, Sd) UCL	2.069	95% Chebyshev(Mean, Sd) UCL	2.175
97.5% Chebyshev(Mean, Sd) UCL	2.323	99% Chebyshev(Mean, Sd) UCL	2.614

Suggested UCL to Use

95% Student's-t UCL 1.971

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positively skewed data sets.

report_result_value (radium-226/228 [pci/l]_intrawell_apw-10s)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	8
		Number of Missing Observations	0
Minimum	1.24	Mean	2.199
Maximum	4.83	Median	2
SD	0.837	Std. Error of Mean	0.209
Coefficient of Variation	0.38	Skewness	2.208

Normal GOF Test

Shapiro Wilk Test Statistic	0.732
1% Shapiro Wilk Critical Value	0.844
Lilliefors Test Statistic	0.344
1% Lilliefors Critical Value	0.248

Shapiro Wilk GOF Test

Data Not Normal at 1% Significance Level

Lilliefors GOF Test

Data Not Normal at 1% Significance Level

Data Not Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL

95% Student's-t UCL 2.566

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	2.667
95% Modified-t UCL (Johnson-1978)	2.585

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
From File filea1b878952361.xls
Full Precision OFF
Confidence Coefficient 95%
Number of Bootstrap Operations 2000

Gamma GOF Test

A-D Test Statistic 1.353
5% A-D Critical Value 0.739
K-S Test Statistic 0.322
5% K-S Critical Value 0.215

Anderson-Darling Gamma GOF Test

Data Not Gamma Distributed at 5% Significance Level

Kolmogorov-Smirnov Gamma GOF Test

Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE) 9.557
Theta hat (MLE) 0.23
nu hat (MLE) 305.8
MLE Mean (bias corrected) 2.199
Adjusted Level of Significance 0.0335

k star (bias corrected MLE) 7.807
Theta star (bias corrected MLE) 0.282
nu star (bias corrected) 249.8
MLE Sd (bias corrected) 0.787
Approximate Chi Square Value (0.05) 214.2
Adjusted Chi Square Value 210.5

Assuming Gamma Distribution

95% Approximate Gamma UCL 2.565

95% Adjusted Gamma UCL 2.611

Lognormal GOF Test

Shapiro Wilk Test Statistic 0.849
10% Shapiro Wilk Critical Value 0.906
Lilliefors Test Statistic 0.302
10% Lilliefors Critical Value 0.196

Shapiro Wilk Lognormal GOF Test

Data Not Lognormal at 10% Significance Level

Lilliefors Lognormal GOF Test

Data Not Lognormal at 10% Significance Level

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data 0.215
Maximum of Logged Data 1.575

Mean of logged Data 0.735
SD of logged Data 0.322

Assuming Lognormal Distribution

95% H-UCL 2.571
95% Chebyshev (MVUE) UCL 2.969
99% Chebyshev (MVUE) UCL 3.969

90% Chebyshev (MVUE) UCL 2.726
97.5% Chebyshev (MVUE) UCL 3.306

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL 2.543
95% Standard Bootstrap UCL 2.536
95% Hall's Bootstrap UCL 4.258
90% Chebyshev(Mean, Sd) UCL 2.827
97.5% Chebyshev(Mean, Sd) UCL 3.506

95% BCA Bootstrap UCL 2.674
95% Bootstrap-t UCL 2.797
95% Percentile Bootstrap UCL 2.57
95% Chebyshev(Mean, Sd) UCL 3.111
99% Chebyshev(Mean, Sd) UCL 4.28

Suggested UCL to Use

95% Student's-t UCL 2.566

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (selenium [ug/l]_intrawell_apw-02)

General Statistics

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
From File filea1b878952361.xls
Full Precision OFF
Confidence Coefficient 95%
Number of Bootstrap Operations 2000

Total Number of Observations	16	Number of Distinct Observations	3
Number of Detects	1	Number of Non-Detects	15
Number of Distinct Detects	1	Number of Distinct Non-Detects	2

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!
It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable report_result_value (selenium [ug/l]_intrawell_apw-02) was not processed!

report_result_value (selenium [ug/l]_intrawell_apw-03)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	4
Number of Detects	2	Number of Non-Detects	14
Number of Distinct Detects	2	Number of Distinct Non-Detects	2
Minimum Detect	1.1	Minimum Non-Detect	1
Maximum Detect	1.9	Maximum Non-Detect	2
Variance Detects	0.32	Percent Non-Detects	87.5%
Mean Detects	1.5	SD Detects	0.566
Median Detects	1.5	CV Detects	0.377
Skewness Detects	N/A	Kurtosis Detects	N/A
Mean of Logged Detects	0.369	SD of Logged Detects	0.386

Warning: Data set has only 2 Detected Values.
This is not enough to compute meaningful or reliable statistics and estimates.

Normal GOF Test on Detects Only Not Enough Data to Perform GOF Test

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	1.067	KM Standard Error of Mean	0.0818
90KM SD	0.224	95% KM (BCA) UCL	N/A
95% KM (t) UCL	1.21	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	1.201	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	1.312	95% KM Chebyshev UCL	1.423
97.5% KM Chebyshev UCL	1.578	99% KM Chebyshev UCL	1.881

Gamma GOF Tests on Detected Observations Only Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	13.72	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.109	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	54.88	nu star (bias corrected)	N/A
Mean (detects)	1.5		

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	1.067	SD (KM)	0.224
Variance (KM)	0.0502	SE of Mean (KM)	0.0818
k hat (KM)	22.65	k star (KM)	18.45
nu hat (KM)	725	nu star (KM)	590.4
theta hat (KM)	0.0471	theta star (KM)	0.0578

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

80% gamma percentile (KM)	1.268	90% gamma percentile (KM)	1.395
95% gamma percentile (KM)	1.505	99% gamma percentile (KM)	1.728

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (590.36, α)	535	Adjusted Level of Significance (β)	0.0335
95% KM Approximate Gamma UCL	1.177	Adjusted Chi Square Value (590.36, β)	529
		95% KM Adjusted Gamma UCL	1.19

Lognormal GOF Test on Detected Observations Only Not Enough Data to Perform GOF Test

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.325	Mean in Log Scale	-1.968
SD in Original Scale	0.5	SD in Log Scale	1.356
95% t UCL (assumes normality of ROS data)	0.545	95% Percentile Bootstrap UCL	0.552
95% BCA Bootstrap UCL	0.621	95% Bootstrap t UCL	0.981
95% H-UCL (Log ROS)	1.11		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	0.0491	KM Geo Mean	1.05
KM SD (logged)	0.16	95% Critical H Value (KM-Log)	1.776
KM Standard Error of Mean (logged)	0.0585	95% H-UCL (KM -Log)	1.145
KM SD (logged)	0.16	95% Critical H Value (KM-Log)	1.776
KM Standard Error of Mean (logged)	0.0585		

DL/2 Statistics

DL/2 Normal

Mean in Original Scale	0.656
SD in Original Scale	0.381
95% t UCL (Assumes normality)	0.823

DL/2 Log-Transformed

Mean in Log Scale	-0.517
SD in Log Scale	0.399
95% H-Stat UCL	0.79

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics Data do not follow a Discernible Distribution

Suggested UCL to Use

95% KM (t) UCL	1.21

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. Recommendations are based upon data size, data distribution, and skewness using results from simulation studies. However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (selenium [ug/l]_intrawell_apw-05/05r)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	2
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	2

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable report_result_value (selenium [ug/l]_intrawell_apw-05/05r) was not processed!

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
From File filea1b878952361.xls
Full Precision OFF
Confidence Coefficient 95%
Number of Bootstrap Operations 2000

report_result_value (selenium [ug/l]_intrawell_apw-06d)

General Statistics

Total Number of Observations	15	Number of Distinct Observations	2
Number of Detects	0	Number of Non-Detects	15
Number of Distinct Detects	0	Number of Distinct Non-Detects	2

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable report_result_value (selenium [ug/l]_intrawell_apw-06d) was not processed!

report_result_value (selenium [ug/l]_intrawell_apw-06s)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	2
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	2

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable report_result_value (selenium [ug/l]_intrawell_apw-06s) was not processed!

report_result_value (selenium [ug/l]_intrawell_apw-07)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	2
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	2

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable report_result_value (selenium [ug/l]_intrawell_apw-07) was not processed!

report_result_value (selenium [ug/l]_intrawell_apw-08)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	14
		Number of Missing Observations	0
Minimum	3.6	Mean	12.93
Maximum	22.1	Median	13.35
SD	4.141	Std. Error of Mean	1.035
Coefficient of Variation	0.32	Skewness	-0.241

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Normal GOF Test

Shapiro Wilk Test Statistic	0.927
1% Shapiro Wilk Critical Value	0.844
Lilliefors Test Statistic	0.192
1% Lilliefors Critical Value	0.248

Shapiro Wilk GOF Test

Data appear Normal at 1% Significance Level

Lilliefors GOF Test

Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL

95% Student's-t UCL	14.75

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	14.57
95% Modified-t UCL (Johnson-1978)	14.74

Gamma GOF Test

A-D Test Statistic	0.98
5% A-D Critical Value	0.74
K-S Test Statistic	0.233
5% K-S Critical Value	0.215

Anderson-Darling Gamma GOF Test

Data Not Gamma Distributed at 5% Significance Level

Kolmogorov-Smirnov Gamma GOF Test

Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	7.887
Theta hat (MLE)	1.64
nu hat (MLE)	252.4
MLE Mean (bias corrected)	12.93
Adjusted Level of Significance	0.0335

k star (bias corrected MLE)	6.45
Theta star (bias corrected MLE)	2.005
nu star (bias corrected)	206.4
MLE Sd (bias corrected)	5.092
Approximate Chi Square Value (0.05)	174.1
Adjusted Chi Square Value	170.8

Assuming Gamma Distribution

95% Approximate Gamma UCL	15.33

95% Adjusted Gamma UCL	15.63

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.812
10% Shapiro Wilk Critical Value	0.906
Lilliefors Test Statistic	0.256
10% Lilliefors Critical Value	0.196

Shapiro Wilk Lognormal GOF Test

Data Not Lognormal at 10% Significance Level

Lilliefors Lognormal GOF Test

Data Not Lognormal at 10% Significance Level

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	1.281
Maximum of Logged Data	3.096

Mean of logged Data	2.495
SD of logged Data	0.411

Assuming Lognormal Distribution

95% H-UCL	16.24
95% Chebyshev (MVUE) UCL	19.11
99% Chebyshev (MVUE) UCL	26.81

90% Chebyshev (MVUE) UCL	17.24
97.5% Chebyshev (MVUE) UCL	21.71

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	14.63
95% Standard Bootstrap UCL	14.57
95% Hall's Bootstrap UCL	14.71

95% BCA Bootstrap UCL	14.45
95% Bootstrap-t UCL	14.57
95% Percentile Bootstrap UCL	14.58

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

90% Chebyshev(Mean, Sd) UCL	16.04	95% Chebyshev(Mean, Sd) UCL	17.44
97.5% Chebyshev(Mean, Sd) UCL	19.4	99% Chebyshev(Mean, Sd) UCL	23.23

Suggested UCL to Use

95% Student's-t UCL 14.75

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. Recommendations are based upon data size, data distribution, and skewness using results from simulation studies. However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positively skewed data sets.

report_result_value (selenium [ug/l]_intrawell_apw-10d)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	10
Number of Detects	13	Number of Non-Detects	3
Number of Distinct Detects	9	Number of Distinct Non-Detects	1
Minimum Detect	1.1	Minimum Non-Detect	1
Maximum Detect	3.3	Maximum Non-Detect	1
Variance Detects	0.485	Percent Non-Detects	18.75%
Mean Detects	1.784	SD Detects	0.696
Median Detects	1.6	CV Detects	0.39
Skewness Detects	1.195	Kurtosis Detects	0.293
Mean of Logged Detects	0.518	SD of Logged Detects	0.351

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.827	Shapiro Wilk GOF Test
1% Shapiro Wilk Critical Value	0.814	Detected Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.296	Lilliefors GOF Test
1% Lilliefors Critical Value	0.271	Detected Data Not Normal at 1% Significance Level

Detected Data appear Approximate Normal at 1% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	1.637	KM Standard Error of Mean	0.176
90KM SD	0.676	95% KM (BCA) UCL	1.943
95% KM (t) UCL	1.945	95% KM (Percentile Bootstrap) UCL	1.925
95% KM (z) UCL	1.926	95% KM Bootstrap t UCL	2.072
90% KM Chebyshev UCL	2.165	95% KM Chebyshev UCL	2.404
97.5% KM Chebyshev UCL	2.736	99% KM Chebyshev UCL	3.388

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.822	Anderson-Darling GOF Test
5% A-D Critical Value	0.734	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.268	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.237	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	8.348	k star (bias corrected MLE)	6.473
Theta hat (MLE)	0.214	Theta star (bias corrected MLE)	0.276
nu hat (MLE)	217	nu star (bias corrected)	168.3
Mean (detects)	1.784		

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
 GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
 For such situations, GROS method may yield incorrect values of UCLs and BTVs
 This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.25	Mean	1.533
Maximum	3.3	Median	1.35
SD	0.827	CV	0.54
k hat (MLE)	3.081	k star (bias corrected MLE)	2.545
Theta hat (MLE)	0.497	Theta star (bias corrected MLE)	0.602
nu hat (MLE)	98.59	nu star (bias corrected)	81.44
Adjusted Level of Significance (β)	0.0335		
Approximate Chi Square Value (81.44, α)	61.64	Adjusted Chi Square Value (81.44, β)	59.69
95% Gamma Approximate UCL	2.025	95% Gamma Adjusted UCL	2.091

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	1.637	SD (KM)	0.676
Variance (KM)	0.457	SE of Mean (KM)	0.176
k hat (KM)	5.859	k star (KM)	4.802
nu hat (KM)	187.5	nu star (KM)	153.7
theta hat (KM)	0.279	theta star (KM)	0.341
80% gamma percentile (KM)	2.21	90% gamma percentile (KM)	2.637
95% gamma percentile (KM)	3.027	99% gamma percentile (KM)	3.852

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (153.68, α)	126	Adjusted Chi Square Value (153.68, β)	123.2
95% KM Approximate Gamma UCL	1.996	95% KM Adjusted Gamma UCL	2.042

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.885	Shapiro Wilk GOF Test
10% Shapiro Wilk Critical Value	0.889	Detected Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.246	Lilliefors GOF Test
10% Lilliefors Critical Value	0.215	Detected Data Not Lognormal at 10% Significance Level

Detected Data Not Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	1.588	Mean in Log Scale	0.363
SD in Original Scale	0.753	SD in Log Scale	0.461
95% t UCL (assumes normality of ROS data)	1.918	95% Percentile Bootstrap UCL	1.896
95% BCA Bootstrap UCL	1.927	95% Bootstrap t UCL	2.029
95% H-UCL (Log ROS)	2.032		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	0.421	KM Geo Mean	1.523
KM SD (logged)	0.365	95% Critical H Value (KM-Log)	1.924
KM Standard Error of Mean (logged)	0.0951	95% H-UCL (KM -Log)	1.952
KM SD (logged)	0.365	95% Critical H Value (KM-Log)	1.924
KM Standard Error of Mean (logged)	0.0951		

DL/2 Statistics

DL/2 Normal

Mean in Original Scale	1.543

DL/2 Log-Transformed

Mean in Log Scale	0.291

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
From File filea1b878952361.xls
Full Precision OFF
Confidence Coefficient 95%
Number of Bootstrap Operations 2000

SD in Original Scale	0.81	SD in Log Scale	0.581
95% t UCL (Assumes normality)	1.898	95% H-Stat UCL	2.181

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL 1.945

When a data set follows an approximate distribution passing only one of the GOF tests,
it is suggested to use a UCL based upon a distribution passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (selenium [ug/l]_intrawell_apw-10s)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	2
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	2

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable report_result_value (selenium [ug/l]_intrawell_apw-10s) was not processed!

report_result_value (sulfate [mg/l]_intrawell_apw-02)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	14
		Number of Missing Observations	0
Minimum	411	Mean	456.6
Maximum	500	Median	460
SD	28.6	Std. Error of Mean	7.15
Coefficient of Variation	0.0626	Skewness	-0.167

Normal GOF Test

Shapiro Wilk Test Statistic	0.946
1% Shapiro Wilk Critical Value	0.844
Lilliefors Test Statistic	0.159
1% Lilliefors Critical Value	0.248

Shapiro Wilk GOF Test

Data appear Normal at 1% Significance Level

Lilliefors GOF Test

Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL

95% Student's-t UCL 469.1

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	468
95% Modified-t UCL (Johnson-1978)	469

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Gamma GOF Test

A-D Test Statistic	0.356	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.736	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.168	Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value	0.214	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	269.4	k star (bias corrected MLE)	219
Theta hat (MLE)	1.695	Theta star (bias corrected MLE)	2.085
nu hat (MLE)	8622	nu star (bias corrected)	7006
MLE Mean (bias corrected)	456.6	MLE Sd (bias corrected)	30.86
		Approximate Chi Square Value (0.05)	6813
Adjusted Level of Significance	0.0335	Adjusted Chi Square Value	6791

Assuming Gamma Distribution

95% Approximate Gamma UCL	469.5	95% Adjusted Gamma UCL	471

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.942	Shapiro Wilk Lognormal GOF Test
10% Shapiro Wilk Critical Value	0.906	Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.17	Lilliefors Lognormal GOF Test
10% Lilliefors Critical Value	0.196	Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	6.019	Mean of logged Data	6.122
Maximum of Logged Data	6.215	SD of logged Data	0.0631

Assuming Lognormal Distribution

95% H-UCL	N/A	90% Chebyshev (MVUE) UCL	478.2
95% Chebyshev (MVUE) UCL	488	97.5% Chebyshev (MVUE) UCL	501.6
99% Chebyshev (MVUE) UCL	528.3		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	468.3	95% BCA Bootstrap UCL	467.4
95% Standard Bootstrap UCL	467.8	95% Bootstrap-t UCL	468.4
95% Hall's Bootstrap UCL	467.6	95% Percentile Bootstrap UCL	467.6
90% Chebyshev(Mean, Sd) UCL	478	95% Chebyshev(Mean, Sd) UCL	487.7
97.5% Chebyshev(Mean, Sd) UCL	501.2	99% Chebyshev(Mean, Sd) UCL	527.7

Suggested UCL to Use

95% Student's-t UCL	469.1

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positively skewed data sets.

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

report_result_value (sulfate [mg/l]_intrawell_apw-03)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	16
		Number of Missing Observations	0
Minimum	80.1	Mean	212.4
Maximum	393	Median	202.5
SD	77.93	Std. Error of Mean	19.48
Coefficient of Variation	0.367	Skewness	0.738

Normal GOF Test

Shapiro Wilk Test Statistic	0.955
1% Shapiro Wilk Critical Value	0.844
Lilliefors Test Statistic	0.181
1% Lilliefors Critical Value	0.248

Shapiro Wilk GOF Test

Data appear Normal at 1% Significance Level

Lilliefors GOF Test

Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL

95% Student's-t UCL	246.6

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	248.3
95% Modified-t UCL (Johnson-1978)	247.2

Gamma GOF Test

A-D Test Statistic	0.226
5% A-D Critical Value	0.74
K-S Test Statistic	0.134
5% K-S Critical Value	0.215

Anderson-Darling Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

Kolmogorov-Smirnov Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	7.879	k star (bias corrected MLE)	6.443
Theta hat (MLE)	26.96	Theta star (bias corrected MLE)	32.97
nu hat (MLE)	252.1	nu star (bias corrected)	206.2
MLE Mean (bias corrected)	212.4	MLE Sd (bias corrected)	83.69
		Approximate Chi Square Value (0.05)	174
Adjusted Level of Significance	0.0335	Adjusted Chi Square Value	170.6

Assuming Gamma Distribution

95% Approximate Gamma UCL	251.8

95% Adjusted Gamma UCL	256.8

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.969
10% Shapiro Wilk Critical Value	0.906
Lilliefors Test Statistic	0.12
10% Lilliefors Critical Value	0.196

Shapiro Wilk Lognormal GOF Test

Data appear Lognormal at 10% Significance Level

Lilliefors Lognormal GOF Test

Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	4.383	Mean of logged Data	5.294
Maximum of Logged Data	5.974	SD of logged Data	0.381

Assuming Lognormal Distribution

95% H-UCL	259.1

90% Chebyshev (MVUE) UCL	275.1

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

95% Chebyshev (MVUE) UCL	303.2	97.5% Chebyshev (MVUE) UCL	342.2
99% Chebyshev (MVUE) UCL	418.9		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	244.5	95% BCA Bootstrap UCL	245.8
95% Standard Bootstrap UCL	243.3	95% Bootstrap-t UCL	251.7
95% Hall's Bootstrap UCL	253.7	95% Percentile Bootstrap UCL	243.6
90% Chebyshev(Mean, Sd) UCL	270.9	95% Chebyshev(Mean, Sd) UCL	297.4
97.5% Chebyshev(Mean, Sd) UCL	334.1	99% Chebyshev(Mean, Sd) UCL	406.3

Suggested UCL to Use

95% Student's-t UCL 246.6

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (sulfate [mg/l]_intrawell_apw-05/05r)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	16
		Number of Missing Observations	0
Minimum	224	Mean	364.8
Maximum	460	Median	378.5
SD	57.99	Std. Error of Mean	14.5
Coefficient of Variation	0.159	Skewness	-0.654

Normal GOF Test

Shapiro Wilk Test Statistic	0.956
1% Shapiro Wilk Critical Value	0.844
Lilliefors Test Statistic	0.152
1% Lilliefors Critical Value	0.248

Shapiro Wilk GOF Test

Data appear Normal at 1% Significance Level

Lilliefors GOF Test

Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL

95% Student's-t UCL 390.2

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	386.1
95% Modified-t UCL (Johnson-1978)	389.8

Gamma GOF Test

A-D Test Statistic	0.408
5% A-D Critical Value	0.736
K-S Test Statistic	0.171
5% K-S Critical Value	0.215

Anderson-Darling Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

Kolmogorov-Smirnov Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	38.11	k star (bias corrected MLE)	31
Theta hat (MLE)	9.573	Theta star (bias corrected MLE)	11.77
nu hat (MLE)	1219	nu star (bias corrected)	992.1

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
 From File filea1b878952361.xls
 Full Precision OFF
 Confidence Coefficient 95%
 Number of Bootstrap Operations 2000

MLE Mean (bias corrected) 364.8 MLE Sd (bias corrected) 65.52

Approximate Chi Square Value (0.05) 920

Adjusted Level of Significance 0.0335 Adjusted Chi Square Value 912.1

Assuming Gamma Distribution

95% Approximate Gamma UCL 393.4 95% Adjusted Gamma UCL 396.8

Lognormal GOF Test

Shapiro Wilk Test Statistic 0.906

10% Shapiro Wilk Critical Value 0.906

Lilliefors Test Statistic 0.173

10% Lilliefors Critical Value 0.196

Shapiro Wilk Lognormal GOF Test

Data Not Lognormal at 10% Significance Level

Lilliefors Lognormal GOF Test

Data appear Lognormal at 10% Significance Level

Data appear Approximate Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data 5.412

Maximum of Logged Data 6.131

Mean of logged Data 5.886

SD of logged Data 0.173

Assuming Lognormal Distribution

95% H-UCL 395.7

95% Chebyshev (MVUE) UCL 434.2

99% Chebyshev (MVUE) UCL 522.8

90% Chebyshev (MVUE) UCL 412.7

97.5% Chebyshev (MVUE) UCL 464.1

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL 388.7

95% Standard Bootstrap UCL 387.5

95% Hall's Bootstrap UCL 385.8

90% Chebyshev(Mean, Sd) UCL 408.3

97.5% Chebyshev(Mean, Sd) UCL 455.3

95% BCA Bootstrap UCL 385

95% Bootstrap-t UCL 386.9

95% Percentile Bootstrap UCL 386.3

95% Chebyshev(Mean, Sd) UCL 428

99% Chebyshev(Mean, Sd) UCL 509.1

Suggested UCL to Use

95% Student's-t UCL 390.2

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positively skewed data sets.

report_result_value (sulfate [mg/l]_intrawell_apw-06d)

General Statistics

Total Number of Observations 15

Number of Distinct Observations 15

Number of Missing Observations 0

Minimum 180

Mean 225.6

Maximum 272

Median 222

SD 30.33

Std. Error of Mean 7.831

Coefficient of Variation 0.134

Skewness 0.192

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Normal GOF Test

Shapiro Wilk Test Statistic	0.938
1% Shapiro Wilk Critical Value	0.835
Lilliefors Test Statistic	0.124
1% Lilliefors Critical Value	0.255

Shapiro Wilk GOF Test

Data appear Normal at 1% Significance Level

Lilliefors GOF Test

Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL

95% Student's-t UCL	239.4

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	238.9
95% Modified-t UCL (Johnson-1978)	239.5

Gamma GOF Test

A-D Test Statistic	0.305
5% A-D Critical Value	0.734
K-S Test Statistic	0.125
5% K-S Critical Value	0.221

Anderson-Darling Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

Kolmogorov-Smirnov Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	59.34
Theta hat (MLE)	3.802
nu hat (MLE)	1780
MLE Mean (bias corrected)	225.6
Adjusted Level of Significance	0.0324

k star (bias corrected MLE)	47.52
Theta star (bias corrected MLE)	4.748
nu star (bias corrected)	1426
MLE Sd (bias corrected)	32.73
Approximate Chi Square Value (0.05)	1339
Adjusted Chi Square Value	1329

Assuming Gamma Distribution

95% Approximate Gamma UCL	240.2

95% Adjusted Gamma UCL	242.1

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.944
10% Shapiro Wilk Critical Value	0.901
Lilliefors Test Statistic	0.114
10% Lilliefors Critical Value	0.202

Shapiro Wilk Lognormal GOF Test

Data appear Lognormal at 10% Significance Level

Lilliefors Lognormal GOF Test

Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	5.193
Maximum of Logged Data	5.606

Mean of logged Data	5.41
SD of logged Data	0.135

Assuming Lognormal Distribution

95% H-UCL	240.6
95% Chebyshev (MVUE) UCL	259.9
99% Chebyshev (MVUE) UCL	303.9

90% Chebyshev (MVUE) UCL	249.2
97.5% Chebyshev (MVUE) UCL	274.7

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	238.5
95% Standard Bootstrap UCL	238.1
95% Hall's Bootstrap UCL	238.6
90% Chebyshev(Mean, Sd) UCL	249.1

95% BCA Bootstrap UCL	238.1
95% Bootstrap-t UCL	239.4
95% Percentile Bootstrap UCL	238.5
95% Chebyshev(Mean, Sd) UCL	259.7

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

97.5% Chebyshev(Mean, Sd) UCL 274.5

99% Chebyshev(Mean, Sd) UCL 303.5

Suggested UCL to Use

95% Student's-t UCL 239.4

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (sulfate [mg/l]_intrawell_apw-06s)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	16
		Number of Missing Observations	0
Minimum	127	Mean	205.5
Maximum	247	Median	214
SD	35.34	Std. Error of Mean	8.836
Coefficient of Variation	0.172	Skewness	-0.857

Normal GOF Test

Shapiro Wilk Test Statistic	0.923	Shapiro Wilk GOF Test
1% Shapiro Wilk Critical Value	0.844	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.159	Lilliefors GOF Test
1% Lilliefors Critical Value	0.248	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL

95% Student's-t UCL 221

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	218
95% Modified-t UCL (Johnson-1978)	220.7

Gamma GOF Test

A-D Test Statistic	0.573	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.736	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.173	Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value	0.215	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	31.95	k star (bias corrected MLE)	26
Theta hat (MLE)	6.432	Theta star (bias corrected MLE)	7.903
nu hat (MLE)	1022	nu star (bias corrected)	832.1
MLE Mean (bias corrected)	205.5	MLE Sd (bias corrected)	40.3
		Approximate Chi Square Value (0.05)	766.1
Adjusted Level of Significance	0.0335	Adjusted Chi Square Value	758.9

Assuming Gamma Distribution

95% Approximate Gamma UCL 223.2

95% Adjusted Gamma UCL 225.3

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.886	Shapiro Wilk Lognormal GOF Test
10% Shapiro Wilk Critical Value	0.906	Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.171	Lilliefors Lognormal GOF Test

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
From File filea1b878952361.xls
Full Precision OFF
Confidence Coefficient 95%
Number of Bootstrap Operations 2000

10% Lilliefors Critical Value 0.196 Data appear Lognormal at 10% Significance Level

Data appear Approximate Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	4.844	Mean of logged Data	5.31
Maximum of Logged Data	5.509	SD of logged Data	0.189

Assuming Lognormal Distribution

95% H-UCL	224.8	90% Chebyshev (MVUE) UCL	235.1
95% Chebyshev (MVUE) UCL	248.4	97.5% Chebyshev (MVUE) UCL	266.9
99% Chebyshev (MVUE) UCL	303.1		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	220	95% BCA Bootstrap UCL	218.3
95% Standard Bootstrap UCL	219.9	95% Bootstrap-t UCL	220
95% Hall's Bootstrap UCL	218.7	95% Percentile Bootstrap UCL	219.6
90% Chebyshev(Mean, Sd) UCL	232	95% Chebyshev(Mean, Sd) UCL	244
97.5% Chebyshev(Mean, Sd) UCL	260.7	99% Chebyshev(Mean, Sd) UCL	293.4

Suggested UCL to Use

95% Student's-t UCL 221

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positively skewed data sets.

report_result_value (sulfate [mg/l]_intrawell_apw-07)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	15
		Number of Missing Observations	0
Minimum	40	Mean	58.43
Maximum	78	Median	60
SD	10.84	Std. Error of Mean	2.709
Coefficient of Variation	0.185	Skewness	-1.046E-4

Normal GOF Test

Shapiro Wilk Test Statistic	0.975	Shapiro Wilk GOF Test
1% Shapiro Wilk Critical Value	0.844	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.101	Lilliefors GOF Test
1% Lilliefors Critical Value	0.248	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	63.17	95% Adjusted-CLT UCL (Chen-1995)	62.88
		95% Modified-t UCL (Johnson-1978)	63.17

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Gamma GOF Test

A-D Test Statistic	0.254
5% A-D Critical Value	0.736
K-S Test Statistic	0.122
5% K-S Critical Value	0.215

Anderson-Darling Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

Kolmogorov-Smirnov Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	30.15
Theta hat (MLE)	1.938
nu hat (MLE)	964.7
MLE Mean (bias corrected)	58.43
Adjusted Level of Significance	0.0335

k star (bias corrected MLE)	24.54
Theta star (bias corrected MLE)	2.381
nu star (bias corrected)	785.2
MLE Sd (bias corrected)	11.79
Approximate Chi Square Value (0.05)	721.2
Adjusted Chi Square Value	714.2

Assuming Gamma Distribution

95% Approximate Gamma UCL 63.61

95% Adjusted Gamma UCL 64.23

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.968
10% Shapiro Wilk Critical Value	0.906
Lilliefors Test Statistic	0.123
10% Lilliefors Critical Value	0.196

Shapiro Wilk Lognormal GOF Test

Data appear Lognormal at 10% Significance Level

Lilliefors Lognormal GOF Test

Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	3.689
Maximum of Logged Data	4.357

Mean of logged Data	4.051
SD of logged Data	0.19

Assuming Lognormal Distribution

95% H-UCL	63.91
95% Chebyshev (MVUE) UCL	70.63
99% Chebyshev (MVUE) UCL	86.27

90% Chebyshev (MVUE) UCL	66.83
97.5% Chebyshev (MVUE) UCL	75.91

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	62.88
95% Standard Bootstrap UCL	62.72
95% Hall's Bootstrap UCL	63.03
90% Chebyshev(Mean, Sd) UCL	66.55
97.5% Chebyshev(Mean, Sd) UCL	75.34

95% BCA Bootstrap UCL	62.79
95% Bootstrap-t UCL	63.39
95% Percentile Bootstrap UCL	62.61
95% Chebyshev(Mean, Sd) UCL	70.23
99% Chebyshev(Mean, Sd) UCL	85.38

Suggested UCL to Use

95% Student's-t UCL 63.17

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positively skewed data sets.

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

report_result_value (sulfate [mg/l]_intrawell_apw-08)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	11
		Number of Missing Observations	0
Minimum	23	Mean	34.86
Maximum	43	Median	38
SD	6.449	Std. Error of Mean	1.612
Coefficient of Variation	0.185	Skewness	-0.876

Normal GOF Test

Shapiro Wilk Test Statistic	0.844	Shapiro Wilk GOF Test
1% Shapiro Wilk Critical Value	0.844	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.255	Lilliefors GOF Test
1% Lilliefors Critical Value	0.248	Data Not Normal at 1% Significance Level

Data appear Approximate Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	37.68	95% Adjusted-CLT UCL (Chen-1995)	37.13
		95% Modified-t UCL (Johnson-1978)	37.62

Gamma GOF Test

A-D Test Statistic	1.316	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.736	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.273	Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value	0.215	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	27.52	k star (bias corrected MLE)	22.4
Theta hat (MLE)	1.266	Theta star (bias corrected MLE)	1.556
nu hat (MLE)	880.7	nu star (bias corrected)	716.9
MLE Mean (bias corrected)	34.86	MLE Sd (bias corrected)	7.364
		Approximate Chi Square Value (0.05)	655.8
Adjusted Level of Significance	0.0335	Adjusted Chi Square Value	649.1

Assuming Gamma Distribution

95% Approximate Gamma UCL	38.11	95% Adjusted Gamma UCL	38.5

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.815	Shapiro Wilk Lognormal GOF Test
10% Shapiro Wilk Critical Value	0.906	Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.274	Lilliefors Lognormal GOF Test
10% Lilliefors Critical Value	0.196	Data Not Lognormal at 10% Significance Level

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	3.135	Mean of logged Data	3.533
Maximum of Logged Data	3.761	SD of logged Data	0.204

Assuming Lognormal Distribution

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
 From File filea1b878952361.xls
 Full Precision OFF
 Confidence Coefficient 95%
 Number of Bootstrap Operations 2000

95% H-UCL	38.43	90% Chebyshev (MVUE) UCL	40.27
95% Chebyshev (MVUE) UCL	42.7	97.5% Chebyshev (MVUE) UCL	46.08
99% Chebyshev (MVUE) UCL	52.71		

Nonparametric Distribution Free UCL Statistics Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	37.51	95% BCA Bootstrap UCL	37.17
95% Standard Bootstrap UCL	37.43	95% Bootstrap-t UCL	37.32
95% Hall's Bootstrap UCL	37.09	95% Percentile Bootstrap UCL	37.31
90% Chebyshev(Mean, Sd) UCL	39.69	95% Chebyshev(Mean, Sd) UCL	41.88
97.5% Chebyshev(Mean, Sd) UCL	44.92	99% Chebyshev(Mean, Sd) UCL	50.9

Suggested UCL to Use

95% Student's-t UCL 37.68

When a data set follows an approximate distribution passing only one of the GOF tests,
it is suggested to use a UCL based upon a distribution passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positively skewed data sets.

report_result_value (sulfate [mg/l]_intrawell_apw-10d)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	9
		Number of Missing Observations	0
Minimum	26	Mean	40.16
Maximum	44	Median	42
SD	5.246	Std. Error of Mean	1.312
Coefficient of Variation	0.131	Skewness	-1.777

Normal GOF Test

Shapiro Wilk Test Statistic 0.756
 1% Shapiro Wilk Critical Value 0.844
 Lilliefors Test Statistic 0.262
 1% Lilliefors Critical Value 0.248

Shapiro Wilk GOF Test

Data Not Normal at 1% Significance Level

Lilliefors GOF Test

Data Not Normal at 1% Significance Level

Data Not Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL

95% Student's-t UCL 42.46

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995) 41.69
 95% Modified-t UCL (Johnson-1978) 42.36

Gamma GOF Test

A-D Test Statistic 1.677
 5% A-D Critical Value 0.735
 K-S Test Statistic 0.271

Anderson-Darling Gamma GOF Test

Data Not Gamma Distributed at 5% Significance Level

Kolmogorov-Smirnov Gamma GOF Test

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
From File filea1b878952361.xls
Full Precision OFF
Confidence Coefficient 95%
Number of Bootstrap Operations 2000

5% K-S Critical Value 0.214

Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	52.88	k star (bias corrected MLE)	43.01
Theta hat (MLE)	0.759	Theta star (bias corrected MLE)	0.934
nu hat (MLE)	1692	nu star (bias corrected)	1376
MLE Mean (bias corrected)	40.16	MLE Sd (bias corrected)	6.123
		Approximate Chi Square Value (0.05)	1291
Adjusted Level of Significance	0.0335	Adjusted Chi Square Value	1282

Assuming Gamma Distribution

95% Approximate Gamma UCL	42.8	95% Adjusted Gamma UCL	43.12

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.717
10% Shapiro Wilk Critical Value	0.906
Lilliefors Test Statistic	0.268
10% Lilliefors Critical Value	0.196

Shapiro Wilk Lognormal GOF Test

Data Not Lognormal at 10% Significance Level

Lilliefors Lognormal GOF Test

Data Not Lognormal at 10% Significance Level

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	3.258	Mean of logged Data	3.683
Maximum of Logged Data	3.784	SD of logged Data	0.149

Assuming Lognormal Distribution

95% H-UCL	43.04	90% Chebyshev (MVUE) UCL	44.68
95% Chebyshev (MVUE) UCL	46.72	97.5% Chebyshev (MVUE) UCL	49.54
99% Chebyshev (MVUE) UCL	55.09		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	42.31	95% BCA Bootstrap UCL	41.78
95% Standard Bootstrap UCL	42.24	95% Bootstrap-t UCL	41.94
95% Hall's Bootstrap UCL	41.76	95% Percentile Bootstrap UCL	42.19
90% Chebyshev(Mean, Sd) UCL	44.09	95% Chebyshev(Mean, Sd) UCL	45.87
97.5% Chebyshev(Mean, Sd) UCL	48.35	99% Chebyshev(Mean, Sd) UCL	53.21

Suggested UCL to Use

95% Student's-t UCL	42.46

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positively skewed data sets.

report_result_value (sulfate [mg/l]_intrawell_apw-10s)

General Statistics

Total Number of Observations

16

Number of Distinct Observations

3

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Number of Detects	2	Number of Non-Detects	14
Number of Distinct Detects	2	Number of Distinct Non-Detects	2
Minimum Detect	10	Minimum Non-Detect	5
Maximum Detect	21	Maximum Non-Detect	10
Variance Detects	60.5	Percent Non-Detects	87.5%
Mean Detects	15.5	SD Detects	7.778
Median Detects	15.5	CV Detects	0.502
Skewness Detects	N/A	Kurtosis Detects	N/A
Mean of Logged Detects	2.674	SD of Logged Detects	0.525

Warning: Data set has only 2 Detected Values.

This is not enough to compute meaningful or reliable statistics and estimates.

Normal GOF Test on Detects Only

Not Enough Data to Perform GOF Test

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	6.313	KM Standard Error of Mean	1.407
90KM SD	3.98	95% KM (BCA) UCL	N/A
95% KM (t) UCL	8.779	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	8.627	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	10.53	95% KM Chebyshev UCL	12.45
97.5% KM Chebyshev UCL	15.1	99% KM Chebyshev UCL	20.31

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	7.594	k star (bias corrected MLE)	N/A
Theta hat (MLE)	2.041	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	30.38	nu star (bias corrected)	N/A
Mean (detects)	15.5		

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	6.313	SD (KM)	3.98
Variance (KM)	15.84	SE of Mean (KM)	1.407
k hat (KM)	2.516	k star (KM)	2.086
nu hat (KM)	80.5	nu star (KM)	66.74
theta hat (KM)	2.509	theta star (KM)	3.027
80% gamma percentile (KM)	9.404	90% gamma percentile (KM)	12.16
95% gamma percentile (KM)	14.78	99% gamma percentile (KM)	20.57

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (66.74, α)	48.94	Adjusted Level of Significance (β)	0.0335
95% KM Approximate Gamma UCL	8.609	Adjusted Chi Square Value (66.74, β)	47.21
		95% KM Adjusted Gamma UCL	8.925

Lognormal GOF Test on Detected Observations Only

Not Enough Data to Perform GOF Test

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	2.623	Mean in Log Scale	-0.604
SD in Original Scale	5.492	SD in Log Scale	1.889

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
From File filea1b878952361.xls
Full Precision OFF
Confidence Coefficient 95%
Number of Bootstrap Operations 2000

95% t UCL (assumes normality of ROS data)	5.03	95% Percentile Bootstrap UCL	4.966
95% BCA Bootstrap UCL	6.236	95% Bootstrap t UCL	14.31
95% H-UCL (Log ROS)	26		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	1.742	KM Geo Mean	5.711
KM SD (logged)	0.376	95% Critical H Value (KM-Log)	1.933
KM Standard Error of Mean (logged)	0.133	95% H-UCL (KM -Log)	7.392
KM SD (logged)	0.376	95% Critical H Value (KM-Log)	1.933
KM Standard Error of Mean (logged)	0.133		

DL/2 Statistics

DL/2 Normal

Mean in Original Scale	6.156
SD in Original Scale	4.21
95% t UCL (Assumes normality)	8.001

DL/2 Log-Transformed

Mean in Log Scale	1.699
SD in Log Scale	0.439
95% H-Stat UCL	7.547

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Suggested UCL to Use

95% KM (t) UCL 8.779

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (thallium [ug/l]_inrawell_apw-02)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	2
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	2

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!

Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable report_result_value (thallium [ug/l]_inrawell_apw-02) was not processed!

report_result_value (thallium [ug/l]_inrawell_apw-03)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	2
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	2

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!

Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable report_result_value (thallium [ug/l]_inrawell_apw-03) was not processed!

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
From File filea1b878952361.xls
Full Precision OFF
Confidence Coefficient 95%
Number of Bootstrap Operations 2000

report_result_value (thallium [ug/l]_intrawell_apw-05/05r)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	2
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	2

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable report_result_value (thallium [ug/l]_intrawell_apw-05/05r) was not processed!

report_result_value (thallium [ug/l]_intrawell_apw-06d)

General Statistics

Total Number of Observations	15	Number of Distinct Observations	2
Number of Detects	0	Number of Non-Detects	15
Number of Distinct Detects	0	Number of Distinct Non-Detects	2

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable report_result_value (thallium [ug/l]_intrawell_apw-06d) was not processed!

report_result_value (thallium [ug/l]_intrawell_apw-06s)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	2
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	2

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable report_result_value (thallium [ug/l]_intrawell_apw-06s) was not processed!

report_result_value (thallium [ug/l]_intrawell_apw-07)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	2
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	2

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
From File filea1b878952361.xls
Full Precision OFF
Confidence Coefficient 95%
Number of Bootstrap Operations 2000

The data set for variable report_result_value (thallium [ug/l]_inrawell_apw-07) was not processed!

report_result_value (thallium [ug/l]_inrawell_apw-08)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	2
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	2

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable report_result_value (thallium [ug/l]_inrawell_apw-08) was not processed!

report_result_value (thallium [ug/l]_inrawell_apw-10d)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	2
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	2

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable report_result_value (thallium [ug/l]_inrawell_apw-10d) was not processed!

report_result_value (thallium [ug/l]_inrawell_apw-10s)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	2
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	2

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable report_result_value (thallium [ug/l]_inrawell_apw-10s) was not processed!

report_result_value (turbidity, field [ntu]_inrawell_apw-02)

General Statistics

Total Number of Observations	8	Number of Distinct Observations	8
		Number of Missing Observations	0
Minimum	19.2	Mean	94.64
Maximum	169	Median	100.5

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
 From File filea1b878952361.xls
 Full Precision OFF
 Confidence Coefficient 95%
 Number of Bootstrap Operations 2000

SD	47.83	Std. Error of Mean	16.91
Coefficient of Variation	0.505	Skewness	-0.254

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach, refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance, but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).

The Chebyshev UCL often results in gross overestimates of the mean.

Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test

Shapiro Wilk Test Statistic	0.94	Shapiro Wilk GOF Test
1% Shapiro Wilk Critical Value	0.749	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.241	Lilliefors GOF Test
1% Lilliefors Critical Value	0.333	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Assuming Normal Distribution

95% Normal UCL

95% Student's-t UCL 126.7

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995) 120.8
 95% Modified-t UCL (Johnson-1978) 126.4

Gamma GOF Test

A-D Test Statistic	0.595	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.721	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.319	Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value	0.296	Data Not Gamma Distributed at 5% Significance Level

Detected data follow Appr. Gamma Distribution at 5% Significance Level

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics

k hat (MLE)	3.034	k star (bias corrected MLE)	1.98
Theta hat (MLE)	31.19	Theta star (bias corrected MLE)	47.8
nu hat (MLE)	48.55	nu star (bias corrected)	31.68
MLE Mean (bias corrected)	94.64	MLE Sd (bias corrected)	67.26
		Approximate Chi Square Value (0.05)	19.82
Adjusted Level of Significance	0.0195	Adjusted Chi Square Value	17.48

Assuming Gamma Distribution

95% Approximate Gamma UCL 151.3 95% Adjusted Gamma UCL 171.5

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.834	Shapiro Wilk Lognormal GOF Test
10% Shapiro Wilk Critical Value	0.851	Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.34	Lilliefors Lognormal GOF Test
10% Lilliefors Critical Value	0.265	Data Not Lognormal at 10% Significance Level

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	2.955	Mean of logged Data	4.376
Maximum of Logged Data	5.13	SD of logged Data	0.717

Assuming Lognormal Distribution

95% H-UCL 218.1 90% Chebyshev (MVUE) UCL 175.7

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
From File filea1b878952361.xls
Full Precision OFF
Confidence Coefficient 95%
Number of Bootstrap Operations 2000

95% Chebyshev (MVUE) UCL	210.5	97.5% Chebyshev (MVUE) UCL	258.7
99% Chebyshev (MVUE) UCL	353.3		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	122.5	95% BCA Bootstrap UCL	119
95% Standard Bootstrap UCL	121.2	95% Bootstrap-t UCL	125
95% Hall's Bootstrap UCL	123.3	95% Percentile Bootstrap UCL	120
90% Chebyshev(Mean, Sd) UCL	145.4	95% Chebyshev(Mean, Sd) UCL	168.3
97.5% Chebyshev(Mean, Sd) UCL	200.2	99% Chebyshev(Mean, Sd) UCL	262.9

Suggested UCL to Use

95% Student's-t UCL 126.7

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positively skewed data sets.

report_result_value (turbidity, field [ntu]_intrawell_apw-03)

General Statistics

Total Number of Observations	8	Number of Distinct Observations	8
		Number of Missing Observations	0
Minimum	2.72	Mean	33.75
Maximum	103	Median	23.71
SD	35.76	Std. Error of Mean	12.64
Coefficient of Variation	1.06	Skewness	1.05

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach, refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance, but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).

The Chebyshev UCL often results in gross overestimates of the mean.

Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test

Shapiro Wilk Test Statistic	0.842	Shapiro Wilk GOF Test
1% Shapiro Wilk Critical Value	0.749	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.272	Lilliefors GOF Test
1% Lilliefors Critical Value	0.333	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	57.7	95% Adjusted-CLT UCL (Chen-1995)	59.56
		95% Modified-t UCL (Johnson-1978)	58.48

Gamma GOF Test

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
 From File filea1b878952361.xls
 Full Precision OFF
 Confidence Coefficient 95%
 Number of Bootstrap Operations 2000

A-D Test Statistic 0.525	Anderson-Darling Gamma GOF Test	
5% A-D Critical Value 0.742	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic 0.267	Kolmogorov-Smirnov Gamma GOF Test	
5% K-S Critical Value 0.303	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level
Note GOF tests may be unreliable for small sample sizes

Gamma Statistics			
k hat (MLE) 0.827		k star (bias corrected MLE) 0.6	
Theta hat (MLE) 40.82		Theta star (bias corrected MLE) 56.25	
nu hat (MLE) 13.23		nu star (bias corrected) 9.6	
MLE Mean (bias corrected) 33.75		MLE Sd (bias corrected) 43.57	
		Approximate Chi Square Value (0.05) 3.693	
Adjusted Level of Significance 0.0195		Adjusted Chi Square Value 2.828	

Assuming Gamma Distribution

95% Approximate Gamma UCL 87.72		95% Adjusted Gamma UCL 114.6

Lognormal GOF Test

Shapiro Wilk Test Statistic 0.884		Shapiro Wilk Lognormal GOF Test
10% Shapiro Wilk Critical Value 0.851		Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic 0.237		Lilliefors Lognormal GOF Test
10% Lilliefors Critical Value 0.265		Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level
Note GOF tests may be unreliable for small sample sizes

Lognormal Statistics

Minimum of Logged Data 1.001		Mean of logged Data 2.804
Maximum of Logged Data 4.635		SD of logged Data 1.408

Assuming Lognormal Distribution

95% H-UCL 485.9		90% Chebyshev (MVUE) UCL 92.09
95% Chebyshev (MVUE) UCL 117.2		97.5% Chebyshev (MVUE) UCL 152
99% Chebyshev (MVUE) UCL 220.5		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL 54.54		95% BCA Bootstrap UCL 57.08
95% Standard Bootstrap UCL 53.43		95% Bootstrap-t UCL 68.16
95% Hall's Bootstrap UCL 58.47		95% Percentile Bootstrap UCL 53.82
90% Chebyshev(Mean, Sd) UCL 71.67		95% Chebyshev(Mean, Sd) UCL 88.85
97.5% Chebyshev(Mean, Sd) UCL 112.7		99% Chebyshev(Mean, Sd) UCL 159.5

Suggested UCL to Use

95% Student's-t UCL 57.7		

The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.

Please verify the data were collected from random locations.

**If the data were collected using judgmental or other non-random methods,
 then contact a statistician to correctly calculate UCLs.**

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (turbidity, field [ntu]_intrawell_apw-05/05r)

General Statistics

Total Number of Observations	8	Number of Distinct Observations	8
		Number of Missing Observations	0
Minimum	4.65	Mean	33.14
Maximum	76.1	Median	36.3
SD	24.85	Std. Error of Mean	8.787
Coefficient of Variation	0.75	Skewness	0.427

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach, refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance, but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).

The Chebyshev UCL often results in gross overestimates of the mean.

Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test

Shapiro Wilk Test Statistic	0.922	Shapiro Wilk GOF Test
1% Shapiro Wilk Critical Value	0.749	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.207	Lilliefors GOF Test
1% Lilliefors Critical Value	0.333	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Assuming Normal Distribution

95% Normal UCL

95% Student's-t UCL	49.79

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	49.01
95% Modified-t UCL (Johnson-1978)	50.01

Gamma GOF Test

A-D Test Statistic	0.462	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.728	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.241	Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value	0.299	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics

k hat (MLE)	1.507	k star (bias corrected MLE)	1.025
Theta hat (MLE)	21.99	Theta star (bias corrected MLE)	32.33
nu hat (MLE)	24.11	nu star (bias corrected)	16.4
MLE Mean (bias corrected)	33.14	MLE Sd (bias corrected)	32.73
		Approximate Chi Square Value (0.05)	8.248
Adjusted Level of Significance	0.0195	Adjusted Chi Square Value	6.837

Assuming Gamma Distribution

95% Approximate Gamma UCL	65.92	95% Adjusted Gamma UCL	79.52

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.884	Shapiro Wilk Lognormal GOF Test

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
 From File filea1b878952361.xls
 Full Precision OFF
 Confidence Coefficient 95%
 Number of Bootstrap Operations 2000

10% Shapiro Wilk Critical Value 0.851 Data appear Lognormal at 10% Significance Level
 Lilliefors Test Statistic 0.271 **Lilliefors Lognormal GOF Test**
 10% Lilliefors Critical Value 0.265 Data Not Lognormal at 10% Significance Level

Data appear Approximate Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal Statistics

Minimum of Logged Data	1.537	Mean of logged Data	3.134
Maximum of Logged Data	4.332	SD of logged Data	1.025

Assuming Lognormal Distribution

95% H-UCL	149.8	90% Chebyshev (MVUE) UCL	75.09
95% Chebyshev (MVUE) UCL	92.99	97.5% Chebyshev (MVUE) UCL	117.8
99% Chebyshev (MVUE) UCL	166.6		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	47.6	95% BCA Bootstrap UCL	47.98
95% Standard Bootstrap UCL	46.86	95% Bootstrap-t UCL	51.18
95% Hall's Bootstrap UCL	49.59	95% Percentile Bootstrap UCL	46.93
90% Chebyshev(Mean, Sd) UCL	59.5	95% Chebyshev(Mean, Sd) UCL	71.44
97.5% Chebyshev(Mean, Sd) UCL	88.02	99% Chebyshev(Mean, Sd) UCL	120.6

Suggested UCL to Use

95% Student's-t UCL 49.79

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (turbidity, field [ntu]_inrawell_apw-06d)

General Statistics

Total Number of Observations	7	Number of Distinct Observations	7
		Number of Missing Observations	0
Minimum	3.02	Mean	55.36
Maximum	181	Median	26.9
SD	61.29	Std. Error of Mean	23.17
Coefficient of Variation	1.107	Skewness	1.746

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,

refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,

but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).

The Chebyshev UCL often results in gross overestimates of the mean.

Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test

Shapiro Wilk Test Statistic 0.803
 1% Shapiro Wilk Critical Value 0.73
 Lilliefors Test Statistic 0.25
 1% Lilliefors Critical Value 0.35

Shapiro Wilk GOF Test

Data appear Normal at 1% Significance Level
Lilliefors GOF Test
 Data appear Normal at 1% Significance Level

UCL Statistics for Data Sets with Non-Detects

User Selected Options

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From File filea1b878952361.xls
Full Precision OFF
Confidence Coefficient 95%
Number of Bootstrap Operations 2000

Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Assuming Normal Distribution

95% Normal UCL

95% Student's-t UCL 100.4

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995) 109.8

95% Modified-t UCL (Johnson-1978) 102.9

Gamma GOF Test

A-D Test Statistic 0.247

5% A-D Critical Value 0.729

K-S Test Statistic 0.18

5% K-S Critical Value 0.32

Anderson-Darling Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

Kolmogorov-Smirnov Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics

k hat (MLE) 0.968

Theta hat (MLE) 57.19

nu hat (MLE) 13.55

MLE Mean (bias corrected) 55.36

k star (bias corrected MLE) 0.648

Theta star (bias corrected MLE) 85.39

nu star (bias corrected) 9.077

MLE Sd (bias corrected) 68.75

Approximate Chi Square Value (0.05) 3.373

Adjusted Chi Square Value 2.413

Adjusted Level of Significance 0.0158

Assuming Gamma Distribution

95% Approximate Gamma UCL 149

95% Adjusted Gamma UCL 208.3

Lognormal GOF Test

Shapiro Wilk Test Statistic 0.954

10% Shapiro Wilk Critical Value 0.838

Lilliefors Test Statistic 0.206

10% Lilliefors Critical Value 0.28

Shapiro Wilk Lognormal GOF Test

Data appear Lognormal at 10% Significance Level

Lilliefors Lognormal GOF Test

Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal Statistics

Minimum of Logged Data 1.105

Maximum of Logged Data 5.198

Mean of logged Data 3.415

SD of logged Data 1.318

Assuming Lognormal Distribution

95% H-UCL 877.4

95% Chebyshev (MVUE) UCL 190.5

99% Chebyshev (MVUE) UCL 357.2

90% Chebyshev (MVUE) UCL 149.9

97.5% Chebyshev (MVUE) UCL 246.7

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL 93.46

95% Standard Bootstrap UCL 90.84

95% Hall's Bootstrap UCL 227.2

90% Chebyshev(Mean, Sd) UCL 124.9

97.5% Chebyshev(Mean, Sd) UCL 200

95% BCA Bootstrap UCL 110.8

95% Bootstrap-t UCL 148.8

95% Percentile Bootstrap UCL 93.87

95% Chebyshev(Mean, Sd) UCL 156.3

99% Chebyshev(Mean, Sd) UCL 285.9

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
From File filea1b878952361.xls
Full Precision OFF
Confidence Coefficient 95%
Number of Bootstrap Operations 2000

Suggested UCL to Use

95% Student's-t UCL 100.4

The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.

Please verify the data were collected from random locations.

If the data were collected using judgmental or other non-random methods,
then contact a statistician to correctly calculate UCLs.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (turbidity, field [ntu]_intrawell_apw-06s)

General Statistics

Total Number of Observations	8	Number of Distinct Observations	8
		Number of Missing Observations	0
Minimum	1.26	Mean	10.06
Maximum	30.5	Median	7.83
SD	9.258	Std. Error of Mean	3.273
Coefficient of Variation	0.92	Skewness	1.813

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach, refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance, but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).

The Chebyshev UCL often results in gross overestimates of the mean.

Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test

Shapiro Wilk Test Statistic	0.819	Shapiro Wilk GOF Test
1% Shapiro Wilk Critical Value	0.749	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.293	Lilliefors GOF Test
1% Lilliefors Critical Value	0.333	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Assuming Normal Distribution

95% Normal UCL

95% Student's-t UCL 16.26

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	17.68
95% Modified-t UCL (Johnson-1978)	16.61

Gamma GOF Test

A-D Test Statistic	0.209	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.728	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.191	Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value	0.299	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics

k hat (MLE)	1.529	k star (bias corrected MLE)	1.039
Theta hat (MLE)	6.576	Theta star (bias corrected MLE)	9.678
nu hat (MLE)	24.47	nu star (bias corrected)	16.63

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
 From File filea1b878952361.xls
 Full Precision OFF
 Confidence Coefficient 95%
 Number of Bootstrap Operations 2000

MLE Mean (bias corrected)	10.06	MLE Sd (bias corrected)	9.866
		Approximate Chi Square Value (0.05)	8.407
Adjusted Level of Significance	0.0195	Adjusted Chi Square Value	6.981

Assuming Gamma Distribution

95% Approximate Gamma UCL	19.89	95% Adjusted Gamma UCL	23.96

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.978	Shapiro Wilk Lognormal GOF Test	
10% Shapiro Wilk Critical Value	0.851	Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.155	Lilliefors Lognormal GOF Test	
10% Lilliefors Critical Value	0.265	Data appear Lognormal at 10% Significance Level	

Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal Statistics

Minimum of Logged Data	0.231	Mean of logged Data	1.947
Maximum of Logged Data	3.418	SD of logged Data	0.959

Assuming Lognormal Distribution

95% H-UCL	37.06	90% Chebyshev (MVUE) UCL	21.02
95% Chebyshev (MVUE) UCL	25.87	97.5% Chebyshev (MVUE) UCL	32.6
99% Chebyshev (MVUE) UCL	45.82		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	15.44	95% BCA Bootstrap UCL	17.16
95% Standard Bootstrap UCL	15.13	95% Bootstrap-t UCL	24.03
95% Hall's Bootstrap UCL	44.57	95% Percentile Bootstrap UCL	15.5
90% Chebyshev(Mean, Sd) UCL	19.88	95% Chebyshev(Mean, Sd) UCL	24.32
97.5% Chebyshev(Mean, Sd) UCL	30.5	99% Chebyshev(Mean, Sd) UCL	42.62

Suggested UCL to Use

95% Student's-t UCL	16.26

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (turbidity, field [ntu]_inrawell_apw-07)

General Statistics

Total Number of Observations	8	Number of Distinct Observations	8
		Number of Missing Observations	0
Minimum	4.36	Mean	34.22
Maximum	79.2	Median	27.9
SD	27.07	Std. Error of Mean	9.569
Coefficient of Variation	0.791	Skewness	0.718

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach, refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes ($n < 7$).

The Chebyshev UCL often results in gross overestimates of the mean.

Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test

Shapiro Wilk Test Statistic	0.917	Shapiro Wilk GOF Test
1% Shapiro Wilk Critical Value	0.749	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.187	Lilliefors GOF Test
1% Lilliefors Critical Value	0.333	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Assuming Normal Distribution

95% Normal UCL

95% Student's-t UCL	52.35

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	52.56
95% Modified-t UCL (Johnson-1978)	52.75

Gamma GOF Test

A-D Test Statistic	0.172	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.728	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.131	Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value	0.299	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics

k hat (MLE)	1.561	k star (bias corrected MLE)	1.059
Theta hat (MLE)	21.92	Theta star (bias corrected MLE)	32.31
nu hat (MLE)	24.98	nu star (bias corrected)	16.94
MLE Mean (bias corrected)	34.22	MLE Sd (bias corrected)	33.25
		Approximate Chi Square Value (0.05)	8.632
Adjusted Level of Significance	0.0195	Adjusted Chi Square Value	7.183

Assuming Gamma Distribution

95% Approximate Gamma UCL	67.17	95% Adjusted Gamma UCL	80.72

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.961	Shapiro Wilk Lognormal GOF Test
10% Shapiro Wilk Critical Value	0.851	Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.147	Lilliefors Lognormal GOF Test
10% Lilliefors Critical Value	0.265	Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal Statistics

Minimum of Logged Data	1.472	Mean of logged Data	3.18
Maximum of Logged Data	4.372	SD of logged Data	0.984

Assuming Lognormal Distribution

95% H-UCL	137.3	90% Chebyshev (MVUE) UCL	74.45
95% Chebyshev (MVUE) UCL	91.85	97.5% Chebyshev (MVUE) UCL	116
99% Chebyshev (MVUE) UCL	163.4		

Nonparametric Distribution Free UCL Statistics

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	49.96	95% BCA Bootstrap UCL	51.97
95% Standard Bootstrap UCL	49.03	95% Bootstrap-t UCL	59.88
95% Hall's Bootstrap UCL	58.25	95% Percentile Bootstrap UCL	49.9
90% Chebyshev(Mean, Sd) UCL	62.93	95% Chebyshev(Mean, Sd) UCL	75.93
97.5% Chebyshev(Mean, Sd) UCL	93.98	99% Chebyshev(Mean, Sd) UCL	129.4

Suggested UCL to Use

95% Student's-t UCL	52.35

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (turbidity, field [ntu]_intrawell_apw-08)

General Statistics

Total Number of Observations	8	Number of Distinct Observations	8
		Number of Missing Observations	0
Minimum	23.1	Mean	134.4
Maximum	305	Median	140
SD	88.53	Std. Error of Mean	31.3
Coefficient of Variation	0.659	Skewness	0.657

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach, refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance, but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes ($n < 7$).

The Chebyshev UCL often results in gross overestimates of the mean.

Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test

Shapiro Wilk Test Statistic	0.894	Shapiro Wilk GOF Test
1% Shapiro Wilk Critical Value	0.749	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.223	Lilliefors GOF Test
1% Lilliefors Critical Value	0.333	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Assuming Normal Distribution

95% Normal UCL

95% Student's-t UCL	193.7

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	193.6
95% Modified-t UCL (Johnson-1978)	194.9

Gamma GOF Test

A-D Test Statistic	0.649	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.725	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.281	Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value	0.298	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Note GOF tests may be unreliable for small sample sizes

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
 From File filea1b878952361.xls
 Full Precision OFF
 Confidence Coefficient 95%
 Number of Bootstrap Operations 2000

Gamma Statistics

k hat (MLE)	1.938	k star (bias corrected MLE)	1.295
Theta hat (MLE)	69.32	Theta star (bias corrected MLE)	103.8
nu hat (MLE)	31.02	nu star (bias corrected)	20.72
MLE Mean (bias corrected)	134.4	MLE Sd (bias corrected)	118.1
		Approximate Chi Square Value (0.05)	11.38
Adjusted Level of Significance	0.0195	Adjusted Chi Square Value	9.68

Assuming Gamma Distribution

95% Approximate Gamma UCL	244.6	95% Adjusted Gamma UCL	287.6

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.822	Shapiro Wilk Lognormal GOF Test	
10% Shapiro Wilk Critical Value	0.851	Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.319	Lilliefors Lognormal GOF Test	
10% Lilliefors Critical Value	0.265	Data Not Lognormal at 10% Significance Level	

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	3.14	Mean of logged Data	4.621
Maximum of Logged Data	5.72	SD of logged Data	0.912

Assuming Lognormal Distribution

95% H-UCL	465.8	90% Chebyshev (MVUE) UCL	286.5
95% Chebyshev (MVUE) UCL	351	97.5% Chebyshev (MVUE) UCL	440.5
99% Chebyshev (MVUE) UCL	616.3		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	185.9	95% BCA Bootstrap UCL	191.3
95% Standard Bootstrap UCL	183.7	95% Bootstrap-t UCL	197.3
95% Hall's Bootstrap UCL	215.8	95% Percentile Bootstrap UCL	187.6
90% Chebyshev(Mean, Sd) UCL	228.3	95% Chebyshev(Mean, Sd) UCL	270.8
97.5% Chebyshev(Mean, Sd) UCL	329.8	99% Chebyshev(Mean, Sd) UCL	445.8

Suggested UCL to Use

95% Student's-t UCL 193.7

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (turbidity, field [ntu]_intrawell_apw-10d)

General Statistics

Total Number of Observations	8	Number of Distinct Observations	8
		Number of Missing Observations	0
Minimum	4.76	Mean	87.03
Maximum	196	Median	46.1
SD	78.77	Std. Error of Mean	27.85
Coefficient of Variation	0.905	Skewness	0.564

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach, refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance, but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes ($n < 7$).

The Chebyshev UCL often results in gross overestimates of the mean.

Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test

Shapiro Wilk Test Statistic	0.811
1% Shapiro Wilk Critical Value	0.749
Lilliefors Test Statistic	0.32
1% Lilliefors Critical Value	0.333

Shapiro Wilk GOF Test

Data appear Normal at 1% Significance Level

Lilliefors GOF Test

Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Assuming Normal Distribution

95% Normal UCL

95% Student's-t UCL	139.8

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	138.8

95% Modified-t UCL (Johnson-1978)	140.7

Gamma GOF Test

A-D Test Statistic	0.453
5% A-D Critical Value	0.734
K-S Test Statistic	0.235
5% K-S Critical Value	0.301

Anderson-Darling Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

Kolmogorov-Smirnov Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics

k hat (MLE)	1.077
Theta hat (MLE)	80.77
nu hat (MLE)	17.24
MLE Mean (bias corrected)	87.03
Adjusted Level of Significance	0.0195

k star (bias corrected MLE)	0.757
Theta star (bias corrected MLE)	115
nu star (bias corrected)	12.11
MLE Sd (bias corrected)	100
Approximate Chi Square Value (0.05)	5.298
Adjusted Chi Square Value	4.216

Assuming Gamma Distribution

95% Approximate Gamma UCL	198.9

95% Adjusted Gamma UCL	249.9

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.898
10% Shapiro Wilk Critical Value	0.851
Lilliefors Test Statistic	0.202
10% Lilliefors Critical Value	0.265

Shapiro Wilk Lognormal GOF Test

Data appear Lognormal at 10% Significance Level

Lilliefors Lognormal GOF Test

Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal Statistics

Minimum of Logged Data	1.56
Maximum of Logged Data	5.278

Mean of logged Data	3.935
SD of logged Data	1.268

Assuming Lognormal Distribution

95% H-UCL	821.9
95% Chebyshev (MVUE) UCL	294.7

90% Chebyshev (MVUE) UCL	233.6
97.5% Chebyshev (MVUE) UCL	379.6

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation ProUCL 5.2 2/29/2024 7:30:26 PM
From File filea1b878952361.xls
Full Precision OFF
Confidence Coefficient 95%
Number of Bootstrap Operations 2000

99% Chebyshev (MVUE) UCL 546.2

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	132.8	95% BCA Bootstrap UCL	136.1
95% Standard Bootstrap UCL	129.6	95% Bootstrap-t UCL	146.4
95% Hall's Bootstrap UCL	118.1	95% Percentile Bootstrap UCL	129.4
90% Chebyshev(Mean, Sd) UCL	170.6	95% Chebyshev(Mean, Sd) UCL	208.4
97.5% Chebyshev(Mean, Sd) UCL	261	99% Chebyshev(Mean, Sd) UCL	364.1

Suggested UCL to Use

95% Student's-t UCL 139.8

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

report_result_value (turbidity, field [ntu]_intrawell_apw-10s)

General Statistics

Total Number of Observations	8	Number of Distinct Observations	8
		Number of Missing Observations	0
Minimum	3.78	Mean	40.42
Maximum	63.6	Median	44.95
SD	22.51	Std. Error of Mean	7.959
Coefficient of Variation	0.557	Skewness	-0.693

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach, refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance, but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes ($n < 7$).

The Chebyshev UCL often results in gross overestimates of the mean.

Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test

Shapiro Wilk Test Statistic	0.896
1% Shapiro Wilk Critical Value	0.749
Lilliefors Test Statistic	0.206
1% Lilliefors Critical Value	0.333

Shapiro Wilk GOF Test

Data appear Normal at 1% Significance Level

Lilliefors GOF Test

Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Assuming Normal Distribution

95% Normal UCL

95% Student's-t UCL 55.5

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	51.43
95% Modified-t UCL (Johnson-1978)	55.18

Gamma GOF Test

A-D Test Statistic	0.679
5% A-D Critical Value	0.725
K-S Test Statistic	0.26
5% K-S Critical Value	0.298

Anderson-Darling Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

Kolmogorov-Smirnov Gamma GOF Test

Detected data appear Gamma Distributed at 5% Significance Level

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.2 2/29/2024 7:30:26 PM
From File	filea1b878952361.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Detected data appear Gamma Distributed at 5% Significance Level

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics

k hat (MLE)	1.922	k star (bias corrected MLE)	1.284
Theta hat (MLE)	21.04	Theta star (bias corrected MLE)	31.47
nu hat (MLE)	30.75	nu star (bias corrected)	20.55
MLE Mean (bias corrected)	40.42	MLE Sd (bias corrected)	35.67
		Approximate Chi Square Value (0.05)	11.26
Adjusted Level of Significance	0.0195	Adjusted Chi Square Value	9.566

Assuming Gamma Distribution

95% Approximate Gamma UCL	73.79	95% Adjusted Gamma UCL	86.83

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.776	Shapiro Wilk Lognormal GOF Test
10% Shapiro Wilk Critical Value	0.851	Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.297	Lilliefors Lognormal GOF Test
10% Lilliefors Critical Value	0.265	Data Not Lognormal at 10% Significance Level

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	1.33	Mean of logged Data	3.417
Maximum of Logged Data	4.153	SD of logged Data	0.989

Assuming Lognormal Distribution

95% H-UCL	177.3	90% Chebyshev (MVUE) UCL	95.13
95% Chebyshev (MVUE) UCL	117.4	97.5% Chebyshev (MVUE) UCL	148.4
99% Chebyshev (MVUE) UCL	209.1		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	53.51	95% BCA Bootstrap UCL	50.93
95% Standard Bootstrap UCL	52.79	95% Bootstrap-t UCL	53.68
95% Hall's Bootstrap UCL	50.71	95% Percentile Bootstrap UCL	52.05
90% Chebyshev(Mean, Sd) UCL	64.3	95% Chebyshev(Mean, Sd) UCL	75.12
97.5% Chebyshev(Mean, Sd) UCL	90.13	99% Chebyshev(Mean, Sd) UCL	119.6

Suggested UCL to Use

95% Student's-t UCL	55.5

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positively skewed data sets.

group	D_report_result_value	report_result_value
Dissolved Solids, Total [mg/L] Intrawell APW-03	1	464
Dissolved Solids, Total [mg/L] Intrawell APW-03	1	514
Dissolved Solids, Total [mg/L] Intrawell APW-03	1	486
Dissolved Solids, Total [mg/L] Intrawell APW-03	1	450
Dissolved Solids, Total [mg/L] Intrawell APW-03	1	554
Dissolved Solids, Total [mg/L] Intrawell APW-03	1	504
Dissolved Solids, Total [mg/L] Intrawell APW-03	1	498
Dissolved Solids, Total [mg/L] Intrawell APW-03	1	456
Dissolved Solids, Total [mg/L] Intrawell APW-03	1	724
Dissolved Solids, Total [mg/L] Intrawell APW-03	1	602
Dissolved Solids, Total [mg/L] Intrawell APW-03	1	610
Dissolved Solids, Total [mg/L] Intrawell APW-03	1	524
Dissolved Solids, Total [mg/L] Intrawell APW-03	1	614
Dissolved Solids, Total [mg/L] Intrawell APW-03	1	636
Dissolved Solids, Total [mg/L] Intrawell APW-03	1	556
Dissolved Solids, Total [mg/L] Intrawell APW-03	1	489
Lead [ug/L] Intrawell APW-03	1	2.1
Lead [ug/L] Intrawell APW-03	1	4.2
Lead [ug/L] Intrawell APW-03	0	1
Lead [ug/L] Intrawell APW-03	0	1
Lead [ug/L] Intrawell APW-03	0	1
Lead [ug/L] Intrawell APW-03	0	1
Lead [ug/L] Intrawell APW-03	0	1
Lead [ug/L] Intrawell APW-03	0	1
Lead [ug/L] Intrawell APW-03	1	1.3
Lead [ug/L] Intrawell APW-03	1	2.3
Lead [ug/L] Intrawell APW-03	1	2.9
Lead [ug/L] Intrawell APW-03	0	1
Lead [ug/L] Intrawell APW-03	1	4.4
Lead [ug/L] Intrawell APW-03	0	1
Lead [ug/L] Intrawell APW-03	0	1
Lead [ug/L] Intrawell APW-03	0	2
Lithium [ug/L] Intrawell APW-03	1	25.8
Lithium [ug/L] Intrawell APW-03	1	26.2
Lithium [ug/L] Intrawell APW-03	1	25.9
Lithium [ug/L] Intrawell APW-03	1	24.5
Lithium [ug/L] Intrawell APW-03	1	30.8
Lithium [ug/L] Intrawell APW-03	1	27
Lithium [ug/L] Intrawell APW-03	1	35
Lithium [ug/L] Intrawell APW-03	1	23.9
Lithium [ug/L] Intrawell APW-03	1	36.1
Lithium [ug/L] Intrawell APW-03	1	32.9
Lithium [ug/L] Intrawell APW-03	1	29
Lithium [ug/L] Intrawell APW-03	1	27.6
Lithium [ug/L] Intrawell APW-03	1	35.2
Lithium [ug/L] Intrawell APW-03	1	31.2
Lithium [ug/L] Intrawell APW-03	1	32.4
Lithium [ug/L] Intrawell APW-03	1	31.6
Thallium [ug/L] Intrawell APW-03	0	1
Thallium [ug/L] Intrawell APW-03	0	1
Thallium [ug/L] Intrawell APW-03	0	1
Thallium [ug/L] Intrawell APW-03	0	1
Thallium [ug/L] Intrawell APW-03	0	1
Thallium [ug/L] Intrawell APW-03	0	1
Thallium [ug/L] Intrawell APW-03	0	1
Thallium [ug/L] Intrawell APW-03	0	1
Thallium [ug/L] Intrawell APW-03	0	1
Thallium [ug/L] Intrawell APW-03	0	1
Thallium [ug/L] Intrawell APW-03	0	2
Thallium [ug/L] Intrawell APW-03	0	2
Thallium [ug/L] Intrawell APW-03	0	2
Thallium [ug/L] Intrawell APW-03	0	2
Thallium [ug/L] Intrawell APW-03	0	2
Thallium [ug/L] Intrawell APW-03	0	2
Thallium [ug/L] Intrawell APW-03	0	2
Thallium [ug/L] Intrawell APW-03	0	2
Antimony [ug/L] Intrawell APW-03	0	

group	D_report_result_value	report_result_value
Antimony [ug/L] Intrawell APW-03	0	1
Antimony [ug/L] Intrawell APW-03	0	1
Antimony [ug/L] Intrawell APW-03	0	1
Antimony [ug/L] Intrawell APW-03	0	1
Antimony [ug/L] Intrawell APW-03	0	1
Antimony [ug/L] Intrawell APW-03	0	1
Antimony [ug/L] Intrawell APW-03	0	1
Antimony [ug/L] Intrawell APW-03	0	1
Antimony [ug/L] Intrawell APW-03	0	1
Antimony [ug/L] Intrawell APW-03	0	1
Antimony [ug/L] Intrawell APW-03	0	1
Antimony [ug/L] Intrawell APW-03	0	1
Antimony [ug/L] Intrawell APW-03	0	1
Antimony [ug/L] Intrawell APW-03	0	1
Antimony [ug/L] Intrawell APW-03	0	1
Antimony [ug/L] Intrawell APW-03	0	4
Arsenic [ug/L] Intrawell APW-03	1	2.2
Arsenic [ug/L] Intrawell APW-03	1	2.9
Arsenic [ug/L] Intrawell APW-03	1	2.1
Arsenic [ug/L] Intrawell APW-03	1	1.8
Arsenic [ug/L] Intrawell APW-03	1	2.3
Arsenic [ug/L] Intrawell APW-03	1	2.4
Arsenic [ug/L] Intrawell APW-03	1	2.8
Arsenic [ug/L] Intrawell APW-03	1	1.8
Arsenic [ug/L] Intrawell APW-03	1	2
Arsenic [ug/L] Intrawell APW-03	1	4.6
Arsenic [ug/L] Intrawell APW-03	1	5.9
Arsenic [ug/L] Intrawell APW-03	1	3
Arsenic [ug/L] Intrawell APW-03	1	4
Arsenic [ug/L] Intrawell APW-03	1	1.7
Arsenic [ug/L] Intrawell APW-03	1	2
Arsenic [ug/L] Intrawell APW-03	0	2
Barium [ug/L] Intrawell APW-03	1	111
Barium [ug/L] Intrawell APW-03	1	146
Barium [ug/L] Intrawell APW-03	1	104
Barium [ug/L] Intrawell APW-03	1	81.4
Barium [ug/L] Intrawell APW-03	1	121
Barium [ug/L] Intrawell APW-03	1	100
Barium [ug/L] Intrawell APW-03	1	150
Barium [ug/L] Intrawell APW-03	1	80.6
Barium [ug/L] Intrawell APW-03	1	158
Barium [ug/L] Intrawell APW-03	1	181
Barium [ug/L] Intrawell APW-03	1	190
Barium [ug/L] Intrawell APW-03	1	135
Barium [ug/L] Intrawell APW-03	1	155
Barium [ug/L] Intrawell APW-03	1	137
Barium [ug/L] Intrawell APW-03	1	167
Barium [ug/L] Intrawell APW-03	1	123
Beryllium [ug/L] Intrawell APW-03	0	1
Beryllium [ug/L] Intrawell APW-03	0	1
Beryllium [ug/L] Intrawell APW-03	0	1
Beryllium [ug/L] Intrawell APW-03	0	1
Beryllium [ug/L] Intrawell APW-03	0	1
Beryllium [ug/L] Intrawell APW-03	0	1
Beryllium [ug/L] Intrawell APW-03	0	1
Beryllium [ug/L] Intrawell APW-03	0	1
Beryllium [ug/L] Intrawell APW-03	0	1
Beryllium [ug/L] Intrawell APW-03	0	1
Beryllium [ug/L] Intrawell APW-03	0	1
Beryllium [ug/L] Intrawell APW-03	0	1
Beryllium [ug/L] Intrawell APW-03	0	1
Beryllium [ug/L] Intrawell APW-03	0	1
Beryllium [ug/L] Intrawell APW-03	0	1
Beryllium [ug/L] Intrawell APW-03	0	1
Beryllium [ug/L] Intrawell APW-03	0	1
Beryllium [ug/L] Intrawell APW-03	0	2
Boron [mg/L] Intrawell APW-03	1	4.16
Boron [mg/L] Intrawell APW-03	1	4.21

group	D_report_result_value	report_result_value
Boron [mg/L] Intrawell APW-03	1	4.7
Boron [mg/L] Intrawell APW-03	1	4.67
Boron [mg/L] Intrawell APW-03	1	4.44
Boron [mg/L] Intrawell APW-03	1	4.52
Boron [mg/L] Intrawell APW-03	1	4.08
Boron [mg/L] Intrawell APW-03	1	4.92
Boron [mg/L] Intrawell APW-03	1	4.27
Boron [mg/L] Intrawell APW-03	1	1.84
Boron [mg/L] Intrawell APW-03	1	3.59
Boron [mg/L] Intrawell APW-03	1	4.94
Boron [mg/L] Intrawell APW-03	1	4.67
Boron [mg/L] Intrawell APW-03	1	4.19
Boron [mg/L] Intrawell APW-03	1	2.22
Cadmium [ug/L] Intrawell APW-03	0	1
Cadmium [ug/L] Intrawell APW-03	0	1
Cadmium [ug/L] Intrawell APW-03	0	1
Cadmium [ug/L] Intrawell APW-03	0	1
Cadmium [ug/L] Intrawell APW-03	0	1
Cadmium [ug/L] Intrawell APW-03	0	1
Cadmium [ug/L] Intrawell APW-03	0	1
Cadmium [ug/L] Intrawell APW-03	0	1
Cadmium [ug/L] Intrawell APW-03	0	1
Cadmium [ug/L] Intrawell APW-03	0	1
Cadmium [ug/L] Intrawell APW-03	0	1
Cadmium [ug/L] Intrawell APW-03	0	1
Cadmium [ug/L] Intrawell APW-03	0	1
Cadmium [ug/L] Intrawell APW-03	0	1
Cadmium [ug/L] Intrawell APW-03	0	1
Chromium [ug/L] Intrawell APW-03	1	8.1
Chromium [ug/L] Intrawell APW-03	1	5.3
Chromium [ug/L] Intrawell APW-03	1	2.6
Chromium [ug/L] Intrawell APW-03	0	1
Chromium [ug/L] Intrawell APW-03	0	1
Chromium [ug/L] Intrawell APW-03	1	5
Chromium [ug/L] Intrawell APW-03	1	2.5
Chromium [ug/L] Intrawell APW-03	0	1
Chromium [ug/L] Intrawell APW-03	1	4.4
Chromium [ug/L] Intrawell APW-03	1	8.3
Chromium [ug/L] Intrawell APW-03	1	11.8
Chromium [ug/L] Intrawell APW-03	1	1.9
Chromium [ug/L] Intrawell APW-03	1	24.1
Chromium [ug/L] Intrawell APW-03	0	1.5
Chromium [ug/L] Intrawell APW-03	0	1.5
Chromium [ug/L] Intrawell APW-03	0	2
Cobalt [ug/L] Intrawell APW-03	0	1
Cobalt [ug/L] Intrawell APW-03	1	1.5
Cobalt [ug/L] Intrawell APW-03	0	1
Cobalt [ug/L] Intrawell APW-03	0	1
Cobalt [ug/L] Intrawell APW-03	0	1
Cobalt [ug/L] Intrawell APW-03	0	1
Cobalt [ug/L] Intrawell APW-03	0	1
Cobalt [ug/L] Intrawell APW-03	0	1
Cobalt [ug/L] Intrawell APW-03	1	1
Cobalt [ug/L] Intrawell APW-03	1	1.4
Cobalt [ug/L] Intrawell APW-03	1	2.1
Cobalt [ug/L] Intrawell APW-03	0	1
Cobalt [ug/L] Intrawell APW-03	1	1.4
Cobalt [ug/L] Intrawell APW-03	0	1
Cobalt [ug/L] Intrawell APW-03	0	1
Cobalt [ug/L] Intrawell APW-03	0	2
Calcium [mg/L] Intrawell APW-03	1	86.3
Calcium [mg/L] Intrawell APW-03	1	104
Calcium [mg/L] Intrawell APW-03	1	88.1
Calcium [mg/L] Intrawell APW-03	1	74.9

[illegible]

group	D_report_result_value	report_result_value
Mercury [ug/L] Intrawell APW-03	0	0.2
Mercury [ug/L] Intrawell APW-03	0	0.2
Mercury [ug/L] Intrawell APW-03	0	0.2
Mercury [ug/L] Intrawell APW-03	0	0.2
Sulfate [mg/L] Intrawell APW-03	1	175
Sulfate [mg/L] Intrawell APW-03	1	222
Sulfate [mg/L] Intrawell APW-03	1	201
Sulfate [mg/L] Intrawell APW-03	1	207
Sulfate [mg/L] Intrawell APW-03	1	204
Sulfate [mg/L] Intrawell APW-03	1	168
Sulfate [mg/L] Intrawell APW-03	1	152
Sulfate [mg/L] Intrawell APW-03	1	194
Sulfate [mg/L] Intrawell APW-03	1	393
Sulfate [mg/L] Intrawell APW-03	1	150
Sulfate [mg/L] Intrawell APW-03	1	226
Sulfate [mg/L] Intrawell APW-03	1	322
Sulfate [mg/L] Intrawell APW-03	1	292
Sulfate [mg/L] Intrawell APW-03	1	280
Sulfate [mg/L] Intrawell APW-03	1	133
Sulfate [mg/L] Intrawell APW-03	1	80.1
Radium-226/228 [pCi/L] Intrawell APW-03	1	2.58
Radium-226/228 [pCi/L] Intrawell APW-03	1	2
Radium-226/228 [pCi/L] Intrawell APW-03	1	1.37
Radium-226/228 [pCi/L] Intrawell APW-03	1	2
Radium-226/228 [pCi/L] Intrawell APW-03	1	2
Radium-226/228 [pCi/L] Intrawell APW-03	1	2
Radium-226/228 [pCi/L] Intrawell APW-03	1	2
Radium-226/228 [pCi/L] Intrawell APW-03	1	2
Radium-226/228 [pCi/L] Intrawell APW-03	1	2.09
Radium-226/228 [pCi/L] Intrawell APW-03	1	2
Radium-226/228 [pCi/L] Intrawell APW-03	1	2
Radium-226/228 [pCi/L] Intrawell APW-03	1	0.776
Radium-226/228 [pCi/L] Intrawell APW-03	1	2
Radium-226/228 [pCi/L] Intrawell APW-03	1	2
Radium-226/228 [pCi/L] Intrawell APW-03	1	2
Radium-226/228 [pCi/L] Intrawell APW-03	1	3.18
pH, Lab [SU] Intrawell APW-03	1	7.88
pH, Lab [SU] Intrawell APW-03	1	7.46
pH, Lab [SU] Intrawell APW-03	1	7.65
pH, Lab [SU] Intrawell APW-03	1	7.93
pH, Lab [SU] Intrawell APW-03	1	7.5
pH, Lab [SU] Intrawell APW-03	1	7.48
pH, Lab [SU] Intrawell APW-03	1	7.26
pH, Lab [SU] Intrawell APW-03	1	7.78
pH, Lab [SU] Intrawell APW-03	1	7.85
pH, Lab [SU] Intrawell APW-03	1	7.46
pH, Lab [SU] Intrawell APW-03	1	7.21
pH, Lab [SU] Intrawell APW-03	1	7.45
pH, Lab [SU] Intrawell APW-03	1	7.77
pH, Lab [SU] Intrawell APW-03	1	7.84
pH, Lab [SU] Intrawell APW-03	1	7.24
pH, Lab [SU] Intrawell APW-03	1	7.4
Fluoride [ug/L] Intrawell APW-03	1	280
Fluoride [ug/L] Intrawell APW-03	1	290
Fluoride [ug/L] Intrawell APW-03	1	290
Fluoride [ug/L] Intrawell APW-03	1	310
Fluoride [ug/L] Intrawell APW-03	1	270
Fluoride [ug/L] Intrawell APW-03	1	290
Fluoride [ug/L] Intrawell APW-03	1	290
Fluoride [ug/L] Intrawell APW-03	1	340
Fluoride [ug/L] Intrawell APW-03	1	260
Fluoride [ug/L] Intrawell APW-03	1	200
Fluoride [ug/L] Intrawell APW-03	1	260
Fluoride [ug/L] Intrawell APW-03	1	230
Fluoride [ug/L] Intrawell APW-03	1	230

group	D_report_result_value	report_result_value
Fluoride [ug/L] Intrawell APW-03	1	250
Fluoride [ug/L] Intrawell APW-03	1	240
Fluoride [ug/L] Intrawell APW-03	1	202
Chloride [mg/L] Intrawell APW-03	1	22
Chloride [mg/L] Intrawell APW-03	1	21
Chloride [mg/L] Intrawell APW-03	1	21
Chloride [mg/L] Intrawell APW-03	1	22
Chloride [mg/L] Intrawell APW-03	1	19
Chloride [mg/L] Intrawell APW-03	1	20
Chloride [mg/L] Intrawell APW-03	1	16
Chloride [mg/L] Intrawell APW-03	1	23
Chloride [mg/L] Intrawell APW-03	1	20
Chloride [mg/L] Intrawell APW-03	1	16
Chloride [mg/L] Intrawell APW-03	1	20
Chloride [mg/L] Intrawell APW-03	1	21
Chloride [mg/L] Intrawell APW-03	1	17
Chloride [mg/L] Intrawell APW-03	1	16
Chloride [mg/L] Intrawell APW-03	1	11
Chloride [mg/L] Intrawell APW-03	1	8.04
Radium-226/228 [pCi/L] Intrawell APW-05/05R	1	2
Radium-226/228 [pCi/L] Intrawell APW-05/05R	1	2
Radium-226/228 [pCi/L] Intrawell APW-05/05R	1	1.48
Radium-226/228 [pCi/L] Intrawell APW-05/05R	1	2
Radium-226/228 [pCi/L] Intrawell APW-05/05R	1	2
Radium-226/228 [pCi/L] Intrawell APW-05/05R	1	2
Radium-226/228 [pCi/L] Intrawell APW-05/05R	1	2
Radium-226/228 [pCi/L] Intrawell APW-05/05R	1	1.75
Radium-226/228 [pCi/L] Intrawell APW-05/05R	1	2
Radium-226/228 [pCi/L] Intrawell APW-05/05R	1	2
Radium-226/228 [pCi/L] Intrawell APW-05/05R	1	0.798
Radium-226/228 [pCi/L] Intrawell APW-05/05R	1	2
Radium-226/228 [pCi/L] Intrawell APW-05/05R	1	6.34
Radium-226/228 [pCi/L] Intrawell APW-05/05R	1	2
Radium-226/228 [pCi/L] Intrawell APW-05/05R	1	3.86
Dissolved Solids, Total [mg/L] Intrawell APW-05/05R	1	842
Dissolved Solids, Total [mg/L] Intrawell APW-05/05R	1	832
Dissolved Solids, Total [mg/L] Intrawell APW-05/05R	1	804
Dissolved Solids, Total [mg/L] Intrawell APW-05/05R	1	826
Dissolved Solids, Total [mg/L] Intrawell APW-05/05R	1	790
Dissolved Solids, Total [mg/L] Intrawell APW-05/05R	1	792
Dissolved Solids, Total [mg/L] Intrawell APW-05/05R	1	552
Dissolved Solids, Total [mg/L] Intrawell APW-05/05R	1	804
Dissolved Solids, Total [mg/L] Intrawell APW-05/05R	1	650
Dissolved Solids, Total [mg/L] Intrawell APW-05/05R	1	750
Dissolved Solids, Total [mg/L] Intrawell APW-05/05R	1	714
Dissolved Solids, Total [mg/L] Intrawell APW-05/05R	1	696
Dissolved Solids, Total [mg/L] Intrawell APW-05/05R	1	740
Dissolved Solids, Total [mg/L] Intrawell APW-05/05R	1	680
Dissolved Solids, Total [mg/L] Intrawell APW-05/05R	1	705
Dissolved Solids, Total [mg/L] Intrawell APW-05/05R	1	677
Lead [ug/L] Intrawell APW-05/05R	0	1
Lead [ug/L] Intrawell APW-05/05R	0	1
Lead [ug/L] Intrawell APW-05/05R	0	1
Lead [ug/L] Intrawell APW-05/05R	0	1
Lead [ug/L] Intrawell APW-05/05R	0	1
Lead [ug/L] Intrawell APW-05/05R	0	1
Lead [ug/L] Intrawell APW-05/05R	0	1
Lead [ug/L] Intrawell APW-05/05R	0	1
Lead [ug/L] Intrawell APW-05/05R	0	1
Lead [ug/L] Intrawell APW-05/05R	0	1
Lead [ug/L] Intrawell APW-05/05R	0	1
Lead [ug/L] Intrawell APW-05/05R	0	1
Lead [ug/L] Intrawell APW-05/05R	1	1.1
Lead [ug/L] Intrawell APW-05/05R	1	2.6
Lead [ug/L] Intrawell APW-05/05R	1	2

group	D_report_result_value	report_result_value
Lead [ug/L] Intrawell APW-05/05R	0	2
Lithium [ug/L] Intrawell APW-05/05R	1	36.3
Lithium [ug/L] Intrawell APW-05/05R	1	44.3
Lithium [ug/L] Intrawell APW-05/05R	1	39.3
Lithium [ug/L] Intrawell APW-05/05R	1	40.5
Lithium [ug/L] Intrawell APW-05/05R	1	41.5
Lithium [ug/L] Intrawell APW-05/05R	1	43.3
Lithium [ug/L] Intrawell APW-05/05R	1	40.4
Lithium [ug/L] Intrawell APW-05/05R	1	39.7
Lithium [ug/L] Intrawell APW-05/05R	1	33.1
Lithium [ug/L] Intrawell APW-05/05R	1	40.8
Lithium [ug/L] Intrawell APW-05/05R	1	37.3
Lithium [ug/L] Intrawell APW-05/05R	1	39.9
Lithium [ug/L] Intrawell APW-05/05R	1	42.3
Lithium [ug/L] Intrawell APW-05/05R	1	36.7
Lithium [ug/L] Intrawell APW-05/05R	1	52.3
Lithium [ug/L] Intrawell APW-05/05R	1	38.8
Thallium [ug/L] Intrawell APW-05/05R	0	1
Thallium [ug/L] Intrawell APW-05/05R	0	1
Thallium [ug/L] Intrawell APW-05/05R	0	1
Thallium [ug/L] Intrawell APW-05/05R	0	1
Thallium [ug/L] Intrawell APW-05/05R	0	1
Thallium [ug/L] Intrawell APW-05/05R	0	1
Thallium [ug/L] Intrawell APW-05/05R	0	1
Thallium [ug/L] Intrawell APW-05/05R	0	1
Thallium [ug/L] Intrawell APW-05/05R	0	2
Thallium [ug/L] Intrawell APW-05/05R	0	2
Thallium [ug/L] Intrawell APW-05/05R	0	2
Thallium [ug/L] Intrawell APW-05/05R	0	2
Thallium [ug/L] Intrawell APW-05/05R	0	2
Thallium [ug/L] Intrawell APW-05/05R	0	2
Thallium [ug/L] Intrawell APW-05/05R	0	2
Thallium [ug/L] Intrawell APW-05/05R	0	2
Antimony [ug/L] Intrawell APW-05/05R	0	1
Antimony [ug/L] Intrawell APW-05/05R	0	1
Antimony [ug/L] Intrawell APW-05/05R	0	1
Antimony [ug/L] Intrawell APW-05/05R	0	1
Antimony [ug/L] Intrawell APW-05/05R	0	1
Antimony [ug/L] Intrawell APW-05/05R	0	1
Antimony [ug/L] Intrawell APW-05/05R	0	1
Antimony [ug/L] Intrawell APW-05/05R	0	1
Antimony [ug/L] Intrawell APW-05/05R	0	1
Antimony [ug/L] Intrawell APW-05/05R	0	1
Antimony [ug/L] Intrawell APW-05/05R	1	1.1
Antimony [ug/L] Intrawell APW-05/05R	0	1
Antimony [ug/L] Intrawell APW-05/05R	0	1
Antimony [ug/L] Intrawell APW-05/05R	0	1
Antimony [ug/L] Intrawell APW-05/05R	0	1
Antimony [ug/L] Intrawell APW-05/05R	0	4
Arsenic [ug/L] Intrawell APW-05/05R	1	3.1
Arsenic [ug/L] Intrawell APW-05/05R	1	2.6
Arsenic [ug/L] Intrawell APW-05/05R	1	1.5
Arsenic [ug/L] Intrawell APW-05/05R	1	1.6
Arsenic [ug/L] Intrawell APW-05/05R	1	1.6
Arsenic [ug/L] Intrawell APW-05/05R	1	1.9
Arsenic [ug/L] Intrawell APW-05/05R	1	2.1
Arsenic [ug/L] Intrawell APW-05/05R	1	1.9
Arsenic [ug/L] Intrawell APW-05/05R	1	4.8
Arsenic [ug/L] Intrawell APW-05/05R	1	2.5
Arsenic [ug/L] Intrawell APW-05/05R	1	2.2
Arsenic [ug/L] Intrawell APW-05/05R	1	2.4
Arsenic [ug/L] Intrawell APW-05/05R	1	3
Arsenic [ug/L] Intrawell APW-05/05R	1	2.8
Arsenic [ug/L] Intrawell APW-05/05R	1	4.2
Arsenic [ug/L] Intrawell APW-05/05R	1	2.2

group	D_report_result_value	report_result_value
Barium [ug/L] Intrawell APW-05/05R	1	226
Barium [ug/L] Intrawell APW-05/05R	1	233
Barium [ug/L] Intrawell APW-05/05R	1	183
Barium [ug/L] Intrawell APW-05/05R	1	216
Barium [ug/L] Intrawell APW-05/05R	1	193
Barium [ug/L] Intrawell APW-05/05R	1	214
Barium [ug/L] Intrawell APW-05/05R	1	214
Barium [ug/L] Intrawell APW-05/05R	1	195
Barium [ug/L] Intrawell APW-05/05R	1	187
Barium [ug/L] Intrawell APW-05/05R	1	154
Barium [ug/L] Intrawell APW-05/05R	1	140
Barium [ug/L] Intrawell APW-05/05R	1	145
Barium [ug/L] Intrawell APW-05/05R	1	183
Barium [ug/L] Intrawell APW-05/05R	1	162
Barium [ug/L] Intrawell APW-05/05R	1	225
Barium [ug/L] Intrawell APW-05/05R	1	151
Beryllium [ug/L] Intrawell APW-05/05R	0	1
Beryllium [ug/L] Intrawell APW-05/05R	0	1
Beryllium [ug/L] Intrawell APW-05/05R	0	1
Beryllium [ug/L] Intrawell APW-05/05R	0	1
Beryllium [ug/L] Intrawell APW-05/05R	0	1
Beryllium [ug/L] Intrawell APW-05/05R	0	1
Beryllium [ug/L] Intrawell APW-05/05R	0	1
Beryllium [ug/L] Intrawell APW-05/05R	0	1
Beryllium [ug/L] Intrawell APW-05/05R	0	2
Beryllium [ug/L] Intrawell APW-05/05R	0	1
Beryllium [ug/L] Intrawell APW-05/05R	0	1
Beryllium [ug/L] Intrawell APW-05/05R	0	1
Beryllium [ug/L] Intrawell APW-05/05R	0	1
Beryllium [ug/L] Intrawell APW-05/05R	0	1
Beryllium [ug/L] Intrawell APW-05/05R	0	2
Boron [mg/L] Intrawell APW-05/05R	1	9.3
Boron [mg/L] Intrawell APW-05/05R	1	10.3
Boron [mg/L] Intrawell APW-05/05R	1	8.89
Boron [mg/L] Intrawell APW-05/05R	1	9.98
Boron [mg/L] Intrawell APW-05/05R	1	9.1
Boron [mg/L] Intrawell APW-05/05R	1	9.83
Boron [mg/L] Intrawell APW-05/05R	1	9.25
Boron [mg/L] Intrawell APW-05/05R	1	8.73
Boron [mg/L] Intrawell APW-05/05R	1	7.67
Boron [mg/L] Intrawell APW-05/05R	1	7.76
Boron [mg/L] Intrawell APW-05/05R	1	7.48
Boron [mg/L] Intrawell APW-05/05R	1	7.35
Boron [mg/L] Intrawell APW-05/05R	1	8.76
Boron [mg/L] Intrawell APW-05/05R	1	7.12
Boron [mg/L] Intrawell APW-05/05R	1	9.62
Cadmium [ug/L] Intrawell APW-05/05R	0	1
Cadmium [ug/L] Intrawell APW-05/05R	0	1
Cadmium [ug/L] Intrawell APW-05/05R	0	1
Cadmium [ug/L] Intrawell APW-05/05R	0	1
Cadmium [ug/L] Intrawell APW-05/05R	0	1
Cadmium [ug/L] Intrawell APW-05/05R	0	1
Cadmium [ug/L] Intrawell APW-05/05R	0	1
Cadmium [ug/L] Intrawell APW-05/05R	0	1
Cadmium [ug/L] Intrawell APW-05/05R	0	1
Cadmium [ug/L] Intrawell APW-05/05R	0	1
Cadmium [ug/L] Intrawell APW-05/05R	0	1
Cadmium [ug/L] Intrawell APW-05/05R	0	1
Cadmium [ug/L] Intrawell APW-05/05R	0	1
Cadmium [ug/L] Intrawell APW-05/05R	0	1
Cadmium [ug/L] Intrawell APW-05/05R	0	1
Cadmium [ug/L] Intrawell APW-05/05R	0	1
Cadmium [ug/L] Intrawell APW-05/05R	0	1
Chromium [ug/L] Intrawell APW-05/05R	1	13.7
Chromium [ug/L] Intrawell APW-05/05R	0	1

[illegible]

group	D_report_result_value	report_result_value
Molybdenum [ug/L] Intrawell APW-05/05R	1	193
Molybdenum [ug/L] Intrawell APW-05/05R	1	246
Molybdenum [ug/L] Intrawell APW-05/05R	1	244
Molybdenum [ug/L] Intrawell APW-05/05R	1	249
Molybdenum [ug/L] Intrawell APW-05/05R	1	203
Molybdenum [ug/L] Intrawell APW-05/05R	1	235
Molybdenum [ug/L] Intrawell APW-05/05R	1	223
Molybdenum [ug/L] Intrawell APW-05/05R	1	217
Molybdenum [ug/L] Intrawell APW-05/05R	1	212
Molybdenum [ug/L] Intrawell APW-05/05R	1	223
Molybdenum [ug/L] Intrawell APW-05/05R	1	203
Molybdenum [ug/L] Intrawell APW-05/05R	1	227
Nickel [ug/L] Intrawell APW-05/05R	1	7.4
Nickel [ug/L] Intrawell APW-05/05R	1	1.2
Nickel [ug/L] Intrawell APW-05/05R	1	2.3
Nickel [ug/L] Intrawell APW-05/05R	0	1
Nickel [ug/L] Intrawell APW-05/05R	0	1
Nickel [ug/L] Intrawell APW-05/05R	1	4.3
Nickel [ug/L] Intrawell APW-05/05R	1	2.1
Nickel [ug/L] Intrawell APW-05/05R	0	1
Nickel [ug/L] Intrawell APW-05/05R	1	3.7
Nickel [ug/L] Intrawell APW-05/05R	1	2
Mercury [ug/L] Intrawell APW-05/05R	0	0.2
Mercury [ug/L] Intrawell APW-05/05R	0	0.2
Mercury [ug/L] Intrawell APW-05/05R	0	0.2
Mercury [ug/L] Intrawell APW-05/05R	0	0.2
Mercury [ug/L] Intrawell APW-05/05R	0	0.2
Mercury [ug/L] Intrawell APW-05/05R	0	0.2
Mercury [ug/L] Intrawell APW-05/05R	0	0.2
Mercury [ug/L] Intrawell APW-05/05R	0	0.2
Mercury [ug/L] Intrawell APW-05/05R	0	0.2
Mercury [ug/L] Intrawell APW-05/05R	0	0.2
Mercury [ug/L] Intrawell APW-05/05R	0	0.2
Mercury [ug/L] Intrawell APW-05/05R	0	0.2
Mercury [ug/L] Intrawell APW-05/05R	0	0.2
Mercury [ug/L] Intrawell APW-05/05R	0	0.2
Mercury [ug/L] Intrawell APW-05/05R	0	0.2
Sulfate [mg/L] Intrawell APW-05/05R	1	407
Sulfate [mg/L] Intrawell APW-05/05R	1	460
Sulfate [mg/L] Intrawell APW-05/05R	1	399
Sulfate [mg/L] Intrawell APW-05/05R	1	413
Sulfate [mg/L] Intrawell APW-05/05R	1	381
Sulfate [mg/L] Intrawell APW-05/05R	1	394
Sulfate [mg/L] Intrawell APW-05/05R	1	439
Sulfate [mg/L] Intrawell APW-05/05R	1	378
Sulfate [mg/L] Intrawell APW-05/05R	1	224
Sulfate [mg/L] Intrawell APW-05/05R	1	379
Sulfate [mg/L] Intrawell APW-05/05R	1	324
Sulfate [mg/L] Intrawell APW-05/05R	1	325
Sulfate [mg/L] Intrawell APW-05/05R	1	335
Sulfate [mg/L] Intrawell APW-05/05R	1	343
Sulfate [mg/L] Intrawell APW-05/05R	1	330
Sulfate [mg/L] Intrawell APW-05/05R	1	306
pH, Lab [SU] Intrawell APW-05/05R	1	7.37
pH, Lab [SU] Intrawell APW-05/05R	1	7.3
pH, Lab [SU] Intrawell APW-05/05R	1	7.26
pH, Lab [SU] Intrawell APW-05/05R	1	7.3
pH, Lab [SU] Intrawell APW-05/05R	1	7.26
pH, Lab [SU] Intrawell APW-05/05R	1	7.31
pH, Lab [SU] Intrawell APW-05/05R	1	7.23
pH, Lab [SU] Intrawell APW-05/05R	1	7.18
pH, Lab [SU] Intrawell APW-05/05R	1	7.35
pH, Lab [SU] Intrawell APW-05/05R	1	7.55
pH, Lab [SU] Intrawell APW-05/05R	1	7.24

group	D_report_result_value	report_result_value
pH, Lab [SU] Intrawell APW-05/05R	1	7.31
pH, Lab [SU] Intrawell APW-05/05R	1	7.27
pH, Lab [SU] Intrawell APW-05/05R	1	7.36
pH, Lab [SU] Intrawell APW-05/05R	1	7.33
pH, Lab [SU] Intrawell APW-05/05R	1	7.42
Fluoride [ug/L] Intrawell APW-05/05R	1	340
Fluoride [ug/L] Intrawell APW-05/05R	1	340
Fluoride [ug/L] Intrawell APW-05/05R	1	320
Fluoride [ug/L] Intrawell APW-05/05R	1	320
Fluoride [ug/L] Intrawell APW-05/05R	1	320
Fluoride [ug/L] Intrawell APW-05/05R	1	330
Fluoride [ug/L] Intrawell APW-05/05R	1	360
Fluoride [ug/L] Intrawell APW-05/05R	1	320
Fluoride [ug/L] Intrawell APW-05/05R	1	350
Fluoride [ug/L] Intrawell APW-05/05R	1	330
Fluoride [ug/L] Intrawell APW-05/05R	1	370
Fluoride [ug/L] Intrawell APW-05/05R	1	330
Fluoride [ug/L] Intrawell APW-05/05R	1	300
Fluoride [ug/L] Intrawell APW-05/05R	1	350
Fluoride [ug/L] Intrawell APW-05/05R	1	380
Fluoride [ug/L] Intrawell APW-05/05R	1	298
Chloride [mg/L] Intrawell APW-05/05R	1	15
Chloride [mg/L] Intrawell APW-05/05R	1	15
Chloride [mg/L] Intrawell APW-05/05R	1	15
Chloride [mg/L] Intrawell APW-05/05R	1	14
Chloride [mg/L] Intrawell APW-05/05R	1	16
Chloride [mg/L] Intrawell APW-05/05R	1	16
Chloride [mg/L] Intrawell APW-05/05R	1	16
Chloride [mg/L] Intrawell APW-05/05R	1	16
Chloride [mg/L] Intrawell APW-05/05R	1	19
Chloride [mg/L] Intrawell APW-05/05R	1	15
Chloride [mg/L] Intrawell APW-05/05R	1	19
Chloride [mg/L] Intrawell APW-05/05R	1	18
Chloride [mg/L] Intrawell APW-05/05R	1	17
Chloride [mg/L] Intrawell APW-05/05R	1	14
Chloride [mg/L] Intrawell APW-05/05R	1	16
Chloride [mg/L] Intrawell APW-05/05R	1	16.9
Radium-226/228 [pCi/L] Intrawell APW-02	1	3.04
Radium-226/228 [pCi/L] Intrawell APW-02	1	2
Radium-226/228 [pCi/L] Intrawell APW-02	1	1.67
Radium-226/228 [pCi/L] Intrawell APW-02	1	2.38
Radium-226/228 [pCi/L] Intrawell APW-02	1	2
Radium-226/228 [pCi/L] Intrawell APW-02	1	2
Radium-226/228 [pCi/L] Intrawell APW-02	1	2
Radium-226/228 [pCi/L] Intrawell APW-02	1	0.711
Radium-226/228 [pCi/L] Intrawell APW-02	1	2
Radium-226/228 [pCi/L] Intrawell APW-02	1	2
Radium-226/228 [pCi/L] Intrawell APW-02	1	1.14
Radium-226/228 [pCi/L] Intrawell APW-02	1	2
Radium-226/228 [pCi/L] Intrawell APW-02	1	4.09
Radium-226/228 [pCi/L] Intrawell APW-02	1	2
Radium-226/228 [pCi/L] Intrawell APW-02	1	0.476
Dissolved Solids, Total [mg/L] Intrawell APW-02	1	858
Dissolved Solids, Total [mg/L] Intrawell APW-02	1	880
Dissolved Solids, Total [mg/L] Intrawell APW-02	1	934
Dissolved Solids, Total [mg/L] Intrawell APW-02	1	916
Dissolved Solids, Total [mg/L] Intrawell APW-02	1	870
Dissolved Solids, Total [mg/L] Intrawell APW-02	1	848
Dissolved Solids, Total [mg/L] Intrawell APW-02	1	836
Dissolved Solids, Total [mg/L] Intrawell APW-02	1	888
Dissolved Solids, Total [mg/L] Intrawell APW-02	1	930
Dissolved Solids, Total [mg/L] Intrawell APW-02	1	890
Dissolved Solids, Total [mg/L] Intrawell APW-02	1	885
Dissolved Solids, Total [mg/L] Intrawell APW-02	1	852
Dissolved Solids, Total [mg/L] Intrawell APW-02	1	920

group	D_report_result_value	report_result_value
Dissolved Solids, Total [mg/L] Intrawell APW-02	1	845
Dissolved Solids, Total [mg/L] Intrawell APW-02	1	920
Dissolved Solids, Total [mg/L] Intrawell APW-02	1	820
Lead [ug/L] Intrawell APW-02	1	11.5
Lead [ug/L] Intrawell APW-02	1	5.4
Lead [ug/L] Intrawell APW-02	1	20.1
Lead [ug/L] Intrawell APW-02	1	9.6
Lead [ug/L] Intrawell APW-02	1	7.5
Lead [ug/L] Intrawell APW-02	1	3.1
Lead [ug/L] Intrawell APW-02	1	4.8
Lead [ug/L] Intrawell APW-02	1	23.9
Lead [ug/L] Intrawell APW-02	1	2.2
Lead [ug/L] Intrawell APW-02	1	11.9
Lead [ug/L] Intrawell APW-02	1	3.3
Lead [ug/L] Intrawell APW-02	1	2.7
Lead [ug/L] Intrawell APW-02	1	2.5
Lead [ug/L] Intrawell APW-02	1	2
Lead [ug/L] Intrawell APW-02	1	5.7
Lead [ug/L] Intrawell APW-02	1	2.35
Lithium [ug/L] Intrawell APW-02	1	50
Lithium [ug/L] Intrawell APW-02	1	45.5
Lithium [ug/L] Intrawell APW-02	1	64.7
Lithium [ug/L] Intrawell APW-02	1	52.1
Lithium [ug/L] Intrawell APW-02	1	54.2
Lithium [ug/L] Intrawell APW-02	1	47.4
Lithium [ug/L] Intrawell APW-02	1	45
Lithium [ug/L] Intrawell APW-02	1	60.4
Lithium [ug/L] Intrawell APW-02	1	50.7
Lithium [ug/L] Intrawell APW-02	1	55.9
Lithium [ug/L] Intrawell APW-02	1	38.6
Lithium [ug/L] Intrawell APW-02	1	41.7
Lithium [ug/L] Intrawell APW-02	1	45.9
Lithium [ug/L] Intrawell APW-02	1	42.2
Lithium [ug/L] Intrawell APW-02	1	56
Lithium [ug/L] Intrawell APW-02	1	41.6
Thallium [ug/L] Intrawell APW-02	0	1
Thallium [ug/L] Intrawell APW-02	0	1
Thallium [ug/L] Intrawell APW-02	0	1
Thallium [ug/L] Intrawell APW-02	0	1
Thallium [ug/L] Intrawell APW-02	0	1
Thallium [ug/L] Intrawell APW-02	0	1
Thallium [ug/L] Intrawell APW-02	0	1
Thallium [ug/L] Intrawell APW-02	0	1
Thallium [ug/L] Intrawell APW-02	0	1
Thallium [ug/L] Intrawell APW-02	0	2
Thallium [ug/L] Intrawell APW-02	0	2
Thallium [ug/L] Intrawell APW-02	0	2
Thallium [ug/L] Intrawell APW-02	0	2
Thallium [ug/L] Intrawell APW-02	0	2
Thallium [ug/L] Intrawell APW-02	0	2
Thallium [ug/L] Intrawell APW-02	0	2
Thallium [ug/L] Intrawell APW-02	0	2
Antimony [ug/L] Intrawell APW-02	0	1
Antimony [ug/L] Intrawell APW-02	0	1
Antimony [ug/L] Intrawell APW-02	0	1
Antimony [ug/L] Intrawell APW-02	0	1
Antimony [ug/L] Intrawell APW-02	0	1
Antimony [ug/L] Intrawell APW-02	0	1
Antimony [ug/L] Intrawell APW-02	0	1
Antimony [ug/L] Intrawell APW-02	1	2.1
Antimony [ug/L] Intrawell APW-02	1	1
Antimony [ug/L] Intrawell APW-02	0	1
Antimony [ug/L] Intrawell APW-02	0	1
Antimony [ug/L] Intrawell APW-02	0	1
Antimony [ug/L] Intrawell APW-02	0	1
Antimony [ug/L] Intrawell APW-02	0	1

group	D_report_result_value	report_result_value
Antimony [ug/L] Intrawell APW-02	0	1
Antimony [ug/L] Intrawell APW-02	0	4
Arsenic [ug/L] Intrawell APW-02	1	19.9
Arsenic [ug/L] Intrawell APW-02	1	14.7
Arsenic [ug/L] Intrawell APW-02	1	21.2
Arsenic [ug/L] Intrawell APW-02	1	17
Arsenic [ug/L] Intrawell APW-02	1	16.9
Arsenic [ug/L] Intrawell APW-02	1	15.7
Arsenic [ug/L] Intrawell APW-02	1	14.8
Arsenic [ug/L] Intrawell APW-02	1	24.3
Arsenic [ug/L] Intrawell APW-02	1	15.8
Arsenic [ug/L] Intrawell APW-02	1	26
Arsenic [ug/L] Intrawell APW-02	1	22
Arsenic [ug/L] Intrawell APW-02	1	18.5
Arsenic [ug/L] Intrawell APW-02	1	14.8
Arsenic [ug/L] Intrawell APW-02	1	9.3
Arsenic [ug/L] Intrawell APW-02	1	23.7
Arsenic [ug/L] Intrawell APW-02	1	11.2
Barium [ug/L] Intrawell APW-02	1	479
Barium [ug/L] Intrawell APW-02	1	355
Barium [ug/L] Intrawell APW-02	1	685
Barium [ug/L] Intrawell APW-02	1	440
Barium [ug/L] Intrawell APW-02	1	427
Barium [ug/L] Intrawell APW-02	1	338
Barium [ug/L] Intrawell APW-02	1	351
Barium [ug/L] Intrawell APW-02	1	739
Barium [ug/L] Intrawell APW-02	1	237
Barium [ug/L] Intrawell APW-02	1	408
Barium [ug/L] Intrawell APW-02	1	254
Barium [ug/L] Intrawell APW-02	1	214
Barium [ug/L] Intrawell APW-02	1	149
Barium [ug/L] Intrawell APW-02	1	152
Barium [ug/L] Intrawell APW-02	1	303
Barium [ug/L] Intrawell APW-02	1	155
Beryllium [ug/L] Intrawell APW-02	0	1
Beryllium [ug/L] Intrawell APW-02	0	1
Beryllium [ug/L] Intrawell APW-02	0	1
Beryllium [ug/L] Intrawell APW-02	0	1
Beryllium [ug/L] Intrawell APW-02	0	1
Beryllium [ug/L] Intrawell APW-02	0	1
Beryllium [ug/L] Intrawell APW-02	0	1
Beryllium [ug/L] Intrawell APW-02	1	1.1
Beryllium [ug/L] Intrawell APW-02	0	2
Beryllium [ug/L] Intrawell APW-02	0	1
Beryllium [ug/L] Intrawell APW-02	0	1
Beryllium [ug/L] Intrawell APW-02	0	1
Beryllium [ug/L] Intrawell APW-02	0	1
Beryllium [ug/L] Intrawell APW-02	0	1
Beryllium [ug/L] Intrawell APW-02	0	2
Boron [mg/L] Intrawell APW-02	1	8.16
Boron [mg/L] Intrawell APW-02	1	8.73
Boron [mg/L] Intrawell APW-02	1	8.94
Boron [mg/L] Intrawell APW-02	1	9
Boron [mg/L] Intrawell APW-02	1	8.98
Boron [mg/L] Intrawell APW-02	1	8.39
Boron [mg/L] Intrawell APW-02	1	8.19
Boron [mg/L] Intrawell APW-02	1	8.24
Boron [mg/L] Intrawell APW-02	1	8.13
Boron [mg/L] Intrawell APW-02	1	9.43
Boron [mg/L] Intrawell APW-02	1	8.97
Boron [mg/L] Intrawell APW-02	1	7.75
Boron [mg/L] Intrawell APW-02	1	9.14
Boron [mg/L] Intrawell APW-02	1	8.24
Boron [mg/L] Intrawell APW-02	1	9.62

group	D_report_result_value	report_result_value
Cadmium [ug/L] Intrawell APW-02	0	1
Cadmium [ug/L] Intrawell APW-02	0	1
Cadmium [ug/L] Intrawell APW-02	0	1
Cadmium [ug/L] Intrawell APW-02	0	1
Cadmium [ug/L] Intrawell APW-02	0	1
Cadmium [ug/L] Intrawell APW-02	0	1
Cadmium [ug/L] Intrawell APW-02	0	1
Cadmium [ug/L] Intrawell APW-02	0	1
Cadmium [ug/L] Intrawell APW-02	1	1
Cadmium [ug/L] Intrawell APW-02	0	1
Cadmium [ug/L] Intrawell APW-02	0	1
Cadmium [ug/L] Intrawell APW-02	0	1
Cadmium [ug/L] Intrawell APW-02	0	1
Cadmium [ug/L] Intrawell APW-02	0	1
Cadmium [ug/L] Intrawell APW-02	0	1
Cadmium [ug/L] Intrawell APW-02	0	1
Chromium [ug/L] Intrawell APW-02	1	37.4
Chromium [ug/L] Intrawell APW-02	1	45.5
Chromium [ug/L] Intrawell APW-02	1	50.3
Chromium [ug/L] Intrawell APW-02	1	23.5
Chromium [ug/L] Intrawell APW-02	1	14
Chromium [ug/L] Intrawell APW-02	1	56.6
Chromium [ug/L] Intrawell APW-02	1	127
Chromium [ug/L] Intrawell APW-02	1	112
Chromium [ug/L] Intrawell APW-02	1	25.4
Chromium [ug/L] Intrawell APW-02	1	14.8
Chromium [ug/L] Intrawell APW-02	1	6.4
Chromium [ug/L] Intrawell APW-02	1	5.2
Chromium [ug/L] Intrawell APW-02	1	2.4
Chromium [ug/L] Intrawell APW-02	1	8
Chromium [ug/L] Intrawell APW-02	1	9.2
Chromium [ug/L] Intrawell APW-02	0	2
Cobalt [ug/L] Intrawell APW-02	1	5.7
Cobalt [ug/L] Intrawell APW-02	1	2.3
Cobalt [ug/L] Intrawell APW-02	1	9.7
Cobalt [ug/L] Intrawell APW-02	1	4.1
Cobalt [ug/L] Intrawell APW-02	1	3.8
Cobalt [ug/L] Intrawell APW-02	1	1.8
Cobalt [ug/L] Intrawell APW-02	1	2.8
Cobalt [ug/L] Intrawell APW-02	1	11
Cobalt [ug/L] Intrawell APW-02	1	2
Cobalt [ug/L] Intrawell APW-02	1	4.4
Cobalt [ug/L] Intrawell APW-02	1	1.5
Cobalt [ug/L] Intrawell APW-02	0	1
Cobalt [ug/L] Intrawell APW-02	0	1
Cobalt [ug/L] Intrawell APW-02	0	1
Cobalt [ug/L] Intrawell APW-02	1	2.7
Cobalt [ug/L] Intrawell APW-02	0	2
Calcium [mg/L] Intrawell APW-02	1	148
Calcium [mg/L] Intrawell APW-02	1	145
Calcium [mg/L] Intrawell APW-02	1	171
Calcium [mg/L] Intrawell APW-02	1	157
Calcium [mg/L] Intrawell APW-02	1	158
Calcium [mg/L] Intrawell APW-02	1	135
Calcium [mg/L] Intrawell APW-02	1	134
Calcium [mg/L] Intrawell APW-02	1	175
Calcium [mg/L] Intrawell APW-02	1	189
Calcium [mg/L] Intrawell APW-02	1	198
Calcium [mg/L] Intrawell APW-02	1	145
Calcium [mg/L] Intrawell APW-02	1	144
Calcium [mg/L] Intrawell APW-02	1	161
Calcium [mg/L] Intrawell APW-02	1	132
Calcium [mg/L] Intrawell APW-02	1	132
Selenium [ug/L] Intrawell APW-02	0	1
Selenium [ug/L] Intrawell APW-02	0	1

group	D_report_result_value	report_result_value
Selenium [ug/L] Intrawell APW-02	0	1
Selenium [ug/L] Intrawell APW-02	0	1
Selenium [ug/L] Intrawell APW-02	0	1
Selenium [ug/L] Intrawell APW-02	0	1
Selenium [ug/L] Intrawell APW-02	0	1
Selenium [ug/L] Intrawell APW-02	0	1
Selenium [ug/L] Intrawell APW-02	0	1
Selenium [ug/L] Intrawell APW-02	0	1
Selenium [ug/L] Intrawell APW-02	0	1
Selenium [ug/L] Intrawell APW-02	0	1
Selenium [ug/L] Intrawell APW-02	0	1
Selenium [ug/L] Intrawell APW-02	0	1
Selenium [ug/L] Intrawell APW-02	1	1.5
Selenium [ug/L] Intrawell APW-02	0	2
Molybdenum [ug/L] Intrawell APW-02	1	172
Molybdenum [ug/L] Intrawell APW-02	1	147
Molybdenum [ug/L] Intrawell APW-02	1	214
Molybdenum [ug/L] Intrawell APW-02	1	175
Molybdenum [ug/L] Intrawell APW-02	1	165
Molybdenum [ug/L] Intrawell APW-02	1	111
Molybdenum [ug/L] Intrawell APW-02	1	95.1
Molybdenum [ug/L] Intrawell APW-02	1	131
Molybdenum [ug/L] Intrawell APW-02	1	240
Molybdenum [ug/L] Intrawell APW-02	1	174
Molybdenum [ug/L] Intrawell APW-02	1	128
Molybdenum [ug/L] Intrawell APW-02	1	165
Molybdenum [ug/L] Intrawell APW-02	1	229
Molybdenum [ug/L] Intrawell APW-02	1	198
Molybdenum [ug/L] Intrawell APW-02	1	147
Molybdenum [ug/L] Intrawell APW-02	1	158
Nickel [ug/L] Intrawell APW-02	1	28.8
Nickel [ug/L] Intrawell APW-02	1	26.3
Nickel [ug/L] Intrawell APW-02	1	41.2
Nickel [ug/L] Intrawell APW-02	1	20.2
Nickel [ug/L] Intrawell APW-02	1	13.5
Nickel [ug/L] Intrawell APW-02	1	29.5
Nickel [ug/L] Intrawell APW-02	1	63.1
Nickel [ug/L] Intrawell APW-02	1	72.5
Nickel [ug/L] Intrawell APW-02	1	14.2
Nickel [ug/L] Intrawell APW-02	1	4.5
Mercury [ug/L] Intrawell APW-02	0	0.2
Mercury [ug/L] Intrawell APW-02	0	0.2
Mercury [ug/L] Intrawell APW-02	0	0.2
Mercury [ug/L] Intrawell APW-02	0	0.2
Mercury [ug/L] Intrawell APW-02	0	0.2
Mercury [ug/L] Intrawell APW-02	0	0.2
Mercury [ug/L] Intrawell APW-02	0	0.2
Mercury [ug/L] Intrawell APW-02	0	0.2
Mercury [ug/L] Intrawell APW-02	0	0.2
Mercury [ug/L] Intrawell APW-02	0	0.2
Mercury [ug/L] Intrawell APW-02	1	0.43
Mercury [ug/L] Intrawell APW-02	0	0.2
Mercury [ug/L] Intrawell APW-02	0	0.2
Mercury [ug/L] Intrawell APW-02	0	0.2
Mercury [ug/L] Intrawell APW-02	0	0.2
Mercury [ug/L] Intrawell APW-02	0	0.2
Mercury [ug/L] Intrawell APW-02	0	0.2
Sulfate [mg/L] Intrawell APW-02	1	462
Sulfate [mg/L] Intrawell APW-02	1	460
Sulfate [mg/L] Intrawell APW-02	1	472
Sulfate [mg/L] Intrawell APW-02	1	479
Sulfate [mg/L] Intrawell APW-02	1	472
Sulfate [mg/L] Intrawell APW-02	1	426
Sulfate [mg/L] Intrawell APW-02	1	443
Sulfate [mg/L] Intrawell APW-02	1	416
Sulfate [mg/L] Intrawell APW-02	1	496

[illegible]

group	D_report_result_value	report_result_value
Radium-226/228 [pCi/L] Intrawell APW-06D	1	1.38
Radium-226/228 [pCi/L] Intrawell APW-06D	1	2
Radium-226/228 [pCi/L] Intrawell APW-06D	1	2.8
Radium-226/228 [pCi/L] Intrawell APW-06D	1	2
Radium-226/228 [pCi/L] Intrawell APW-06D	1	1.82
Dissolved Solids, Total [mg/L] Intrawell APW-06D	1	558
Dissolved Solids, Total [mg/L] Intrawell APW-06D	1	560
Dissolved Solids, Total [mg/L] Intrawell APW-06D	1	562
Dissolved Solids, Total [mg/L] Intrawell APW-06D	1	564
Dissolved Solids, Total [mg/L] Intrawell APW-06D	1	590
Dissolved Solids, Total [mg/L] Intrawell APW-06D	1	482
Dissolved Solids, Total [mg/L] Intrawell APW-06D	1	584
Dissolved Solids, Total [mg/L] Intrawell APW-06D	1	670
Dissolved Solids, Total [mg/L] Intrawell APW-06D	1	580
Dissolved Solids, Total [mg/L] Intrawell APW-06D	1	582
Dissolved Solids, Total [mg/L] Intrawell APW-06D	1	735
Dissolved Solids, Total [mg/L] Intrawell APW-06D	1	565
Dissolved Solids, Total [mg/L] Intrawell APW-06D	1	560
Dissolved Solids, Total [mg/L] Intrawell APW-06D	1	536
Lead [ug/L] Intrawell APW-06D	0	1
Lead [ug/L] Intrawell APW-06D	0	1
Lead [ug/L] Intrawell APW-06D	0	1
Lead [ug/L] Intrawell APW-06D	0	1
Lead [ug/L] Intrawell APW-06D	0	1
Lead [ug/L] Intrawell APW-06D	0	1
Lead [ug/L] Intrawell APW-06D	0	1
Lead [ug/L] Intrawell APW-06D	0	1
Lead [ug/L] Intrawell APW-06D	0	1
Lead [ug/L] Intrawell APW-06D	1	1.2
Lead [ug/L] Intrawell APW-06D	0	1
Lead [ug/L] Intrawell APW-06D	1	1.6
Lead [ug/L] Intrawell APW-06D	0	1
Lead [ug/L] Intrawell APW-06D	0	1
Lead [ug/L] Intrawell APW-06D	0	2
Lithium [ug/L] Intrawell APW-06D	1	16
Lithium [ug/L] Intrawell APW-06D	1	17.6
Lithium [ug/L] Intrawell APW-06D	1	16.1
Lithium [ug/L] Intrawell APW-06D	1	16.3
Lithium [ug/L] Intrawell APW-06D	1	17.8
Lithium [ug/L] Intrawell APW-06D	1	18.1
Lithium [ug/L] Intrawell APW-06D	1	16.5
Lithium [ug/L] Intrawell APW-06D	1	16.2
Lithium [ug/L] Intrawell APW-06D	1	18.5
Lithium [ug/L] Intrawell APW-06D	1	17.5
Lithium [ug/L] Intrawell APW-06D	1	17.2
Lithium [ug/L] Intrawell APW-06D	1	18.4
Lithium [ug/L] Intrawell APW-06D	1	16.9
Lithium [ug/L] Intrawell APW-06D	1	19.9
Lithium [ug/L] Intrawell APW-06D	1	17.3
Thallium [ug/L] Intrawell APW-06D	0	1
Thallium [ug/L] Intrawell APW-06D	0	1
Thallium [ug/L] Intrawell APW-06D	0	1
Thallium [ug/L] Intrawell APW-06D	0	1
Thallium [ug/L] Intrawell APW-06D	0	1
Thallium [ug/L] Intrawell APW-06D	0	1
Thallium [ug/L] Intrawell APW-06D	0	1
Thallium [ug/L] Intrawell APW-06D	0	1
Thallium [ug/L] Intrawell APW-06D	0	2
Thallium [ug/L] Intrawell APW-06D	0	2
Thallium [ug/L] Intrawell APW-06D	0	2
Thallium [ug/L] Intrawell APW-06D	0	2
Thallium [ug/L] Intrawell APW-06D	0	2
Thallium [ug/L] Intrawell APW-06D	0	2
Thallium [ug/L] Intrawell APW-06D	0	2
Antimony [ug/L] Intrawell APW-06D	0	1

group	D_report_result_value	report_result_value
Antimony [ug/L] Intrawell APW-06D	0	1
Antimony [ug/L] Intrawell APW-06D	0	1
Antimony [ug/L] Intrawell APW-06D	0	1
Antimony [ug/L] Intrawell APW-06D	0	1
Antimony [ug/L] Intrawell APW-06D	0	1
Antimony [ug/L] Intrawell APW-06D	0	1
Antimony [ug/L] Intrawell APW-06D	0	1
Antimony [ug/L] Intrawell APW-06D	0	1
Antimony [ug/L] Intrawell APW-06D	0	1
Antimony [ug/L] Intrawell APW-06D	0	1
Antimony [ug/L] Intrawell APW-06D	0	1
Antimony [ug/L] Intrawell APW-06D	0	1
Antimony [ug/L] Intrawell APW-06D	0	1
Antimony [ug/L] Intrawell APW-06D	0	1
Antimony [ug/L] Intrawell APW-06D	0	4
Arsenic [ug/L] Intrawell APW-06D	1	6.8
Arsenic [ug/L] Intrawell APW-06D	1	10.1
Arsenic [ug/L] Intrawell APW-06D	1	7.5
Arsenic [ug/L] Intrawell APW-06D	1	7.4
Arsenic [ug/L] Intrawell APW-06D	1	9
Arsenic [ug/L] Intrawell APW-06D	1	9.5
Arsenic [ug/L] Intrawell APW-06D	1	10.6
Arsenic [ug/L] Intrawell APW-06D	1	9.6
Arsenic [ug/L] Intrawell APW-06D	1	10.4
Arsenic [ug/L] Intrawell APW-06D	1	11.1
Arsenic [ug/L] Intrawell APW-06D	1	10.7
Arsenic [ug/L] Intrawell APW-06D	1	11.5
Arsenic [ug/L] Intrawell APW-06D	1	10.9
Arsenic [ug/L] Intrawell APW-06D	1	13.5
Arsenic [ug/L] Intrawell APW-06D	1	10.2
Barium [ug/L] Intrawell APW-06D	1	173
Barium [ug/L] Intrawell APW-06D	1	172
Barium [ug/L] Intrawell APW-06D	1	142
Barium [ug/L] Intrawell APW-06D	1	153
Barium [ug/L] Intrawell APW-06D	1	155
Barium [ug/L] Intrawell APW-06D	1	163
Barium [ug/L] Intrawell APW-06D	1	166
Barium [ug/L] Intrawell APW-06D	1	148
Barium [ug/L] Intrawell APW-06D	1	143
Barium [ug/L] Intrawell APW-06D	1	142
Barium [ug/L] Intrawell APW-06D	1	134
Barium [ug/L] Intrawell APW-06D	1	145
Barium [ug/L] Intrawell APW-06D	1	128
Barium [ug/L] Intrawell APW-06D	1	151
Barium [ug/L] Intrawell APW-06D	1	115
Beryllium [ug/L] Intrawell APW-06D	0	1
Beryllium [ug/L] Intrawell APW-06D	0	1
Beryllium [ug/L] Intrawell APW-06D	0	1
Beryllium [ug/L] Intrawell APW-06D	0	1
Beryllium [ug/L] Intrawell APW-06D	0	1
Beryllium [ug/L] Intrawell APW-06D	0	1
Beryllium [ug/L] Intrawell APW-06D	0	1
Beryllium [ug/L] Intrawell APW-06D	0	1
Beryllium [ug/L] Intrawell APW-06D	0	1
Beryllium [ug/L] Intrawell APW-06D	0	1
Beryllium [ug/L] Intrawell APW-06D	0	1
Beryllium [ug/L] Intrawell APW-06D	0	1
Beryllium [ug/L] Intrawell APW-06D	0	1
Beryllium [ug/L] Intrawell APW-06D	0	1
Beryllium [ug/L] Intrawell APW-06D	0	2
Boron [mg/L] Intrawell APW-06D	1	3.72
Boron [mg/L] Intrawell APW-06D	1	3.87
Boron [mg/L] Intrawell APW-06D	1	3.55
Boron [mg/L] Intrawell APW-06D	1	3.58
Boron [mg/L] Intrawell APW-06D	1	3.9
Boron [mg/L] Intrawell APW-06D	1	3.84

group	D_report_result_value	report_result_value
Boron [mg/L] Intrawell APW-06D	1	3.3
Boron [mg/L] Intrawell APW-06D	1	3.09
Boron [mg/L] Intrawell APW-06D	1	5.51
Boron [mg/L] Intrawell APW-06D	1	4.29
Boron [mg/L] Intrawell APW-06D	1	3.95
Boron [mg/L] Intrawell APW-06D	1	4.99
Boron [mg/L] Intrawell APW-06D	1	3.81
Boron [mg/L] Intrawell APW-06D	1	3.8
Cadmium [ug/L] Intrawell APW-06D	0	1
Cadmium [ug/L] Intrawell APW-06D	0	1
Cadmium [ug/L] Intrawell APW-06D	0	1
Cadmium [ug/L] Intrawell APW-06D	0	1
Cadmium [ug/L] Intrawell APW-06D	0	1
Cadmium [ug/L] Intrawell APW-06D	0	1
Cadmium [ug/L] Intrawell APW-06D	0	1
Cadmium [ug/L] Intrawell APW-06D	0	1
Cadmium [ug/L] Intrawell APW-06D	0	1
Cadmium [ug/L] Intrawell APW-06D	0	1
Cadmium [ug/L] Intrawell APW-06D	0	1
Cadmium [ug/L] Intrawell APW-06D	0	1
Cadmium [ug/L] Intrawell APW-06D	0	1
Cadmium [ug/L] Intrawell APW-06D	0	1
Cadmium [ug/L] Intrawell APW-06D	0	1
Chromium [ug/L] Intrawell APW-06D	0	1
Chromium [ug/L] Intrawell APW-06D	1	1.3
Chromium [ug/L] Intrawell APW-06D	0	1
Chromium [ug/L] Intrawell APW-06D	0	1
Chromium [ug/L] Intrawell APW-06D	0	1
Chromium [ug/L] Intrawell APW-06D	1	1.7
Chromium [ug/L] Intrawell APW-06D	1	3
Chromium [ug/L] Intrawell APW-06D	1	1.4
Chromium [ug/L] Intrawell APW-06D	0	1.5
Chromium [ug/L] Intrawell APW-06D	1	6.3
Chromium [ug/L] Intrawell APW-06D	0	1.5
Chromium [ug/L] Intrawell APW-06D	1	5.7
Chromium [ug/L] Intrawell APW-06D	1	72.7
Chromium [ug/L] Intrawell APW-06D	0	1.5
Chromium [ug/L] Intrawell APW-06D	1	8.61
Cobalt [ug/L] Intrawell APW-06D	1	1.2
Cobalt [ug/L] Intrawell APW-06D	1	1
Cobalt [ug/L] Intrawell APW-06D	0	1
Cobalt [ug/L] Intrawell APW-06D	0	1
Cobalt [ug/L] Intrawell APW-06D	0	1
Cobalt [ug/L] Intrawell APW-06D	0	1
Cobalt [ug/L] Intrawell APW-06D	0	1
Cobalt [ug/L] Intrawell APW-06D	0	1
Cobalt [ug/L] Intrawell APW-06D	0	1
Cobalt [ug/L] Intrawell APW-06D	1	3.5
Cobalt [ug/L] Intrawell APW-06D	1	1.3
Cobalt [ug/L] Intrawell APW-06D	1	5.4
Cobalt [ug/L] Intrawell APW-06D	1	3.5
Cobalt [ug/L] Intrawell APW-06D	1	1.3
Cobalt [ug/L] Intrawell APW-06D	0	2
Calcium [mg/L] Intrawell APW-06D	1	99.9
Calcium [mg/L] Intrawell APW-06D	1	110
Calcium [mg/L] Intrawell APW-06D	1	96.7
Calcium [mg/L] Intrawell APW-06D	1	100
Calcium [mg/L] Intrawell APW-06D	1	110
Calcium [mg/L] Intrawell APW-06D	1	107
Calcium [mg/L] Intrawell APW-06D	1	105
Calcium [mg/L] Intrawell APW-06D	1	105
Calcium [mg/L] Intrawell APW-06D	1	123
Calcium [mg/L] Intrawell APW-06D	1	110
Calcium [mg/L] Intrawell APW-06D	1	116
Calcium [mg/L] Intrawell APW-06D	1	128

group	D_report_result_value	report_result_value
Calcium [mg/L] Intrawell APW-06D	1	106
Calcium [mg/L] Intrawell APW-06D	1	98.4
Selenium [ug/L] Intrawell APW-06D	0	1
Selenium [ug/L] Intrawell APW-06D	0	1
Selenium [ug/L] Intrawell APW-06D	0	1
Selenium [ug/L] Intrawell APW-06D	0	1
Selenium [ug/L] Intrawell APW-06D	0	1
Selenium [ug/L] Intrawell APW-06D	0	1
Selenium [ug/L] Intrawell APW-06D	0	1
Selenium [ug/L] Intrawell APW-06D	0	1
Selenium [ug/L] Intrawell APW-06D	0	1
Selenium [ug/L] Intrawell APW-06D	0	1
Selenium [ug/L] Intrawell APW-06D	0	1
Selenium [ug/L] Intrawell APW-06D	0	1
Selenium [ug/L] Intrawell APW-06D	0	1
Selenium [ug/L] Intrawell APW-06D	0	2
Molybdenum [ug/L] Intrawell APW-06D	1	64.6
Molybdenum [ug/L] Intrawell APW-06D	1	60.6
Molybdenum [ug/L] Intrawell APW-06D	1	58.2
Molybdenum [ug/L] Intrawell APW-06D	1	58.9
Molybdenum [ug/L] Intrawell APW-06D	1	60
Molybdenum [ug/L] Intrawell APW-06D	1	58.4
Molybdenum [ug/L] Intrawell APW-06D	1	46.5
Molybdenum [ug/L] Intrawell APW-06D	1	46.3
Molybdenum [ug/L] Intrawell APW-06D	1	71.9
Molybdenum [ug/L] Intrawell APW-06D	1	69.6
Molybdenum [ug/L] Intrawell APW-06D	1	68.3
Molybdenum [ug/L] Intrawell APW-06D	1	60.2
Molybdenum [ug/L] Intrawell APW-06D	1	67.2
Molybdenum [ug/L] Intrawell APW-06D	1	55.7
Molybdenum [ug/L] Intrawell APW-06D	1	60.5
Nickel [ug/L] Intrawell APW-06D	1	3.2
Nickel [ug/L] Intrawell APW-06D	1	2.8
Nickel [ug/L] Intrawell APW-06D	1	1.8
Nickel [ug/L] Intrawell APW-06D	1	2
Nickel [ug/L] Intrawell APW-06D	1	1.7
Nickel [ug/L] Intrawell APW-06D	1	2.2
Nickel [ug/L] Intrawell APW-06D	1	3.2
Nickel [ug/L] Intrawell APW-06D	1	2.5
Nickel [ug/L] Intrawell APW-06D	1	9.3
Mercury [ug/L] Intrawell APW-06D	0	0.2
Mercury [ug/L] Intrawell APW-06D	0	0.2
Mercury [ug/L] Intrawell APW-06D	0	0.2
Mercury [ug/L] Intrawell APW-06D	0	0.2
Mercury [ug/L] Intrawell APW-06D	0	0.2
Mercury [ug/L] Intrawell APW-06D	0	0.2
Mercury [ug/L] Intrawell APW-06D	0	0.2
Mercury [ug/L] Intrawell APW-06D	0	0.2
Mercury [ug/L] Intrawell APW-06D	0	0.2
Mercury [ug/L] Intrawell APW-06D	0	0.2
Mercury [ug/L] Intrawell APW-06D	0	0.2
Mercury [ug/L] Intrawell APW-06D	0	0.2
Mercury [ug/L] Intrawell APW-06D	0	0.2
Mercury [ug/L] Intrawell APW-06D	0	0.2
Mercury [ug/L] Intrawell APW-06D	0	0.2
Sulfate [mg/L] Intrawell APW-06D	1	215
Sulfate [mg/L] Intrawell APW-06D	1	228
Sulfate [mg/L] Intrawell APW-06D	1	206
Sulfate [mg/L] Intrawell APW-06D	1	222
Sulfate [mg/L] Intrawell APW-06D	1	230
Sulfate [mg/L] Intrawell APW-06D	1	236
Sulfate [mg/L] Intrawell APW-06D	1	211
Sulfate [mg/L] Intrawell APW-06D	1	189
Sulfate [mg/L] Intrawell APW-06D	1	272

group	D_report_result_value	report_result_value
Sulfate [mg/L] Intrawell APW-06D	1	254
Sulfate [mg/L] Intrawell APW-06D	1	269
Sulfate [mg/L] Intrawell APW-06D	1	270
Sulfate [mg/L] Intrawell APW-06D	1	218
Sulfate [mg/L] Intrawell APW-06D	1	184
Sulfate [mg/L] Intrawell APW-06D	1	180
pH, Lab [SU] Intrawell APW-06D	1	7.23
pH, Lab [SU] Intrawell APW-06D	1	7.25
pH, Lab [SU] Intrawell APW-06D	1	7.23
pH, Lab [SU] Intrawell APW-06D	1	7.19
pH, Lab [SU] Intrawell APW-06D	1	7.2
pH, Lab [SU] Intrawell APW-06D	1	7.22
pH, Lab [SU] Intrawell APW-06D	1	7.21
pH, Lab [SU] Intrawell APW-06D	1	7.2
pH, Lab [SU] Intrawell APW-06D	1	7.42
pH, Lab [SU] Intrawell APW-06D	1	7.21
pH, Lab [SU] Intrawell APW-06D	1	7.29
pH, Lab [SU] Intrawell APW-06D	1	7.39
pH, Lab [SU] Intrawell APW-06D	1	7.3
pH, Lab [SU] Intrawell APW-06D	1	7.36
pH, Lab [SU] Intrawell APW-06D	1	7.73
Fluoride [ug/L] Intrawell APW-06D	1	220
Fluoride [ug/L] Intrawell APW-06D	1	230
Fluoride [ug/L] Intrawell APW-06D	1	210
Fluoride [ug/L] Intrawell APW-06D	1	220
Fluoride [ug/L] Intrawell APW-06D	1	210
Fluoride [ug/L] Intrawell APW-06D	1	220
Fluoride [ug/L] Intrawell APW-06D	1	230
Fluoride [ug/L] Intrawell APW-06D	1	210
Fluoride [ug/L] Intrawell APW-06D	1	200
Fluoride [ug/L] Intrawell APW-06D	1	240
Fluoride [ug/L] Intrawell APW-06D	1	210
Fluoride [ug/L] Intrawell APW-06D	1	200
Fluoride [ug/L] Intrawell APW-06D	1	220
Fluoride [ug/L] Intrawell APW-06D	1	240
Fluoride [ug/L] Intrawell APW-06D	1	212
Chloride [mg/L] Intrawell APW-06D	1	17
Chloride [mg/L] Intrawell APW-06D	1	17
Chloride [mg/L] Intrawell APW-06D	1	16
Chloride [mg/L] Intrawell APW-06D	1	16
Chloride [mg/L] Intrawell APW-06D	1	16
Chloride [mg/L] Intrawell APW-06D	1	16
Chloride [mg/L] Intrawell APW-06D	1	17
Chloride [mg/L] Intrawell APW-06D	1	17
Chloride [mg/L] Intrawell APW-06D	1	14
Chloride [mg/L] Intrawell APW-06D	1	17
Chloride [mg/L] Intrawell APW-06D	1	16
Chloride [mg/L] Intrawell APW-06D	1	15
Chloride [mg/L] Intrawell APW-06D	1	16
Chloride [mg/L] Intrawell APW-06D	1	22
Chloride [mg/L] Intrawell APW-06D	1	21.2
Dissolved Solids, Total [mg/L] Intrawell APW-06S	1	500
Dissolved Solids, Total [mg/L] Intrawell APW-06S	1	546
Dissolved Solids, Total [mg/L] Intrawell APW-06S	1	574
Dissolved Solids, Total [mg/L] Intrawell APW-06S	1	528
Dissolved Solids, Total [mg/L] Intrawell APW-06S	1	566
Dissolved Solids, Total [mg/L] Intrawell APW-06S	1	588
Dissolved Solids, Total [mg/L] Intrawell APW-06S	1	598
Dissolved Solids, Total [mg/L] Intrawell APW-06S	1	666
Dissolved Solids, Total [mg/L] Intrawell APW-06S	1	600
Dissolved Solids, Total [mg/L] Intrawell APW-06S	1	630
Dissolved Solids, Total [mg/L] Intrawell APW-06S	1	605
Dissolved Solids, Total [mg/L] Intrawell APW-06S	1	638
Dissolved Solids, Total [mg/L] Intrawell APW-06S	1	615
Dissolved Solids, Total [mg/L] Intrawell APW-06S	1	565

[illegible]

group	D_report_result_value	report_result_value
Antimony [ug/L] Intrawell APW-06S	0	4
Arsenic [ug/L] Intrawell APW-06S	1	1.7
Arsenic [ug/L] Intrawell APW-06S	1	1.6
Arsenic [ug/L] Intrawell APW-06S	1	1.8
Arsenic [ug/L] Intrawell APW-06S	1	2
Arsenic [ug/L] Intrawell APW-06S	1	1.3
Arsenic [ug/L] Intrawell APW-06S	1	1.2
Arsenic [ug/L] Intrawell APW-06S	1	1.1
Arsenic [ug/L] Intrawell APW-06S	1	1.1
Arsenic [ug/L] Intrawell APW-06S	1	1
Arsenic [ug/L] Intrawell APW-06S	1	1.2
Arsenic [ug/L] Intrawell APW-06S	1	1
Arsenic [ug/L] Intrawell APW-06S	1	1.1
Arsenic [ug/L] Intrawell APW-06S	0	1
Arsenic [ug/L] Intrawell APW-06S	1	1.2
Arsenic [ug/L] Intrawell APW-06S	1	1.6
Arsenic [ug/L] Intrawell APW-06S	0	2
Barium [ug/L] Intrawell APW-06S	1	222
Barium [ug/L] Intrawell APW-06S	1	237
Barium [ug/L] Intrawell APW-06S	1	205
Barium [ug/L] Intrawell APW-06S	1	226
Barium [ug/L] Intrawell APW-06S	1	214
Barium [ug/L] Intrawell APW-06S	1	213
Barium [ug/L] Intrawell APW-06S	1	224
Barium [ug/L] Intrawell APW-06S	1	205
Barium [ug/L] Intrawell APW-06S	1	250
Barium [ug/L] Intrawell APW-06S	1	221
Barium [ug/L] Intrawell APW-06S	1	190
Barium [ug/L] Intrawell APW-06S	1	202
Barium [ug/L] Intrawell APW-06S	1	224
Barium [ug/L] Intrawell APW-06S	1	206
Barium [ug/L] Intrawell APW-06S	1	305
Barium [ug/L] Intrawell APW-06S	1	204
Beryllium [ug/L] Intrawell APW-06S	0	1
Beryllium [ug/L] Intrawell APW-06S	0	1
Beryllium [ug/L] Intrawell APW-06S	0	1
Beryllium [ug/L] Intrawell APW-06S	0	1
Beryllium [ug/L] Intrawell APW-06S	0	1
Beryllium [ug/L] Intrawell APW-06S	0	1
Beryllium [ug/L] Intrawell APW-06S	0	1
Beryllium [ug/L] Intrawell APW-06S	0	1
Beryllium [ug/L] Intrawell APW-06S	0	1
Beryllium [ug/L] Intrawell APW-06S	0	1
Beryllium [ug/L] Intrawell APW-06S	0	1
Beryllium [ug/L] Intrawell APW-06S	0	1
Beryllium [ug/L] Intrawell APW-06S	0	1
Beryllium [ug/L] Intrawell APW-06S	0	1
Beryllium [ug/L] Intrawell APW-06S	0	2
Boron [mg/L] Intrawell APW-06S	1	4.65
Boron [mg/L] Intrawell APW-06S	1	5.93
Boron [mg/L] Intrawell APW-06S	1	5.83
Boron [mg/L] Intrawell APW-06S	1	5.64
Boron [mg/L] Intrawell APW-06S	1	5.8
Boron [mg/L] Intrawell APW-06S	1	6.93
Boron [mg/L] Intrawell APW-06S	1	7.42
Boron [mg/L] Intrawell APW-06S	1	6.66
Boron [mg/L] Intrawell APW-06S	1	4.77
Boron [mg/L] Intrawell APW-06S	1	6.61
Boron [mg/L] Intrawell APW-06S	1	6.31
Boron [mg/L] Intrawell APW-06S	1	6.84
Boron [mg/L] Intrawell APW-06S	1	5.84
Boron [mg/L] Intrawell APW-06S	1	5.79
Boron [mg/L] Intrawell APW-06S	1	9.19
Cadmium [ug/L] Intrawell APW-06S	0	1

group	D_report_result_value	report_result_value
Cadmium [ug/L] Intrawell APW-06S	0	1
Cadmium [ug/L] Intrawell APW-06S	0	1
Cadmium [ug/L] Intrawell APW-06S	0	1
Cadmium [ug/L] Intrawell APW-06S	0	1
Cadmium [ug/L] Intrawell APW-06S	0	1
Cadmium [ug/L] Intrawell APW-06S	0	1
Cadmium [ug/L] Intrawell APW-06S	0	1
Cadmium [ug/L] Intrawell APW-06S	0	1
Cadmium [ug/L] Intrawell APW-06S	0	1
Cadmium [ug/L] Intrawell APW-06S	0	1
Cadmium [ug/L] Intrawell APW-06S	0	1
Cadmium [ug/L] Intrawell APW-06S	0	1
Cadmium [ug/L] Intrawell APW-06S	0	1
Cadmium [ug/L] Intrawell APW-06S	0	1
Chromium [ug/L] Intrawell APW-06S	1	2.7
Chromium [ug/L] Intrawell APW-06S	1	17.3
Chromium [ug/L] Intrawell APW-06S	1	2.8
Chromium [ug/L] Intrawell APW-06S	0	1
Chromium [ug/L] Intrawell APW-06S	0	1
Chromium [ug/L] Intrawell APW-06S	1	4.8
Chromium [ug/L] Intrawell APW-06S	1	1.2
Chromium [ug/L] Intrawell APW-06S	0	1
Chromium [ug/L] Intrawell APW-06S	1	2.8
Chromium [ug/L] Intrawell APW-06S	0	1.5
Chromium [ug/L] Intrawell APW-06S	1	2.2
Chromium [ug/L] Intrawell APW-06S	0	1.5
Chromium [ug/L] Intrawell APW-06S	1	1.9
Chromium [ug/L] Intrawell APW-06S	1	6.7
Chromium [ug/L] Intrawell APW-06S	0	1.5
Chromium [ug/L] Intrawell APW-06S	0	2
Cobalt [ug/L] Intrawell APW-06S	0	1
Cobalt [ug/L] Intrawell APW-06S	0	1
Cobalt [ug/L] Intrawell APW-06S	0	1
Cobalt [ug/L] Intrawell APW-06S	0	1
Cobalt [ug/L] Intrawell APW-06S	0	1
Cobalt [ug/L] Intrawell APW-06S	0	1
Cobalt [ug/L] Intrawell APW-06S	0	1
Cobalt [ug/L] Intrawell APW-06S	0	1
Cobalt [ug/L] Intrawell APW-06S	1	1
Cobalt [ug/L] Intrawell APW-06S	0	1
Cobalt [ug/L] Intrawell APW-06S	0	1
Cobalt [ug/L] Intrawell APW-06S	0	1
Cobalt [ug/L] Intrawell APW-06S	0	1
Cobalt [ug/L] Intrawell APW-06S	0	1
Cobalt [ug/L] Intrawell APW-06S	0	1
Cobalt [ug/L] Intrawell APW-06S	0	1
Cobalt [ug/L] Intrawell APW-06S	0	2
Calcium [mg/L] Intrawell APW-06S	1	101
Calcium [mg/L] Intrawell APW-06S	1	97.2
Calcium [mg/L] Intrawell APW-06S	1	87.5
Calcium [mg/L] Intrawell APW-06S	1	96.8
Calcium [mg/L] Intrawell APW-06S	1	99.5
Calcium [mg/L] Intrawell APW-06S	1	98.1
Calcium [mg/L] Intrawell APW-06S	1	98.7
Calcium [mg/L] Intrawell APW-06S	1	97.4
Calcium [mg/L] Intrawell APW-06S	1	115
Calcium [mg/L] Intrawell APW-06S	1	105
Calcium [mg/L] Intrawell APW-06S	1	103
Calcium [mg/L] Intrawell APW-06S	1	97.1
Calcium [mg/L] Intrawell APW-06S	1	109
Calcium [mg/L] Intrawell APW-06S	1	92.7
Calcium [mg/L] Intrawell APW-06S	1	90
Selenium [ug/L] Intrawell APW-06S	0	1
Selenium [ug/L] Intrawell APW-06S	0	1
Selenium [ug/L] Intrawell APW-06S	0	1

group	D_report_result_value	report_result_value
Selenium [ug/L] Intrawell APW-06S	0	1
Selenium [ug/L] Intrawell APW-06S	0	1
Selenium [ug/L] Intrawell APW-06S	0	1
Selenium [ug/L] Intrawell APW-06S	0	1
Selenium [ug/L] Intrawell APW-06S	0	1
Selenium [ug/L] Intrawell APW-06S	0	1
Selenium [ug/L] Intrawell APW-06S	0	1
Selenium [ug/L] Intrawell APW-06S	0	1
Selenium [ug/L] Intrawell APW-06S	0	1
Selenium [ug/L] Intrawell APW-06S	0	1
Selenium [ug/L] Intrawell APW-06S	0	1
Selenium [ug/L] Intrawell APW-06S	0	1
Selenium [ug/L] Intrawell APW-06S	0	2
Molybdenum [ug/L] Intrawell APW-06S	1	249
Molybdenum [ug/L] Intrawell APW-06S	1	287
Molybdenum [ug/L] Intrawell APW-06S	1	272
Molybdenum [ug/L] Intrawell APW-06S	1	243
Molybdenum [ug/L] Intrawell APW-06S	1	274
Molybdenum [ug/L] Intrawell APW-06S	1	314
Molybdenum [ug/L] Intrawell APW-06S	1	324
Molybdenum [ug/L] Intrawell APW-06S	1	323
Molybdenum [ug/L] Intrawell APW-06S	1	237
Molybdenum [ug/L] Intrawell APW-06S	1	271
Molybdenum [ug/L] Intrawell APW-06S	1	259
Molybdenum [ug/L] Intrawell APW-06S	1	265
Molybdenum [ug/L] Intrawell APW-06S	1	235
Molybdenum [ug/L] Intrawell APW-06S	1	225
Molybdenum [ug/L] Intrawell APW-06S	1	207
Molybdenum [ug/L] Intrawell APW-06S	1	255
Nickel [ug/L] Intrawell APW-06S	1	2.1
Nickel [ug/L] Intrawell APW-06S	1	9
Nickel [ug/L] Intrawell APW-06S	1	2.1
Nickel [ug/L] Intrawell APW-06S	1	1.2
Nickel [ug/L] Intrawell APW-06S	0	1
Nickel [ug/L] Intrawell APW-06S	1	3.1
Nickel [ug/L] Intrawell APW-06S	1	1.6
Nickel [ug/L] Intrawell APW-06S	1	1.2
Nickel [ug/L] Intrawell APW-06S	1	2.7
Nickel [ug/L] Intrawell APW-06S	1	2.3
Mercury [ug/L] Intrawell APW-06S	0	0.2
Mercury [ug/L] Intrawell APW-06S	0	0.2
Mercury [ug/L] Intrawell APW-06S	0	0.2
Mercury [ug/L] Intrawell APW-06S	0	0.2
Mercury [ug/L] Intrawell APW-06S	0	0.2
Mercury [ug/L] Intrawell APW-06S	0	0.2
Mercury [ug/L] Intrawell APW-06S	0	0.2
Mercury [ug/L] Intrawell APW-06S	0	0.2
Mercury [ug/L] Intrawell APW-06S	0	0.2
Mercury [ug/L] Intrawell APW-06S	0	0.2
Mercury [ug/L] Intrawell APW-06S	0	0.2
Mercury [ug/L] Intrawell APW-06S	0	0.2
Mercury [ug/L] Intrawell APW-06S	0	0.2
Mercury [ug/L] Intrawell APW-06S	0	0.2
Mercury [ug/L] Intrawell APW-06S	0	0.2
Mercury [ug/L] Intrawell APW-06S	0	0.2
Mercury [ug/L] Intrawell APW-06S	0	0.2
Sulfate [mg/L] Intrawell APW-06S	1	127
Sulfate [mg/L] Intrawell APW-06S	1	177
Sulfate [mg/L] Intrawell APW-06S	1	167
Sulfate [mg/L] Intrawell APW-06S	1	151
Sulfate [mg/L] Intrawell APW-06S	1	189
Sulfate [mg/L] Intrawell APW-06S	1	201
Sulfate [mg/L] Intrawell APW-06S	1	233
Sulfate [mg/L] Intrawell APW-06S	1	220
Sulfate [mg/L] Intrawell APW-06S	1	200
Sulfate [mg/L] Intrawell APW-06S	1	227

group	D_report_result_value	report_result_value
Sulfate [mg/L] Intrawell APW-06S	1	243
Sulfate [mg/L] Intrawell APW-06S	1	247
Sulfate [mg/L] Intrawell APW-06S	1	208
Sulfate [mg/L] Intrawell APW-06S	1	221
Sulfate [mg/L] Intrawell APW-06S	1	237
Sulfate [mg/L] Intrawell APW-06S	1	240
Radium-226/228 [pCi/L] Intrawell APW-06S	1	2
Radium-226/228 [pCi/L] Intrawell APW-06S	1	2
Radium-226/228 [pCi/L] Intrawell APW-06S	1	1.07
Radium-226/228 [pCi/L] Intrawell APW-06S	1	2
Radium-226/228 [pCi/L] Intrawell APW-06S	1	2
Radium-226/228 [pCi/L] Intrawell APW-06S	1	2
Radium-226/228 [pCi/L] Intrawell APW-06S	1	2
Radium-226/228 [pCi/L] Intrawell APW-06S	1	2
Radium-226/228 [pCi/L] Intrawell APW-06S	1	0.497
Radium-226/228 [pCi/L] Intrawell APW-06S	1	2.93
Radium-226/228 [pCi/L] Intrawell APW-06S	1	2
Radium-226/228 [pCi/L] Intrawell APW-06S	1	1.47
Radium-226/228 [pCi/L] Intrawell APW-06S	1	2
Radium-226/228 [pCi/L] Intrawell APW-06S	1	2
Radium-226/228 [pCi/L] Intrawell APW-06S	1	2
Radium-226/228 [pCi/L] Intrawell APW-06S	1	1.93
pH, Lab [SU] Intrawell APW-06S	1	7.16
pH, Lab [SU] Intrawell APW-06S	1	7.06
pH, Lab [SU] Intrawell APW-06S	1	7.18
pH, Lab [SU] Intrawell APW-06S	1	7.23
pH, Lab [SU] Intrawell APW-06S	1	7.09
pH, Lab [SU] Intrawell APW-06S	1	7.13
pH, Lab [SU] Intrawell APW-06S	1	7.09
pH, Lab [SU] Intrawell APW-06S	1	7.02
pH, Lab [SU] Intrawell APW-06S	1	7.24
pH, Lab [SU] Intrawell APW-06S	1	7.38
pH, Lab [SU] Intrawell APW-06S	1	7.04
pH, Lab [SU] Intrawell APW-06S	1	7.12
pH, Lab [SU] Intrawell APW-06S	1	7.05
pH, Lab [SU] Intrawell APW-06S	1	7.21
pH, Lab [SU] Intrawell APW-06S	1	7.12
pH, Lab [SU] Intrawell APW-06S	1	7.67
Fluoride [ug/L] Intrawell APW-06S	1	410
Fluoride [ug/L] Intrawell APW-06S	1	260
Fluoride [ug/L] Intrawell APW-06S	1	250
Fluoride [ug/L] Intrawell APW-06S	1	260
Fluoride [ug/L] Intrawell APW-06S	1	250
Fluoride [ug/L] Intrawell APW-06S	1	250
Fluoride [ug/L] Intrawell APW-06S	1	270
Fluoride [ug/L] Intrawell APW-06S	1	240
Fluoride [ug/L] Intrawell APW-06S	1	290
Fluoride [ug/L] Intrawell APW-06S	1	280
Fluoride [ug/L] Intrawell APW-06S	1	320
Fluoride [ug/L] Intrawell APW-06S	1	290
Fluoride [ug/L] Intrawell APW-06S	1	260
Fluoride [ug/L] Intrawell APW-06S	1	300
Fluoride [ug/L] Intrawell APW-06S	1	330
Fluoride [ug/L] Intrawell APW-06S	1	277
Chloride [mg/L] Intrawell APW-06S	1	31
Chloride [mg/L] Intrawell APW-06S	1	28
Chloride [mg/L] Intrawell APW-06S	1	27
Chloride [mg/L] Intrawell APW-06S	1	27
Chloride [mg/L] Intrawell APW-06S	1	26
Chloride [mg/L] Intrawell APW-06S	1	27
Chloride [mg/L] Intrawell APW-06S	1	26
Chloride [mg/L] Intrawell APW-06S	1	25
Chloride [mg/L] Intrawell APW-06S	1	24
Chloride [mg/L] Intrawell APW-06S	1	25
Chloride [mg/L] Intrawell APW-06S	1	24

group	D_report_result_value	report_result_value
Chloride [mg/L] Intrawell APW-06S	1	24
Chloride [mg/L] Intrawell APW-06S	1	23
Chloride [mg/L] Intrawell APW-06S	1	20
Chloride [mg/L] Intrawell APW-06S	1	22
Chloride [mg/L] Intrawell APW-06S	1	21.2
Dissolved Solids, Total [mg/L] Intrawell APW-10D	1	466
Dissolved Solids, Total [mg/L] Intrawell APW-10D	1	474
Dissolved Solids, Total [mg/L] Intrawell APW-10D	1	442
Dissolved Solids, Total [mg/L] Intrawell APW-10D	1	468
Dissolved Solids, Total [mg/L] Intrawell APW-10D	1	482
Dissolved Solids, Total [mg/L] Intrawell APW-10D	1	448
Dissolved Solids, Total [mg/L] Intrawell APW-10D	1	448
Dissolved Solids, Total [mg/L] Intrawell APW-10D	1	512
Dissolved Solids, Total [mg/L] Intrawell APW-10D	1	452
Dissolved Solids, Total [mg/L] Intrawell APW-10D	1	460
Dissolved Solids, Total [mg/L] Intrawell APW-10D	1	460
Dissolved Solids, Total [mg/L] Intrawell APW-10D	1	454
Dissolved Solids, Total [mg/L] Intrawell APW-10D	1	485
Dissolved Solids, Total [mg/L] Intrawell APW-10D	1	468
Dissolved Solids, Total [mg/L] Intrawell APW-10D	1	445
Dissolved Solids, Total [mg/L] Intrawell APW-10D	1	436
Lead [ug/L] Intrawell APW-10D	0	1
Lead [ug/L] Intrawell APW-10D	0	1
Lead [ug/L] Intrawell APW-10D	0	1
Lead [ug/L] Intrawell APW-10D	0	1
Lead [ug/L] Intrawell APW-10D	0	1
Lead [ug/L] Intrawell APW-10D	0	1
Lead [ug/L] Intrawell APW-10D	0	1
Lead [ug/L] Intrawell APW-10D	0	1
Lead [ug/L] Intrawell APW-10D	0	1
Lead [ug/L] Intrawell APW-10D	1	1
Lead [ug/L] Intrawell APW-10D	1	2
Lead [ug/L] Intrawell APW-10D	0	1
Lead [ug/L] Intrawell APW-10D	0	1
Lead [ug/L] Intrawell APW-10D	0	1
Lead [ug/L] Intrawell APW-10D	0	1
Lead [ug/L] Intrawell APW-10D	0	2
Lithium [ug/L] Intrawell APW-10D	1	14.7
Lithium [ug/L] Intrawell APW-10D	1	15.5
Lithium [ug/L] Intrawell APW-10D	1	14.6
Lithium [ug/L] Intrawell APW-10D	1	14.6
Lithium [ug/L] Intrawell APW-10D	1	15.3
Lithium [ug/L] Intrawell APW-10D	1	15.5
Lithium [ug/L] Intrawell APW-10D	1	14.2
Lithium [ug/L] Intrawell APW-10D	1	14
Lithium [ug/L] Intrawell APW-10D	1	18
Lithium [ug/L] Intrawell APW-10D	1	15.6
Lithium [ug/L] Intrawell APW-10D	1	12.6
Lithium [ug/L] Intrawell APW-10D	1	14.6
Lithium [ug/L] Intrawell APW-10D	1	15.8
Lithium [ug/L] Intrawell APW-10D	1	14.8
Lithium [ug/L] Intrawell APW-10D	1	15.4
Lithium [ug/L] Intrawell APW-10D	1	15.2
Thallium [ug/L] Intrawell APW-10D	0	1
Thallium [ug/L] Intrawell APW-10D	0	1
Thallium [ug/L] Intrawell APW-10D	0	1
Thallium [ug/L] Intrawell APW-10D	0	1
Thallium [ug/L] Intrawell APW-10D	0	1
Thallium [ug/L] Intrawell APW-10D	0	1
Thallium [ug/L] Intrawell APW-10D	0	1
Thallium [ug/L] Intrawell APW-10D	0	1
Thallium [ug/L] Intrawell APW-10D	0	2
Thallium [ug/L] Intrawell APW-10D	0	2
Thallium [ug/L] Intrawell APW-10D	0	2
Thallium [ug/L] Intrawell APW-10D	0	2

[illegible]

group	D_report_result_value	report_result_value
Beryllium [ug/L] Intrawell APW-10D	0	1
Beryllium [ug/L] Intrawell APW-10D	0	1
Beryllium [ug/L] Intrawell APW-10D	0	2
Boron [mg/L] Intrawell APW-10D	1	0.0999
Boron [mg/L] Intrawell APW-10D	1	0.101
Boron [mg/L] Intrawell APW-10D	1	0.0843
Boron [mg/L] Intrawell APW-10D	1	0.0713
Boron [mg/L] Intrawell APW-10D	1	0.0885
Boron [mg/L] Intrawell APW-10D	1	0.0922
Boron [mg/L] Intrawell APW-10D	1	0.0923
Boron [mg/L] Intrawell APW-10D	1	0.0906
Boron [mg/L] Intrawell APW-10D	1	0.118
Boron [mg/L] Intrawell APW-10D	1	0.0731
Boron [mg/L] Intrawell APW-10D	1	0.0522
Boron [mg/L] Intrawell APW-10D	1	0.073
Boron [mg/L] Intrawell APW-10D	1	0.0674
Boron [mg/L] Intrawell APW-10D	1	0.066
Boron [mg/L] Intrawell APW-10D	1	0.0754
Cadmium [ug/L] Intrawell APW-10D	0	1
Cadmium [ug/L] Intrawell APW-10D	0	1
Cadmium [ug/L] Intrawell APW-10D	0	1
Cadmium [ug/L] Intrawell APW-10D	0	1
Cadmium [ug/L] Intrawell APW-10D	0	1
Cadmium [ug/L] Intrawell APW-10D	0	1
Cadmium [ug/L] Intrawell APW-10D	0	1
Cadmium [ug/L] Intrawell APW-10D	0	1
Cadmium [ug/L] Intrawell APW-10D	0	1
Cadmium [ug/L] Intrawell APW-10D	0	1
Cadmium [ug/L] Intrawell APW-10D	0	1
Cadmium [ug/L] Intrawell APW-10D	0	1
Cadmium [ug/L] Intrawell APW-10D	0	1
Cadmium [ug/L] Intrawell APW-10D	0	1
Cadmium [ug/L] Intrawell APW-10D	1	1.1
Cadmium [ug/L] Intrawell APW-10D	0	1
Cadmium [ug/L] Intrawell APW-10D	0	1
Cadmium [ug/L] Intrawell APW-10D	0	1
Chromium [ug/L] Intrawell APW-10D	1	3.6
Chromium [ug/L] Intrawell APW-10D	1	7.8
Chromium [ug/L] Intrawell APW-10D	1	2.2
Chromium [ug/L] Intrawell APW-10D	1	1.1
Chromium [ug/L] Intrawell APW-10D	0	1
Chromium [ug/L] Intrawell APW-10D	0	1
Chromium [ug/L] Intrawell APW-10D	1	4.2
Chromium [ug/L] Intrawell APW-10D	0	1
Chromium [ug/L] Intrawell APW-10D	0	1.5
Chromium [ug/L] Intrawell APW-10D	1	14.8
Chromium [ug/L] Intrawell APW-10D	1	2.4
Chromium [ug/L] Intrawell APW-10D	0	1.5
Chromium [ug/L] Intrawell APW-10D	1	1.5
Chromium [ug/L] Intrawell APW-10D	1	4.2
Chromium [ug/L] Intrawell APW-10D	1	2.1
Chromium [ug/L] Intrawell APW-10D	0	2
Cobalt [ug/L] Intrawell APW-10D	1	3.9
Cobalt [ug/L] Intrawell APW-10D	1	2.4
Cobalt [ug/L] Intrawell APW-10D	1	2.5
Cobalt [ug/L] Intrawell APW-10D	1	3.2
Cobalt [ug/L] Intrawell APW-10D	1	1.7
Cobalt [ug/L] Intrawell APW-10D	1	1.3
Cobalt [ug/L] Intrawell APW-10D	1	2.6
Cobalt [ug/L] Intrawell APW-10D	1	2.6
Cobalt [ug/L] Intrawell APW-10D	1	3.4
Cobalt [ug/L] Intrawell APW-10D	1	4.9
Cobalt [ug/L] Intrawell APW-10D	1	3
Cobalt [ug/L] Intrawell APW-10D	1	3.3
Cobalt [ug/L] Intrawell APW-10D	1	7
Cobalt [ug/L] Intrawell APW-10D	1	3.1
Cobalt [ug/L] Intrawell APW-10D	1	3.9

[illegible]

group	D_report_result_value	report_result_value
Mercury [ug/L] Intrawell APW-10D	0	0.2
Mercury [ug/L] Intrawell APW-10D	0	0.2
Mercury [ug/L] Intrawell APW-10D	0	0.2
Mercury [ug/L] Intrawell APW-10D	0	0.2
Mercury [ug/L] Intrawell APW-10D	0	0.2
Mercury [ug/L] Intrawell APW-10D	0	0.2
Mercury [ug/L] Intrawell APW-10D	0	0.2
Mercury [ug/L] Intrawell APW-10D	0	0.2
Mercury [ug/L] Intrawell APW-10D	0	0.2
Sulfate [mg/L] Intrawell APW-10D	1	38
Sulfate [mg/L] Intrawell APW-10D	1	44
Sulfate [mg/L] Intrawell APW-10D	1	43
Sulfate [mg/L] Intrawell APW-10D	1	42
Sulfate [mg/L] Intrawell APW-10D	1	42
Sulfate [mg/L] Intrawell APW-10D	1	44
Sulfate [mg/L] Intrawell APW-10D	1	44
Sulfate [mg/L] Intrawell APW-10D	1	44
Sulfate [mg/L] Intrawell APW-10D	1	41
Sulfate [mg/L] Intrawell APW-10D	1	43
Sulfate [mg/L] Intrawell APW-10D	1	42
Sulfate [mg/L] Intrawell APW-10D	1	39
Sulfate [mg/L] Intrawell APW-10D	1	44
Sulfate [mg/L] Intrawell APW-10D	1	31
Sulfate [mg/L] Intrawell APW-10D	1	26
Sulfate [mg/L] Intrawell APW-10D	1	35.5
Radium-226/228 [pCi/L] Intrawell APW-10D	1	2
Radium-226/228 [pCi/L] Intrawell APW-10D	1	2
Radium-226/228 [pCi/L] Intrawell APW-10D	1	1.33
Radium-226/228 [pCi/L] Intrawell APW-10D	1	2
Radium-226/228 [pCi/L] Intrawell APW-10D	1	2
Radium-226/228 [pCi/L] Intrawell APW-10D	1	2
Radium-226/228 [pCi/L] Intrawell APW-10D	1	2
Radium-226/228 [pCi/L] Intrawell APW-10D	1	2
Radium-226/228 [pCi/L] Intrawell APW-10D	1	1.44
Radium-226/228 [pCi/L] Intrawell APW-10D	1	2
Radium-226/228 [pCi/L] Intrawell APW-10D	1	2
Radium-226/228 [pCi/L] Intrawell APW-10D	1	1.03
Radium-226/228 [pCi/L] Intrawell APW-10D	1	2
Radium-226/228 [pCi/L] Intrawell APW-10D	1	2
Radium-226/228 [pCi/L] Intrawell APW-10D	1	2
Radium-226/228 [pCi/L] Intrawell APW-10D	1	1.53
pH, Lab [SU] Intrawell APW-10D	1	7.12
pH, Lab [SU] Intrawell APW-10D	1	7.11
pH, Lab [SU] Intrawell APW-10D	1	7.05
pH, Lab [SU] Intrawell APW-10D	1	7.11
pH, Lab [SU] Intrawell APW-10D	1	7.12
pH, Lab [SU] Intrawell APW-10D	1	7.15
pH, Lab [SU] Intrawell APW-10D	1	7.03
pH, Lab [SU] Intrawell APW-10D	1	7.03
pH, Lab [SU] Intrawell APW-10D	1	7.21
pH, Lab [SU] Intrawell APW-10D	1	7.29
pH, Lab [SU] Intrawell APW-10D	1	7.04
pH, Lab [SU] Intrawell APW-10D	1	7.57
pH, Lab [SU] Intrawell APW-10D	1	6.98
pH, Lab [SU] Intrawell APW-10D	1	7.22
pH, Lab [SU] Intrawell APW-10D	1	7.08
pH, Lab [SU] Intrawell APW-10D	1	7.66
Fluoride [ug/L] Intrawell APW-10D	1	100
Fluoride [ug/L] Intrawell APW-10D	1	120
Fluoride [ug/L] Intrawell APW-10D	1	100
Fluoride [ug/L] Intrawell APW-10D	0	100
Fluoride [ug/L] Intrawell APW-10D	1	110
Fluoride [ug/L] Intrawell APW-10D	1	100
Fluoride [ug/L] Intrawell APW-10D	1	110
Fluoride [ug/L] Intrawell APW-10D	0	100

group	D_report_result_value	report_result_value
Fluoride [ug/L] Intrawell APW-10D	1	120
Fluoride [ug/L] Intrawell APW-10D	1	100
Fluoride [ug/L] Intrawell APW-10D	1	120
Fluoride [ug/L] Intrawell APW-10D	1	120
Fluoride [ug/L] Intrawell APW-10D	1	110
Fluoride [ug/L] Intrawell APW-10D	1	110
Fluoride [ug/L] Intrawell APW-10D	1	140
Fluoride [ug/L] Intrawell APW-10D	0	150
Chloride [mg/L] Intrawell APW-10D	1	24
Chloride [mg/L] Intrawell APW-10D	1	17
Chloride [mg/L] Intrawell APW-10D	1	17
Chloride [mg/L] Intrawell APW-10D	1	15
Chloride [mg/L] Intrawell APW-10D	1	17
Chloride [mg/L] Intrawell APW-10D	1	16
Chloride [mg/L] Intrawell APW-10D	1	14
Chloride [mg/L] Intrawell APW-10D	1	16
Chloride [mg/L] Intrawell APW-10D	1	16
Chloride [mg/L] Intrawell APW-10D	1	18
Chloride [mg/L] Intrawell APW-10D	1	14
Chloride [mg/L] Intrawell APW-10D	1	13
Chloride [mg/L] Intrawell APW-10D	1	14
Chloride [mg/L] Intrawell APW-10D	1	10
Chloride [mg/L] Intrawell APW-10D	1	10
Chloride [mg/L] Intrawell APW-10D	1	15.4
Dissolved Solids, Total [mg/L] Intrawell APW-10S	1	708
Dissolved Solids, Total [mg/L] Intrawell APW-10S	1	720
Dissolved Solids, Total [mg/L] Intrawell APW-10S	1	678
Dissolved Solids, Total [mg/L] Intrawell APW-10S	1	708
Dissolved Solids, Total [mg/L] Intrawell APW-10S	1	734
Dissolved Solids, Total [mg/L] Intrawell APW-10S	1	770
Dissolved Solids, Total [mg/L] Intrawell APW-10S	1	762
Dissolved Solids, Total [mg/L] Intrawell APW-10S	1	735
Dissolved Solids, Total [mg/L] Intrawell APW-10S	1	770
Dissolved Solids, Total [mg/L] Intrawell APW-10S	1	750
Dissolved Solids, Total [mg/L] Intrawell APW-10S	1	780
Dissolved Solids, Total [mg/L] Intrawell APW-10S	1	725
Dissolved Solids, Total [mg/L] Intrawell APW-10S	1	775
Dissolved Solids, Total [mg/L] Intrawell APW-10S	1	900
Dissolved Solids, Total [mg/L] Intrawell APW-10S	1	692
Lead [ug/L] Intrawell APW-10S	0	1
Lead [ug/L] Intrawell APW-10S	0	1
Lead [ug/L] Intrawell APW-10S	0	1
Lead [ug/L] Intrawell APW-10S	0	1
Lead [ug/L] Intrawell APW-10S	0	1
Lead [ug/L] Intrawell APW-10S	0	1
Lead [ug/L] Intrawell APW-10S	0	1
Lead [ug/L] Intrawell APW-10S	0	1
Lead [ug/L] Intrawell APW-10S	1	1
Lead [ug/L] Intrawell APW-10S	1	4.3
Lead [ug/L] Intrawell APW-10S	1	1.4
Lead [ug/L] Intrawell APW-10S	0	1
Lead [ug/L] Intrawell APW-10S	1	1.6
Lead [ug/L] Intrawell APW-10S	1	3.1
Lead [ug/L] Intrawell APW-10S	0	1
Lead [ug/L] Intrawell APW-10S	0	2
Lithium [ug/L] Intrawell APW-10S	1	26.3
Lithium [ug/L] Intrawell APW-10S	1	27.8
Lithium [ug/L] Intrawell APW-10S	1	27.2
Lithium [ug/L] Intrawell APW-10S	1	28.9
Lithium [ug/L] Intrawell APW-10S	1	29.3
Lithium [ug/L] Intrawell APW-10S	1	30.8
Lithium [ug/L] Intrawell APW-10S	1	31.6
Lithium [ug/L] Intrawell APW-10S	1	29.7
Lithium [ug/L] Intrawell APW-10S	1	35.3
Lithium [ug/L] Intrawell APW-10S	1	33

group	D_report_result_value	report_result_value
Lithium [ug/L] Intrawell APW-10S	1	30.7
Lithium [ug/L] Intrawell APW-10S	1	32.3
Lithium [ug/L] Intrawell APW-10S	1	29.1
Lithium [ug/L] Intrawell APW-10S	1	30.1
Lithium [ug/L] Intrawell APW-10S	1	40.1
Lithium [ug/L] Intrawell APW-10S	1	32.8
Thallium [ug/L] Intrawell APW-10S	0	1
Thallium [ug/L] Intrawell APW-10S	0	1
Thallium [ug/L] Intrawell APW-10S	0	1
Thallium [ug/L] Intrawell APW-10S	0	1
Thallium [ug/L] Intrawell APW-10S	0	1
Thallium [ug/L] Intrawell APW-10S	0	1
Thallium [ug/L] Intrawell APW-10S	0	1
Thallium [ug/L] Intrawell APW-10S	0	1
Thallium [ug/L] Intrawell APW-10S	0	1
Thallium [ug/L] Intrawell APW-10S	0	2
Thallium [ug/L] Intrawell APW-10S	0	2
Thallium [ug/L] Intrawell APW-10S	0	2
Thallium [ug/L] Intrawell APW-10S	0	2
Thallium [ug/L] Intrawell APW-10S	0	2
Thallium [ug/L] Intrawell APW-10S	0	2
Antimony [ug/L] Intrawell APW-10S	0	1
Antimony [ug/L] Intrawell APW-10S	0	1
Antimony [ug/L] Intrawell APW-10S	0	1
Antimony [ug/L] Intrawell APW-10S	0	1
Antimony [ug/L] Intrawell APW-10S	0	1
Antimony [ug/L] Intrawell APW-10S	0	1
Antimony [ug/L] Intrawell APW-10S	0	1
Antimony [ug/L] Intrawell APW-10S	0	1
Antimony [ug/L] Intrawell APW-10S	0	1
Antimony [ug/L] Intrawell APW-10S	0	1
Antimony [ug/L] Intrawell APW-10S	0	1
Antimony [ug/L] Intrawell APW-10S	0	1
Antimony [ug/L] Intrawell APW-10S	0	1
Antimony [ug/L] Intrawell APW-10S	0	1
Antimony [ug/L] Intrawell APW-10S	0	1
Antimony [ug/L] Intrawell APW-10S	0	1
Antimony [ug/L] Intrawell APW-10S	0	1
Arsenic [ug/L] Intrawell APW-10S	1	186
Arsenic [ug/L] Intrawell APW-10S	1	189
Arsenic [ug/L] Intrawell APW-10S	1	180
Arsenic [ug/L] Intrawell APW-10S	1	209
Arsenic [ug/L] Intrawell APW-10S	1	183
Arsenic [ug/L] Intrawell APW-10S	1	193
Arsenic [ug/L] Intrawell APW-10S	1	230
Arsenic [ug/L] Intrawell APW-10S	1	198
Arsenic [ug/L] Intrawell APW-10S	1	185
Arsenic [ug/L] Intrawell APW-10S	1	187
Arsenic [ug/L] Intrawell APW-10S	1	182
Arsenic [ug/L] Intrawell APW-10S	1	191
Arsenic [ug/L] Intrawell APW-10S	1	194
Arsenic [ug/L] Intrawell APW-10S	1	174
Arsenic [ug/L] Intrawell APW-10S	1	276
Arsenic [ug/L] Intrawell APW-10S	1	196
Barium [ug/L] Intrawell APW-10S	1	613
Barium [ug/L] Intrawell APW-10S	1	634
Barium [ug/L] Intrawell APW-10S	1	543
Barium [ug/L] Intrawell APW-10S	1	668
Barium [ug/L] Intrawell APW-10S	1	565
Barium [ug/L] Intrawell APW-10S	1	598
Barium [ug/L] Intrawell APW-10S	1	703
Barium [ug/L] Intrawell APW-10S	1	585
Barium [ug/L] Intrawell APW-10S	1	575
Barium [ug/L] Intrawell APW-10S	1	612
Barium [ug/L] Intrawell APW-10S	1	536

group	D_report_result_value	report_result_value
Barium [ug/L] Intrawell APW-10S	1	575
Barium [ug/L] Intrawell APW-10S	1	589
Barium [ug/L] Intrawell APW-10S	1	591
Barium [ug/L] Intrawell APW-10S	1	804
Barium [ug/L] Intrawell APW-10S	1	597
Beryllium [ug/L] Intrawell APW-10S	0	1
Beryllium [ug/L] Intrawell APW-10S	0	1
Beryllium [ug/L] Intrawell APW-10S	0	1
Beryllium [ug/L] Intrawell APW-10S	0	1
Beryllium [ug/L] Intrawell APW-10S	0	1
Beryllium [ug/L] Intrawell APW-10S	0	1
Beryllium [ug/L] Intrawell APW-10S	0	1
Beryllium [ug/L] Intrawell APW-10S	0	1
Beryllium [ug/L] Intrawell APW-10S	0	1
Beryllium [ug/L] Intrawell APW-10S	0	1
Beryllium [ug/L] Intrawell APW-10S	0	1
Beryllium [ug/L] Intrawell APW-10S	0	1
Beryllium [ug/L] Intrawell APW-10S	0	1
Beryllium [ug/L] Intrawell APW-10S	0	1
Beryllium [ug/L] Intrawell APW-10S	0	2
Boron [mg/L] Intrawell APW-10S	1	0.525
Boron [mg/L] Intrawell APW-10S	1	0.544
Boron [mg/L] Intrawell APW-10S	1	0.536
Boron [mg/L] Intrawell APW-10S	1	0.595
Boron [mg/L] Intrawell APW-10S	1	0.545
Boron [mg/L] Intrawell APW-10S	1	0.573
Boron [mg/L] Intrawell APW-10S	1	0.645
Boron [mg/L] Intrawell APW-10S	1	0.582
Boron [mg/L] Intrawell APW-10S	1	0.683
Boron [mg/L] Intrawell APW-10S	1	0.565
Boron [mg/L] Intrawell APW-10S	1	0.569
Boron [mg/L] Intrawell APW-10S	1	0.592
Boron [mg/L] Intrawell APW-10S	1	0.582
Boron [mg/L] Intrawell APW-10S	1	0.553
Boron [mg/L] Intrawell APW-10S	1	0.555
Cadmium [ug/L] Intrawell APW-10S	0	1
Cadmium [ug/L] Intrawell APW-10S	0	1
Cadmium [ug/L] Intrawell APW-10S	0	1
Cadmium [ug/L] Intrawell APW-10S	0	1
Cadmium [ug/L] Intrawell APW-10S	0	1
Cadmium [ug/L] Intrawell APW-10S	0	1
Cadmium [ug/L] Intrawell APW-10S	0	1
Cadmium [ug/L] Intrawell APW-10S	0	1
Cadmium [ug/L] Intrawell APW-10S	0	1
Cadmium [ug/L] Intrawell APW-10S	0	1
Cadmium [ug/L] Intrawell APW-10S	0	1
Cadmium [ug/L] Intrawell APW-10S	0	1
Cadmium [ug/L] Intrawell APW-10S	0	1
Cadmium [ug/L] Intrawell APW-10S	0	1
Cadmium [ug/L] Intrawell APW-10S	0	1
Chromium [ug/L] Intrawell APW-10S	1	9.1
Chromium [ug/L] Intrawell APW-10S	1	1.9
Chromium [ug/L] Intrawell APW-10S	1	1
Chromium [ug/L] Intrawell APW-10S	1	1.6
Chromium [ug/L] Intrawell APW-10S	0	1
Chromium [ug/L] Intrawell APW-10S	1	1.6
Chromium [ug/L] Intrawell APW-10S	1	1.9
Chromium [ug/L] Intrawell APW-10S	0	1
Chromium [ug/L] Intrawell APW-10S	1	1.5
Chromium [ug/L] Intrawell APW-10S	1	15
Chromium [ug/L] Intrawell APW-10S	1	3.2
Chromium [ug/L] Intrawell APW-10S	1	2.3
Chromium [ug/L] Intrawell APW-10S	1	2.5

[illegible]

group	D_report_result_value	report_result_value
Molybdenum [ug/L] Intrawell APW-10S	0	5
Nickel [ug/L] Intrawell APW-10S	1	5.1
Nickel [ug/L] Intrawell APW-10S	1	1.2
Nickel [ug/L] Intrawell APW-10S	0	1
Nickel [ug/L] Intrawell APW-10S	1	1.5
Nickel [ug/L] Intrawell APW-10S	0	1
Nickel [ug/L] Intrawell APW-10S	0	1
Nickel [ug/L] Intrawell APW-10S	1	1.4
Nickel [ug/L] Intrawell APW-10S	0	1
Nickel [ug/L] Intrawell APW-10S	1	1.4
Nickel [ug/L] Intrawell APW-10S	1	3.1
Mercury [ug/L] Intrawell APW-10S	0	0.2
Mercury [ug/L] Intrawell APW-10S	0	0.2
Mercury [ug/L] Intrawell APW-10S	0	0.2
Mercury [ug/L] Intrawell APW-10S	0	0.2
Mercury [ug/L] Intrawell APW-10S	0	0.2
Mercury [ug/L] Intrawell APW-10S	0	0.2
Mercury [ug/L] Intrawell APW-10S	0	0.2
Mercury [ug/L] Intrawell APW-10S	0	0.2
Mercury [ug/L] Intrawell APW-10S	0	0.2
Mercury [ug/L] Intrawell APW-10S	0	0.2
Mercury [ug/L] Intrawell APW-10S	0	0.2
Mercury [ug/L] Intrawell APW-10S	0	0.2
Mercury [ug/L] Intrawell APW-10S	0	0.2
Mercury [ug/L] Intrawell APW-10S	0	0.2
Radium-226/228 [pCi/L] Intrawell APW-10S	1	2
Radium-226/228 [pCi/L] Intrawell APW-10S	1	2
Radium-226/228 [pCi/L] Intrawell APW-10S	1	1.63
Radium-226/228 [pCi/L] Intrawell APW-10S	1	2
Radium-226/228 [pCi/L] Intrawell APW-10S	1	2
Radium-226/228 [pCi/L] Intrawell APW-10S	1	2
Radium-226/228 [pCi/L] Intrawell APW-10S	1	3
Radium-226/228 [pCi/L] Intrawell APW-10S	1	2
Radium-226/228 [pCi/L] Intrawell APW-10S	1	1.25
Radium-226/228 [pCi/L] Intrawell APW-10S	1	2.82
Radium-226/228 [pCi/L] Intrawell APW-10S	1	2
Radium-226/228 [pCi/L] Intrawell APW-10S	1	1.24
Radium-226/228 [pCi/L] Intrawell APW-10S	1	2
Radium-226/228 [pCi/L] Intrawell APW-10S	1	4.83
Radium-226/228 [pCi/L] Intrawell APW-10S	1	2
Radium-226/228 [pCi/L] Intrawell APW-10S	1	2.42
Sulfate [mg/L] Intrawell APW-10S	1	10
Sulfate [mg/L] Intrawell APW-10S	0	10
Sulfate [mg/L] Intrawell APW-10S	0	10
Sulfate [mg/L] Intrawell APW-10S	0	10
Sulfate [mg/L] Intrawell APW-10S	0	10
Sulfate [mg/L] Intrawell APW-10S	0	10
Sulfate [mg/L] Intrawell APW-10S	0	10
Sulfate [mg/L] Intrawell APW-10S	0	10
Sulfate [mg/L] Intrawell APW-10S	0	10
Sulfate [mg/L] Intrawell APW-10S	0	10
Sulfate [mg/L] Intrawell APW-10S	0	10
Sulfate [mg/L] Intrawell APW-10S	0	10
Sulfate [mg/L] Intrawell APW-10S	1	21
Sulfate [mg/L] Intrawell APW-10S	0	10
Sulfate [mg/L] Intrawell APW-10S	0	10
Sulfate [mg/L] Intrawell APW-10S	0	10
Sulfate [mg/L] Intrawell APW-10S	0	10
Sulfate [mg/L] Intrawell APW-10S	0	5
pH, Lab [SU] Intrawell APW-10S	1	6.99
pH, Lab [SU] Intrawell APW-10S	1	6.96
pH, Lab [SU] Intrawell APW-10S	1	6.95
pH, Lab [SU] Intrawell APW-10S	1	6.98
pH, Lab [SU] Intrawell APW-10S	1	6.97
pH, Lab [SU] Intrawell APW-10S	1	6.98

[illegible]

group	D_report_result_value	report_result_value
Lead [ug/L] Intrawell APW-08	0	1
Lead [ug/L] Intrawell APW-08	1	2.4
Lead [ug/L] Intrawell APW-08	0	1
Lead [ug/L] Intrawell APW-08	1	1.2
Lead [ug/L] Intrawell APW-08	0	1
Lead [ug/L] Intrawell APW-08	1	2.8
Lead [ug/L] Intrawell APW-08	1	1.5
Lead [ug/L] Intrawell APW-08	1	1.8
Lead [ug/L] Intrawell APW-08	0	2
Lithium [ug/L] Intrawell APW-08	1	19.6
Lithium [ug/L] Intrawell APW-08	1	20.6
Lithium [ug/L] Intrawell APW-08	1	20.7
Lithium [ug/L] Intrawell APW-08	1	21.6
Lithium [ug/L] Intrawell APW-08	1	22.3
Lithium [ug/L] Intrawell APW-08	1	21.6
Lithium [ug/L] Intrawell APW-08	1	19.2
Lithium [ug/L] Intrawell APW-08	1	19.6
Lithium [ug/L] Intrawell APW-08	1	16
Lithium [ug/L] Intrawell APW-08	1	16
Lithium [ug/L] Intrawell APW-08	1	14.7
Lithium [ug/L] Intrawell APW-08	1	15.5
Lithium [ug/L] Intrawell APW-08	1	15.7
Lithium [ug/L] Intrawell APW-08	1	17.7
Lithium [ug/L] Intrawell APW-08	1	21.1
Lithium [ug/L] Intrawell APW-08	1	14.2
Thallium [ug/L] Intrawell APW-08	0	1
Thallium [ug/L] Intrawell APW-08	0	1
Thallium [ug/L] Intrawell APW-08	0	1
Thallium [ug/L] Intrawell APW-08	0	1
Thallium [ug/L] Intrawell APW-08	0	1
Thallium [ug/L] Intrawell APW-08	0	1
Thallium [ug/L] Intrawell APW-08	0	1
Thallium [ug/L] Intrawell APW-08	0	1
Thallium [ug/L] Intrawell APW-08	0	1
Thallium [ug/L] Intrawell APW-08	0	2
Thallium [ug/L] Intrawell APW-08	0	2
Thallium [ug/L] Intrawell APW-08	0	2
Thallium [ug/L] Intrawell APW-08	0	2
Thallium [ug/L] Intrawell APW-08	0	2
Thallium [ug/L] Intrawell APW-08	0	2
Thallium [ug/L] Intrawell APW-08	0	2
Thallium [ug/L] Intrawell APW-08	0	2
Antimony [ug/L] Intrawell APW-08	0	1
Antimony [ug/L] Intrawell APW-08	0	1
Antimony [ug/L] Intrawell APW-08	0	1
Antimony [ug/L] Intrawell APW-08	0	1
Antimony [ug/L] Intrawell APW-08	0	1
Antimony [ug/L] Intrawell APW-08	0	1
Antimony [ug/L] Intrawell APW-08	0	1
Antimony [ug/L] Intrawell APW-08	0	1
Antimony [ug/L] Intrawell APW-08	0	1
Antimony [ug/L] Intrawell APW-08	0	1
Antimony [ug/L] Intrawell APW-08	0	1
Antimony [ug/L] Intrawell APW-08	0	1
Antimony [ug/L] Intrawell APW-08	0	1
Antimony [ug/L] Intrawell APW-08	0	1
Antimony [ug/L] Intrawell APW-08	0	1
Antimony [ug/L] Intrawell APW-08	0	4
Arsenic [ug/L] Intrawell APW-08	0	1
Arsenic [ug/L] Intrawell APW-08	1	1.1
Arsenic [ug/L] Intrawell APW-08	0	1
Arsenic [ug/L] Intrawell APW-08	0	1
Arsenic [ug/L] Intrawell APW-08	0	1
Arsenic [ug/L] Intrawell APW-08	1	1
Arsenic [ug/L] Intrawell APW-08	0	1
Arsenic [ug/L] Intrawell APW-08	0	

group	D_report_result_value	report_result_value
Arsenic [ug/L] Intrawell APW-08	1	2.2
Arsenic [ug/L] Intrawell APW-08	1	1.5
Arsenic [ug/L] Intrawell APW-08	1	1.7
Arsenic [ug/L] Intrawell APW-08	1	1.6
Arsenic [ug/L] Intrawell APW-08	1	2
Arsenic [ug/L] Intrawell APW-08	1	1.8
Arsenic [ug/L] Intrawell APW-08	1	2.5
Arsenic [ug/L] Intrawell APW-08	0	2
Barium [ug/L] Intrawell APW-08	1	207
Barium [ug/L] Intrawell APW-08	1	256
Barium [ug/L] Intrawell APW-08	1	219
Barium [ug/L] Intrawell APW-08	1	240
Barium [ug/L] Intrawell APW-08	1	217
Barium [ug/L] Intrawell APW-08	1	223
Barium [ug/L] Intrawell APW-08	1	226
Barium [ug/L] Intrawell APW-08	1	215
Barium [ug/L] Intrawell APW-08	1	235
Barium [ug/L] Intrawell APW-08	1	190
Barium [ug/L] Intrawell APW-08	1	179
Barium [ug/L] Intrawell APW-08	1	167
Barium [ug/L] Intrawell APW-08	1	225
Barium [ug/L] Intrawell APW-08	1	199
Barium [ug/L] Intrawell APW-08	1	261
Barium [ug/L] Intrawell APW-08	1	170
Beryllium [ug/L] Intrawell APW-08	0	1
Beryllium [ug/L] Intrawell APW-08	0	1
Beryllium [ug/L] Intrawell APW-08	0	1
Beryllium [ug/L] Intrawell APW-08	0	1
Beryllium [ug/L] Intrawell APW-08	0	1
Beryllium [ug/L] Intrawell APW-08	0	1
Beryllium [ug/L] Intrawell APW-08	0	1
Beryllium [ug/L] Intrawell APW-08	0	1
Beryllium [ug/L] Intrawell APW-08	0	1
Beryllium [ug/L] Intrawell APW-08	0	1
Beryllium [ug/L] Intrawell APW-08	0	1
Beryllium [ug/L] Intrawell APW-08	0	1
Beryllium [ug/L] Intrawell APW-08	0	1
Beryllium [ug/L] Intrawell APW-08	0	1
Beryllium [ug/L] Intrawell APW-08	0	1
Beryllium [ug/L] Intrawell APW-08	0	2
Boron [mg/L] Intrawell APW-08	1	0.132
Boron [mg/L] Intrawell APW-08	1	0.154
Boron [mg/L] Intrawell APW-08	1	0.135
Boron [mg/L] Intrawell APW-08	1	0.138
Boron [mg/L] Intrawell APW-08	1	0.141
Boron [mg/L] Intrawell APW-08	1	0.145
Boron [mg/L] Intrawell APW-08	1	0.151
Boron [mg/L] Intrawell APW-08	1	0.132
Boron [mg/L] Intrawell APW-08	1	0.115
Boron [mg/L] Intrawell APW-08	1	0.11
Boron [mg/L] Intrawell APW-08	1	0.103
Boron [mg/L] Intrawell APW-08	1	0.095
Boron [mg/L] Intrawell APW-08	1	0.103
Boron [mg/L] Intrawell APW-08	1	0.116
Boron [mg/L] Intrawell APW-08	1	0.155
Cadmium [ug/L] Intrawell APW-08	0	1
Cadmium [ug/L] Intrawell APW-08	0	1
Cadmium [ug/L] Intrawell APW-08	0	1
Cadmium [ug/L] Intrawell APW-08	0	1
Cadmium [ug/L] Intrawell APW-08	0	1
Cadmium [ug/L] Intrawell APW-08	0	1
Cadmium [ug/L] Intrawell APW-08	0	1
Cadmium [ug/L] Intrawell APW-08	0	1
Cadmium [ug/L] Intrawell APW-08	0	1
Cadmium [ug/L] Intrawell APW-08	1	1
Cadmium [ug/L] Intrawell APW-08	0	1

group	D_report_result_value	report_result_value
Cadmium [ug/L] Intrawell APW-08	0	1
Cadmium [ug/L] Intrawell APW-08	0	1
Cadmium [ug/L] Intrawell APW-08	0	1
Cadmium [ug/L] Intrawell APW-08	0	1
Cadmium [ug/L] Intrawell APW-08	0	1
Cadmium [ug/L] Intrawell APW-08	0	1
Chromium [ug/L] Intrawell APW-08	1	1.8
Chromium [ug/L] Intrawell APW-08	1	2.3
Chromium [ug/L] Intrawell APW-08	0	1
Chromium [ug/L] Intrawell APW-08	1	5.9
Chromium [ug/L] Intrawell APW-08	0	1
Chromium [ug/L] Intrawell APW-08	1	2.1
Chromium [ug/L] Intrawell APW-08	0	1
Chromium [ug/L] Intrawell APW-08	0	1
Chromium [ug/L] Intrawell APW-08	1	5.4
Chromium [ug/L] Intrawell APW-08	1	1.6
Chromium [ug/L] Intrawell APW-08	1	3.6
Chromium [ug/L] Intrawell APW-08	1	2.7
Chromium [ug/L] Intrawell APW-08	1	8.2
Chromium [ug/L] Intrawell APW-08	1	3.1
Chromium [ug/L] Intrawell APW-08	1	4.9
Chromium [ug/L] Intrawell APW-08	0	2
Cobalt [ug/L] Intrawell APW-08	1	1.7
Cobalt [ug/L] Intrawell APW-08	1	1.3
Cobalt [ug/L] Intrawell APW-08	1	1
Cobalt [ug/L] Intrawell APW-08	1	1.2
Cobalt [ug/L] Intrawell APW-08	0	1
Cobalt [ug/L] Intrawell APW-08	0	1
Cobalt [ug/L] Intrawell APW-08	0	1
Cobalt [ug/L] Intrawell APW-08	0	1
Cobalt [ug/L] Intrawell APW-08	1	2
Cobalt [ug/L] Intrawell APW-08	1	1.3
Cobalt [ug/L] Intrawell APW-08	1	1.6
Cobalt [ug/L] Intrawell APW-08	1	1.2
Cobalt [ug/L] Intrawell APW-08	1	1.9
Cobalt [ug/L] Intrawell APW-08	1	1.4
Cobalt [ug/L] Intrawell APW-08	1	2.1
Cobalt [ug/L] Intrawell APW-08	0	2
Calcium [mg/L] Intrawell APW-08	1	97.4
Calcium [mg/L] Intrawell APW-08	1	105
Calcium [mg/L] Intrawell APW-08	1	92.6
Calcium [mg/L] Intrawell APW-08	1	101
Calcium [mg/L] Intrawell APW-08	1	102
Calcium [mg/L] Intrawell APW-08	1	98.6
Calcium [mg/L] Intrawell APW-08	1	95
Calcium [mg/L] Intrawell APW-08	1	97.8
Calcium [mg/L] Intrawell APW-08	1	93.3
Calcium [mg/L] Intrawell APW-08	1	85.1
Calcium [mg/L] Intrawell APW-08	1	82.8
Calcium [mg/L] Intrawell APW-08	1	79.4
Calcium [mg/L] Intrawell APW-08	1	99.4
Calcium [mg/L] Intrawell APW-08	1	86.4
Calcium [mg/L] Intrawell APW-08	1	81.2
Selenium [ug/L] Intrawell APW-08	1	8
Selenium [ug/L] Intrawell APW-08	1	14.1
Selenium [ug/L] Intrawell APW-08	1	13.2
Selenium [ug/L] Intrawell APW-08	1	14.9
Selenium [ug/L] Intrawell APW-08	1	13.5
Selenium [ug/L] Intrawell APW-08	1	14.1
Selenium [ug/L] Intrawell APW-08	1	14.9
Selenium [ug/L] Intrawell APW-08	1	13
Selenium [ug/L] Intrawell APW-08	1	3.6
Selenium [ug/L] Intrawell APW-08	1	7.7
Selenium [ug/L] Intrawell APW-08	1	11
Selenium [ug/L] Intrawell APW-08	1	14.8

group	D_report_result_value	report_result_value
Selenium [ug/L] Intrawell APW-08	1	12.9
Selenium [ug/L] Intrawell APW-08	1	12.2
Selenium [ug/L] Intrawell APW-08	1	22.1
Selenium [ug/L] Intrawell APW-08	1	16.9
Molybdenum [ug/L] Intrawell APW-08	1	1.1
Molybdenum [ug/L] Intrawell APW-08	0	1
Molybdenum [ug/L] Intrawell APW-08	0	1
Molybdenum [ug/L] Intrawell APW-08	1	1.1
Molybdenum [ug/L] Intrawell APW-08	0	1
Molybdenum [ug/L] Intrawell APW-08	0	1
Molybdenum [ug/L] Intrawell APW-08	0	1
Molybdenum [ug/L] Intrawell APW-08	0	1
Molybdenum [ug/L] Intrawell APW-08	1	1.5
Molybdenum [ug/L] Intrawell APW-08	0	1.5
Molybdenum [ug/L] Intrawell APW-08	0	1.5
Molybdenum [ug/L] Intrawell APW-08	0	1.5
Molybdenum [ug/L] Intrawell APW-08	0	1.5
Molybdenum [ug/L] Intrawell APW-08	0	1.5
Molybdenum [ug/L] Intrawell APW-08	0	5
Nickel [ug/L] Intrawell APW-08	1	3.9
Nickel [ug/L] Intrawell APW-08	1	4.3
Nickel [ug/L] Intrawell APW-08	1	2.9
Nickel [ug/L] Intrawell APW-08	1	6.2
Nickel [ug/L] Intrawell APW-08	1	2.6
Nickel [ug/L] Intrawell APW-08	1	2.7
Nickel [ug/L] Intrawell APW-08	1	2.6
Nickel [ug/L] Intrawell APW-08	1	2.6
Nickel [ug/L] Intrawell APW-08	1	5.4
Nickel [ug/L] Intrawell APW-08	1	7.7
Mercury [ug/L] Intrawell APW-08	0	0.2
Mercury [ug/L] Intrawell APW-08	0	0.2
Mercury [ug/L] Intrawell APW-08	0	0.2
Mercury [ug/L] Intrawell APW-08	0	0.2
Mercury [ug/L] Intrawell APW-08	0	0.2
Mercury [ug/L] Intrawell APW-08	0	0.2
Mercury [ug/L] Intrawell APW-08	0	0.2
Mercury [ug/L] Intrawell APW-08	0	0.2
Mercury [ug/L] Intrawell APW-08	0	0.2
Mercury [ug/L] Intrawell APW-08	0	0.2
Mercury [ug/L] Intrawell APW-08	0	0.2
Mercury [ug/L] Intrawell APW-08	0	0.2
Mercury [ug/L] Intrawell APW-08	0	0.2
Mercury [ug/L] Intrawell APW-08	0	0.2
Radium-226/228 [pCi/L] Intrawell APW-08	1	2
Radium-226/228 [pCi/L] Intrawell APW-08	1	2
Radium-226/228 [pCi/L] Intrawell APW-08	1	1.61
Radium-226/228 [pCi/L] Intrawell APW-08	1	2
Radium-226/228 [pCi/L] Intrawell APW-08	1	2
Radium-226/228 [pCi/L] Intrawell APW-08	1	2
Radium-226/228 [pCi/L] Intrawell APW-08	1	2
Radium-226/228 [pCi/L] Intrawell APW-08	1	2
Radium-226/228 [pCi/L] Intrawell APW-08	1	0.735
Radium-226/228 [pCi/L] Intrawell APW-08	1	2
Radium-226/228 [pCi/L] Intrawell APW-08	1	2.08
Radium-226/228 [pCi/L] Intrawell APW-08	1	0.611
Radium-226/228 [pCi/L] Intrawell APW-08	1	2
Radium-226/228 [pCi/L] Intrawell APW-08	1	2
Radium-226/228 [pCi/L] Intrawell APW-08	1	2
Radium-226/228 [pCi/L] Intrawell APW-08	1	2.39
Sulfate [mg/L] Intrawell APW-08	1	43
Sulfate [mg/L] Intrawell APW-08	1	40
Sulfate [mg/L] Intrawell APW-08	1	38

group	D_report_result_value	report_result_value
Sulfate [mg/L] Intrawell APW-08	1	40
Sulfate [mg/L] Intrawell APW-08	1	39
Sulfate [mg/L] Intrawell APW-08	1	38
Sulfate [mg/L] Intrawell APW-08	1	39
Sulfate [mg/L] Intrawell APW-08	1	37
Sulfate [mg/L] Intrawell APW-08	1	39
Sulfate [mg/L] Intrawell APW-08	1	39
Sulfate [mg/L] Intrawell APW-08	1	34
Sulfate [mg/L] Intrawell APW-08	1	29
Sulfate [mg/L] Intrawell APW-08	1	31
Sulfate [mg/L] Intrawell APW-08	1	23
Sulfate [mg/L] Intrawell APW-08	1	24
Sulfate [mg/L] Intrawell APW-08	1	24.7
pH, Lab [SU] Intrawell APW-08	1	7.04
pH, Lab [SU] Intrawell APW-08	1	7.07
pH, Lab [SU] Intrawell APW-08	1	7
pH, Lab [SU] Intrawell APW-08	1	7.12
pH, Lab [SU] Intrawell APW-08	1	7.25
pH, Lab [SU] Intrawell APW-08	1	7.11
pH, Lab [SU] Intrawell APW-08	1	7.04
pH, Lab [SU] Intrawell APW-08	1	7.04
pH, Lab [SU] Intrawell APW-08	1	7.34
pH, Lab [SU] Intrawell APW-08	1	7.47
pH, Lab [SU] Intrawell APW-08	1	7.25
pH, Lab [SU] Intrawell APW-08	1	7.31
pH, Lab [SU] Intrawell APW-08	1	7.18
pH, Lab [SU] Intrawell APW-08	1	7.16
pH, Lab [SU] Intrawell APW-08	1	7.27
pH, Lab [SU] Intrawell APW-08	1	7.68
Fluoride [ug/L] Intrawell APW-08	1	300
Fluoride [ug/L] Intrawell APW-08	1	300
Fluoride [ug/L] Intrawell APW-08	1	290
Fluoride [ug/L] Intrawell APW-08	1	290
Fluoride [ug/L] Intrawell APW-08	1	280
Fluoride [ug/L] Intrawell APW-08	1	280
Fluoride [ug/L] Intrawell APW-08	1	300
Fluoride [ug/L] Intrawell APW-08	1	280
Fluoride [ug/L] Intrawell APW-08	1	290
Fluoride [ug/L] Intrawell APW-08	1	260
Fluoride [ug/L] Intrawell APW-08	1	280
Fluoride [ug/L] Intrawell APW-08	1	260
Fluoride [ug/L] Intrawell APW-08	1	260
Fluoride [ug/L] Intrawell APW-08	1	260
Fluoride [ug/L] Intrawell APW-08	1	290
Fluoride [ug/L] Intrawell APW-08	1	232
Chloride [mg/L] Intrawell APW-08	1	9
Chloride [mg/L] Intrawell APW-08	1	10
Chloride [mg/L] Intrawell APW-08	1	10
Chloride [mg/L] Intrawell APW-08	1	10
Chloride [mg/L] Intrawell APW-08	1	10
Chloride [mg/L] Intrawell APW-08	1	11
Chloride [mg/L] Intrawell APW-08	1	12
Chloride [mg/L] Intrawell APW-08	1	11
Chloride [mg/L] Intrawell APW-08	1	9
Chloride [mg/L] Intrawell APW-08	1	11
Chloride [mg/L] Intrawell APW-08	1	12
Chloride [mg/L] Intrawell APW-08	1	13
Chloride [mg/L] Intrawell APW-08	1	10
Chloride [mg/L] Intrawell APW-08	1	10
Chloride [mg/L] Intrawell APW-08	1	11
Chloride [mg/L] Intrawell APW-08	1	10.6
Radium-226/228 [pCi/L] Intrawell APW-07	1	2
Radium-226/228 [pCi/L] Intrawell APW-07	1	2
Radium-226/228 [pCi/L] Intrawell APW-07	1	1.29
Radium-226/228 [pCi/L] Intrawell APW-07	1	2

group	D_report_result_value	report_result_value
Radium-226/228 [pCi/L] Intrawell APW-07	1	2
Radium-226/228 [pCi/L] Intrawell APW-07	1	2
Radium-226/228 [pCi/L] Intrawell APW-07	1	2
Radium-226/228 [pCi/L] Intrawell APW-07	1	2
Radium-226/228 [pCi/L] Intrawell APW-07	1	1.1
Radium-226/228 [pCi/L] Intrawell APW-07	1	2
Radium-226/228 [pCi/L] Intrawell APW-07	1	2
Radium-226/228 [pCi/L] Intrawell APW-07	1	2.1
Radium-226/228 [pCi/L] Intrawell APW-07	1	2
Radium-226/228 [pCi/L] Intrawell APW-07	1	2
Radium-226/228 [pCi/L] Intrawell APW-07	1	2
Radium-226/228 [pCi/L] Intrawell APW-07	1	2.7
Dissolved Solids, Total [mg/L] Intrawell APW-07	1	762
Dissolved Solids, Total [mg/L] Intrawell APW-07	1	786
Dissolved Solids, Total [mg/L] Intrawell APW-07	1	624
Dissolved Solids, Total [mg/L] Intrawell APW-07	1	730
Dissolved Solids, Total [mg/L] Intrawell APW-07	1	742
Dissolved Solids, Total [mg/L] Intrawell APW-07	1	736
Dissolved Solids, Total [mg/L] Intrawell APW-07	1	720
Dissolved Solids, Total [mg/L] Intrawell APW-07	1	740
Dissolved Solids, Total [mg/L] Intrawell APW-07	1	780
Dissolved Solids, Total [mg/L] Intrawell APW-07	1	815
Dissolved Solids, Total [mg/L] Intrawell APW-07	1	800
Dissolved Solids, Total [mg/L] Intrawell APW-07	1	824
Dissolved Solids, Total [mg/L] Intrawell APW-07	1	665
Dissolved Solids, Total [mg/L] Intrawell APW-07	1	740
Dissolved Solids, Total [mg/L] Intrawell APW-07	1	790
Dissolved Solids, Total [mg/L] Intrawell APW-07	1	734
Lead [ug/L] Intrawell APW-07	0	1
Lead [ug/L] Intrawell APW-07	0	1
Lead [ug/L] Intrawell APW-07	0	1
Lead [ug/L] Intrawell APW-07	0	1
Lead [ug/L] Intrawell APW-07	0	1
Lead [ug/L] Intrawell APW-07	0	1
Lead [ug/L] Intrawell APW-07	0	1
Lead [ug/L] Intrawell APW-07	0	1
Lead [ug/L] Intrawell APW-07	0	1
Lead [ug/L] Intrawell APW-07	0	1
Lead [ug/L] Intrawell APW-07	0	1
Lead [ug/L] Intrawell APW-07	1	7.4
Lead [ug/L] Intrawell APW-07	0	1
Lead [ug/L] Intrawell APW-07	0	1
Lead [ug/L] Intrawell APW-07	0	1
Lead [ug/L] Intrawell APW-07	0	1
Lead [ug/L] Intrawell APW-07	0	1
Lead [ug/L] Intrawell APW-07	0	2
Lithium [ug/L] Intrawell APW-07	1	14.7
Lithium [ug/L] Intrawell APW-07	1	18.1
Lithium [ug/L] Intrawell APW-07	1	17.2
Lithium [ug/L] Intrawell APW-07	1	17.6
Lithium [ug/L] Intrawell APW-07	1	18.5
Lithium [ug/L] Intrawell APW-07	1	19.1
Lithium [ug/L] Intrawell APW-07	1	18.1
Lithium [ug/L] Intrawell APW-07	1	17.8
Lithium [ug/L] Intrawell APW-07	1	14.3
Lithium [ug/L] Intrawell APW-07	1	16.1
Lithium [ug/L] Intrawell APW-07	1	16.6
Lithium [ug/L] Intrawell APW-07	1	18.1
Lithium [ug/L] Intrawell APW-07	1	15.3
Lithium [ug/L] Intrawell APW-07	1	14.1
Lithium [ug/L] Intrawell APW-07	1	23.1
Lithium [ug/L] Intrawell APW-07	1	19
Thallium [ug/L] Intrawell APW-07	0	1
Thallium [ug/L] Intrawell APW-07	0	1
Thallium [ug/L] Intrawell APW-07	0	1
Thallium [ug/L] Intrawell APW-07	0	1
Thallium [ug/L] Intrawell APW-07	0	1

[illegible]

[illegible]

group	D_report_result_value	report_result_value
Cobalt [ug/L] Intrawell APW-07	1	1
Cobalt [ug/L] Intrawell APW-07	0	1
Cobalt [ug/L] Intrawell APW-07	0	1
Cobalt [ug/L] Intrawell APW-07	0	1
Cobalt [ug/L] Intrawell APW-07	0	1
Cobalt [ug/L] Intrawell APW-07	0	1
Cobalt [ug/L] Intrawell APW-07	1	1.3
Cobalt [ug/L] Intrawell APW-07	0	2
Calcium [mg/L] Intrawell APW-07	1	192
Calcium [mg/L] Intrawell APW-07	1	204
Calcium [mg/L] Intrawell APW-07	1	171
Calcium [mg/L] Intrawell APW-07	1	187
Calcium [mg/L] Intrawell APW-07	1	196
Calcium [mg/L] Intrawell APW-07	1	193
Calcium [mg/L] Intrawell APW-07	1	191
Calcium [mg/L] Intrawell APW-07	1	185
Calcium [mg/L] Intrawell APW-07	1	238
Calcium [mg/L] Intrawell APW-07	1	210
Calcium [mg/L] Intrawell APW-07	1	209
Calcium [mg/L] Intrawell APW-07	1	200
Calcium [mg/L] Intrawell APW-07	1	183
Calcium [mg/L] Intrawell APW-07	1	161
Calcium [mg/L] Intrawell APW-07	1	177
Selenium [ug/L] Intrawell APW-07	0	1
Selenium [ug/L] Intrawell APW-07	0	1
Selenium [ug/L] Intrawell APW-07	0	1
Selenium [ug/L] Intrawell APW-07	0	1
Selenium [ug/L] Intrawell APW-07	0	1
Selenium [ug/L] Intrawell APW-07	0	1
Selenium [ug/L] Intrawell APW-07	0	1
Selenium [ug/L] Intrawell APW-07	0	1
Selenium [ug/L] Intrawell APW-07	0	1
Selenium [ug/L] Intrawell APW-07	0	1
Selenium [ug/L] Intrawell APW-07	0	1
Selenium [ug/L] Intrawell APW-07	0	1
Selenium [ug/L] Intrawell APW-07	0	1
Selenium [ug/L] Intrawell APW-07	0	1
Selenium [ug/L] Intrawell APW-07	0	1
Selenium [ug/L] Intrawell APW-07	0	2
Molybdenum [ug/L] Intrawell APW-07	1	4.6
Molybdenum [ug/L] Intrawell APW-07	1	3.6
Molybdenum [ug/L] Intrawell APW-07	1	3.3
Molybdenum [ug/L] Intrawell APW-07	1	2.3
Molybdenum [ug/L] Intrawell APW-07	1	3
Molybdenum [ug/L] Intrawell APW-07	1	4.4
Molybdenum [ug/L] Intrawell APW-07	1	3.7
Molybdenum [ug/L] Intrawell APW-07	1	3.6
Molybdenum [ug/L] Intrawell APW-07	1	3.5
Molybdenum [ug/L] Intrawell APW-07	1	3
Molybdenum [ug/L] Intrawell APW-07	1	2.9
Molybdenum [ug/L] Intrawell APW-07	1	3.1
Molybdenum [ug/L] Intrawell APW-07	1	2.8
Molybdenum [ug/L] Intrawell APW-07	1	2.9
Molybdenum [ug/L] Intrawell APW-07	1	4.2
Molybdenum [ug/L] Intrawell APW-07	0	5
Nickel [ug/L] Intrawell APW-07	1	1.4
Nickel [ug/L] Intrawell APW-07	1	3.3
Nickel [ug/L] Intrawell APW-07	1	1.3
Nickel [ug/L] Intrawell APW-07	0	1
Nickel [ug/L] Intrawell APW-07	0	1
Nickel [ug/L] Intrawell APW-07	1	15
Nickel [ug/L] Intrawell APW-07	0	1
Nickel [ug/L] Intrawell APW-07	0	1
Nickel [ug/L] Intrawell APW-07	1	4.2
Nickel [ug/L] Intrawell APW-07	0	1

group	D_report_result_value	report_result_value
Mercury [ug/L] Intrawell APW-07	0	0.2
Mercury [ug/L] Intrawell APW-07	0	0.2
Mercury [ug/L] Intrawell APW-07	0	0.2
Mercury [ug/L] Intrawell APW-07	0	0.2
Mercury [ug/L] Intrawell APW-07	0	0.2
Mercury [ug/L] Intrawell APW-07	0	0.2
Mercury [ug/L] Intrawell APW-07	0	0.2
Mercury [ug/L] Intrawell APW-07	0	0.2
Mercury [ug/L] Intrawell APW-07	0	0.2
Mercury [ug/L] Intrawell APW-07	0	0.2
Mercury [ug/L] Intrawell APW-07	0	0.2
Mercury [ug/L] Intrawell APW-07	0	0.2
Mercury [ug/L] Intrawell APW-07	0	0.2
Mercury [ug/L] Intrawell APW-07	0	0.2
Mercury [ug/L] Intrawell APW-07	0	0.2
Sulfate [mg/L] Intrawell APW-07	1	66
Sulfate [mg/L] Intrawell APW-07	1	59
Sulfate [mg/L] Intrawell APW-07	1	52
Sulfate [mg/L] Intrawell APW-07	1	50
Sulfate [mg/L] Intrawell APW-07	1	61
Sulfate [mg/L] Intrawell APW-07	1	63
Sulfate [mg/L] Intrawell APW-07	1	67
Sulfate [mg/L] Intrawell APW-07	1	64
Sulfate [mg/L] Intrawell APW-07	1	72
Sulfate [mg/L] Intrawell APW-07	1	78
Sulfate [mg/L] Intrawell APW-07	1	48
Sulfate [mg/L] Intrawell APW-07	1	48
Sulfate [mg/L] Intrawell APW-07	1	54
Sulfate [mg/L] Intrawell APW-07	1	44
Sulfate [mg/L] Intrawell APW-07	1	40
Sulfate [mg/L] Intrawell APW-07	1	68.8
pH, Lab [SU] Intrawell APW-07	1	6.84
pH, Lab [SU] Intrawell APW-07	1	6.84
pH, Lab [SU] Intrawell APW-07	1	6.86
pH, Lab [SU] Intrawell APW-07	1	6.87
pH, Lab [SU] Intrawell APW-07	1	6.83
pH, Lab [SU] Intrawell APW-07	1	6.96
pH, Lab [SU] Intrawell APW-07	1	6.97
pH, Lab [SU] Intrawell APW-07	1	6.88
pH, Lab [SU] Intrawell APW-07	1	6.88
pH, Lab [SU] Intrawell APW-07	1	7.02
pH, Lab [SU] Intrawell APW-07	1	6.78
pH, Lab [SU] Intrawell APW-07	1	7.23
pH, Lab [SU] Intrawell APW-07	1	6.79
pH, Lab [SU] Intrawell APW-07	1	6.94
pH, Lab [SU] Intrawell APW-07	1	6.86
pH, Lab [SU] Intrawell APW-07	1	7.31
Fluoride [ug/L] Intrawell APW-07	1	350
Fluoride [ug/L] Intrawell APW-07	1	210
Fluoride [ug/L] Intrawell APW-07	1	190
Fluoride [ug/L] Intrawell APW-07	1	200
Fluoride [ug/L] Intrawell APW-07	1	200
Fluoride [ug/L] Intrawell APW-07	1	190
Fluoride [ug/L] Intrawell APW-07	1	200
Fluoride [ug/L] Intrawell APW-07	1	180
Fluoride [ug/L] Intrawell APW-07	1	180
Fluoride [ug/L] Intrawell APW-07	1	170
Fluoride [ug/L] Intrawell APW-07	1	180
Fluoride [ug/L] Intrawell APW-07	1	190
Fluoride [ug/L] Intrawell APW-07	1	170
Fluoride [ug/L] Intrawell APW-07	1	180
Fluoride [ug/L] Intrawell APW-07	1	200
Fluoride [ug/L] Intrawell APW-07	1	172
Chloride [mg/L] Intrawell APW-07	1	15

group	D_report_result_value	report_result_value
Chloride [mg/L] Intrawell APW-07	1	15
Chloride [mg/L] Intrawell APW-07	1	14
Chloride [mg/L] Intrawell APW-07	1	15
Chloride [mg/L] Intrawell APW-07	1	16
Chloride [mg/L] Intrawell APW-07	1	15
Chloride [mg/L] Intrawell APW-07	1	15
Chloride [mg/L] Intrawell APW-07	1	15
Chloride [mg/L] Intrawell APW-07	1	11
Chloride [mg/L] Intrawell APW-07	1	12
Chloride [mg/L] Intrawell APW-07	1	12
Chloride [mg/L] Intrawell APW-07	1	14
Chloride [mg/L] Intrawell APW-07	1	10
Chloride [mg/L] Intrawell APW-07	1	9
Chloride [mg/L] Intrawell APW-07	1	11
Chloride [mg/L] Intrawell APW-07	1	11.5
Iron [mg/L] Intrawell APW-10S	1	19.6
Iron [mg/L] Intrawell APW-10S	1	17.2
Manganese [mg/L] Intrawell APW-10S	1	0.243
Manganese [mg/L] Intrawell APW-10S	1	0.174
Turbidity, Field [NTU] Intrawell APW-10S	1	61.5
Turbidity, Field [NTU] Intrawell APW-10S	1	34.3
Turbidity, Field [NTU] Intrawell APW-10S	1	52.6
Turbidity, Field [NTU] Intrawell APW-10S	1	37.3
Turbidity, Field [NTU] Intrawell APW-10S	1	57.2
Turbidity, Field [NTU] Intrawell APW-10S	1	63.6
Turbidity, Field [NTU] Intrawell APW-10S	1	13.1
Turbidity, Field [NTU] Intrawell APW-10S	1	3.78
Iron [mg/L] Intrawell APW-10D	1	0.758
Iron [mg/L] Intrawell APW-10D	1	0.175
Manganese [mg/L] Intrawell APW-10D	1	1.16
Manganese [mg/L] Intrawell APW-10D	1	0.88
Turbidity, Field [NTU] Intrawell APW-10D	1	46.9
Turbidity, Field [NTU] Intrawell APW-10D	1	21.9
Turbidity, Field [NTU] Intrawell APW-10D	1	36.4
Turbidity, Field [NTU] Intrawell APW-10D	1	45.3
Turbidity, Field [NTU] Intrawell APW-10D	1	176
Turbidity, Field [NTU] Intrawell APW-10D	1	169
Turbidity, Field [NTU] Intrawell APW-10D	1	196
Turbidity, Field [NTU] Intrawell APW-10D	1	4.76
Iron [mg/L] Intrawell APW-08	1	3.14
Iron [mg/L] Intrawell APW-08	1	0.44
Manganese [mg/L] Intrawell APW-08	1	0.202
Manganese [mg/L] Intrawell APW-08	1	0.0435
Turbidity, Field [NTU] Intrawell APW-08	1	119
Turbidity, Field [NTU] Intrawell APW-08	1	139
Turbidity, Field [NTU] Intrawell APW-08	1	305
Turbidity, Field [NTU] Intrawell APW-08	1	26.9
Turbidity, Field [NTU] Intrawell APW-08	1	152
Turbidity, Field [NTU] Intrawell APW-08	1	141
Turbidity, Field [NTU] Intrawell APW-08	1	169
Turbidity, Field [NTU] Intrawell APW-08	1	23.1
Iron [mg/L] Intrawell APW-03	1	1.66
Iron [mg/L] Intrawell APW-03	1	0.367
Manganese [mg/L] Intrawell APW-03	1	0.321
Manganese [mg/L] Intrawell APW-03	1	0.435
Turbidity, Field [NTU] Intrawell APW-03	1	40.3
Turbidity, Field [NTU] Intrawell APW-03	1	56.1
Turbidity, Field [NTU] Intrawell APW-03	1	103
Turbidity, Field [NTU] Intrawell APW-03	1	50.7
Turbidity, Field [NTU] Intrawell APW-03	1	6.04
Turbidity, Field [NTU] Intrawell APW-03	1	2.72
Turbidity, Field [NTU] Intrawell APW-03	1	4
Turbidity, Field [NTU] Intrawell APW-03	1	7.12
Iron [mg/L] Intrawell APW-06S	1	9.35
Iron [mg/L] Intrawell APW-06S	1	9.18

group	D_report_result_value	report_result_value
Manganese [mg/L] Intrawell APW-06S	1	0.53
Manganese [mg/L] Intrawell APW-06S	1	0.512
Turbidity, Field [NTU] Intrawell APW-06S	1	30.5
Turbidity, Field [NTU] Intrawell APW-06S	1	15.1
Turbidity, Field [NTU] Intrawell APW-06S	1	5.56
Turbidity, Field [NTU] Intrawell APW-06S	1	6.67
Turbidity, Field [NTU] Intrawell APW-06S	1	9.06
Turbidity, Field [NTU] Intrawell APW-06S	1	8.99
Turbidity, Field [NTU] Intrawell APW-06S	1	1.26
Turbidity, Field [NTU] Intrawell APW-06S	1	3.32
Turbidity, Field [NTU] Intrawell APW-02	1	38
Turbidity, Field [NTU] Intrawell APW-02	1	19.2
Turbidity, Field [NTU] Intrawell APW-02	1	132
Turbidity, Field [NTU] Intrawell APW-02	1	93.6
Turbidity, Field [NTU] Intrawell APW-02	1	104.3
Turbidity, Field [NTU] Intrawell APW-02	1	97
Turbidity, Field [NTU] Intrawell APW-02	1	169
Turbidity, Field [NTU] Intrawell APW-02	1	104
Iron [mg/L] Intrawell APW-02	1	11.7
Iron [mg/L] Intrawell APW-02	1	7.63
Manganese [mg/L] Intrawell APW-02	1	0.752
Manganese [mg/L] Intrawell APW-02	1	0.669
Iron [mg/L] Intrawell APW-05/05R	1	2.77
Iron [mg/L] Intrawell APW-05/05R	1	5.89
Manganese [mg/L] Intrawell APW-05/05R	1	0.9
Manganese [mg/L] Intrawell APW-05/05R	1	0.554
Turbidity, Field [NTU] Intrawell APW-05/05R	1	51.8
Turbidity, Field [NTU] Intrawell APW-05/05R	1	9.19
Turbidity, Field [NTU] Intrawell APW-05/05R	1	4.65
Turbidity, Field [NTU] Intrawell APW-05/05R	1	8.21
Turbidity, Field [NTU] Intrawell APW-05/05R	1	42.6
Turbidity, Field [NTU] Intrawell APW-05/05R	1	33.7
Turbidity, Field [NTU] Intrawell APW-05/05R	1	76.1
Turbidity, Field [NTU] Intrawell APW-05/05R	1	38.9
Iron [mg/L] Intrawell APW-07	1	17.3
Iron [mg/L] Intrawell APW-07	1	18.9
Manganese [mg/L] Intrawell APW-07	1	1.11
Manganese [mg/L] Intrawell APW-07	1	1.19
Turbidity, Field [NTU] Intrawell APW-07	1	66.2
Turbidity, Field [NTU] Intrawell APW-07	1	34.8
Turbidity, Field [NTU] Intrawell APW-07	1	10.5
Turbidity, Field [NTU] Intrawell APW-07	1	79.2
Turbidity, Field [NTU] Intrawell APW-07	1	14.8
Turbidity, Field [NTU] Intrawell APW-07	1	42.9
Turbidity, Field [NTU] Intrawell APW-07	1	21
Turbidity, Field [NTU] Intrawell APW-07	1	4.36
Turbidity, Field [NTU] Intrawell APW-06D	1	18.5
Turbidity, Field [NTU] Intrawell APW-06D	1	74.4
Turbidity, Field [NTU] Intrawell APW-06D	1	26.9
Turbidity, Field [NTU] Intrawell APW-06D	1	181
Turbidity, Field [NTU] Intrawell APW-06D	1	65.5
Turbidity, Field [NTU] Intrawell APW-06D	1	3.02
Turbidity, Field [NTU] Intrawell APW-06D	1	18.2
Iron [mg/L] Intrawell APW-06D	1	3.65
Manganese [mg/L] Intrawell APW-06D	1	0.622



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