



## Department of Energy

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November 22, 2023

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Dear Mr. Hendricks and Ms. Nielsen:

**C-746-S&T LANDFILLS THIRD QUARTER CALENDAR YEAR 2023  
(JULY–SEPTEMBER) COMPLIANCE MONITORING REPORT, PADUCAH  
GASEOUS DIFFUSION PLANT, PADUCAH, KENTUCKY, FRNP-RPT-0294/V3,  
PERMIT NUMBER SW07300014, SW07300015, SW07300045, AGENCY  
INTEREST ID NO. 3059**

The subject report for the third quarter calendar year (CY) 2023 has been uploaded to the Kentucky eForms portal via the Kentucky Online Gateway. Other recipients outside the Solid Waste Branch are receiving this document via e-mail distribution (see distribution list). This report is required in accordance with Solid Waste Landfill Permit Number SW07300014, SW07300015, SW07300045 (Permit). This report includes groundwater analytical data, a validation summary, groundwater flow rate and direction determination, figures depicting well locations, and methane monitoring results.

The statistical analyses of the third quarter CY 2023 monitoring well (MW) data collected from the C-746-S&T Landfills were performed in accordance with Monitoring Condition GSTR0003, Standard Requirement 3, using the U.S. Environmental Protection Agency guidance document, *Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Final Guidance* (1989).

A statistically significant exceedance was indicated for conductivity in MW373. This statistical exceedance is a Type 2 Exceedance—Source Unknown. Continued evaluation of conductivity levels through future quarterly monitoring events is recommended. This report also serves as the statistical exceedance notification for the third quarter CY 2023, in accordance with Monitoring Condition GSTR0001, Standard Requirement 5, of the Permit.

If you have any questions or require additional information, please contact Ryan Callihan at (740) 970-0255.

Sincerely,

**APRIL LADD**

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LADD  
Date: 2023.11.22 14:38:26  
-06'00'

April Ladd  
Paducah Site Lead  
Portsmouth/Paducah Project Office

Enclosure:

*C-746-S&T Landfills Third Quarter Calendar Year 2023 (July–September) Compliance Monitoring Report, Paducah Gaseous Diffusion Plant, Paducah, Kentucky, FRNP-RPT-0294/V3*

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FRNP-RPT-0294/V3

**C-746-S&T Landfills  
Third Quarter Calendar Year 2023  
(July–September)  
Compliance Monitoring Report,  
Paducah Gaseous Diffusion Plant,  
Paducah, Kentucky**



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**C-746-S&T Landfills  
Third Quarter Calendar Year 2023  
(July–September)  
Compliance Monitoring Report,  
Paducah Gaseous Diffusion Plant,  
Paducah, Kentucky**

Date Issued—November 2023

U.S. DEPARTMENT OF ENERGY  
Office of Environmental Management

Prepared by  
FOUR RIVERS NUCLEAR PARTNERSHIP, LLC,  
managing the  
Deactivation and Remediation Project at the  
Paducah Gaseous Diffusion Plant  
under Contract DE-EM0004895

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## ACRONYMS

<i>CFR</i>	<i>Code of Federal Regulations</i>
COD	chemical oxygen demand
<i>KAR</i>	<i>Kentucky Administrative Regulations</i>
KDWM	Kentucky Division of Waste Management
<i>KRS</i>	<i>Kentucky Revised Statutes</i>
LEL	lower explosive limit
LRGA	Lower Regional Gravel Aquifer
LTL	lower tolerance limit
MCL	maximum contaminant level
MW	monitoring well
RGA	Regional Gravel Aquifer
UCRS	Upper Continental Recharge System
URGA	Upper Regional Gravel Aquifer
UTL	upper tolerance limit

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# 1. INTRODUCTION

This report, *C-746-S&T Landfills Third Quarter Calendar Year 2023 (July–September) Compliance Monitoring Report, Paducah Gaseous Diffusion Plant, Paducah, Kentucky*, is being submitted in accordance with Solid Waste Landfill Permit No. SW07300014, SW07300015, SW07300045.

The Groundwater, Surface Water, Leachate, and Methane Monitoring Sample Data Reporting Form is provided in Appendix A. The facility information sheet is provided in Appendix B. Groundwater analytical results are groundwater sample analyses tables and laboratory reports that are presented in Appendix C. The statistical analyses and qualification statement are provided in Appendix D. The groundwater flow rate and direction determinations are provided in Appendix E. Appendix F contains the notifications for all permit required parameters whose concentrations exceed the maximum contaminant level (MCL) for Kentucky solid waste facilities provided in 401 *KAR* 47:030 § 6 and for all permit required parameters listed in 40 *CFR* § 302.4, Appendix A, that do not have an MCL and whose concentrations exceed the historical background concentrations [upper tolerance limit (UTL), or both UTL and lower tolerance limit (LTL) for pH, as established at a 95% confidence]. Appendix G provides a chart of exceedances of the MCL and historical UTL that have occurred since the fourth quarter calendar year 2002. Methane monitoring results are documented on the approved C-746-S&T Landfills Methane Monitoring Report form provided in Appendix H. The form includes pertinent remarks/observations as required by 401 *KAR* 48:090 § 5. Surface water results are provided in Appendix I. Analytical laboratory certification is provided in Appendix J. Laboratory analytical methods used to analyze the included data set are provided in Appendix K. Micro-purging stability parameter results are provided in Appendix L.

## 1.1 BACKGROUND

The C-746-S&T Landfills are closed, solid waste landfills located north of the Paducah Site and south of the C-746-U Landfill. Construction and operation of the C-746-S Residential Landfill were permitted in April 1981 under Solid Waste Landfill Permit No. 073-00014. The permitted C-746-S Landfill area covers about 16 acres and contains a clay liner with a final cover of compacted soil. The C-746-S Landfill was a sanitary landfill for the Paducah Gaseous Diffusion Plant operations. The C-746-S Landfill is closed and has been inactive since July 1995.

Construction and operation of the C-746-T Inert Landfill were permitted in February 1985 under Solid Waste Landfill Permit No. 073-00015. The permitted C-746-T Landfill area covers about 20 acres and contains a clay liner with a final cover of compacted soil. The C-746-T Landfill was used to dispose of construction debris (e.g., concrete, wood, rock) and steam plant fly ash from the Paducah Gaseous Diffusion Plant operations. The C-746-T Landfill is closed and has been inactive since June 1992.

## 1.2 MONITORING PERIOD ACTIVITIES

### 1.2.1 Groundwater Monitoring

Three zones are monitored at the site: the Upper Continental Recharge System (UCRS), the Upper Regional Gravel Aquifer (URGA), and the Lower Regional Gravel Aquifer (LRGA). There are 23 monitoring wells (MWs) under permit for the C-746-S&T Landfills: 5 UCRS wells, 11 URGA wells, and 7 LRGA wells. A map of the MW locations is presented in Figure 1. All MWs listed on the permit were sampled this quarter, except MW389 (screened in the UCRS), which had an insufficient amount of water to obtain a sample.

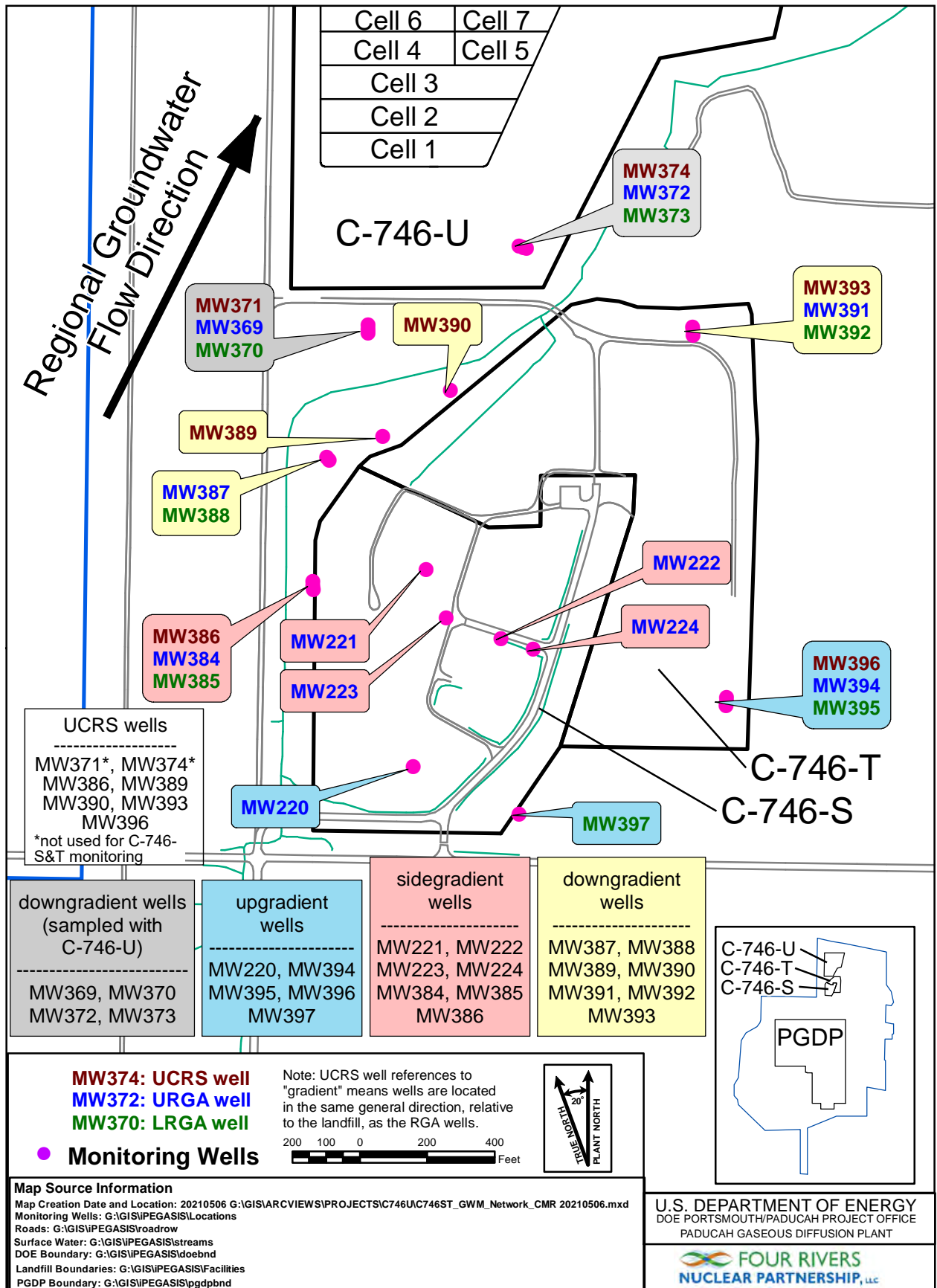


Figure 1. C-746-S&T Landfills Groundwater Monitoring Well Network

Consistent with the approved *Groundwater Monitoring Plan for the Solid Waste Permitted Landfills (C-746-S Residential Landfill, C-746-T Inert Landfill, and C-746-U Contained Landfill) at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky*, PAD-PROJ-0139 (Groundwater Monitoring Plan), UCRS wells are included in the monitoring program (LATA Kentucky 2014). Groundwater flow gradients are downward through the UCRS, but the underlying Regional Gravel Aquifer (RGA) flows laterally. Groundwater flow in the RGA is typically in a north-northeasterly direction in the vicinity of the C-746-S&T Landfills. The Ohio River and lower reaches of Little Bayou Creek are the discharge areas for the RGA flow system from the vicinity of the landfills. Consistent with the conceptual site model, the constituent concentrations in UCRS wells are considered to be representative only of the conditions local to the well or sourced from overlying soils; thus, no discussion of potential “upgradient” sources is relevant to the discussion for the UCRS. Nevertheless, a UTL for background also has been calculated for UCRS wells using concentrations from UCRS wells located in the same direction (relative to the landfill) as those RGA wells identified as upgradient. The results from these wells are considered to represent historical “background” for UCRS water quality. Similarly, other gradient references for UCRS wells are identified using the same gradient references (relative to the landfill) that are attributed to nearby RGA wells. Results from UCRS wells are compared to this UTL (for background), and exceedances of these values are reported in the quarterly report.

Groundwater sampling was conducted within the third quarter 2023 in accordance with the Groundwater Monitoring Plan (LATA Kentucky 2014) using the Deactivation and Remediation Contractor, procedure CP4-ES-2101, *Groundwater Sampling*. Groundwater sampling for the third quarter 2023 was conducted on July 25–31, 2023. One cooler containing samples from MW220, MW221, and MW 224 was delayed during shipment and arrived at the laboratory with an internal temperature outside of the acceptable range for some analytes. Those wells were resampled for affected analytes on July 31. The analytical laboratory used U.S. Environmental Protection Agency-approved methods, as applicable. The parameters specified in Permit Condition GSTR0003, Special Condition 3, were analyzed for all locations sampled.

The groundwater flow rate and direction determination are provided in Appendix E. Depth-to-water was measured on July 24–25, 2023, in MWs of the C-746-S&T Landfills (see Appendix E, Table E.1); in MWs of the C-746-S&T Landfills; and in MWs of the surrounding region (shown on Appendix E, Figure E.3). Water level measurements in 39 vicinity wells define the potentiometric surface for the RGA. Typical regional flow in the RGA is northeastward, toward the Ohio River. During July, RGA groundwater flow was directed inward and then north towards the Ohio River. The hydraulic gradient for the RGA in the vicinity of the C-746-S&T Landfills in July was  $3.53 \times 10^{-4}$  ft/ft, while the gradient beneath the C-746-S&T Landfills was approximately  $2.04 \times 10^{-4}$  ft/ft (see Appendix E, Table E.2). Calculated groundwater flow rates (average linear velocities) for the RGA at the C-746-S&T Landfills ranged from 0.347 to 0.592 ft/day (see Appendix E, Table E.3).

### **1.2.2 Methane Monitoring**

Methane monitoring was conducted in accordance with 401 KAR 48:090 § 5 and the Solid Waste Landfill Permit. Industrial Hygiene staff monitored for the occurrence of methane in one on-site building location, four locations along the landfill boundary, and 27 passive gas vents located in Cells 1, 2, and 3 of the C-746-S Landfill on August 10, 2023. Appendix H provides a map of the monitoring locations (Appendix H, Figure H.1). Monitoring results identified that all locations were compliant with the regulatory requirement of < 100% lower explosive limit (LEL) at boundary locations and < 25% LEL at all other locations. The results are documented on the C-746-S&T Landfills Methane Monitoring Report provided in Appendix H.

### 1.2.3 Surface Water Monitoring

Surface water sampling was performed on July 19, 2023, at the three locations monitored for the C-746-S&T Landfills: (1) upstream location L135, (2) instream location L154, and (3) instream location L136 (Figure 2). Surface water was monitored, as specified in 401 KAR 48:300 § 2, and the approved *Surface Water Monitoring Plan for C-746-U and C-746-S&T Landfills Permit Number SW07300014, SW07300015, SW07300045, Paducah Gaseous Diffusion Plant, Paducah, Kentucky, Agency Interest Number 3059* (FRNP 2021), which is Technical Application Attachment 24 of the Solid Waste Permit. Surface water results are provided in Appendix I.

### 1.3 KEY RESULTS

Groundwater data were evaluated in accordance with the approved Groundwater Monitoring Plan (LATA Kentucky 2014), which is Technical Application Attachment 25, of the Solid Waste Permit. Parameters that had concentrations that exceeded their respective MCL are listed in Table 1. Those constituents that exceeded their respective MCL were evaluated further against their historical background UTL. Table 2 identifies parameters that exceeded their MCL and also exceeded their historical background UTL, as well as other parameters that do not have MCLs but have concentrations that exceeded the statistically derived historical background UTL<sup>1</sup> during the third quarter 2023. Those constituents (present in downgradient wells) that exceed their historical background UTL were evaluated against their current UTL-derived background using the most recent eight quarters of data from wells designated as background wells (Table 3).

**Table 1. Summary of MCL Exceedances**

<b>UCRS</b>	<b>URGA</b>	<b>LRGA</b>
None	MW372: Trichloroethene	MW370: Trichloroethene
	MW394: Trichloroethene	MW395: Trichloroethene

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<sup>1</sup> The UTL comparison for pH uses a two-sided test, both UTL and LTL.

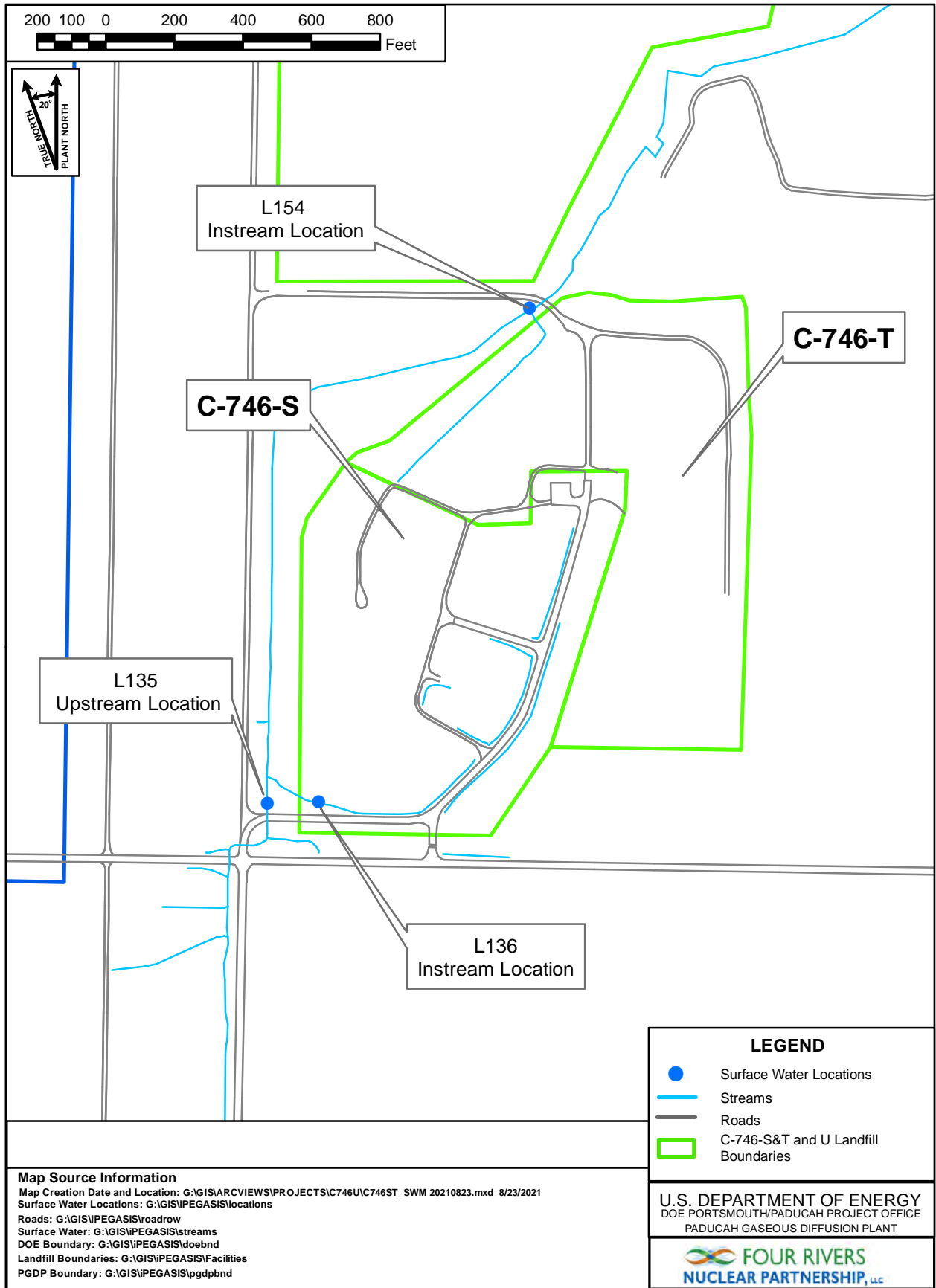


Figure 2. C-746-S&T Landfill Surface Water Monitoring Locations

**Table 2. Exceedances of Statistically Derived Historical Background Concentrations**

UCRS <sup>a</sup>	URGA	LRGA
MW386: Oxidation-reduction potential <sup>b</sup>	MW220: Sulfate	MW370: Oxidation-reduction potential <sup>b</sup> and sulfate
MW390: Oxidation-reduction potential <sup>b</sup> and technetium-99	MW222: Oxidation-reduction potential <sup>b</sup>	MW373: Calcium, conductivity, dissolved solids, magnesium, oxidation-reduction potential, <sup>b</sup> and sulfate
MW393: Oxidation-reduction potential <sup>b</sup>	MW223: Oxidation-reduction potential <sup>b</sup>	MW385: Oxidation-reduction potential, <sup>b</sup> sulfate, and technetium-99
MW396: Oxidation-reduction potential <sup>b</sup>	MW369: Oxidation-reduction potential <sup>b</sup> and technetium-99	MW388: Oxidation-reduction potential <sup>b</sup> and sulfate
	MW372: Calcium, conductivity, dissolved solids, magnesium, and sulfate	MW392: Oxidation-reduction potential <sup>b</sup>
	MW384: Oxidation-reduction potential, <sup>b</sup> sulfate, and technetium-99	MW395: Oxidation-reduction potential <sup>b</sup>
	MW387: Magnesium, oxidation-reduction potential, <sup>b</sup> sulfate, and technetium-99	MW397: Oxidation-reduction potential <sup>b</sup>
	MW391: Oxidation-reduction potential <sup>b</sup>	
	MW394: Oxidation-reduction potential <sup>b</sup>	

<sup>a</sup> Gradients in the UCRS are downward. UCRS gradient designations are identified using the same gradient reference (relative to the landfill) that is attributed to nearby RGA wells.

<sup>b</sup> Oxidation-reduction potential calibrated as Eh.

Sidegradient wells: MW221, MW222, MW223, MW224, MW384, MW385, and MW386.

Downgradient wells: MW369, MW370, MW372, MW373, MW387, MW388, MW389, MW390, MW391, MW392, and MW393.

Background wells: MW220, MW394, MW395, MW396, and MW397.

**Table 3. Exceedances of Current Background UTL in Downgradient Wells**

URGA	LRGA
MW369: Technetium-99	MW370: Sulfate
MW372: Calcium, conductivity, dissolved solids, magnesium, and sulfate	MW373: Calcium, conductivity, dissolved solids, magnesium, and sulfate
MW387: Magnesium, sulfate, and technetium-99	MW388: Sulfate

The notification of parameters that exceeded the MCL has been submitted electronically to KDWM, in accordance with 401 KAR 48:300 § 7, prior to the submittal of this report.

The constituents that exceeded their MCL were subjected to a comparison against the UTL concentrations calculated using historical concentrations from wells identified as background. In accordance with the approved Groundwater Monitoring Plan (LATA Kentucky 2014), the MCL exceedance for TCE in downgradient wells MW370 and MW372 did not exceed the historical background concentration and is considered to be a Type 1 exceedance—not attributable to the C-746-S&T Landfills.

This report serves as the notification of parameters that had statistically significant increased concentrations relative to historical background concentrations, as required by Permit No.

SW07300014, SW07300015, SW07300045, Condition GSTR0003, Standard Requirement 5, and 401 KAR 48:300 § 7.

The constituents listed in Table 2 that had exceedances of the statistically derived historical background UTL underwent additional statistical evaluation. The current quarter concentrations were compared to the current background UTL to identify if the current downgradient well concentrations are consistent with current background values. The current background UTL was developed using the most recent eight quarters of data from wells identified as background wells. Table 3 summarizes the evaluation against current background UTL for those constituents present in downgradient wells with historical UTL exceedances. In accordance with the approved Groundwater Monitoring Plan (LATA Kentucky 2014), constituents in downgradient wells that exceed the historical UTL, but do not exceed the current UTL, are considered not to have a C-746-S&T Landfills source; therefore, they are Type 1 exceedances—not attributable to the C-746-S&T Landfills.

The constituents listed in Table 3 that exceed both the historical UTL and the current UTL and do not have an identified source are considered preliminarily to be Type 2 exceedances, per the approved Groundwater Monitoring Plan (LATA Kentucky 2014). To evaluate these preliminary Type 2 exceedances further, the parameters were subjected to the Mann-Kendall statistical test for trend using the most recent eight quarters of data. The results are summarized in Table 4. Fifteen of the 16 preliminary Type 2 exceedances in downgradient wells do not have increasing trends and are considered to be Type 1 exceedances—not attributable to the C-746-S&T Landfills.

One of the 16 preliminary Type 2 exceedances in downgradient wells had an increasing trend. Specifically, the Mann-Kendall statistical test indicates an increasing trend for conductivity in MW373 over the past eight quarters. The observed trend should be considered a Type 2 exceedance—source unknown. Evaluation of conductivity trends through future quarterly monitoring events is recommended.

In accordance with Permit Condition GSTR0003, Special Condition 2, of the Solid Waste Landfill Permit, the groundwater assessment and corrective action requirements of 401 KAR 48:300 § 8 shall not apply to the C-746-S Residential Landfill and the C-746-T Inert Landfill. This variance in the permit provides that groundwater assessment and corrective actions for these landfills will be conducted in accordance with the corrective action requirements of 401 KAR 39:090.

**Table 4. C-746-S&T Landfills Downgradient Wells Trend Summary  
Utilizing the Previous Eight Quarters**

Location	Well ID	Parameter	Sample Size	Alpha <sup>a</sup>	p-Value <sup>b</sup>	S <sup>c</sup>	Decision <sup>d</sup>
C-746-S&T Landfills	MW369	Technetium-99	8	0.05	0.274	-6	No Trend
	MW370	Sulfate	8	0.05	0.054	-14	No Trend
	MW372	Calcium	8	0.05	0.031	-16	Decreasing
		Conductivity	8	0.05	0.138	10	No Trend
		Dissolved Solids	8	0.05	0.002	-22	Decreasing
		Magnesium	8	0.05	0.138	-11	No Trend
		Sulfate	8	0.05	0.452	-3	No Trend

**Table 4. C-746-S&T Landfills Downgradient Wells Trend Summary  
Utilizing the Previous Eight Quarters (Continued)**

Location	Well ID	Parameter	Sample Size	Alpha <sup>a</sup>	p-Value <sup>b</sup>	S <sup>c</sup>	Decision <sup>d</sup>
C-746-S&T Landfills	MW373	Calcium	8	0.05	0.274	7	No Trend
		Conductivity	8	0.05	0.031	17	Increasing
		Dissolved Solids	8	0.05	0.548	1	No Trend
		Magnesium	8	0.05	0.119	8	No Trend
		Sulfate	8	0.05	0.36	5	No Trend
	MW387	Magnesium	8	0.05	0.119	-9	No Trend
		Sulfate	8	0.05	0.138	-10	No Trend
		Technetium-99	8	0.05	0.054	-14	No Trend
	MW388	Sulfate	8	0.05	0.089	13	No Trend

<sup>a</sup> An alpha of 0.05 represents a 95% confidence interval.

<sup>b</sup> The p-value represents the risk of acceptance the H<sub>a</sub> hypothesis of a trend, in terms of a percentage.

<sup>c</sup> The initial value of the Mann-Kendall statistic, S, is assumed to be 0 (e.g., no trend). If a data value from a later time period is higher than a data value from an earlier time period, S is incremented by 1. On the other hand, if the data value from a later time period is lower than a data value sampled earlier, S is decremented by 1. The net result of all such increments and decrements yields the final value of S. A very high positive value of S is an indicator of an increasing trend, and a very low negative value indicates a decreasing trend.

<sup>d</sup> The Mann-Kendall decision operates on two hypotheses; the H<sub>0</sub> and H<sub>a</sub>. H<sub>0</sub> assumes there is no trend in the data, whereas H<sub>a</sub> assumes either a positive or negative trend.

Note: Statistics generated using ProUCL.

The statistical evaluation of UCRS concentrations against the current UCRS background UTL identified a technetium-99 level in UCRS well MW390 that exceed both the historical and current backgrounds (Table 5). Because UCRS wells are not hydrogeologically downgradient of the C-746-S&T Landfills, this exceedance is considered to be a Type 1 exceedance—not attributable to the C-746-S&T Landfills.

**Table 5. Exceedances of Current Background  
UTL in Downgradient UCRS Wells\***

<b>UCRS</b>
MW390: Technetium-99

\*In the same direction (relative to the landfill) as RGA wells.

All MCL and UTL exceedances reported for this quarter, except for conductivity in MW373, were evaluated and considered to be Type 1 exceedances—not attributable to the C-746-S&T Landfills.



## 2. DATA EVALUATION/STATISTICAL SYNOPSIS

The statistical analyses conducted on the third quarter 2023 groundwater data collected from the C-746-S&T Landfill MWs were performed in accordance with the Groundwater Monitoring Plan (LATA Kentucky 2014). The statistical analyses for this report utilize data from the first eight quarters that were sampled for each parameter, beginning with the first two baseline sampling events in 2002, when available. The sampling dates associated with background data are listed next to the result in the statistical analysis sheets in Appendix D (Attachments D1 and D2).

For those parameters that exceed the MCL for Kentucky solid waste facilities found in 401 KAR 47:030 § 6, exceedances were documented and evaluated further as follows. Exceedances were reviewed against historical background results (UTL). If the MCL exceedance was found not to exceed the historical UTL, the exceedance was noted as a Type 1 exceedance—an exceedance not attributable to the landfills. If there was an exceedance of the MCL in a downgradient well and this constituent also exceeded the historical background, the quarterly result was compared to the current background UTL (developed using the most recent eight quarters of data from wells identified as downgradient wells) to identify if this exceedance is attributable to upgradient/non-landfill sources. If the downgradient well concentration was less than the current background, the exceedance was noted as a Type 1 exceedance. If a constituent exceeds its Kentucky solid waste facility MCL, historical background UTL, and current background UTL, it was reported as a Type 2 exceedance—source undetermined. Type 2 exceedances (undetermined source) were further evaluated using the Mann-Kendall test for trend. If there was not a statistically significant increasing trend for a constituent in a downgradient well, the exceedance was reclassified as a Type 1 exceedance—not attributable to the landfills.

For those parameters that do not have a Kentucky solid waste facility MCL, the same process was used. If a constituent without an MCL exceeded its historical background UTL and its current background UTL, it was evaluated further to identify the source of the exceedance, if possible. If the source of the exceedance—could not be identified, it was reported as a Type 2 exceedance—source undetermined. Type 2 exceedances (undetermined source) were further evaluated using the Mann-Kendall test for trend. If there was not a statistically significant increasing trend for a constituent in a downgradient well, the exceedance was reclassified as a Type 1 exceedance—not attributable to the landfills.

To calculate the UTL, the data were divided into censored (non-detects) and uncensored (detected) observations. The one-sided tolerance interval statistical test was conducted only on parameters that had at least one uncensored observation. Results of the one-sided tolerance interval statistical test were used to determine whether the data show a statistical exceedance in concentrations with respect to historical background concentrations (UTL).

For the statistical analysis of pH, a two-sided tolerance interval statistical test was conducted. The test well results were compared to both the UTL and LTL to determine if statistically significant deviations in concentrations exist with respect to background well data.

A stepwise list of the one-sided tolerance interval statistical procedures applied to the data is provided in Appendix D under Statistical Analysis Process. The statistical analysis was conducted separately for each parameter in each well. The MWs included in the statistical analyses are listed in Table 6.

**Table 6. Monitoring Wells Included in Statistical Analysis<sup>a</sup>**

<b>UCRS</b>	<b>URGA</b>	<b>LRGA</b>
MW386	MW220 (background)	MW370
MW389 <sup>b</sup>	MW221	MW373
MW390	MW222	MW385
MW393	MW223	MW388
MW396 <sup>c</sup>	MW224	MW392
	MW369	MW395 (background)
	MW372	MW397 (background)
	MW384	
	MW387	
	MW391	
	MW394 (background)	

<sup>a</sup> Map showing the MW locations is shown on Figure 1.

<sup>b</sup> Well had insufficient water to permit a water sample for laboratory analysis.

<sup>c</sup> In the same direction (relative to the landfill) as RGA wells considered to be background.

## 2.1 STATISTICAL ANALYSIS OF GROUNDWATER DATA

Parameters requiring statistical analysis are summarized in Appendix D for each hydrological unit. A stepwise list for determining exceedances of statistically derived historical background concentrations is provided in Appendix D under Statistical Analysis Process. A comparison of the current quarter's results to the statistically derived historical background was conducted for parameters that do not have MCLs and also for those parameters whose concentrations exceed MCLs. Appendix G summarizes the occurrences (by well and by quarter) of exceedances of historical UTLs and MCL exceedances. The constituents that had exceedances of the statistically derived historical background UTL underwent additional statistical evaluation. The current quarter concentrations were compared to the current background UTL developed using the most recent eight quarters of data from wells identified as background in order to determine if the current downgradient well concentrations are consistent with current background values. Table 3 summarizes the constituents present in downgradient wells with historical UTL exceedances that are above the current UTL. Those constituents that have exceeded both the historical and current background UTLs in downgradient wells were further evaluated for increasing trends and are listed in Table 4.

### 2.1.1 Upper Continental Recharge System

In this quarter, 26 parameters, including those with MCLs, required statistical analysis in the UCRS. During the third quarter, oxidation-reduction potential and technetium-99 displayed concentrations that exceeded the respective historical UTL and are listed in Table 2. Technetium-99 exceeded the current background UTL in downgradient well MW390 and is shown on Table 5.

### 2.1.2 Upper Regional Gravel Aquifer

In this quarter, 27 parameters, including those with MCLs, required statistical analysis in the URGA. During the third quarter, calcium, conductivity, dissolved solids, magnesium, oxidation-reduction potential, sulfate, and technetium-99 displayed concentrations that exceeded their respective historical UTLs and are listed in Table 2. Calcium, conductivity, dissolved solids, magnesium, sulfate, and technetium-99 exceeded the current background UTL in downgradient wells and are included in Table 3.

### **2.1.3 Lower Regional Gravel Aquifer**

In this quarter, 27 parameters, including those with MCLs, required statistical analysis in the LRGA. During the third quarter, calcium, conductivity, dissolved solids, magnesium, oxidation-reduction potential, sulfate, and technetium-99 displayed concentrations that exceeded their respective historical UTL and are listed in Table 2. Calcium, conductivity, dissolved solids, magnesium, and sulfate exceeded the current background UTL in downgradient wells and are included in Table 3.

## **2.2 DATA VERIFICATION AND VALIDATION**

Data verification is the process of comparing a data set against set standard or contractual requirements. In accordance with the approved Groundwater Monitoring Plan, (LATA Kentucky 2014), data verification is performed for 100% of the data. Data are flagged as necessary.

Data validation was performed on 100% of the organic, inorganic, and radiochemical analytical data by a qualified individual independent from sampling, laboratory, project management, or other decision-making personnel. Data validation evaluates the laboratory adherence to analytical method requirements. Validation qualifiers are added by the independent validator and not the laboratory.

Field quality control samples are collected for each sampling event. Field blanks, rinseate blanks, and trip blanks are obtained to ensure quality of field and laboratory practices and data are reported in the Groundwater Sample Analysis tables in Appendix C. Laboratory quality control samples, such as matrix spikes, matrix spike duplicates, and method blanks, are performed by the laboratory. Both field and laboratory quality control sample results are reviewed as part of the data verification/validation process.

Data verification and validation results for this data set indicated that all data were considered usable.

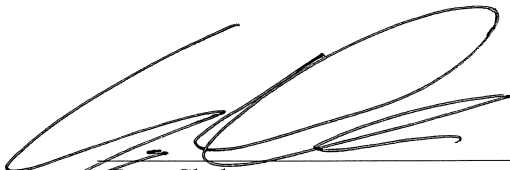
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### 3. PROFESSIONAL GEOLOGIST AUTHORIZATION

**DOCUMENT IDENTIFICATION:** *C-746-S&T Landfills Third Quarter Calendar Year 2023  
(July–September) Compliance Monitoring Report, Paducah  
Gaseous Diffusion Plant, Paducah, Kentucky  
(FRNP-RPT-0294/V3)*

Stamped and signed pursuant to my authority as a duly registered geologist under the provisions of *KRS* Chapter 322A.



  
\_\_\_\_\_  
Evan Clark

\_\_\_\_\_  
PG265379

11/24/2023  
Date

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## 4. REFERENCES

FRNP (Four Rivers Nuclear Partnership, LLC) 2021. *Surface Water Monitoring Plan for C-746-U and C-746-S&T Landfills Permit Number SW07300014, SW07300015, SW07300045, Paducah Gaseous Diffusion Plant, Paducah, Kentucky, Agency Interest Number 3059, Solid Waste Landfill Permit No. SW07300014, SW07300015, SW07300045, Technical Application, Attachment 24, Four Rivers Nuclear Partnership, LLC, Paducah, KY, March.*

LATA Kentucky (LATA Environmental Services of Kentucky, LLC) 2014. *Groundwater Monitoring Plan for the Solid Waste Permitted Landfills (C-746-S Residential Landfill, C-746-T Inert Landfill, and C-746-U Contained Landfill) at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky, PAD-PROJ-0139, Solid Waste Landfill Permit No. SW07300014, SW07300015, SW07300045, Technical Application, Attachment 25, LATA Environmental Services of Kentucky, LLC, Kevil, KY, June.*

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**APPENDIX A**

**GROUNDWATER, SURFACE WATER,  
LEACHATE, AND METHANE MONITORING  
SAMPLE DATA REPORTING FORM**

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**GROUNDWATER, SURFACE WATER, LEACHATE,  
AND METHANE MONITORING  
SAMPLE DATA REPORTING FORM**

**NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION CABINET  
DEPARTMENT FOR ENVIRONMENTAL PROTECTION  
DIVISION OF WASTE MANAGEMENT  
SOLID WASTE BRANCH  
14 REILLY ROAD  
FRANKFORT, KY 40601**

Facility Name: U.S. DOE–Paducah Gaseous Diffusion Plant Activity: C-746-S&T Landfills  
(As officially shown on DWM Permit Face)

Permit No: SW07300014,  
SW07300015,  
SW07300045 Finds/Unit No: \_\_\_\_\_ Quarter & Year 3rd Qtr. CY 2023

*Please check the following as applicable:*

\_\_\_\_\_ Characterization     X  Quarterly    \_\_\_\_\_ Semiannual    \_\_\_\_\_ Annual    \_\_\_\_\_ Assessment

*Please check applicable submittal(s):*     X  Groundwater    \_\_\_\_\_ Surface Water

\_\_\_\_\_ Leachate     X  Methane Monitoring

This form is to be utilized by those sites required by regulation (Kentucky Waste Management Regulations-401 KAR 48:300 and 45:160) or by statute (Kentucky Revised Statues Chapter 224) to conduct groundwater and surface water monitoring under the jurisdiction of the Division of Waste Management. **You must report any indication of contamination within forty-eight (48) hours of making the determination using statistical analyses, direct comparison, or other similar techniques. Submitting the lab report is NOT considered notification.** Instructions for completing the form are attached. Do not submit the instruction pages.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for such violations.

\_\_\_\_\_  
Myrna E. Redfield, Program Manager  
Four Rivers Nuclear Partnership, LLC

\_\_\_\_\_  
Date

\_\_\_\_\_  
April Ladd, Paducah Site Lead  
U.S. Department of Energy

\_\_\_\_\_  
Date

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**APPENDIX B**  
**FACILITY INFORMATION SHEET**

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## FACILITY INFORMATION SHEET

Groundwater: July 2023  
Methane: August 2023  
Surface Water: July 2023

County: McCracken Permit Nos. SW07300014,  
SW07300015,  
SW07300045

Facility Name: U.S. DOE—Paducah Gaseous Diffusion Plant  
(As officially shown on DWM Permit Face)

Site Address: 5600 Hobbs Road Kevil, Kentucky 42053  
Street City/State Zip

Phone No: (270) 441-6800 Latitude: N 37° 07' 37.70" Longitude: W 88° 47' 55.41"

---

### OWNER INFORMATION

Facility Owner: U.S. DOE, Joel Bradburne, Manager, Portsmouth/Paducah Project Office Phone No: (859) 219-4000

Contact Person: Bruce Ford Phone No: (270) 441-5357  
Director, Environmental Services

Contact Person Title: Four Rivers Nuclear Partnership, LLC

Mailing Address: 5511 Hobbs Road Kevil, Kentucky 42053  
Street City/State Zip

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### SAMPLING PERSONNEL (IF OTHER THAN LANDFILL OR LABORATORY)

Company: Four Rivers Nuclear Partnership, LLC

Contact Person: Chris Skinner Phone No: (270) 441-5675

Mailing Address: 5511 Hobbs Road Kevil, Kentucky 42053  
Street City/State Zip

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### LABORATORY RECORD #1

Laboratory: GEL Laboratories, LLC Lab ID No: KY90129

Contact Person: Valerie Davis Phone No: (843) 769-7391

Mailing Address: 2040 Savage Road Charleston, South Carolina 29407  
Street City/State Zip

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### LABORATORY RECORD #2

Laboratory: N/A Lab ID No: N/A

Contact Person: N/A Phone No: N/A

Mailing Address: N/A  
Street City/State Zip

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### LABORATORY RECORD #3

Laboratory: N/A Lab ID No: N/A

Contact Person: N/A Phone No: N/A

Mailing Address: N/A  
Street City/State Zip

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**APPENDIX C**  
**GROUNDWATER SAMPLE ANALYSES**  
**AND LABORATORY REPORTS**

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**Paducah OREIS  
GROUNDWATER MONITORING REPORT**

**Facility:** C-746-S&T Landfill      **County:** McCracken      **Permit #:** SW07300014,SW07300015,SW07300045

**Sampling Point:** MW220      UP      **RGA Type:** URGA      **Period:** 3rd Quarter 2023

**AKGWA Well Tag #:** 8000-5201      **SAMPLE ID:** MW220SG4-23      **Sample Type:** REG

Parameter	Qualifier	Result	Units	Reporting Limit	Date Collected	Counting Error (+/-)	TPU	Method	Validation
Barometric Pressure Reading		30.07	Inches/Hg		7/28/2023				X
Conductivity		357	umho/cm		7/28/2023				X
Depth to Water		57.85	ft		7/28/2023				X
Dissolved Oxygen		5.9	mg/L		7/28/2023				X
Eh (approx)		420	mV		7/28/2023				X
pH		5.96	Std Unit		7/28/2023				X
Temperature		69	deg F		7/28/2023				X
Turbidity		3.55	NTU		7/28/2023				X
Aluminum	U	0.05	mg/L	0.05	7/28/2023			SW846-6020B	=
Antimony	U	0.003	mg/L	0.003	7/28/2023			SW846-6020B	=
Arsenic	U	0.005	mg/L	0.005	7/28/2023			SW846-6020B	=
Barium		0.22	mg/L	0.004	7/28/2023			SW846-6020B	=
Beryllium	U	0.0005	mg/L	0.0005	7/28/2023			SW846-6020B	=
Boron	J	0.00842	mg/L	0.015	7/28/2023			SW846-6020B	=
Cadmium	U	0.001	mg/L	0.001	7/28/2023			SW846-6020B	=
Calcium		22.1	mg/L	0.2	7/28/2023			SW846-6020B	=
Chromium	J	0.00356	mg/L	0.01	7/28/2023			SW846-6020B	=
Cobalt	U	0.001	mg/L	0.001	7/28/2023			SW846-6020B	=
Copper	J	0.0016	mg/L	0.002	7/28/2023			SW846-6020B	J
Iron	U	0.1	mg/L	0.1	7/28/2023			SW846-6020B	=
Lead	U	0.002	mg/L	0.002	7/28/2023			SW846-6020B	=
Magnesium		8.97	mg/L	0.03	7/28/2023			SW846-6020B	=
Manganese	U	0.005	mg/L	0.005	7/28/2023			SW846-6020B	=
Molybdenum	J	0.000526	mg/L	0.001	7/28/2023			SW846-6020B	=
Nickel		0.00657	mg/L	0.002	7/28/2023			SW846-6020B	J
Potassium		1.62	mg/L	0.3	7/28/2023			SW846-6020B	=
Rhodium	U	0.005	mg/L	0.005	7/28/2023			SW846-6020B	=
Selenium	J	0.00166	mg/L	0.005	7/28/2023			SW846-6020B	J
Silver	U	0.001	mg/L	0.001	7/28/2023			SW846-6020B	=
Sodium		38.5	mg/L	0.25	7/28/2023			SW846-6020B	=
Tantalum	U	0.005	mg/L	0.005	7/28/2023			SW846-6020B	=
Thallium	U	0.002	mg/L	0.002	7/28/2023			SW846-6020B	=
Uranium	U	0.0002	mg/L	0.0002	7/28/2023			SW846-6020B	=
Vanadium	U	0.02	mg/L	0.02	7/28/2023			SW846-6020B	=
Zinc	U	0.02	mg/L	0.02	7/28/2023			SW846-6020B	=
Mercury	U	0.0002	mg/L	0.0002	7/28/2023			SW846-7470A	=
Barium, Dissolved		0.228	mg/L	0.004	7/28/2023			SW846-6020B	=
Chromium, Dissolved	J	0.0034	mg/L	0.01	7/28/2023			SW846-6020B	=
Uranium, Dissolved	U	0.0002	mg/L	0.0002	7/28/2023			SW846-6020B	=
Radium-226	U	0.551	pCi/L	0.847	7/28/2023	0.69	0.691	AN-1418	=
Strontium-90	U	0.258	pCi/L	7.09	7/28/2023	3.84	3.84	EPA-905.0-M	=
Tritium	U	22.5	pCi/L	212	7/28/2023	112	113	EPA-906.0-M	=
Technetium-99	U	19.1	pCi/L	20.1	7/28/2023	12.2	12.4	HASL 300, Tc-02-RC M	=
Thorium-230	U	0.781	pCi/L	3.16	7/28/2023	1.76	1.77	HASL 300, Th-01-RC M	=
Alpha activity	U	-1.94	pCi/L	10.3	7/28/2023	4.21	4.21	SW846-9310	=
Beta activity	U	6.86	pCi/L	9.86	7/28/2023	6.1	6.2	SW846-9310	=
1,2-Dibromo-3-chloropropane	U	0.0188	ug/L	0.0188	7/28/2023			SW846-8011	=
1,1,1,2-Tetrachloroethane	U	1	ug/L	1	7/28/2023			SW846-8260D	=
1,1,1-Trichloroethane	U	1	ug/L	1	7/28/2023			SW846-8260D	=

1,1,2,2-Tetrachloroethane	U	1 ug/L	1	7/28/2023	SW846-8260D	=
1,1,2-Trichloroethane	U	1 ug/L	1	7/28/2023	SW846-8260D	=
1,1-Dichloroethane	U	1 ug/L	1	7/28/2023	SW846-8260D	=
1,1-Dichloroethene	U	1 ug/L	1	7/28/2023	SW846-8260D	=
1,2,3-Trichloropropane	U	1 ug/L	1	7/28/2023	SW846-8260D	=
1,2-Dibromoethane	U	1 ug/L	1	7/28/2023	SW846-8260D	=
1,2-Dichlorobenzene	U	1 ug/L	1	7/28/2023	SW846-8260D	=
1,2-Dichloroethane	U	1 ug/L	1	7/28/2023	SW846-8260D	=
1,2-Dichloropropane	U	1 ug/L	1	7/28/2023	SW846-8260D	=
1,4-Dichlorobenzene	U	1 ug/L	1	7/28/2023	SW846-8260D	=
2-Butanone	U	5 ug/L	5	7/28/2023	SW846-8260D	=
2-Hexanone	U	5 ug/L	5	7/28/2023	SW846-8260D	=
4-Methyl-2-pentanone	U	5 ug/L	5	7/28/2023	SW846-8260D	=
Acetone	U	5 ug/L	5	7/28/2023	SW846-8260D	=
Acrolein	U	5 ug/L	5	7/28/2023	SW846-8260D	UJ
Acrylonitrile	U	5 ug/L	5	7/28/2023	SW846-8260D	=
Benzene	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Bromochloromethane	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Bromodichloromethane	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Bromoform	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Bromomethane	UL	1 ug/L	1	7/28/2023	SW846-8260D	UJ
Carbon disulfide	U	5 ug/L	5	7/28/2023	SW846-8260D	=
Carbon tetrachloride	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Chlorobenzene	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Chloroethane	UL	1 ug/L	1	7/28/2023	SW846-8260D	=
Chloroform	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Chloromethane	ULY1	1 ug/L	1	7/28/2023	SW846-8260D	UJ
cis-1,2-Dichloroethene	U	1 ug/L	1	7/28/2023	SW846-8260D	=
cis-1,3-Dichloropropene	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Dibromochloromethane	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Dibromomethane	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Ethylbenzene	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Iodomethane	U	5 ug/L	5	7/28/2023	SW846-8260D	=
Methylene chloride	U	5 ug/L	5	7/28/2023	SW846-8260D	=
Styrene	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Tetrachloroethene	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Toluene	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Total Xylene	U	3 ug/L	3	7/28/2023	SW846-8260D	=
trans-1,2-Dichloroethene	U	1 ug/L	1	7/28/2023	SW846-8260D	=
trans-1,3-Dichloropropene	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Trans-1,4-Dichloro-2-butene	U	5 ug/L	5	7/28/2023	SW846-8260D	=
Trichloroethene	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Trichlorofluoromethane	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Vinyl acetate	U	5 ug/L	5	7/28/2023	SW846-8260D	=
Vinyl chloride	UL	1 ug/L	1	7/28/2023	SW846-8260D	UJ

**Paducah OREIS  
GROUNDWATER MONITORING REPORT**

**Facility:** C-746-S&T Landfill      **County:** McCracken      **Permit #:** SW07300014,SW07300015,SW07300045  
**Sampling Point:** MW220      UP      **RGA Type:** URGA      **Period:** 3rd Quarter 2023  
**AKGWA Well Tag #:** 8000-5201      **SAMPLE ID:** MW220SG4-23R      **Sample Type:** REG

Parameter	Qualifier	Result	Units	Reporting Limit	Date Collected	Counting Error (+/-)	TPU	Method	Validation
Bromide	J	0.198	mg/L	0.2	7/31/2023			SW846-9056A	=
Chloride	J	17.7	mg/L	250	7/31/2023			SW846-9056A	=
Fluoride	J	0.176	mg/L	4	7/31/2023			SW846-9056A	=
Nitrate as Nitrogen	J	0.816	mg/L	10	7/31/2023			SW846-9056A	=
Sulfate		17.8	mg/L	0.4	7/31/2023			SW846-9056A	=
Barometric Pressure Reading		30.11	Inches/Hg		7/31/2023				X
Conductivity		354	umho/cm		7/31/2023				X
Depth to Water		57.92	ft		7/31/2023				X
Dissolved Oxygen		6.11	mg/L		7/31/2023				X
Eh (approx)		377	mV		7/31/2023				X
pH		6.09	Std Unit		7/31/2023				X
Temperature		69.5	deg F		7/31/2023				X
Turbidity		2.8	NTU		7/31/2023				X
Dissolved Solids		176	mg/L	10	7/31/2023			EPA-160.1	=
Iodide	U	0.5	mg/L	0.5	7/31/2023			EPA-300.0	=
Chemical Oxygen Demand (COD)	U	20	mg/L	20	7/31/2023			EPA-410.4	=
Cyanide	U	0.2	mg/L	0.2	7/31/2023			SW846-9012B	=
Total Organic Halides (TOX)		11.7	ug/L	10	7/31/2023			SW846-9020B	=
Total Organic Carbon (TOC)	J	0.901	mg/L	2	7/31/2023			SW846-9060A	=

**Paducah OREIS  
GROUNDWATER MONITORING REPORT**

**Facility:** C-746-S&T Landfill      **County:** McCracken      **Permit #:** SW07300014,SW07300015,SW07300045

**Sampling Point:** MW221      SIDE      **RGA Type:** URGA      **Period:** 3rd Quarter 2023

**AKGWA Well Tag #:** 8000-5202      **SAMPLE ID:** MW221SG4-23      **Sample Type:** REG

Parameter	Qualifier	Result	Units	Reporting Limit	Date Collected	Counting Error (+/-)	TPU	Method	Validation
Barometric Pressure Reading		30.04	Inches/Hg		7/28/2023				X
Conductivity		395	umho/cm		7/28/2023				X
Depth to Water		67.44	ft		7/28/2023				X
Dissolved Oxygen		5.4	mg/L		7/28/2023				X
Eh (approx)		410	mV		7/28/2023				X
pH		5.96	Std Unit		7/28/2023				X
Temperature		65.8	deg F		7/28/2023				X
Turbidity		3.29	NTU		7/28/2023				X
Aluminum	U	0.05	mg/L	0.05	7/28/2023			SW846-6020B	=
Antimony	U	0.003	mg/L	0.003	7/28/2023			SW846-6020B	=
Arsenic	U	0.005	mg/L	0.005	7/28/2023			SW846-6020B	=
Barium		0.222	mg/L	0.004	7/28/2023			SW846-6020B	=
Beryllium	U	0.0005	mg/L	0.0005	7/28/2023			SW846-6020B	=
Boron		0.0163	mg/L	0.015	7/28/2023			SW846-6020B	=
Cadmium	U	0.001	mg/L	0.001	7/28/2023			SW846-6020B	=
Calcium		20.8	mg/L	0.2	7/28/2023			SW846-6020B	=
Chromium	U	0.01	mg/L	0.01	7/28/2023			SW846-6020B	=
Cobalt	U	0.001	mg/L	0.001	7/28/2023			SW846-6020B	=
Copper		0.00249	mg/L	0.002	7/28/2023			SW846-6020B	J
Iron	U	0.1	mg/L	0.1	7/28/2023			SW846-6020B	=
Lead	U	0.002	mg/L	0.002	7/28/2023			SW846-6020B	=
Magnesium		8.93	mg/L	0.03	7/28/2023			SW846-6020B	=
Manganese	U	0.005	mg/L	0.005	7/28/2023			SW846-6020B	=
Molybdenum		0.00374	mg/L	0.001	7/28/2023			SW846-6020B	=
Nickel		0.0242	mg/L	0.002	7/28/2023			SW846-6020B	=
Potassium		2.19	mg/L	0.3	7/28/2023			SW846-6020B	=
Rhodium	U	0.005	mg/L	0.005	7/28/2023			SW846-6020B	=
Selenium	U	0.005	mg/L	0.005	7/28/2023			SW846-6020B	=
Silver	U	0.001	mg/L	0.001	7/28/2023			SW846-6020B	=
Sodium		45.2	mg/L	0.25	7/28/2023			SW846-6020B	=
Tantalum	U	0.005	mg/L	0.005	7/28/2023			SW846-6020B	=
Thallium	U	0.002	mg/L	0.002	7/28/2023			SW846-6020B	=
Uranium	U	0.0002	mg/L	0.0002	7/28/2023			SW846-6020B	=
Vanadium	U	0.02	mg/L	0.02	7/28/2023			SW846-6020B	=
Zinc	J	0.00582	mg/L	0.02	7/28/2023			SW846-6020B	=
Mercury	U	0.0002	mg/L	0.0002	7/28/2023			SW846-7470A	=
Barium, Dissolved		0.222	mg/L	0.004	7/28/2023			SW846-6020B	=
Chromium, Dissolved	U	0.01	mg/L	0.01	7/28/2023			SW846-6020B	=
Uranium, Dissolved	U	0.0002	mg/L	0.0002	7/28/2023			SW846-6020B	=
Radium-226	U	0.278	pCi/L	0.481	7/28/2023	0.329	0.33	AN-1418	=
Strontium-90	U	2.96	pCi/L	4.84	7/28/2023	2.95	2.98	EPA-905.0-M	=
Tritium	U	-32.1	pCi/L	212	7/28/2023	103	103	EPA-906.0-M	=
Technetium-99	U	19.5	pCi/L	19.7	7/28/2023	12	12.2	HASL 300, Tc-02-RC M	=
Thorium-230	U	0.5	pCi/L	2.45	7/28/2023	1.34	1.35	HASL 300, Th-01-RC M	=
Alpha activity	U	-0.509	pCi/L	6.23	7/28/2023	2.35	2.36	SW846-9310	=
Beta activity	U	4.67	pCi/L	9.48	7/28/2023	5.62	5.67	SW846-9310	=
1,2-Dibromo-3-chloropropane	U	0.0189	ug/L	0.0189	7/28/2023			SW846-8011	=
1,1,1,2-Tetrachloroethane	U	1	ug/L	1	7/28/2023			SW846-8260D	=
1,1,1-Trichloroethane	U	1	ug/L	1	7/28/2023			SW846-8260D	=

1,1,2,2-Tetrachloroethane	U	1 ug/L	1	7/28/2023	SW846-8260D	=
1,1,2-Trichloroethane	U	1 ug/L	1	7/28/2023	SW846-8260D	=
1,1-Dichloroethane	U	1 ug/L	1	7/28/2023	SW846-8260D	=
1,1-Dichloroethene	U	1 ug/L	1	7/28/2023	SW846-8260D	=
1,2,3-Trichloropropane	U	1 ug/L	1	7/28/2023	SW846-8260D	=
1,2-Dibromoethane	U	1 ug/L	1	7/28/2023	SW846-8260D	=
1,2-Dichlorobenzene	U	1 ug/L	1	7/28/2023	SW846-8260D	=
1,2-Dichloroethane	U	1 ug/L	1	7/28/2023	SW846-8260D	=
1,2-Dichloropropane	U	1 ug/L	1	7/28/2023	SW846-8260D	=
1,4-Dichlorobenzene	U	1 ug/L	1	7/28/2023	SW846-8260D	=
2-Butanone	U	5 ug/L	5	7/28/2023	SW846-8260D	=
2-Hexanone	U	5 ug/L	5	7/28/2023	SW846-8260D	=
4-Methyl-2-pentanone	U	5 ug/L	5	7/28/2023	SW846-8260D	=
Acetone	U	5 ug/L	5	7/28/2023	SW846-8260D	=
Acrolein	U	5 ug/L	5	7/28/2023	SW846-8260D	UJ
Acrylonitrile	U	5 ug/L	5	7/28/2023	SW846-8260D	=
Benzene	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Bromochloromethane	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Bromodichloromethane	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Bromoform	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Bromomethane	UL	1 ug/L	1	7/28/2023	SW846-8260D	UJ
Carbon disulfide	U	5 ug/L	5	7/28/2023	SW846-8260D	=
Carbon tetrachloride	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Chlorobenzene	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Chloroethane	UL	1 ug/L	1	7/28/2023	SW846-8260D	=
Chloroform	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Chloromethane	ULY1	1 ug/L	1	7/28/2023	SW846-8260D	UJ
cis-1,2-Dichloroethene	U	1 ug/L	1	7/28/2023	SW846-8260D	=
cis-1,3-Dichloropropene	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Dibromochloromethane	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Dibromomethane	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Ethylbenzene	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Iodomethane	U	5 ug/L	5	7/28/2023	SW846-8260D	=
Methylene chloride	U	5 ug/L	5	7/28/2023	SW846-8260D	=
Styrene	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Tetrachloroethene	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Toluene	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Total Xylene	U	3 ug/L	3	7/28/2023	SW846-8260D	=
trans-1,2-Dichloroethene	U	1 ug/L	1	7/28/2023	SW846-8260D	=
trans-1,3-Dichloropropene	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Trans-1,4-Dichloro-2-butene	U	5 ug/L	5	7/28/2023	SW846-8260D	=
Trichloroethene	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Trichlorofluoromethane	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Vinyl acetate	U	5 ug/L	5	7/28/2023	SW846-8260D	=
Vinyl chloride	UL	1 ug/L	1	7/28/2023	SW846-8260D	UJ

**Paducah OREIS  
GROUNDWATER MONITORING REPORT**

**Facility:** C-746-S&T Landfill      **County:** McCracken      **Permit #:** SW07300014,SW07300015,SW07300045  
**Sampling Point:** MW221      SIDE      **RGA Type:** URGA      **Period:** 3rd Quarter 2023  
**AKGWA Well Tag #:** 8000-5202      **SAMPLE ID:** MW221SG4-23R      **Sample Type:** REG

Parameter	Qualifier	Result	Units	Reporting Limit	Date Collected	Counting Error (+/-)	TPU	Method	Validation
Bromide		0.522	mg/L	0.2	7/31/2023			SW846-9056A	=
Chloride	J	34.4	mg/L	250	7/31/2023			SW846-9056A	=
Fluoride	J	0.209	mg/L	4	7/31/2023			SW846-9056A	=
Nitrate as Nitrogen	J	0.958	mg/L	10	7/31/2023			SW846-9056A	=
Sulfate		15.2	mg/L	0.4	7/31/2023			SW846-9056A	=
Barometric Pressure Reading		30.12	Inches/Hg		7/31/2023				X
Conductivity		398	umho/cm		7/31/2023				X
Depth to Water		67.54	ft		7/31/2023				X
Dissolved Oxygen		5.82	mg/L		7/31/2023				X
Eh (approx)		361	mV		7/31/2023				X
pH		6.1	Std Unit		7/31/2023				X
Temperature		69.3	deg F		7/31/2023				X
Turbidity		2.28	NTU		7/31/2023				X
Dissolved Solids		205	mg/L	10	7/31/2023			EPA-160.1	=
Iodide	U	0.5	mg/L	0.5	7/31/2023			EPA-300.0	=
Chemical Oxygen Demand (COD)	U	20	mg/L	20	7/31/2023			EPA-410.4	=
Cyanide	U	0.2	mg/L	0.2	7/31/2023			SW846-9012B	=
Total Organic Halides (TOX)	JB	5.48	ug/L	10	7/31/2023			SW846-9020B	U
Total Organic Carbon (TOC)	J	0.891	mg/L	2	7/31/2023			SW846-9060A	=



**Paducah OREIS  
GROUNDWATER MONITORING REPORT**

**Facility:** C-746-S&T Landfill      **County:** McCracken      **Permit #:** SW07300014,SW07300015,SW07300045

**Sampling Point:** MW222      SIDE      **RGA Type:** URGA      **Period:** 3rd Quarter 2023

**AKGWA Well Tag #:** 8000-5242      **SAMPLE ID:** MW222SG4-23      **Sample Type:** REG

Parameter	Qualifier	Result	Units	Reporting Limit	Date Collected	Counting Error (+/-)	TPU	Method	Validation
Bromide		0.427	mg/L	0.2	7/28/2023			SW846-9056A	=
Chloride	J	30.3	mg/L	250	7/28/2023			SW846-9056A	=
Fluoride	J	0.271	mg/L	4	7/28/2023			SW846-9056A	=
Nitrate as Nitrogen	J	0.851	mg/L	10	7/28/2023			SW846-9056A	=
Sulfate		12.3	mg/L	0.4	7/28/2023			SW846-9056A	=
Barometric Pressure Reading		30.06	Inches/Hg		7/28/2023				X
Conductivity		360	umho/cm		7/28/2023				X
Depth to Water		71.33	ft		7/28/2023				X
Dissolved Oxygen		4.37	mg/L		7/28/2023				X
Eh (approx)		405	mV		7/28/2023				X
pH		6.08	Std Unit		7/28/2023				X
Temperature		67.7	deg F		7/28/2023				X
Turbidity		3.68	NTU		7/28/2023				X
Aluminum	U	0.05	mg/L	0.05	7/28/2023			SW846-6020B	=
Antimony	U	0.003	mg/L	0.003	7/28/2023			SW846-6020B	=
Arsenic	U	0.005	mg/L	0.005	7/28/2023			SW846-6020B	=
Barium		0.283	mg/L	0.004	7/28/2023			SW846-6020B	=
Beryllium	U	0.0005	mg/L	0.0005	7/28/2023			SW846-6020B	=
Boron	J	0.00872	mg/L	0.015	7/28/2023			SW846-6020B	=
Cadmium	U	0.001	mg/L	0.001	7/28/2023			SW846-6020B	=
Calcium		18	mg/L	0.2	7/28/2023			SW846-6020B	=
Chromium	U	0.01	mg/L	0.01	7/28/2023			SW846-6020B	=
Cobalt	J	0.00038	mg/L	0.001	7/28/2023			SW846-6020B	J
Copper	J	0.00119	mg/L	0.002	7/28/2023			SW846-6020B	J
Iron	U	0.1	mg/L	0.1	7/28/2023			SW846-6020B	=
Lead	U	0.002	mg/L	0.002	7/28/2023			SW846-6020B	=
Magnesium		7.66	mg/L	0.03	7/28/2023			SW846-6020B	=
Manganese		0.00542	mg/L	0.005	7/28/2023			SW846-6020B	J
Molybdenum		0.00176	mg/L	0.001	7/28/2023			SW846-6020B	=
Nickel		0.0188	mg/L	0.002	7/28/2023			SW846-6020B	=
Potassium		0.769	mg/L	0.3	7/28/2023			SW846-6020B	=
Rhodium	U	0.005	mg/L	0.005	7/28/2023			SW846-6020B	=
Selenium	U	0.005	mg/L	0.005	7/28/2023			SW846-6020B	=
Silver	U	0.001	mg/L	0.001	7/28/2023			SW846-6020B	=
Sodium		43.9	mg/L	0.25	7/28/2023			SW846-6020B	=
Tantalum	U	0.005	mg/L	0.005	7/28/2023			SW846-6020B	=
Thallium	U	0.002	mg/L	0.002	7/28/2023			SW846-6020B	=
Uranium	U	0.0002	mg/L	0.0002	7/28/2023			SW846-6020B	=
Vanadium	U	0.02	mg/L	0.02	7/28/2023			SW846-6020B	=
Zinc	J	0.00383	mg/L	0.02	7/28/2023			SW846-6020B	=
Mercury	U	0.0002	mg/L	0.0002	7/28/2023			SW846-7470A	=
Barium, Dissolved		0.291	mg/L	0.004	7/28/2023			SW846-6020B	=
Chromium, Dissolved	U	0.01	mg/L	0.01	7/28/2023			SW846-6020B	=
Uranium, Dissolved	U	0.0002	mg/L	0.0002	7/28/2023			SW846-6020B	=
Radium-226	U	0.0165	pCi/L	0.36	7/28/2023	0.172	0.172	AN-1418	=
Strontium-90	U	5.23	pCi/L	5.88	7/28/2023	3.76	3.85	EPA-905.0-M	=
Tritium	U	-15.6	pCi/L	210	7/28/2023	105	105	EPA-906.0-M	=
Technetium-99	U	14.3	pCi/L	19.5	7/28/2023	11.7	11.8	HASL 300, Tc-02-RC M	=
Thorium-230	U	1.9	pCi/L	2.52	7/28/2023	1.87	1.89	HASL 300, Th-01-RC M	=

Alpha activity	U	0.444	pCi/L	8.24	7/28/2023	3.89	3.9	SW846-9310	=
Beta activity	U	5.26	pCi/L	9.54	7/28/2023	5.74	5.8	SW846-9310	=
1,2-Dibromo-3-chloropropane	U	0.0189	ug/L	0.0189	7/28/2023			SW846-8011	=
1,1,1,2-Tetrachloroethane	U	1	ug/L	1	7/28/2023			SW846-8260D	=
1,1,1-Trichloroethane	U	1	ug/L	1	7/28/2023			SW846-8260D	=
1,1,2,2-Tetrachloroethane	U	1	ug/L	1	7/28/2023			SW846-8260D	=
1,1,2-Trichloroethane	U	1	ug/L	1	7/28/2023			SW846-8260D	=
1,1-Dichloroethane	U	1	ug/L	1	7/28/2023			SW846-8260D	=
1,1-Dichloroethene	U	1	ug/L	1	7/28/2023			SW846-8260D	=
1,2,3-Trichloropropane	U	1	ug/L	1	7/28/2023			SW846-8260D	=
1,2-Dibromoethane	U	1	ug/L	1	7/28/2023			SW846-8260D	=
1,2-Dichlorobenzene	U	1	ug/L	1	7/28/2023			SW846-8260D	=
1,2-Dichloroethane	U	1	ug/L	1	7/28/2023			SW846-8260D	=
1,2-Dichloropropane	U	1	ug/L	1	7/28/2023			SW846-8260D	=
1,4-Dichlorobenzene	U	1	ug/L	1	7/28/2023			SW846-8260D	=
2-Butanone	U	5	ug/L	5	7/28/2023			SW846-8260D	=
2-Hexanone	U	5	ug/L	5	7/28/2023			SW846-8260D	=
4-Methyl-2-pentanone	U	5	ug/L	5	7/28/2023			SW846-8260D	=
Acetone	U	5	ug/L	5	7/28/2023			SW846-8260D	=
Acrolein	U	5	ug/L	5	7/28/2023			SW846-8260D	UJ
Acrylonitrile	U	5	ug/L	5	7/28/2023			SW846-8260D	=
Benzene	U	1	ug/L	1	7/28/2023			SW846-8260D	=
Bromochloromethane	U	1	ug/L	1	7/28/2023			SW846-8260D	=
Bromodichloromethane	U	1	ug/L	1	7/28/2023			SW846-8260D	=
Bromoform	U	1	ug/L	1	7/28/2023			SW846-8260D	=
Bromomethane	UL	1	ug/L	1	7/28/2023			SW846-8260D	UJ
Carbon disulfide	U	5	ug/L	5	7/28/2023			SW846-8260D	=
Carbon tetrachloride	U	1	ug/L	1	7/28/2023			SW846-8260D	=
Chlorobenzene	U	1	ug/L	1	7/28/2023			SW846-8260D	=
Chloroethane	UL	1	ug/L	1	7/28/2023			SW846-8260D	=
Chloroform	U	1	ug/L	1	7/28/2023			SW846-8260D	=
Chloromethane	ULY1	1	ug/L	1	7/28/2023			SW846-8260D	UJ
cis-1,2-Dichloroethene	U	1	ug/L	1	7/28/2023			SW846-8260D	=
cis-1,3-Dichloropropene	U	1	ug/L	1	7/28/2023			SW846-8260D	=
Dibromochloromethane	U	1	ug/L	1	7/28/2023			SW846-8260D	=
Dibromomethane	U	1	ug/L	1	7/28/2023			SW846-8260D	=
Ethylbenzene	U	1	ug/L	1	7/28/2023			SW846-8260D	=
Iodomethane	U	5	ug/L	5	7/28/2023			SW846-8260D	=
Methylene chloride	U	5	ug/L	5	7/28/2023			SW846-8260D	=
Styrene	U	1	ug/L	1	7/28/2023			SW846-8260D	=
Tetrachloroethene	U	1	ug/L	1	7/28/2023			SW846-8260D	=
Toluene	U	1	ug/L	1	7/28/2023			SW846-8260D	=
Total Xylene	U	3	ug/L	3	7/28/2023			SW846-8260D	=
trans-1,2-Dichloroethene	U	1	ug/L	1	7/28/2023			SW846-8260D	=
trans-1,3-Dichloropropene	U	1	ug/L	1	7/28/2023			SW846-8260D	=
Trans-1,4-Dichloro-2-butene	U	5	ug/L	5	7/28/2023			SW846-8260D	=
Trichloroethene	U	1	ug/L	1	7/28/2023			SW846-8260D	=
Trichlorofluoromethane	U	1	ug/L	1	7/28/2023			SW846-8260D	=
Vinyl acetate	U	5	ug/L	5	7/28/2023			SW846-8260D	=
Vinyl chloride	UL	1	ug/L	1	7/28/2023			SW846-8260D	UJ
Dissolved Solids		184	mg/L	10	7/28/2023			EPA-160.1	=
Iodide	U	0.5	mg/L	0.5	7/28/2023			EPA-300.0	=
Chemical Oxygen Demand (COD)	U	20	mg/L	20	7/28/2023			EPA-410.4	=
Cyanide	U	0.2	mg/L	0.2	7/28/2023			SW846-9012B	=
Total Organic Halides (TOX)	JB	5.88	ug/L	10	7/28/2023			SW846-9020B	U
Total Organic Carbon (TOC)	J	0.942	mg/L	2	7/28/2023			SW846-9060A	=

**Paducah OREIS  
GROUNDWATER MONITORING REPORT**

**Facility:** C-746-S&T Landfill      **County:** McCracken      **Permit #:** SW07300014,SW07300015,SW07300045

**Sampling Point:** MW223      SIDE      **RGA Type:** URGA      **Period:** 3rd Quarter 2023

**AKGWA Well Tag #:** 8000-5243      **SAMPLE ID:** MW223SG4-23      **Sample Type:** REG

Parameter	Qualifier	Result	Units	Reporting Limit	Date Collected	Counting Error (+/-)	TPU	Method	Validation
Bromide		0.477	mg/L	0.2	7/28/2023			SW846-9056A	=
Chloride	J	33.9	mg/L	250	7/28/2023			SW846-9056A	=
Fluoride	J	0.226	mg/L	4	7/28/2023			SW846-9056A	=
Nitrate as Nitrogen	J	0.796	mg/L	10	7/28/2023			SW846-9056A	=
Sulfate		14.2	mg/L	0.4	7/28/2023			SW846-9056A	=
Barometric Pressure Reading		30.05	Inches/Hg		7/28/2023				X
Conductivity		396	umho/cm		7/28/2023				X
Depth to Water		70.49	ft		7/28/2023				X
Dissolved Oxygen		2.83	mg/L		7/28/2023				X
Eh (approx)		400	mV		7/28/2023				X
pH		6.03	Std Unit		7/28/2023				X
Temperature		65	deg F		7/28/2023				X
Turbidity		2.84	NTU		7/28/2023				X
Aluminum	U	0.05	mg/L	0.05	7/28/2023			SW846-6020B	=
Antimony	U	0.003	mg/L	0.003	7/28/2023			SW846-6020B	=
Arsenic	U	0.005	mg/L	0.005	7/28/2023			SW846-6020B	=
Barium		0.265	mg/L	0.004	7/28/2023			SW846-6020B	=
Beryllium	U	0.0005	mg/L	0.0005	7/28/2023			SW846-6020B	=
Boron	J	0.00846	mg/L	0.015	7/28/2023			SW846-6020B	=
Cadmium	U	0.001	mg/L	0.001	7/28/2023			SW846-6020B	=
Calcium		22.3	mg/L	0.2	7/28/2023			SW846-6020B	=
Chromium		0.0154	mg/L	0.01	7/28/2023			SW846-6020B	=
Cobalt	U	0.001	mg/L	0.001	7/28/2023			SW846-6020B	=
Copper	J	0.00134	mg/L	0.002	7/28/2023			SW846-6020B	J
Iron	U	0.1	mg/L	0.1	7/28/2023			SW846-6020B	=
Lead	U	0.002	mg/L	0.002	7/28/2023			SW846-6020B	=
Magnesium		9.06	mg/L	0.03	7/28/2023			SW846-6020B	=
Manganese	J	0.00333	mg/L	0.005	7/28/2023			SW846-6020B	J
Molybdenum		0.00583	mg/L	0.001	7/28/2023			SW846-6020B	=
Nickel		0.2	mg/L	0.002	7/28/2023			SW846-6020B	=
Potassium		2.32	mg/L	0.3	7/28/2023			SW846-6020B	=
Rhodium	U	0.005	mg/L	0.005	7/28/2023			SW846-6020B	=
Selenium	U	0.005	mg/L	0.005	7/28/2023			SW846-6020B	=
Silver	U	0.001	mg/L	0.001	7/28/2023			SW846-6020B	=
Sodium		44.4	mg/L	0.25	7/28/2023			SW846-6020B	=
Tantalum	U	0.005	mg/L	0.005	7/28/2023			SW846-6020B	=
Thallium	U	0.002	mg/L	0.002	7/28/2023			SW846-6020B	=
Uranium	U	0.0002	mg/L	0.0002	7/28/2023			SW846-6020B	=
Vanadium	U	0.02	mg/L	0.02	7/28/2023			SW846-6020B	=
Zinc	J	0.00347	mg/L	0.02	7/28/2023			SW846-6020B	=
Mercury	U	0.0002	mg/L	0.0002	7/28/2023			SW846-7470A	=
Barium, Dissolved		0.273	mg/L	0.004	7/28/2023			SW846-6020B	=
Chromium, Dissolved		0.0153	mg/L	0.01	7/28/2023			SW846-6020B	=
Uranium, Dissolved	U	0.0002	mg/L	0.0002	7/28/2023			SW846-6020B	=
Radium-226	U	0.319	pCi/L	0.464	7/28/2023	0.341	0.342	AN-1418	=
Strontium-90	U	-3.2	pCi/L	6.65	7/28/2023	2.98	2.98	EPA-905.0-M	=
Tritium	U	-30.7	pCi/L	212	7/28/2023	103	103	EPA-906.0-M	=
Technetium-99	U	9.63	pCi/L	20.7	7/28/2023	12.3	12.3	HASL 300, Tc-02-RC M	=
Thorium-230	U	1.55	pCi/L	3.13	7/28/2023	2.04	2.06	HASL 300, Th-01-RC M	=

Alpha activity	U	-0.339	pCi/L	6.97	7/28/2023	2.93	2.93	SW846-9310	=
Beta activity	U	6.4	pCi/L	8.87	7/28/2023	5.52	5.62	SW846-9310	=
1,2-Dibromo-3-chloropropane	U	0.019	ug/L	0.019	7/28/2023			SW846-8011	=
1,1,1,2-Tetrachloroethane	U	1	ug/L	1	7/28/2023			SW846-8260D	=
1,1,1-Trichloroethane	U	1	ug/L	1	7/28/2023			SW846-8260D	=
1,1,2,2-Tetrachloroethane	U	1	ug/L	1	7/28/2023			SW846-8260D	=
1,1,2-Trichloroethane	U	1	ug/L	1	7/28/2023			SW846-8260D	=
1,1-Dichloroethane	U	1	ug/L	1	7/28/2023			SW846-8260D	=
1,1-Dichloroethene	U	1	ug/L	1	7/28/2023			SW846-8260D	=
1,2,3-Trichloropropane	U	1	ug/L	1	7/28/2023			SW846-8260D	=
1,2-Dibromoethane	U	1	ug/L	1	7/28/2023			SW846-8260D	=
1,2-Dichlorobenzene	U	1	ug/L	1	7/28/2023			SW846-8260D	=
1,2-Dichloroethane	U	1	ug/L	1	7/28/2023			SW846-8260D	=
1,2-Dichloropropane	U	1	ug/L	1	7/28/2023			SW846-8260D	=
1,4-Dichlorobenzene	U	1	ug/L	1	7/28/2023			SW846-8260D	=
2-Butanone	U	5	ug/L	5	7/28/2023			SW846-8260D	=
2-Hexanone	U	5	ug/L	5	7/28/2023			SW846-8260D	=
4-Methyl-2-pentanone	U	5	ug/L	5	7/28/2023			SW846-8260D	=
Acetone	U	5	ug/L	5	7/28/2023			SW846-8260D	=
Acrolein	U	5	ug/L	5	7/28/2023			SW846-8260D	UJ
Acrylonitrile	U	5	ug/L	5	7/28/2023			SW846-8260D	=
Benzene	U	1	ug/L	1	7/28/2023			SW846-8260D	=
Bromochloromethane	U	1	ug/L	1	7/28/2023			SW846-8260D	=
Bromodichloromethane	U	1	ug/L	1	7/28/2023			SW846-8260D	=
Bromoform	U	1	ug/L	1	7/28/2023			SW846-8260D	=
Bromomethane	UL	1	ug/L	1	7/28/2023			SW846-8260D	UJ
Carbon disulfide	U	5	ug/L	5	7/28/2023			SW846-8260D	=
Carbon tetrachloride	U	1	ug/L	1	7/28/2023			SW846-8260D	=
Chlorobenzene	U	1	ug/L	1	7/28/2023			SW846-8260D	=
Chloroethane	UL	1	ug/L	1	7/28/2023			SW846-8260D	=
Chloroform	U	1	ug/L	1	7/28/2023			SW846-8260D	=
Chloromethane	ULY1	1	ug/L	1	7/28/2023			SW846-8260D	UJ
cis-1,2-Dichloroethene	U	1	ug/L	1	7/28/2023			SW846-8260D	=
cis-1,3-Dichloropropene	U	1	ug/L	1	7/28/2023			SW846-8260D	=
Dibromochloromethane	U	1	ug/L	1	7/28/2023			SW846-8260D	=
Dibromomethane	U	1	ug/L	1	7/28/2023			SW846-8260D	=
Ethylbenzene	U	1	ug/L	1	7/28/2023			SW846-8260D	=
Iodomethane	U	5	ug/L	5	7/28/2023			SW846-8260D	=
Methylene chloride	U	5	ug/L	5	7/28/2023			SW846-8260D	=
Styrene	U	1	ug/L	1	7/28/2023			SW846-8260D	=
Tetrachloroethene	U	1	ug/L	1	7/28/2023			SW846-8260D	=
Toluene	U	1	ug/L	1	7/28/2023			SW846-8260D	=
Total Xylene	U	3	ug/L	3	7/28/2023			SW846-8260D	=
trans-1,2-Dichloroethene	U	1	ug/L	1	7/28/2023			SW846-8260D	=
trans-1,3-Dichloropropene	U	1	ug/L	1	7/28/2023			SW846-8260D	=
Trans-1,4-Dichloro-2-butene	U	5	ug/L	5	7/28/2023			SW846-8260D	=
Trichloroethene	U	1	ug/L	1	7/28/2023			SW846-8260D	=
Trichlorofluoromethane	U	1	ug/L	1	7/28/2023			SW846-8260D	=
Vinyl acetate	U	5	ug/L	5	7/28/2023			SW846-8260D	=
Vinyl chloride	UL	1	ug/L	1	7/28/2023			SW846-8260D	UJ
Dissolved Solids		209	mg/L	10	7/28/2023			EPA-160.1	=
Iodide	U	0.5	mg/L	0.5	7/28/2023			EPA-300.0	=
Chemical Oxygen Demand (COD)	U	20	mg/L	20	7/28/2023			EPA-410.4	=
Cyanide	U	0.2	mg/L	0.2	7/28/2023			SW846-9012B	=
Total Organic Halides (TOX)	J	5.22	ug/L	10	7/28/2023			SW846-9020B	=
Total Organic Carbon (TOC)	J	0.727	mg/L	2	7/28/2023			SW846-9060A	=

**Paducah OREIS  
GROUNDWATER MONITORING REPORT**

**Facility:** C-746-S&T Landfill      **County:** McCracken      **Permit #:** SW07300014,SW07300015,SW07300045

**Sampling Point:** MW224      SIDE      **RGA Type:** URGA      **Period:** 3rd Quarter 2023

**AKGWA Well Tag #:** 8000-5244      **SAMPLE ID:** MW224DSG4-23      **Sample Type:** FR

Parameter	Qualifier	Result	Units	Reporting Limit	Date Collected	Counting Error (+/-)	TPU	Method	Validation
Aluminum	U	0.05	mg/L	0.05	7/28/2023			SW846-6020B	=
Antimony	U	0.003	mg/L	0.003	7/28/2023			SW846-6020B	=
Arsenic	U	0.005	mg/L	0.005	7/28/2023			SW846-6020B	=
Barium		0.248	mg/L	0.004	7/28/2023			SW846-6020B	=
Beryllium	U	0.0005	mg/L	0.0005	7/28/2023			SW846-6020B	=
Boron		0.0251	mg/L	0.015	7/28/2023			SW846-6020B	=
Cadmium	U	0.001	mg/L	0.001	7/28/2023			SW846-6020B	=
Calcium		23.8	mg/L	0.2	7/28/2023			SW846-6020B	=
Chromium	J	0.00449	mg/L	0.01	7/28/2023			SW846-6020B	=
Cobalt	U	0.001	mg/L	0.001	7/28/2023			SW846-6020B	=
Copper	J	0.000816	mg/L	0.002	7/28/2023			SW846-6020B	J
Iron	J	0.0688	mg/L	0.1	7/28/2023			SW846-6020B	=
Lead	U	0.002	mg/L	0.002	7/28/2023			SW846-6020B	=
Magnesium		9.8	mg/L	0.03	7/28/2023			SW846-6020B	=
Manganese	J	0.00406	mg/L	0.005	7/28/2023			SW846-6020B	J
Molybdenum		0.00111	mg/L	0.001	7/28/2023			SW846-6020B	=
Nickel		0.0116	mg/L	0.002	7/28/2023			SW846-6020B	J
Potassium		1.06	mg/L	0.3	7/28/2023			SW846-6020B	=
Rhodium	U	0.005	mg/L	0.005	7/28/2023			SW846-6020B	=
Selenium	U	0.005	mg/L	0.005	7/28/2023			SW846-6020B	=
Silver	U	0.001	mg/L	0.001	7/28/2023			SW846-6020B	=
Sodium		56.4	mg/L	2.5	7/28/2023			SW846-6020B	=
Tantalum	U	0.005	mg/L	0.005	7/28/2023			SW846-6020B	=
Thallium	U	0.002	mg/L	0.002	7/28/2023			SW846-6020B	=
Uranium	U	0.0002	mg/L	0.0002	7/28/2023			SW846-6020B	=
Vanadium	U	0.02	mg/L	0.02	7/28/2023			SW846-6020B	=
Zinc	U	0.02	mg/L	0.02	7/28/2023			SW846-6020B	=
Mercury	U	0.0002	mg/L	0.0002	7/28/2023			SW846-7470A	=
Barium, Dissolved		0.256	mg/L	0.004	7/28/2023			SW846-6020B	=
Chromium, Dissolved	U	0.01	mg/L	0.01	7/28/2023			SW846-6020B	=
Uranium, Dissolved	U	0.0002	mg/L	0.0002	7/28/2023			SW846-6020B	=
Radium-226	U	0.181	pCi/L	0.454	7/28/2023	0.294	0.294	AN-1418	=
Strontium-90	U	2.98	pCi/L	4.69	7/28/2023	2.87	2.91	EPA-905.0-M	=
Tritium	U	-48.6	pCi/L	212	7/28/2023	99.7	99.7	EPA-906.0-M	=
Technetium-99	U	2.27	pCi/L	18.7	7/28/2023	10.7	10.7	HASL 300, Tc-02-RC M	=
Thorium-230	U	0.696	pCi/L	2.81	7/28/2023	1.57	1.57	HASL 300, Th-01-RC M	=
Alpha activity	U	2.33	pCi/L	9.44	7/28/2023	5.06	5.07	SW846-9310	=
Beta activity	U	2.26	pCi/L	9.18	7/28/2023	5.15	5.16	SW846-9310	=
1,2-Dibromo-3-chloropropane	U	0.0194	ug/L	0.0194	7/28/2023			SW846-8011	=
1,1,1,2-Tetrachloroethane	U	1	ug/L	1	7/28/2023			SW846-8260D	=
1,1,1-Trichloroethane	U	1	ug/L	1	7/28/2023			SW846-8260D	=
1,1,2,2-Tetrachloroethane	U	1	ug/L	1	7/28/2023			SW846-8260D	=
1,1,2-Trichloroethane	U	1	ug/L	1	7/28/2023			SW846-8260D	=
1,1-Dichloroethane	U	1	ug/L	1	7/28/2023			SW846-8260D	=
1,1-Dichloroethene	U	1	ug/L	1	7/28/2023			SW846-8260D	=
1,2,3-Trichloropropane	U	1	ug/L	1	7/28/2023			SW846-8260D	=
1,2-Dibromoethane	U	1	ug/L	1	7/28/2023			SW846-8260D	=
1,2-Dichlorobenzene	U	1	ug/L	1	7/28/2023			SW846-8260D	=
1,2-Dichloroethane	U	1	ug/L	1	7/28/2023			SW846-8260D	=

1,2-Dichloropropane	U	1 ug/L	1	7/28/2023	SW846-8260D	=
1,4-Dichlorobenzene	U	1 ug/L	1	7/28/2023	SW846-8260D	=
2-Butanone	U	5 ug/L	5	7/28/2023	SW846-8260D	=
2-Hexanone	U	5 ug/L	5	7/28/2023	SW846-8260D	=
4-Methyl-2-pentanone	U	5 ug/L	5	7/28/2023	SW846-8260D	=
Acetone	U	5 ug/L	5	7/28/2023	SW846-8260D	=
Acrolein	U	5 ug/L	5	7/28/2023	SW846-8260D	UJ
Acrylonitrile	U	5 ug/L	5	7/28/2023	SW846-8260D	=
Benzene	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Bromochloromethane	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Bromodichloromethane	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Bromoform	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Bromomethane	UL	1 ug/L	1	7/28/2023	SW846-8260D	UJ
Carbon disulfide	U	5 ug/L	5	7/28/2023	SW846-8260D	=
Carbon tetrachloride	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Chlorobenzene	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Chloroethane	UL	1 ug/L	1	7/28/2023	SW846-8260D	=
Chloroform	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Chloromethane	ULY1	1 ug/L	1	7/28/2023	SW846-8260D	UJ
cis-1,2-Dichloroethene	U	1 ug/L	1	7/28/2023	SW846-8260D	=
cis-1,3-Dichloropropene	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Dibromochloromethane	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Dibromomethane	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Ethylbenzene	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Iodomethane	U	5 ug/L	5	7/28/2023	SW846-8260D	=
Methylene chloride	U	5 ug/L	5	7/28/2023	SW846-8260D	=
Styrene	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Tetrachloroethene	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Toluene	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Total Xylene	U	3 ug/L	3	7/28/2023	SW846-8260D	=
trans-1,2-Dichloroethene	U	1 ug/L	1	7/28/2023	SW846-8260D	=
trans-1,3-Dichloropropene	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Trans-1,4-Dichloro-2-butene	U	5 ug/L	5	7/28/2023	SW846-8260D	=
Trichloroethene	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Trichlorofluoromethane	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Vinyl acetate	U	5 ug/L	5	7/28/2023	SW846-8260D	=
Vinyl chloride	UL	1 ug/L	1	7/28/2023	SW846-8260D	UJ

**Paducah OREIS  
GROUNDWATER MONITORING REPORT**

**Facility:** C-746-S&T Landfill      **County:** McCracken      **Permit #:** SW07300014,SW07300015,SW07300045  
**Sampling Point:** MW224      SIDE      **RGA Type:** URGA      **Period:** 3rd Quarter 2023  
**AKGWA Well Tag #:** 8000-5244      **SAMPLE ID:** MW224DSG4-23      **Sample Type:** FR

Parameter	Qualifier	Result	Units	Reporting Limit	Date Collected	Counting Error (+/-)	TPU	Method	Validation
Bromide		0.346	mg/L	0.2	7/31/2023			SW846-9056A	=
Chloride	J	21.9	mg/L	250	7/31/2023			SW846-9056A	=
Fluoride	J	0.262	mg/L	4	7/31/2023			SW846-9056A	=
Nitrate as Nitrogen	J	0.778	mg/L	10	7/31/2023			SW846-9056A	=
Sulfate		16.7	mg/L	0.4	7/31/2023			SW846-9056A	=
Barometric Pressure Reading		30.12	Inches/Hg		7/31/2023				X
Conductivity		442	umho/cm		7/31/2023				X
Depth to Water		71.77	ft		7/31/2023				X
Dissolved Oxygen		3.53	mg/L		7/31/2023				X
Eh (approx)		371	mV		7/31/2023				X
pH		6.13	Std Unit		7/31/2023				X
Temperature		72.1	deg F		7/31/2023				X
Turbidity		2	NTU		7/31/2023				X
Dissolved Solids		235	mg/L	10	7/31/2023			EPA-160.1	=
Iodide	U	0.5	mg/L	0.5	7/31/2023			EPA-300.0	=
Chemical Oxygen Demand (COD)	U	20	mg/L	20	7/31/2023			EPA-410.4	=
Cyanide	U	0.2	mg/L	0.2	7/31/2023			SW846-9012B	=
Total Organic Halides (TOX)	JB	9.1	ug/L	10	7/31/2023			SW846-9020B	U
Total Organic Carbon (TOC)	J	1.07	mg/L	2	7/31/2023			SW846-9060A	=

**Paducah OREIS  
GROUNDWATER MONITORING REPORT**

**Facility:** C-746-S&T Landfill      **County:** McCracken      **Permit #:** SW07300014,SW07300015,SW07300045

**Sampling Point:** MW224      SIDE      **RGA Type:** URGA      **Period:** 3rd Quarter 2023

**AKGWA Well Tag #:** 8000-5244      **SAMPLE ID:** MW224SG4-23      **Sample Type:** REG

Parameter	Qualifier	Result	Units	Reporting Limit	Date Collected	Counting Error (+/-)	TPU	Method	Validation
Barometric Pressure Reading		30.05	Inches/Hg		7/28/2023				X
Conductivity		439	umho/cm		7/28/2023				X
Depth to Water		71.67	ft		7/28/2023				X
Dissolved Oxygen		2.96	mg/L		7/28/2023				X
Eh (approx)		415	mV		7/28/2023				X
pH		6.02	Std Unit		7/28/2023				X
Temperature		67.7	deg F		7/28/2023				X
Turbidity		5.1	NTU		7/28/2023				X
Aluminum	U	0.05	mg/L	0.05	7/28/2023			SW846-6020B	=
Antimony	U	0.003	mg/L	0.003	7/28/2023			SW846-6020B	=
Arsenic	U	0.005	mg/L	0.005	7/28/2023			SW846-6020B	=
Barium		0.248	mg/L	0.004	7/28/2023			SW846-6020B	=
Beryllium	U	0.0005	mg/L	0.0005	7/28/2023			SW846-6020B	=
Boron		0.0235	mg/L	0.015	7/28/2023			SW846-6020B	=
Cadmium	U	0.001	mg/L	0.001	7/28/2023			SW846-6020B	=
Calcium		23.5	mg/L	0.2	7/28/2023			SW846-6020B	=
Chromium	J	0.00418	mg/L	0.01	7/28/2023			SW846-6020B	=
Cobalt	U	0.001	mg/L	0.001	7/28/2023			SW846-6020B	=
Copper	J	0.000946	mg/L	0.002	7/28/2023			SW846-6020B	J
Iron	J	0.07	mg/L	0.1	7/28/2023			SW846-6020B	=
Lead	U	0.002	mg/L	0.002	7/28/2023			SW846-6020B	=
Magnesium		9.9	mg/L	0.03	7/28/2023			SW846-6020B	=
Manganese	J	0.00393	mg/L	0.005	7/28/2023			SW846-6020B	J
Molybdenum		0.00109	mg/L	0.001	7/28/2023			SW846-6020B	=
Nickel		0.0117	mg/L	0.002	7/28/2023			SW846-6020B	J
Potassium		1.05	mg/L	0.3	7/28/2023			SW846-6020B	=
Rhodium	U	0.005	mg/L	0.005	7/28/2023			SW846-6020B	=
Selenium	U	0.005	mg/L	0.005	7/28/2023			SW846-6020B	=
Silver	U	0.001	mg/L	0.001	7/28/2023			SW846-6020B	=
Sodium		56.2	mg/L	2.5	7/28/2023			SW846-6020B	=
Tantalum	U	0.005	mg/L	0.005	7/28/2023			SW846-6020B	=
Thallium	U	0.002	mg/L	0.002	7/28/2023			SW846-6020B	=
Uranium	U	0.0002	mg/L	0.0002	7/28/2023			SW846-6020B	=
Vanadium	U	0.02	mg/L	0.02	7/28/2023			SW846-6020B	=
Zinc	U	0.02	mg/L	0.02	7/28/2023			SW846-6020B	=
Mercury	U	0.0002	mg/L	0.0002	7/28/2023			SW846-7470A	=
Barium, Dissolved		0.249	mg/L	0.004	7/28/2023			SW846-6020B	=
Chromium, Dissolved	U	0.01	mg/L	0.01	7/28/2023			SW846-6020B	=
Uranium, Dissolved	U	0.0002	mg/L	0.0002	7/28/2023			SW846-6020B	=
Radium-226	U	0.14	pCi/L	1.01	7/28/2023	0.529	0.529	AN-1418	=
Strontium-90	U	-2.85	pCi/L	6.73	7/28/2023	3.12	3.12	EPA-905.0-M	=
Tritium	U	-27.8	pCi/L	212	7/28/2023	104	104	EPA-906.0-M	=
Technetium-99	U	6.75	pCi/L	18.3	7/28/2023	10.7	10.7	HASL 300, Tc-02-RC M	=
Thorium-230	U	1.34	pCi/L	2.72	7/28/2023	1.77	1.79	HASL 300, Th-01-RC M	=
Alpha activity	U	0.254	pCi/L	8.39	7/28/2023	3.97	3.97	SW846-9310	=
Beta activity	U	8.9	pCi/L	11.3	7/28/2023	7.06	7.22	SW846-9310	=
1,2-Dibromo-3-chloropropane	U	0.0194	ug/L	0.0194	7/28/2023			SW846-8011	=
1,1,1,2-Tetrachloroethane	U	1	ug/L	1	7/28/2023			SW846-8260D	=
1,1,1-Trichloroethane	U	1	ug/L	1	7/28/2023			SW846-8260D	=



1,1,2,2-Tetrachloroethane	U	1 ug/L	1	7/28/2023	SW846-8260D	=
1,1,2-Trichloroethane	U	1 ug/L	1	7/28/2023	SW846-8260D	=
1,1-Dichloroethane	U	1 ug/L	1	7/28/2023	SW846-8260D	=
1,1-Dichloroethene	U	1 ug/L	1	7/28/2023	SW846-8260D	=
1,2,3-Trichloropropane	U	1 ug/L	1	7/28/2023	SW846-8260D	=
1,2-Dibromoethane	U	1 ug/L	1	7/28/2023	SW846-8260D	=
1,2-Dichlorobenzene	U	1 ug/L	1	7/28/2023	SW846-8260D	=
1,2-Dichloroethane	U	1 ug/L	1	7/28/2023	SW846-8260D	=
1,2-Dichloropropane	U	1 ug/L	1	7/28/2023	SW846-8260D	=
1,4-Dichlorobenzene	U	1 ug/L	1	7/28/2023	SW846-8260D	=
2-Butanone	U	5 ug/L	5	7/28/2023	SW846-8260D	=
2-Hexanone	U	5 ug/L	5	7/28/2023	SW846-8260D	=
4-Methyl-2-pentanone	U	5 ug/L	5	7/28/2023	SW846-8260D	=
Acetone	U	5 ug/L	5	7/28/2023	SW846-8260D	=
Acrolein	U	5 ug/L	5	7/28/2023	SW846-8260D	UJ
Acrylonitrile	U	5 ug/L	5	7/28/2023	SW846-8260D	=
Benzene	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Bromochloromethane	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Bromodichloromethane	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Bromoform	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Bromomethane	UL	1 ug/L	1	7/28/2023	SW846-8260D	UJ
Carbon disulfide	U	5 ug/L	5	7/28/2023	SW846-8260D	=
Carbon tetrachloride	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Chlorobenzene	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Chloroethane	UL	1 ug/L	1	7/28/2023	SW846-8260D	=
Chloroform	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Chloromethane	ULY1	1 ug/L	1	7/28/2023	SW846-8260D	UJ
cis-1,2-Dichloroethene	U	1 ug/L	1	7/28/2023	SW846-8260D	=
cis-1,3-Dichloropropene	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Dibromochloromethane	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Dibromomethane	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Ethylbenzene	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Iodomethane	U	5 ug/L	5	7/28/2023	SW846-8260D	=
Methylene chloride	U	5 ug/L	5	7/28/2023	SW846-8260D	=
Styrene	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Tetrachloroethene	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Toluene	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Total Xylene	U	3 ug/L	3	7/28/2023	SW846-8260D	=
trans-1,2-Dichloroethene	U	1 ug/L	1	7/28/2023	SW846-8260D	=
trans-1,3-Dichloropropene	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Trans-1,4-Dichloro-2-butene	U	5 ug/L	5	7/28/2023	SW846-8260D	=
Trichloroethene	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Trichlorofluoromethane	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Vinyl acetate	U	5 ug/L	5	7/28/2023	SW846-8260D	=
Vinyl chloride	UL	1 ug/L	1	7/28/2023	SW846-8260D	UJ

**Paducah OREIS  
GROUNDWATER MONITORING REPORT**

**Facility:** C-746-S&T Landfill      **County:** McCracken      **Permit #:** SW07300014,SW07300015,SW07300045  
**Sampling Point:** MW224      SIDE      **RGA Type:** URGA      **Period:** 3rd Quarter 2023  
**AKGWA Well Tag #:** 8000-5244      **SAMPLE ID:** MW224SG4-23R      **Sample Type:** REG

Parameter	Qualifier	Result	Units	Reporting Limit	Date Collected	Counting Error (+/-)	TPU	Method	Validation
Bromide		0.355	mg/L	0.2	7/31/2023			SW846-9056A	=
Chloride	J	21.7	mg/L	250	7/31/2023			SW846-9056A	=
Fluoride	J	0.268	mg/L	4	7/31/2023			SW846-9056A	=
Nitrate as Nitrogen	J	0.772	mg/L	10	7/31/2023			SW846-9056A	=
Sulfate		16.8	mg/L	0.4	7/31/2023			SW846-9056A	=
Dissolved Solids		233	mg/L	10	7/31/2023			EPA-160.1	=
Iodide	U	0.5	mg/L	0.5	7/31/2023			EPA-300.0	=
Chemical Oxygen Demand (COD)	U	20	mg/L	20	7/31/2023			EPA-410.4	=
Cyanide	U	0.2	mg/L	0.2	7/31/2023			SW846-9012B	=
Total Organic Halides (TOX)	JB	9.54	ug/L	10	7/31/2023			SW846-9020B	U
Total Organic Carbon (TOC)	J	1.16	mg/L	2	7/31/2023			SW846-9060A	=

**Paducah OREIS  
GROUNDWATER MONITORING REPORT**

**Facility:** C-746-S&T Landfill      **County:** McCracken      **Permit #:** SW07300014,SW07300015,SW07300045

**Sampling Point:** MW369      DOWN      **RGA Type:** URGA      **Period:** 3rd Quarter 2023

**AKGWA Well Tag #:** 8004-4820      **SAMPLE ID:** MW369UG4-23      **Sample Type:** REG

Parameter	Qualifier	Result	Units	Reporting Limit	Date Collected	Counting Error (+/-)	TPU	Method	Validation
Bromide	W	0.325	mg/L	0.2	7/25/2023			SW846-9056A	=
Chloride	JW	28.3	mg/L	250	7/25/2023			SW846-9056A	=
Fluoride	J	0.228	mg/L	4	7/25/2023			SW846-9056A	=
Nitrate as Nitrogen	J	0.933	mg/L	10	7/25/2023			SW846-9056A	=
Sulfate		7.91	mg/L	0.4	7/25/2023			SW846-9056A	=
Barometric Pressure Reading		30.09	Inches/Hg		7/25/2023				X
Conductivity		350	umho/cm		7/25/2023				X
Depth to Water		40.24	ft		7/25/2023				X
Dissolved Oxygen		2.85	mg/L		7/25/2023				X
Eh (approx)		406	mV		7/25/2023				X
pH		5.96	Std Unit		7/25/2023				X
Temperature		65.9	deg F		7/25/2023				X
Turbidity		6	NTU		7/25/2023				X
Aluminum		0.112	mg/L	0.05	7/25/2023			SW846-6020B	=
Antimony	U	0.003	mg/L	0.003	7/25/2023			SW846-6020B	=
Arsenic	U	0.005	mg/L	0.005	7/25/2023			SW846-6020B	=
Barium		0.363	mg/L	0.004	7/25/2023			SW846-6020B	=
Beryllium	U	0.0005	mg/L	0.0005	7/25/2023			SW846-6020B	=
Boron		0.0161	mg/L	0.015	7/25/2023			SW846-6020B	=
Cadmium	U	0.001	mg/L	0.001	7/25/2023			SW846-6020B	=
Calcium		15.7	mg/L	0.2	7/25/2023			SW846-6020B	J
Chromium	U	0.01	mg/L	0.01	7/25/2023			SW846-6020B	=
Cobalt		0.00583	mg/L	0.001	7/25/2023			SW846-6020B	J
Copper		0.00504	mg/L	0.002	7/25/2023			SW846-6020B	J
Iron		0.36	mg/L	0.1	7/25/2023			SW846-6020B	=
Lead	U	0.002	mg/L	0.002	7/25/2023			SW846-6020B	=
Magnesium		6.17	mg/L	0.03	7/25/2023			SW846-6020B	=
Manganese		0.0332	mg/L	0.005	7/25/2023			SW846-6020B	J
Molybdenum	U	0.001	mg/L	0.001	7/25/2023			SW846-6020B	=
Nickel		0.00462	mg/L	0.002	7/25/2023			SW846-6020B	J
Potassium		0.519	mg/L	0.3	7/25/2023			SW846-6020B	=
Rhodium	U	0.005	mg/L	0.005	7/25/2023			SW846-6020B	=
Selenium	J	0.00218	mg/L	0.005	7/25/2023			SW846-6020B	J
Silver	U	0.001	mg/L	0.001	7/25/2023			SW846-6020B	=
Sodium		47.6	mg/L	0.25	7/25/2023			SW846-6020B	=
Tantalum	U	0.005	mg/L	0.005	7/25/2023			SW846-6020B	=
Thallium	U	0.002	mg/L	0.002	7/25/2023			SW846-6020B	=
Uranium	U	0.0002	mg/L	0.0002	7/25/2023			SW846-6020B	=
Vanadium	U	0.02	mg/L	0.02	7/25/2023			SW846-6020B	=
Zinc	J	0.0123	mg/L	0.02	7/25/2023			SW846-6020B	J
Mercury	U	0.0002	mg/L	0.0002	7/25/2023			SW846-7470A	=
Barium, Dissolved		0.366	mg/L	0.004	7/25/2023			SW846-6020B	=
Chromium, Dissolved	U	0.01	mg/L	0.01	7/25/2023			SW846-6020B	=
Uranium, Dissolved	U	0.0002	mg/L	0.0002	7/25/2023			SW846-6020B	=
PCB-1016	U	0.0962	ug/L	0.0962	7/25/2023			SW846-8082A	UJ
PCB-1221	U	0.0962	ug/L	0.0962	7/25/2023			SW846-8082A	=
PCB-1232	U	0.0962	ug/L	0.0962	7/25/2023			SW846-8082A	=
PCB-1242	U	0.0962	ug/L	0.0962	7/25/2023			SW846-8082A	=
PCB-1248	U	0.0962	ug/L	0.0962	7/25/2023			SW846-8082A	=

PCB-1254	U	0.0962	ug/L	0.0962	7/25/2023			SW846-8082A	=
PCB-1260	U	0.0962	ug/L	0.0962	7/25/2023			SW846-8082A	UJ
PCB-1268	U	0.0962	ug/L	0.0962	7/25/2023			SW846-8082A	=
Polychlorinated biphenyl	U	0.0962	ug/L	0.0962	7/25/2023			SW846-8082A	UJ
Radium-226	U	0.427	pCi/L	0.561	7/25/2023	0.413	0.414	AN-1418	=
Radium-228	U	2.75	pCi/L	3.24	7/25/2023	2.09	2.21	EPA-904-M	=
Strontium-90	U	3.71	pCi/L	4.94	7/25/2023	3.13	3.19	EPA-905.0-M	=
Tritium	U	-0.366	pCi/L	214	7/25/2023	119	119	EPA-906.0-M	=
Technetium-99		56.1	pCi/L	21.2	7/25/2023	13.9	15.3	HASL 300, Tc-02-RC M	=
Thorium-230	U	0.529	pCi/L	3.17	7/25/2023	1.69	1.7	HASL 300, Th-01-RC M	=
Thorium-232	U	-0.145	pCi/L	2.16	7/25/2023	0.879	0.881	HASL 300, Th-01-RC M	=
Alpha activity	U	-0.652	pCi/L	4.94	7/25/2023	1.65	1.65	SW846-9310	=
Beta activity		42.3	pCi/L	7.46	7/25/2023	8	10.6	SW846-9310	=
1,2-Dibromo-3-chloropropane	U	0.0193	ug/L	0.0193	7/25/2023			SW846-8011	=
1,1,1,2-Tetrachloroethane	U	1	ug/L	1	7/25/2023			SW846-8260D	=
1,1,1-Trichloroethane	U	1	ug/L	1	7/25/2023			SW846-8260D	=
1,1,2,2-Tetrachloroethane	U	1	ug/L	1	7/25/2023			SW846-8260D	=
1,1,2-Trichloroethane	U	1	ug/L	1	7/25/2023			SW846-8260D	=
1,1-Dichloroethane	U	1	ug/L	1	7/25/2023			SW846-8260D	=
1,1-Dichloroethene	U	1	ug/L	1	7/25/2023			SW846-8260D	=
1,2,3-Trichloropropane	U	1	ug/L	1	7/25/2023			SW846-8260D	=
1,2-Dibromoethane	U	1	ug/L	1	7/25/2023			SW846-8260D	=
1,2-Dichlorobenzene	U	1	ug/L	1	7/25/2023			SW846-8260D	=
1,2-Dichloroethane	U	1	ug/L	1	7/25/2023			SW846-8260D	=
1,2-Dichloropropane	U	1	ug/L	1	7/25/2023			SW846-8260D	=
1,4-Dichlorobenzene	U	1	ug/L	1	7/25/2023			SW846-8260D	=
2-Butanone	U	5	ug/L	5	7/25/2023			SW846-8260D	=
2-Hexanone	U	5	ug/L	5	7/25/2023			SW846-8260D	=
4-Methyl-2-pentanone	U	5	ug/L	5	7/25/2023			SW846-8260D	=
Acetone	U	5	ug/L	5	7/25/2023			SW846-8260D	=
Acrolein	U	5	ug/L	5	7/25/2023			SW846-8260D	=
Acrylonitrile	U	5	ug/L	5	7/25/2023			SW846-8260D	=
Benzene	U	1	ug/L	1	7/25/2023			SW846-8260D	=
Bromochloromethane	U	1	ug/L	1	7/25/2023			SW846-8260D	=
Bromodichloromethane	U	1	ug/L	1	7/25/2023			SW846-8260D	=
Bromoform	U	1	ug/L	1	7/25/2023			SW846-8260D	UJ
Bromomethane	U	1	ug/L	1	7/25/2023			SW846-8260D	=
Carbon disulfide	U	5	ug/L	5	7/25/2023			SW846-8260D	=
Carbon tetrachloride	U	1	ug/L	1	7/25/2023			SW846-8260D	UJ
Chlorobenzene	U	1	ug/L	1	7/25/2023			SW846-8260D	=
Chloroethane	U	1	ug/L	1	7/25/2023			SW846-8260D	=
Chloroform	U	1	ug/L	1	7/25/2023			SW846-8260D	=
Chloromethane	U	1	ug/L	1	7/25/2023			SW846-8260D	=
cis-1,2-Dichloroethene	U	1	ug/L	1	7/25/2023			SW846-8260D	=
cis-1,3-Dichloropropene	U	1	ug/L	1	7/25/2023			SW846-8260D	=
Dibromochloromethane	U	1	ug/L	1	7/25/2023			SW846-8260D	=
Dibromomethane	U	1	ug/L	1	7/25/2023			SW846-8260D	=
Ethylbenzene	U	1	ug/L	1	7/25/2023			SW846-8260D	=
Iodomethane	U	5	ug/L	5	7/25/2023			SW846-8260D	=
Methylene chloride	U	5	ug/L	5	7/25/2023			SW846-8260D	=
Styrene	U	1	ug/L	1	7/25/2023			SW846-8260D	=
Tetrachloroethene	U	1	ug/L	1	7/25/2023			SW846-8260D	=
Toluene	U	1	ug/L	1	7/25/2023			SW846-8260D	=
Total Xylene	U	3	ug/L	3	7/25/2023			SW846-8260D	=
trans-1,2-Dichloroethene	U	1	ug/L	1	7/25/2023			SW846-8260D	=
trans-1,3-Dichloropropene	U	1	ug/L	1	7/25/2023			SW846-8260D	=
Trans-1,4-Dichloro-2-butene	U	5	ug/L	5	7/25/2023			SW846-8260D	=

Trichloroethene		2.27	ug/L	1	7/25/2023	SW846-8260D	=
Trichlorofluoromethane	U	1	ug/L	1	7/25/2023	SW846-8260D	=
Vinyl acetate	U	5	ug/L	5	7/25/2023	SW846-8260D	=
Vinyl chloride	U	1	ug/L	1	7/25/2023	SW846-8260D	=
Dissolved Solids		175	mg/L	10	7/25/2023	EPA-160.1	=
Iodide	U	0.5	mg/L	0.5	7/25/2023	EPA-300.0	=
Chemical Oxygen Demand (COD)	U	20	mg/L	20	7/25/2023	EPA-410.4	=
Cyanide	U	0.2	mg/L	0.2	7/25/2023	SW846-9012B	=
Total Organic Halides (TOX)	J	5.18	ug/L	10	7/25/2023	SW846-9020B	=
Total Organic Carbon (TOC)	J	0.817	mg/L	2	7/25/2023	SW846-9060A	=

**Paducah OREIS  
GROUNDWATER MONITORING REPORT**

**Facility:** C-746-S&T Landfill      **County:** McCracken      **Permit #:** SW07300014,SW07300015,SW07300045

**Sampling Point:** MW370      DOWN      **RGA Type:** LRGA      **Period:** 3rd Quarter 2023

**AKGWA Well Tag #:** 8004-4818      **SAMPLE ID:** MW370UG4-23      **Sample Type:** REG

Parameter	Qualifier	Result	Units	Reporting Limit	Date Collected	Counting Error (+/-)	TPU	Method	Validation
Bromide	W	0.675	mg/L	0.2	7/25/2023			SW846-9056A	J
Chloride	JW	44	mg/L	250	7/25/2023			SW846-9056A	J
Fluoride	J	0.17	mg/L	4	7/25/2023			SW846-9056A	=
Nitrate as Nitrogen	J	1.02	mg/L	10	7/25/2023			SW846-9056A	=
Sulfate		20.3	mg/L	2	7/25/2023			SW846-9056A	=
Barometric Pressure Reading		30.1	Inches/Hg		7/25/2023				X
Conductivity		468	umho/cm		7/25/2023				X
Depth to Water		41.12	ft		7/25/2023				X
Dissolved Oxygen		4.01	mg/L		7/25/2023				X
Eh (approx)		388	mV		7/25/2023				X
pH		6.12	Std Unit		7/25/2023				X
Temperature		72.6	deg F		7/25/2023				X
Turbidity		4.5	NTU		7/25/2023				X
Aluminum	U	0.05	mg/L	0.05	7/25/2023			SW846-6020B	=
Antimony	U	0.003	mg/L	0.003	7/25/2023			SW846-6020B	=
Arsenic	U	0.005	mg/L	0.005	7/25/2023			SW846-6020B	=
Barium		0.223	mg/L	0.004	7/25/2023			SW846-6020B	=
Beryllium	U	0.0005	mg/L	0.0005	7/25/2023			SW846-6020B	=
Boron		0.124	mg/L	0.015	7/25/2023			SW846-6020B	=
Cadmium	U	0.001	mg/L	0.001	7/25/2023			SW846-6020B	=
Calcium		29.3	mg/L	0.2	7/25/2023			SW846-6020B	J
Chromium	U	0.01	mg/L	0.01	7/25/2023			SW846-6020B	=
Cobalt	U	0.001	mg/L	0.001	7/25/2023			SW846-6020B	=
Copper	J	0.00196	mg/L	0.002	7/25/2023			SW846-6020B	J
Iron	U	0.1	mg/L	0.1	7/25/2023			SW846-6020B	=
Lead	U	0.002	mg/L	0.002	7/25/2023			SW846-6020B	=
Magnesium		12.1	mg/L	0.03	7/25/2023			SW846-6020B	=
Manganese	J	0.0014	mg/L	0.005	7/25/2023			SW846-6020B	J
Molybdenum	U	0.001	mg/L	0.001	7/25/2023			SW846-6020B	=
Nickel	J	0.000752	mg/L	0.002	7/25/2023			SW846-6020B	J
Potassium		2.49	mg/L	0.3	7/25/2023			SW846-6020B	=
Rhodium	U	0.005	mg/L	0.005	7/25/2023			SW846-6020B	=
Selenium	U	0.005	mg/L	0.005	7/25/2023			SW846-6020B	=
Silver	U	0.001	mg/L	0.001	7/25/2023			SW846-6020B	=
Sodium		42.8	mg/L	0.25	7/25/2023			SW846-6020B	=
Tantalum	U	0.005	mg/L	0.005	7/25/2023			SW846-6020B	=
Thallium	U	0.002	mg/L	0.002	7/25/2023			SW846-6020B	=
Uranium	U	0.0002	mg/L	0.0002	7/25/2023			SW846-6020B	=
Vanadium	U	0.02	mg/L	0.02	7/25/2023			SW846-6020B	=
Zinc	J	0.00572	mg/L	0.02	7/25/2023			SW846-6020B	J
Mercury	U	0.0002	mg/L	0.0002	7/25/2023			SW846-7470A	=
Barium, Dissolved		0.223	mg/L	0.004	7/25/2023			SW846-6020B	=
Chromium, Dissolved	U	0.01	mg/L	0.01	7/25/2023			SW846-6020B	=
Uranium, Dissolved	U	0.0002	mg/L	0.0002	7/25/2023			SW846-6020B	=
PCB-1016	U	0.1	ug/L	0.1	7/25/2023			SW846-8082A	UJ
PCB-1221	U	0.1	ug/L	0.1	7/25/2023			SW846-8082A	=
PCB-1232	U	0.1	ug/L	0.1	7/25/2023			SW846-8082A	=
PCB-1242	U	0.1	ug/L	0.1	7/25/2023			SW846-8082A	=
PCB-1248	U	0.1	ug/L	0.1	7/25/2023			SW846-8082A	=

PCB-1254	U	0.1	ug/L	0.1	7/25/2023			SW846-8082A	=
PCB-1260	U	0.1	ug/L	0.1	7/25/2023			SW846-8082A	UJ
PCB-1268	U	0.1	ug/L	0.1	7/25/2023			SW846-8082A	=
Polychlorinated biphenyl	U	0.1	ug/L	0.1	7/25/2023			SW846-8082A	UJ
Radium-226	U	0.42	pCi/L	0.433	7/25/2023	0.37	0.371	AN-1418	=
Radium-228	U	1.19	pCi/L	3.7	7/25/2023	2.1	2.12	EPA-904-M	=
Strontium-90	U	6.33	pCi/L	7.14	7/25/2023	4.52	4.63	EPA-905.0-M	=
Tritium	U	61.8	pCi/L	216	7/25/2023	125	125	EPA-906.0-M	=
Technetium-99	U	20.3	pCi/L	21.9	7/25/2023	13.3	13.5	HASL 300, Tc-02-RC M	=
Thorium-230	U	1.68	pCi/L	3.55	7/25/2023	2.32	2.35	HASL 300, Th-01-RC M	=
Thorium-232	U	-0.0431	pCi/L	1.77	7/25/2023	0.886	0.888	HASL 300, Th-01-RC M	=
Alpha activity	U	0.582	pCi/L	5.83	7/25/2023	2.76	2.76	SW846-9310	=
Beta activity		15.3	pCi/L	7.44	7/25/2023	5.73	6.28	SW846-9310	=
1,2-Dibromo-3-chloropropane	U	0.0187	ug/L	0.0187	7/25/2023			SW846-8011	=
1,1,1,2-Tetrachloroethane	U	1	ug/L	1	7/25/2023			SW846-8260D	=
1,1,1-Trichloroethane	U	1	ug/L	1	7/25/2023			SW846-8260D	=
1,1,2,2-Tetrachloroethane	U	1	ug/L	1	7/25/2023			SW846-8260D	=
1,1,2-Trichloroethane	U	1	ug/L	1	7/25/2023			SW846-8260D	=
1,1-Dichloroethane	U	1	ug/L	1	7/25/2023			SW846-8260D	=
1,1-Dichloroethene	U	1	ug/L	1	7/25/2023			SW846-8260D	=
1,2,3-Trichloropropane	U	1	ug/L	1	7/25/2023			SW846-8260D	=
1,2-Dibromoethane	U	1	ug/L	1	7/25/2023			SW846-8260D	=
1,2-Dichlorobenzene	U	1	ug/L	1	7/25/2023			SW846-8260D	=
1,2-Dichloroethane	U	1	ug/L	1	7/25/2023			SW846-8260D	=
1,2-Dichloropropane	U	1	ug/L	1	7/25/2023			SW846-8260D	=
1,4-Dichlorobenzene	U	1	ug/L	1	7/25/2023			SW846-8260D	=
2-Butanone	U	5	ug/L	5	7/25/2023			SW846-8260D	=
2-Hexanone	U	5	ug/L	5	7/25/2023			SW846-8260D	=
4-Methyl-2-pentanone	U	5	ug/L	5	7/25/2023			SW846-8260D	=
Acetone	U	5	ug/L	5	7/25/2023			SW846-8260D	=
Acrolein	U	5	ug/L	5	7/25/2023			SW846-8260D	=
Acrylonitrile	U	5	ug/L	5	7/25/2023			SW846-8260D	=
Benzene	U	1	ug/L	1	7/25/2023			SW846-8260D	=
Bromochloromethane	U	1	ug/L	1	7/25/2023			SW846-8260D	=
Bromodichloromethane	U	1	ug/L	1	7/25/2023			SW846-8260D	=
Bromoform	U	1	ug/L	1	7/25/2023			SW846-8260D	UJ
Bromomethane	U	1	ug/L	1	7/25/2023			SW846-8260D	=
Carbon disulfide	U	5	ug/L	5	7/25/2023			SW846-8260D	=
Carbon tetrachloride	U	1	ug/L	1	7/25/2023			SW846-8260D	UJ
Chlorobenzene	U	1	ug/L	1	7/25/2023			SW846-8260D	=
Chloroethane	U	1	ug/L	1	7/25/2023			SW846-8260D	=
Chloroform	U	1	ug/L	1	7/25/2023			SW846-8260D	=
Chloromethane	U	1	ug/L	1	7/25/2023			SW846-8260D	=
cis-1,2-Dichloroethene	U	1	ug/L	1	7/25/2023			SW846-8260D	=
cis-1,3-Dichloropropene	U	1	ug/L	1	7/25/2023			SW846-8260D	=
Dibromochloromethane	U	1	ug/L	1	7/25/2023			SW846-8260D	=
Dibromomethane	U	1	ug/L	1	7/25/2023			SW846-8260D	=
Ethylbenzene	U	1	ug/L	1	7/25/2023			SW846-8260D	=
Iodomethane	U	5	ug/L	5	7/25/2023			SW846-8260D	=
Methylene chloride	U	5	ug/L	5	7/25/2023			SW846-8260D	=
Styrene	U	1	ug/L	1	7/25/2023			SW846-8260D	=
Tetrachloroethene	U	1	ug/L	1	7/25/2023			SW846-8260D	=
Toluene	U	1	ug/L	1	7/25/2023			SW846-8260D	=
Total Xylene	U	3	ug/L	3	7/25/2023			SW846-8260D	=
trans-1,2-Dichloroethene	U	1	ug/L	1	7/25/2023			SW846-8260D	=
trans-1,3-Dichloropropene	U	1	ug/L	1	7/25/2023			SW846-8260D	=
Trans-1,4-Dichloro-2-butene	U	5	ug/L	5	7/25/2023			SW846-8260D	=

Trichloroethene		5.48	ug/L	1	7/25/2023	SW846-8260D	=
Trichlorofluoromethane	U	1	ug/L	1	7/25/2023	SW846-8260D	=
Vinyl acetate	U	5	ug/L	5	7/25/2023	SW846-8260D	=
Vinyl chloride	U	1	ug/L	1	7/25/2023	SW846-8260D	=
Dissolved Solids		211	mg/L	10	7/25/2023	EPA-160.1	=
Iodide	U	0.5	mg/L	0.5	7/25/2023	EPA-300.0	=
Chemical Oxygen Demand (COD)	U	20	mg/L	20	7/25/2023	EPA-410.4	=
Cyanide	U	0.2	mg/L	0.2	7/25/2023	SW846-9012B	=
Total Organic Halides (TOX)	JB	7.64	ug/L	10	7/25/2023	SW846-9020B	U
Total Organic Carbon (TOC)	J	0.765	mg/L	2	7/25/2023	SW846-9060A	=



**Paducah OREIS  
GROUNDWATER MONITORING REPORT**

**Facility:** C-746-S&T Landfill      **County:** McCracken      **Permit #:** SW07300014,SW07300015,SW07300045

**Sampling Point:** MW372      DOWN      **RGA Type:** URGA      **Period:** 3rd Quarter 2023

**AKGWA Well Tag #:** 8004-4808      **SAMPLE ID:** MW372UG4-23      **Sample Type:** REG

Parameter	Qualifier	Result	Units	Reporting Limit	Date Collected	Counting Error (+/-)	TPU	Method	Validation
Bromide	W	0.595	mg/L	0.2	7/25/2023			SW846-9056A	=
Chloride	JW	38.7	mg/L	250	7/25/2023			SW846-9056A	=
Fluoride	J	0.175	mg/L	4	7/25/2023			SW846-9056A	=
Nitrate as Nitrogen	J	0.742	mg/L	10	7/25/2023			SW846-9056A	=
Sulfate		145	mg/L	10	7/25/2023			SW846-9056A	=
Barometric Pressure Reading		30.1	Inches/Hg		7/25/2023				X
Conductivity		759	umho/cm		7/25/2023				X
Depth to Water		35.38	ft		7/25/2023				X
Dissolved Oxygen		1.91	mg/L		7/25/2023				X
Eh (approx)		387	mV		7/25/2023				X
pH		6.05	Std Unit		7/25/2023				X
Temperature		69.4	deg F		7/25/2023				X
Turbidity		1.52	NTU		7/25/2023				X
Aluminum	U	0.05	mg/L	0.05	7/25/2023			SW846-6020B	=
Antimony	U	0.003	mg/L	0.003	7/25/2023			SW846-6020B	=
Arsenic	U	0.005	mg/L	0.005	7/25/2023			SW846-6020B	=
Barium		0.0596	mg/L	0.004	7/25/2023			SW846-6020B	=
Beryllium	U	0.0005	mg/L	0.0005	7/25/2023			SW846-6020B	=
Boron		1.29	mg/L	0.15	7/25/2023			SW846-6020B	=
Cadmium	U	0.001	mg/L	0.001	7/25/2023			SW846-6020B	=
Calcium		61	mg/L	2	7/25/2023			SW846-6020B	J
Chromium	U	0.01	mg/L	0.01	7/25/2023			SW846-6020B	=
Cobalt	J	0.000305	mg/L	0.001	7/25/2023			SW846-6020B	J
Copper	J	0.00127	mg/L	0.002	7/25/2023			SW846-6020B	J
Iron	J	0.033	mg/L	0.1	7/25/2023			SW846-6020B	=
Lead	U	0.002	mg/L	0.002	7/25/2023			SW846-6020B	=
Magnesium		21.1	mg/L	0.03	7/25/2023			SW846-6020B	=
Manganese	J	0.00157	mg/L	0.005	7/25/2023			SW846-6020B	J
Molybdenum	J	0.000202	mg/L	0.001	7/25/2023			SW846-6020B	=
Nickel	J	0.000929	mg/L	0.002	7/25/2023			SW846-6020B	J
Potassium		2.3	mg/L	0.3	7/25/2023			SW846-6020B	=
Rhodium	U	0.005	mg/L	0.005	7/25/2023			SW846-6020B	=
Selenium	U	0.005	mg/L	0.005	7/25/2023			SW846-6020B	=
Silver	U	0.001	mg/L	0.001	7/25/2023			SW846-6020B	=
Sodium		56.9	mg/L	2.5	7/25/2023			SW846-6020B	=
Tantalum	U	0.005	mg/L	0.005	7/25/2023			SW846-6020B	=
Thallium	U	0.002	mg/L	0.002	7/25/2023			SW846-6020B	=
Uranium	U	0.0002	mg/L	0.0002	7/25/2023			SW846-6020B	=
Vanadium	U	0.02	mg/L	0.02	7/25/2023			SW846-6020B	=
Zinc	J	0.00431	mg/L	0.02	7/25/2023			SW846-6020B	J
Mercury	U	0.0002	mg/L	0.0002	7/25/2023			SW846-7470A	=
Barium, Dissolved		0.063	mg/L	0.004	7/25/2023			SW846-6020B	=
Chromium, Dissolved	U	0.01	mg/L	0.01	7/25/2023			SW846-6020B	=
Uranium, Dissolved	U	0.0002	mg/L	0.0002	7/25/2023			SW846-6020B	=
PCB-1016	U	0.102	ug/L	0.102	7/25/2023			SW846-8082A	UJ
PCB-1221	U	0.102	ug/L	0.102	7/25/2023			SW846-8082A	=
PCB-1232	U	0.102	ug/L	0.102	7/25/2023			SW846-8082A	=
PCB-1242	U	0.102	ug/L	0.102	7/25/2023			SW846-8082A	=
PCB-1248	U	0.102	ug/L	0.102	7/25/2023			SW846-8082A	=

PCB-1254	U	0.102	ug/L	0.102	7/25/2023			SW846-8082A	=
PCB-1260	U	0.102	ug/L	0.102	7/25/2023			SW846-8082A	UJ
PCB-1268	U	0.102	ug/L	0.102	7/25/2023			SW846-8082A	=
Polychlorinated biphenyl	U	0.102	ug/L	0.102	7/25/2023			SW846-8082A	UJ
Radium-226	U	0.0809	pCi/L	0.386	7/25/2023	0.223	0.223	AN-1418	=
Radium-228	U	1.6	pCi/L	4.35	7/25/2023	2.49	2.53	EPA-904-M	=
Strontium-90	U	0.725	pCi/L	6.04	7/25/2023	3.29	3.29	EPA-905.0-M	=
Tritium	U	7.49	pCi/L	215	7/25/2023	121	121	EPA-906.0-M	=
Technetium-99	U	20	pCi/L	21.2	7/25/2023	12.9	13.1	HASL 300, Tc-02-RC M	=
Thorium-230	U	2.33	pCi/L	3.01	7/25/2023	2.25	2.28	HASL 300, Th-01-RC M	=
Thorium-232	U	0.859	pCi/L	2.07	7/25/2023	1.43	1.44	HASL 300, Th-01-RC M	=
Alpha activity	U	2.37	pCi/L	7.33	7/25/2023	4.08	4.1	SW846-9310	=
Beta activity		18.9	pCi/L	7.96	7/25/2023	6.36	7.08	SW846-9310	=
1,2-Dibromo-3-chloropropane	U	0.0189	ug/L	0.0189	7/25/2023			SW846-8011	=
1,1,1,2-Tetrachloroethane	U	1	ug/L	1	7/25/2023			SW846-8260D	=
1,1,1-Trichloroethane	U	1	ug/L	1	7/25/2023			SW846-8260D	=
1,1,2,2-Tetrachloroethane	U	1	ug/L	1	7/25/2023			SW846-8260D	=
1,1,2-Trichloroethane	U	1	ug/L	1	7/25/2023			SW846-8260D	=
1,1-Dichloroethane	U	1	ug/L	1	7/25/2023			SW846-8260D	=
1,1-Dichloroethene	U	1	ug/L	1	7/25/2023			SW846-8260D	=
1,2,3-Trichloropropane	U	1	ug/L	1	7/25/2023			SW846-8260D	=
1,2-Dibromoethane	U	1	ug/L	1	7/25/2023			SW846-8260D	=
1,2-Dichlorobenzene	U	1	ug/L	1	7/25/2023			SW846-8260D	=
1,2-Dichloroethane	U	1	ug/L	1	7/25/2023			SW846-8260D	=
1,2-Dichloropropane	U	1	ug/L	1	7/25/2023			SW846-8260D	=
1,4-Dichlorobenzene	U	1	ug/L	1	7/25/2023			SW846-8260D	=
2-Butanone	U	5	ug/L	5	7/25/2023			SW846-8260D	=
2-Hexanone	U	5	ug/L	5	7/25/2023			SW846-8260D	=
4-Methyl-2-pentanone	U	5	ug/L	5	7/25/2023			SW846-8260D	=
Acetone	U	5	ug/L	5	7/25/2023			SW846-8260D	=
Acrolein	U	5	ug/L	5	7/25/2023			SW846-8260D	=
Acrylonitrile	U	5	ug/L	5	7/25/2023			SW846-8260D	=
Benzene	U	1	ug/L	1	7/25/2023			SW846-8260D	=
Bromochloromethane	U	1	ug/L	1	7/25/2023			SW846-8260D	=
Bromodichloromethane	U	1	ug/L	1	7/25/2023			SW846-8260D	=
Bromoform	U	1	ug/L	1	7/25/2023			SW846-8260D	UJ
Bromomethane	U	1	ug/L	1	7/25/2023			SW846-8260D	=
Carbon disulfide	U	5	ug/L	5	7/25/2023			SW846-8260D	=
Carbon tetrachloride	U	1	ug/L	1	7/25/2023			SW846-8260D	UJ
Chlorobenzene	U	1	ug/L	1	7/25/2023			SW846-8260D	=
Chloroethane	U	1	ug/L	1	7/25/2023			SW846-8260D	=
Chloroform	U	1	ug/L	1	7/25/2023			SW846-8260D	=
Chloromethane	U	1	ug/L	1	7/25/2023			SW846-8260D	=
cis-1,2-Dichloroethene	U	1	ug/L	1	7/25/2023			SW846-8260D	=
cis-1,3-Dichloropropene	U	1	ug/L	1	7/25/2023			SW846-8260D	=
Dibromochloromethane	U	1	ug/L	1	7/25/2023			SW846-8260D	=
Dibromomethane	U	1	ug/L	1	7/25/2023			SW846-8260D	=
Ethylbenzene	U	1	ug/L	1	7/25/2023			SW846-8260D	=
Iodomethane	U	5	ug/L	5	7/25/2023			SW846-8260D	=
Methylene chloride	U	5	ug/L	5	7/25/2023			SW846-8260D	=
Styrene	U	1	ug/L	1	7/25/2023			SW846-8260D	=
Tetrachloroethene	U	1	ug/L	1	7/25/2023			SW846-8260D	=
Toluene	U	1	ug/L	1	7/25/2023			SW846-8260D	=
Total Xylene	U	3	ug/L	3	7/25/2023			SW846-8260D	=
trans-1,2-Dichloroethene	U	1	ug/L	1	7/25/2023			SW846-8260D	=
trans-1,3-Dichloropropene	U	1	ug/L	1	7/25/2023			SW846-8260D	=
Trans-1,4-Dichloro-2-butene	U	5	ug/L	5	7/25/2023			SW846-8260D	=

Trichloroethene		5.09	ug/L	1	7/25/2023	SW846-8260D	=
Trichlorofluoromethane	U	1	ug/L	1	7/25/2023	SW846-8260D	=
Vinyl acetate	U	5	ug/L	5	7/25/2023	SW846-8260D	=
Vinyl chloride	U	1	ug/L	1	7/25/2023	SW846-8260D	=
Dissolved Solids		423	mg/L	10	7/25/2023	EPA-160.1	=
Iodide	U	0.5	mg/L	0.5	7/25/2023	EPA-300.0	=
Chemical Oxygen Demand (COD)	U	20	mg/L	20	7/25/2023	EPA-410.4	=
Cyanide	J	0.00437	mg/L	0.2	7/25/2023	SW846-9012B	=
Total Organic Halides (TOX)	J	9.56	ug/L	10	7/25/2023	SW846-9020B	=
Total Organic Carbon (TOC)	J	0.881	mg/L	2	7/25/2023	SW846-9060A	=

**Paducah OREIS  
GROUNDWATER MONITORING REPORT**

**Facility:** C-746-S&T Landfill      **County:** McCracken      **Permit #:** SW07300014,SW07300015,SW07300045

**Sampling Point:** MW373      DOWN      **RGA Type:** LRGA      **Period:** 3rd Quarter 2023

**AKGWA Well Tag #:** 8004-4792      **SAMPLE ID:** MW373UG4-23      **Sample Type:** REG

Parameter	Qualifier	Result	Units	Reporting Limit	Date Collected	Counting Error (+/-)	TPU	Method	Validation
Bromide	JW	0.463	mg/L	1	7/25/2023			SW846-9056A	=
Chloride	JW	32.1	mg/L	5	7/25/2023			SW846-9056A	=
Fluoride	J	0.187	mg/L	4	7/25/2023			SW846-9056A	=
Nitrate as Nitrogen	J	0.658	mg/L	10	7/25/2023			SW846-9056A	=
Sulfate		180	mg/L	10	7/25/2023			SW846-9056A	=
Barometric Pressure Reading		30.1	Inches/Hg		7/25/2023				X
Conductivity		910	umho/cm		7/25/2023				X
Depth to Water		35.68	ft		7/25/2023				X
Dissolved Oxygen		1.69	mg/L		7/25/2023				X
Eh (approx)		384	mV		7/25/2023				X
pH		6.08	Std Unit		7/25/2023				X
Temperature		72	deg F		7/25/2023				X
Turbidity		1.6	NTU		7/25/2023				X
Aluminum	U	0.05	mg/L	0.05	7/25/2023			SW846-6020B	=
Antimony	U	0.003	mg/L	0.003	7/25/2023			SW846-6020B	=
Arsenic	U	0.005	mg/L	0.005	7/25/2023			SW846-6020B	=
Barium		0.0342	mg/L	0.004	7/25/2023			SW846-6020B	=
Beryllium	U	0.0005	mg/L	0.0005	7/25/2023			SW846-6020B	=
Boron		2.01	mg/L	0.3	7/25/2023			SW846-6020B	=
Cadmium	U	0.001	mg/L	0.001	7/25/2023			SW846-6020B	=
Calcium		78.7	mg/L	4	7/25/2023			SW846-6020B	J
Chromium	U	0.01	mg/L	0.01	7/25/2023			SW846-6020B	=
Cobalt	U	0.001	mg/L	0.001	7/25/2023			SW846-6020B	=
Copper	J	0.00112	mg/L	0.002	7/25/2023			SW846-6020B	J
Iron	J	0.0429	mg/L	0.1	7/25/2023			SW846-6020B	=
Lead	U	0.002	mg/L	0.002	7/25/2023			SW846-6020B	=
Magnesium		26.6	mg/L	0.03	7/25/2023			SW846-6020B	=
Manganese		0.0518	mg/L	0.005	7/25/2023			SW846-6020B	J
Molybdenum	U	0.001	mg/L	0.001	7/25/2023			SW846-6020B	=
Nickel	J	0.00168	mg/L	0.002	7/25/2023			SW846-6020B	J
Potassium		2.73	mg/L	0.3	7/25/2023			SW846-6020B	=
Rhodium	U	0.005	mg/L	0.005	7/25/2023			SW846-6020B	=
Selenium	U	0.005	mg/L	0.005	7/25/2023			SW846-6020B	=
Silver	U	0.001	mg/L	0.001	7/25/2023			SW846-6020B	=
Sodium		62.9	mg/L	5	7/25/2023			SW846-6020B	=
Tantalum	U	0.005	mg/L	0.005	7/25/2023			SW846-6020B	=
Thallium	U	0.002	mg/L	0.002	7/25/2023			SW846-6020B	=
Uranium	U	0.0002	mg/L	0.0002	7/25/2023			SW846-6020B	=
Vanadium	U	0.02	mg/L	0.02	7/25/2023			SW846-6020B	=
Zinc	J	0.00448	mg/L	0.02	7/25/2023			SW846-6020B	J
Mercury	U	0.0002	mg/L	0.0002	7/25/2023			SW846-7470A	=
Barium, Dissolved		0.0327	mg/L	0.004	7/25/2023			SW846-6020B	=
Chromium, Dissolved	U	0.01	mg/L	0.01	7/25/2023			SW846-6020B	=
Uranium, Dissolved	U	0.0002	mg/L	0.0002	7/25/2023			SW846-6020B	=
PCB-1016	U	0.102	ug/L	0.102	7/25/2023			SW846-8082A	UJ
PCB-1221	U	0.102	ug/L	0.102	7/25/2023			SW846-8082A	=
PCB-1232	U	0.102	ug/L	0.102	7/25/2023			SW846-8082A	=
PCB-1242	U	0.102	ug/L	0.102	7/25/2023			SW846-8082A	=
PCB-1248	U	0.102	ug/L	0.102	7/25/2023			SW846-8082A	=

PCB-1254	U	0.102	ug/L	0.102	7/25/2023			SW846-8082A	=
PCB-1260	U	0.102	ug/L	0.102	7/25/2023			SW846-8082A	UJ
PCB-1268	U	0.102	ug/L	0.102	7/25/2023			SW846-8082A	=
Polychlorinated biphenyl	U	0.102	ug/L	0.102	7/25/2023			SW846-8082A	UJ
Radium-226	U	0.0298	pCi/L	0.458	7/25/2023	0.221	0.221	AN-1418	=
Radium-228	U	0.476	pCi/L	3.95	7/25/2023	2.16	2.16	EPA-904-M	=
Strontium-90	U	2.72	pCi/L	6.17	7/25/2023	3.61	3.64	EPA-905.0-M	=
Tritium	U	40.1	pCi/L	215	7/25/2023	123	123	EPA-906.0-M	=
Technetium-99	U	13.3	pCi/L	21.2	7/25/2023	12.7	12.8	HASL 300, Tc-02-RC M	=
Thorium-230	U	2.12	pCi/L	3.47	7/25/2023	2.51	2.54	HASL 300, Th-01-RC M	=
Thorium-232	U	0.436	pCi/L	1.91	7/25/2023	1.35	1.35	HASL 300, Th-01-RC M	=
Alpha activity	U	2.01	pCi/L	6.04	7/25/2023	3.36	3.38	SW846-9310	=
Beta activity	U	5.93	pCi/L	7.79	7/25/2023	4.88	4.98	SW846-9310	=
1,2-Dibromo-3-chloropropane	U	0.0191	ug/L	0.0191	7/25/2023			SW846-8011	=
1,1,1,2-Tetrachloroethane	U	1	ug/L	1	7/25/2023			SW846-8260D	=
1,1,1-Trichloroethane	U	1	ug/L	1	7/25/2023			SW846-8260D	=
1,1,2,2-Tetrachloroethane	U	1	ug/L	1	7/25/2023			SW846-8260D	=
1,1,2-Trichloroethane	U	1	ug/L	1	7/25/2023			SW846-8260D	=
1,1-Dichloroethane	U	1	ug/L	1	7/25/2023			SW846-8260D	=
1,1-Dichloroethene	U	1	ug/L	1	7/25/2023			SW846-8260D	=
1,2,3-Trichloropropane	U	1	ug/L	1	7/25/2023			SW846-8260D	=
1,2-Dibromoethane	U	1	ug/L	1	7/25/2023			SW846-8260D	=
1,2-Dichlorobenzene	U	1	ug/L	1	7/25/2023			SW846-8260D	=
1,2-Dichloroethane	U	1	ug/L	1	7/25/2023			SW846-8260D	=
1,2-Dichloropropane	U	1	ug/L	1	7/25/2023			SW846-8260D	=
1,4-Dichlorobenzene	U	1	ug/L	1	7/25/2023			SW846-8260D	=
2-Butanone	U	5	ug/L	5	7/25/2023			SW846-8260D	=
2-Hexanone	U	5	ug/L	5	7/25/2023			SW846-8260D	=
4-Methyl-2-pentanone	U	5	ug/L	5	7/25/2023			SW846-8260D	=
Acetone	U	5	ug/L	5	7/25/2023			SW846-8260D	=
Acrolein	U	5	ug/L	5	7/25/2023			SW846-8260D	=
Acrylonitrile	U	5	ug/L	5	7/25/2023			SW846-8260D	=
Benzene	U	1	ug/L	1	7/25/2023			SW846-8260D	=
Bromochloromethane	U	1	ug/L	1	7/25/2023			SW846-8260D	=
Bromodichloromethane	U	1	ug/L	1	7/25/2023			SW846-8260D	=
Bromoform	U	1	ug/L	1	7/25/2023			SW846-8260D	UJ
Bromomethane	U	1	ug/L	1	7/25/2023			SW846-8260D	=
Carbon disulfide	U	5	ug/L	5	7/25/2023			SW846-8260D	=
Carbon tetrachloride	U	1	ug/L	1	7/25/2023			SW846-8260D	UJ
Chlorobenzene	U	1	ug/L	1	7/25/2023			SW846-8260D	=
Chloroethane	U	1	ug/L	1	7/25/2023			SW846-8260D	=
Chloroform	U	1	ug/L	1	7/25/2023			SW846-8260D	=
Chloromethane	U	1	ug/L	1	7/25/2023			SW846-8260D	=
cis-1,2-Dichloroethene	U	1	ug/L	1	7/25/2023			SW846-8260D	=
cis-1,3-Dichloropropene	U	1	ug/L	1	7/25/2023			SW846-8260D	=
Dibromochloromethane	U	1	ug/L	1	7/25/2023			SW846-8260D	=
Dibromomethane	U	1	ug/L	1	7/25/2023			SW846-8260D	=
Ethylbenzene	U	1	ug/L	1	7/25/2023			SW846-8260D	=
Iodomethane	U	5	ug/L	5	7/25/2023			SW846-8260D	=
Methylene chloride	U	5	ug/L	5	7/25/2023			SW846-8260D	=
Styrene	U	1	ug/L	1	7/25/2023			SW846-8260D	=
Tetrachloroethene	U	1	ug/L	1	7/25/2023			SW846-8260D	=
Toluene	U	1	ug/L	1	7/25/2023			SW846-8260D	=
Total Xylene	U	3	ug/L	3	7/25/2023			SW846-8260D	=
trans-1,2-Dichloroethene	U	1	ug/L	1	7/25/2023			SW846-8260D	=
trans-1,3-Dichloropropene	U	1	ug/L	1	7/25/2023			SW846-8260D	=
Trans-1,4-Dichloro-2-butene	U	5	ug/L	5	7/25/2023			SW846-8260D	=

Trichloroethene		3.53	ug/L	1	7/25/2023	SW846-8260D	=
Trichlorofluoromethane	U	1	ug/L	1	7/25/2023	SW846-8260D	=
Vinyl acetate	U	5	ug/L	5	7/25/2023	SW846-8260D	=
Vinyl chloride	U	1	ug/L	1	7/25/2023	SW846-8260D	=
Dissolved Solids		514	mg/L	10	7/25/2023	EPA-160.1	=
Iodide	U	0.5	mg/L	0.5	7/25/2023	EPA-300.0	=
Chemical Oxygen Demand (COD)	U	20	mg/L	20	7/25/2023	EPA-410.4	=
Cyanide	J	0.00361	mg/L	0.2	7/25/2023	SW846-9012B	=
Total Organic Halides (TOX)	J	9.2	ug/L	10	7/25/2023	SW846-9020B	=
Total Organic Carbon (TOC)	J	1.22	mg/L	2	7/25/2023	SW846-9060A	=

**Paducah OREIS  
GROUNDWATER MONITORING REPORT**

**Facility:** C-746-S&T Landfill      **County:** McCracken      **Permit #:** SW07300014,SW07300015,SW07300045

**Sampling Point:** MW384      SIDE      **RGA Type:** URGA      **Period:** 3rd Quarter 2023

**AKGWA Well Tag #:** 8004-4809      **SAMPLE ID:** MW384SG4-23      **Sample Type:** REG

Parameter	Qualifier	Result	Units	Reporting Limit	Date Collected	Counting Error (+/-)	TPU	Method	Validation
Bromide		0.445	mg/L	0.2	7/26/2023			SW846-9056A	=
Chloride	J	31.8	mg/L	250	7/26/2023			SW846-9056A	=
Fluoride	J	0.18	mg/L	4	7/26/2023			SW846-9056A	=
Nitrate as Nitrogen	J	0.745	mg/L	10	7/26/2023			SW846-9056A	=
Sulfate		23.7	mg/L	2	7/26/2023			SW846-9056A	=
Barometric Pressure Reading		30.05	Inches/Hg		7/26/2023				X
Conductivity		481	umho/cm		7/26/2023				X
Depth to Water		41.19	ft		7/26/2023				X
Dissolved Oxygen		4.27	mg/L		7/26/2023				X
Eh (approx)		469	mV		7/26/2023				X
pH		6.14	Std Unit		7/26/2023				X
Temperature		68.1	deg F		7/26/2023				X
Turbidity		2.84	NTU		7/26/2023				X
Aluminum	U	0.05	mg/L	0.05	7/26/2023			SW846-6020B	=
Antimony	U	0.003	mg/L	0.003	7/26/2023			SW846-6020B	=
Arsenic	U	0.005	mg/L	0.005	7/26/2023			SW846-6020B	=
Barium		0.234	mg/L	0.004	7/26/2023			SW846-6020B	=
Beryllium	U	0.0005	mg/L	0.0005	7/26/2023			SW846-6020B	=
Boron		0.0367	mg/L	0.015	7/26/2023			SW846-6020B	=
Cadmium	U	0.001	mg/L	0.001	7/26/2023			SW846-6020B	=
Calcium		26.6	mg/L	0.2	7/26/2023			SW846-6020B	=
Chromium	U	0.01	mg/L	0.01	7/26/2023			SW846-6020B	=
Cobalt	U	0.001	mg/L	0.001	7/26/2023			SW846-6020B	=
Copper	J	0.00121	mg/L	0.002	7/26/2023			SW846-6020B	J
Iron	J	0.0478	mg/L	0.1	7/26/2023			SW846-6020B	=
Lead	U	0.002	mg/L	0.002	7/26/2023			SW846-6020B	=
Magnesium		11.3	mg/L	0.03	7/26/2023			SW846-6020B	=
Manganese	J	0.00115	mg/L	0.005	7/26/2023			SW846-6020B	J
Molybdenum	U	0.001	mg/L	0.001	7/26/2023			SW846-6020B	=
Nickel	U	0.002	mg/L	0.002	7/26/2023			SW846-6020B	=
Potassium		1.45	mg/L	0.3	7/26/2023			SW846-6020B	=
Rhodium	U	0.005	mg/L	0.005	7/26/2023			SW846-6020B	=
Selenium	U	0.005	mg/L	0.005	7/26/2023			SW846-6020B	=
Silver	U	0.001	mg/L	0.001	7/26/2023			SW846-6020B	=
Sodium		52.8	mg/L	2.5	7/26/2023			SW846-6020B	=
Tantalum	U	0.005	mg/L	0.005	7/26/2023			SW846-6020B	=
Thallium	U	0.002	mg/L	0.002	7/26/2023			SW846-6020B	=
Uranium	U	0.0002	mg/L	0.0002	7/26/2023			SW846-6020B	=
Vanadium	U	0.02	mg/L	0.02	7/26/2023			SW846-6020B	=
Zinc	J	0.00339	mg/L	0.02	7/26/2023			SW846-6020B	=
Mercury	BJ	0.000097	mg/L	0.0002	7/26/2023			SW846-7470A	U
Barium, Dissolved		0.23	mg/L	0.004	7/26/2023			SW846-6020B	=
Chromium, Dissolved	U	0.01	mg/L	0.01	7/26/2023			SW846-6020B	=
Uranium, Dissolved	U	0.0002	mg/L	0.0002	7/26/2023			SW846-6020B	=
Radium-226	U	0.316	pCi/L	0.54	7/26/2023	0.452	0.452	AN-1418	=
Strontium-90	U	6.16	pCi/L	6.26	7/26/2023	4.19	4.31	EPA-905.0-M	=
Tritium	U	26.9	pCi/L	235	7/26/2023	134	134	EPA-906.0-M	=
Technetium-99		73.8	pCi/L	18.7	7/26/2023	14.1	16.4	HASL 300, Tc-02-RC M	=
Thorium-230	U	2.33	pCi/L	2.99	7/26/2023	2.36	2.4	HASL 300, Th-01-RC M	=

Alpha activity	U	4.85	pCi/L	6.7	7/26/2023	4.53	4.6	SW846-9310	=
Beta activity		46	pCi/L	10.2	7/26/2023	9.41	12.2	SW846-9310	=
1,2-Dibromo-3-chloropropane	U	0.019	ug/L	0.019	7/26/2023			SW846-8011	=
1,1,1,2-Tetrachloroethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
1,1,1-Trichloroethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
1,1,2,2-Tetrachloroethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
1,1,2-Trichloroethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
1,1-Dichloroethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
1,1-Dichloroethene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
1,2,3-Trichloropropane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
1,2-Dibromoethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
1,2-Dichlorobenzene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
1,2-Dichloroethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
1,2-Dichloropropane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
1,4-Dichlorobenzene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
2-Butanone	U	5	ug/L	5	7/26/2023			SW846-8260D	=
2-Hexanone	U	5	ug/L	5	7/26/2023			SW846-8260D	=
4-Methyl-2-pentanone	U	5	ug/L	5	7/26/2023			SW846-8260D	=
Acetone	U	5	ug/L	5	7/26/2023			SW846-8260D	=
Acrolein	U	5	ug/L	5	7/26/2023			SW846-8260D	=
Acrylonitrile	U	5	ug/L	5	7/26/2023			SW846-8260D	=
Benzene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Bromochloromethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Bromodichloromethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Bromoform	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Bromomethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Carbon disulfide	U	5	ug/L	5	7/26/2023			SW846-8260D	=
Carbon tetrachloride	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Chlorobenzene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Chloroethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Chloroform	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Chloromethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
cis-1,2-Dichloroethene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
cis-1,3-Dichloropropene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Dibromochloromethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Dibromomethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Ethylbenzene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Iodomethane	U	5	ug/L	5	7/26/2023			SW846-8260D	=
Methylene chloride	U	5	ug/L	5	7/26/2023			SW846-8260D	=
Styrene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Tetrachloroethene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Toluene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Total Xylene	U	3	ug/L	3	7/26/2023			SW846-8260D	=
trans-1,2-Dichloroethene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
trans-1,3-Dichloropropene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Trans-1,4-Dichloro-2-butene	U	5	ug/L	5	7/26/2023			SW846-8260D	=
Trichloroethene	J	0.51	ug/L	1	7/26/2023			SW846-8260D	=
Trichlorofluoromethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Vinyl acetate	U	5	ug/L	5	7/26/2023			SW846-8260D	=
Vinyl chloride	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Dissolved Solids		238	mg/L	10	7/26/2023			EPA-160.1	=
Iodide	U	0.5	mg/L	0.5	7/26/2023			EPA-300.0	=
Chemical Oxygen Demand (COD)	U	20	mg/L	20	7/26/2023			EPA-410.4	=
Cyanide	U	0.2	mg/L	0.2	7/26/2023			SW846-9012B	=
Total Organic Halides (TOX)	J	6.54	ug/L	10	7/26/2023			SW846-9020B	=
Total Organic Carbon (TOC)	J	1.19	mg/L	2	7/26/2023			SW846-9060A	=



**Paducah OREIS  
GROUNDWATER MONITORING REPORT**

**Facility:** C-746-S&T Landfill      **County:** McCracken      **Permit #:** SW07300014,SW07300015,SW07300045

**Sampling Point:** MW385      SIDE      **RGA Type:** LRGA      **Period:** 3rd Quarter 2023

**AKGWA Well Tag #:** 8004-4810      **SAMPLE ID:** MW385SG4-23      **Sample Type:** REG

Parameter	Qualifier	Result	Units	Reporting Limit	Date Collected	Counting Error (+/-)	TPU	Method	Validation
Bromide		0.236	mg/L	0.2	7/26/2023			SW846-9056A	=
Chloride	J	22.9	mg/L	250	7/26/2023			SW846-9056A	=
Fluoride	J	0.154	mg/L	4	7/26/2023			SW846-9056A	=
Nitrate as Nitrogen	J	0.738	mg/L	10	7/26/2023			SW846-9056A	=
Sulfate		19.3	mg/L	2	7/26/2023			SW846-9056A	=
Barometric Pressure Reading		30.05	Inches/Hg		7/26/2023				X
Conductivity		460	umho/cm		7/26/2023				X
Depth to Water		41.77	ft		7/26/2023				X
Dissolved Oxygen		0.92	mg/L		7/26/2023				X
Eh (approx)		386	mV		7/26/2023				X
pH		6.41	Std Unit		7/26/2023				X
Temperature		67.2	deg F		7/26/2023				X
Turbidity		2.5	NTU		7/26/2023				X
Aluminum	U	0.05	mg/L	0.05	7/26/2023			SW846-6020B	=
Antimony	U	0.003	mg/L	0.003	7/26/2023			SW846-6020B	=
Arsenic	U	0.005	mg/L	0.005	7/26/2023			SW846-6020B	=
Barium		0.206	mg/L	0.004	7/26/2023			SW846-6020B	=
Beryllium	U	0.0005	mg/L	0.0005	7/26/2023			SW846-6020B	=
Boron		0.0525	mg/L	0.015	7/26/2023			SW846-6020B	=
Cadmium	U	0.001	mg/L	0.001	7/26/2023			SW846-6020B	=
Calcium		27.5	mg/L	0.2	7/26/2023			SW846-6020B	=
Chromium	U	0.01	mg/L	0.01	7/26/2023			SW846-6020B	=
Cobalt	U	0.001	mg/L	0.001	7/26/2023			SW846-6020B	=
Copper	J	0.00108	mg/L	0.002	7/26/2023			SW846-6020B	J
Iron	U	0.1	mg/L	0.1	7/26/2023			SW846-6020B	=
Lead	U	0.002	mg/L	0.002	7/26/2023			SW846-6020B	=
Magnesium		10.6	mg/L	0.03	7/26/2023			SW846-6020B	=
Manganese		0.005	mg/L	0.005	7/26/2023			SW846-6020B	J
Molybdenum	J	0.000249	mg/L	0.001	7/26/2023			SW846-6020B	=
Nickel	J	0.000808	mg/L	0.002	7/26/2023			SW846-6020B	J
Potassium		1.59	mg/L	0.3	7/26/2023			SW846-6020B	=
Rhodium	U	0.005	mg/L	0.005	7/26/2023			SW846-6020B	=
Selenium	U	0.005	mg/L	0.005	7/26/2023			SW846-6020B	=
Silver	U	0.001	mg/L	0.001	7/26/2023			SW846-6020B	=
Sodium		38.6	mg/L	0.25	7/26/2023			SW846-6020B	=
Tantalum	U	0.005	mg/L	0.005	7/26/2023			SW846-6020B	=
Thallium	U	0.002	mg/L	0.002	7/26/2023			SW846-6020B	=
Uranium	J	0.000085	mg/L	0.0002	7/26/2023			SW846-6020B	U
Vanadium	U	0.02	mg/L	0.02	7/26/2023			SW846-6020B	=
Zinc	J	0.00478	mg/L	0.02	7/26/2023			SW846-6020B	=
Mercury	BJ	0.000106	mg/L	0.0002	7/26/2023			SW846-7470A	U
Barium, Dissolved		0.204	mg/L	0.004	7/26/2023			SW846-6020B	=
Chromium, Dissolved	U	0.01	mg/L	0.01	7/26/2023			SW846-6020B	=
Uranium, Dissolved	J	0.000074	mg/L	0.0002	7/26/2023			SW846-6020B	U
Radium-226	U	0.878	pCi/L	0.932	7/26/2023	0.812	0.814	AN-1418	=
Strontium-90	U	-1.09	pCi/L	6.66	7/26/2023	3.36	3.36	EPA-905.0-M	=
Tritium	U	106	pCi/L	237	7/26/2023	140	141	EPA-906.0-M	=
Technetium-99		37.8	pCi/L	18.4	7/26/2023	12.4	13.1	HASL 300, Tc-02-RC M	=
Thorium-230	U	0.751	pCi/L	2.85	7/26/2023	1.64	1.65	HASL 300, Th-01-RC M	=

Alpha activity	U	-0.977	pCi/L	7.11	7/26/2023	3.01	3.01	SW846-9310	=
Beta activity		33.1	pCi/L	9.33	7/26/2023	7.99	9.73	SW846-9310	=
1,2-Dibromo-3-chloropropane	U	0.0189	ug/L	0.0189	7/26/2023			SW846-8011	=
1,1,1,2-Tetrachloroethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
1,1,1-Trichloroethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
1,1,2,2-Tetrachloroethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
1,1,2-Trichloroethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
1,1-Dichloroethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
1,1-Dichloroethene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
1,2,3-Trichloropropane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
1,2-Dibromoethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
1,2-Dichlorobenzene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
1,2-Dichloroethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
1,2-Dichloropropane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
1,4-Dichlorobenzene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
2-Butanone	U	5	ug/L	5	7/26/2023			SW846-8260D	=
2-Hexanone	U	5	ug/L	5	7/26/2023			SW846-8260D	=
4-Methyl-2-pentanone	U	5	ug/L	5	7/26/2023			SW846-8260D	=
Acetone	U	5	ug/L	5	7/26/2023			SW846-8260D	=
Acrolein	U	5	ug/L	5	7/26/2023			SW846-8260D	=
Acrylonitrile	U	5	ug/L	5	7/26/2023			SW846-8260D	=
Benzene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Bromochloromethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Bromodichloromethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Bromoform	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Bromomethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Carbon disulfide	U	5	ug/L	5	7/26/2023			SW846-8260D	=
Carbon tetrachloride	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Chlorobenzene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Chloroethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Chloroform	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Chloromethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
cis-1,2-Dichloroethene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
cis-1,3-Dichloropropene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Dibromochloromethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Dibromomethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Ethylbenzene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Iodomethane	U	5	ug/L	5	7/26/2023			SW846-8260D	=
Methylene chloride	U	5	ug/L	5	7/26/2023			SW846-8260D	=
Styrene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Tetrachloroethene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Toluene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Total Xylene	U	3	ug/L	3	7/26/2023			SW846-8260D	=
trans-1,2-Dichloroethene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
trans-1,3-Dichloropropene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Trans-1,4-Dichloro-2-butene	U	5	ug/L	5	7/26/2023			SW846-8260D	=
Trichloroethene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Trichlorofluoromethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Vinyl acetate	U	5	ug/L	5	7/26/2023			SW846-8260D	=
Vinyl chloride	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Dissolved Solids		191	mg/L	10	7/26/2023			EPA-160.1	=
Iodide	U	0.5	mg/L	0.5	7/26/2023			EPA-300.0	=
Chemical Oxygen Demand (COD)	U	20	mg/L	20	7/26/2023			EPA-410.4	=
Cyanide	U	0.2	mg/L	0.2	7/26/2023			SW846-9012B	=
Total Organic Halides (TOX)		10.5	ug/L	10	7/26/2023			SW846-9020B	=
Total Organic Carbon (TOC)	J	0.828	mg/L	2	7/26/2023			SW846-9060A	=

**Paducah OREIS  
GROUNDWATER MONITORING REPORT**

**Facility:** C-746-S&T Landfill      **County:** McCracken      **Permit #:** SW07300014,SW07300015,SW07300045

**Sampling Point:** MW386      SIDE      **RGA Type:** UCRS      **Period:** 3rd Quarter 2023

**AKGWA Well Tag #:** 8004-4804      **SAMPLE ID:** MW386SG4-23      **Sample Type:** REG

Parameter	Qualifier	Result	Units	Reporting Limit	Date Collected	Counting Error (+/-)	TPU	Method	Validation
Bromide	J	0.126	mg/L	0.2	7/26/2023			SW846-9056A	=
Chloride	J	11.4	mg/L	250	7/26/2023			SW846-9056A	=
Fluoride	J	0.733	mg/L	4	7/26/2023			SW846-9056A	=
Nitrate as Nitrogen	J	0.0484	mg/L	10	7/26/2023			SW846-9056A	=
Sulfate		41.4	mg/L	2	7/26/2023			SW846-9056A	=
Barometric Pressure Reading		30.01	Inches/Hg		7/26/2023				X
Conductivity		576	umho/cm		7/26/2023				X
Depth to Water		20.91	ft		7/26/2023				X
Dissolved Oxygen		1.33	mg/L		7/26/2023				X
Eh (approx)		342	mV		7/26/2023				X
pH		6.76	Std Unit		7/26/2023				X
Temperature		67.9	deg F		7/26/2023				X
Turbidity		3.12	NTU		7/26/2023				X
Aluminum	U	0.05	mg/L	0.05	7/26/2023			SW846-6020B	=
Antimony	U	0.003	mg/L	0.003	7/26/2023			SW846-6020B	=
Arsenic	U	0.005	mg/L	0.005	7/26/2023			SW846-6020B	=
Barium		0.133	mg/L	0.004	7/26/2023			SW846-6020B	=
Beryllium	U	0.0005	mg/L	0.0005	7/26/2023			SW846-6020B	=
Boron	J	0.0134	mg/L	0.015	7/26/2023			SW846-6020B	=
Cadmium	U	0.001	mg/L	0.001	7/26/2023			SW846-6020B	=
Calcium		20.3	mg/L	0.2	7/26/2023			SW846-6020B	=
Chromium	U	0.01	mg/L	0.01	7/26/2023			SW846-6020B	=
Cobalt	J	0.000344	mg/L	0.001	7/26/2023			SW846-6020B	J
Copper	J	0.00114	mg/L	0.002	7/26/2023			SW846-6020B	J
Iron	J	0.0883	mg/L	0.1	7/26/2023			SW846-6020B	=
Lead	U	0.002	mg/L	0.002	7/26/2023			SW846-6020B	=
Magnesium		8.58	mg/L	0.03	7/26/2023			SW846-6020B	=
Manganese		0.0312	mg/L	0.005	7/26/2023			SW846-6020B	J
Molybdenum	J	0.000643	mg/L	0.001	7/26/2023			SW846-6020B	=
Nickel	J	0.00113	mg/L	0.002	7/26/2023			SW846-6020B	J
Potassium	J	0.255	mg/L	0.3	7/26/2023			SW846-6020B	=
Rhodium	U	0.005	mg/L	0.005	7/26/2023			SW846-6020B	=
Selenium	U	0.005	mg/L	0.005	7/26/2023			SW846-6020B	=
Silver	U	0.001	mg/L	0.001	7/26/2023			SW846-6020B	=
Sodium		95.1	mg/L	2.5	7/26/2023			SW846-6020B	=
Tantalum	U	0.005	mg/L	0.005	7/26/2023			SW846-6020B	=
Thallium	U	0.002	mg/L	0.002	7/26/2023			SW846-6020B	=
Uranium	J	0.000068	mg/L	0.0002	7/26/2023			SW846-6020B	U
Vanadium	U	0.02	mg/L	0.02	7/26/2023			SW846-6020B	=
Zinc	U	0.02	mg/L	0.02	7/26/2023			SW846-6020B	=
Mercury	BJ	0.000109	mg/L	0.0002	7/26/2023			SW846-7470A	U
Barium, Dissolved		0.131	mg/L	0.004	7/26/2023			SW846-6020B	=
Chromium, Dissolved	U	0.01	mg/L	0.01	7/26/2023			SW846-6020B	=
Uranium, Dissolved	U	0.0002	mg/L	0.0002	7/26/2023			SW846-6020B	=
Radium-226	U	0.213	pCi/L	0.497	7/26/2023	0.32	0.32	AN-1418	=
Strontium-90	U	0.428	pCi/L	6.73	7/26/2023	3.57	3.57	EPA-905.0-M	=
Tritium	U	-55.3	pCi/L	236	7/26/2023	128	128	EPA-906.0-M	=
Technetium-99	U	4.62	pCi/L	18.5	7/26/2023	10.7	10.7	HASL 300, Tc-02-RC M	=
Thorium-230	U	1.53	pCi/L	2.91	7/26/2023	1.98	2	HASL 300, Th-01-RC M	=

Alpha activity	U	1.14	pCi/L	5.37	7/26/2023	2.7	2.7	SW846-9310	=
Beta activity	U	-0.834	pCi/L	7.47	7/26/2023	3.8	3.8	SW846-9310	=
1,2-Dibromo-3-chloropropane	U	0.0187	ug/L	0.0187	7/26/2023			SW846-8011	=
1,1,1,2-Tetrachloroethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
1,1,1-Trichloroethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
1,1,2,2-Tetrachloroethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
1,1,2-Trichloroethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
1,1-Dichloroethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
1,1-Dichloroethene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
1,2,3-Trichloropropane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
1,2-Dibromoethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
1,2-Dichlorobenzene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
1,2-Dichloroethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
1,2-Dichloropropane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
1,4-Dichlorobenzene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
2-Butanone	U	5	ug/L	5	7/26/2023			SW846-8260D	=
2-Hexanone	U	5	ug/L	5	7/26/2023			SW846-8260D	=
4-Methyl-2-pentanone	U	5	ug/L	5	7/26/2023			SW846-8260D	=
Acetone	U	5	ug/L	5	7/26/2023			SW846-8260D	=
Acrolein	U	5	ug/L	5	7/26/2023			SW846-8260D	=
Acrylonitrile	U	5	ug/L	5	7/26/2023			SW846-8260D	=
Benzene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Bromochloromethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Bromodichloromethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Bromoform	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Bromomethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Carbon disulfide	U	5	ug/L	5	7/26/2023			SW846-8260D	=
Carbon tetrachloride	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Chlorobenzene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Chloroethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Chloroform	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Chloromethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
cis-1,2-Dichloroethene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
cis-1,3-Dichloropropene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Dibromochloromethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Dibromomethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Ethylbenzene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Iodomethane	U	5	ug/L	5	7/26/2023			SW846-8260D	=
Methylene chloride	U	5	ug/L	5	7/26/2023			SW846-8260D	=
Styrene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Tetrachloroethene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Toluene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Total Xylene	U	3	ug/L	3	7/26/2023			SW846-8260D	=
trans-1,2-Dichloroethene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
trans-1,3-Dichloropropene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Trans-1,4-Dichloro-2-butene	U	5	ug/L	5	7/26/2023			SW846-8260D	=
Trichloroethene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Trichlorofluoromethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Vinyl acetate	U	5	ug/L	5	7/26/2023			SW846-8260D	=
Vinyl chloride	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Dissolved Solids		331	mg/L	10	7/26/2023			EPA-160.1	=
Iodide	U	0.5	mg/L	0.5	7/26/2023			EPA-300.0	=
Chemical Oxygen Demand (COD)	U	20	mg/L	20	7/26/2023			EPA-410.4	=
Cyanide	U	0.2	mg/L	0.2	7/26/2023			SW846-9012B	=
Total Organic Halides (TOX)		116	ug/L	10	7/26/2023			SW846-9020B	=
Total Organic Carbon (TOC)		4.22	mg/L	2	7/26/2023			SW846-9060A	=

**Paducah OREIS  
GROUNDWATER MONITORING REPORT**

**Facility:** C-746-S&T Landfill      **County:** McCracken      **Permit #:** SW07300014,SW07300015,SW07300045

**Sampling Point:** MW387      DOWN      **RGA Type:** URGA      **Period:** 3rd Quarter 2023

**AKGWA Well Tag #:** 8004-4815      **SAMPLE ID:** MW387SG4-23      **Sample Type:** REG

Parameter	Qualifier	Result	Units	Reporting Limit	Date Collected	Counting Error (+/-)	TPU	Method	Validation
Bromide		0.518	mg/L	0.2	7/26/2023			SW846-9056A	=
Chloride	J	38.3	mg/L	250	7/26/2023			SW846-9056A	=
Fluoride	J	0.866	mg/L	4	7/26/2023			SW846-9056A	=
Nitrate as Nitrogen	J	0.931	mg/L	10	7/26/2023			SW846-9056A	=
Sulfate		31.5	mg/L	2	7/26/2023			SW846-9056A	=
Barometric Pressure Reading		30.03	Inches/Hg		7/26/2023				X
Conductivity		570	umho/cm		7/26/2023				X
Depth to Water		39.44	ft		7/26/2023				X
Dissolved Oxygen		4.53	mg/L		7/26/2023				X
Eh (approx)		410	mV		7/26/2023				X
pH		6.15	Std Unit		7/26/2023				X
Temperature		65.8	deg F		7/26/2023				X
Turbidity		3.11	NTU		7/26/2023				X
Aluminum	U	0.05	mg/L	0.05	7/26/2023			SW846-6020B	=
Antimony	U	0.003	mg/L	0.003	7/26/2023			SW846-6020B	=
Arsenic	U	0.005	mg/L	0.005	7/26/2023			SW846-6020B	=
Barium		0.107	mg/L	0.004	7/26/2023			SW846-6020B	=
Beryllium	U	0.0005	mg/L	0.0005	7/26/2023			SW846-6020B	=
Boron		0.0432	mg/L	0.015	7/26/2023			SW846-6020B	=
Cadmium	U	0.001	mg/L	0.001	7/26/2023			SW846-6020B	=
Calcium		37.8	mg/L	0.2	7/26/2023			SW846-6020B	=
Chromium	J	0.00534	mg/L	0.01	7/26/2023			SW846-6020B	=
Cobalt	U	0.001	mg/L	0.001	7/26/2023			SW846-6020B	=
Copper		0.00342	mg/L	0.002	7/26/2023			SW846-6020B	J
Iron	J	0.0549	mg/L	0.1	7/26/2023			SW846-6020B	=
Lead	U	0.002	mg/L	0.002	7/26/2023			SW846-6020B	=
Magnesium		15.7	mg/L	0.03	7/26/2023			SW846-6020B	=
Manganese	J	0.00183	mg/L	0.005	7/26/2023			SW846-6020B	J
Molybdenum	U	0.001	mg/L	0.001	7/26/2023			SW846-6020B	=
Nickel	J	0.00138	mg/L	0.002	7/26/2023			SW846-6020B	J
Potassium		1.76	mg/L	0.3	7/26/2023			SW846-6020B	=
Rhodium	U	0.005	mg/L	0.005	7/26/2023			SW846-6020B	=
Selenium	U	0.005	mg/L	0.005	7/26/2023			SW846-6020B	=
Silver	U	0.001	mg/L	0.001	7/26/2023			SW846-6020B	=
Sodium		52.2	mg/L	2.5	7/26/2023			SW846-6020B	=
Tantalum	U	0.005	mg/L	0.005	7/26/2023			SW846-6020B	=
Thallium	U	0.002	mg/L	0.002	7/26/2023			SW846-6020B	=
Uranium	U	0.0002	mg/L	0.0002	7/26/2023			SW846-6020B	=
Vanadium	U	0.02	mg/L	0.02	7/26/2023			SW846-6020B	=
Zinc	J	0.00705	mg/L	0.02	7/26/2023			SW846-6020B	=
Mercury	BJ	0.000098	mg/L	0.0002	7/26/2023			SW846-7470A	U
Barium, Dissolved		0.105	mg/L	0.004	7/26/2023			SW846-6020B	=
Chromium, Dissolved	J	0.00462	mg/L	0.01	7/26/2023			SW846-6020B	=
Uranium, Dissolved	U	0.0002	mg/L	0.0002	7/26/2023			SW846-6020B	=
Radium-226	U	0.359	pCi/L	0.524	7/26/2023	0.385	0.386	AN-1418	=
Strontium-90	U	3.22	pCi/L	6.26	7/26/2023	3.72	3.76	EPA-905.0-M	=
Tritium	U	18.5	pCi/L	233	7/26/2023	132	132	EPA-906.0-M	=
Technetium-99		45.8	pCi/L	17.5	7/26/2023	12.2	13.3	HASL 300, Tc-02-RC M	=
Thorium-230	U	-0.758	pCi/L	3.63	7/26/2023	1.06	1.07	HASL 300, Th-01-RC M	=

Alpha activity	U	0.00738	pCi/L	5.31	7/26/2023	2.28	2.28	SW846-9310	=
Beta activity		39.1	pCi/L	7.76	7/26/2023	7.82	10.2	SW846-9310	=
1,2-Dibromo-3-chloropropane	U	0.0187	ug/L	0.0187	7/26/2023			SW846-8011	=
1,1,1,2-Tetrachloroethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
1,1,1-Trichloroethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
1,1,2,2-Tetrachloroethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
1,1,2-Trichloroethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
1,1-Dichloroethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
1,1-Dichloroethene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
1,2,3-Trichloropropane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
1,2-Dibromoethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
1,2-Dichlorobenzene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
1,2-Dichloroethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
1,2-Dichloropropane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
1,4-Dichlorobenzene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
2-Butanone	U	5	ug/L	5	7/26/2023			SW846-8260D	=
2-Hexanone	U	5	ug/L	5	7/26/2023			SW846-8260D	=
4-Methyl-2-pentanone	U	5	ug/L	5	7/26/2023			SW846-8260D	=
Acetone	U	5	ug/L	5	7/26/2023			SW846-8260D	=
Acrolein	U	5	ug/L	5	7/26/2023			SW846-8260D	=
Acrylonitrile	U	5	ug/L	5	7/26/2023			SW846-8260D	=
Benzene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Bromochloromethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Bromodichloromethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Bromoform	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Bromomethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Carbon disulfide	U	5	ug/L	5	7/26/2023			SW846-8260D	=
Carbon tetrachloride	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Chlorobenzene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Chloroethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Chloroform	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Chloromethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
cis-1,2-Dichloroethene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
cis-1,3-Dichloropropene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Dibromochloromethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Dibromomethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Ethylbenzene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Iodomethane	U	5	ug/L	5	7/26/2023			SW846-8260D	=
Methylene chloride	U	5	ug/L	5	7/26/2023			SW846-8260D	=
Styrene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Tetrachloroethene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Toluene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Total Xylene	U	3	ug/L	3	7/26/2023			SW846-8260D	=
trans-1,2-Dichloroethene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
trans-1,3-Dichloropropene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Trans-1,4-Dichloro-2-butene	U	5	ug/L	5	7/26/2023			SW846-8260D	=
Trichloroethene	J	0.38	ug/L	1	7/26/2023			SW846-8260D	=
Trichlorofluoromethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Vinyl acetate	U	5	ug/L	5	7/26/2023			SW846-8260D	=
Vinyl chloride	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Dissolved Solids		281	mg/L	10	7/26/2023			EPA-160.1	=
Iodide	U	0.5	mg/L	0.5	7/26/2023			EPA-300.0	=
Chemical Oxygen Demand (COD)	U	20	mg/L	20	7/26/2023			EPA-410.4	=
Cyanide	U	0.2	mg/L	0.2	7/26/2023			SW846-9012B	=
Total Organic Halides (TOX)	J	6.76	ug/L	10	7/26/2023			SW846-9020B	=
Total Organic Carbon (TOC)	J	1.09	mg/L	2	7/26/2023			SW846-9060A	=

**Paducah OREIS  
GROUNDWATER MONITORING REPORT**

**Facility:** C-746-S&T Landfill      **County:** McCracken      **Permit #:** SW07300014,SW07300015,SW07300045

**Sampling Point:** MW388      DOWN      **RGA Type:** LRGA      **Period:** 3rd Quarter 2023

**AKGWA Well Tag #:** 8004-4816      **SAMPLE ID:** MW388SG4-23      **Sample Type:** REG

Parameter	Qualifier	Result	Units	Reporting Limit	Date Collected	Counting Error (+/-)	TPU	Method	Validation
Bromide		0.503	mg/L	0.2	7/26/2023			SW846-9056A	=
Chloride	J	36.8	mg/L	250	7/26/2023			SW846-9056A	=
Fluoride	J	0.287	mg/L	4	7/26/2023			SW846-9056A	=
Nitrate as Nitrogen	J	0.978	mg/L	10	7/26/2023			SW846-9056A	=
Sulfate		20	mg/L	2	7/26/2023			SW846-9056A	=
Barometric Pressure Reading		30.05	Inches/Hg		7/26/2023				X
Conductivity		443	umho/cm		7/26/2023				X
Depth to Water		39.42	ft		7/26/2023				X
Dissolved Oxygen		4.39	mg/L		7/26/2023				X
Eh (approx)		432	mV		7/26/2023				X
pH		6.13	Std Unit		7/26/2023				X
Temperature		67.1	deg F		7/26/2023				X
Turbidity		2.91	NTU		7/26/2023				X
Aluminum	U	0.05	mg/L	0.05	7/26/2023			SW846-6020B	=
Antimony	U	0.003	mg/L	0.003	7/26/2023			SW846-6020B	=
Arsenic	U	0.005	mg/L	0.005	7/26/2023			SW846-6020B	=
Barium		0.164	mg/L	0.004	7/26/2023			SW846-6020B	=
Beryllium	U	0.0005	mg/L	0.0005	7/26/2023			SW846-6020B	=
Boron		0.0269	mg/L	0.015	7/26/2023			SW846-6020B	=
Cadmium	U	0.001	mg/L	0.001	7/26/2023			SW846-6020B	=
Calcium		25.5	mg/L	0.2	7/26/2023			SW846-6020B	=
Chromium	U	0.01	mg/L	0.01	7/26/2023			SW846-6020B	=
Cobalt	U	0.001	mg/L	0.001	7/26/2023			SW846-6020B	=
Copper	J	0.00116	mg/L	0.002	7/26/2023			SW846-6020B	J
Iron	U	0.1	mg/L	0.1	7/26/2023			SW846-6020B	=
Lead	U	0.002	mg/L	0.002	7/26/2023			SW846-6020B	=
Magnesium		10.9	mg/L	0.03	7/26/2023			SW846-6020B	=
Manganese	U	0.005	mg/L	0.005	7/26/2023			SW846-6020B	=
Molybdenum	U	0.001	mg/L	0.001	7/26/2023			SW846-6020B	=
Nickel	U	0.002	mg/L	0.002	7/26/2023			SW846-6020B	=
Potassium		1.78	mg/L	0.3	7/26/2023			SW846-6020B	=
Rhodium	U	0.005	mg/L	0.005	7/26/2023			SW846-6020B	=
Selenium	U	0.005	mg/L	0.005	7/26/2023			SW846-6020B	=
Silver	U	0.001	mg/L	0.001	7/26/2023			SW846-6020B	=
Sodium		42.7	mg/L	0.25	7/26/2023			SW846-6020B	=
Tantalum	U	0.005	mg/L	0.005	7/26/2023			SW846-6020B	=
Thallium	U	0.002	mg/L	0.002	7/26/2023			SW846-6020B	=
Uranium	U	0.0002	mg/L	0.0002	7/26/2023			SW846-6020B	=
Vanadium	U	0.02	mg/L	0.02	7/26/2023			SW846-6020B	=
Zinc	J	0.00512	mg/L	0.02	7/26/2023			SW846-6020B	=
Mercury	BJ	0.000108	mg/L	0.0002	7/26/2023			SW846-7470A	U
Barium, Dissolved		0.165	mg/L	0.004	7/26/2023			SW846-6020B	=
Chromium, Dissolved	U	0.01	mg/L	0.01	7/26/2023			SW846-6020B	=
Uranium, Dissolved	U	0.0002	mg/L	0.0002	7/26/2023			SW846-6020B	=
Radium-226	U	0.277	pCi/L	0.724	7/26/2023	0.483	0.483	AN-1418	=
Strontium-90	U	4.84	pCi/L	6.91	7/26/2023	4.27	4.34	EPA-905.0-M	=
Tritium	U	31.6	pCi/L	236	7/26/2023	134	134	EPA-906.0-M	=
Technetium-99	U	16.4	pCi/L	18.4	7/26/2023	11.3	11.4	HASL 300, Tc-02-RC M	=
Thorium-230	U	0.129	pCi/L	3.23	7/26/2023	1.52	1.52	HASL 300, Th-01-RC M	=



Alpha activity	U	-0.239	pCi/L	5.61	7/26/2023	2.3	2.3	SW846-9310	=
Beta activity		18.6	pCi/L	9.81	7/26/2023	7.06	7.7	SW846-9310	=
1,2-Dibromo-3-chloropropane	U	0.0192	ug/L	0.0192	7/26/2023			SW846-8011	=
1,1,1,2-Tetrachloroethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
1,1,1-Trichloroethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
1,1,2,2-Tetrachloroethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
1,1,2-Trichloroethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
1,1-Dichloroethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
1,1-Dichloroethene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
1,2,3-Trichloropropane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
1,2-Dibromoethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
1,2-Dichlorobenzene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
1,2-Dichloroethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
1,2-Dichloropropane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
1,4-Dichlorobenzene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
2-Butanone	U	5	ug/L	5	7/26/2023			SW846-8260D	=
2-Hexanone	U	5	ug/L	5	7/26/2023			SW846-8260D	=
4-Methyl-2-pentanone	U	5	ug/L	5	7/26/2023			SW846-8260D	=
Acetone	U	5	ug/L	5	7/26/2023			SW846-8260D	=
Acrolein	U	5	ug/L	5	7/26/2023			SW846-8260D	=
Acrylonitrile	U	5	ug/L	5	7/26/2023			SW846-8260D	=
Benzene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Bromochloromethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Bromodichloromethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Bromoform	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Bromomethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Carbon disulfide	U	5	ug/L	5	7/26/2023			SW846-8260D	=
Carbon tetrachloride	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Chlorobenzene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Chloroethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Chloroform	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Chloromethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
cis-1,2-Dichloroethene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
cis-1,3-Dichloropropene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Dibromochloromethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Dibromomethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Ethylbenzene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Iodomethane	U	5	ug/L	5	7/26/2023			SW846-8260D	=
Methylene chloride	U	5	ug/L	5	7/26/2023			SW846-8260D	=
Styrene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Tetrachloroethene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Toluene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Total Xylene	U	3	ug/L	3	7/26/2023			SW846-8260D	=
trans-1,2-Dichloroethene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
trans-1,3-Dichloropropene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Trans-1,4-Dichloro-2-butene	U	5	ug/L	5	7/26/2023			SW846-8260D	=
Trichloroethene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Trichlorofluoromethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Vinyl acetate	U	5	ug/L	5	7/26/2023			SW846-8260D	=
Vinyl chloride	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Dissolved Solids		198	mg/L	10	7/26/2023			EPA-160.1	=
Iodide	U	0.5	mg/L	0.5	7/26/2023			EPA-300.0	=
Chemical Oxygen Demand (COD)	U	20	mg/L	20	7/26/2023			EPA-410.4	=
Cyanide	U	0.2	mg/L	0.2	7/26/2023			SW846-9012B	=
Total Organic Halides (TOX)	J	4.76	ug/L	10	7/26/2023			SW846-9020B	=
Total Organic Carbon (TOC)	J	1.07	mg/L	2	7/26/2023			SW846-9060A	=



**Paducah OREIS  
GROUNDWATER MONITORING REPORT**

**Facility:** C-746-S&T Landfill      **County:** McCracken      **Permit #:** SW07300014,SW07300015,SW07300045

**Sampling Point:** MW390      DOWN      **RGA Type:** UCRS      **Period:** 3rd Quarter 2023

**AKGWA Well Tag #:** 8004-4811      **SAMPLE ID:** MW390SG4-23      **Sample Type:** REG

Parameter	Qualifier	Result	Units	Reporting Limit	Date Collected	Counting Error (+/-)	TPU	Method	Validation
Bromide		0.345	mg/L	0.2	7/26/2023			SW846-9056A	=
Chloride	J	36.4	mg/L	250	7/26/2023			SW846-9056A	=
Fluoride	J	0.316	mg/L	4	7/26/2023			SW846-9056A	=
Nitrate as Nitrogen	J	2.01	mg/L	10	7/26/2023			SW846-9056A	=
Sulfate		35.2	mg/L	2	7/26/2023			SW846-9056A	=
Barometric Pressure Reading		30.01	Inches/Hg		7/26/2023				X
Conductivity		618	umho/cm		7/26/2023				X
Depth to Water		36.37	ft		7/26/2023				X
Dissolved Oxygen		4.57	mg/L		7/26/2023				X
Eh (approx)		419	mV		7/26/2023				X
pH		6.3	Std Unit		7/26/2023				X
Temperature		68.4	deg F		7/26/2023				X
Turbidity		2.81	NTU		7/26/2023				X
Aluminum	J	0.0241	mg/L	0.05	7/26/2023			SW846-6020B	=
Antimony	U	0.003	mg/L	0.003	7/26/2023			SW846-6020B	=
Arsenic	U	0.005	mg/L	0.005	7/26/2023			SW846-6020B	=
Barium		0.21	mg/L	0.004	7/26/2023			SW846-6020B	=
Beryllium	U	0.0005	mg/L	0.0005	7/26/2023			SW846-6020B	=
Boron	J	0.0134	mg/L	0.015	7/26/2023			SW846-6020B	=
Cadmium	U	0.001	mg/L	0.001	7/26/2023			SW846-6020B	=
Calcium		25	mg/L	0.2	7/26/2023			SW846-6020B	=
Chromium	U	0.01	mg/L	0.01	7/26/2023			SW846-6020B	=
Cobalt	U	0.001	mg/L	0.001	7/26/2023			SW846-6020B	=
Copper		0.0021	mg/L	0.002	7/26/2023			SW846-6020B	J
Iron	U	0.1	mg/L	0.1	7/26/2023			SW846-6020B	=
Lead	U	0.002	mg/L	0.002	7/26/2023			SW846-6020B	=
Magnesium		10.6	mg/L	0.03	7/26/2023			SW846-6020B	=
Manganese	U	0.005	mg/L	0.005	7/26/2023			SW846-6020B	=
Molybdenum	J	0.000354	mg/L	0.001	7/26/2023			SW846-6020B	=
Nickel	J	0.0012	mg/L	0.002	7/26/2023			SW846-6020B	J
Potassium		0.32	mg/L	0.3	7/26/2023			SW846-6020B	=
Rhodium	U	0.005	mg/L	0.005	7/26/2023			SW846-6020B	=
Selenium	U	0.005	mg/L	0.005	7/26/2023			SW846-6020B	=
Silver	U	0.001	mg/L	0.001	7/26/2023			SW846-6020B	=
Sodium		84.3	mg/L	2.5	7/26/2023			SW846-6020B	=
Tantalum	U	0.005	mg/L	0.005	7/26/2023			SW846-6020B	=
Thallium	U	0.002	mg/L	0.002	7/26/2023			SW846-6020B	=
Uranium	J	0.00013	mg/L	0.0002	7/26/2023			SW846-6020B	U
Vanadium	J	0.00363	mg/L	0.02	7/26/2023			SW846-6020B	=
Zinc	J	0.0069	mg/L	0.02	7/26/2023			SW846-6020B	=
Mercury	BJ	0.00011	mg/L	0.0002	7/26/2023			SW846-7470A	U
Barium, Dissolved		0.22	mg/L	0.004	7/26/2023			SW846-6020B	=
Chromium, Dissolved	U	0.01	mg/L	0.01	7/26/2023			SW846-6020B	=
Uranium, Dissolved	J	0.000131	mg/L	0.0002	7/26/2023			SW846-6020B	U
Radium-226	U	0.275	pCi/L	0.477	7/26/2023	0.326	0.327	AN-1418	=
Strontium-90	U	3.54	pCi/L	5.73	7/26/2023	3.49	3.53	EPA-905.0-M	=
Tritium	U	35.7	pCi/L	234	7/26/2023	133	134	EPA-906.0-M	=
Technetium-99		49	pCi/L	18.1	7/26/2023	12.7	13.9	HASL 300, Tc-02-RC M	=
Thorium-230	U	-0.463	pCi/L	2.79	7/26/2023	0.985	0.986	HASL 300, Th-01-RC M	=

Alpha activity	U	3.83	pCi/L	5.34	7/26/2023	3.73	3.8	SW846-9310	=
Beta activity		45.5	pCi/L	7.86	7/26/2023	8.37	11.3	SW846-9310	=
1,2-Dibromo-3-chloropropane	U	0.0187	ug/L	0.0187	7/26/2023			SW846-8011	=
1,1,1,2-Tetrachloroethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
1,1,1-Trichloroethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
1,1,2,2-Tetrachloroethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
1,1,2-Trichloroethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
1,1-Dichloroethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
1,1-Dichloroethene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
1,2,3-Trichloropropane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
1,2-Dibromoethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
1,2-Dichlorobenzene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
1,2-Dichloroethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
1,2-Dichloropropane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
1,4-Dichlorobenzene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
2-Butanone	U	5	ug/L	5	7/26/2023			SW846-8260D	=
2-Hexanone	U	5	ug/L	5	7/26/2023			SW846-8260D	=
4-Methyl-2-pentanone	U	5	ug/L	5	7/26/2023			SW846-8260D	=
Acetone	U	5	ug/L	5	7/26/2023			SW846-8260D	=
Acrolein	U	5	ug/L	5	7/26/2023			SW846-8260D	=
Acrylonitrile	U	5	ug/L	5	7/26/2023			SW846-8260D	=
Benzene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Bromochloromethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Bromodichloromethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Bromoform	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Bromomethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Carbon disulfide	U	5	ug/L	5	7/26/2023			SW846-8260D	=
Carbon tetrachloride	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Chlorobenzene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Chloroethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Chloroform	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Chloromethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
cis-1,2-Dichloroethene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
cis-1,3-Dichloropropene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Dibromochloromethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Dibromomethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Ethylbenzene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Iodomethane	U	5	ug/L	5	7/26/2023			SW846-8260D	=
Methylene chloride	U	5	ug/L	5	7/26/2023			SW846-8260D	=
Styrene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Tetrachloroethene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Toluene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Total Xylene	U	3	ug/L	3	7/26/2023			SW846-8260D	=
trans-1,2-Dichloroethene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
trans-1,3-Dichloropropene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Trans-1,4-Dichloro-2-butene	U	5	ug/L	5	7/26/2023			SW846-8260D	=
Trichloroethene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Trichlorofluoromethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Vinyl acetate	U	5	ug/L	5	7/26/2023			SW846-8260D	=
Vinyl chloride	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Dissolved Solids		332	mg/L	10	7/26/2023			EPA-160.1	=
Iodide	U	0.5	mg/L	0.5	7/26/2023			EPA-300.0	=
Chemical Oxygen Demand (COD)	U	20	mg/L	20	7/26/2023			EPA-410.4	=
Cyanide	U	0.2	mg/L	0.2	7/26/2023			SW846-9012B	=
Total Organic Halides (TOX)		12.9	ug/L	10	7/26/2023			SW846-9020B	=
Total Organic Carbon (TOC)	J	1.89	mg/L	2	7/26/2023			SW846-9060A	=

**Paducah OREIS  
GROUNDWATER MONITORING REPORT**

**Facility:** C-746-S&T Landfill      **County:** McCracken      **Permit #:** SW07300014,SW07300015,SW07300045

**Sampling Point:** MW391      DOWN      **RGA Type:** URGA      **Period:** 3rd Quarter 2023

**AKGWA Well Tag #:** 8004-4805      **SAMPLE ID:** MW391SG4-23      **Sample Type:** REG

Parameter	Qualifier	Result	Units	Reporting Limit	Date Collected	Counting Error (+/-)	TPU	Method	Validation
Bromide	W	0.601	mg/L	0.2	7/27/2023			SW846-9056A	=
Chloride	J	42.5	mg/L	250	7/27/2023			SW846-9056A	=
Fluoride	J	0.148	mg/L	4	7/27/2023			SW846-9056A	=
Nitrate as Nitrogen	J	1.1	mg/L	10	7/27/2023			SW846-9056A	=
Sulfate		12.9	mg/L	0.4	7/27/2023			SW846-9056A	=
Barometric Pressure Reading		30.03	Inches/Hg		7/27/2023				X
Conductivity		382	umho/cm		7/27/2023				X
Depth to Water		42.69	ft		7/27/2023				X
Dissolved Oxygen		4.57	mg/L		7/27/2023				X
Eh (approx)		443	mV		7/27/2023				X
pH		6	Std Unit		7/27/2023				X
Temperature		64.7	deg F		7/27/2023				X
Turbidity		2.34	NTU		7/27/2023				X
Aluminum	U	0.05	mg/L	0.05	7/27/2023			SW846-6020B	=
Antimony	U	0.003	mg/L	0.003	7/27/2023			SW846-6020B	=
Arsenic	U	0.005	mg/L	0.005	7/27/2023			SW846-6020B	=
Barium		0.228	mg/L	0.004	7/27/2023			SW846-6020B	=
Beryllium	U	0.0005	mg/L	0.0005	7/27/2023			SW846-6020B	=
Boron		0.027	mg/L	0.015	7/27/2023			SW846-6020B	=
Cadmium	U	0.001	mg/L	0.001	7/27/2023			SW846-6020B	=
Calcium		25.2	mg/L	0.2	7/27/2023			SW846-6020B	=
Chromium	U	0.01	mg/L	0.01	7/27/2023			SW846-6020B	=
Cobalt	U	0.001	mg/L	0.001	7/27/2023			SW846-6020B	=
Copper	J	0.00115	mg/L	0.002	7/27/2023			SW846-6020B	J
Iron	J	0.0631	mg/L	0.1	7/27/2023			SW846-6020B	=
Lead	U	0.002	mg/L	0.002	7/27/2023			SW846-6020B	=
Magnesium		10.1	mg/L	0.03	7/27/2023			SW846-6020B	=
Manganese	J	0.00141	mg/L	0.005	7/27/2023			SW846-6020B	J
Molybdenum	U	0.001	mg/L	0.001	7/27/2023			SW846-6020B	=
Nickel	U	0.002	mg/L	0.002	7/27/2023			SW846-6020B	=
Potassium		1.48	mg/L	0.3	7/27/2023			SW846-6020B	=
Rhodium	U	0.005	mg/L	0.005	7/27/2023			SW846-6020B	=
Selenium	U	0.005	mg/L	0.005	7/27/2023			SW846-6020B	=
Silver	U	0.001	mg/L	0.001	7/27/2023			SW846-6020B	=
Sodium		30.4	mg/L	0.25	7/27/2023			SW846-6020B	=
Tantalum	U	0.005	mg/L	0.005	7/27/2023			SW846-6020B	=
Thallium	U	0.002	mg/L	0.002	7/27/2023			SW846-6020B	=
Uranium	U	0.0002	mg/L	0.0002	7/27/2023			SW846-6020B	=
Vanadium	U	0.02	mg/L	0.02	7/27/2023			SW846-6020B	=
Zinc	U	0.02	mg/L	0.02	7/27/2023			SW846-6020B	=
Mercury	U	0.0002	mg/L	0.0002	7/27/2023			SW846-7470A	=
Barium, Dissolved		0.223	mg/L	0.004	7/27/2023			SW846-6020B	=
Chromium, Dissolved	U	0.01	mg/L	0.01	7/27/2023			SW846-6020B	=
Uranium, Dissolved	U	0.0002	mg/L	0.0002	7/27/2023			SW846-6020B	=
Radium-226	U	0.322	pCi/L	0.512	7/27/2023	0.362	0.363	AN-1418	=
Strontium-90	U	1.51	pCi/L	7.39	7/27/2023	4.15	4.15	EPA-905.0-M	=
Tritium	U	123	pCi/L	265	7/27/2023	157	159	EPA-906.0-M	=
Technetium-99	U	4.13	pCi/L	18.1	7/27/2023	10.5	10.5	HASL 300, Tc-02-RC M	=
Thorium-230	U	-0.38	pCi/L	3.03	7/27/2023	1.2	1.2	HASL 300, Th-01-RC M	=

Alpha activity	U	3.12	pCi/L	7.48	7/27/2023	4.35	4.39	SW846-9310	=
Beta activity		11.1	pCi/L	9.37	7/27/2023	6.34	6.61	SW846-9310	=
1,2-Dibromo-3-chloropropane	U	0.0191	ug/L	0.0191	7/27/2023			SW846-8011	=
1,1,1,2-Tetrachloroethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
1,1,1-Trichloroethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
1,1,2,2-Tetrachloroethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
1,1,2-Trichloroethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
1,1-Dichloroethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
1,1-Dichloroethene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
1,2,3-Trichloropropane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
1,2-Dibromoethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
1,2-Dichlorobenzene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
1,2-Dichloroethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
1,2-Dichloropropane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
1,4-Dichlorobenzene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
2-Butanone	U	5	ug/L	5	7/27/2023			SW846-8260D	=
2-Hexanone	U	5	ug/L	5	7/27/2023			SW846-8260D	=
4-Methyl-2-pentanone	U	5	ug/L	5	7/27/2023			SW846-8260D	=
Acetone	U	5	ug/L	5	7/27/2023			SW846-8260D	=
Acrolein	U	5	ug/L	5	7/27/2023			SW846-8260D	UJ
Acrylonitrile	U	5	ug/L	5	7/27/2023			SW846-8260D	=
Benzene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Bromochloromethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Bromodichloromethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Bromoform	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Bromomethane	UL	1	ug/L	1	7/27/2023			SW846-8260D	UJ
Carbon disulfide	U	5	ug/L	5	7/27/2023			SW846-8260D	=
Carbon tetrachloride	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Chlorobenzene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Chloroethane	UL	1	ug/L	1	7/27/2023			SW846-8260D	=
Chloroform	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Chloromethane	ULY1	1	ug/L	1	7/27/2023			SW846-8260D	UJ
cis-1,2-Dichloroethene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
cis-1,3-Dichloropropene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Dibromochloromethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Dibromomethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Ethylbenzene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Iodomethane	U	5	ug/L	5	7/27/2023			SW846-8260D	=
Methylene chloride	J	0.61	ug/L	5	7/27/2023			SW846-8260D	=
Styrene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Tetrachloroethene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Toluene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Total Xylene	U	3	ug/L	3	7/27/2023			SW846-8260D	=
trans-1,2-Dichloroethene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
trans-1,3-Dichloropropene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Trans-1,4-Dichloro-2-butene	U	5	ug/L	5	7/27/2023			SW846-8260D	=
Trichloroethene		2.69	ug/L	1	7/27/2023			SW846-8260D	=
Trichlorofluoromethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Vinyl acetate	U	5	ug/L	5	7/27/2023			SW846-8260D	=
Vinyl chloride	UL	1	ug/L	1	7/27/2023			SW846-8260D	UJ
Dissolved Solids		188	mg/L	10	7/27/2023			EPA-160.1	=
Iodide	U	0.5	mg/L	0.5	7/27/2023			EPA-300.0	=
Chemical Oxygen Demand (COD)	U	20	mg/L	20	7/27/2023			EPA-410.4	=
Cyanide	U	0.2	mg/L	0.2	7/27/2023			SW846-9012B	=
Total Organic Halides (TOX)	J	6.26	ug/L	10	7/27/2023			SW846-9020B	=
Total Organic Carbon (TOC)	J	0.823	mg/L	2	7/27/2023			SW846-9060A	=

**Paducah OREIS  
GROUNDWATER MONITORING REPORT**

**Facility:** C-746-S&T Landfill      **County:** McCracken      **Permit #:** SW07300014,SW07300015,SW07300045

**Sampling Point:** MW392      DOWN      **RGA Type:** LRGA      **Period:** 3rd Quarter 2023

**AKGWA Well Tag #:** 8004-4806      **SAMPLE ID:** MW392SG4-23      **Sample Type:** REG

Parameter	Qualifier	Result	Units	Reporting Limit	Date Collected	Counting Error (+/-)	TPU	Method	Validation
Bromide	W	0.7	mg/L	0.2	7/27/2023			SW846-9056A	J
Chloride	J	45	mg/L	250	7/27/2023			SW846-9056A	=
Fluoride	J	0.218	mg/L	4	7/27/2023			SW846-9056A	=
Nitrate as Nitrogen	J	0.634	mg/L	10	7/27/2023			SW846-9056A	=
Sulfate		8.31	mg/L	0.4	7/27/2023			SW846-9056A	=
Barometric Pressure Reading		30.03	Inches/Hg		7/27/2023				X
Conductivity		350	umho/cm		7/27/2023				X
Depth to Water		41.88	ft		7/27/2023				X
Dissolved Oxygen		1.08	mg/L		7/27/2023				X
Eh (approx)		428	mV		7/27/2023				X
pH		5.93	Std Unit		7/27/2023				X
Temperature		69.9	deg F		7/27/2023				X
Turbidity		2.1	NTU		7/27/2023				X
Aluminum		0.0603	mg/L	0.05	7/27/2023			SW846-6020B	J
Antimony	U	0.003	mg/L	0.003	7/27/2023			SW846-6020B	=
Arsenic	U	0.005	mg/L	0.005	7/27/2023			SW846-6020B	=
Barium		0.29	mg/L	0.004	7/27/2023			SW846-6020B	=
Beryllium	U	0.0005	mg/L	0.0005	7/27/2023			SW846-6020B	=
Boron		0.0232	mg/L	0.015	7/27/2023			SW846-6020B	=
Cadmium	U	0.001	mg/L	0.001	7/27/2023			SW846-6020B	=
Calcium		23.8	mg/L	0.2	7/27/2023			SW846-6020B	=
Chromium	U	0.01	mg/L	0.01	7/27/2023			SW846-6020B	=
Cobalt	U	0.001	mg/L	0.001	7/27/2023			SW846-6020B	=
Copper	J	0.00131	mg/L	0.002	7/27/2023			SW846-6020B	J
Iron	J	0.0921	mg/L	0.1	7/27/2023			SW846-6020B	=
Lead	U	0.002	mg/L	0.002	7/27/2023			SW846-6020B	=
Magnesium		9.47	mg/L	0.03	7/27/2023			SW846-6020B	=
Manganese		0.134	mg/L	0.005	7/27/2023			SW846-6020B	=
Molybdenum	U	0.001	mg/L	0.001	7/27/2023			SW846-6020B	=
Nickel	J	0.0014	mg/L	0.002	7/27/2023			SW846-6020B	J
Potassium		1.99	mg/L	0.3	7/27/2023			SW846-6020B	=
Rhodium	U	0.005	mg/L	0.005	7/27/2023			SW846-6020B	=
Selenium	U	0.005	mg/L	0.005	7/27/2023			SW846-6020B	=
Silver	U	0.001	mg/L	0.001	7/27/2023			SW846-6020B	=
Sodium		23.8	mg/L	0.25	7/27/2023			SW846-6020B	=
Tantalum	U	0.005	mg/L	0.005	7/27/2023			SW846-6020B	=
Thallium	U	0.002	mg/L	0.002	7/27/2023			SW846-6020B	=
Uranium	U	0.0002	mg/L	0.0002	7/27/2023			SW846-6020B	=
Vanadium	U	0.02	mg/L	0.02	7/27/2023			SW846-6020B	=
Zinc	J	0.00428	mg/L	0.02	7/27/2023			SW846-6020B	=
Mercury	U	0.0002	mg/L	0.0002	7/27/2023			SW846-7470A	=
Barium, Dissolved		0.293	mg/L	0.004	7/27/2023			SW846-6020B	=
Chromium, Dissolved	U	0.01	mg/L	0.01	7/27/2023			SW846-6020B	=
Uranium, Dissolved	U	0.0002	mg/L	0.0002	7/27/2023			SW846-6020B	=
Radium-226	U	0.143	pCi/L	0.621	7/27/2023	0.343	0.343	AN-1418	=
Strontium-90	U	0.854	pCi/L	5.63	7/27/2023	3.06	3.06	EPA-905.0-M	=
Tritium	U	78.5	pCi/L	268	7/27/2023	158	159	EPA-906.0-M	=
Technetium-99	U	1.18	pCi/L	18.2	7/27/2023	10.4	10.4	HASL 300, Tc-02-RC M	=
Thorium-230	U	0.411	pCi/L	2.33	7/27/2023	1.24	1.25	HASL 300, Th-01-RC M	=

Alpha activity	U	-0.495	pCi/L	6.2	7/27/2023	2.34	2.34	SW846-9310	=
Beta activity	U	2.85	pCi/L	9.62	7/27/2023	5.45	5.47	SW846-9310	=
1,2-Dibromo-3-chloropropane	U	0.0189	ug/L	0.0189	7/27/2023			SW846-8011	=
1,1,1,2-Tetrachloroethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
1,1,1-Trichloroethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
1,1,2,2-Tetrachloroethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
1,1,2-Trichloroethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
1,1-Dichloroethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
1,1-Dichloroethene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
1,2,3-Trichloropropane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
1,2-Dibromoethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
1,2-Dichlorobenzene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
1,2-Dichloroethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
1,2-Dichloropropane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
1,4-Dichlorobenzene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
2-Butanone	U	5	ug/L	5	7/27/2023			SW846-8260D	=
2-Hexanone	U	5	ug/L	5	7/27/2023			SW846-8260D	=
4-Methyl-2-pentanone	U	5	ug/L	5	7/27/2023			SW846-8260D	=
Acetone	U	5	ug/L	5	7/27/2023			SW846-8260D	=
Acrolein	U	5	ug/L	5	7/27/2023			SW846-8260D	UJ
Acrylonitrile	U	5	ug/L	5	7/27/2023			SW846-8260D	=
Benzene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Bromochloromethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Bromodichloromethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Bromoform	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Bromomethane	UL	1	ug/L	1	7/27/2023			SW846-8260D	UJ
Carbon disulfide	U	5	ug/L	5	7/27/2023			SW846-8260D	=
Carbon tetrachloride	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Chlorobenzene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Chloroethane	UL	1	ug/L	1	7/27/2023			SW846-8260D	=
Chloroform	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Chloromethane	ULY1	1	ug/L	1	7/27/2023			SW846-8260D	UJ
cis-1,2-Dichloroethene	J	0.75	ug/L	1	7/27/2023			SW846-8260D	=
cis-1,3-Dichloropropene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Dibromochloromethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Dibromomethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Ethylbenzene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Iodomethane	U	5	ug/L	5	7/27/2023			SW846-8260D	=
Methylene chloride	J	0.69	ug/L	5	7/27/2023			SW846-8260D	=
Styrene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Tetrachloroethene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Toluene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Total Xylene	U	3	ug/L	3	7/27/2023			SW846-8260D	=
trans-1,2-Dichloroethene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
trans-1,3-Dichloropropene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Trans-1,4-Dichloro-2-butene	U	5	ug/L	5	7/27/2023			SW846-8260D	=
Trichloroethene		4.88	ug/L	1	7/27/2023			SW846-8260D	=
Trichlorofluoromethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Vinyl acetate	U	5	ug/L	5	7/27/2023			SW846-8260D	=
Vinyl chloride	UL	1	ug/L	1	7/27/2023			SW846-8260D	UJ
Dissolved Solids		178	mg/L	10	7/27/2023			EPA-160.1	=
Iodide	U	0.5	mg/L	0.5	7/27/2023			EPA-300.0	=
Chemical Oxygen Demand (COD)	U	20	mg/L	20	7/27/2023			EPA-410.4	=
Cyanide	U	0.2	mg/L	0.2	7/27/2023			SW846-9012B	=
Total Organic Halides (TOX)	J	3.68	ug/L	10	7/27/2023			SW846-9020B	=
Total Organic Carbon (TOC)	J	0.741	mg/L	2	7/27/2023			SW846-9060A	=

**Paducah OREIS  
GROUNDWATER MONITORING REPORT**

**Facility:** C-746-S&T Landfill      **County:** McCracken      **Permit #:** SW07300014,SW07300015,SW07300045

**Sampling Point:** MW393      DOWN      **RGA Type:** UCRS      **Period:** 3rd Quarter 2023

**AKGWA Well Tag #:** 8004-4807      **SAMPLE ID:** MW393SG4-23      **Sample Type:** REG

Parameter	Qualifier	Result	Units	Reporting Limit	Date Collected	Counting Error (+/-)	TPU	Method	Validation
Bromide	JW	0.131	mg/L	0.2	7/27/2023			SW846-9056A	=
Chloride	J	9.23	mg/L	250	7/27/2023			SW846-9056A	=
Fluoride	J	0.205	mg/L	4	7/27/2023			SW846-9056A	=
Nitrate as Nitrogen	J	0.121	mg/L	10	7/27/2023			SW846-9056A	=
Sulfate		21.7	mg/L	2	7/27/2023			SW846-9056A	=
Barometric Pressure Reading		30.02	Inches/Hg		7/27/2023				X
Conductivity		453	umho/cm		7/27/2023				X
Depth to Water		29.8	ft		7/27/2023				X
Dissolved Oxygen		1.73	mg/L		7/27/2023				X
Eh (approx)		391	mV		7/27/2023				X
pH		6.23	Std Unit		7/27/2023				X
Temperature		70.1	deg F		7/27/2023				X
Turbidity		6.33	NTU		7/27/2023				X
Aluminum	U	0.05	mg/L	0.05	7/27/2023			SW846-6020B	=
Antimony	U	0.003	mg/L	0.003	7/27/2023			SW846-6020B	=
Arsenic	J	0.00383	mg/L	0.005	7/27/2023			SW846-6020B	=
Barium		0.0719	mg/L	0.004	7/27/2023			SW846-6020B	=
Beryllium	U	0.0005	mg/L	0.0005	7/27/2023			SW846-6020B	=
Boron		0.0176	mg/L	0.015	7/27/2023			SW846-6020B	=
Cadmium	U	0.001	mg/L	0.001	7/27/2023			SW846-6020B	=
Calcium		15.8	mg/L	0.2	7/27/2023			SW846-6020B	=
Chromium	U	0.01	mg/L	0.01	7/27/2023			SW846-6020B	=
Cobalt	U	0.001	mg/L	0.001	7/27/2023			SW846-6020B	=
Copper	J	0.00103	mg/L	0.002	7/27/2023			SW846-6020B	J
Iron		0.394	mg/L	0.1	7/27/2023			SW846-6020B	=
Lead	U	0.002	mg/L	0.002	7/27/2023			SW846-6020B	=
Magnesium		3.91	mg/L	0.03	7/27/2023			SW846-6020B	=
Manganese		0.0108	mg/L	0.005	7/27/2023			SW846-6020B	J
Molybdenum	J	0.00032	mg/L	0.001	7/27/2023			SW846-6020B	=
Nickel	U	0.002	mg/L	0.002	7/27/2023			SW846-6020B	=
Potassium		0.477	mg/L	0.3	7/27/2023			SW846-6020B	=
Rhodium	U	0.005	mg/L	0.005	7/27/2023			SW846-6020B	=
Selenium	U	0.005	mg/L	0.005	7/27/2023			SW846-6020B	=
Silver	U	0.001	mg/L	0.001	7/27/2023			SW846-6020B	=
Sodium		83.6	mg/L	2.5	7/27/2023			SW846-6020B	=
Tantalum	U	0.005	mg/L	0.005	7/27/2023			SW846-6020B	=
Thallium	U	0.002	mg/L	0.002	7/27/2023			SW846-6020B	=
Uranium	U	0.0002	mg/L	0.0002	7/27/2023			SW846-6020B	=
Vanadium	U	0.02	mg/L	0.02	7/27/2023			SW846-6020B	=
Zinc	U	0.02	mg/L	0.02	7/27/2023			SW846-6020B	=
Mercury	U	0.0002	mg/L	0.0002	7/27/2023			SW846-7470A	=
Barium, Dissolved		0.0554	mg/L	0.004	7/27/2023			SW846-6020B	=
Chromium, Dissolved	U	0.01	mg/L	0.01	7/27/2023			SW846-6020B	=
Uranium, Dissolved	U	0.0002	mg/L	0.0002	7/27/2023			SW846-6020B	=
Radium-226	U	0.129	pCi/L	0.562	7/27/2023	0.31	0.31	AN-1418	=
Strontium-90	U	3.3	pCi/L	7.2	7/27/2023	4.23	4.27	EPA-905.0-M	=
Tritium	U	169	pCi/L	267	7/27/2023	160	163	EPA-906.0-M	=
Technetium-99	U	-3	pCi/L	18.8	7/27/2023	10.5	10.5	HASL 300, Tc-02-RC M	=
Thorium-230	U	1.65	pCi/L	2.6	7/27/2023	1.79	1.82	HASL 300, Th-01-RC M	=



Alpha activity	U	-0.908	pCi/L	8.55	7/27/2023	3.56	3.56	SW846-9310	=
Beta activity	U	1.5	pCi/L	9.51	7/27/2023	5.22	5.23	SW846-9310	=
1,2-Dibromo-3-chloropropane	U	0.0187	ug/L	0.0187	7/27/2023			SW846-8011	=
1,1,1,2-Tetrachloroethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
1,1,1-Trichloroethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
1,1,2,2-Tetrachloroethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
1,1,2-Trichloroethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
1,1-Dichloroethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
1,1-Dichloroethene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
1,2,3-Trichloropropane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
1,2-Dibromoethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
1,2-Dichlorobenzene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
1,2-Dichloroethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
1,2-Dichloropropane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
1,4-Dichlorobenzene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
2-Butanone	U	5	ug/L	5	7/27/2023			SW846-8260D	=
2-Hexanone	U	5	ug/L	5	7/27/2023			SW846-8260D	=
4-Methyl-2-pentanone	U	5	ug/L	5	7/27/2023			SW846-8260D	=
Acetone	U	5	ug/L	5	7/27/2023			SW846-8260D	=
Acrolein	U	5	ug/L	5	7/27/2023			SW846-8260D	UJ
Acrylonitrile	U	5	ug/L	5	7/27/2023			SW846-8260D	=
Benzene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Bromochloromethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Bromodichloromethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Bromoform	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Bromomethane	UL	1	ug/L	1	7/27/2023			SW846-8260D	UJ
Carbon disulfide	U	5	ug/L	5	7/27/2023			SW846-8260D	=
Carbon tetrachloride	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Chlorobenzene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Chloroethane	UL	1	ug/L	1	7/27/2023			SW846-8260D	=
Chloroform	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Chloromethane	ULY1	1	ug/L	1	7/27/2023			SW846-8260D	UJ
cis-1,2-Dichloroethene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
cis-1,3-Dichloropropene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Dibromochloromethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Dibromomethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Ethylbenzene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Iodomethane	U	5	ug/L	5	7/27/2023			SW846-8260D	=
Methylene chloride	J	0.57	ug/L	5	7/27/2023			SW846-8260D	=
Styrene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Tetrachloroethene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Toluene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Total Xylene	U	3	ug/L	3	7/27/2023			SW846-8260D	=
trans-1,2-Dichloroethene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
trans-1,3-Dichloropropene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Trans-1,4-Dichloro-2-butene	U	5	ug/L	5	7/27/2023			SW846-8260D	=
Trichloroethene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Trichlorofluoromethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Vinyl acetate	U	5	ug/L	5	7/27/2023			SW846-8260D	=
Vinyl chloride	UL	1	ug/L	1	7/27/2023			SW846-8260D	UJ
Dissolved Solids		270	mg/L	10	7/27/2023			EPA-160.1	=
Iodide	U	0.5	mg/L	0.5	7/27/2023			EPA-300.0	=
Chemical Oxygen Demand (COD)	U	20	mg/L	20	7/27/2023			EPA-410.4	=
Cyanide	U	0.2	mg/L	0.2	7/27/2023			SW846-9012B	=
Total Organic Halides (TOX)		14.4	ug/L	10	7/27/2023			SW846-9020B	=
Total Organic Carbon (TOC)		2.29	mg/L	2	7/27/2023			SW846-9060A	=



**Paducah OREIS  
GROUNDWATER MONITORING REPORT**

**Facility:** C-746-S&T Landfill      **County:** McCracken      **Permit #:** SW07300014,SW07300015,SW07300045

**Sampling Point:** MW394      UP      **RGA Type:** URGA      **Period:** 3rd Quarter 2023

**AKGWA Well Tag #:** 8004-4802      **SAMPLE ID:** MW394SG4-23      **Sample Type:** REG

Parameter	Qualifier	Result	Units	Reporting Limit	Date Collected	Counting Error (+/-)	TPU	Method	Validation
Bromide	W	0.619	mg/L	0.2	7/27/2023			SW846-9056A	=
Chloride	J	45.7	mg/L	250	7/27/2023			SW846-9056A	=
Fluoride	J	0.135	mg/L	4	7/27/2023			SW846-9056A	=
Nitrate as Nitrogen	J	1.08	mg/L	10	7/27/2023			SW846-9056A	=
Sulfate		12.2	mg/L	0.4	7/27/2023			SW846-9056A	=
Barometric Pressure Reading		30.01	Inches/Hg		7/27/2023				X
Conductivity		415	umho/cm		7/27/2023				X
Depth to Water		54.26	ft		7/27/2023				X
Dissolved Oxygen		4.93	mg/L		7/27/2023				X
Eh (approx)		494	mV		7/27/2023				X
pH		5.9	Std Unit		7/27/2023				X
Temperature		68.4	deg F		7/27/2023				X
Turbidity		1.97	NTU		7/27/2023				X
Aluminum	U	0.05	mg/L	0.05	7/27/2023			SW846-6020B	=
Antimony	U	0.003	mg/L	0.003	7/27/2023			SW846-6020B	=
Arsenic	U	0.005	mg/L	0.005	7/27/2023			SW846-6020B	=
Barium		0.259	mg/L	0.004	7/27/2023			SW846-6020B	=
Beryllium	U	0.0005	mg/L	0.0005	7/27/2023			SW846-6020B	=
Boron		0.02	mg/L	0.015	7/27/2023			SW846-6020B	=
Cadmium	U	0.001	mg/L	0.001	7/27/2023			SW846-6020B	=
Calcium		26.5	mg/L	0.2	7/27/2023			SW846-6020B	=
Chromium	U	0.01	mg/L	0.01	7/27/2023			SW846-6020B	=
Cobalt	U	0.001	mg/L	0.001	7/27/2023			SW846-6020B	=
Copper		0.00369	mg/L	0.002	7/27/2023			SW846-6020B	J
Iron	U	0.1	mg/L	0.1	7/27/2023			SW846-6020B	=
Lead	U	0.002	mg/L	0.002	7/27/2023			SW846-6020B	=
Magnesium		10.7	mg/L	0.03	7/27/2023			SW846-6020B	=
Manganese	U	0.005	mg/L	0.005	7/27/2023			SW846-6020B	=
Molybdenum	U	0.001	mg/L	0.001	7/27/2023			SW846-6020B	=
Nickel		0.00414	mg/L	0.002	7/27/2023			SW846-6020B	J
Potassium		1.26	mg/L	0.3	7/27/2023			SW846-6020B	=
Rhodium	U	0.005	mg/L	0.005	7/27/2023			SW846-6020B	=
Selenium	U	0.005	mg/L	0.005	7/27/2023			SW846-6020B	=
Silver	U	0.001	mg/L	0.001	7/27/2023			SW846-6020B	=
Sodium		31.8	mg/L	0.25	7/27/2023			SW846-6020B	=
Tantalum	U	0.005	mg/L	0.005	7/27/2023			SW846-6020B	=
Thallium	U	0.002	mg/L	0.002	7/27/2023			SW846-6020B	=
Uranium	U	0.0002	mg/L	0.0002	7/27/2023			SW846-6020B	=
Vanadium	U	0.02	mg/L	0.02	7/27/2023			SW846-6020B	=
Zinc	J	0.00991	mg/L	0.02	7/27/2023			SW846-6020B	=
Mercury	U	0.0002	mg/L	0.0002	7/27/2023			SW846-7470A	=
Barium, Dissolved		0.267	mg/L	0.004	7/27/2023			SW846-6020B	=
Chromium, Dissolved	U	0.01	mg/L	0.01	7/27/2023			SW846-6020B	=
Uranium, Dissolved	U	0.0002	mg/L	0.0002	7/27/2023			SW846-6020B	=
Radium-226	U	-0.102	pCi/L	0.706	7/27/2023	0.29	0.29	AN-1418	=
Strontium-90	U	1.62	pCi/L	6.55	7/27/2023	3.66	3.67	EPA-905.0-M	=
Tritium	U	103	pCi/L	271	7/27/2023	160	161	EPA-906.0-M	=
Technetium-99	U	4.32	pCi/L	18.8	7/27/2023	10.9	10.9	HASL 300, Tc-02-RC M	=
Thorium-230	U	0.654	pCi/L	3.16	7/27/2023	1.71	1.72	HASL 300, Th-01-RC M	=

Alpha activity	U	2.27	pCi/L	7.24	7/27/2023	3.98	4	SW846-9310	=
Beta activity	U	4.4	pCi/L	9.28	7/27/2023	5.48	5.53	SW846-9310	=
1,2-Dibromo-3-chloropropane	U	0.0187	ug/L	0.0187	7/27/2023			SW846-8011	=
1,1,1,2-Tetrachloroethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
1,1,1-Trichloroethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
1,1,2,2-Tetrachloroethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
1,1,2-Trichloroethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
1,1-Dichloroethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
1,1-Dichloroethene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
1,2,3-Trichloropropane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
1,2-Dibromoethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
1,2-Dichlorobenzene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
1,2-Dichloroethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
1,2-Dichloropropane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
1,4-Dichlorobenzene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
2-Butanone	U	5	ug/L	5	7/27/2023			SW846-8260D	=
2-Hexanone	U	5	ug/L	5	7/27/2023			SW846-8260D	=
4-Methyl-2-pentanone	U	5	ug/L	5	7/27/2023			SW846-8260D	=
Acetone	U	5	ug/L	5	7/27/2023			SW846-8260D	=
Acrolein	U	5	ug/L	5	7/27/2023			SW846-8260D	UJ
Acrylonitrile	U	5	ug/L	5	7/27/2023			SW846-8260D	=
Benzene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Bromochloromethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Bromodichloromethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Bromoform	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Bromomethane	UL	1	ug/L	1	7/27/2023			SW846-8260D	UJ
Carbon disulfide	U	5	ug/L	5	7/27/2023			SW846-8260D	=
Carbon tetrachloride	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Chlorobenzene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Chloroethane	UL	1	ug/L	1	7/27/2023			SW846-8260D	=
Chloroform	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Chloromethane	ULY1	1	ug/L	1	7/27/2023			SW846-8260D	UJ
cis-1,2-Dichloroethene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
cis-1,3-Dichloropropene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Dibromochloromethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Dibromomethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Ethylbenzene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Iodomethane	U	5	ug/L	5	7/27/2023			SW846-8260D	=
Methylene chloride	U	5	ug/L	5	7/27/2023			SW846-8260D	=
Styrene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Tetrachloroethene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Toluene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Total Xylene	U	3	ug/L	3	7/27/2023			SW846-8260D	=
trans-1,2-Dichloroethene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
trans-1,3-Dichloropropene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Trans-1,4-Dichloro-2-butene	U	5	ug/L	5	7/27/2023			SW846-8260D	=
Trichloroethene		6.47	ug/L	1	7/27/2023			SW846-8260D	=
Trichlorofluoromethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Vinyl acetate	U	5	ug/L	5	7/27/2023			SW846-8260D	=
Vinyl chloride	UL	1	ug/L	1	7/27/2023			SW846-8260D	UJ
Dissolved Solids		201	mg/L	10	7/27/2023			EPA-160.1	=
Iodide	U	0.5	mg/L	0.5	7/27/2023			EPA-300.0	=
Chemical Oxygen Demand (COD)	U	20	mg/L	20	7/27/2023			EPA-410.4	=
Cyanide	U	0.2	mg/L	0.2	7/27/2023			SW846-9012B	=
Total Organic Halides (TOX)		12.4	ug/L	10	7/27/2023			SW846-9020B	=
Total Organic Carbon (TOC)	J	0.746	mg/L	2	7/27/2023			SW846-9060A	=

**Paducah OREIS  
GROUNDWATER MONITORING REPORT**

**Facility:** C-746-S&T Landfill      **County:** McCracken      **Permit #:** SW07300014,SW07300015,SW07300045

**Sampling Point:** MW395      UP      **RGA Type:** LRGA      **Period:** 3rd Quarter 2023

**AKGWA Well Tag #:** 8004-4801      **SAMPLE ID:** MW395SG4-23      **Sample Type:** REG

Parameter	Qualifier	Result	Units	Reporting Limit	Date Collected	Counting Error (+/-)	TPU	Method	Validation
Bromide	W	0.614	mg/L	0.2	7/27/2023			SW846-9056A	=
Chloride	J	44.3	mg/L	250	7/27/2023			SW846-9056A	=
Fluoride	J	0.13	mg/L	4	7/27/2023			SW846-9056A	=
Nitrate as Nitrogen	J	1.07	mg/L	10	7/27/2023			SW846-9056A	=
Sulfate		11.5	mg/L	0.4	7/27/2023			SW846-9056A	=
Barometric Pressure Reading		30.01	Inches/Hg		7/27/2023				X
Conductivity		385	umho/cm		7/27/2023				X
Depth to Water		54.95	ft		7/27/2023				X
Dissolved Oxygen		1.9	mg/L		7/27/2023				X
Eh (approx)		302	mV		7/27/2023				X
pH		5.94	Std Unit		7/27/2023				X
Temperature		71	deg F		7/27/2023				X
Turbidity		2.69	NTU		7/27/2023				X
Aluminum	U	0.05	mg/L	0.05	7/27/2023			SW846-6020B	=
Antimony	U	0.003	mg/L	0.003	7/27/2023			SW846-6020B	=
Arsenic	U	0.005	mg/L	0.005	7/27/2023			SW846-6020B	=
Barium		0.283	mg/L	0.004	7/27/2023			SW846-6020B	=
Beryllium	U	0.0005	mg/L	0.0005	7/27/2023			SW846-6020B	=
Boron		0.0193	mg/L	0.015	7/27/2023			SW846-6020B	=
Cadmium	U	0.001	mg/L	0.001	7/27/2023			SW846-6020B	=
Calcium		26.2	mg/L	0.2	7/27/2023			SW846-6020B	=
Chromium	U	0.01	mg/L	0.01	7/27/2023			SW846-6020B	=
Cobalt	U	0.001	mg/L	0.001	7/27/2023			SW846-6020B	=
Copper	J	0.00185	mg/L	0.002	7/27/2023			SW846-6020B	J
Iron		0.103	mg/L	0.1	7/27/2023			SW846-6020B	=
Lead	U	0.002	mg/L	0.002	7/27/2023			SW846-6020B	=
Magnesium		10.5	mg/L	0.03	7/27/2023			SW846-6020B	=
Manganese		0.0328	mg/L	0.005	7/27/2023			SW846-6020B	J
Molybdenum	J	0.000205	mg/L	0.001	7/27/2023			SW846-6020B	=
Nickel	J	0.00155	mg/L	0.002	7/27/2023			SW846-6020B	J
Potassium		1.59	mg/L	0.3	7/27/2023			SW846-6020B	=
Rhodium	U	0.005	mg/L	0.005	7/27/2023			SW846-6020B	=
Selenium	U	0.005	mg/L	0.005	7/27/2023			SW846-6020B	=
Silver	U	0.001	mg/L	0.001	7/27/2023			SW846-6020B	=
Sodium		28.5	mg/L	0.25	7/27/2023			SW846-6020B	=
Tantalum	U	0.005	mg/L	0.005	7/27/2023			SW846-6020B	=
Thallium	U	0.002	mg/L	0.002	7/27/2023			SW846-6020B	=
Uranium	U	0.0002	mg/L	0.0002	7/27/2023			SW846-6020B	=
Vanadium	U	0.02	mg/L	0.02	7/27/2023			SW846-6020B	=
Zinc	J	0.00909	mg/L	0.02	7/27/2023			SW846-6020B	=
Mercury	U	0.0002	mg/L	0.0002	7/27/2023			SW846-7470A	=
Barium, Dissolved		0.274	mg/L	0.004	7/27/2023			SW846-6020B	=
Chromium, Dissolved	U	0.01	mg/L	0.01	7/27/2023			SW846-6020B	=
Uranium, Dissolved	U	0.0002	mg/L	0.0002	7/27/2023			SW846-6020B	=
Radium-226	U	0.324	pCi/L	0.473	7/27/2023	0.359	0.359	AN-1418	=
Strontium-90	U	1.52	pCi/L	5.07	7/27/2023	2.82	2.83	EPA-905.0-M	=
Tritium	U	159	pCi/L	257	7/27/2023	153	156	EPA-906.0-M	=
Technetium-99	U	3.76	pCi/L	19.8	7/27/2023	11.4	11.4	HASL 300, Tc-02-RC M	=
Thorium-230	U	0.718	pCi/L	2.37	7/27/2023	1.39	1.4	HASL 300, Th-01-RC M	=

Alpha activity	U	0.526	pCi/L	5.33	7/27/2023	2.42	2.42	SW846-9310	=
Beta activity		8.57	pCi/L	8.23	7/27/2023	5.46	5.64	SW846-9310	=
1,2-Dibromo-3-chloropropane	U	0.019	ug/L	0.019	7/27/2023			SW846-8011	=
1,1,1,2-Tetrachloroethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
1,1,1-Trichloroethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
1,1,2,2-Tetrachloroethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
1,1,2-Trichloroethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
1,1-Dichloroethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
1,1-Dichloroethene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
1,2,3-Trichloropropane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
1,2-Dibromoethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
1,2-Dichlorobenzene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
1,2-Dichloroethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
1,2-Dichloropropane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
1,4-Dichlorobenzene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
2-Butanone	U	5	ug/L	5	7/27/2023			SW846-8260D	=
2-Hexanone	U	5	ug/L	5	7/27/2023			SW846-8260D	=
4-Methyl-2-pentanone	U	5	ug/L	5	7/27/2023			SW846-8260D	=
Acetone	U	5	ug/L	5	7/27/2023			SW846-8260D	=
Acrolein	U	5	ug/L	5	7/27/2023			SW846-8260D	UJ
Acrylonitrile	U	5	ug/L	5	7/27/2023			SW846-8260D	=
Benzene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Bromochloromethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Bromodichloromethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Bromoform	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Bromomethane	UL	1	ug/L	1	7/27/2023			SW846-8260D	UJ
Carbon disulfide	U	5	ug/L	5	7/27/2023			SW846-8260D	=
Carbon tetrachloride	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Chlorobenzene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Chloroethane	UL	1	ug/L	1	7/27/2023			SW846-8260D	=
Chloroform	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Chloromethane	ULY1	1	ug/L	1	7/27/2023			SW846-8260D	UJ
cis-1,2-Dichloroethene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
cis-1,3-Dichloropropene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Dibromochloromethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Dibromomethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Ethylbenzene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Iodomethane	U	5	ug/L	5	7/27/2023			SW846-8260D	=
Methylene chloride	U	5	ug/L	5	7/27/2023			SW846-8260D	=
Styrene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Tetrachloroethene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Toluene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Total Xylene	U	3	ug/L	3	7/27/2023			SW846-8260D	=
trans-1,2-Dichloroethene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
trans-1,3-Dichloropropene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Trans-1,4-Dichloro-2-butene	U	5	ug/L	5	7/27/2023			SW846-8260D	=
Trichloroethene		5.18	ug/L	1	7/27/2023			SW846-8260D	=
Trichlorofluoromethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Vinyl acetate	U	5	ug/L	5	7/27/2023			SW846-8260D	=
Vinyl chloride	UL	1	ug/L	1	7/27/2023			SW846-8260D	UJ
Dissolved Solids		188	mg/L	10	7/27/2023			EPA-160.1	=
Iodide	U	0.5	mg/L	0.5	7/27/2023			EPA-300.0	=
Chemical Oxygen Demand (COD)	U	20	mg/L	20	7/27/2023			EPA-410.4	=
Cyanide	U	0.2	mg/L	0.2	7/27/2023			SW846-9012B	=
Total Organic Halides (TOX)	JB	7.98	ug/L	10	7/27/2023			SW846-9020B	U
Total Organic Carbon (TOC)	J	0.705	mg/L	2	7/27/2023			SW846-9060A	=

**Paducah OREIS  
GROUNDWATER MONITORING REPORT**

**Facility:** C-746-S&T Landfill      **County:** McCracken      **Permit #:** SW07300014,SW07300015,SW07300045

**Sampling Point:** MW396      UP      **RGA Type:** UCRS      **Period:** 3rd Quarter 2023

**AKGWA Well Tag #:** 8004-4803      **SAMPLE ID:** MW396SG4-23      **Sample Type:** REG

Parameter	Qualifier	Result	Units	Reporting Limit	Date Collected	Counting Error (+/-)	TPU	Method	Validation
Bromide	W	0.84	mg/L	0.2	7/27/2023			SW846-9056A	=
Chloride	J	52.1	mg/L	250	7/27/2023			SW846-9056A	=
Fluoride	J	0.651	mg/L	4	7/27/2023			SW846-9056A	=
Nitrate as Nitrogen	J	0.153	mg/L	10	7/27/2023			SW846-9056A	=
Sulfate		30.5	mg/L	4	7/27/2023			SW846-9056A	=
Barometric Pressure Reading		30.02	Inches/Hg		7/27/2023				X
Conductivity		673	umho/cm		7/27/2023				X
Depth to Water		12.51	ft		7/27/2023				X
Dissolved Oxygen		1.2	mg/L		7/27/2023				X
Eh (approx)		315	mV		7/27/2023				X
pH		6.5	Std Unit		7/27/2023				X
Temperature		70.3	deg F		7/27/2023				X
Turbidity		3.09	NTU		7/27/2023				X
Aluminum	U	0.05	mg/L	0.05	7/27/2023			SW846-6020B	=
Antimony	U	0.003	mg/L	0.003	7/27/2023			SW846-6020B	=
Arsenic	U	0.005	mg/L	0.005	7/27/2023			SW846-6020B	=
Barium		0.377	mg/L	0.004	7/27/2023			SW846-6020B	=
Beryllium	U	0.0005	mg/L	0.0005	7/27/2023			SW846-6020B	=
Boron	J	0.00825	mg/L	0.015	7/27/2023			SW846-6020B	=
Cadmium	U	0.001	mg/L	0.001	7/27/2023			SW846-6020B	=
Calcium		31.2	mg/L	0.2	7/27/2023			SW846-6020B	=
Chromium	U	0.01	mg/L	0.01	7/27/2023			SW846-6020B	=
Cobalt	U	0.001	mg/L	0.001	7/27/2023			SW846-6020B	=
Copper	J	0.00112	mg/L	0.002	7/27/2023			SW846-6020B	J
Iron		0.116	mg/L	0.1	7/27/2023			SW846-6020B	=
Lead	U	0.002	mg/L	0.002	7/27/2023			SW846-6020B	=
Magnesium		13.6	mg/L	0.03	7/27/2023			SW846-6020B	=
Manganese		0.0319	mg/L	0.005	7/27/2023			SW846-6020B	J
Molybdenum	J	0.0004	mg/L	0.001	7/27/2023			SW846-6020B	=
Nickel	J	0.000628	mg/L	0.002	7/27/2023			SW846-6020B	J
Potassium		0.817	mg/L	0.3	7/27/2023			SW846-6020B	=
Rhodium	U	0.005	mg/L	0.005	7/27/2023			SW846-6020B	=
Selenium	U	0.005	mg/L	0.005	7/27/2023			SW846-6020B	=
Silver	U	0.001	mg/L	0.001	7/27/2023			SW846-6020B	=
Sodium		99.2	mg/L	2.5	7/27/2023			SW846-6020B	=
Tantalum	U	0.005	mg/L	0.005	7/27/2023			SW846-6020B	=
Thallium	U	0.002	mg/L	0.002	7/27/2023			SW846-6020B	=
Uranium	U	0.0002	mg/L	0.0002	7/27/2023			SW846-6020B	=
Vanadium	U	0.02	mg/L	0.02	7/27/2023			SW846-6020B	=
Zinc	J	0.00353	mg/L	0.02	7/27/2023			SW846-6020B	=
Mercury	U	0.0002	mg/L	0.0002	7/27/2023			SW846-7470A	=
Barium, Dissolved		0.375	mg/L	0.004	7/27/2023			SW846-6020B	=
Chromium, Dissolved	U	0.01	mg/L	0.01	7/27/2023			SW846-6020B	=
Uranium, Dissolved	U	0.0002	mg/L	0.0002	7/27/2023			SW846-6020B	=
Radium-226	U	0.133	pCi/L	0.515	7/27/2023	0.294	0.294	AN-1418	=
Strontium-90	U	-0.262	pCi/L	6.51	7/27/2023	3.39	3.39	EPA-905.0-M	=
Tritium	U	91.8	pCi/L	263	7/27/2023	155	156	EPA-906.0-M	=
Technetium-99	U	3.97	pCi/L	20.2	7/27/2023	11.7	11.7	HASL 300, Tc-02-RC M	=
Thorium-230	U	1.1	pCi/L	2.59	7/27/2023	1.6	1.61	HASL 300, Th-01-RC M	=

Alpha activity	U	-1.1	pCi/L	9.26	7/27/2023	3.92	3.92	SW846-9310	=
Beta activity	U	1.61	pCi/L	11.8	7/27/2023	6.54	6.55	SW846-9310	=
1,2-Dibromo-3-chloropropane	U	0.0186	ug/L	0.0186	7/27/2023			SW846-8011	=
1,1,1,2-Tetrachloroethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
1,1,1-Trichloroethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
1,1,2,2-Tetrachloroethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
1,1,2-Trichloroethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
1,1-Dichloroethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
1,1-Dichloroethene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
1,2,3-Trichloropropane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
1,2-Dibromoethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
1,2-Dichlorobenzene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
1,2-Dichloroethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
1,2-Dichloropropane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
1,4-Dichlorobenzene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
2-Butanone	U	5	ug/L	5	7/27/2023			SW846-8260D	=
2-Hexanone	U	5	ug/L	5	7/27/2023			SW846-8260D	=
4-Methyl-2-pentanone	U	5	ug/L	5	7/27/2023			SW846-8260D	=
Acetone	U	5	ug/L	5	7/27/2023			SW846-8260D	=
Acrolein	U	5	ug/L	5	7/27/2023			SW846-8260D	UJ
Acrylonitrile	U	5	ug/L	5	7/27/2023			SW846-8260D	=
Benzene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Bromochloromethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Bromodichloromethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Bromoform	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Bromomethane	UL	1	ug/L	1	7/27/2023			SW846-8260D	UJ
Carbon disulfide	U	5	ug/L	5	7/27/2023			SW846-8260D	=
Carbon tetrachloride	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Chlorobenzene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Chloroethane	UL	1	ug/L	1	7/27/2023			SW846-8260D	=
Chloroform	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Chloromethane	ULY1	1	ug/L	1	7/27/2023			SW846-8260D	UJ
cis-1,2-Dichloroethene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
cis-1,3-Dichloropropene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Dibromochloromethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Dibromomethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Ethylbenzene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Iodomethane	U	5	ug/L	5	7/27/2023			SW846-8260D	=
Methylene chloride	U	5	ug/L	5	7/27/2023			SW846-8260D	=
Styrene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Tetrachloroethene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Toluene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Total Xylene	U	3	ug/L	3	7/27/2023			SW846-8260D	=
trans-1,2-Dichloroethene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
trans-1,3-Dichloropropene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Trans-1,4-Dichloro-2-butene	U	5	ug/L	5	7/27/2023			SW846-8260D	=
Trichloroethene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Trichlorofluoromethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Vinyl acetate	U	5	ug/L	5	7/27/2023			SW846-8260D	=
Vinyl chloride	UL	1	ug/L	1	7/27/2023			SW846-8260D	UJ
Dissolved Solids		391	mg/L	10	7/27/2023			EPA-160.1	=
Iodide	U	0.5	mg/L	0.5	7/27/2023			EPA-300.0	=
Chemical Oxygen Demand (COD)	U	20	mg/L	20	7/27/2023			EPA-410.4	=
Cyanide	U	0.2	mg/L	0.2	7/27/2023			SW846-9012B	=
Total Organic Halides (TOX)	B	54.3	ug/L	10	7/27/2023			SW846-9020B	=
Total Organic Carbon (TOC)		3.92	mg/L	2	7/27/2023			SW846-9060A	=

**Paducah OREIS  
GROUNDWATER MONITORING REPORT**

**Facility:** C-746-S&T Landfill      **County:** McCracken      **Permit #:** SW07300014,SW07300015,SW07300045

**Sampling Point:** MW397      UP      **RGA Type:** LRGA      **Period:** 3rd Quarter 2023

**AKGWA Well Tag #:** 8004-4817      **SAMPLE ID:** MW397SG4-23      **Sample Type:** REG

Parameter	Qualifier	Result	Units	Reporting Limit	Date Collected	Counting Error (+/-)	TPU	Method	Validation
Bromide	W	0.392	mg/L	0.2	7/27/2023			SW846-9056A	=
Chloride	J	34.6	mg/L	250	7/27/2023			SW846-9056A	=
Fluoride	J	0.149	mg/L	4	7/27/2023			SW846-9056A	=
Nitrate as Nitrogen	J	1.06	mg/L	10	7/27/2023			SW846-9056A	=
Sulfate		12.1	mg/L	0.4	7/27/2023			SW846-9056A	=
Barometric Pressure Reading		30.03	Inches/Hg		7/27/2023				X
Conductivity		319	umho/cm		7/27/2023				X
Depth to Water		62.79	ft		7/27/2023				X
Dissolved Oxygen		5.99	mg/L		7/27/2023				X
Eh (approx)		405	mV		7/27/2023				X
pH		5.94	Std Unit		7/27/2023				X
Temperature		65.3	deg F		7/27/2023				X
Turbidity		2.24	NTU		7/27/2023				X
Aluminum	U	0.05	mg/L	0.05	7/27/2023			SW846-6020B	=
Antimony	U	0.003	mg/L	0.003	7/27/2023			SW846-6020B	=
Arsenic	U	0.005	mg/L	0.005	7/27/2023			SW846-6020B	=
Barium		0.136	mg/L	0.004	7/27/2023			SW846-6020B	=
Beryllium	U	0.0005	mg/L	0.0005	7/27/2023			SW846-6020B	=
Boron	J	0.00773	mg/L	0.015	7/27/2023			SW846-6020B	=
Cadmium	U	0.001	mg/L	0.001	7/27/2023			SW846-6020B	=
Calcium		17.6	mg/L	0.2	7/27/2023			SW846-6020B	=
Chromium	U	0.01	mg/L	0.01	7/27/2023			SW846-6020B	=
Cobalt	U	0.001	mg/L	0.001	7/27/2023			SW846-6020B	=
Copper	J	0.000818	mg/L	0.002	7/27/2023			SW846-6020B	J
Iron	U	0.1	mg/L	0.1	7/27/2023			SW846-6020B	=
Lead	U	0.002	mg/L	0.002	7/27/2023			SW846-6020B	=
Magnesium		7.07	mg/L	0.03	7/27/2023			SW846-6020B	=
Manganese	U	0.005	mg/L	0.005	7/27/2023			SW846-6020B	=
Molybdenum	U	0.001	mg/L	0.001	7/27/2023			SW846-6020B	=
Nickel	U	0.002	mg/L	0.002	7/27/2023			SW846-6020B	=
Potassium		1.74	mg/L	0.3	7/27/2023			SW846-6020B	=
Rhodium	U	0.005	mg/L	0.005	7/27/2023			SW846-6020B	=
Selenium	U	0.005	mg/L	0.005	7/27/2023			SW846-6020B	=
Silver	U	0.001	mg/L	0.001	7/27/2023			SW846-6020B	=
Sodium		30	mg/L	0.25	7/27/2023			SW846-6020B	=
Tantalum	U	0.005	mg/L	0.005	7/27/2023			SW846-6020B	=
Thallium	U	0.002	mg/L	0.002	7/27/2023			SW846-6020B	=
Uranium	U	0.0002	mg/L	0.0002	7/27/2023			SW846-6020B	=
Vanadium	U	0.02	mg/L	0.02	7/27/2023			SW846-6020B	=
Zinc	U	0.02	mg/L	0.02	7/27/2023			SW846-6020B	=
Mercury	U	0.0002	mg/L	0.0002	7/27/2023			SW846-7470A	=
Barium, Dissolved		0.141	mg/L	0.004	7/27/2023			SW846-6020B	=
Chromium, Dissolved	U	0.01	mg/L	0.01	7/27/2023			SW846-6020B	=
Uranium, Dissolved	U	0.0002	mg/L	0.0002	7/27/2023			SW846-6020B	=
Radium-226	U	-0.0409	pCi/L	0.467	7/27/2023	0.185	0.185	AN-1418	=
Strontium-90	U	0.766	pCi/L	5.87	7/27/2023	3.18	3.18	EPA-905.0-M	=
Tritium	U	150	pCi/L	264	7/27/2023	157	160	EPA-906.0-M	=
Technetium-99		27.7	pCi/L	19.1	7/27/2023	12.3	12.7	HASL 300, Tc-02-RC M	=
Thorium-230	U	0.174	pCi/L	2.29	7/27/2023	1.12	1.13	HASL 300, Th-01-RC M	=



Alpha activity	U	1.12	pCi/L	5.49	7/27/2023	2.76	2.77	SW846-9310	=
Beta activity		13.8	pCi/L	8.98	7/27/2023	6.43	6.84	SW846-9310	=
1,2-Dibromo-3-chloropropane	U	0.0192	ug/L	0.0192	7/27/2023			SW846-8011	=
1,1,1,2-Tetrachloroethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
1,1,1-Trichloroethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
1,1,2,2-Tetrachloroethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
1,1,2-Trichloroethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
1,1-Dichloroethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
1,1-Dichloroethene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
1,2,3-Trichloropropane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
1,2-Dibromoethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
1,2-Dichlorobenzene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
1,2-Dichloroethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
1,2-Dichloropropane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
1,4-Dichlorobenzene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
2-Butanone	U	5	ug/L	5	7/27/2023			SW846-8260D	=
2-Hexanone	U	5	ug/L	5	7/27/2023			SW846-8260D	=
4-Methyl-2-pentanone	U	5	ug/L	5	7/27/2023			SW846-8260D	=
Acetone	U	5	ug/L	5	7/27/2023			SW846-8260D	=
Acrolein	U	5	ug/L	5	7/27/2023			SW846-8260D	UJ
Acrylonitrile	U	5	ug/L	5	7/27/2023			SW846-8260D	=
Benzene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Bromochloromethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Bromodichloromethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Bromoform	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Bromomethane	UL	1	ug/L	1	7/27/2023			SW846-8260D	UJ
Carbon disulfide	U	5	ug/L	5	7/27/2023			SW846-8260D	=
Carbon tetrachloride	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Chlorobenzene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Chloroethane	UL	1	ug/L	1	7/27/2023			SW846-8260D	=
Chloroform	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Chloromethane	ULY1	1	ug/L	1	7/27/2023			SW846-8260D	UJ
cis-1,2-Dichloroethene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
cis-1,3-Dichloropropene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Dibromochloromethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Dibromomethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Ethylbenzene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Iodomethane	U	5	ug/L	5	7/27/2023			SW846-8260D	=
Methylene chloride	U	5	ug/L	5	7/27/2023			SW846-8260D	=
Styrene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Tetrachloroethene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Toluene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Total Xylene	U	3	ug/L	3	7/27/2023			SW846-8260D	=
trans-1,2-Dichloroethene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
trans-1,3-Dichloropropene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Trans-1,4-Dichloro-2-butene	U	5	ug/L	5	7/27/2023			SW846-8260D	=
Trichloroethene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Trichlorofluoromethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Vinyl acetate	U	5	ug/L	5	7/27/2023			SW846-8260D	=
Vinyl chloride	UL	1	ug/L	1	7/27/2023			SW846-8260D	UJ
Dissolved Solids		152	mg/L	10	7/27/2023			EPA-160.1	=
Iodide	U	0.5	mg/L	0.5	7/27/2023			EPA-300.0	=
Chemical Oxygen Demand (COD)	U	20	mg/L	20	7/27/2023			EPA-410.4	=
Cyanide	U	0.2	mg/L	0.2	7/27/2023			SW846-9012B	=
Total Organic Halides (TOX)	JB	4.42	ug/L	10	7/27/2023			SW846-9020B	U
Total Organic Carbon (TOC)	J	0.632	mg/L	2	7/27/2023			SW846-9060A	=



**Paducah OREIS  
GROUNDWATER MONITORING REPORT**

Facility: C-746-S&T Landfill

County: McCracken

Permit #: SW07300014,SW07300015,SW07300045

Sampling Point: QC

Period: 3rd Quarter 2023

AKGWA Well Tag #: N/A

SAMPLE ID: FB1SG4-23

Sample Type: FB

Parameter	Qualifier	Result	Units	Reporting Limit	Date Collected	Counting Error (+/-)	TPU	Method	Validation
Aluminum	U	0.05	mg/L	0.05	7/28/2023			SW846-6020B	=
Antimony	U	0.003	mg/L	0.003	7/28/2023			SW846-6020B	=
Arsenic	U	0.005	mg/L	0.005	7/28/2023			SW846-6020B	=
Barium	U	0.004	mg/L	0.004	7/28/2023			SW846-6020B	=
Beryllium	U	0.0005	mg/L	0.0005	7/28/2023			SW846-6020B	=
Boron	U	0.015	mg/L	0.015	7/28/2023			SW846-6020B	=
Cadmium	U	0.001	mg/L	0.001	7/28/2023			SW846-6020B	=
Calcium	U	0.2	mg/L	0.2	7/28/2023			SW846-6020B	=
Chromium	U	0.01	mg/L	0.01	7/28/2023			SW846-6020B	=
Cobalt	U	0.001	mg/L	0.001	7/28/2023			SW846-6020B	=
Copper	J	0.000425	mg/L	0.002	7/28/2023			SW846-6020B	J
Iron	U	0.1	mg/L	0.1	7/28/2023			SW846-6020B	=
Lead	U	0.002	mg/L	0.002	7/28/2023			SW846-6020B	=
Magnesium		0.0332	mg/L	0.03	7/28/2023			SW846-6020B	=
Manganese	U	0.005	mg/L	0.005	7/28/2023			SW846-6020B	=
Molybdenum	U	0.001	mg/L	0.001	7/28/2023			SW846-6020B	=
Nickel		0.00506	mg/L	0.002	7/28/2023			SW846-6020B	J
Potassium	U	0.3	mg/L	0.3	7/28/2023			SW846-6020B	=
Rhodium	U	0.005	mg/L	0.005	7/28/2023			SW846-6020B	=
Selenium	U	0.005	mg/L	0.005	7/28/2023			SW846-6020B	=
Silver	U	0.001	mg/L	0.001	7/28/2023			SW846-6020B	=
Sodium	J	0.212	mg/L	0.25	7/28/2023			SW846-6020B	=
Tantalum	U	0.005	mg/L	0.005	7/28/2023			SW846-6020B	=
Thallium	U	0.002	mg/L	0.002	7/28/2023			SW846-6020B	=
Uranium	U	0.0002	mg/L	0.0002	7/28/2023			SW846-6020B	=
Vanadium	U	0.02	mg/L	0.02	7/28/2023			SW846-6020B	=
Zinc	U	0.02	mg/L	0.02	7/28/2023			SW846-6020B	=
Mercury	U	0.0002	mg/L	0.0002	7/28/2023			SW846-7470A	=
Radium-226	U	0.0899	pCi/L	0.328	7/28/2023	0.207	0.207	AN-1418	=
Strontium-90	U	0.703	pCi/L	5.87	7/28/2023	3.17	3.17	EPA-905.0-M	=
Tritium	U	27.4	pCi/L	211	7/28/2023	113	113	EPA-906.0-M	=
Technetium-99	U	5.57	pCi/L	19.6	7/28/2023	11.5	11.5	HASL 300, Tc-02-RC M	=
Thorium-230	U	1.79	pCi/L	2.6	7/28/2023	1.82	1.84	HASL 300, Th-01-RC M	=
Alpha activity	U	2.95	pCi/L	5.43	7/28/2023	3.41	3.45	SW846-9310	=
Beta activity	U	4.19	pCi/L	9.35	7/28/2023	5.49	5.54	SW846-9310	=
1,2-Dibromo-3-chloropropane	U	0.0188	ug/L	0.0188	7/28/2023			SW846-8011	=
1,1,1,2-Tetrachloroethane	U	1	ug/L	1	7/28/2023			SW846-8260D	=
1,1,1-Trichloroethane	U	1	ug/L	1	7/28/2023			SW846-8260D	=
1,1,2,2-Tetrachloroethane	U	1	ug/L	1	7/28/2023			SW846-8260D	=
1,1,2-Trichloroethane	U	1	ug/L	1	7/28/2023			SW846-8260D	=
1,1-Dichloroethane	U	1	ug/L	1	7/28/2023			SW846-8260D	=
1,1-Dichloroethene	U	1	ug/L	1	7/28/2023			SW846-8260D	=
1,2,3-Trichloropropane	U	1	ug/L	1	7/28/2023			SW846-8260D	=
1,2-Dibromoethane	U	1	ug/L	1	7/28/2023			SW846-8260D	=
1,2-Dichlorobenzene	U	1	ug/L	1	7/28/2023			SW846-8260D	=
1,2-Dichloroethane	U	1	ug/L	1	7/28/2023			SW846-8260D	=
1,2-Dichloropropane	U	1	ug/L	1	7/28/2023			SW846-8260D	=
1,4-Dichlorobenzene	U	1	ug/L	1	7/28/2023			SW846-8260D	=
2-Butanone	U	5	ug/L	5	7/28/2023			SW846-8260D	=

2-Hexanone	U	5 ug/L	5	7/28/2023	SW846-8260D	=
4-Methyl-2-pentanone	U	5 ug/L	5	7/28/2023	SW846-8260D	=
Acetone	U	5 ug/L	5	7/28/2023	SW846-8260D	=
Acrolein	U	5 ug/L	5	7/28/2023	SW846-8260D	UJ
Acrylonitrile	U	5 ug/L	5	7/28/2023	SW846-8260D	=
Benzene	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Bromochloromethane	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Bromodichloromethane	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Bromoform	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Bromomethane	UL	1 ug/L	1	7/28/2023	SW846-8260D	UJ
Carbon disulfide	U	5 ug/L	5	7/28/2023	SW846-8260D	=
Carbon tetrachloride	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Chlorobenzene		3.24 ug/L	1	7/28/2023	SW846-8260D	=
Chloroethane	UL	1 ug/L	1	7/28/2023	SW846-8260D	=
Chloroform	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Chloromethane	ULY1	1 ug/L	1	7/28/2023	SW846-8260D	UJ
cis-1,2-Dichloroethene	U	1 ug/L	1	7/28/2023	SW846-8260D	=
cis-1,3-Dichloropropene	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Dibromochloromethane	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Dibromomethane	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Ethylbenzene	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Iodomethane	U	5 ug/L	5	7/28/2023	SW846-8260D	=
Methylene chloride	U	5 ug/L	5	7/28/2023	SW846-8260D	=
Styrene	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Tetrachloroethene	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Toluene	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Total Xylene	U	3 ug/L	3	7/28/2023	SW846-8260D	=
trans-1,2-Dichloroethene	U	1 ug/L	1	7/28/2023	SW846-8260D	=
trans-1,3-Dichloropropene	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Trans-1,4-Dichloro-2-butene	U	5 ug/L	5	7/28/2023	SW846-8260D	=
Trichloroethene	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Trichlorofluoromethane	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Vinyl acetate	U	5 ug/L	5	7/28/2023	SW846-8260D	=
Vinyl chloride	UL	1 ug/L	1	7/28/2023	SW846-8260D	UJ

**Paducah OREIS  
GROUNDWATER MONITORING REPORT**

**Facility:** C-746-S&T Landfill     
 **County:** McCracken     
 **Permit #:** SW07300014,SW07300015,SW07300045  
**Sampling Point:** QC     
 **Period:** 3rd Quarter 2023  
**AKGWA Well Tag #:** N/A     
 **SAMPLE ID:** FB1SG4-23R     
 **Sample Type:** FB

Parameter	Qualifier	Result	Units	Reporting Limit	Date Collected	Counting Error (+/-)	TPU	Method	Validation
Iodide	U	0.5	mg/L	0.5	7/31/2023			EPA-300.0	=

**Paducah OREIS  
GROUNDWATER MONITORING REPORT**

Facility: C-746-S&T Landfill

County: McCracken

Permit #: SW07300014,SW07300015,SW07300045

Sampling Point: QC

Period: 3rd Quarter 2023

AKGWA Well Tag #: N/A

SAMPLE ID: R11SG4-23

Sample Type: RI

Parameter	Qualifier	Result	Units	Reporting Limit	Date Collected	Counting Error (+/-)	TPU	Method	Validation
Aluminum	U	0.05	mg/L	0.05	7/28/2023			SW846-6020B	=
Antimony	U	0.003	mg/L	0.003	7/28/2023			SW846-6020B	=
Arsenic	U	0.005	mg/L	0.005	7/28/2023			SW846-6020B	=
Barium	U	0.004	mg/L	0.004	7/28/2023			SW846-6020B	=
Beryllium	U	0.0005	mg/L	0.0005	7/28/2023			SW846-6020B	=
Boron	U	0.015	mg/L	0.015	7/28/2023			SW846-6020B	=
Cadmium	U	0.001	mg/L	0.001	7/28/2023			SW846-6020B	=
Calcium	U	0.2	mg/L	0.2	7/28/2023			SW846-6020B	=
Chromium	U	0.01	mg/L	0.01	7/28/2023			SW846-6020B	=
Cobalt	U	0.001	mg/L	0.001	7/28/2023			SW846-6020B	=
Copper		0.0057	mg/L	0.002	7/28/2023			SW846-6020B	J
Iron	U	0.1	mg/L	0.1	7/28/2023			SW846-6020B	=
Lead	U	0.002	mg/L	0.002	7/28/2023			SW846-6020B	=
Magnesium	U	0.03	mg/L	0.03	7/28/2023			SW846-6020B	=
Manganese	U	0.005	mg/L	0.005	7/28/2023			SW846-6020B	=
Molybdenum	U	0.001	mg/L	0.001	7/28/2023			SW846-6020B	=
Nickel		0.00323	mg/L	0.002	7/28/2023			SW846-6020B	J
Potassium	U	0.3	mg/L	0.3	7/28/2023			SW846-6020B	=
Rhodium	U	0.005	mg/L	0.005	7/28/2023			SW846-6020B	=
Selenium	U	0.005	mg/L	0.005	7/28/2023			SW846-6020B	=
Silver	U	0.001	mg/L	0.001	7/28/2023			SW846-6020B	=
Sodium	U	0.25	mg/L	0.25	7/28/2023			SW846-6020B	=
Tantalum	U	0.005	mg/L	0.005	7/28/2023			SW846-6020B	=
Thallium	U	0.002	mg/L	0.002	7/28/2023			SW846-6020B	=
Uranium	U	0.0002	mg/L	0.0002	7/28/2023			SW846-6020B	=
Vanadium	U	0.02	mg/L	0.02	7/28/2023			SW846-6020B	=
Zinc	U	0.02	mg/L	0.02	7/28/2023			SW846-6020B	=
Mercury	U	0.0002	mg/L	0.0002	7/28/2023			SW846-7470A	=
Radium-226	U	-0.0597	pCi/L	0.524	7/28/2023	0.202	0.202	AN-1418	=
Strontium-90	U	-0.0619	pCi/L	6.34	7/28/2023	3.33	3.33	EPA-905.0-M	=
Tritium	U	-77.9	pCi/L	212	7/28/2023	94.1	94.1	EPA-906.0-M	=
Technetium-99	U	5.71	pCi/L	20	7/28/2023	11.7	11.7	HASL 300, Tc-02-RC M	=
Thorium-230	U	0.391	pCi/L	2.27	7/28/2023	1.21	1.22	HASL 300, Th-01-RC M	=
Alpha activity	U	2.01	pCi/L	5.91	7/28/2023	3.29	3.31	SW846-9310	=
Beta activity	U	5.25	pCi/L	10	7/28/2023	5.97	6.04	SW846-9310	=
1,2-Dibromo-3-chloropropane	U	0.0192	ug/L	0.0192	7/28/2023			SW846-8011	=
1,1,1,2-Tetrachloroethane	U	1	ug/L	1	7/28/2023			SW846-8260D	=
1,1,1-Trichloroethane	U	1	ug/L	1	7/28/2023			SW846-8260D	=
1,1,2,2-Tetrachloroethane	U	1	ug/L	1	7/28/2023			SW846-8260D	=
1,1,2-Trichloroethane	U	1	ug/L	1	7/28/2023			SW846-8260D	=
1,1-Dichloroethane	U	1	ug/L	1	7/28/2023			SW846-8260D	=
1,1-Dichloroethene	U	1	ug/L	1	7/28/2023			SW846-8260D	=
1,2,3-Trichloropropane	U	1	ug/L	1	7/28/2023			SW846-8260D	=
1,2-Dibromoethane	U	1	ug/L	1	7/28/2023			SW846-8260D	=
1,2-Dichlorobenzene	U	1	ug/L	1	7/28/2023			SW846-8260D	=
1,2-Dichloroethane	U	1	ug/L	1	7/28/2023			SW846-8260D	=
1,2-Dichloropropane	U	1	ug/L	1	7/28/2023			SW846-8260D	=
1,4-Dichlorobenzene	U	1	ug/L	1	7/28/2023			SW846-8260D	=
2-Butanone	U	5	ug/L	5	7/28/2023			SW846-8260D	=

2-Hexanone	U	5 ug/L	5	7/28/2023	SW846-8260D	=
4-Methyl-2-pentanone	U	5 ug/L	5	7/28/2023	SW846-8260D	=
Acetone	U	5 ug/L	5	7/28/2023	SW846-8260D	=
Acrolein	U	5 ug/L	5	7/28/2023	SW846-8260D	UJ
Acrylonitrile	U	5 ug/L	5	7/28/2023	SW846-8260D	=
Benzene	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Bromochloromethane	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Bromodichloromethane	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Bromoform	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Bromomethane	UL	1 ug/L	1	7/28/2023	SW846-8260D	UJ
Carbon disulfide	U	5 ug/L	5	7/28/2023	SW846-8260D	=
Carbon tetrachloride	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Chlorobenzene		4.15 ug/L	1	7/28/2023	SW846-8260D	=
Chloroethane	UL	1 ug/L	1	7/28/2023	SW846-8260D	=
Chloroform	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Chloromethane	ULY1	1 ug/L	1	7/28/2023	SW846-8260D	UJ
cis-1,2-Dichloroethene	U	1 ug/L	1	7/28/2023	SW846-8260D	=
cis-1,3-Dichloropropene	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Dibromochloromethane	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Dibromomethane	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Ethylbenzene	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Iodomethane	U	5 ug/L	5	7/28/2023	SW846-8260D	=
Methylene chloride	U	5 ug/L	5	7/28/2023	SW846-8260D	=
Styrene	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Tetrachloroethene	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Toluene	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Total Xylene	U	3 ug/L	3	7/28/2023	SW846-8260D	=
trans-1,2-Dichloroethene	U	1 ug/L	1	7/28/2023	SW846-8260D	=
trans-1,3-Dichloropropene	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Trans-1,4-Dichloro-2-butene	U	5 ug/L	5	7/28/2023	SW846-8260D	=
Trichloroethene	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Trichlorofluoromethane	U	1 ug/L	1	7/28/2023	SW846-8260D	=
Vinyl acetate	U	5 ug/L	5	7/28/2023	SW846-8260D	=
Vinyl chloride	UL	1 ug/L	1	7/28/2023	SW846-8260D	UJ

**Paducah OREIS  
GROUNDWATER MONITORING REPORT**

**Facility:** C-746-S&T Landfill      **County:** McCracken      **Permit #:** SW07300014,SW07300015,SW07300045

**Sampling Point:** QC      **Period:** 3rd Quarter 2023

**AKGWA Well Tag #:** N/A      **SAMPLE ID:** RI1SG4-23R      **Sample Type:** RI

Parameter	Qualifier	Result	Units	Reporting Limit	Date Collected	Counting Error (+/-)	TPU	Method	Validation
Iodide	U	0.5	mg/L	0.5	7/31/2023			EPA-300.0	=

**Paducah OREIS  
GROUNDWATER MONITORING REPORT**

Facility: C-746-S&T Landfill

County: McCracken

Permit #: SW07300014,SW07300015,SW07300045

Sampling Point: QC

Period: 3rd Quarter 2023

AKGWA Well Tag #: N/A

SAMPLE ID: TB1SG4-23

Sample Type: TB

Parameter	Qualifier	Result	Units	Reporting Limit	Date Collected	Counting Error (+/-)	TPU	Method	Validation
1,2-Dibromo-3-chloropropane	U	0.0191	ug/L	0.0191	7/26/2023			SW846-8011	=
1,1,1,2-Tetrachloroethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
1,1,1-Trichloroethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
1,1,2,2-Tetrachloroethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
1,1,2-Trichloroethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
1,1-Dichloroethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
1,1-Dichloroethene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
1,2,3-Trichloropropane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
1,2-Dibromoethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
1,2-Dichlorobenzene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
1,2-Dichloroethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
1,2-Dichloropropane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
1,4-Dichlorobenzene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
2-Butanone	J	1.76	ug/L	5	7/26/2023			SW846-8260D	=
2-Hexanone	U	5	ug/L	5	7/26/2023			SW846-8260D	=
4-Methyl-2-pentanone	U	5	ug/L	5	7/26/2023			SW846-8260D	=
Acetone	J	3.17	ug/L	5	7/26/2023			SW846-8260D	=
Acrolein	U	5	ug/L	5	7/26/2023			SW846-8260D	=
Acrylonitrile	U	5	ug/L	5	7/26/2023			SW846-8260D	=
Benzene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Bromochloromethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Bromodichloromethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Bromoform	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Bromomethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Carbon disulfide	U	5	ug/L	5	7/26/2023			SW846-8260D	=
Carbon tetrachloride	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Chlorobenzene		5.36	ug/L	1	7/26/2023			SW846-8260D	=
Chloroethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Chloroform	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Chloromethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
cis-1,2-Dichloroethene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
cis-1,3-Dichloropropene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Dibromochloromethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Dibromomethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Ethylbenzene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Iodomethane	U	5	ug/L	5	7/26/2023			SW846-8260D	=
Methylene chloride	U	5	ug/L	5	7/26/2023			SW846-8260D	=
Styrene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Tetrachloroethene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Toluene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Total Xylene	U	3	ug/L	3	7/26/2023			SW846-8260D	=
trans-1,2-Dichloroethene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
trans-1,3-Dichloropropene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Trans-1,4-Dichloro-2-butene	U	5	ug/L	5	7/26/2023			SW846-8260D	=
Trichloroethene	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Trichlorofluoromethane	U	1	ug/L	1	7/26/2023			SW846-8260D	=
Vinyl acetate	U	5	ug/L	5	7/26/2023			SW846-8260D	=
Vinyl chloride	U	1	ug/L	1	7/26/2023			SW846-8260D	=

**Paducah OREIS  
GROUNDWATER MONITORING REPORT**

Facility: C-746-S&T Landfill

County: McCracken

Permit #: SW07300014,SW07300015,SW07300045

Sampling Point: QC

Period: 3rd Quarter 2023

AKGWA Well Tag #: N/A

SAMPLE ID: TB2SG4-23

Sample Type: TB

Parameter	Qualifier	Result	Units	Reporting Limit	Date Collected	Counting Error (+/-)	TPU	Method	Validation
1,2-Dibromo-3-chloropropane	U	0.0191	ug/L	0.0191	7/27/2023			SW846-8011	=
1,1,1,2-Tetrachloroethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
1,1,1-Trichloroethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
1,1,2,2-Tetrachloroethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
1,1,2-Trichloroethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
1,1-Dichloroethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
1,1-Dichloroethene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
1,2,3-Trichloropropane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
1,2-Dibromoethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
1,2-Dichlorobenzene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
1,2-Dichloroethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
1,2-Dichloropropane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
1,4-Dichlorobenzene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
2-Butanone	U	5	ug/L	5	7/27/2023			SW846-8260D	=
2-Hexanone	U	5	ug/L	5	7/27/2023			SW846-8260D	=
4-Methyl-2-pentanone	U	5	ug/L	5	7/27/2023			SW846-8260D	=
Acetone	U	5	ug/L	5	7/27/2023			SW846-8260D	=
Acrolein	U	5	ug/L	5	7/27/2023			SW846-8260D	UJ
Acrylonitrile	U	5	ug/L	5	7/27/2023			SW846-8260D	=
Benzene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Bromochloromethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Bromodichloromethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Bromoform	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Bromomethane	UL	1	ug/L	1	7/27/2023			SW846-8260D	UJ
Carbon disulfide	U	5	ug/L	5	7/27/2023			SW846-8260D	=
Carbon tetrachloride	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Chlorobenzene		4.92	ug/L	1	7/27/2023			SW846-8260D	=
Chloroethane	UL	1	ug/L	1	7/27/2023			SW846-8260D	=
Chloroform	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Chloromethane	ULY1	1	ug/L	1	7/27/2023			SW846-8260D	UJ
cis-1,2-Dichloroethene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
cis-1,3-Dichloropropene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Dibromochloromethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Dibromomethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Ethylbenzene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Iodomethane	U	5	ug/L	5	7/27/2023			SW846-8260D	=
Methylene chloride	U	5	ug/L	5	7/27/2023			SW846-8260D	=
Styrene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Tetrachloroethene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Toluene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Total Xylene	U	3	ug/L	3	7/27/2023			SW846-8260D	=
trans-1,2-Dichloroethene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
trans-1,3-Dichloropropene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Trans-1,4-Dichloro-2-butene	U	5	ug/L	5	7/27/2023			SW846-8260D	=
Trichloroethene	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Trichlorofluoromethane	U	1	ug/L	1	7/27/2023			SW846-8260D	=
Vinyl acetate	U	5	ug/L	5	7/27/2023			SW846-8260D	=
Vinyl chloride	UL	1	ug/L	1	7/27/2023			SW846-8260D	UJ



**Paducah OREIS  
GROUNDWATER MONITORING REPORT**

Facility: C-746-S&T Landfill

County: McCracken

Permit #: SW07300014,SW07300015,SW07300045

Sampling Point: QC

Period: 3rd Quarter 2023

AKGWA Well Tag #: N/A

SAMPLE ID: TB3SG4-23

Sample Type: TB

Parameter	Qualifier	Result	Units	Reporting Limit	Date Collected	Counting Error (+/-)	TPU	Method	Validation
1,2-Dibromo-3-chloropropane	U	0.0193	ug/L	0.0193	7/28/2023			SW846-8011	=
1,1,1,2-Tetrachloroethane	U	1	ug/L	1	7/28/2023			SW846-8260D	=
1,1,1-Trichloroethane	U	1	ug/L	1	7/28/2023			SW846-8260D	=
1,1,2,2-Tetrachloroethane	U	1	ug/L	1	7/28/2023			SW846-8260D	=
1,1,2-Trichloroethane	U	1	ug/L	1	7/28/2023			SW846-8260D	=
1,1-Dichloroethane	U	1	ug/L	1	7/28/2023			SW846-8260D	=
1,1-Dichloroethene	U	1	ug/L	1	7/28/2023			SW846-8260D	=
1,2,3-Trichloropropane	U	1	ug/L	1	7/28/2023			SW846-8260D	=
1,2-Dibromoethane	U	1	ug/L	1	7/28/2023			SW846-8260D	=
1,2-Dichlorobenzene	U	1	ug/L	1	7/28/2023			SW846-8260D	=
1,2-Dichloroethane	U	1	ug/L	1	7/28/2023			SW846-8260D	=
1,2-Dichloropropane	U	1	ug/L	1	7/28/2023			SW846-8260D	=
1,4-Dichlorobenzene	U	1	ug/L	1	7/28/2023			SW846-8260D	=
2-Butanone	U	5	ug/L	5	7/28/2023			SW846-8260D	=
2-Hexanone	U	5	ug/L	5	7/28/2023			SW846-8260D	=
4-Methyl-2-pentanone	U	5	ug/L	5	7/28/2023			SW846-8260D	=
Acetone	U	5	ug/L	5	7/28/2023			SW846-8260D	=
Acrolein	U	5	ug/L	5	7/28/2023			SW846-8260D	UJ
Acrylonitrile	U	5	ug/L	5	7/28/2023			SW846-8260D	=
Benzene	U	1	ug/L	1	7/28/2023			SW846-8260D	=
Bromochloromethane	U	1	ug/L	1	7/28/2023			SW846-8260D	=
Bromodichloromethane	U	1	ug/L	1	7/28/2023			SW846-8260D	=
Bromoform	U	1	ug/L	1	7/28/2023			SW846-8260D	=
Bromomethane	UL	1	ug/L	1	7/28/2023			SW846-8260D	UJ
Carbon disulfide	U	5	ug/L	5	7/28/2023			SW846-8260D	=
Carbon tetrachloride	U	1	ug/L	1	7/28/2023			SW846-8260D	=
Chlorobenzene		3.77	ug/L	1	7/28/2023			SW846-8260D	=
Chloroethane	UL	1	ug/L	1	7/28/2023			SW846-8260D	=
Chloroform	U	1	ug/L	1	7/28/2023			SW846-8260D	=
Chloromethane	ULY1	1	ug/L	1	7/28/2023			SW846-8260D	UJ
cis-1,2-Dichloroethene	U	1	ug/L	1	7/28/2023			SW846-8260D	=
cis-1,3-Dichloropropene	U	1	ug/L	1	7/28/2023			SW846-8260D	=
Dibromochloromethane	U	1	ug/L	1	7/28/2023			SW846-8260D	=
Dibromomethane	U	1	ug/L	1	7/28/2023			SW846-8260D	=
Ethylbenzene	U	1	ug/L	1	7/28/2023			SW846-8260D	=
Iodomethane	U	5	ug/L	5	7/28/2023			SW846-8260D	=
Methylene chloride	U	5	ug/L	5	7/28/2023			SW846-8260D	=
Styrene	U	1	ug/L	1	7/28/2023			SW846-8260D	=
Tetrachloroethene	U	1	ug/L	1	7/28/2023			SW846-8260D	=
Toluene	U	1	ug/L	1	7/28/2023			SW846-8260D	=
Total Xylene	U	3	ug/L	3	7/28/2023			SW846-8260D	=
trans-1,2-Dichloroethene	U	1	ug/L	1	7/28/2023			SW846-8260D	=
trans-1,3-Dichloropropene	U	1	ug/L	1	7/28/2023			SW846-8260D	=
Trans-1,4-Dichloro-2-butene	U	5	ug/L	5	7/28/2023			SW846-8260D	=
Trichloroethene	U	1	ug/L	1	7/28/2023			SW846-8260D	=
Trichlorofluoromethane	U	1	ug/L	1	7/28/2023			SW846-8260D	=
Vinyl acetate	U	5	ug/L	5	7/28/2023			SW846-8260D	=
Vinyl chloride	UL	1	ug/L	1	7/28/2023			SW846-8260D	UJ

Qualifier Code Definitions	
B	Analyte found in the associated blank
H	Analysis performed outside holding time requirement
J	Estimated value
L	LCS or LCSD recovery outside of control limits
L1	LCS/LCSD RPD outside acceptance criteria
N	Sample spike (MS/MSD) recovery not within control limits
N1	MS/MSD RPD outside acceptance criteria
P	Difference between results from two GC columns outside control limits
S	Sample surrogate recovery outside acceptance criteria
T	Tracer recovery outside control limits of 30-110%
U	Analyte analyzed for but not detected at or below the lowest concentration reported.
W	Post-digestion spike recovery out of control limits
W1	Post-digestion spike and post-digestion spike duplicate RPD out of control limits
X	Other specific flags and footnotes may be required to properly define the results.
Y1	MS/MSD recovery outside acceptance criteria
Y2	MS/MSD RPD outside acceptance criteria

RGA Type Code Definitions	
LRGA	Lower Regional Gravel Aquifer
UCRS	Upper Continental Recharge System
URGA	Upper Regional Gravel Aquifer
NA	

Sample Type Code Definitions	
REG	Regular
FR	Field Replicate (code used for Field Duplicate)
RI	Equipment Rinsate Blank
FB	Field Blank
TB	Trip Blank

Validation Code Definitions	
=	Validated result, no additional qualifier necessary
J	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
U	The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
UJ	Analyte not detected above the reported detection limit, and the reported detection limit is approximated due to quality deficiency.
X	Not validated

**ATTACHMENT C1**

**GEL LABORATORIES CERTIFICATE OF ANALYSIS**

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# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Company : Four Rivers Nuclear Partnership,  
Address : LLC  
5600 Hobbs Road

Kevil, Kentucky 42053

Report Date: November 2, 2023

Contact: Ms. Jaime Morrow

Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW220SG4-23  
Sample ID: 631286001  
Matrix: WG  
Collect Date: 28-JUL-23  
Receive Date: 29-JUL-23  
Collector: Client

Project: FRNP00511  
Client ID: FRNP005

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Alpha Spec Analysis</b>														
<i>AlphaSpec Ra226, Liquid "As Received"</i>														
Radium-226	U	0.551	+/-0.690	0.847	+/-0.691	5.00	pCi/L			CM4	08/14/23	1345	2472141	1
<i>Th-01-RC M, Th Isotopes, Liquid "As Received"</i>														
Thorium-230	U	0.781	+/-1.76	3.16	+/-1.77	50.0	pCi/L			MR2	08/06/23	1059	2468223	2
<b>Rad Gas Flow Proportional Counting</b>														
<i>905.0 Mod, Sr90, liquid "As Received"</i>														
Strontium-90	U	0.258	+/-3.84	7.09	+/-3.84	8.00	pCi/L			ST2	08/02/23	1424	2468500	3
<i>9310,Alpha/Beta Activity, liquid "As Received"</i>														
Alpha	U	-1.94	+/-4.21	10.3	+/-4.21	15.0	pCi/L			KP1	08/01/23	1152	2468503	4
Beta	U	6.86	+/-6.10	9.86	+/-6.20	50.0	pCi/L							
<b>Rad Liquid Scintillation Analysis</b>														
<i>906.0 Mod, Tritium Dist, Liquid "As Received"</i>														
Tritium	U	22.5	+/-112	212	+/-113	300	pCi/L			GS3	08/01/23	2244	2468600	5
<i>Tc-02-RC-MOD, Tc99, Liquid "As Received"</i>														
Technetium-99	U	19.1	+/-12.2	20.1	+/-12.4	25.0	pCi/L			AG2	08/09/23	1029	2468282	6

### The following Analytical Methods were performed

Method	Description
1	Eichrom Industries, AN-1418
2	DOE EML HASL-300, Th-01-RC Modified
3	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified
4	EPA 900.0/SW846 9310
5	EPA 906.0 Modified
6	DOE EML HASL-300, Tc-02-RC Modified

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Barium-133 Tracer	AlphaSpec Ra226, Liquid "As Received"	2472141	90.1	(30%-110%)
Thorium-229 Tracer	Th-01-RC M, Th Isotopes, Liquid "As Received"	2468223	86.9	(30%-110%)
Strontium Carrier	905.0 Mod, Sr90, liquid "As Received"	2468500	87.1	(30%-110%)
Technetium-99m Tracer	Tc-02-RC-MOD, Tc99, Liquid "As Received"	2468282	98.9	(30%-110%)

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Kevil, Kentucky 42053

Report Date: November 2, 2023

Contact: Ms. Jaime Morrow

Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW220SG4-23

Project: FRNP00511

Sample ID: 631286001

Client ID: FRNP005

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Surrogate/Tracer	Recovery	Test						Batch ID	Recovery%	Acceptable Limits				

### Notes:

The MDC is a sample specific MDC.

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

### Column headers are defined as follows:

DF: Dilution Factor

Mtd.: Method

DL: Detection Limit

PF: Prep Factor

Lc/LC: Critical Level

RL: Reporting Limit

MDA: Minimum Detectable Activity

TPU: Total Propagated Uncertainty

MDC: Minimum Detectable Concentration

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## Certificate of Analysis

Company : Four Rivers Nuclear Partnership,  
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5600 Hobbs Road

Kevil, Kentucky 42053

Report Date: November 2, 2023

Contact: Ms. Jaime Morrow

Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW221SG4-23

Project: FRNP00511

Sample ID: 631286003

Client ID: FRNP005

Matrix: WG

Collect Date: 28-JUL-23

Receive Date: 29-JUL-23

Collector: Client

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Alpha Spec Analysis</b>														
<i>AlphaSpec Ra226, Liquid "As Received"</i>														
Radium-226	U	0.278	+/-0.329	0.481	+/-0.330	5.00	pCi/L			CM4	08/11/23	1244	2472141	1
<i>Th-01-RC M, Th Isotopes, Liquid "As Received"</i>														
Thorium-230	U	0.500	+/-1.34	2.45	+/-1.35	50.0	pCi/L			MR2	08/06/23	1059	2468223	2
<b>Rad Gas Flow Proportional Counting</b>														
<i>905.0 Mod, Sr90, liquid "As Received"</i>														
Strontium-90	U	2.96	+/-2.95	4.84	+/-2.98	8.00	pCi/L			ST2	08/02/23	1425	2468500	3
<i>9310,Alpha/Beta Activity, liquid "As Received"</i>														
Alpha	U	-0.509	+/-2.35	6.23	+/-2.36	15.0	pCi/L			KP1	08/01/23	0645	2468503	4
Beta	U	4.67	+/-5.62	9.48	+/-5.67	50.0	pCi/L							
<b>Rad Liquid Scintillation Analysis</b>														
<i>906.0 Mod, Tritium Dist, Liquid "As Received"</i>														
Tritium	U	-32.1	+/-103	212	+/-103	300	pCi/L			GS3	08/01/23	2311	2468600	5
<i>Tc-02-RC-MOD, Tc99, Liquid "As Received"</i>														
Technetium-99	U	19.5	+/-12.0	19.7	+/-12.2	25.0	pCi/L			AG2	08/08/23	1000	2468282	6

**The following Analytical Methods were performed**

Method	Description
1	Eichrom Industries, AN-1418
2	DOE EML HASL-300, Th-01-RC Modified
3	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified
4	EPA 900.0/SW846 9310
5	EPA 906.0 Modified
6	DOE EML HASL-300, Tc-02-RC Modified

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Barium-133 Tracer	AlphaSpec Ra226, Liquid "As Received"	2472141	93.9	(30%-110%)
Thorium-229 Tracer	Th-01-RC M, Th Isotopes, Liquid "As Received"	2468223	90.2	(30%-110%)
Strontium Carrier	905.0 Mod, Sr90, liquid "As Received"	2468500	94.1	(30%-110%)
Technetium-99m Tracer	Tc-02-RC-MOD, Tc99, Liquid "As Received"	2468282	99.1	(30%-110%)

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5600 Hobbs Road

Kevil, Kentucky 42053

Report Date: November 2, 2023

Contact: Ms. Jaime Morrow

Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW221SG4-23

Project: FRNP00511

Sample ID: 631286003

Client ID: FRNP005

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Surrogate/Tracer	Recovery	Test						Batch ID	Recovery%	Acceptable Limits				

### Notes:

The MDC is a sample specific MDC.

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

### Column headers are defined as follows:

DF: Dilution Factor

Mtd.: Method

DL: Detection Limit

PF: Prep Factor

Lc/LC: Critical Level

RL: Reporting Limit

MDA: Minimum Detectable Activity

TPU: Total Propagated Uncertainty

MDC: Minimum Detectable Concentration



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5600 Hobbs Road

Kevil, Kentucky 42053

Report Date: November 2, 2023

Contact: Ms. Jaime Morrow

Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW222SG4-23

Project: FRNP00511

Sample ID: 631286005

Client ID: FRNP005

Matrix: WG

Collect Date: 28-JUL-23

Receive Date: 29-JUL-23

Collector: Client

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Alpha Spec Analysis</b>														
<i>AlphaSpec Ra226, Liquid "As Received"</i>														
Radium-226	U	0.0165	+/-0.172	0.360	+/-0.172	5.00	pCi/L			CM4	08/11/23	1244	2472141	1
<i>Th-01-RC M, Th Isotopes, Liquid "As Received"</i>														
Thorium-230	U	1.90	+/-1.87	2.52	+/-1.89	50.0	pCi/L			MR2	08/06/23	1059	2468223	2
<b>Rad Gas Flow Proportional Counting</b>														
<i>905.0 Mod, Sr90, liquid "As Received"</i>														
Strontium-90	U	5.23	+/-3.76	5.88	+/-3.85	8.00	pCi/L			ST2	08/02/23	1425	2468500	3
<i>9310,Alpha/Beta Activity, liquid "As Received"</i>														
Alpha	U	0.444	+/-3.89	8.24	+/-3.90	15.0	pCi/L			KP1	08/01/23	0645	2468503	4
Beta	U	5.26	+/-5.74	9.54	+/-5.80	50.0	pCi/L							
<b>Rad Liquid Scintillation Analysis</b>														
<i>906.0 Mod, Tritium Dist, Liquid "As Received"</i>														
Tritium	U	-15.6	+/-105	210	+/-105	300	pCi/L			GS3	08/01/23	2338	2468600	5
<i>Tc-02-RC-MOD, Tc99, Liquid "As Received"</i>														
Technetium-99	U	14.3	+/-11.7	19.5	+/-11.8	25.0	pCi/L			AG2	08/08/23	1032	2468282	6

**The following Analytical Methods were performed**

Method	Description
1	Eichrom Industries, AN-1418
2	DOE EML HASL-300, Th-01-RC Modified
3	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified
4	EPA 900.0/SW846 9310
5	EPA 906.0 Modified
6	DOE EML HASL-300, Tc-02-RC Modified

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Barium-133 Tracer	AlphaSpec Ra226, Liquid "As Received"	2472141	93.2	(30%-110%)
Thorium-229 Tracer	Th-01-RC M, Th Isotopes, Liquid "As Received"	2468223	92.6	(30%-110%)
Strontium Carrier	905.0 Mod, Sr90, liquid "As Received"	2468500	87.1	(30%-110%)
Technetium-99m Tracer	Tc-02-RC-MOD, Tc99, Liquid "As Received"	2468282	100	(30%-110%)

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Kevil, Kentucky 42053

Report Date: November 2, 2023

Contact: Ms. Jaime Morrow

Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW222SG4-23

Project: FRNP00511

Sample ID: 631286005

Client ID: FRNP005

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Surrogate/Tracer	Recovery	Test						Batch ID	Recovery%	Acceptable Limits				

### Notes:

The MDC is a sample specific MDC.

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### Column headers are defined as follows:

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Lc/LC: Critical Level

RL: Reporting Limit

MDA: Minimum Detectable Activity

TPU: Total Propagated Uncertainty

MDC: Minimum Detectable Concentration

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Kevil, Kentucky 42053

Report Date: November 2, 2023

Contact: Ms. Jaime Morrow

Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW223SG4-23

Project: FRNP00511

Sample ID: 631286007

Client ID: FRNP005

Matrix: WG

Collect Date: 28-JUL-23

Receive Date: 29-JUL-23

Collector: Client

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Alpha Spec Analysis</b>														
<i>AlphaSpec Ra226, Liquid "As Received"</i>														
Radium-226	U	0.319	+/-0.341	0.464	+/-0.342	5.00	pCi/L			CM4	08/11/23	1244	2472141	1
<i>Th-01-RC M, Th Isotopes, Liquid "As Received"</i>														
Thorium-230	U	1.55	+/-2.04	3.13	+/-2.06	50.0	pCi/L			MR2	08/06/23	1059	2468223	2
<b>Rad Gas Flow Proportional Counting</b>														
<i>905.0 Mod, Sr90, liquid "As Received"</i>														
Strontium-90	U	-3.20	+/-2.98	6.65	+/-2.98	8.00	pCi/L			ST2	08/02/23	1425	2468500	3
<i>9310,Alpha/Beta Activity, liquid "As Received"</i>														
Alpha	U	-0.339	+/-2.93	6.97	+/-2.93	15.0	pCi/L			KP1	08/01/23	0645	2468503	4
Beta	U	6.40	+/-5.52	8.87	+/-5.62	50.0	pCi/L							
<b>Rad Liquid Scintillation Analysis</b>														
<i>906.0 Mod, Tritium Dist, Liquid "As Received"</i>														
Tritium	U	-30.7	+/-103	212	+/-103	300	pCi/L			GS3	08/02/23	0006	2468600	5
<i>Tc-02-RC-MOD, Tc99, Liquid "As Received"</i>														
Technetium-99	U	9.63	+/-12.3	20.7	+/-12.3	25.0	pCi/L			AG2	08/08/23	1103	2468282	6

**The following Analytical Methods were performed**

Method	Description
1	Eichrom Industries, AN-1418
2	DOE EML HASL-300, Th-01-RC Modified
3	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified
4	EPA 900.0/SW846 9310
5	EPA 906.0 Modified
6	DOE EML HASL-300, Tc-02-RC Modified

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Barium-133 Tracer	AlphaSpec Ra226, Liquid "As Received"	2472141	89.5	(30%-110%)
Thorium-229 Tracer	Th-01-RC M, Th Isotopes, Liquid "As Received"	2468223	80.1	(30%-110%)
Strontium Carrier	905.0 Mod, Sr90, liquid "As Received"	2468500	72.9	(30%-110%)
Technetium-99m Tracer	Tc-02-RC-MOD, Tc99, Liquid "As Received"	2468282	94.9	(30%-110%)

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Report Date: November 2, 2023

Contact: Ms. Jaime Morrow

Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW223SG4-23

Project: FRNP00511

Sample ID: 631286007

Client ID: FRNP005

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Surrogate/Tracer	Recovery	Test						Batch ID	Recovery%	Acceptable Limits				

### Notes:

The MDC is a sample specific MDC.

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### Column headers are defined as follows:

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Mtd.: Method

DL: Detection Limit

PF: Prep Factor

Lc/LC: Critical Level

RL: Reporting Limit

MDA: Minimum Detectable Activity

TPU: Total Propagated Uncertainty

MDC: Minimum Detectable Concentration

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Report Date: November 2, 2023

Contact: Ms. Jaime Morrow

Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW224DSG4-23

Project: FRNP00511

Sample ID: 631286009

Client ID: FRNP005

Matrix: WG

Collect Date: 28-JUL-23

Receive Date: 29-JUL-23

Collector: Client

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Alpha Spec Analysis</b>														
<i>AlphaSpec Ra226, Liquid "As Received"</i>														
Radium-226	U	0.181	+/-0.294	0.454	+/-0.294	5.00	pCi/L			CM4	08/11/23	1244	2472141	1
<i>Th-01-RC M, Th Isotopes, Liquid "As Received"</i>														
Thorium-230	U	0.696	+/-1.57	2.81	+/-1.57	50.0	pCi/L			MR2	08/06/23	1059	2468223	2
<b>Rad Gas Flow Proportional Counting</b>														
<i>905.0 Mod, Sr90, liquid "As Received"</i>														
Strontium-90	U	2.98	+/-2.87	4.69	+/-2.91	8.00	pCi/L			ST2	08/02/23	1425	2468500	3
<i>9310,Alpha/Beta Activity, liquid "As Received"</i>														
Alpha	U	2.33	+/-5.06	9.44	+/-5.07	15.0	pCi/L			KP1	08/01/23	1153	2468503	4
Beta	U	2.26	+/-5.15	9.18	+/-5.16	50.0	pCi/L							
<b>Rad Liquid Scintillation Analysis</b>														
<i>906.0 Mod, Tritium Dist, Liquid "As Received"</i>														
Tritium	U	-48.6	+/-99.7	212	+/-99.7	300	pCi/L			GS3	08/02/23	0033	2468600	5
<i>Tc-02-RC-MOD, Tc99, Liquid "As Received"</i>														
Technetium-99	U	2.27	+/-10.7	18.7	+/-10.7	25.0	pCi/L			AG2	08/13/23	1523	2470468	6

### The following Analytical Methods were performed

Method	Description
1	Eichrom Industries, AN-1418
2	DOE EML HASL-300, Th-01-RC Modified
3	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified
4	EPA 900.0/SW846 9310
5	EPA 906.0 Modified
6	DOE EML HASL-300, Tc-02-RC Modified

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Barium-133 Tracer	AlphaSpec Ra226, Liquid "As Received"	2472141	92.3	(30%-110%)
Thorium-229 Tracer	Th-01-RC M, Th Isotopes, Liquid "As Received"	2468223	89.5	(30%-110%)
Strontium Carrier	905.0 Mod, Sr90, liquid "As Received"	2468500	91.8	(30%-110%)
Technetium-99m Tracer	Tc-02-RC-MOD, Tc99, Liquid "As Received"	2470468	97.3	(30%-110%)

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Company : Four Rivers Nuclear Partnership,  
Address : LLC  
5600 Hobbs Road

Kevil, Kentucky 42053

Report Date: November 2, 2023

Contact: Ms. Jaime Morrow

Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW224DSG4-23

Project: FRNP00511

Sample ID: 631286009

Client ID: FRNP005

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Surrogate/Tracer	Recovery	Test						Batch ID	Recovery%	Acceptable Limits				

### Notes:

The MDC is a sample specific MDC.

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

### Column headers are defined as follows:

DF: Dilution Factor

Mtd.: Method

DL: Detection Limit

PF: Prep Factor

Lc/LC: Critical Level

RL: Reporting Limit

MDA: Minimum Detectable Activity

TPU: Total Propagated Uncertainty

MDC: Minimum Detectable Concentration

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## Certificate of Analysis

Company : Four Rivers Nuclear Partnership,  
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Kevil, Kentucky 42053

Report Date: November 2, 2023

Contact: Ms. Jaime Morrow

Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW224SG4-23

Project: FRNP00511

Sample ID: 631286011

Client ID: FRNP005

Matrix: WG

Collect Date: 28-JUL-23

Receive Date: 29-JUL-23

Collector: Client

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Alpha Spec Analysis</b>														
<i>AlphaSpec Ra226, Liquid "As Received"</i>														
Radium-226	U	0.140	+/-0.529	1.01	+/-0.529	5.00	pCi/L			CM4	08/14/23	1345	2472141	1
<i>Th-01-RC M, Th Isotopes, Liquid "As Received"</i>														
Thorium-230	U	1.34	+/-1.77	2.72	+/-1.79	50.0	pCi/L			MR2	08/06/23	1059	2468223	2
<b>Rad Gas Flow Proportional Counting</b>														
<i>905.0 Mod, Sr90, liquid "As Received"</i>														
Strontium-90	U	-2.85	+/-3.12	6.73	+/-3.12	8.00	pCi/L			ST2	08/02/23	1425	2468500	3
<i>9310,Alpha/Beta Activity, liquid "As Received"</i>														
Alpha	U	0.254	+/-3.97	8.39	+/-3.97	15.0	pCi/L			KP1	08/01/23	0645	2468503	4
Beta	U	8.90	+/-7.06	11.3	+/-7.22	50.0	pCi/L							
<b>Rad Liquid Scintillation Analysis</b>														
<i>906.0 Mod, Tritium Dist, Liquid "As Received"</i>														
Tritium	U	-27.8	+/-104	212	+/-104	300	pCi/L			GS3	08/02/23	0100	2468600	5
<i>Tc-02-RC-MOD, Tc99, Liquid "As Received"</i>														
Technetium-99	U	6.75	+/-10.7	18.3	+/-10.7	25.0	pCi/L			AG2	08/13/23	1540	2470468	6

**The following Analytical Methods were performed**

Method	Description
1	Eichrom Industries, AN-1418
2	DOE EML HASL-300, Th-01-RC Modified
3	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified
4	EPA 900.0/SW846 9310
5	EPA 906.0 Modified
6	DOE EML HASL-300, Tc-02-RC Modified

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Barium-133 Tracer	AlphaSpec Ra226, Liquid "As Received"	2472141	91.2	(30%-110%)
Thorium-229 Tracer	Th-01-RC M, Th Isotopes, Liquid "As Received"	2468223	82.8	(30%-110%)
Strontium Carrier	905.0 Mod, Sr90, liquid "As Received"	2468500	77.6	(30%-110%)
Technetium-99m Tracer	Tc-02-RC-MOD, Tc99, Liquid "As Received"	2470468	99.3	(30%-110%)

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Kevil, Kentucky 42053

Report Date: November 2, 2023

Contact: Ms. Jaime Morrow

Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW224SG4-23

Project: FRNP00511

Sample ID: 631286011

Client ID: FRNP005

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Surrogate/Tracer	Recovery	Test						Batch ID	Recovery%	Acceptable Limits				

### Notes:

The MDC is a sample specific MDC.

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

### Column headers are defined as follows:

DF: Dilution Factor

Mtd.: Method

DL: Detection Limit

PF: Prep Factor

Lc/LC: Critical Level

RL: Reporting Limit

MDA: Minimum Detectable Activity

TPU: Total Propagated Uncertainty

MDC: Minimum Detectable Concentration



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Kevil, Kentucky 42053

Report Date: November 2, 2023

Contact: Ms. Jaime Morrow

Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: FB1SG4-23

Project: FRNP00511

Sample ID: 631286013

Client ID: FRNP005

Matrix: WATER

Collect Date: 28-JUL-23

Receive Date: 29-JUL-23

Collector: Client

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Alpha Spec Analysis</b>														
<i>AlphaSpec Ra226, Liquid "As Received"</i>														
Radium-226	U	0.0899	+/-0.207	0.328	+/-0.207	5.00	pCi/L			CM4	08/11/23	1244	2472141	1
<i>Th-01-RC M, Th Isotopes, Liquid "As Received"</i>														
Thorium-230	U	1.79	+/-1.82	2.60	+/-1.84	50.0	pCi/L			MR2	08/06/23	1059	2468223	2
<b>Rad Gas Flow Proportional Counting</b>														
<i>905.0 Mod, Sr90, liquid "As Received"</i>														
Strontium-90	U	0.703	+/-3.17	5.87	+/-3.17	8.00	pCi/L			ST2	08/02/23	1425	2468500	3
<i>9310,Alpha/Beta Activity, liquid "As Received"</i>														
Alpha	U	2.95	+/-3.41	5.43	+/-3.45	15.0	pCi/L			KP1	08/01/23	0645	2468503	4
Beta	U	4.19	+/-5.49	9.35	+/-5.54	50.0	pCi/L							
<b>Rad Liquid Scintillation Analysis</b>														
<i>906.0 Mod, Tritium Dist, Liquid "As Received"</i>														
Tritium	U	27.4	+/-113	211	+/-113	300	pCi/L			GS3	08/02/23	0128	2468600	5
<i>Tc-02-RC-MOD, Tc99, Liquid "As Received"</i>														
Technetium-99	U	5.57	+/-11.5	19.6	+/-11.5	25.0	pCi/L			AG2	08/08/23	1135	2468282	6

**The following Analytical Methods were performed**

Method	Description
1	Eichrom Industries, AN-1418
2	DOE EML HASL-300, Th-01-RC Modified
3	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified
4	EPA 900.0/SW846 9310
5	EPA 906.0 Modified
6	DOE EML HASL-300, Tc-02-RC Modified

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Barium-133 Tracer	AlphaSpec Ra226, Liquid "As Received"	2472141	89.2	(30%-110%)
Thorium-229 Tracer	Th-01-RC M, Th Isotopes, Liquid "As Received"	2468223	89.9	(30%-110%)
Strontium Carrier	905.0 Mod, Sr90, liquid "As Received"	2468500	80	(30%-110%)
Technetium-99m Tracer	Tc-02-RC-MOD, Tc99, Liquid "As Received"	2468282	100	(30%-110%)

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Kevil, Kentucky 42053

Report Date: November 2, 2023

Contact: Ms. Jaime Morrow

Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: FB1SG4-23

Project: FRNP00511

Sample ID: 631286013

Client ID: FRNP005

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Surrogate/Tracer	Recovery	Test						Batch ID	Recovery%	Acceptable Limits				

### Notes:

The MDC is a sample specific MDC.

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

### Column headers are defined as follows:

DF: Dilution Factor

Mtd.: Method

DL: Detection Limit

PF: Prep Factor

Lc/LC: Critical Level

RL: Reporting Limit

MDA: Minimum Detectable Activity

TPU: Total Propagated Uncertainty

MDC: Minimum Detectable Concentration

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Kevil, Kentucky 42053

Report Date: November 2, 2023

Contact: Ms. Jaime Morrow

Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: RI1SG4-23

Project: FRNP00511

Sample ID: 631286014

Client ID: FRNP005

Matrix: WATER

Collect Date: 28-JUL-23

Receive Date: 29-JUL-23

Collector: Client

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Alpha Spec Analysis</b>														
<i>AlphaSpec Ra226, Liquid "As Received"</i>														
Radium-226	U	-0.0597	+/-0.202	0.524	+/-0.202	5.00	pCi/L			CM4	08/11/23	1244	2472141	1
<i>Th-01-RC M, Th Isotopes, Liquid "As Received"</i>														
Thorium-230	U	0.391	+/-1.21	2.27	+/-1.22	50.0	pCi/L			MR2	08/06/23	1059	2468223	2
<b>Rad Gas Flow Proportional Counting</b>														
<i>905.0 Mod, Sr90, liquid "As Received"</i>														
Strontium-90	U	-0.0619	+/-3.33	6.34	+/-3.33	8.00	pCi/L			ST2	08/02/23	1425	2468500	3
<i>9310,Alpha/Beta Activity, liquid "As Received"</i>														
Alpha	U	2.01	+/-3.29	5.91	+/-3.31	15.0	pCi/L			KP1	08/01/23	0645	2468503	4
Beta	U	5.25	+/-5.97	10.0	+/-6.04	50.0	pCi/L							
<b>Rad Liquid Scintillation Analysis</b>														
<i>906.0 Mod, Tritium Dist, Liquid "As Received"</i>														
Tritium	U	-77.9	+/-94.1	212	+/-94.1	300	pCi/L			GS3	08/02/23	0155	2468600	5
<i>Tc-02-RC-MOD, Tc99, Liquid "As Received"</i>														
Technetium-99	U	5.71	+/-11.7	20.0	+/-11.7	25.0	pCi/L			AG2	08/08/23	1206	2468282	6

**The following Analytical Methods were performed**

Method	Description
1	Eichrom Industries, AN-1418
2	DOE EML HASL-300, Th-01-RC Modified
3	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified
4	EPA 900.0/SW846 9310
5	EPA 906.0 Modified
6	DOE EML HASL-300, Tc-02-RC Modified

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Barium-133 Tracer	AlphaSpec Ra226, Liquid "As Received"	2472141	91.5	(30%-110%)
Thorium-229 Tracer	Th-01-RC M, Th Isotopes, Liquid "As Received"	2468223	91.9	(30%-110%)
Strontium Carrier	905.0 Mod, Sr90, liquid "As Received"	2468500	80	(30%-110%)
Technetium-99m Tracer	Tc-02-RC-MOD, Tc99, Liquid "As Received"	2468282	97.3	(30%-110%)

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## Certificate of Analysis

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Kevil, Kentucky 42053

Report Date: November 2, 2023

Contact: Ms. Jaime Morrow

Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: RI1SG4-23

Project: FRNP00511

Sample ID: 631286014

Client ID: FRNP005

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Surrogate/Tracer	Recovery	Test						Batch ID	Recovery%	Acceptable	Limits			

### Notes:

The MDC is a sample specific MDC.

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

### Column headers are defined as follows:

DF: Dilution Factor

Mtd.: Method

DL: Detection Limit

PF: Prep Factor

Lc/LC: Critical Level

RL: Reporting Limit

MDA: Minimum Detectable Activity

TPU: Total Propagated Uncertainty

MDC: Minimum Detectable Concentration

# GEL LABORATORIES LLC

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road

Kevil, Kentucky 42053

Contact: Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW220SG4-23 Project: FRNP00511  
Sample ID: 631286001 Client ID: FRNP005  
Matrix: WG  
Collect Date: 28-JUL-23 10:42  
Receive Date: 29-JUL-23  
Collector: Client

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
504.1/8011 Analysis of EDB/DBCP												
8011, VOA Compounds Liquid "As Received"												
1,2-Dibromo-3-chloropropane	U	0.0188	0.00848	0.0188	ug/L	0.942	1	LOF	08/03/23	2307	2468814	1
Mercury Analysis-CVAA												
7470, Mercury Liquid "As Received"												
Mercury	U	0.000200	0.0000670	0.000200	mg/L	1.00	1	JP2	08/02/23	1127	2468975	2
Metals Analysis-ICP-MS												
6020, Metals (15+) "As Received"												
Aluminum	U	0.0500	0.0193	0.0500	mg/L	1.00	1	PRB	08/16/23	0225	2469288	3
Arsenic	U	0.00500	0.00200	0.00500	mg/L	1.00	1					
Barium		0.220	0.000670	0.00400	mg/L	1.00	1					
Beryllium	U	0.000500	0.000200	0.000500	mg/L	1.00	1					
Boron	J	0.00842	0.00520	0.0150	mg/L	1.00	1					
Cadmium	U	0.00100	0.000300	0.00100	mg/L	1.00	1					
Calcium		22.1	0.0800	0.200	mg/L	1.00	1					
Chromium	J	0.00356	0.00300	0.0100	mg/L	1.00	1					
Cobalt	U	0.00100	0.000300	0.00100	mg/L	1.00	1					
Copper	J	0.00160	0.000300	0.00200	mg/L	1.00	1					
Iron	U	0.100	0.0330	0.100	mg/L	1.00	1					
Lead	U	0.00200	0.000500	0.00200	mg/L	1.00	1					
Magnesium		8.97	0.0100	0.0300	mg/L	1.00	1					
Manganese	U	0.00500	0.00100	0.00500	mg/L	1.00	1					
Molybdenum	J	0.000526	0.000200	0.00100	mg/L	1.00	1					
Nickel		0.00657	0.000600	0.00200	mg/L	1.00	1					
Potassium		1.62	0.0800	0.300	mg/L	1.00	1					
Selenium	J	0.00166	0.00150	0.00500	mg/L	1.00	1					
Silver	U	0.00100	0.000300	0.00100	mg/L	1.00	1					
Sodium		38.5	0.0800	0.250	mg/L	1.00	1					
Thallium	U	0.00200	0.000600	0.00200	mg/L	1.00	1					
Uranium	U	0.000200	0.0000670	0.000200	mg/L	1.00	1					
Vanadium	U	0.0200	0.00330	0.0200	mg/L	1.00	1					
Zinc	U	0.0200	0.00330	0.0200	mg/L	1.00	1					
Rhodium	U	0.00500	0.00160	0.00500	mg/L	1.00	1	PRB	08/16/23	1141	2469288	4
Tantalum	U	0.00500	0.00100	0.00500	mg/L	1.00	1					
Antimony	U	0.00300	0.00100	0.00300	mg/L	1.00	1	PRB	08/15/23	1805	2469288	5
Volatile Organics												
8260D, Volatiles- full suite "As Received"												

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road  
  
Kevil, Kentucky 42053  
Contact: Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW220SG4-23 Project: FRNP00511  
Sample ID: 631286001 Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Volatile Organics												
8260D, Volatiles- full suite "As Received"												
1,1,1,2-Tetrachloroethane	U	1.00	0.333	1.00	ug/L		1	KP2	08/01/23	1733	2468743	6
1,1,1-Trichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1,2,2-Tetrachloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1,2-Trichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1-Dichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1					
1,2,3-Trichloropropane	U	1.00	0.333	1.00	ug/L		1					
1,2-Dibromoethane	U	1.00	0.333	1.00	ug/L		1					
1,2-Dichlorobenzene	U	1.00	0.333	1.00	ug/L		1					
1,2-Dichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,2-Dichloropropane	U	1.00	0.333	1.00	ug/L		1					
1,4-Dichlorobenzene	U	1.00	0.333	1.00	ug/L		1					
2-Butanone	U	5.00	1.67	5.00	ug/L		1					
2-Hexanone	U	5.00	1.67	5.00	ug/L		1					
4-Methyl-2-pentanone	U	5.00	1.67	5.00	ug/L		1					
Acetone	U	5.00	1.74	5.00	ug/L		1					
Acrolein	U	5.00	1.67	5.00	ug/L		1					
Acrylonitrile	U	5.00	1.67	5.00	ug/L		1					
Benzene	U	1.00	0.333	1.00	ug/L		1					
Bromochloromethane	U	1.00	0.333	1.00	ug/L		1					
Bromodichloromethane	U	1.00	0.333	1.00	ug/L		1					
Bromoform	U	1.00	0.333	1.00	ug/L		1					
Bromomethane	UL	1.00	0.337	1.00	ug/L		1					
Carbon disulfide	U	5.00	1.67	5.00	ug/L		1					
Carbon tetrachloride	U	1.00	0.333	1.00	ug/L		1					
Chlorobenzene	U	1.00	0.333	1.00	ug/L		1					
Chloroethane	LU	1.00	0.333	1.00	ug/L		1					
Chloroform	U	1.00	0.333	1.00	ug/L		1					
Chloromethane	LYIU	1.00	0.333	1.00	ug/L		1					
Dibromochloromethane	U	1.00	0.333	1.00	ug/L		1					
Dibromomethane	U	1.00	0.333	1.00	ug/L		1					
Ethylbenzene	U	1.00	0.333	1.00	ug/L		1					
Iodomethane	U	5.00	1.67	5.00	ug/L		1					
Methylene chloride	U	5.00	0.500	5.00	ug/L		1					
Styrene	U	1.00	0.333	1.00	ug/L		1					
Tetrachloroethylene	U	1.00	0.333	1.00	ug/L		1					

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road

Contact: Kevil, Kentucky 42053  
Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW220SG4-23  
Sample ID: 631286001

Project: FRNP00511  
Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Volatile Organics												
8260D, Volatiles- full suite "As Received"												
Toluene	U	1.00	0.333	1.00	ug/L		1					
Trichloroethylene	U	1.00	0.333	1.00	ug/L		1					
Trichlorofluoromethane	U	1.00	0.333	1.00	ug/L		1					
Vinyl acetate	U	5.00	1.67	5.00	ug/L		1					
Vinyl chloride	LU	1.00	0.333	1.00	ug/L		1					
Xylenes (total)	U	3.00	1.00	3.00	ug/L		1					
cis-1,2-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1					
cis-1,3-Dichloropropylene	U	1.00	0.333	1.00	ug/L		1					
trans-1,2-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1					
trans-1,3-Dichloropropylene	U	1.00	0.333	1.00	ug/L		1					
trans-1,4-Dichloro-2-butene	U	5.00	1.67	5.00	ug/L		1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 8011 PREP	8011 Prep	LOF	08/03/23	1348	2468812
SW846 3005A	ICP-MS 3005A PREP	EM2	08/03/23	1525	2469286
SW846 7470A Prep	EPA 7470A Mercury Prep Liquid	EK1	08/01/23	1245	2468974

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 8011	
2	SW846 7470A	
3	SW846 3005A/6020B	
4	SW846 3005A/6020B	
5	SW846 3005A/6020B	
6	SW846 8260D	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
1-Chloro-2-fluorobenzene	8011, VOA Compounds Liquid "As Received"	7.76 ug/L	6.73	115	(46%-159%)
Bromofluorobenzene	8260D, Volatiles- full suite "As Received"	45.7 ug/L	50.0	91	(72%-125%)
1,2-Dichloroethane-d4	8260D, Volatiles- full suite "As Received"	49.3 ug/L	50.0	99	(73%-129%)
Toluene-d8	8260D, Volatiles- full suite "As Received"	50.1 ug/L	50.0	100	(75%-123%)

Notes:

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## *Certificate of Analysis*

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road  
  
Kevil, Kentucky 42053  
Contact: Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

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Client Sample ID:	MW220SG4-23	Project:	FRNP00511
Sample ID:	631286001	Client ID:	FRNP005

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Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
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*Column headers are defined as follows:*

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit



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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road

Kevil, Kentucky 42053

Contact: Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW220SG4-23      Project: FRNP00511  
Sample ID: 631286002      Client ID: FRNP005  
Matrix: WG  
Collect Date: 28-JUL-23 10:42  
Receive Date: 29-JUL-23  
Collector: Client

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Metals Analysis-ICP-MS												
6020, Dissolved Metals (3 Elements) "As Received"												
Barium		0.228	0.000670	0.00400	mg/L	1.00	1	PRB	08/16/23	0228	2469288	1
Chromium	J	0.00340	0.00300	0.0100	mg/L	1.00	1					
Uranium	U	0.000200	0.0000670	0.000200	mg/L	1.00	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3005A	ICP-MS 3005A PREP	EM2	08/03/23	1525	2469286
EPA 160	Laboratory Filtration	RXB5	08/01/23	1220	2468811

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 3005A/6020B	

### Notes:

Column headers are defined as follows:

DF: Dilution Factor      Lc/LC: Critical Level  
DL: Detection Limit      PF: Prep Factor  
MDA: Minimum Detectable Activity      RL: Reporting Limit  
MDC: Minimum Detectable Concentration      SQL: Sample Quantitation Limit

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
 Address : 5600 Hobbs Road  
  
 Kevil, Kentucky 42053  
 Contact: Ms. Jaime Morrow  
 Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW221SG4-23	Project: FRNP00511
Sample ID: 631286003	Client ID: FRNP005
Matrix: WG	
Collect Date: 28-JUL-23 06:39	
Receive Date: 29-JUL-23	
Collector: Client	

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
504.1/8011 Analysis of EDB/DBCP												
8011, VOA Compounds Liquid "As Received"												
1,2-Dibromo-3-chloropropane	U	0.0189	0.00851	0.0189	ug/L	0.945	1	LOF	08/03/23	2331	2468814	1
Mercury Analysis-CVAA												
7470, Mercury Liquid "As Received"												
Mercury	U	0.000200	0.0000670	0.000200	mg/L	1.00	1	JP2	08/02/23	1129	2468975	2
Metals Analysis-ICP-MS												
6020, Metals (15+) "As Received"												
Antimony	U	0.00300	0.00100	0.00300	mg/L	1.00	1	PRB	08/15/23	1812	2469288	3
Aluminum	U	0.0500	0.0193	0.0500	mg/L	1.00	1	PRB	08/16/23	0232	2469288	4
Arsenic	U	0.00500	0.00200	0.00500	mg/L	1.00	1					
Barium		0.222	0.000670	0.00400	mg/L	1.00	1					
Beryllium	U	0.000500	0.000200	0.000500	mg/L	1.00	1					
Boron		0.0163	0.00520	0.0150	mg/L	1.00	1					
Cadmium	U	0.00100	0.000300	0.00100	mg/L	1.00	1					
Calcium		20.8	0.0800	0.200	mg/L	1.00	1					
Chromium	U	0.0100	0.00300	0.0100	mg/L	1.00	1					
Cobalt	U	0.00100	0.000300	0.00100	mg/L	1.00	1					
Copper		0.00249	0.000300	0.00200	mg/L	1.00	1					
Iron	U	0.100	0.0330	0.100	mg/L	1.00	1					
Lead	U	0.00200	0.000500	0.00200	mg/L	1.00	1					
Magnesium		8.93	0.0100	0.0300	mg/L	1.00	1					
Manganese	U	0.00500	0.00100	0.00500	mg/L	1.00	1					
Molybdenum		0.00374	0.000200	0.00100	mg/L	1.00	1					
Nickel		0.0242	0.000600	0.00200	mg/L	1.00	1					
Potassium		2.19	0.0800	0.300	mg/L	1.00	1					
Selenium	U	0.00500	0.00150	0.00500	mg/L	1.00	1					
Silver	U	0.00100	0.000300	0.00100	mg/L	1.00	1					
Sodium		45.2	0.0800	0.250	mg/L	1.00	1					
Thallium	U	0.00200	0.000600	0.00200	mg/L	1.00	1					
Uranium	U	0.000200	0.0000670	0.000200	mg/L	1.00	1					
Vanadium	U	0.0200	0.00330	0.0200	mg/L	1.00	1					
Zinc	J	0.00582	0.00330	0.0200	mg/L	1.00	1					
Rhodium	U	0.00500	0.00160	0.00500	mg/L	1.00	1	PRB	08/16/23	1143	2469288	5
Tantalum	U	0.00500	0.00100	0.00500	mg/L	1.00	1					

**Volatile Organics**

8260D, Volatiles- full suite "As Received"

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road

Contact: Kevil, Kentucky 42053  
Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW221SG4-23  
Sample ID: 631286003

Project: FRNP00511  
Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Volatile Organics												
8260D, Volatiles- full suite "As Received"												
1,1,1,2-Tetrachloroethane	U	1.00	0.333	1.00	ug/L		1	KP2	08/01/23	1757	2468743	6
1,1,1-Trichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1,2,2-Tetrachloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1,2-Trichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1-Dichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1					
1,2,3-Trichloropropane	U	1.00	0.333	1.00	ug/L		1					
1,2-Dibromoethane	U	1.00	0.333	1.00	ug/L		1					
1,2-Dichlorobenzene	U	1.00	0.333	1.00	ug/L		1					
1,2-Dichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,2-Dichloropropane	U	1.00	0.333	1.00	ug/L		1					
1,4-Dichlorobenzene	U	1.00	0.333	1.00	ug/L		1					
2-Butanone	U	5.00	1.67	5.00	ug/L		1					
2-Hexanone	U	5.00	1.67	5.00	ug/L		1					
4-Methyl-2-pentanone	U	5.00	1.67	5.00	ug/L		1					
Acetone	U	5.00	1.74	5.00	ug/L		1					
Acrolein	U	5.00	1.67	5.00	ug/L		1					
Acrylonitrile	U	5.00	1.67	5.00	ug/L		1					
Benzene	U	1.00	0.333	1.00	ug/L		1					
Bromochloromethane	U	1.00	0.333	1.00	ug/L		1					
Bromodichloromethane	U	1.00	0.333	1.00	ug/L		1					
Bromoform	U	1.00	0.333	1.00	ug/L		1					
Bromomethane	UL	1.00	0.337	1.00	ug/L		1					
Carbon disulfide	U	5.00	1.67	5.00	ug/L		1					
Carbon tetrachloride	U	1.00	0.333	1.00	ug/L		1					
Chlorobenzene	U	1.00	0.333	1.00	ug/L		1					
Chloroethane	LU	1.00	0.333	1.00	ug/L		1					
Chloroform	U	1.00	0.333	1.00	ug/L		1					
Chloromethane	LYIU	1.00	0.333	1.00	ug/L		1					
Dibromochloromethane	U	1.00	0.333	1.00	ug/L		1					
Dibromomethane	U	1.00	0.333	1.00	ug/L		1					
Ethylbenzene	U	1.00	0.333	1.00	ug/L		1					
Iodomethane	U	5.00	1.67	5.00	ug/L		1					
Methylene chloride	U	5.00	0.500	5.00	ug/L		1					
Styrene	U	1.00	0.333	1.00	ug/L		1					
Tetrachloroethylene	U	1.00	0.333	1.00	ug/L		1					

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road

Contact: Kevil, Kentucky 42053  
Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW221SG4-23  
Sample ID: 631286003

Project: FRNP00511  
Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Volatile Organics												
8260D, Volatiles- full suite "As Received"												
Toluene	U	1.00	0.333	1.00	ug/L		1					
Trichloroethylene	U	1.00	0.333	1.00	ug/L		1					
Trichlorofluoromethane	U	1.00	0.333	1.00	ug/L		1					
Vinyl acetate	U	5.00	1.67	5.00	ug/L		1					
Vinyl chloride	LU	1.00	0.333	1.00	ug/L		1					
Xylenes (total)	U	3.00	1.00	3.00	ug/L		1					
cis-1,2-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1					
cis-1,3-Dichloropropylene	U	1.00	0.333	1.00	ug/L		1					
trans-1,2-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1					
trans-1,3-Dichloropropylene	U	1.00	0.333	1.00	ug/L		1					
trans-1,4-Dichloro-2-butene	U	5.00	1.67	5.00	ug/L		1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3005A	ICP-MS 3005A PREP	EM2	08/03/23	1525	2469286
SW846 7470A Prep	EPA 7470A Mercury Prep Liquid	EK1	08/01/23	1245	2468974
SW846 8011 PREP	8011 Prep	LOF	08/03/23	1348	2468812

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 8011	
2	SW846 7470A	
3	SW846 3005A/6020B	
4	SW846 3005A/6020B	
5	SW846 3005A/6020B	
6	SW846 8260D	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
1-Chloro-2-fluorobenzene	8011, VOA Compounds Liquid "As Received"	7.59 ug/L	6.75	112	(46%-159%)
Bromofluorobenzene	8260D, Volatiles- full suite "As Received"	44.8 ug/L	50.0	90	(72%-125%)
1,2-Dichloroethane-d4	8260D, Volatiles- full suite "As Received"	48.8 ug/L	50.0	98	(73%-129%)
Toluene-d8	8260D, Volatiles- full suite "As Received"	49.7 ug/L	50.0	99	(75%-123%)

Notes:

# GEL LABORATORIES LLC

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road  
Kevil, Kentucky 42053  
Contact: Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

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Client Sample ID:	MW221SG4-23	Project:	FRNP00511
Sample ID:	631286003	Client ID:	FRNP005

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Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
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Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road  
Kevil, Kentucky 42053  
Contact: Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW221SG4-23      Project: FRNP00511  
Sample ID: 631286004      Client ID: FRNP005  
Matrix: WG  
Collect Date: 28-JUL-23 06:39  
Receive Date: 29-JUL-23  
Collector: Client

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Metals Analysis-ICP-MS												
6020, Dissolved Metals (3 Elements) "As Received"												
Barium		0.222	0.000670	0.00400	mg/L	1.00	1	PRB	08/16/23	0235	2469288	1
Chromium	U	0.0100	0.00300	0.0100	mg/L	1.00	1					
Uranium	U	0.000200	0.0000670	0.000200	mg/L	1.00	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3005A	ICP-MS 3005A PREP	EM2	08/03/23	1525	2469286
EPA 160	Laboratory Filtration	RXB5	08/01/23	1220	2468811

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 3005A/6020B	

### Notes:

Column headers are defined as follows:

DF: Dilution Factor      Lc/LC: Critical Level  
DL: Detection Limit      PF: Prep Factor  
MDA: Minimum Detectable Activity      RL: Reporting Limit  
MDC: Minimum Detectable Concentration      SQL: Sample Quantitation Limit

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road

Kevil, Kentucky 42053

Contact: Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW222SG4-23 Project: FRNP00511  
Sample ID: 631286005 Client ID: FRNP005  
Matrix: WG  
Collect Date: 28-JUL-23 08:32  
Receive Date: 29-JUL-23  
Collector: Client

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
504.1/8011 Analysis of EDB/DBCP												
8011, VOA Compounds Liquid "As Received"												
1,2-Dibromo-3-chloropropane	U	0.0189	0.00853	0.0189	ug/L	0.947	1	LOF	08/04/23	0045	2468814	1
Carbon Analysis												
9060A, Total Organic Carbon "As Received"												
Total Organic Carbon Average	J	0.942	0.330	2.00	mg/L		1	RM3	08/01/23	0834	2468684	2
Flow Injection Analysis												
9012B, Total Cyanide "As Received"												
Cyanide, Total	U	0.200	0.00167	0.200	mg/L	1.00	1	AXH3	08/01/23	1510	2468244	3
Halogen Analysis												
9020B, TOX (Organic Halogen) "As Received"												
Total Organic Halogens	BJ	5.88	3.33	10.0	ug/L		1	RM3	08/10/23	1747	2474234	4
Ion Chromatography												
300.0, Iodide in Liquid "As Received"												
Iodide	U	0.500	0.167	0.500	mg/L		1	LXA2	08/05/23	1435	2471866	5
SW846 9056A Anions (5) "As Received"												
Bromide		0.427	0.0670	0.200	mg/L		1	JLD1	07/29/23	1213	2468137	6
Fluoride	J	0.271	0.0330	4.00	mg/L		1					
Nitrate-N	J	0.851	0.0330	10.0	mg/L		1					
Sulfate		12.3	0.133	0.400	mg/L		1					
Chloride	J	30.3	0.335	250	mg/L		5	JLD1	07/29/23	1524	2468137	7
Mercury Analysis-CVAA												
7470, Mercury Liquid "As Received"												
Mercury	U	0.000200	0.0000670	0.000200	mg/L	1.00	1	JP2	08/02/23	1131	2468975	8
Metals Analysis-ICP-MS												
6020, Metals (15+) "As Received"												
Aluminum	U	0.0500	0.0193	0.0500	mg/L	1.00	1	PRB	08/16/23	0239	2469288	9
Arsenic	U	0.00500	0.00200	0.00500	mg/L	1.00	1					
Barium		0.283	0.000670	0.00400	mg/L	1.00	1					
Beryllium	U	0.000500	0.000200	0.000500	mg/L	1.00	1					
Boron	J	0.00872	0.00520	0.0150	mg/L	1.00	1					
Cadmium	U	0.00100	0.000300	0.00100	mg/L	1.00	1					
Calcium		18.0	0.0800	0.200	mg/L	1.00	1					
Chromium	U	0.0100	0.00300	0.0100	mg/L	1.00	1					
Cobalt	J	0.000380	0.000300	0.00100	mg/L	1.00	1					

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
 Address : 5600 Hobbs Road  
  
 Kevil, Kentucky 42053  
 Contact: Ms. Jaime Morrow  
 Project: C-746-S&T Landfill Quarterly(SG23-04)

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Client Sample ID: MW222SG4-23	Project: FRNP00511
Sample ID: 631286005	Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Metals Analysis-ICP-MS</b>												
<b>6020, Metals (15+) "As Received"</b>												
Copper	J	0.00119	0.000300	0.00200	mg/L	1.00	1					
Iron	U	0.100	0.0330	0.100	mg/L	1.00	1					
Lead	U	0.00200	0.000500	0.00200	mg/L	1.00	1					
Magnesium		7.66	0.0100	0.0300	mg/L	1.00	1					
Manganese		0.00542	0.00100	0.00500	mg/L	1.00	1					
Molybdenum		0.00176	0.000200	0.00100	mg/L	1.00	1					
Nickel		0.0188	0.000600	0.00200	mg/L	1.00	1					
Potassium		0.769	0.0800	0.300	mg/L	1.00	1					
Selenium	U	0.00500	0.00150	0.00500	mg/L	1.00	1					
Silver	U	0.00100	0.000300	0.00100	mg/L	1.00	1					
Sodium		43.9	0.0800	0.250	mg/L	1.00	1					
Thallium	U	0.00200	0.000600	0.00200	mg/L	1.00	1					
Uranium	U	0.000200	0.0000670	0.000200	mg/L	1.00	1					
Vanadium	U	0.0200	0.00330	0.0200	mg/L	1.00	1					
Zinc	J	0.00383	0.00330	0.0200	mg/L	1.00	1					
Rhodium	U	0.00500	0.00160	0.00500	mg/L	1.00	1	PRB	08/16/23	1145	2469288	10
Tantalum	U	0.00500	0.00100	0.00500	mg/L	1.00	1					
Antimony	U	0.00300	0.00100	0.00300	mg/L	1.00	1	PRB	08/15/23	1820	2469288	11
<b>Solids Analysis</b>												
<b>160.1, Dissolved Solids "As Received"</b>												
Total Dissolved Solids		184	2.38	10.0	mg/L			CH6	08/03/23	1509	2470749	12
<b>Spectrometric Analysis</b>												
<b>410.4, Chem. Oxygen Demand "As Received"</b>												
COD	U	20.0	8.95	20.0	mg/L		1	JW2	08/01/23	1655	2469194	13
<b>Volatile Organics</b>												
<b>8260D, Volatiles- full suite "As Received"</b>												
1,1,1,2-Tetrachloroethane	U	1.00	0.333	1.00	ug/L		1	KP2	08/01/23	1821	2468743	14
1,1,1-Trichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1,2,2-Tetrachloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1,2-Trichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1-Dichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1					
1,2,3-Trichloropropane	U	1.00	0.333	1.00	ug/L		1					
1,2-Dibromoethane	U	1.00	0.333	1.00	ug/L		1					



# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road

Kevil, Kentucky 42053

Contact: Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW222SG4-23  
Sample ID: 631286005

Project: FRNP00511  
Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time Batch	Method
Volatile Organics											
8260D, Volatiles- full suite "As Received"											
1,2-Dichlorobenzene	U	1.00	0.333	1.00	ug/L		1				
1,2-Dichloroethane	U	1.00	0.333	1.00	ug/L		1				
1,2-Dichloropropane	U	1.00	0.333	1.00	ug/L		1				
1,4-Dichlorobenzene	U	1.00	0.333	1.00	ug/L		1				
2-Butanone	U	5.00	1.67	5.00	ug/L		1				
2-Hexanone	U	5.00	1.67	5.00	ug/L		1				
4-Methyl-2-pentanone	U	5.00	1.67	5.00	ug/L		1				
Acetone	U	5.00	1.74	5.00	ug/L		1				
Acrolein	U	5.00	1.67	5.00	ug/L		1				
Acrylonitrile	U	5.00	1.67	5.00	ug/L		1				
Benzene	U	1.00	0.333	1.00	ug/L		1				
Bromochloromethane	U	1.00	0.333	1.00	ug/L		1				
Bromodichloromethane	U	1.00	0.333	1.00	ug/L		1				
Bromoform	U	1.00	0.333	1.00	ug/L		1				
Bromomethane	UL	1.00	0.337	1.00	ug/L		1				
Carbon disulfide	U	5.00	1.67	5.00	ug/L		1				
Carbon tetrachloride	U	1.00	0.333	1.00	ug/L		1				
Chlorobenzene	U	1.00	0.333	1.00	ug/L		1				
Chloroethane	LU	1.00	0.333	1.00	ug/L		1				
Chloroform	U	1.00	0.333	1.00	ug/L		1				
Chloromethane	LY1U	1.00	0.333	1.00	ug/L		1				
Dibromochloromethane	U	1.00	0.333	1.00	ug/L		1				
Dibromomethane	U	1.00	0.333	1.00	ug/L		1				
Ethylbenzene	U	1.00	0.333	1.00	ug/L		1				
Iodomethane	U	5.00	1.67	5.00	ug/L		1				
Methylene chloride	U	5.00	0.500	5.00	ug/L		1				
Styrene	U	1.00	0.333	1.00	ug/L		1				
Tetrachloroethylene	U	1.00	0.333	1.00	ug/L		1				
Toluene	U	1.00	0.333	1.00	ug/L		1				
Trichloroethylene	U	1.00	0.333	1.00	ug/L		1				
Trichlorofluoromethane	U	1.00	0.333	1.00	ug/L		1				
Vinyl acetate	U	5.00	1.67	5.00	ug/L		1				
Vinyl chloride	LU	1.00	0.333	1.00	ug/L		1				
Xylenes (total)	U	3.00	1.00	3.00	ug/L		1				
cis-1,2-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1				
cis-1,3-Dichloropropylene	U	1.00	0.333	1.00	ug/L		1				

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
 Address : 5600 Hobbs Road  
  
 Kevil, Kentucky 42053  
 Contact: Ms. Jaime Morrow  
 Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW222SG4-23	Project: FRNP00511
Sample ID: 631286005	Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Volatile Organics												
8260D, Volatiles- full suite "As Received"												
trans-1,2-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1					
trans-1,3-Dichloropropylene	U	1.00	0.333	1.00	ug/L		1					
trans-1,4-Dichloro-2-butene	U	5.00	1.67	5.00	ug/L		1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3005A	ICP-MS 3005A PREP	EM2	08/03/23	1525	2469286
SW846 9010C Distillation	SW846 9010C Prep	ES2	08/01/23	1001	2468243
SW846 8011 PREP	8011 Prep	LOF	08/03/23	1348	2468812
SW846 7470A Prep	EPA 7470A Mercury Prep Liquid	EK1	08/01/23	1245	2468974

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 8011	
2	SW846 9060A	
3	SW846 9012B	
4	SW846 9020B	
5	EPA 300.0	
6	SW846 9056A	
7	SW846 9056A	
8	SW846 7470A	
9	SW846 3005A/6020B	
10	SW846 3005A/6020B	
11	SW846 3005A/6020B	
12	EPA 160.1	
13	EPA 410.4	
14	SW846 8260D	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
1-Chloro-2-fluorobenzene	8011, VOA Compounds Liquid "As Received"	7.14 ug/L	6.77	105	(46%-159%)
Bromofluorobenzene	8260D, Volatiles- full suite "As Received"	45.0 ug/L	50.0	90	(72%-125%)
1,2-Dichloroethane-d4	8260D, Volatiles- full suite "As Received"	50.7 ug/L	50.0	101	(73%-129%)
Toluene-d8	8260D, Volatiles- full suite "As Received"	50.9 ug/L	50.0	102	(75%-123%)

**Notes:**

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Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road  
Kevil, Kentucky 42053  
Contact: Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

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Client Sample ID:	MW222SG4-23	Project:	FRNP00511
Sample ID:	631286005	Client ID:	FRNP005

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Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time Batch	Method
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Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road  
Kevil, Kentucky 42053  
Contact: Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW222SG4-23  
Sample ID: 631286006  
Matrix: WG  
Collect Date: 28-JUL-23 08:32  
Receive Date: 29-JUL-23  
Collector: Client

Project: FRNP00511  
Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Metals Analysis-ICP-MS												
6020, Dissolved Metals (3 Elements) "As Received"												
Barium		0.291	0.000670	0.00400	mg/L	1.00	1	PRB	08/16/23	0243	2469288	1
Chromium	U	0.0100	0.00300	0.0100	mg/L	1.00	1					
Uranium	U	0.000200	0.0000670	0.000200	mg/L	1.00	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 160	Laboratory Filtration	RXB5	08/01/23	1220	2468811
SW846 3005A	ICP-MS 3005A PREP	EM2	08/03/23	1525	2469286

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 3005A/6020B	

**Notes:**

Column headers are defined as follows:

DF: Dilution Factor  
DL: Detection Limit  
MDA: Minimum Detectable Activity  
MDC: Minimum Detectable Concentration  
Lc/LC: Critical Level  
PF: Prep Factor  
RL: Reporting Limit  
SQL: Sample Quantitation Limit

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road  
Kevil, Kentucky 42053  
Contact: Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW223SG4-23 Project: FRNP00511  
Sample ID: 631286007 Client ID: FRNP005  
Matrix: WG  
Collect Date: 28-JUL-23 07:26  
Receive Date: 29-JUL-23  
Collector: Client

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
504.1/8011 Analysis of EDB/DBCP												
8011, VOA Compounds Liquid "As Received"												
1,2-Dibromo-3-chloropropane	U	0.0190	0.00854	0.0190	ug/L	0.949	1	LOF	08/04/23	0109	2468814	1
Carbon Analysis												
9060A, Total Organic Carbon "As Received"												
Total Organic Carbon Average	J	0.727	0.330	2.00	mg/L		1	RM3	08/01/23	0914	2468684	2
Flow Injection Analysis												
9012B, Total Cyanide "As Received"												
Cyanide, Total	U	0.200	0.00167	0.200	mg/L	1.00	1	AXH3	08/01/23	1511	2468244	3
Halogen Analysis												
9020B, TOX (Organic Halogen) "As Received"												
Total Organic Halogens	J	5.22	3.33	10.0	ug/L		1	RM3	08/14/23	1527	2476025	4
Ion Chromatography												
300.0, Iodide in Liquid "As Received"												
Iodide	U	0.500	0.167	0.500	mg/L		1	LXA2	08/05/23	1448	2471866	5
SW846 9056A Anions (5) "As Received"												
Chloride	J	33.9	0.335	250	mg/L		5	JLD1	07/29/23	1555	2468137	6
Bromide		0.477	0.0670	0.200	mg/L		1	JLD1	07/29/23	1244	2468137	7
Fluoride	J	0.226	0.0330	4.00	mg/L		1					
Nitrate-N	J	0.796	0.0330	10.0	mg/L		1					
Sulfate		14.2	0.133	0.400	mg/L		1					
Mercury Analysis-CVAA												
7470, Mercury Liquid "As Received"												
Mercury	U	0.000200	0.0000670	0.000200	mg/L	1.00	1	JP2	08/02/23	1132	2468975	8
Metals Analysis-ICP-MS												
6020, Metals (15+) "As Received"												
Rhodium	U	0.00500	0.00160	0.00500	mg/L	1.00	1	PRB	08/16/23	1151	2469288	9
Tantalum	U	0.00500	0.00100	0.00500	mg/L	1.00	1					
Antimony	U	0.00300	0.00100	0.00300	mg/L	1.00	1	PRB	08/15/23	1834	2469288	10
Aluminum	U	0.0500	0.0193	0.0500	mg/L	1.00	1	PRB	08/16/23	0253	2469288	11
Arsenic	U	0.00500	0.00200	0.00500	mg/L	1.00	1					
Barium		0.265	0.000670	0.00400	mg/L	1.00	1					
Beryllium	U	0.000500	0.000200	0.000500	mg/L	1.00	1					
Boron	J	0.00846	0.00520	0.0150	mg/L	1.00	1					
Cadmium	U	0.00100	0.000300	0.00100	mg/L	1.00	1					

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road

Kevil, Kentucky 42053

Contact: Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW223SG4-23  
Sample ID: 631286007

Project: FRNP00511  
Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Metals Analysis-ICP-MS</b>												
<b>6020, Metals (15+) "As Received"</b>												
Calcium		22.3	0.0800	0.200	mg/L	1.00	1					
Chromium		0.0154	0.00300	0.0100	mg/L	1.00	1					
Cobalt	U	0.00100	0.000300	0.00100	mg/L	1.00	1					
Copper	J	0.00134	0.000300	0.00200	mg/L	1.00	1					
Iron	U	0.100	0.0330	0.100	mg/L	1.00	1					
Lead	U	0.00200	0.000500	0.00200	mg/L	1.00	1					
Magnesium		9.06	0.0100	0.0300	mg/L	1.00	1					
Manganese	J	0.00333	0.00100	0.00500	mg/L	1.00	1					
Molybdenum		0.00583	0.000200	0.00100	mg/L	1.00	1					
Nickel		0.200	0.000600	0.00200	mg/L	1.00	1					
Potassium		2.32	0.0800	0.300	mg/L	1.00	1					
Selenium	U	0.00500	0.00150	0.00500	mg/L	1.00	1					
Silver	U	0.00100	0.000300	0.00100	mg/L	1.00	1					
Sodium		44.4	0.0800	0.250	mg/L	1.00	1					
Thallium	U	0.00200	0.000600	0.00200	mg/L	1.00	1					
Uranium	U	0.000200	0.0000670	0.000200	mg/L	1.00	1					
Vanadium	U	0.0200	0.00330	0.0200	mg/L	1.00	1					
Zinc	J	0.00347	0.00330	0.0200	mg/L	1.00	1					
<b>Solids Analysis</b>												
<b>160.1, Dissolved Solids "As Received"</b>												
Total Dissolved Solids		209	2.38	10.0	mg/L			CH6	08/03/23	1509	2470749	12
<b>Spectrometric Analysis</b>												
<b>410.4, Chem. Oxygen Demand "As Received"</b>												
COD	U	20.0	8.95	20.0	mg/L		1	JW2	08/01/23	1655	2469194	13
<b>Volatile Organics</b>												
<b>8260D, Volatiles- full suite "As Received"</b>												
1,1,1,2-Tetrachloroethane	U	1.00	0.333	1.00	ug/L		1	KP2	08/01/23	1846	2468743	14
1,1,1-Trichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1,2,2-Tetrachloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1,2-Trichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1-Dichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1					
1,2,3-Trichloropropane	U	1.00	0.333	1.00	ug/L		1					
1,2-Dibromoethane	U	1.00	0.333	1.00	ug/L		1					

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Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road

Kevil, Kentucky 42053

Contact: Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW223SG4-23  
Sample ID: 631286007

Project: FRNP00511  
Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time Batch	Method
Volatile Organics											
8260D, Volatiles- full suite "As Received"											
1,2-Dichlorobenzene	U	1.00	0.333	1.00	ug/L		1				
1,2-Dichloroethane	U	1.00	0.333	1.00	ug/L		1				
1,2-Dichloropropane	U	1.00	0.333	1.00	ug/L		1				
1,4-Dichlorobenzene	U	1.00	0.333	1.00	ug/L		1				
2-Butanone	U	5.00	1.67	5.00	ug/L		1				
2-Hexanone	U	5.00	1.67	5.00	ug/L		1				
4-Methyl-2-pentanone	U	5.00	1.67	5.00	ug/L		1				
Acetone	U	5.00	1.74	5.00	ug/L		1				
Acrolein	U	5.00	1.67	5.00	ug/L		1				
Acrylonitrile	U	5.00	1.67	5.00	ug/L		1				
Benzene	U	1.00	0.333	1.00	ug/L		1				
Bromochloromethane	U	1.00	0.333	1.00	ug/L		1				
Bromodichloromethane	U	1.00	0.333	1.00	ug/L		1				
Bromoform	U	1.00	0.333	1.00	ug/L		1				
Bromomethane	UL	1.00	0.337	1.00	ug/L		1				
Carbon disulfide	U	5.00	1.67	5.00	ug/L		1				
Carbon tetrachloride	U	1.00	0.333	1.00	ug/L		1				
Chlorobenzene	U	1.00	0.333	1.00	ug/L		1				
Chloroethane	LU	1.00	0.333	1.00	ug/L		1				
Chloroform	U	1.00	0.333	1.00	ug/L		1				
Chloromethane	LY1U	1.00	0.333	1.00	ug/L		1				
Dibromochloromethane	U	1.00	0.333	1.00	ug/L		1				
Dibromomethane	U	1.00	0.333	1.00	ug/L		1				
Ethylbenzene	U	1.00	0.333	1.00	ug/L		1				
Iodomethane	U	5.00	1.67	5.00	ug/L		1				
Methylene chloride	U	5.00	0.500	5.00	ug/L		1				
Styrene	U	1.00	0.333	1.00	ug/L		1				
Tetrachloroethylene	U	1.00	0.333	1.00	ug/L		1				
Toluene	U	1.00	0.333	1.00	ug/L		1				
Trichloroethylene	U	1.00	0.333	1.00	ug/L		1				
Trichlorofluoromethane	U	1.00	0.333	1.00	ug/L		1				
Vinyl acetate	U	5.00	1.67	5.00	ug/L		1				
Vinyl chloride	LU	1.00	0.333	1.00	ug/L		1				
Xylenes (total)	U	3.00	1.00	3.00	ug/L		1				
cis-1,2-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1				
cis-1,3-Dichloropropylene	U	1.00	0.333	1.00	ug/L		1				

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 Address : 5600 Hobbs Road  
  
 Kevil, Kentucky 42053  
 Contact: Ms. Jaime Morrow  
 Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW223SG4-23	Project: FRNP00511
Sample ID: 631286007	Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Volatile Organics												
8260D, Volatiles- full suite "As Received"												
trans-1,2-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1					
trans-1,3-Dichloropropylene	U	1.00	0.333	1.00	ug/L		1					
trans-1,4-Dichloro-2-butene	U	5.00	1.67	5.00	ug/L		1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 8011 PREP	8011 Prep	LOF	08/03/23	1348	2468812
SW846 7470A Prep	EPA 7470A Mercury Prep Liquid	EK1	08/01/23	1245	2468974
SW846 3005A	ICP-MS 3005A PREP	EM2	08/03/23	1525	2469286
SW846 9010C Distillation	SW846 9010C Prep	ES2	08/01/23	1001	2468243

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 8011	
2	SW846 9060A	
3	SW846 9012B	
4	SW846 9020B	
5	EPA 300.0	
6	SW846 9056A	
7	SW846 9056A	
8	SW846 7470A	
9	SW846 3005A/6020B	
10	SW846 3005A/6020B	
11	SW846 3005A/6020B	
12	EPA 160.1	
13	EPA 410.4	
14	SW846 8260D	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
1-Chloro-2-fluorobenzene	8011, VOA Compounds Liquid "As Received"	7.46 ug/L	6.78	110	(46%-159%)
Bromofluorobenzene	8260D, Volatiles- full suite "As Received"	44.2 ug/L	50.0	88	(72%-125%)
1,2-Dichloroethane-d4	8260D, Volatiles- full suite "As Received"	49.2 ug/L	50.0	98	(73%-129%)
Toluene-d8	8260D, Volatiles- full suite "As Received"	48.5 ug/L	50.0	97	(75%-123%)

**Notes:**



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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road  
Kevil, Kentucky 42053  
Contact: Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

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Client Sample ID:	MW223SG4-23	Project:	FRNP00511
Sample ID:	631286007	Client ID:	FRNP005

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Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
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Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road

Kevil, Kentucky 42053

Contact: Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW223SG4-23      Project: FRNP00511  
Sample ID: 631286008      Client ID: FRNP005  
Matrix: WG  
Collect Date: 28-JUL-23 07:26  
Receive Date: 29-JUL-23  
Collector: Client

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Metals Analysis-ICP-MS												
6020, Dissolved Metals (3 Elements) "As Received"												
Barium		0.273	0.000670	0.00400	mg/L	1.00	1	PRB	08/16/23	0311	2469288	1
Chromium		0.0153	0.00300	0.0100	mg/L	1.00	1					
Uranium	U	0.000200	0.0000670	0.000200	mg/L	1.00	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 160	Laboratory Filtration	RXB5	08/01/23	1220	2468811
SW846 3005A	ICP-MS 3005A PREP	EM2	08/03/23	1525	2469286

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 3005A/6020B	

### Notes:

Column headers are defined as follows:

DF: Dilution Factor      Lc/LC: Critical Level  
DL: Detection Limit      PF: Prep Factor  
MDA: Minimum Detectable Activity      RL: Reporting Limit  
MDC: Minimum Detectable Concentration      SQL: Sample Quantitation Limit

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
 Address : 5600 Hobbs Road  
  
 Kevil, Kentucky 42053  
 Contact: Ms. Jaime Morrow  
 Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW224DSG4-23	Project: FRNP00511
Sample ID: 631286009	Client ID: FRNP005
Matrix: WG	
Collect Date: 28-JUL-23 09:22	
Receive Date: 29-JUL-23	
Collector: Client	

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
504.1/8011 Analysis of EDB/DBCP												
8011, VOA Compounds Liquid "As Received"												
1,2-Dibromo-3-chloropropane	U	0.0194	0.00872	0.0194	ug/L	0.969	1	LOF	08/04/23	0223	2468814	1
Mercury Analysis-CVAA												
7470, Mercury Liquid "As Received"												
Mercury	U	0.000200	0.0000670	0.000200	mg/L	1.00	1	JP2	08/02/23	1144	2468975	2
Metals Analysis-ICP-MS												
6020, Metals (15+) "As Received"												
Sodium		56.4	0.800	2.50	mg/L	1.00	10	PRB	08/16/23	0806	2469288	3
Aluminum	U	0.0500	0.0193	0.0500	mg/L	1.00	1	PRB	08/16/23	0337	2469288	4
Arsenic	U	0.00500	0.00200	0.00500	mg/L	1.00	1					
Barium		0.248	0.000670	0.00400	mg/L	1.00	1					
Beryllium	U	0.000500	0.000200	0.000500	mg/L	1.00	1					
Boron		0.0251	0.00520	0.0150	mg/L	1.00	1					
Cadmium	U	0.00100	0.000300	0.00100	mg/L	1.00	1					
Calcium		23.8	0.0800	0.200	mg/L	1.00	1					
Chromium	J	0.00449	0.00300	0.0100	mg/L	1.00	1					
Cobalt	U	0.00100	0.000300	0.00100	mg/L	1.00	1					
Copper	J	0.000816	0.000300	0.00200	mg/L	1.00	1					
Iron	J	0.0688	0.0330	0.100	mg/L	1.00	1					
Lead	U	0.00200	0.000500	0.00200	mg/L	1.00	1					
Magnesium		9.80	0.0100	0.0300	mg/L	1.00	1					
Manganese	J	0.00406	0.00100	0.00500	mg/L	1.00	1					
Molybdenum		0.00111	0.000200	0.00100	mg/L	1.00	1					
Nickel		0.0116	0.000600	0.00200	mg/L	1.00	1					
Potassium		1.06	0.0800	0.300	mg/L	1.00	1					
Selenium	U	0.00500	0.00150	0.00500	mg/L	1.00	1					
Silver	U	0.00100	0.000300	0.00100	mg/L	1.00	1					
Thallium	U	0.00200	0.000600	0.00200	mg/L	1.00	1					
Uranium	U	0.000200	0.0000670	0.000200	mg/L	1.00	1					
Vanadium	U	0.0200	0.00330	0.0200	mg/L	1.00	1					
Zinc	U	0.0200	0.00330	0.0200	mg/L	1.00	1					
Antimony	U	0.00300	0.00100	0.00300	mg/L	1.00	1	PRB	08/15/23	1917	2469288	5
Rhodium	U	0.00500	0.00160	0.00500	mg/L	1.00	1	PRB	08/16/23	1200	2469288	6
Tantalum	U	0.00500	0.00100	0.00500	mg/L	1.00	1					

**Volatile Organics**

8260D, Volatiles- full suite "As Received"

# GEL LABORATORIES LLC

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road  
  
Kevil, Kentucky 42053  
Contact: Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW224DSG4-23 Project: FRNP00511  
Sample ID: 631286009 Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Volatile Organics												
8260D, Volatiles- full suite "As Received"												
1,1,1,2-Tetrachloroethane	U	1.00	0.333	1.00	ug/L		1	KP2	08/01/23	1910	2468743	7
1,1,1-Trichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1,2,2-Tetrachloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1,2-Trichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1-Dichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1					
1,2,3-Trichloropropane	U	1.00	0.333	1.00	ug/L		1					
1,2-Dibromoethane	U	1.00	0.333	1.00	ug/L		1					
1,2-Dichlorobenzene	U	1.00	0.333	1.00	ug/L		1					
1,2-Dichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,2-Dichloropropane	U	1.00	0.333	1.00	ug/L		1					
1,4-Dichlorobenzene	U	1.00	0.333	1.00	ug/L		1					
2-Butanone	U	5.00	1.67	5.00	ug/L		1					
2-Hexanone	U	5.00	1.67	5.00	ug/L		1					
4-Methyl-2-pentanone	U	5.00	1.67	5.00	ug/L		1					
Acetone	U	5.00	1.74	5.00	ug/L		1					
Acrolein	U	5.00	1.67	5.00	ug/L		1					
Acrylonitrile	U	5.00	1.67	5.00	ug/L		1					
Benzene	U	1.00	0.333	1.00	ug/L		1					
Bromochloromethane	U	1.00	0.333	1.00	ug/L		1					
Bromodichloromethane	U	1.00	0.333	1.00	ug/L		1					
Bromoform	U	1.00	0.333	1.00	ug/L		1					
Bromomethane	UL	1.00	0.337	1.00	ug/L		1					
Carbon disulfide	U	5.00	1.67	5.00	ug/L		1					
Carbon tetrachloride	U	1.00	0.333	1.00	ug/L		1					
Chlorobenzene	U	1.00	0.333	1.00	ug/L		1					
Chloroethane	LU	1.00	0.333	1.00	ug/L		1					
Chloroform	U	1.00	0.333	1.00	ug/L		1					
Chloromethane	LYIU	1.00	0.333	1.00	ug/L		1					
Dibromochloromethane	U	1.00	0.333	1.00	ug/L		1					
Dibromomethane	U	1.00	0.333	1.00	ug/L		1					
Ethylbenzene	U	1.00	0.333	1.00	ug/L		1					
Iodomethane	U	5.00	1.67	5.00	ug/L		1					
Methylene chloride	U	5.00	0.500	5.00	ug/L		1					
Styrene	U	1.00	0.333	1.00	ug/L		1					
Tetrachloroethylene	U	1.00	0.333	1.00	ug/L		1					

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Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road  
  
Kevil, Kentucky 42053  
Contact: Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW224DSG4-23 Project: FRNP00511  
Sample ID: 631286009 Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Volatile Organics												
8260D, Volatiles- full suite "As Received"												
Toluene	U	1.00	0.333	1.00	ug/L		1					
Trichloroethylene	U	1.00	0.333	1.00	ug/L		1					
Trichlorofluoromethane	U	1.00	0.333	1.00	ug/L		1					
Vinyl acetate	U	5.00	1.67	5.00	ug/L		1					
Vinyl chloride	LU	1.00	0.333	1.00	ug/L		1					
Xylenes (total)	U	3.00	1.00	3.00	ug/L		1					
cis-1,2-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1					
cis-1,3-Dichloropropylene	U	1.00	0.333	1.00	ug/L		1					
trans-1,2-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1					
trans-1,3-Dichloropropylene	U	1.00	0.333	1.00	ug/L		1					
trans-1,4-Dichloro-2-butene	U	5.00	1.67	5.00	ug/L		1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 7470A Prep	EPA 7470A Mercury Prep Liquid	EK1	08/01/23	1245	2468974
SW846 8011 PREP	8011 Prep	LOF	08/03/23	1348	2468812
SW846 3005A	ICP-MS 3005A PREP	EM2	08/03/23	1525	2469286

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 8011	
2	SW846 7470A	
3	SW846 3005A/6020B	
4	SW846 3005A/6020B	
5	SW846 3005A/6020B	
6	SW846 3005A/6020B	
7	SW846 8260D	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
1-Chloro-2-fluorobenzene	8011, VOA Compounds Liquid "As Received"	7.23 ug/L	6.92	104	(46%-159%)
Bromofluorobenzene	8260D, Volatiles- full suite "As Received"	44.9 ug/L	50.0	90	(72%-125%)
1,2-Dichloroethane-d4	8260D, Volatiles- full suite "As Received"	47.9 ug/L	50.0	96	(73%-129%)
Toluene-d8	8260D, Volatiles- full suite "As Received"	49.8 ug/L	50.0	100	(75%-123%)

Notes:

# GEL LABORATORIES LLC

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road  
Kevil, Kentucky 42053  
Contact: Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

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Client Sample ID:	MW224DSG4-23	Project:	FRNP00511
Sample ID:	631286009	Client ID:	FRNP005

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Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time Batch	Method
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Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road

Kevil, Kentucky 42053

Contact: Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW224DSG4-23      Project: FRNP00511  
Sample ID: 631286010      Client ID: FRNP005  
Matrix: WG  
Collect Date: 28-JUL-23 09:22  
Receive Date: 29-JUL-23  
Collector: Client

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Metals Analysis-ICP-MS												
6020, Dissolved Metals (3 Elements) "As Received"												
Barium		0.256	0.000670	0.00400	mg/L	1.00	1	PRB	08/16/23	0340	2469288	1
Chromium	U	0.0100	0.00300	0.0100	mg/L	1.00	1					
Uranium	U	0.000200	0.0000670	0.000200	mg/L	1.00	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 160	Laboratory Filtration	RXB5	08/01/23	1220	2468811
SW846 3005A	ICP-MS 3005A PREP	EM2	08/03/23	1525	2469286

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 3005A/6020B	

### Notes:

Column headers are defined as follows:

DF: Dilution Factor      Lc/LC: Critical Level  
DL: Detection Limit      PF: Prep Factor  
MDA: Minimum Detectable Activity      RL: Reporting Limit  
MDC: Minimum Detectable Concentration      SQL: Sample Quantitation Limit

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road

Kevil, Kentucky 42053

Contact: Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW224SG4-23 Project: FRNP00511  
Sample ID: 631286011 Client ID: FRNP005  
Matrix: WG  
Collect Date: 28-JUL-23 09:22  
Receive Date: 29-JUL-23  
Collector: Client

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
504.1/8011 Analysis of EDB/DBCP												
8011, VOA Compounds Liquid "As Received"												
1,2-Dibromo-3-chloropropane	U	0.0194	0.00875	0.0194	ug/L	0.972	1	LOF	08/04/23	0247	2468814	1
Mercury Analysis-CVAA												
7470, Mercury Liquid "As Received"												
Mercury	U	0.000200	0.0000670	0.000200	mg/L	1.00	1	JP2	08/02/23	1145	2468975	2
Metals Analysis-ICP-MS												
6020, Metals (15+) "As Received"												
Aluminum	U	0.0500	0.0193	0.0500	mg/L	1.00	1	PRB	08/16/23	0344	2469288	3
Arsenic	U	0.00500	0.00200	0.00500	mg/L	1.00	1					
Barium		0.248	0.000670	0.00400	mg/L	1.00	1					
Beryllium	U	0.000500	0.000200	0.000500	mg/L	1.00	1					
Boron		0.0235	0.00520	0.0150	mg/L	1.00	1					
Cadmium	U	0.00100	0.000300	0.00100	mg/L	1.00	1					
Calcium		23.5	0.0800	0.200	mg/L	1.00	1					
Chromium	J	0.00418	0.00300	0.0100	mg/L	1.00	1					
Cobalt	U	0.00100	0.000300	0.00100	mg/L	1.00	1					
Copper	J	0.000946	0.000300	0.00200	mg/L	1.00	1					
Iron	J	0.0700	0.0330	0.100	mg/L	1.00	1					
Lead	U	0.00200	0.000500	0.00200	mg/L	1.00	1					
Magnesium		9.90	0.0100	0.0300	mg/L	1.00	1					
Manganese	J	0.00393	0.00100	0.00500	mg/L	1.00	1					
Molybdenum		0.00109	0.000200	0.00100	mg/L	1.00	1					
Nickel		0.0117	0.000600	0.00200	mg/L	1.00	1					
Potassium		1.05	0.0800	0.300	mg/L	1.00	1					
Selenium	U	0.00500	0.00150	0.00500	mg/L	1.00	1					
Silver	U	0.00100	0.000300	0.00100	mg/L	1.00	1					
Thallium	U	0.00200	0.000600	0.00200	mg/L	1.00	1					
Uranium	U	0.000200	0.0000670	0.000200	mg/L	1.00	1					
Vanadium	U	0.0200	0.00330	0.0200	mg/L	1.00	1					
Zinc	U	0.0200	0.00330	0.0200	mg/L	1.00	1					
Rhodium	U	0.00500	0.00160	0.00500	mg/L	1.00	1	PRB	08/16/23	1202	2469288	4
Tantalum	U	0.00500	0.00100	0.00500	mg/L	1.00	1					
Sodium		56.2	0.800	2.50	mg/L	1.00	10	PRB	08/16/23	0808	2469288	5
Antimony	U	0.00300	0.00100	0.00300	mg/L	1.00	1	PRB	08/15/23	1925	2469288	6

### Volatile Organics

8260D, Volatiles- full suite "As Received"



# GEL LABORATORIES LLC

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road

Contact: Kevil, Kentucky 42053  
Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW224SG4-23  
Sample ID: 631286011

Project: FRNP00511  
Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Volatile Organics												
8260D, Volatiles- full suite "As Received"												
1,1,1,2-Tetrachloroethane	U	1.00	0.333	1.00	ug/L		1	KP2	08/01/23	1935	2468743	7
1,1,1-Trichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1,2,2-Tetrachloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1,2-Trichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1-Dichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1					
1,2,3-Trichloropropane	U	1.00	0.333	1.00	ug/L		1					
1,2-Dibromoethane	U	1.00	0.333	1.00	ug/L		1					
1,2-Dichlorobenzene	U	1.00	0.333	1.00	ug/L		1					
1,2-Dichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,2-Dichloropropane	U	1.00	0.333	1.00	ug/L		1					
1,4-Dichlorobenzene	U	1.00	0.333	1.00	ug/L		1					
2-Butanone	U	5.00	1.67	5.00	ug/L		1					
2-Hexanone	U	5.00	1.67	5.00	ug/L		1					
4-Methyl-2-pentanone	U	5.00	1.67	5.00	ug/L		1					
Acetone	U	5.00	1.74	5.00	ug/L		1					
Acrolein	U	5.00	1.67	5.00	ug/L		1					
Acrylonitrile	U	5.00	1.67	5.00	ug/L		1					
Benzene	U	1.00	0.333	1.00	ug/L		1					
Bromochloromethane	U	1.00	0.333	1.00	ug/L		1					
Bromodichloromethane	U	1.00	0.333	1.00	ug/L		1					
Bromoform	U	1.00	0.333	1.00	ug/L		1					
Bromomethane	UL	1.00	0.337	1.00	ug/L		1					
Carbon disulfide	U	5.00	1.67	5.00	ug/L		1					
Carbon tetrachloride	U	1.00	0.333	1.00	ug/L		1					
Chlorobenzene	U	1.00	0.333	1.00	ug/L		1					
Chloroethane	LU	1.00	0.333	1.00	ug/L		1					
Chloroform	U	1.00	0.333	1.00	ug/L		1					
Chloromethane	LYIU	1.00	0.333	1.00	ug/L		1					
Dibromochloromethane	U	1.00	0.333	1.00	ug/L		1					
Dibromomethane	U	1.00	0.333	1.00	ug/L		1					
Ethylbenzene	U	1.00	0.333	1.00	ug/L		1					
Iodomethane	U	5.00	1.67	5.00	ug/L		1					
Methylene chloride	U	5.00	0.500	5.00	ug/L		1					
Styrene	U	1.00	0.333	1.00	ug/L		1					
Tetrachloroethylene	U	1.00	0.333	1.00	ug/L		1					

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
 Address : 5600 Hobbs Road  
  
 Kevil, Kentucky 42053  
 Contact: Ms. Jaime Morrow  
 Project: C-746-S&T Landfill Quarterly(SG23-04)

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Client Sample ID: MW224SG4-23	Project: FRNP00511
Sample ID: 631286011	Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Volatile Organics												
8260D, Volatiles- full suite "As Received"												
Toluene	U	1.00	0.333	1.00	ug/L		1					
Trichloroethylene	U	1.00	0.333	1.00	ug/L		1					
Trichlorofluoromethane	U	1.00	0.333	1.00	ug/L		1					
Vinyl acetate	U	5.00	1.67	5.00	ug/L		1					
Vinyl chloride	LU	1.00	0.333	1.00	ug/L		1					
Xylenes (total)	U	3.00	1.00	3.00	ug/L		1					
cis-1,2-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1					
cis-1,3-Dichloropropylene	U	1.00	0.333	1.00	ug/L		1					
trans-1,2-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1					
trans-1,3-Dichloropropylene	U	1.00	0.333	1.00	ug/L		1					
trans-1,4-Dichloro-2-butene	U	5.00	1.67	5.00	ug/L		1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 7470A Prep	EPA 7470A Mercury Prep Liquid	EK1	08/01/23	1245	2468974
SW846 3005A	ICP-MS 3005A PREP	EM2	08/03/23	1525	2469286
SW846 8011 PREP	8011 Prep	LOF	08/03/23	1348	2468812

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 8011	
2	SW846 7470A	
3	SW846 3005A/6020B	
4	SW846 3005A/6020B	
5	SW846 3005A/6020B	
6	SW846 3005A/6020B	
7	SW846 8260D	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
1-Chloro-2-fluorobenzene	8011, VOA Compounds Liquid "As Received"	7.09 ug/L	6.94	102	(46%-159%)
Bromofluorobenzene	8260D, Volatiles- full suite "As Received"	43.4 ug/L	50.0	87	(72%-125%)
1,2-Dichloroethane-d4	8260D, Volatiles- full suite "As Received"	48.7 ug/L	50.0	97	(73%-129%)
Toluene-d8	8260D, Volatiles- full suite "As Received"	50.5 ug/L	50.0	101	(75%-123%)

**Notes:**

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road  
Kevil, Kentucky 42053  
Contact: Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

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Client Sample ID:	MW224SG4-23	Project:	FRNP00511
Sample ID:	631286011	Client ID:	FRNP005

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Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time Batch	Method
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Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road

Kevil, Kentucky 42053

Contact: Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW224SG4-23      Project: FRNP00511  
Sample ID: 631286012      Client ID: FRNP005  
Matrix: WG  
Collect Date: 28-JUL-23 09:22  
Receive Date: 29-JUL-23  
Collector: Client

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Metals Analysis-ICP-MS												
6020, Dissolved Metals (3 Elements) "As Received"												
Barium		0.249	0.000670	0.00400	mg/L	1.00	1	PRB	08/16/23	0347	2469288	1
Chromium	U	0.0100	0.00300	0.0100	mg/L	1.00	1					
Uranium	U	0.000200	0.0000670	0.000200	mg/L	1.00	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3005A	ICP-MS 3005A PREP	EM2	08/03/23	1525	2469286
EPA 160	Laboratory Filtration	RXB5	08/01/23	1220	2468811

The following Analytical Methods were performed:

Method	Description	Analyst	Comments
1	SW846 3005A/6020B		

**Notes:**

Column headers are defined as follows:

DF: Dilution Factor      Lc/LC: Critical Level  
DL: Detection Limit      PF: Prep Factor  
MDA: Minimum Detectable Activity      RL: Reporting Limit  
MDC: Minimum Detectable Concentration      SQL: Sample Quantitation Limit

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
 Address : 5600 Hobbs Road  
 Kevil, Kentucky 42053  
 Contact: Ms. Jaime Morrow  
 Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: FB1SG4-23	Project: FRNP00511
Sample ID: 631286013	Client ID: FRNP005
Matrix: WATER	
Collect Date: 28-JUL-23 09:25	
Receive Date: 29-JUL-23	
Collector: Client	

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
504.1/8011 Analysis of EDB/DBCP												
8011, VOA Compounds Liquid "As Received"												
1,2-Dibromo-3-chloropropane	U	0.0188	0.00847	0.0188	ug/L	0.942	1	LOF	08/04/23	0312	2468814	1
Mercury Analysis-CVAA												
7470, Mercury Liquid "As Received"												
Mercury	U	0.000200	0.0000670	0.000200	mg/L	1.00	1	JP2	08/02/23	1147	2468975	2
Metals Analysis-ICP-MS												
6020, Metals (15+) "As Received"												
Aluminum	U	0.0500	0.0193	0.0500	mg/L	1.00	1	PRB	08/16/23	0351	2469288	3
Arsenic	U	0.00500	0.00200	0.00500	mg/L	1.00	1					
Barium	U	0.00400	0.000670	0.00400	mg/L	1.00	1					
Beryllium	U	0.000500	0.000200	0.000500	mg/L	1.00	1					
Boron	U	0.0150	0.00520	0.0150	mg/L	1.00	1					
Cadmium	U	0.00100	0.000300	0.00100	mg/L	1.00	1					
Calcium	U	0.200	0.0800	0.200	mg/L	1.00	1					
Chromium	U	0.0100	0.00300	0.0100	mg/L	1.00	1					
Cobalt	U	0.00100	0.000300	0.00100	mg/L	1.00	1					
Copper	J	0.000425	0.000300	0.00200	mg/L	1.00	1					
Iron	U	0.100	0.0330	0.100	mg/L	1.00	1					
Lead	U	0.00200	0.000500	0.00200	mg/L	1.00	1					
Magnesium		0.0332	0.0100	0.0300	mg/L	1.00	1					
Manganese	U	0.00500	0.00100	0.00500	mg/L	1.00	1					
Molybdenum	U	0.00100	0.000200	0.00100	mg/L	1.00	1					
Nickel		0.00506	0.000600	0.00200	mg/L	1.00	1					
Potassium	U	0.300	0.0800	0.300	mg/L	1.00	1					
Selenium	U	0.00500	0.00150	0.00500	mg/L	1.00	1					
Silver	U	0.00100	0.000300	0.00100	mg/L	1.00	1					
Sodium	J	0.212	0.0800	0.250	mg/L	1.00	1					
Thallium	U	0.00200	0.000600	0.00200	mg/L	1.00	1					
Uranium	U	0.000200	0.0000670	0.000200	mg/L	1.00	1					
Vanadium	U	0.0200	0.00330	0.0200	mg/L	1.00	1					
Zinc	U	0.0200	0.00330	0.0200	mg/L	1.00	1					
Rhodium	U	0.00500	0.00160	0.00500	mg/L	1.00	1	PRB	08/16/23	1204	2469288	4
Tantalum	U	0.00500	0.00100	0.00500	mg/L	1.00	1					
Antimony	U	0.00300	0.00100	0.00300	mg/L	1.00	1	PRB	08/15/23	1932	2469288	5
Volatile Organics												
8260D, Volatiles- full suite "As Received"												

# GEL LABORATORIES LLC

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road

Contact: Kevil, Kentucky 42053  
Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: FB1SG4-23  
Sample ID: 631286013

Project: FRNP00511  
Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Volatile Organics												
8260D, Volatiles- full suite "As Received"												
1,1,1,2-Tetrachloroethane	U	1.00	0.333	1.00	ug/L		1	KP2	08/01/23	1959	2468743	6
1,1,1-Trichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1,2,2-Tetrachloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1,2-Trichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1-Dichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1					
1,2,3-Trichloropropane	U	1.00	0.333	1.00	ug/L		1					
1,2-Dibromoethane	U	1.00	0.333	1.00	ug/L		1					
1,2-Dichlorobenzene	U	1.00	0.333	1.00	ug/L		1					
1,2-Dichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,2-Dichloropropane	U	1.00	0.333	1.00	ug/L		1					
1,4-Dichlorobenzene	U	1.00	0.333	1.00	ug/L		1					
2-Butanone	U	5.00	1.67	5.00	ug/L		1					
2-Hexanone	U	5.00	1.67	5.00	ug/L		1					
4-Methyl-2-pentanone	U	5.00	1.67	5.00	ug/L		1					
Acetone	U	5.00	1.74	5.00	ug/L		1					
Acrolein	U	5.00	1.67	5.00	ug/L		1					
Acrylonitrile	U	5.00	1.67	5.00	ug/L		1					
Benzene	U	1.00	0.333	1.00	ug/L		1					
Bromochloromethane	U	1.00	0.333	1.00	ug/L		1					
Bromodichloromethane	U	1.00	0.333	1.00	ug/L		1					
Bromoform	U	1.00	0.333	1.00	ug/L		1					
Bromomethane	UL	1.00	0.337	1.00	ug/L		1					
Carbon disulfide	U	5.00	1.67	5.00	ug/L		1					
Carbon tetrachloride	U	1.00	0.333	1.00	ug/L		1					
Chlorobenzene		3.24	0.333	1.00	ug/L		1					
Chloroethane	LU	1.00	0.333	1.00	ug/L		1					
Chloroform	U	1.00	0.333	1.00	ug/L		1					
Chloromethane	LYIU	1.00	0.333	1.00	ug/L		1					
Dibromochloromethane	U	1.00	0.333	1.00	ug/L		1					
Dibromomethane	U	1.00	0.333	1.00	ug/L		1					
Ethylbenzene	U	1.00	0.333	1.00	ug/L		1					
Iodomethane	U	5.00	1.67	5.00	ug/L		1					
Methylene chloride	U	5.00	0.500	5.00	ug/L		1					
Styrene	U	1.00	0.333	1.00	ug/L		1					
Tetrachloroethylene	U	1.00	0.333	1.00	ug/L		1					

# GEL LABORATORIES LLC

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road  
Kevil, Kentucky 42053  
Contact: Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: FB1SG4-23 Project: FRNP00511  
Sample ID: 631286013 Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Volatile Organics												
8260D, Volatiles- full suite "As Received"												
Toluene	U	1.00	0.333	1.00	ug/L		1					
Trichloroethylene	U	1.00	0.333	1.00	ug/L		1					
Trichlorofluoromethane	U	1.00	0.333	1.00	ug/L		1					
Vinyl acetate	U	5.00	1.67	5.00	ug/L		1					
Vinyl chloride	LU	1.00	0.333	1.00	ug/L		1					
Xylenes (total)	U	3.00	1.00	3.00	ug/L		1					
cis-1,2-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1					
cis-1,3-Dichloropropylene	U	1.00	0.333	1.00	ug/L		1					
trans-1,2-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1					
trans-1,3-Dichloropropylene	U	1.00	0.333	1.00	ug/L		1					
trans-1,4-Dichloro-2-butene	U	5.00	1.67	5.00	ug/L		1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3005A	ICP-MS 3005A PREP	EM2	08/03/23	1525	2469286
SW846 8011 PREP	8011 Prep	LOF	08/03/23	1348	2468812
SW846 7470A Prep	EPA 7470A Mercury Prep Liquid	EK1	08/01/23	1245	2468974

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 8011	
2	SW846 7470A	
3	SW846 3005A/6020B	
4	SW846 3005A/6020B	
5	SW846 3005A/6020B	
6	SW846 8260D	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
1-Chloro-2-fluorobenzene	8011, VOA Compounds Liquid "As Received"	7.21 ug/L	6.73	107	(46%-159%)
Bromofluorobenzene	8260D, Volatiles- full suite "As Received"	43.0 ug/L	50.0	86	(72%-125%)
1,2-Dichloroethane-d4	8260D, Volatiles- full suite "As Received"	49.3 ug/L	50.0	99	(73%-129%)
Toluene-d8	8260D, Volatiles- full suite "As Received"	48.4 ug/L	50.0	97	(75%-123%)

Notes:

# GEL LABORATORIES LLC

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road  
Kevil, Kentucky 42053  
Contact: Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: FB1SG4-23  
Sample ID: 631286013

Project: FRNP00511  
Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
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Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit



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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road

Kevil, Kentucky 42053

Contact: Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: RI1SG4-23 Project: FRNP00511  
Sample ID: 631286014 Client ID: FRNP005  
Matrix: WATER  
Collect Date: 28-JUL-23 06:00  
Receive Date: 29-JUL-23  
Collector: Client

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
504.1/8011 Analysis of EDB/DBCP												
8011, VOA Compounds Liquid "As Received"												
1,2-Dibromo-3-chloropropane	U	0.0192	0.00865	0.0192	ug/L	0.961	1	LOF	08/04/23	0336	2468814	1
Mercury Analysis-CVAA												
7470, Mercury Liquid "As Received"												
Mercury	U	0.000200	0.0000670	0.000200	mg/L	1.00	1	JP2	08/02/23	1149	2468975	2
Metals Analysis-ICP-MS												
6020, Metals (15+) "As Received"												
Antimony	U	0.00300	0.00100	0.00300	mg/L	1.00	1	PRB	08/15/23	1935	2469288	3
Aluminum	U	0.0500	0.0193	0.0500	mg/L	1.00	1	PRB	08/16/23	0355	2469288	4
Arsenic	U	0.00500	0.00200	0.00500	mg/L	1.00	1					
Barium	U	0.00400	0.000670	0.00400	mg/L	1.00	1					
Beryllium	U	0.000500	0.000200	0.000500	mg/L	1.00	1					
Boron	U	0.0150	0.00520	0.0150	mg/L	1.00	1					
Cadmium	U	0.00100	0.000300	0.00100	mg/L	1.00	1					
Calcium	U	0.200	0.0800	0.200	mg/L	1.00	1					
Chromium	U	0.0100	0.00300	0.0100	mg/L	1.00	1					
Cobalt	U	0.00100	0.000300	0.00100	mg/L	1.00	1					
Copper	U	0.00570	0.000300	0.00200	mg/L	1.00	1					
Iron	U	0.100	0.0330	0.100	mg/L	1.00	1					
Lead	U	0.00200	0.000500	0.00200	mg/L	1.00	1					
Magnesium	U	0.0300	0.0100	0.0300	mg/L	1.00	1					
Manganese	U	0.00500	0.00100	0.00500	mg/L	1.00	1					
Molybdenum	U	0.00100	0.000200	0.00100	mg/L	1.00	1					
Nickel	U	0.00323	0.000600	0.00200	mg/L	1.00	1					
Potassium	U	0.300	0.0800	0.300	mg/L	1.00	1					
Selenium	U	0.00500	0.00150	0.00500	mg/L	1.00	1					
Silver	U	0.00100	0.000300	0.00100	mg/L	1.00	1					
Sodium	U	0.250	0.0800	0.250	mg/L	1.00	1					
Thallium	U	0.00200	0.000600	0.00200	mg/L	1.00	1					
Uranium	U	0.000200	0.0000670	0.000200	mg/L	1.00	1					
Vanadium	U	0.0200	0.00330	0.0200	mg/L	1.00	1					
Zinc	U	0.0200	0.00330	0.0200	mg/L	1.00	1					
Rhodium	U	0.00500	0.00160	0.00500	mg/L	1.00	1	PRB	08/16/23	1206	2469288	5
Tantalum	U	0.00500	0.00100	0.00500	mg/L	1.00	1					

### Volatile Organics

8260D, Volatiles- full suite "As Received"

# GEL LABORATORIES LLC

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
 Address : 5600 Hobbs Road  
  
 Kevil, Kentucky 42053  
 Contact: Ms. Jaime Morrow  
 Project: C-746-S&T Landfill Quarterly(SG23-04)

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Client Sample ID: RI1SG4-23	Project: FRNP00511
Sample ID: 631286014	Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Volatile Organics</b>												
<b>8260D, Volatiles- full suite "As Received"</b>												
1,1,1,2-Tetrachloroethane	U	1.00	0.333	1.00	ug/L		1	KP2	08/01/23	1644	2468743	6
1,1,1-Trichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1,2,2-Tetrachloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1,2-Trichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1-Dichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1					
1,2,3-Trichloropropane	U	1.00	0.333	1.00	ug/L		1					
1,2-Dibromoethane	U	1.00	0.333	1.00	ug/L		1					
1,2-Dichlorobenzene	U	1.00	0.333	1.00	ug/L		1					
1,2-Dichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,2-Dichloropropane	U	1.00	0.333	1.00	ug/L		1					
1,4-Dichlorobenzene	U	1.00	0.333	1.00	ug/L		1					
2-Butanone	U	5.00	1.67	5.00	ug/L		1					
2-Hexanone	U	5.00	1.67	5.00	ug/L		1					
4-Methyl-2-pentanone	U	5.00	1.67	5.00	ug/L		1					
Acetone	U	5.00	1.74	5.00	ug/L		1					
Acrolein	U	5.00	1.67	5.00	ug/L		1					
Acrylonitrile	U	5.00	1.67	5.00	ug/L		1					
Benzene	U	1.00	0.333	1.00	ug/L		1					
Bromochloromethane	U	1.00	0.333	1.00	ug/L		1					
Bromodichloromethane	U	1.00	0.333	1.00	ug/L		1					
Bromoform	U	1.00	0.333	1.00	ug/L		1					
Bromomethane	UL	1.00	0.337	1.00	ug/L		1					
Carbon disulfide	U	5.00	1.67	5.00	ug/L		1					
Carbon tetrachloride	U	1.00	0.333	1.00	ug/L		1					
Chlorobenzene		4.15	0.333	1.00	ug/L		1					
Chloroethane	LU	1.00	0.333	1.00	ug/L		1					
Chloroform	U	1.00	0.333	1.00	ug/L		1					
Chloromethane	LYIU	1.00	0.333	1.00	ug/L		1					
Dibromochloromethane	U	1.00	0.333	1.00	ug/L		1					
Dibromomethane	U	1.00	0.333	1.00	ug/L		1					
Ethylbenzene	U	1.00	0.333	1.00	ug/L		1					
Iodomethane	U	5.00	1.67	5.00	ug/L		1					
Methylene chloride	U	5.00	0.500	5.00	ug/L		1					
Styrene	U	1.00	0.333	1.00	ug/L		1					
Tetrachloroethylene	U	1.00	0.333	1.00	ug/L		1					

# GEL LABORATORIES LLC

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road

Contact: Kevil, Kentucky 42053  
Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: RI1SG4-23  
Sample ID: 631286014

Project: FRNP00511  
Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Volatile Organics												
8260D, Volatiles- full suite "As Received"												
Toluene	U	1.00	0.333	1.00	ug/L		1					
Trichloroethylene	U	1.00	0.333	1.00	ug/L		1					
Trichlorofluoromethane	U	1.00	0.333	1.00	ug/L		1					
Vinyl acetate	U	5.00	1.67	5.00	ug/L		1					
Vinyl chloride	LU	1.00	0.333	1.00	ug/L		1					
Xylenes (total)	U	3.00	1.00	3.00	ug/L		1					
cis-1,2-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1					
cis-1,3-Dichloropropylene	U	1.00	0.333	1.00	ug/L		1					
trans-1,2-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1					
trans-1,3-Dichloropropylene	U	1.00	0.333	1.00	ug/L		1					
trans-1,4-Dichloro-2-butene	U	5.00	1.67	5.00	ug/L		1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3005A	ICP-MS 3005A PREP	EM2	08/03/23	1525	2469286
SW846 8011 PREP	8011 Prep	LOF	08/03/23	1348	2468812
SW846 7470A Prep	EPA 7470A Mercury Prep Liquid	EK1	08/01/23	1245	2468974

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 8011	
2	SW846 7470A	
3	SW846 3005A/6020B	
4	SW846 3005A/6020B	
5	SW846 3005A/6020B	
6	SW846 8260D	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
1-Chloro-2-fluorobenzene	8011, VOA Compounds Liquid "As Received"	8.04 ug/L	6.86	117	(46%-159%)
Bromofluorobenzene	8260D, Volatiles- full suite "As Received"	44.4 ug/L	50.0	89	(72%-125%)
1,2-Dichloroethane-d4	8260D, Volatiles- full suite "As Received"	48.6 ug/L	50.0	97	(73%-129%)
Toluene-d8	8260D, Volatiles- full suite "As Received"	48.5 ug/L	50.0	97	(75%-123%)

Notes:

# GEL LABORATORIES LLC

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road  
Kevil, Kentucky 42053  
Contact: Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

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Client Sample ID:	RI1SG4-23	Project:	FRNP00511
Sample ID:	631286014	Client ID:	FRNP005

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Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time Batch	Method
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Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
 Address : 5600 Hobbs Road  
 Kevil, Kentucky 42053  
 Contact: Ms. Jaime Morrow  
 Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: TB3SG4-23	Project: FRNP00511
Sample ID: 631286015	Client ID: FRNP005
Matrix: WATER	
Collect Date: 28-JUL-23 05:55	
Receive Date: 29-JUL-23	
Collector: Client	

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
504.1/8011 Analysis of EDB/DBCP												
8011, VOA Compounds Liquid "As Received"												
1,2-Dibromo-3-chloropropane	U	0.0193	0.00867	0.0193	ug/L	0.963	1	LOF	08/04/23	0401	2468814	1
Volatile Organics												
8260D, Volatiles- full suite "As Received"												
1,1,1,2-Tetrachloroethane	U	1.00	0.333	1.00	ug/L		1	KP2	08/01/23	1708	2468743	2
1,1,1-Trichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1,2,2-Tetrachloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1,2-Trichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1-Dichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1					
1,2,3-Trichloropropane	U	1.00	0.333	1.00	ug/L		1					
1,2-Dibromoethane	U	1.00	0.333	1.00	ug/L		1					
1,2-Dichlorobenzene	U	1.00	0.333	1.00	ug/L		1					
1,2-Dichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,2-Dichloropropane	U	1.00	0.333	1.00	ug/L		1					
1,4-Dichlorobenzene	U	1.00	0.333	1.00	ug/L		1					
2-Butanone	U	5.00	1.67	5.00	ug/L		1					
2-Hexanone	U	5.00	1.67	5.00	ug/L		1					
4-Methyl-2-pentanone	U	5.00	1.67	5.00	ug/L		1					
Acetone	U	5.00	1.74	5.00	ug/L		1					
Acrolein	U	5.00	1.67	5.00	ug/L		1					
Acrylonitrile	U	5.00	1.67	5.00	ug/L		1					
Benzene	U	1.00	0.333	1.00	ug/L		1					
Bromochloromethane	U	1.00	0.333	1.00	ug/L		1					
Bromodichloromethane	U	1.00	0.333	1.00	ug/L		1					
Bromoform	U	1.00	0.333	1.00	ug/L		1					
Bromomethane	UL	1.00	0.337	1.00	ug/L		1					
Carbon disulfide	U	5.00	1.67	5.00	ug/L		1					
Carbon tetrachloride	U	1.00	0.333	1.00	ug/L		1					
Chlorobenzene		3.77	0.333	1.00	ug/L		1					
Chloroethane	LU	1.00	0.333	1.00	ug/L		1					
Chloroform	U	1.00	0.333	1.00	ug/L		1					
Chloromethane	LYIU	1.00	0.333	1.00	ug/L		1					
Dibromochloromethane	U	1.00	0.333	1.00	ug/L		1					
Dibromomethane	U	1.00	0.333	1.00	ug/L		1					
Ethylbenzene	U	1.00	0.333	1.00	ug/L		1					
Iodomethane	U	5.00	1.67	5.00	ug/L		1					

# GEL LABORATORIES LLC

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road

Kevil, Kentucky 42053

Contact: Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: TB3SG4-23  
Sample ID: 631286015

Project: FRNP00511  
Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Volatile Organics												
8260D, Volatiles- full suite "As Received"												
Methylene chloride	U	5.00	0.500	5.00	ug/L		1					
Styrene	U	1.00	0.333	1.00	ug/L		1					
Tetrachloroethylene	U	1.00	0.333	1.00	ug/L		1					
Toluene	U	1.00	0.333	1.00	ug/L		1					
Trichloroethylene	U	1.00	0.333	1.00	ug/L		1					
Trichlorofluoromethane	U	1.00	0.333	1.00	ug/L		1					
Vinyl acetate	U	5.00	1.67	5.00	ug/L		1					
Vinyl chloride	LU	1.00	0.333	1.00	ug/L		1					
Xylenes (total)	U	3.00	1.00	3.00	ug/L		1					
cis-1,2-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1					
cis-1,3-Dichloropropylene	U	1.00	0.333	1.00	ug/L		1					
trans-1,2-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1					
trans-1,3-Dichloropropylene	U	1.00	0.333	1.00	ug/L		1					
trans-1,4-Dichloro-2-butene	U	5.00	1.67	5.00	ug/L		1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 8011 PREP	8011 Prep	LOF	08/03/23	1348	2468812

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 8011	
2	SW846 8260D	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
1-Chloro-2-fluorobenzene	8011, VOA Compounds Liquid "As Received"	7.37 ug/L	6.88	107	(46%-159%)
Bromofluorobenzene	8260D, Volatiles- full suite "As Received"	45.0 ug/L	50.0	90	(72%-125%)
1,2-Dichloroethane-d4	8260D, Volatiles- full suite "As Received"	49.4 ug/L	50.0	99	(73%-129%)
Toluene-d8	8260D, Volatiles- full suite "As Received"	49.8 ug/L	50.0	100	(75%-123%)

Notes:

# GEL LABORATORIES LLC

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road  
Kevil, Kentucky 42053  
Contact: Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: TB3SG4-23  
Sample ID: 631286015

Project: FRNP00511  
Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
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Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

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**ATTACHMENT C2**

**GEL LABORATORIES CERTIFICATE OF ANALYSIS**

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# GEL LABORATORIES LLC

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
 Address : 5600 Hobbs Road  
 Kevil, Kentucky 42053  
 Contact: Ms. Jaime Morrow  
 Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW384SG4-23	Project: FRNP00511
Sample ID: 630883001	Client ID: FRNP005
Matrix: WG	
Collect Date: 26-JUL-23 12:03	
Receive Date: 27-JUL-23	
Collector: Client	

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>504.1/8011 Analysis of EDB/DBCP</b>												
<b>8011, VOA Compounds Liquid "As Received"</b>												
1,2-Dibromo-3-chloropropane	U	0.0190	0.00856	0.0190	ug/L	0.951	1	LOF	08/02/23	2258	2468089	1
<b>Carbon Analysis</b>												
<b>9060A, Total Organic Carbon "As Received"</b>												
Total Organic Carbon Average	J	1.19	0.330	2.00	mg/L		1	RM3	07/31/23	1748	2468684	2
<b>Flow Injection Analysis</b>												
<b>9012B, Total Cyanide "As Received"</b>												
Cyanide, Total	U	0.200	0.00167	0.200	mg/L	1.00	1	AXH3	07/31/23	0735	2466827	3
<b>Halogen Analysis</b>												
<b>9020B, TOX (Organic Halogen) "As Received"</b>												
Total Organic Halogens	J	6.54	3.33	10.0	ug/L		1	RM3	08/07/23	1907	2472135	4
<b>Ion Chromatography</b>												
<b>300.0, Iodide in Liquid "As Received"</b>												
Iodide	U	0.500	0.167	0.500	mg/L		1	LXA2	07/27/23	1700	2467144	5
<b>SW846 9056A Anions (5) "As Received"</b>												
Bromide		0.445	0.0670	0.200	mg/L		1	JLD1	07/27/23	1210	2466706	6
Fluoride	J	0.180	0.0330	4.00	mg/L		1					
Chloride	J	31.8	0.335	250	mg/L		5	JLD1	07/27/23	2008	2466706	7
Nitrate-N	J	0.745	0.165	10.0	mg/L		5					
Sulfate		23.7	0.665	2.00	mg/L		5					
<b>Mercury Analysis-CVAA</b>												
<b>7470, Mercury Liquid "As Received"</b>												
Mercury	BJ	0.0000970	0.0000670	0.000200	mg/L	1.00	1	JP2	07/31/23	1029	2467502	8
<b>Metals Analysis-ICP-MS</b>												
<b>6020, Metals (15+) "As Received"</b>												
Aluminum	U	0.0500	0.0193	0.0500	mg/L	1.00	1	PRB	08/09/23	2207	2468524	9
Arsenic	U	0.00500	0.00200	0.00500	mg/L	1.00	1					
Barium		0.234	0.000670	0.00400	mg/L	1.00	1					
Beryllium	U	0.000500	0.000200	0.000500	mg/L	1.00	1					
Boron		0.0367	0.00520	0.0150	mg/L	1.00	1					
Cadmium	U	0.00100	0.000300	0.00100	mg/L	1.00	1					
Calcium		26.6	0.0800	0.200	mg/L	1.00	1					
Chromium	U	0.0100	0.00300	0.0100	mg/L	1.00	1					
Cobalt	U	0.00100	0.000300	0.00100	mg/L	1.00	1					

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
 Address : 5600 Hobbs Road  
  
 Kevil, Kentucky 42053  
 Contact: Ms. Jaime Morrow  
 Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW384SG4-23	Project: FRNP00511
Sample ID: 630883001	Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Metals Analysis-ICP-MS</b>												
<b>6020, Metals (15+) "As Received"</b>												
Copper	J	0.00121	0.000300	0.00200	mg/L	1.00	1					
Iron	J	0.0478	0.0330	0.100	mg/L	1.00	1					
Lead	U	0.00200	0.000500	0.00200	mg/L	1.00	1					
Magnesium		11.3	0.0100	0.0300	mg/L	1.00	1					
Manganese	J	0.00115	0.00100	0.00500	mg/L	1.00	1					
Molybdenum	U	0.00100	0.000200	0.00100	mg/L	1.00	1					
Nickel	U	0.00200	0.000600	0.00200	mg/L	1.00	1					
Potassium		1.45	0.0800	0.300	mg/L	1.00	1					
Silver	U	0.00100	0.000300	0.00100	mg/L	1.00	1					
Thallium	U	0.00200	0.000600	0.00200	mg/L	1.00	1					
Uranium	U	0.000200	0.0000670	0.000200	mg/L	1.00	1					
Vanadium	U	0.0200	0.00330	0.0200	mg/L	1.00	1					
Zinc	J	0.00339	0.00330	0.0200	mg/L	1.00	1					
Sodium		52.8	0.800	2.50	mg/L	1.00	10	PRB	08/10/23	0724	2468524	10
Antimony	U	0.00300	0.00100	0.00300	mg/L	1.00	1	PRB	08/10/23	0414	2468524	11
Selenium	U	0.00500	0.00150	0.00500	mg/L	1.00	1					
Rhodium	U	0.00500	0.00160	0.00500	mg/L	1.00	1	PRB	08/10/23	0140	2468524	12
Tantalum	U	0.00500	0.00100	0.00500	mg/L	1.00	1					
<b>Solids Analysis</b>												
<b>160.1, Dissolved Solids "As Received"</b>												
Total Dissolved Solids		238	2.38	10.0	mg/L			CH6	07/28/23	0944	2467003	13
<b>Spectrometric Analysis</b>												
<b>410.4, Chem. Oxygen Demand "As Received"</b>												
COD	U	20.0	8.95	20.0	mg/L		1	JW2	07/27/23	1502	2466799	14
<b>Volatile Organics</b>												
<b>8260D, Volatiles- full suite "As Received"</b>												
1,1,1,2-Tetrachloroethane	U	1.00	0.333	1.00	ug/L		1	JM6	07/31/23	1303	2467759	15
1,1,1-Trichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1,2,2-Tetrachloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1,2-Trichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1-Dichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1					
1,2,3-Trichloropropane	U	1.00	0.333	1.00	ug/L		1					
1,2-Dibromoethane	U	1.00	0.333	1.00	ug/L		1					

# GEL LABORATORIES LLC

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road

Kevil, Kentucky 42053

Contact: Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW384SG4-23  
Sample ID: 630883001

Project: FRNP00511  
Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time Batch	Method
Volatile Organics											
8260D, Volatiles- full suite "As Received"											
1,2-Dichlorobenzene	U	1.00	0.333	1.00	ug/L		1				
1,2-Dichloroethane	U	1.00	0.333	1.00	ug/L		1				
1,2-Dichloropropane	U	1.00	0.333	1.00	ug/L		1				
1,4-Dichlorobenzene	U	1.00	0.333	1.00	ug/L		1				
2-Butanone	U	5.00	1.67	5.00	ug/L		1				
2-Hexanone	U	5.00	1.67	5.00	ug/L		1				
4-Methyl-2-pentanone	U	5.00	1.67	5.00	ug/L		1				
Acetone	U	5.00	1.74	5.00	ug/L		1				
Acrolein	U	5.00	1.67	5.00	ug/L		1				
Acrylonitrile	U	5.00	1.67	5.00	ug/L		1				
Benzene	U	1.00	0.333	1.00	ug/L		1				
Bromochloromethane	U	1.00	0.333	1.00	ug/L		1				
Bromodichloromethane	U	1.00	0.333	1.00	ug/L		1				
Bromoform	U	1.00	0.333	1.00	ug/L		1				
Bromomethane	U	1.00	0.337	1.00	ug/L		1				
Carbon disulfide	U	5.00	1.67	5.00	ug/L		1				
Carbon tetrachloride	U	1.00	0.333	1.00	ug/L		1				
Chlorobenzene	U	1.00	0.333	1.00	ug/L		1				
Chloroethane	U	1.00	0.333	1.00	ug/L		1				
Chloroform	U	1.00	0.333	1.00	ug/L		1				
Chloromethane	U	1.00	0.333	1.00	ug/L		1				
Dibromochloromethane	U	1.00	0.333	1.00	ug/L		1				
Dibromomethane	U	1.00	0.333	1.00	ug/L		1				
Ethylbenzene	U	1.00	0.333	1.00	ug/L		1				
Iodomethane	U	5.00	1.67	5.00	ug/L		1				
Methylene chloride	U	5.00	0.500	5.00	ug/L		1				
Styrene	U	1.00	0.333	1.00	ug/L		1				
Tetrachloroethylene	U	1.00	0.333	1.00	ug/L		1				
Toluene	U	1.00	0.333	1.00	ug/L		1				
Trichloroethylene	J	0.510	0.333	1.00	ug/L		1				
Trichlorofluoromethane	U	1.00	0.333	1.00	ug/L		1				
Vinyl acetate	U	5.00	1.67	5.00	ug/L		1				
Vinyl chloride	U	1.00	0.333	1.00	ug/L		1				
Xylenes (total)	U	3.00	1.00	3.00	ug/L		1				
cis-1,2-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1				
cis-1,3-Dichloropropylene	U	1.00	0.333	1.00	ug/L		1				

# GEL LABORATORIES LLC

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
 Address : 5600 Hobbs Road  
  
 Kevil, Kentucky 42053  
 Contact: Ms. Jaime Morrow  
 Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW384SG4-23	Project: FRNP00511
Sample ID: 630883001	Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Volatile Organics												
8260D, Volatiles- full suite "As Received"												
trans-1,2-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1					
trans-1,3-Dichloropropylene	U	1.00	0.333	1.00	ug/L		1					
trans-1,4-Dichloro-2-butene	U	5.00	1.67	5.00	ug/L		1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 8011 PREP	8011 Prep	LOF	08/02/23	1257	2468088
SW846 7470A Prep	EPA 7470A Mercury Prep Liquid	AXS5	07/28/23	1208	2467496
SW846 3005A	ICP-MS 3005A PREP	JD2	08/02/23	0745	2468523
SW846 9010C Distillation	SW846 9010C Prep	ES2	07/28/23	0952	2466824

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 8011	
2	SW846 9060A	
3	SW846 9012B	
4	SW846 9020B	
5	EPA 300.0	
6	SW846 9056A	
7	SW846 9056A	
8	SW846 7470A	
9	SW846 3005A/6020B	
10	SW846 3005A/6020B	
11	SW846 3005A/6020B	
12	SW846 3005A/6020B	
13	EPA 160.1	
14	EPA 410.4	
15	SW846 8260D	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
1-Chloro-2-fluorobenzene	8011, VOA Compounds Liquid "As Received"	7.52 ug/L	6.79	111	(46%-159%)
Bromofluorobenzene	8260D, Volatiles- full suite "As Received"	56.0 ug/L	50.0	112	(72%-125%)
1,2-Dichloroethane-d4	8260D, Volatiles- full suite "As Received"	55.1 ug/L	50.0	110	(73%-129%)
Toluene-d8	8260D, Volatiles- full suite "As Received"	51.6 ug/L	50.0	103	(75%-123%)

**Notes:**

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## *Certificate of Analysis*

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road  
Kevil, Kentucky 42053  
Contact: Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW384SG4-23  
Sample ID: 630883001

Project: FRNP00511  
Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
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*Column headers are defined as follows:*

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road

Kevil, Kentucky 42053

Contact: Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

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Client Sample ID:	MW384SG4-23	Project:	FRNP00511
Sample ID:	630883002	Client ID:	FRNP005
Matrix:	WG		
Collect Date:	26-JUL-23 12:03		
Receive Date:	27-JUL-23		
Collector:	Client		

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Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Metals Analysis-ICP-MS												
6020, Dissolved Metals (3 Elements) "As Received"												
Barium		0.230	0.000670	0.00400	mg/L	1.00	1	PRB	08/09/23	2211	2468524	1
Chromium	U	0.0100	0.00300	0.0100	mg/L	1.00	1					
Uranium	U	0.000200	0.0000670	0.000200	mg/L	1.00	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3005A	ICP-MS 3005A PREP	JD2	08/02/23	0745	2468523
EPA 160	Laboratory Filtration	RXB5	07/31/23	1015	2466848

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 3005A/6020B	

### Notes:

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit



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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road

Kevil, Kentucky 42053

Contact: Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW385SG4-23 Project: FRNP00511  
Sample ID: 630883003 Client ID: FRNP005  
Matrix: WG  
Collect Date: 26-JUL-23 12:47  
Receive Date: 27-JUL-23  
Collector: Client

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
504.1/8011 Analysis of EDB/DBCP												
8011, VOA Compounds Liquid "As Received"												
1,2-Dibromo-3-chloropropane	U	0.0189	0.00850	0.0189	ug/L	0.945	1	LOF	08/02/23	2322	2468089	1
Carbon Analysis												
9060A, Total Organic Carbon "As Received"												
Total Organic Carbon Average	J	0.828	0.330	2.00	mg/L		1	RM3	07/31/23	1827	2468684	2
Flow Injection Analysis												
9012B, Total Cyanide "As Received"												
Cyanide, Total	U	0.200	0.00167	0.200	mg/L	1.00	1	AXH3	07/31/23	0739	2466827	3
Halogen Analysis												
9020B, TOX (Organic Halogen) "As Received"												
Total Organic Halogens		10.5	3.33	10.0	ug/L		1	RM3	08/14/23	1256	2476025	4
Ion Chromatography												
300.0, Iodide in Liquid "As Received"												
Iodide	U	0.500	0.167	0.500	mg/L		1	LXA2	07/27/23	1713	2467144	5
SW846 9056A Anions (5) "As Received"												
Bromide		0.236	0.0670	0.200	mg/L		1	JLD1	07/27/23	1241	2466706	6
Fluoride	J	0.154	0.0330	4.00	mg/L		1					
Chloride	J	22.9	0.335	250	mg/L		5	JLD1	07/27/23	2040	2466706	7
Nitrate-N	J	0.738	0.165	10.0	mg/L		5					
Sulfate		19.3	0.665	2.00	mg/L		5					
Mercury Analysis-CVAA												
7470, Mercury Liquid "As Received"												
Mercury	BJ	0.000106	0.0000670	0.000200	mg/L	1.00	1	JP2	07/31/23	1031	2467502	8
Metals Analysis-ICP-MS												
6020, Metals (15+) "As Received"												
Rhodium	U	0.00500	0.00160	0.00500	mg/L	1.00	1	PRB	08/10/23	0141	2468524	9
Tantalum	U	0.00500	0.00100	0.00500	mg/L	1.00	1					
Aluminum	U	0.0500	0.0193	0.0500	mg/L	1.00	1	PRB	08/09/23	2215	2468524	10
Arsenic	U	0.00500	0.00200	0.00500	mg/L	1.00	1					
Barium		0.206	0.000670	0.00400	mg/L	1.00	1					
Beryllium	U	0.000500	0.000200	0.000500	mg/L	1.00	1					
Boron		0.0525	0.00520	0.0150	mg/L	1.00	1					
Cadmium	U	0.00100	0.000300	0.00100	mg/L	1.00	1					
Calcium		27.5	0.0800	0.200	mg/L	1.00	1					

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road

Kevil, Kentucky 42053

Contact: Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW385SG4-23  
Sample ID: 630883003

Project: FRNP00511  
Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Metals Analysis-ICP-MS</b>												
<b>6020, Metals (15+) "As Received"</b>												
Chromium	U	0.0100	0.00300	0.0100	mg/L	1.00	1					
Cobalt	U	0.00100	0.000300	0.00100	mg/L	1.00	1					
Copper	J	0.00108	0.000300	0.00200	mg/L	1.00	1					
Iron	U	0.100	0.0330	0.100	mg/L	1.00	1					
Lead	U	0.00200	0.000500	0.00200	mg/L	1.00	1					
Magnesium		10.6	0.0100	0.0300	mg/L	1.00	1					
Manganese		0.00500	0.00100	0.00500	mg/L	1.00	1					
Molybdenum	J	0.000249	0.000200	0.00100	mg/L	1.00	1					
Nickel	J	0.000808	0.000600	0.00200	mg/L	1.00	1					
Potassium		1.59	0.0800	0.300	mg/L	1.00	1					
Silver	U	0.00100	0.000300	0.00100	mg/L	1.00	1					
Sodium		38.6	0.0800	0.250	mg/L	1.00	1					
Thallium	U	0.00200	0.000600	0.00200	mg/L	1.00	1					
Uranium	J	0.0000850	0.0000670	0.000200	mg/L	1.00	1					
Vanadium	U	0.0200	0.00330	0.0200	mg/L	1.00	1					
Zinc	J	0.00478	0.00330	0.0200	mg/L	1.00	1					
Antimony	U	0.00300	0.00100	0.00300	mg/L	1.00	1	PRB	08/10/23	0422	2468524	11
Selenium	U	0.00500	0.00150	0.00500	mg/L	1.00	1					
<b>Solids Analysis</b>												
<b>160.1, Dissolved Solids "As Received"</b>												
Total Dissolved Solids		191	2.38	10.0	mg/L			CH6	07/28/23	0944	2467003	12
<b>Spectrometric Analysis</b>												
<b>410.4, Chem. Oxygen Demand "As Received"</b>												
COD	U	20.0	8.95	20.0	mg/L		1	JW2	07/27/23	1502	2466799	13
<b>Volatile Organics</b>												
<b>8260D, Volatiles- full suite "As Received"</b>												
1,1,1,2-Tetrachloroethane	U	1.00	0.333	1.00	ug/L		1	JM6	07/31/23	1236	2467759	14
1,1,1-Trichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1,2,2-Tetrachloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1,2-Trichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1-Dichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1					
1,2,3-Trichloropropane	U	1.00	0.333	1.00	ug/L		1					
1,2-Dibromoethane	U	1.00	0.333	1.00	ug/L		1					

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road

Kevil, Kentucky 42053

Contact: Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW385SG4-23	Project: FRNP00511
Sample ID: 630883003	Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst Date	Time Batch	Method
<b>Volatile Organics</b>										
<b>8260D, Volatiles- full suite "As Received"</b>										
1,2-Dichlorobenzene	U	1.00	0.333	1.00	ug/L		1			
1,2-Dichloroethane	U	1.00	0.333	1.00	ug/L		1			
1,2-Dichloropropane	U	1.00	0.333	1.00	ug/L		1			
1,4-Dichlorobenzene	U	1.00	0.333	1.00	ug/L		1			
2-Butanone	U	5.00	1.67	5.00	ug/L		1			
2-Hexanone	U	5.00	1.67	5.00	ug/L		1			
4-Methyl-2-pentanone	U	5.00	1.67	5.00	ug/L		1			
Acetone	U	5.00	1.74	5.00	ug/L		1			
Acrolein	U	5.00	1.67	5.00	ug/L		1			
Acrylonitrile	U	5.00	1.67	5.00	ug/L		1			
Benzene	U	1.00	0.333	1.00	ug/L		1			
Bromochloromethane	U	1.00	0.333	1.00	ug/L		1			
Bromodichloromethane	U	1.00	0.333	1.00	ug/L		1			
Bromoform	U	1.00	0.333	1.00	ug/L		1			
Bromomethane	U	1.00	0.337	1.00	ug/L		1			
Carbon disulfide	U	5.00	1.67	5.00	ug/L		1			
Carbon tetrachloride	U	1.00	0.333	1.00	ug/L		1			
Chlorobenzene	U	1.00	0.333	1.00	ug/L		1			
Chloroethane	U	1.00	0.333	1.00	ug/L		1			
Chloroform	U	1.00	0.333	1.00	ug/L		1			
Chloromethane	U	1.00	0.333	1.00	ug/L		1			
Dibromochloromethane	U	1.00	0.333	1.00	ug/L		1			
Dibromomethane	U	1.00	0.333	1.00	ug/L		1			
Ethylbenzene	U	1.00	0.333	1.00	ug/L		1			
Iodomethane	U	5.00	1.67	5.00	ug/L		1			
Methylene chloride	U	5.00	0.500	5.00	ug/L		1			
Styrene	U	1.00	0.333	1.00	ug/L		1			
Tetrachloroethylene	U	1.00	0.333	1.00	ug/L		1			
Toluene	U	1.00	0.333	1.00	ug/L		1			
Trichloroethylene	U	1.00	0.333	1.00	ug/L		1			
Trichlorofluoromethane	U	1.00	0.333	1.00	ug/L		1			
Vinyl acetate	U	5.00	1.67	5.00	ug/L		1			
Vinyl chloride	U	1.00	0.333	1.00	ug/L		1			
Xylenes (total)	U	3.00	1.00	3.00	ug/L		1			
cis-1,2-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1			
cis-1,3-Dichloropropylene	U	1.00	0.333	1.00	ug/L		1			

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Address : 5600 Hobbs Road  
Kevil, Kentucky 42053  
Contact: Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW385SG4-23 Project: FRNP00511  
Sample ID: 630883003 Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Volatile Organics												
8260D, Volatiles- full suite "As Received"												
trans-1,2-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1					
trans-1,3-Dichloropropylene	U	1.00	0.333	1.00	ug/L		1					
trans-1,4-Dichloro-2-butene	U	5.00	1.67	5.00	ug/L		1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 8011 PREP	8011 Prep	LOF	08/02/23	1257	2468088
SW846 3005A	ICP-MS 3005A PREP	JD2	08/02/23	0745	2468523
SW846 9010C Distillation	SW846 9010C Prep	ES2	07/28/23	0952	2466824
SW846 7470A Prep	EPA 7470A Mercury Prep Liquid	AXS5	07/28/23	1208	2467496

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 8011	
2	SW846 9060A	
3	SW846 9012B	
4	SW846 9020B	
5	EPA 300.0	
6	SW846 9056A	
7	SW846 9056A	
8	SW846 7470A	
9	SW846 3005A/6020B	
10	SW846 3005A/6020B	
11	SW846 3005A/6020B	
12	EPA 160.1	
13	EPA 410.4	
14	SW846 8260D	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
1-Chloro-2-fluorobenzene	8011, VOA Compounds Liquid "As Received"	6.58 ug/L	6.75	98	(46%-159%)
Bromofluorobenzene	8260D, Volatiles- full suite "As Received"	56.2 ug/L	50.0	112	(72%-125%)
1,2-Dichloroethane-d4	8260D, Volatiles- full suite "As Received"	54.8 ug/L	50.0	110	(73%-129%)
Toluene-d8	8260D, Volatiles- full suite "As Received"	51.7 ug/L	50.0	103	(75%-123%)

Notes:

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Address : 5600 Hobbs Road

Contact: Kevil, Kentucky 42053  
Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW385SG4-23  
Sample ID: 630883003

Project: FRNP00511  
Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
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Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

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## *Certificate of Analysis*

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
 Address : 5600 Hobbs Road  
  
 Kevil, Kentucky 42053  
 Contact: Ms. Jaime Morrow  
 Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW385SG4-23	Project: FRNP00511
Sample ID: 630883004	Client ID: FRNP005
Matrix: WG	
Collect Date: 26-JUL-23 12:47	
Receive Date: 27-JUL-23	
Collector: Client	

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Metals Analysis-ICP-MS												
6020, Dissolved Metals (3 Elements) "As Received"												
Barium		0.204	0.000670	0.00400	mg/L	1.00	1	PRB	08/09/23	2240	2468524	1
Chromium	U	0.0100	0.00300	0.0100	mg/L	1.00	1					
Uranium	J	0.0000740	0.0000670	0.000200	mg/L	1.00	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 160	Laboratory Filtration	RXB5	07/31/23	1015	2466848
SW846 3005A	ICP-MS 3005A PREP	JD2	08/02/23	0745	2468523

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 3005A/6020B	

**Notes:**

*Column headers are defined as follows:*

- |                                       |                                |
|---------------------------------------|--------------------------------|
| DF: Dilution Factor                   | Lc/LC: Critical Level          |
| DL: Detection Limit                   | PF: Prep Factor                |
| MDA: Minimum Detectable Activity      | RL: Reporting Limit            |
| MDC: Minimum Detectable Concentration | SQL: Sample Quantitation Limit |

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road

Kevil, Kentucky 42053

Contact: Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW386SG4-23      Project: FRNP00511  
Sample ID: 630883005      Client ID: FRNP005  
Matrix: WG  
Collect Date: 26-JUL-23 13:44  
Receive Date: 27-JUL-23  
Collector: Client

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
504.1/8011 Analysis of EDB/DBCP												
8011, VOA Compounds Liquid "As Received"												
1,2-Dibromo-3-chloropropane	U	0.0187	0.00844	0.0187	ug/L	0.937	1	LOF	08/03/23	0036	2468089	1
Carbon Analysis												
9060A, Total Organic Carbon "As Received"												
Total Organic Carbon Average		4.22	0.330	2.00	mg/L		1	RM3	07/31/23	2025	2468684	2
Flow Injection Analysis												
9012B, Total Cyanide "As Received"												
Cyanide, Total	U	0.200	0.00167	0.200	mg/L	1.00	1	AXH3	07/31/23	1015	2466827	3
Halogen Analysis												
9020B, TOX (Organic Halogen) "As Received"												
Total Organic Halogens		116	3.33	10.0	ug/L		1	RM3	08/07/23	1950	2472135	4
Ion Chromatography												
300.0, Iodide in Liquid "As Received"												
Iodide	U	0.500	0.167	0.500	mg/L		1	LXA2	07/27/23	1752	2467144	5
SW846 9056A Anions (5) "As Received"												
Bromide	J	0.126	0.0670	0.200	mg/L		1	JLD1	07/27/23	1313	2466706	6
Fluoride	J	0.733	0.0330	4.00	mg/L		1					
Nitrate-N	J	0.0484	0.0330	10.0	mg/L		1					
Chloride	J	11.4	0.335	250	mg/L		5	JLD1	07/27/23	2319	2466706	7
Sulfate		41.4	0.665	2.00	mg/L		5					
Mercury Analysis-CVAA												
7470, Mercury Liquid "As Received"												
Mercury	BJ	0.000109	0.0000670	0.000200	mg/L	1.00	1	JP2	07/31/23	1045	2467502	8
Metals Analysis-ICP-MS												
6020, Metals (15+) "As Received"												
Antimony	U	0.00300	0.00100	0.00300	mg/L	1.00	1	PRB	08/10/23	0506	2468524	9
Selenium	U	0.00500	0.00150	0.00500	mg/L	1.00	1					
Aluminum	U	0.0500	0.0193	0.0500	mg/L	1.00	1	PRB	08/09/23	2258	2468524	10
Arsenic	U	0.00500	0.00200	0.00500	mg/L	1.00	1					
Barium		0.133	0.000670	0.00400	mg/L	1.00	1					
Beryllium	U	0.000500	0.000200	0.000500	mg/L	1.00	1					
Boron	J	0.0134	0.00520	0.0150	mg/L	1.00	1					
Cadmium	U	0.00100	0.000300	0.00100	mg/L	1.00	1					
Calcium		20.3	0.0800	0.200	mg/L	1.00	1					

# GEL LABORATORIES LLC

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
 Address : 5600 Hobbs Road  
  
 Kevil, Kentucky 42053  
 Contact: Ms. Jaime Morrow  
 Project: C-746-S&T Landfill Quarterly(SG23-04)

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Client Sample ID: MW386SG4-23	Project: FRNP00511
Sample ID: 630883005	Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Metals Analysis-ICP-MS</b>												
<b>6020, Metals (15+) "As Received"</b>												
Chromium	U	0.0100	0.00300	0.0100	mg/L	1.00	1					
Cobalt	J	0.000344	0.000300	0.00100	mg/L	1.00	1					
Copper	J	0.00114	0.000300	0.00200	mg/L	1.00	1					
Iron	J	0.0883	0.0330	0.100	mg/L	1.00	1					
Lead	U	0.00200	0.000500	0.00200	mg/L	1.00	1					
Magnesium		8.58	0.0100	0.0300	mg/L	1.00	1					
Manganese		0.0312	0.00100	0.00500	mg/L	1.00	1					
Molybdenum	J	0.000643	0.000200	0.00100	mg/L	1.00	1					
Nickel	J	0.00113	0.000600	0.00200	mg/L	1.00	1					
Potassium	J	0.255	0.0800	0.300	mg/L	1.00	1					
Silver	U	0.00100	0.000300	0.00100	mg/L	1.00	1					
Thallium	U	0.00200	0.000600	0.00200	mg/L	1.00	1					
Uranium	J	0.0000680	0.0000670	0.000200	mg/L	1.00	1					
Vanadium	U	0.0200	0.00330	0.0200	mg/L	1.00	1					
Zinc	U	0.0200	0.00330	0.0200	mg/L	1.00	1					
Rhodium	U	0.00500	0.00160	0.00500	mg/L	1.00	1	PRB	08/10/23	0155	2468524	11
Tantalum	U	0.00500	0.00100	0.00500	mg/L	1.00	1					
Sodium		95.1	0.800	2.50	mg/L	1.00	10	PRB	08/10/23	0728	2468524	12
<b>Solids Analysis</b>												
<b>160.1, Dissolved Solids "As Received"</b>												
Total Dissolved Solids		331	2.38	10.0	mg/L			CH6	07/28/23	0944	2467003	13
<b>Spectrometric Analysis</b>												
<b>410.4, Chem. Oxygen Demand "As Received"</b>												
COD	U	20.0	8.95	20.0	mg/L		1	JW2	07/27/23	1502	2466799	14
<b>Volatile Organics</b>												
<b>8260D, Volatiles- full suite "As Received"</b>												
1,1,1,2-Tetrachloroethane	U	1.00	0.333	1.00	ug/L		1	JM6	07/31/23	1209	2467759	15
1,1,1-Trichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1,2,2-Tetrachloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1,2-Trichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1-Dichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1					
1,2,3-Trichloropropane	U	1.00	0.333	1.00	ug/L		1					
1,2-Dibromoethane	U	1.00	0.333	1.00	ug/L		1					



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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road

Kevil, Kentucky 42053

Contact: Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW386SG4-23  
Sample ID: 630883005

Project: FRNP00511  
Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time Batch	Method
Volatile Organics											
8260D, Volatiles- full suite "As Received"											
1,2-Dichlorobenzene	U	1.00	0.333	1.00	ug/L		1				
1,2-Dichloroethane	U	1.00	0.333	1.00	ug/L		1				
1,2-Dichloropropane	U	1.00	0.333	1.00	ug/L		1				
1,4-Dichlorobenzene	U	1.00	0.333	1.00	ug/L		1				
2-Butanone	U	5.00	1.67	5.00	ug/L		1				
2-Hexanone	U	5.00	1.67	5.00	ug/L		1				
4-Methyl-2-pentanone	U	5.00	1.67	5.00	ug/L		1				
Acetone	U	5.00	1.74	5.00	ug/L		1				
Acrolein	U	5.00	1.67	5.00	ug/L		1				
Acrylonitrile	U	5.00	1.67	5.00	ug/L		1				
Benzene	U	1.00	0.333	1.00	ug/L		1				
Bromochloromethane	U	1.00	0.333	1.00	ug/L		1				
Bromodichloromethane	U	1.00	0.333	1.00	ug/L		1				
Bromoform	U	1.00	0.333	1.00	ug/L		1				
Bromomethane	U	1.00	0.337	1.00	ug/L		1				
Carbon disulfide	U	5.00	1.67	5.00	ug/L		1				
Carbon tetrachloride	U	1.00	0.333	1.00	ug/L		1				
Chlorobenzene	U	1.00	0.333	1.00	ug/L		1				
Chloroethane	U	1.00	0.333	1.00	ug/L		1				
Chloroform	U	1.00	0.333	1.00	ug/L		1				
Chloromethane	U	1.00	0.333	1.00	ug/L		1				
Dibromochloromethane	U	1.00	0.333	1.00	ug/L		1				
Dibromomethane	U	1.00	0.333	1.00	ug/L		1				
Ethylbenzene	U	1.00	0.333	1.00	ug/L		1				
Iodomethane	U	5.00	1.67	5.00	ug/L		1				
Methylene chloride	U	5.00	0.500	5.00	ug/L		1				
Styrene	U	1.00	0.333	1.00	ug/L		1				
Tetrachloroethylene	U	1.00	0.333	1.00	ug/L		1				
Toluene	U	1.00	0.333	1.00	ug/L		1				
Trichloroethylene	U	1.00	0.333	1.00	ug/L		1				
Trichlorofluoromethane	U	1.00	0.333	1.00	ug/L		1				
Vinyl acetate	U	5.00	1.67	5.00	ug/L		1				
Vinyl chloride	U	1.00	0.333	1.00	ug/L		1				
Xylenes (total)	U	3.00	1.00	3.00	ug/L		1				
cis-1,2-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1				
cis-1,3-Dichloropropylene	U	1.00	0.333	1.00	ug/L		1				

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 Kevil, Kentucky 42053  
 Contact: Ms. Jaime Morrow  
 Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW386SG4-23	Project: FRNP00511
Sample ID: 630883005	Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Volatile Organics												
8260D, Volatiles- full suite "As Received"												
trans-1,2-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1					
trans-1,3-Dichloropropylene	U	1.00	0.333	1.00	ug/L		1					
trans-1,4-Dichloro-2-butene	U	5.00	1.67	5.00	ug/L		1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3005A	ICP-MS 3005A PREP	JD2	08/02/23	0745	2468523
SW846 7470A Prep	EPA 7470A Mercury Prep Liquid	AXS5	07/28/23	1208	2467496
SW846 8011 PREP	8011 Prep	LOF	08/02/23	1257	2468088
SW846 9010C Distillation	SW846 9010C Prep	ES2	07/28/23	0952	2466824

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 8011	
2	SW846 9060A	
3	SW846 9012B	
4	SW846 9020B	
5	EPA 300.0	
6	SW846 9056A	
7	SW846 9056A	
8	SW846 7470A	
9	SW846 3005A/6020B	
10	SW846 3005A/6020B	
11	SW846 3005A/6020B	
12	SW846 3005A/6020B	
13	EPA 160.1	
14	EPA 410.4	
15	SW846 8260D	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
1-Chloro-2-fluorobenzene	8011, VOA Compounds Liquid "As Received"	5.39 ug/L	6.70	80	(46%-159%)
Bromofluorobenzene	8260D, Volatiles- full suite "As Received"	57.0 ug/L	50.0	114	(72%-125%)
1,2-Dichloroethane-d4	8260D, Volatiles- full suite "As Received"	55.0 ug/L	50.0	110	(73%-129%)
Toluene-d8	8260D, Volatiles- full suite "As Received"	51.7 ug/L	50.0	103	(75%-123%)

**Notes:**

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Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road  
Kevil, Kentucky 42053  
Contact: Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

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Client Sample ID:	MW386SG4-23	Project:	FRNP00511
Sample ID:	630883005	Client ID:	FRNP005

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Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
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Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road

Contact: Kevil, Kentucky 42053  
Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW386SG4-23	Project: FRNP00511
Sample ID: 630883006	Client ID: FRNP005
Matrix: WG	
Collect Date: 26-JUL-23 13:44	
Receive Date: 27-JUL-23	
Collector: Client	

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Metals Analysis-ICP-MS												
6020, Dissolved Metals (3 Elements) "As Received"												
Barium		0.131	0.000670	0.00400	mg/L	1.00	1	PRB	08/09/23	2302	2468524	1
Chromium	U	0.0100	0.00300	0.0100	mg/L	1.00	1					
Uranium	U	0.000200	0.0000670	0.000200	mg/L	1.00	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 160	Laboratory Filtration	RXB5	07/31/23	1015	2466848
SW846 3005A	ICP-MS 3005A PREP	JD2	08/02/23	0745	2468523

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 3005A/6020B	

**Notes:**

Column headers are defined as follows:

- |                                       |                                |
|---------------------------------------|--------------------------------|
| DF: Dilution Factor                   | Lc/LC: Critical Level          |
| DL: Detection Limit                   | PF: Prep Factor                |
| MDA: Minimum Detectable Activity      | RL: Reporting Limit            |
| MDC: Minimum Detectable Concentration | SQL: Sample Quantitation Limit |

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road  
Kevil, Kentucky 42053  
Contact: Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW387SG4-23 Project: FRNP00511  
Sample ID: 630883007 Client ID: FRNP005  
Matrix: WG  
Collect Date: 26-JUL-23 09:42  
Receive Date: 27-JUL-23  
Collector: Client

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
504.1/8011 Analysis of EDB/DBCP												
8011, VOA Compounds Liquid "As Received"												
1,2-Dibromo-3-chloropropane	U	0.0187	0.00843	0.0187	ug/L	0.936	1	LOF	08/03/23	0100	2468089	1
Carbon Analysis												
9060A, Total Organic Carbon "As Received"												
Total Organic Carbon Average	J	1.09	0.330	2.00	mg/L		1	RM3	07/31/23	2104	2468684	2
Flow Injection Analysis												
9012B, Total Cyanide "As Received"												
Cyanide, Total	U	0.200	0.00167	0.200	mg/L	1.00	1	AXH3	07/31/23	1051	2466827	3
Halogen Analysis												
9020B, TOX (Organic Halogen) "As Received"												
Total Organic Halogens	J	6.76	3.33	10.0	ug/L		1	RM3	08/07/23	2050	2472135	4
Ion Chromatography												
300.0, Iodide in Liquid "As Received"												
Iodide	U	0.500	0.167	0.500	mg/L		1	LXA2	07/27/23	1805	2467144	5
SW846 9056A Anions (5) "As Received"												
Bromide		0.518	0.0670	0.200	mg/L		1	JLD1	07/27/23	1345	2466706	6
Fluoride	J	0.866	0.0330	4.00	mg/L		1					
Chloride	J	38.3	0.335	250	mg/L		5	JLD1	07/27/23	2351	2466706	7
Nitrate-N	J	0.931	0.165	10.0	mg/L		5					
Sulfate		31.5	0.665	2.00	mg/L		5					
Mercury Analysis-CVAA												
7470, Mercury Liquid "As Received"												
Mercury	BJ	0.0000980	0.0000670	0.000200	mg/L	1.00	1	JP2	07/31/23	1047	2467502	8
Metals Analysis-ICP-MS												
6020, Metals (15+) "As Received"												
Aluminum	U	0.0500	0.0193	0.0500	mg/L	1.00	1	PRB	08/09/23	2313	2468524	9
Arsenic	U	0.00500	0.00200	0.00500	mg/L	1.00	1					
Barium		0.107	0.000670	0.00400	mg/L	1.00	1					
Beryllium	U	0.000500	0.000200	0.000500	mg/L	1.00	1					
Boron		0.0432	0.00520	0.0150	mg/L	1.00	1					
Cadmium	U	0.00100	0.000300	0.00100	mg/L	1.00	1					
Calcium		37.8	0.0800	0.200	mg/L	1.00	1					
Chromium	J	0.00534	0.00300	0.0100	mg/L	1.00	1					
Cobalt	U	0.00100	0.000300	0.00100	mg/L	1.00	1					

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Address : 5600 Hobbs Road

Kevil, Kentucky 42053

Contact: Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW387SG4-23  
Sample ID: 630883007

Project: FRNP00511  
Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Metals Analysis-ICP-MS</b>												
<b>6020, Metals (15+) "As Received"</b>												
Copper		0.00342	0.000300	0.00200	mg/L	1.00	1					
Iron	J	0.0549	0.0330	0.100	mg/L	1.00	1					
Lead	U	0.00200	0.000500	0.00200	mg/L	1.00	1					
Magnesium		15.7	0.0100	0.0300	mg/L	1.00	1					
Manganese	J	0.00183	0.00100	0.00500	mg/L	1.00	1					
Molybdenum	U	0.00100	0.000200	0.00100	mg/L	1.00	1					
Nickel	J	0.00138	0.000600	0.00200	mg/L	1.00	1					
Potassium		1.76	0.0800	0.300	mg/L	1.00	1					
Silver	U	0.00100	0.000300	0.00100	mg/L	1.00	1					
Thallium	U	0.00200	0.000600	0.00200	mg/L	1.00	1					
Uranium	U	0.000200	0.0000670	0.000200	mg/L	1.00	1					
Vanadium	U	0.0200	0.00330	0.0200	mg/L	1.00	1					
Zinc	J	0.00705	0.00330	0.0200	mg/L	1.00	1					
Sodium		52.2	0.800	2.50	mg/L	1.00	10	PRB	08/10/23	0731	2468524	10
Antimony	U	0.00300	0.00100	0.00300	mg/L	1.00	1	PRB	08/10/23	0521	2468524	11
Selenium	U	0.00500	0.00150	0.00500	mg/L	1.00	1					
Rhodium	U	0.00500	0.00160	0.00500	mg/L	1.00	1	PRB	08/10/23	0157	2468524	12
Tantalum	U	0.00500	0.00100	0.00500	mg/L	1.00	1					
<b>Solids Analysis</b>												
<b>160.1, Dissolved Solids "As Received"</b>												
Total Dissolved Solids		281	2.38	10.0	mg/L			CH6	07/28/23	0944	2467003	13
<b>Spectrometric Analysis</b>												
<b>410.4, Chem. Oxygen Demand "As Received"</b>												
COD	U	20.0	8.95	20.0	mg/L		1	JW2	07/27/23	1503	2466799	14
<b>Volatile Organics</b>												
<b>8260D, Volatiles- full suite "As Received"</b>												
1,1,1,2-Tetrachloroethane	U	1.00	0.333	1.00	ug/L		1	JM6	07/31/23	1142	2467759	15
1,1,1-Trichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1,2,2-Tetrachloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1,2-Trichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1-Dichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1					
1,2,3-Trichloropropane	U	1.00	0.333	1.00	ug/L		1					
1,2-Dibromoethane	U	1.00	0.333	1.00	ug/L		1					

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Address : 5600 Hobbs Road  
Kevil, Kentucky 42053  
Contact: Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW387SG4-23 Project: FRNP00511  
Sample ID: 630883007 Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Volatile Organics												
8260D, Volatiles- full suite "As Received"												
1,2-Dichlorobenzene	U	1.00	0.333	1.00	ug/L		1					
1,2-Dichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,2-Dichloropropane	U	1.00	0.333	1.00	ug/L		1					
1,4-Dichlorobenzene	U	1.00	0.333	1.00	ug/L		1					
2-Butanone	U	5.00	1.67	5.00	ug/L		1					
2-Hexanone	U	5.00	1.67	5.00	ug/L		1					
4-Methyl-2-pentanone	U	5.00	1.67	5.00	ug/L		1					
Acetone	U	5.00	1.74	5.00	ug/L		1					
Acrolein	U	5.00	1.67	5.00	ug/L		1					
Acrylonitrile	U	5.00	1.67	5.00	ug/L		1					
Benzene	U	1.00	0.333	1.00	ug/L		1					
Bromochloromethane	U	1.00	0.333	1.00	ug/L		1					
Bromodichloromethane	U	1.00	0.333	1.00	ug/L		1					
Bromoform	U	1.00	0.333	1.00	ug/L		1					
Bromomethane	U	1.00	0.337	1.00	ug/L		1					
Carbon disulfide	U	5.00	1.67	5.00	ug/L		1					
Carbon tetrachloride	U	1.00	0.333	1.00	ug/L		1					
Chlorobenzene	U	1.00	0.333	1.00	ug/L		1					
Chloroethane	U	1.00	0.333	1.00	ug/L		1					
Chloroform	U	1.00	0.333	1.00	ug/L		1					
Chloromethane	U	1.00	0.333	1.00	ug/L		1					
Dibromochloromethane	U	1.00	0.333	1.00	ug/L		1					
Dibromomethane	U	1.00	0.333	1.00	ug/L		1					
Ethylbenzene	U	1.00	0.333	1.00	ug/L		1					
Iodomethane	U	5.00	1.67	5.00	ug/L		1					
Methylene chloride	U	5.00	0.500	5.00	ug/L		1					
Styrene	U	1.00	0.333	1.00	ug/L		1					
Tetrachloroethylene	U	1.00	0.333	1.00	ug/L		1					
Toluene	U	1.00	0.333	1.00	ug/L		1					
Trichloroethylene	J	0.380	0.333	1.00	ug/L		1					
Trichlorofluoromethane	U	1.00	0.333	1.00	ug/L		1					
Vinyl acetate	U	5.00	1.67	5.00	ug/L		1					
Vinyl chloride	U	1.00	0.333	1.00	ug/L		1					
Xylenes (total)	U	3.00	1.00	3.00	ug/L		1					
cis-1,2-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1					
cis-1,3-Dichloropropylene	U	1.00	0.333	1.00	ug/L		1					

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
 Address : 5600 Hobbs Road  
  
 Kevil, Kentucky 42053  
 Contact: Ms. Jaime Morrow  
 Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW387SG4-23	Project: FRNP00511
Sample ID: 630883007	Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Volatile Organics												
8260D, Volatiles- full suite "As Received"												
trans-1,2-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1					
trans-1,3-Dichloropropylene	U	1.00	0.333	1.00	ug/L		1					
trans-1,4-Dichloro-2-butene	U	5.00	1.67	5.00	ug/L		1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 9010C Distillation	SW846 9010C Prep	ES2	07/28/23	0952	2466824
SW846 8011 PREP	8011 Prep	LOF	08/02/23	1257	2468088
SW846 7470A Prep	EPA 7470A Mercury Prep Liquid	AXS5	07/28/23	1208	2467496
SW846 3005A	ICP-MS 3005A PREP	JD2	08/02/23	0745	2468523

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 8011	
2	SW846 9060A	
3	SW846 9012B	
4	SW846 9020B	
5	EPA 300.0	
6	SW846 9056A	
7	SW846 9056A	
8	SW846 7470A	
9	SW846 3005A/6020B	
10	SW846 3005A/6020B	
11	SW846 3005A/6020B	
12	SW846 3005A/6020B	
13	EPA 160.1	
14	EPA 410.4	
15	SW846 8260D	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
1-Chloro-2-fluorobenzene	8011, VOA Compounds Liquid "As Received"	9.00 ug/L	6.69	135	(46%-159%)
Bromofluorobenzene	8260D, Volatiles- full suite "As Received"	56.4 ug/L	50.0	113	(72%-125%)
1,2-Dichloroethane-d4	8260D, Volatiles- full suite "As Received"	55.1 ug/L	50.0	110	(73%-129%)
Toluene-d8	8260D, Volatiles- full suite "As Received"	50.0 ug/L	50.0	100	(75%-123%)

**Notes:**



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## *Certificate of Analysis*

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road

Contact: Kevil, Kentucky 42053  
Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW387SG4-23  
Sample ID: 630883007

Project: FRNP00511  
Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
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*Column headers are defined as follows:*

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road

Kevil, Kentucky 42053

Contact: Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW387SG4-23      Project: FRNP00511  
Sample ID: 630883008      Client ID: FRNP005  
Matrix: WG  
Collect Date: 26-JUL-23 09:42  
Receive Date: 27-JUL-23  
Collector: Client

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Metals Analysis-ICP-MS												
6020, Dissolved Metals (3 Elements) "As Received"												
Barium		0.105	0.000670	0.00400	mg/L	1.00	1	PRB	08/09/23	2316	2468524	1
Chromium	J	0.00462	0.00300	0.0100	mg/L	1.00	1					
Uranium	U	0.000200	0.0000670	0.000200	mg/L	1.00	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 160	Laboratory Filtration	RXB5	07/31/23	1015	2466848
SW846 3005A	ICP-MS 3005A PREP	JD2	08/02/23	0745	2468523

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 3005A/6020B	

### Notes:

Column headers are defined as follows:

DF: Dilution Factor      Lc/LC: Critical Level  
DL: Detection Limit      PF: Prep Factor  
MDA: Minimum Detectable Activity      RL: Reporting Limit  
MDC: Minimum Detectable Concentration      SQL: Sample Quantitation Limit

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road  
Kevil, Kentucky 42053  
Contact: Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW388SG4-23 Project: FRNP00511  
Sample ID: 630883009 Client ID: FRNP005  
Matrix: WG  
Collect Date: 26-JUL-23 11:21  
Receive Date: 27-JUL-23  
Collector: Client

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
504.1/8011 Analysis of EDB/DBCP												
8011, VOA Compounds Liquid "As Received"												
1,2-Dibromo-3-chloropropane	U	0.0192	0.00863	0.0192	ug/L	0.958	1	LOF	08/03/23	0125	2468089	1
Carbon Analysis												
9060A, Total Organic Carbon "As Received"												
Total Organic Carbon Average	J	1.07	0.330	2.00	mg/L		1	RM3	07/31/23	2143	2468684	2
Flow Injection Analysis												
9012B, Total Cyanide "As Received"												
Cyanide, Total	U	0.200	0.00167	0.200	mg/L	1.00	1	AXH3	07/31/23	1017	2466827	3
Halogen Analysis												
9020B, TOX (Organic Halogen) "As Received"												
Total Organic Halogens	J	4.76	3.33	10.0	ug/L		1	RM3	08/08/23	1211	2472135	4
Ion Chromatography												
300.0, Iodide in Liquid "As Received"												
Iodide	U	0.500	0.167	0.500	mg/L		1	LXA2	07/27/23	1818	2467144	5
SW846 9056A Anions (5) "As Received"												
Bromide		0.503	0.0670	0.200	mg/L		1	JLD1	07/27/23	1417	2466706	6
Fluoride	J	0.287	0.0330	4.00	mg/L		1					
Chloride	J	36.8	0.335	250	mg/L		5	JLD1	07/28/23	0023	2466706	7
Nitrate-N	J	0.978	0.165	10.0	mg/L		5					
Sulfate		20.0	0.665	2.00	mg/L		5					
Mercury Analysis-CVAA												
7470, Mercury Liquid "As Received"												
Mercury	BJ	0.000108	0.0000670	0.000200	mg/L	1.00	1	JP2	07/31/23	1048	2467502	8
Metals Analysis-ICP-MS												
6020, Metals (15+) "As Received"												
Antimony	U	0.00300	0.00100	0.00300	mg/L	1.00	1	PRB	08/10/23	0528	2468524	9
Selenium	U	0.00500	0.00150	0.00500	mg/L	1.00	1					
Aluminum	U	0.0500	0.0193	0.0500	mg/L	1.00	1	PRB	08/09/23	2320	2468524	10
Arsenic	U	0.00500	0.00200	0.00500	mg/L	1.00	1					
Barium		0.164	0.000670	0.00400	mg/L	1.00	1					
Beryllium	U	0.000500	0.000200	0.000500	mg/L	1.00	1					
Boron		0.0269	0.00520	0.0150	mg/L	1.00	1					
Cadmium	U	0.00100	0.000300	0.00100	mg/L	1.00	1					
Calcium		25.5	0.0800	0.200	mg/L	1.00	1					

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
 Address : 5600 Hobbs Road  
  
 Kevil, Kentucky 42053  
 Contact: Ms. Jaime Morrow  
 Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW388SG4-23	Project: FRNP00511
Sample ID: 630883009	Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Metals Analysis-ICP-MS</b>												
<b>6020, Metals (15+) "As Received"</b>												
Chromium	U	0.0100	0.00300	0.0100	mg/L	1.00	1					
Cobalt	U	0.00100	0.000300	0.00100	mg/L	1.00	1					
Copper	J	0.00116	0.000300	0.00200	mg/L	1.00	1					
Iron	U	0.100	0.0330	0.100	mg/L	1.00	1					
Lead	U	0.00200	0.000500	0.00200	mg/L	1.00	1					
Magnesium		10.9	0.0100	0.0300	mg/L	1.00	1					
Manganese	U	0.00500	0.00100	0.00500	mg/L	1.00	1					
Molybdenum	U	0.00100	0.000200	0.00100	mg/L	1.00	1					
Nickel	U	0.00200	0.000600	0.00200	mg/L	1.00	1					
Potassium		1.78	0.0800	0.300	mg/L	1.00	1					
Silver	U	0.00100	0.000300	0.00100	mg/L	1.00	1					
Sodium		42.7	0.0800	0.250	mg/L	1.00	1					
Thallium	U	0.00200	0.000600	0.00200	mg/L	1.00	1					
Uranium	U	0.000200	0.0000670	0.000200	mg/L	1.00	1					
Vanadium	U	0.0200	0.00330	0.0200	mg/L	1.00	1					
Zinc	J	0.00512	0.00330	0.0200	mg/L	1.00	1					
Rhodium	U	0.00500	0.00160	0.00500	mg/L	1.00	1	PRB	08/10/23	0159	2468524	11
Tantalum	U	0.00500	0.00100	0.00500	mg/L	1.00	1					
<b>Solids Analysis</b>												
<b>160.1, Dissolved Solids "As Received"</b>												
Total Dissolved Solids		198	2.38	10.0	mg/L			CH6	07/28/23	0944	2467003	12
<b>Spectrometric Analysis</b>												
<b>410.4, Chem. Oxygen Demand "As Received"</b>												
COD	U	20.0	8.95	20.0	mg/L		1	JW2	07/27/23	1503	2466799	13
<b>Volatile Organics</b>												
<b>8260D, Volatiles- full suite "As Received"</b>												
1,1,1,2-Tetrachloroethane	U	1.00	0.333	1.00	ug/L		1	JM6	07/31/23	1115	2467759	14
1,1,1-Trichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1,2,2-Tetrachloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1,2-Trichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1-Dichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1					
1,2,3-Trichloropropane	U	1.00	0.333	1.00	ug/L		1					
1,2-Dibromoethane	U	1.00	0.333	1.00	ug/L		1					

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road

Kevil, Kentucky 42053

Contact: Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW388SG4-23  
Sample ID: 630883009

Project: FRNP00511  
Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time Batch	Method
Volatile Organics											
8260D, Volatiles- full suite "As Received"											
1,2-Dichlorobenzene	U	1.00	0.333	1.00	ug/L		1				
1,2-Dichloroethane	U	1.00	0.333	1.00	ug/L		1				
1,2-Dichloropropane	U	1.00	0.333	1.00	ug/L		1				
1,4-Dichlorobenzene	U	1.00	0.333	1.00	ug/L		1				
2-Butanone	U	5.00	1.67	5.00	ug/L		1				
2-Hexanone	U	5.00	1.67	5.00	ug/L		1				
4-Methyl-2-pentanone	U	5.00	1.67	5.00	ug/L		1				
Acetone	U	5.00	1.74	5.00	ug/L		1				
Acrolein	U	5.00	1.67	5.00	ug/L		1				
Acrylonitrile	U	5.00	1.67	5.00	ug/L		1				
Benzene	U	1.00	0.333	1.00	ug/L		1				
Bromochloromethane	U	1.00	0.333	1.00	ug/L		1				
Bromodichloromethane	U	1.00	0.333	1.00	ug/L		1				
Bromoform	U	1.00	0.333	1.00	ug/L		1				
Bromomethane	U	1.00	0.337	1.00	ug/L		1				
Carbon disulfide	U	5.00	1.67	5.00	ug/L		1				
Carbon tetrachloride	U	1.00	0.333	1.00	ug/L		1				
Chlorobenzene	U	1.00	0.333	1.00	ug/L		1				
Chloroethane	U	1.00	0.333	1.00	ug/L		1				
Chloroform	U	1.00	0.333	1.00	ug/L		1				
Chloromethane	U	1.00	0.333	1.00	ug/L		1				
Dibromochloromethane	U	1.00	0.333	1.00	ug/L		1				
Dibromomethane	U	1.00	0.333	1.00	ug/L		1				
Ethylbenzene	U	1.00	0.333	1.00	ug/L		1				
Iodomethane	U	5.00	1.67	5.00	ug/L		1				
Methylene chloride	U	5.00	0.500	5.00	ug/L		1				
Styrene	U	1.00	0.333	1.00	ug/L		1				
Tetrachloroethylene	U	1.00	0.333	1.00	ug/L		1				
Toluene	U	1.00	0.333	1.00	ug/L		1				
Trichloroethylene	U	1.00	0.333	1.00	ug/L		1				
Trichlorofluoromethane	U	1.00	0.333	1.00	ug/L		1				
Vinyl acetate	U	5.00	1.67	5.00	ug/L		1				
Vinyl chloride	U	1.00	0.333	1.00	ug/L		1				
Xylenes (total)	U	3.00	1.00	3.00	ug/L		1				
cis-1,2-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1				
cis-1,3-Dichloropropylene	U	1.00	0.333	1.00	ug/L		1				

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 Address : 5600 Hobbs Road  
  
 Kevil, Kentucky 42053  
 Contact: Ms. Jaime Morrow  
 Project: C-746-S&T Landfill Quarterly(SG23-04)

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Client Sample ID: MW388SG4-23	Project: FRNP00511
Sample ID: 630883009	Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Volatile Organics												
8260D, Volatiles- full suite "As Received"												
trans-1,2-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1					
trans-1,3-Dichloropropylene	U	1.00	0.333	1.00	ug/L		1					
trans-1,4-Dichloro-2-butene	U	5.00	1.67	5.00	ug/L		1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 9010C Distillation	SW846 9010C Prep	ES2	07/28/23	0952	2466824
SW846 7470A Prep	EPA 7470A Mercury Prep Liquid	AXS5	07/28/23	1208	2467496
SW846 3005A	ICP-MS 3005A PREP	JD2	08/02/23	0745	2468523
SW846 8011 PREP	8011 Prep	LOF	08/02/23	1257	2468088

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 8011	
2	SW846 9060A	
3	SW846 9012B	
4	SW846 9020B	
5	EPA 300.0	
6	SW846 9056A	
7	SW846 9056A	
8	SW846 7470A	
9	SW846 3005A/6020B	
10	SW846 3005A/6020B	
11	SW846 3005A/6020B	
12	EPA 160.1	
13	EPA 410.4	
14	SW846 8260D	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
1-Chloro-2-fluorobenzene	8011, VOA Compounds Liquid "As Received"	7.38 ug/L	6.85	108	(46%-159%)
Bromofluorobenzene	8260D, Volatiles- full suite "As Received"	54.5 ug/L	50.0	109	(72%-125%)
1,2-Dichloroethane-d4	8260D, Volatiles- full suite "As Received"	55.1 ug/L	50.0	110	(73%-129%)
Toluene-d8	8260D, Volatiles- full suite "As Received"	51.0 ug/L	50.0	102	(75%-123%)

**Notes:**

# GEL LABORATORIES LLC

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## *Certificate of Analysis*

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road  
  
Kevil, Kentucky 42053  
Contact: Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

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Client Sample ID:	MW388SG4-23	Project:	FRNP00511
Sample ID:	630883009	Client ID:	FRNP005

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Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time Batch	Method
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*Column headers are defined as follows:*

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road

Kevil, Kentucky 42053

Contact: Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW388SG4-23      Project: FRNP00511  
Sample ID: 630883010      Client ID: FRNP005  
Matrix: WG  
Collect Date: 26-JUL-23 11:21  
Receive Date: 27-JUL-23  
Collector: Client

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Metals Analysis-ICP-MS												
6020, Dissolved Metals (3 Elements) "As Received"												
Barium		0.165	0.000670	0.00400	mg/L	1.00	1	PRB	08/09/23	2323	2468524	1
Chromium	U	0.0100	0.00300	0.0100	mg/L	1.00	1					
Uranium	U	0.000200	0.0000670	0.000200	mg/L	1.00	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3005A	ICP-MS 3005A PREP	JD2	08/02/23	0745	2468523
EPA 160	Laboratory Filtration	RXB5	07/31/23	1015	2466848

The following Analytical Methods were performed:

Method	Description	Analyst	Comments
1	SW846 3005A/6020B		

### Notes:

Column headers are defined as follows:

DF: Dilution Factor      Lc/LC: Critical Level  
DL: Detection Limit      PF: Prep Factor  
MDA: Minimum Detectable Activity      RL: Reporting Limit  
MDC: Minimum Detectable Concentration      SQL: Sample Quantitation Limit



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Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
 Address : 5600 Hobbs Road  
  
 Kevil, Kentucky 42053  
 Contact: Ms. Jaime Morrow  
 Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW390SG4-23	Project: FRNP00511
Sample ID: 630883011	Client ID: FRNP005
Matrix: WG	
Collect Date: 26-JUL-23 08:37	
Receive Date: 27-JUL-23	
Collector: Client	

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
504.1/8011 Analysis of EDB/DBCP												
8011, VOA Compounds Liquid "As Received"												
1,2-Dibromo-3-chloropropane	U	0.0187	0.00841	0.0187	ug/L	0.934	1	LOF	08/03/23	0149	2468089	1
Carbon Analysis												
9060A, Total Organic Carbon "As Received"												
Total Organic Carbon Average	J	1.89	0.330	2.00	mg/L		1	RM3	07/31/23	2222	2468684	2
Flow Injection Analysis												
9012B, Total Cyanide "As Received"												
Cyanide, Total	U	0.200	0.00167	0.200	mg/L	1.00	1	AXH3	07/31/23	1018	2466827	3
Halogen Analysis												
9020B, TOX (Organic Halogen) "As Received"												
Total Organic Halogens		12.9	3.33	10.0	ug/L		1	RM3	08/08/23	1911	2472705	4
Ion Chromatography												
300.0, Iodide in Liquid "As Received"												
Iodide	U	0.500	0.167	0.500	mg/L		1	LXA2	07/27/23	1830	2467144	5
SW846 9056A Anions (5) "As Received"												
Chloride	J	36.4	0.335	250	mg/L		5	JLD1	07/28/23	0055	2466706	6
Nitrate-N	J	2.01	0.165	10.0	mg/L		5					
Sulfate		35.2	0.665	2.00	mg/L		5					
Bromide		0.345	0.0670	0.200	mg/L		1	JLD1	07/27/23	1449	2466706	7
Fluoride	J	0.316	0.0330	4.00	mg/L		1					
Mercury Analysis-CVAA												
7470, Mercury Liquid "As Received"												
Mercury	BJ	0.000110	0.0000670	0.000200	mg/L	1.00	1	JP2	07/31/23	1050	2467502	8
Metals Analysis-ICP-MS												
6020, Metals (15+) "As Received"												
Antimony	U	0.00300	0.00100	0.00300	mg/L	1.00	1	PRB	08/10/23	0536	2468524	9
Selenium	U	0.00500	0.00150	0.00500	mg/L	1.00	1					
Rhodium	U	0.00500	0.00160	0.00500	mg/L	1.00	1	PRB	08/10/23	0201	2468524	10
Tantalum	U	0.00500	0.00100	0.00500	mg/L	1.00	1					
Sodium		84.3	0.800	2.50	mg/L	1.00	10	PRB	08/10/23	0735	2468524	11
Aluminum	J	0.0241	0.0193	0.0500	mg/L	1.00	1	PRB	08/09/23	2327	2468524	12
Arsenic	U	0.00500	0.00200	0.00500	mg/L	1.00	1					
Barium		0.210	0.000670	0.00400	mg/L	1.00	1					
Beryllium	U	0.000500	0.000200	0.000500	mg/L	1.00	1					

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road

Kevil, Kentucky 42053

Contact: Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW390SG4-23  
Sample ID: 630883011

Project: FRNP00511  
Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Metals Analysis-ICP-MS</b>												
<b>6020, Metals (15+) "As Received"</b>												
Boron	J	0.0134	0.00520	0.0150	mg/L	1.00	1					
Cadmium	U	0.00100	0.000300	0.00100	mg/L	1.00	1					
Calcium		25.0	0.0800	0.200	mg/L	1.00	1					
Chromium	U	0.0100	0.00300	0.0100	mg/L	1.00	1					
Cobalt	U	0.00100	0.000300	0.00100	mg/L	1.00	1					
Copper		0.00210	0.000300	0.00200	mg/L	1.00	1					
Iron	U	0.100	0.0330	0.100	mg/L	1.00	1					
Lead	U	0.00200	0.000500	0.00200	mg/L	1.00	1					
Magnesium		10.6	0.0100	0.0300	mg/L	1.00	1					
Manganese	U	0.00500	0.00100	0.00500	mg/L	1.00	1					
Molybdenum	J	0.000354	0.000200	0.00100	mg/L	1.00	1					
Nickel	J	0.00120	0.000600	0.00200	mg/L	1.00	1					
Potassium		0.320	0.0800	0.300	mg/L	1.00	1					
Silver	U	0.00100	0.000300	0.00100	mg/L	1.00	1					
Thallium	U	0.00200	0.000600	0.00200	mg/L	1.00	1					
Uranium	J	0.000130	0.0000670	0.000200	mg/L	1.00	1					
Vanadium	J	0.00363	0.00330	0.0200	mg/L	1.00	1					
Zinc	J	0.00690	0.00330	0.0200	mg/L	1.00	1					
<b>Solids Analysis</b>												
<b>160.1, Dissolved Solids "As Received"</b>												
Total Dissolved Solids		332	2.38	10.0	mg/L			CH6	07/28/23	0944	2467003	13
<b>Spectrometric Analysis</b>												
<b>410.4, Chem. Oxygen Demand "As Received"</b>												
COD	U	20.0	8.95	20.0	mg/L		1	JW2	07/27/23	1503	2466799	14
<b>Volatile Organics</b>												
<b>8260D, Volatiles- full suite "As Received"</b>												
1,1,1,2-Tetrachloroethane	U	1.00	0.333	1.00	ug/L		1	JM6	07/31/23	1048	2467759	15
1,1,1-Trichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1,2,2-Tetrachloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1,2-Trichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1-Dichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1					
1,2,3-Trichloropropane	U	1.00	0.333	1.00	ug/L		1					
1,2-Dibromoethane	U	1.00	0.333	1.00	ug/L		1					

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road

Kevil, Kentucky 42053

Contact: Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW390SG4-23  
Sample ID: 630883011

Project: FRNP00511  
Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time Batch	Method
Volatile Organics											
8260D, Volatiles- full suite "As Received"											
1,2-Dichlorobenzene	U	1.00	0.333	1.00	ug/L		1				
1,2-Dichloroethane	U	1.00	0.333	1.00	ug/L		1				
1,2-Dichloropropane	U	1.00	0.333	1.00	ug/L		1				
1,4-Dichlorobenzene	U	1.00	0.333	1.00	ug/L		1				
2-Butanone	U	5.00	1.67	5.00	ug/L		1				
2-Hexanone	U	5.00	1.67	5.00	ug/L		1				
4-Methyl-2-pentanone	U	5.00	1.67	5.00	ug/L		1				
Acetone	U	5.00	1.74	5.00	ug/L		1				
Acrolein	U	5.00	1.67	5.00	ug/L		1				
Acrylonitrile	U	5.00	1.67	5.00	ug/L		1				
Benzene	U	1.00	0.333	1.00	ug/L		1				
Bromochloromethane	U	1.00	0.333	1.00	ug/L		1				
Bromodichloromethane	U	1.00	0.333	1.00	ug/L		1				
Bromoform	U	1.00	0.333	1.00	ug/L		1				
Bromomethane	U	1.00	0.337	1.00	ug/L		1				
Carbon disulfide	U	5.00	1.67	5.00	ug/L		1				
Carbon tetrachloride	U	1.00	0.333	1.00	ug/L		1				
Chlorobenzene	U	1.00	0.333	1.00	ug/L		1				
Chloroethane	U	1.00	0.333	1.00	ug/L		1				
Chloroform	U	1.00	0.333	1.00	ug/L		1				
Chloromethane	U	1.00	0.333	1.00	ug/L		1				
Dibromochloromethane	U	1.00	0.333	1.00	ug/L		1				
Dibromomethane	U	1.00	0.333	1.00	ug/L		1				
Ethylbenzene	U	1.00	0.333	1.00	ug/L		1				
Iodomethane	U	5.00	1.67	5.00	ug/L		1				
Methylene chloride	U	5.00	0.500	5.00	ug/L		1				
Styrene	U	1.00	0.333	1.00	ug/L		1				
Tetrachloroethylene	U	1.00	0.333	1.00	ug/L		1				
Toluene	U	1.00	0.333	1.00	ug/L		1				
Trichloroethylene	U	1.00	0.333	1.00	ug/L		1				
Trichlorofluoromethane	U	1.00	0.333	1.00	ug/L		1				
Vinyl acetate	U	5.00	1.67	5.00	ug/L		1				
Vinyl chloride	U	1.00	0.333	1.00	ug/L		1				
Xylenes (total)	U	3.00	1.00	3.00	ug/L		1				
cis-1,2-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1				
cis-1,3-Dichloropropylene	U	1.00	0.333	1.00	ug/L		1				

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road  
  
Kevil, Kentucky 42053  
Contact: Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW390SG4-23 Project: FRNP00511  
Sample ID: 630883011 Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Volatile Organics												
8260D, Volatiles- full suite "As Received"												
trans-1,2-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1					
trans-1,3-Dichloropropylene	U	1.00	0.333	1.00	ug/L		1					
trans-1,4-Dichloro-2-butene	U	5.00	1.67	5.00	ug/L		1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3005A	ICP-MS 3005A PREP	JD2	08/02/23	0745	2468523
SW846 9010C Distillation	SW846 9010C Prep	ES2	07/28/23	0952	2466824
SW846 7470A Prep	EPA 7470A Mercury Prep Liquid	AXS5	07/28/23	1208	2467496
SW846 8011 PREP	8011 Prep	LOF	08/02/23	1257	2468088

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 8011	
2	SW846 9060A	
3	SW846 9012B	
4	SW846 9020B	
5	EPA 300.0	
6	SW846 9056A	
7	SW846 9056A	
8	SW846 7470A	
9	SW846 3005A/6020B	
10	SW846 3005A/6020B	
11	SW846 3005A/6020B	
12	SW846 3005A/6020B	
13	EPA 160.1	
14	EPA 410.4	
15	SW846 8260D	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
1-Chloro-2-fluorobenzene	8011, VOA Compounds Liquid "As Received"	7.34 ug/L	6.67	110	(46%-159%)
Bromofluorobenzene	8260D, Volatiles- full suite "As Received"	57.5 ug/L	50.0	115	(72%-125%)
1,2-Dichloroethane-d4	8260D, Volatiles- full suite "As Received"	55.9 ug/L	50.0	112	(73%-129%)
Toluene-d8	8260D, Volatiles- full suite "As Received"	51.5 ug/L	50.0	103	(75%-123%)

Notes:

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## *Certificate of Analysis*

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road  
  
Kevil, Kentucky 42053  
Contact: Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

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Client Sample ID: MW390SG4-23                      Project: FRNP00511  
Sample ID: 630883011                                  Client ID: FRNP005

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Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
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*Column headers are defined as follows:*

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road

Kevil, Kentucky 42053

Contact: Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW390SG4-23      Project: FRNP00511  
Sample ID: 630883012      Client ID: FRNP005  
Matrix: WG  
Collect Date: 26-JUL-23 08:37  
Receive Date: 27-JUL-23  
Collector: Client

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Metals Analysis-ICP-MS												
6020, Dissolved Metals (3 Elements) "As Received"												
Barium		0.220	0.000670	0.00400	mg/L	1.00	1	PRB	08/09/23	2331	2468524	1
Chromium	U	0.0100	0.00300	0.0100	mg/L	1.00	1					
Uranium	J	0.000131	0.0000670	0.000200	mg/L	1.00	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 160	Laboratory Filtration	RXB5	07/31/23	1015	2466848
SW846 3005A	ICP-MS 3005A PREP	JD2	08/02/23	0745	2468523

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 3005A/6020B	

### Notes:

Column headers are defined as follows:

DF: Dilution Factor      Lc/LC: Critical Level  
DL: Detection Limit      PF: Prep Factor  
MDA: Minimum Detectable Activity      RL: Reporting Limit  
MDC: Minimum Detectable Concentration      SQL: Sample Quantitation Limit

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
 Address : 5600 Hobbs Road  
 Kevil, Kentucky 42053  
 Contact: Ms. Jaime Morrow  
 Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: TB1SG4-23	Project: FRNP00511
Sample ID: 630883013	Client ID: FRNP005
Matrix: WATER	
Collect Date: 26-JUL-23 06:35	
Receive Date: 27-JUL-23	
Collector: Client	

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
504.1/8011 Analysis of EDB/DBCP												
8011, VOA Compounds Liquid "As Received"												
1,2-Dibromo-3-chloropropane	U	0.0191	0.00861	0.0191	ug/L	0.956	1	LOF	08/03/23	0214	2468089	1
Volatile Organics												
8260D, Volatiles- full suite "As Received"												
1,1,1,2-Tetrachloroethane	U	1.00	0.333	1.00	ug/L		1	JM6	07/31/23	1021	2467759	2
1,1,1-Trichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1,2,2-Tetrachloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1,2-Trichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1-Dichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1					
1,2,3-Trichloropropane	U	1.00	0.333	1.00	ug/L		1					
1,2-Dibromoethane	U	1.00	0.333	1.00	ug/L		1					
1,2-Dichlorobenzene	U	1.00	0.333	1.00	ug/L		1					
1,2-Dichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,2-Dichloropropane	U	1.00	0.333	1.00	ug/L		1					
1,4-Dichlorobenzene	U	1.00	0.333	1.00	ug/L		1					
2-Butanone	J	1.76	1.67	5.00	ug/L		1					
2-Hexanone	U	5.00	1.67	5.00	ug/L		1					
4-Methyl-2-pentanone	U	5.00	1.67	5.00	ug/L		1					
Acetone	J	3.17	1.74	5.00	ug/L		1					
Acrolein	U	5.00	1.67	5.00	ug/L		1					
Acrylonitrile	U	5.00	1.67	5.00	ug/L		1					
Benzene	U	1.00	0.333	1.00	ug/L		1					
Bromochloromethane	U	1.00	0.333	1.00	ug/L		1					
Bromodichloromethane	U	1.00	0.333	1.00	ug/L		1					
Bromoform	U	1.00	0.333	1.00	ug/L		1					
Bromomethane	U	1.00	0.337	1.00	ug/L		1					
Carbon disulfide	U	5.00	1.67	5.00	ug/L		1					
Carbon tetrachloride	U	1.00	0.333	1.00	ug/L		1					
Chlorobenzene		5.36	0.333	1.00	ug/L		1					
Chloroethane	U	1.00	0.333	1.00	ug/L		1					
Chloroform	U	1.00	0.333	1.00	ug/L		1					
Chloromethane	U	1.00	0.333	1.00	ug/L		1					
Dibromochloromethane	U	1.00	0.333	1.00	ug/L		1					
Dibromomethane	U	1.00	0.333	1.00	ug/L		1					
Ethylbenzene	U	1.00	0.333	1.00	ug/L		1					
Iodomethane	U	5.00	1.67	5.00	ug/L		1					

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road

Kevil, Kentucky 42053

Contact: Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: TB1SG4-23  
Sample ID: 630883013

Project: FRNP00511  
Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Volatile Organics												
8260D, Volatiles- full suite "As Received"												
Methylene chloride	U	5.00	0.500	5.00	ug/L		1					
Styrene	U	1.00	0.333	1.00	ug/L		1					
Tetrachloroethylene	U	1.00	0.333	1.00	ug/L		1					
Toluene	U	1.00	0.333	1.00	ug/L		1					
Trichloroethylene	U	1.00	0.333	1.00	ug/L		1					
Trichlorofluoromethane	U	1.00	0.333	1.00	ug/L		1					
Vinyl acetate	U	5.00	1.67	5.00	ug/L		1					
Vinyl chloride	U	1.00	0.333	1.00	ug/L		1					
Xylenes (total)	U	3.00	1.00	3.00	ug/L		1					
cis-1,2-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1					
cis-1,3-Dichloropropylene	U	1.00	0.333	1.00	ug/L		1					
trans-1,2-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1					
trans-1,3-Dichloropropylene	U	1.00	0.333	1.00	ug/L		1					
trans-1,4-Dichloro-2-butene	U	5.00	1.67	5.00	ug/L		1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 8011 PREP	8011 Prep	LOF	08/02/23	1257	2468088

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 8011	
2	SW846 8260D	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
1-Chloro-2-fluorobenzene	8011, VOA Compounds Liquid "As Received"	7.66 ug/L	6.83	112	(46%-159%)
Bromofluorobenzene	8260D, Volatiles- full suite "As Received"	55.3 ug/L	50.0	111	(72%-125%)
1,2-Dichloroethane-d4	8260D, Volatiles- full suite "As Received"	54.8 ug/L	50.0	110	(73%-129%)
Toluene-d8	8260D, Volatiles- full suite "As Received"	51.1 ug/L	50.0	102	(75%-123%)

Notes:



# GEL LABORATORIES LLC

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road  
Kevil, Kentucky 42053  
Contact: Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

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Client Sample ID:	TB1SG4-23	Project:	FRNP00511
Sample ID:	630883013	Client ID:	FRNP005

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Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
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Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

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## Certificate of Analysis

Company : Four Rivers Nuclear Partnership,  
Address : LLC  
5600 Hobbs Road

Kevil, Kentucky 42053

Report Date: November 2, 2023

Contact: Ms. Jaime Morrow

Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW384SG4-23  
Sample ID: 630883001  
Matrix: WG  
Collect Date: 26-JUL-23  
Receive Date: 27-JUL-23  
Collector: Client

Project: FRNP00511  
Client ID: FRNP005

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Alpha Spec Analysis</b>														
<i>AlphaSpec Ra226, Liquid "As Received"</i>														
Radium-226	U	0.316	+/-0.452	0.540	+/-0.452	5.00	pCi/L			EJ1	08/08/23	0856	2466776	1
<i>Th-01-RC M, Th Isotopes, Liquid "As Received"</i>														
Thorium-230	U	2.33	+/-2.36	2.99	+/-2.40	50.0	pCi/L			EJ1	07/31/23	1316	2466784	2
<b>Rad Gas Flow Proportional Counting</b>														
<i>905.0 Mod, Sr90, liquid "As Received"</i>														
Strontium-90	U	6.16	+/-4.19	6.26	+/-4.31	8.00	pCi/L			ST2	07/31/23	1311	2466772	3
<i>9310,Alpha/Beta Activity, liquid "As Received"</i>														
Alpha	U	4.85	+/-4.53	6.70	+/-4.60	15.0	pCi/L			JXK3	08/01/23	1100	2466763	4
Beta		46.0	+/-9.41	10.2	+/-12.2	50.0	pCi/L							
<b>Rad Liquid Scintillation Analysis</b>														
<i>906.0 Mod, Tritium Dist, Liquid "As Received"</i>														
Tritium	U	26.9	+/-134	235	+/-134	300	pCi/L			GS3	07/29/23	2104	2467189	5
<i>Tc-02-RC-MOD, Tc99, Liquid "As Received"</i>														
Technetium-99		73.8	+/-14.1	18.7	+/-16.4	25.0	pCi/L			AG2	08/06/23	1718	2467172	6

**The following Analytical Methods were performed**

Method	Description
1	Eichrom Industries, AN-1418
2	DOE EML HASL-300, Th-01-RC Modified
3	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified
4	EPA 900.0/SW846 9310
5	EPA 906.0 Modified
6	DOE EML HASL-300, Tc-02-RC Modified

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Barium-133 Tracer	AlphaSpec Ra226, Liquid "As Received"	2466776	92.2	(30%-110%)
Thorium-229 Tracer	Th-01-RC M, Th Isotopes, Liquid "As Received"	2466784	96.3	(30%-110%)
Strontium Carrier	905.0 Mod, Sr90, liquid "As Received"	2466772	63.5	(30%-110%)
Technetium-99m Tracer	Tc-02-RC-MOD, Tc99, Liquid "As Received"	2467172	95.1	(30%-110%)

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## Certificate of Analysis

Company : Four Rivers Nuclear Partnership,  
Address : LLC  
5600 Hobbs Road

Kevil, Kentucky 42053

Report Date: November 2, 2023

Contact: Ms. Jaime Morrow

Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW384SG4-23

Project: FRNP00511

Sample ID: 630883001

Client ID: FRNP005

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Surrogate/Tracer	Recovery	Test						Batch ID	Recovery%	Acceptable Limits				

### Notes:

The MDC is a sample specific MDC.

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

### Column headers are defined as follows:

DF: Dilution Factor

Mtd.: Method

DL: Detection Limit

PF: Prep Factor

Lc/LC: Critical Level

RL: Reporting Limit

MDA: Minimum Detectable Activity

TPU: Total Propagated Uncertainty

MDC: Minimum Detectable Concentration

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## Certificate of Analysis

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Kevil, Kentucky 42053

Report Date: November 2, 2023

Contact: Ms. Jaime Morrow

Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW385SG4-23

Project: FRNP00511

Sample ID: 630883003

Client ID: FRNP005

Matrix: WG

Collect Date: 26-JUL-23

Receive Date: 27-JUL-23

Collector: Client

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Alpha Spec Analysis</b>														
<i>AlphaSpec Ra226, Liquid "As Received"</i>														
Radium-226	U	0.878	+/-0.812	0.932	+/-0.814	5.00	pCi/L			EJ1	08/08/23	0856	2466776	1
<i>Th-01-RC M, Th Isotopes, Liquid "As Received"</i>														
Thorium-230	U	0.751	+/-1.64	2.85	+/-1.65	50.0	pCi/L			EJ1	07/31/23	1316	2466784	2
<b>Rad Gas Flow Proportional Counting</b>														
<i>905.0 Mod, Sr90, liquid "As Received"</i>														
Strontium-90	U	-1.09	+/-3.36	6.66	+/-3.36	8.00	pCi/L			ST2	07/31/23	1311	2466772	3
<i>9310,Alpha/Beta Activity, liquid "As Received"</i>														
Alpha	U	-0.977	+/-3.01	7.11	+/-3.01	15.0	pCi/L			JXK3	07/31/23	1522	2466763	4
Beta		33.1	+/-7.99	9.33	+/-9.73	50.0	pCi/L							
<b>Rad Liquid Scintillation Analysis</b>														
<i>906.0 Mod, Tritium Dist, Liquid "As Received"</i>														
Tritium	U	106	+/-140	237	+/-141	300	pCi/L			GS3	07/29/23	2141	2467189	5
<i>Tc-02-RC-MOD, Tc99, Liquid "As Received"</i>														
Technetium-99		37.8	+/-12.4	18.4	+/-13.1	25.0	pCi/L			AG2	08/06/23	1735	2467172	6

**The following Analytical Methods were performed**

Method	Description
1	Eichrom Industries, AN-1418
2	DOE EML HASL-300, Th-01-RC Modified
3	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified
4	EPA 900.0/SW846 9310
5	EPA 906.0 Modified
6	DOE EML HASL-300, Tc-02-RC Modified

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Barium-133 Tracer	AlphaSpec Ra226, Liquid "As Received"	2466776	84.9	(30%-110%)
Thorium-229 Tracer	Th-01-RC M, Th Isotopes, Liquid "As Received"	2466784	96.9	(30%-110%)
Strontium Carrier	905.0 Mod, Sr90, liquid "As Received"	2466772	82.4	(30%-110%)
Technetium-99m Tracer	Tc-02-RC-MOD, Tc99, Liquid "As Received"	2467172	95.5	(30%-110%)

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Kevil, Kentucky 42053

Report Date: November 2, 2023

Contact: Ms. Jaime Morrow

Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW385SG4-23

Project: FRNP00511

Sample ID: 630883003

Client ID: FRNP005

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Surrogate/Tracer	Recovery	Test						Batch ID	Recovery%	Acceptable Limits				

### Notes:

The MDC is a sample specific MDC.

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

### Column headers are defined as follows:

DF: Dilution Factor

Mtd.: Method

DL: Detection Limit

PF: Prep Factor

Lc/LC: Critical Level

RL: Reporting Limit

MDA: Minimum Detectable Activity

TPU: Total Propagated Uncertainty

MDC: Minimum Detectable Concentration

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## Certificate of Analysis

Company : Four Rivers Nuclear Partnership,  
Address : LLC  
5600 Hobbs Road

Kevil, Kentucky 42053

Report Date: November 2, 2023

Contact: Ms. Jaime Morrow

Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW386SG4-23

Project: FRNP00511

Sample ID: 630883005

Client ID: FRNP005

Matrix: WG

Collect Date: 26-JUL-23

Receive Date: 27-JUL-23

Collector: Client

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Alpha Spec Analysis</b>														
<i>AlphaSpec Ra226, Liquid "As Received"</i>														
Radium-226	U	0.213	+/-0.320	0.497	+/-0.320	5.00	pCi/L			EJ1	08/05/23	1013	2466776	1
<i>Th-01-RC M, Th Isotopes, Liquid "As Received"</i>														
Thorium-230	U	1.53	+/-1.98	2.91	+/-2.00	50.0	pCi/L			EJ1	07/31/23	1316	2466784	2
<b>Rad Gas Flow Proportional Counting</b>														
<i>905.0 Mod, Sr90, liquid "As Received"</i>														
Strontium-90	U	0.428	+/-3.57	6.73	+/-3.57	8.00	pCi/L			ST2	07/31/23	1312	2466772	3
<i>9310,Alpha/Beta Activity, liquid "As Received"</i>														
Alpha	U	1.14	+/-2.70	5.37	+/-2.70	15.0	pCi/L			JXK3	07/31/23	1522	2466763	4
Beta	U	-0.834	+/-3.80	7.47	+/-3.80	50.0	pCi/L							
<b>Rad Liquid Scintillation Analysis</b>														
<i>906.0 Mod, Tritium Dist, Liquid "As Received"</i>														
Tritium	U	-55.3	+/-128	236	+/-128	300	pCi/L			GS3	07/29/23	2217	2467189	5
<i>Tc-02-RC-MOD, Tc99, Liquid "As Received"</i>														
Technetium-99	U	4.62	+/-10.7	18.5	+/-10.7	25.0	pCi/L			AG2	08/06/23	1752	2467172	6

**The following Analytical Methods were performed**

Method	Description
1	Eichrom Industries, AN-1418
2	DOE EML HASL-300, Th-01-RC Modified
3	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified
4	EPA 900.0/SW846 9310
5	EPA 906.0 Modified
6	DOE EML HASL-300, Tc-02-RC Modified

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Barium-133 Tracer	AlphaSpec Ra226, Liquid "As Received"	2466776	93.1	(30%-110%)
Thorium-229 Tracer	Th-01-RC M, Th Isotopes, Liquid "As Received"	2466784	93.1	(30%-110%)
Strontium Carrier	905.0 Mod, Sr90, liquid "As Received"	2466772	70.6	(30%-110%)
Technetium-99m Tracer	Tc-02-RC-MOD, Tc99, Liquid "As Received"	2467172	95.7	(30%-110%)

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Kevil, Kentucky 42053

Report Date: November 2, 2023

Contact: Ms. Jaime Morrow

Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW386SG4-23

Project: FRNP00511

Sample ID: 630883005

Client ID: FRNP005

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Surrogate/Tracer	Recovery	Test						Batch ID	Recovery%	Acceptable Limits				

### Notes:

The MDC is a sample specific MDC.

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

### Column headers are defined as follows:

DF: Dilution Factor

Mtd.: Method

DL: Detection Limit

PF: Prep Factor

Lc/LC: Critical Level

RL: Reporting Limit

MDA: Minimum Detectable Activity

TPU: Total Propagated Uncertainty

MDC: Minimum Detectable Concentration

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## Certificate of Analysis

Company : Four Rivers Nuclear Partnership,  
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Kevil, Kentucky 42053

Report Date: November 2, 2023

Contact: Ms. Jaime Morrow

Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW387SG4-23

Project: FRNP00511

Sample ID: 630883007

Client ID: FRNP005

Matrix: WG

Collect Date: 26-JUL-23

Receive Date: 27-JUL-23

Collector: Client

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Alpha Spec Analysis</b>														
<i>AlphaSpec Ra226, Liquid "As Received"</i>														
Radium-226	U	0.359	+/-0.385	0.524	+/-0.386	5.00	pCi/L			EJ1	08/05/23	1013	2466776	1
<i>Th-01-RC M, Th Isotopes, Liquid "As Received"</i>														
Thorium-230	U	-0.758	+/-1.06	3.63	+/-1.07	50.0	pCi/L			EJ1	07/31/23	1316	2466784	2
<b>Rad Gas Flow Proportional Counting</b>														
<i>905.0 Mod, Sr90, liquid "As Received"</i>														
Strontium-90	U	3.22	+/-3.72	6.26	+/-3.76	8.00	pCi/L			ST2	07/31/23	1312	2466772	3
<i>9310,Alpha/Beta Activity, liquid "As Received"</i>														
Alpha	U	0.00738	+/-2.28	5.31	+/-2.28	15.0	pCi/L			JXK3	07/31/23	1522	2466763	4
Beta		39.1	+/-7.82	7.76	+/-10.2	50.0	pCi/L							
<b>Rad Liquid Scintillation Analysis</b>														
<i>906.0 Mod, Tritium Dist, Liquid "As Received"</i>														
Tritium	U	18.5	+/-132	233	+/-132	300	pCi/L			GS3	07/29/23	2254	2467189	5
<i>Tc-02-RC-MOD, Tc99, Liquid "As Received"</i>														
Technetium-99		45.8	+/-12.2	17.5	+/-13.3	25.0	pCi/L			AG2	08/06/23	1808	2467172	6

**The following Analytical Methods were performed**

Method	Description
1	Eichrom Industries, AN-1418
2	DOE EML HASL-300, Th-01-RC Modified
3	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified
4	EPA 900.0/SW846 9310
5	EPA 906.0 Modified
6	DOE EML HASL-300, Tc-02-RC Modified

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Barium-133 Tracer	AlphaSpec Ra226, Liquid "As Received"	2466776	90.7	(30%-110%)
Thorium-229 Tracer	Th-01-RC M, Th Isotopes, Liquid "As Received"	2466784	66.1	(30%-110%)
Strontium Carrier	905.0 Mod, Sr90, liquid "As Received"	2466772	80	(30%-110%)
Technetium-99m Tracer	Tc-02-RC-MOD, Tc99, Liquid "As Received"	2467172	99.9	(30%-110%)



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Report Date: November 2, 2023

Contact: Ms. Jaime Morrow

Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW387SG4-23

Project: FRNP00511

Sample ID: 630883007

Client ID: FRNP005

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Surrogate/Tracer	Recovery	Test						Batch ID	Recovery%	Acceptable Limits				

### Notes:

The MDC is a sample specific MDC.

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

### Column headers are defined as follows:

DF: Dilution Factor

Mtd.: Method

DL: Detection Limit

PF: Prep Factor

Lc/LC: Critical Level

RL: Reporting Limit

MDA: Minimum Detectable Activity

TPU: Total Propagated Uncertainty

MDC: Minimum Detectable Concentration

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## Certificate of Analysis

Company : Four Rivers Nuclear Partnership,  
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5600 Hobbs Road

Kevil, Kentucky 42053

Report Date: November 2, 2023

Contact: Ms. Jaime Morrow

Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW388SG4-23

Project: FRNP00511

Sample ID: 630883009

Client ID: FRNP005

Matrix: WG

Collect Date: 26-JUL-23

Receive Date: 27-JUL-23

Collector: Client

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Alpha Spec Analysis</b>														
<i>AlphaSpec Ra226, Liquid "As Received"</i>														
Radium-226	U	0.277	+/-0.483	0.724	+/-0.483	5.00	pCi/L			EJ1	08/08/23	0856	2466776	1
<i>Th-01-RC M, Th Isotopes, Liquid "As Received"</i>														
Thorium-230	U	0.129	+/-1.52	3.23	+/-1.52	50.0	pCi/L			EJ1	07/31/23	1316	2466784	2
<b>Rad Gas Flow Proportional Counting</b>														
<i>905.0 Mod, Sr90, liquid "As Received"</i>														
Strontium-90	U	4.84	+/-4.27	6.91	+/-4.34	8.00	pCi/L			ST2	07/31/23	1312	2466772	3
<i>9310,Alpha/Beta Activity, liquid "As Received"</i>														
Alpha	U	-0.239	+/-2.30	5.61	+/-2.30	15.0	pCi/L			JXK3	07/31/23	1522	2466763	4
Beta		18.6	+/-7.06	9.81	+/-7.70	50.0	pCi/L							
<b>Rad Liquid Scintillation Analysis</b>														
<i>906.0 Mod, Tritium Dist, Liquid "As Received"</i>														
Tritium	U	31.6	+/-134	236	+/-134	300	pCi/L			GS3	07/29/23	2331	2467189	5
<i>Tc-02-RC-MOD, Tc99, Liquid "As Received"</i>														
Technetium-99	U	16.4	+/-11.3	18.4	+/-11.4	25.0	pCi/L			AG2	08/06/23	1825	2467172	6

**The following Analytical Methods were performed**

Method	Description
1	Eichrom Industries, AN-1418
2	DOE EML HASL-300, Th-01-RC Modified
3	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified
4	EPA 900.0/SW846 9310
5	EPA 906.0 Modified
6	DOE EML HASL-300, Tc-02-RC Modified

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Barium-133 Tracer	AlphaSpec Ra226, Liquid "As Received"	2466776	95.8	(30%-110%)
Thorium-229 Tracer	Th-01-RC M, Th Isotopes, Liquid "As Received"	2466784	82.8	(30%-110%)
Strontium Carrier	905.0 Mod, Sr90, liquid "As Received"	2466772	75.3	(30%-110%)
Technetium-99m Tracer	Tc-02-RC-MOD, Tc99, Liquid "As Received"	2467172	95.8	(30%-110%)

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## Certificate of Analysis

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Kevil, Kentucky 42053

Report Date: November 2, 2023

Contact: Ms. Jaime Morrow

Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW388SG4-23

Project: FRNP00511

Sample ID: 630883009

Client ID: FRNP005

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Surrogate/Tracer	Recovery	Test						Batch ID	Recovery%	Acceptable Limits				

### Notes:

The MDC is a sample specific MDC.

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

### Column headers are defined as follows:

DF: Dilution Factor

Mtd.: Method

DL: Detection Limit

PF: Prep Factor

Lc/LC: Critical Level

RL: Reporting Limit

MDA: Minimum Detectable Activity

TPU: Total Propagated Uncertainty

MDC: Minimum Detectable Concentration

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## Certificate of Analysis

Company : Four Rivers Nuclear Partnership,  
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Kevil, Kentucky 42053

Report Date: November 2, 2023

Contact: Ms. Jaime Morrow

Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW390SG4-23

Project: FRNP00511

Sample ID: 630883011

Client ID: FRNP005

Matrix: WG

Collect Date: 26-JUL-23

Receive Date: 27-JUL-23

Collector: Client

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Alpha Spec Analysis</b>														
<i>AlphaSpec Ra226, Liquid "As Received"</i>														
Radium-226	U	0.275	+/-0.326	0.477	+/-0.327	5.00	pCi/L			EJ1	08/05/23	1014	2466776	1
<i>Th-01-RC M, Th Isotopes, Liquid "As Received"</i>														
Thorium-230	U	-0.463	+/-0.985	2.79	+/-0.986	50.0	pCi/L			EJ1	07/31/23	1316	2466784	2
<b>Rad Gas Flow Proportional Counting</b>														
<i>905.0 Mod, Sr90, liquid "As Received"</i>														
Strontium-90	U	3.54	+/-3.49	5.73	+/-3.53	8.00	pCi/L			ST2	07/31/23	1312	2466772	3
<i>9310,Alpha/Beta Activity, liquid "As Received"</i>														
Alpha	U	3.83	+/-3.73	5.34	+/-3.80	15.0	pCi/L			JXK3	07/31/23	1522	2466763	4
Beta		45.5	+/-8.37	7.86	+/-11.3	50.0	pCi/L							
<b>Rad Liquid Scintillation Analysis</b>														
<i>906.0 Mod, Tritium Dist, Liquid "As Received"</i>														
Tritium	U	35.7	+/-133	234	+/-134	300	pCi/L			GS3	07/30/23	0008	2467189	5
<i>Tc-02-RC-MOD, Tc99, Liquid "As Received"</i>														
Technetium-99		49.0	+/-12.7	18.1	+/-13.9	25.0	pCi/L			AG2	08/06/23	1841	2467172	6

**The following Analytical Methods were performed**

Method	Description
1	Eichrom Industries, AN-1418
2	DOE EML HASL-300, Th-01-RC Modified
3	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified
4	EPA 900.0/SW846 9310
5	EPA 906.0 Modified
6	DOE EML HASL-300, Tc-02-RC Modified

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Barium-133 Tracer	AlphaSpec Ra226, Liquid "As Received"	2466776	93.8	(30%-110%)
Thorium-229 Tracer	Th-01-RC M, Th Isotopes, Liquid "As Received"	2466784	101	(30%-110%)
Strontium Carrier	905.0 Mod, Sr90, liquid "As Received"	2466772	84.7	(30%-110%)
Technetium-99m Tracer	Tc-02-RC-MOD, Tc99, Liquid "As Received"	2467172	97.1	(30%-110%)

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## Certificate of Analysis

Company : Four Rivers Nuclear Partnership,  
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5600 Hobbs Road

Kevil, Kentucky 42053

Report Date: November 2, 2023

Contact: Ms. Jaime Morrow

Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW390SG4-23

Project: FRNP00511

Sample ID: 630883011

Client ID: FRNP005

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Surrogate/Tracer	Recovery	Test						Batch ID	Recovery%	Acceptable Limits				

### Notes:

The MDC is a sample specific MDC.

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

### Column headers are defined as follows:

DF: Dilution Factor

Mtd.: Method

DL: Detection Limit

PF: Prep Factor

Lc/LC: Critical Level

RL: Reporting Limit

MDA: Minimum Detectable Activity

TPU: Total Propagated Uncertainty

MDC: Minimum Detectable Concentration

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**ATTACHMENT C3**

**GEL LABORATORIES CERTIFICATE OF ANALYSIS**

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# GEL LABORATORIES LLC

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
 Address : 5600 Hobbs Road  
  
 Kevil, Kentucky 42053  
 Contact: Ms. Jaime Morrow  
 Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW391SG4-23	Project: FRNP00511
Sample ID: 631127001	Client ID: FRNP005
Matrix: WG	
Collect Date: 27-JUL-23 10:57	
Receive Date: 28-JUL-23	
Collector: Client	

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>504.1/8011 Analysis of EDB/DBCP</b>												
<b>8011, VOA Compounds Liquid "As Received"</b>												
1,2-Dibromo-3-chloropropane	U	0.0191	0.00859	0.0191	ug/L	0.954	1	LOF	08/03/23	1722	2468092	1
<b>Carbon Analysis</b>												
<b>9060A, Total Organic Carbon "As Received"</b>												
Total Organic Carbon Average	J	0.823	0.330	2.00	mg/L		1	RM3	08/01/23	0051	2468684	2
<b>Flow Injection Analysis</b>												
<b>9012B, Total Cyanide "As Received"</b>												
Cyanide, Total	U	0.200	0.00167	0.200	mg/L	1.00	1	AXH3	08/01/23	1447	2468244	3
<b>Halogen Analysis</b>												
<b>9020B, TOX (Organic Halogen) "As Received"</b>												
Total Organic Halogens	J	6.26	3.33	10.0	ug/L		1	RM3	08/08/23	1947	2472705	4
<b>Ion Chromatography</b>												
<b>300.0, Iodide in Liquid "As Received"</b>												
Iodide	U	0.500	0.167	0.500	mg/L		1	LXA2	08/04/23	1807	2468036	5
<b>SW846 9056A Anions (5) "As Received"</b>												
Chloride	J	42.5	0.670	250	mg/L		10	JLD1	07/28/23	1839	2467686	6
Bromide	W	0.601	0.0670	0.200	mg/L		1	JLD1	07/28/23	1145	2467686	7
Fluoride	J	0.148	0.0330	4.00	mg/L		1					
Nitrate-N	J	1.10	0.0330	10.0	mg/L		1					
Sulfate		12.9	0.133	0.400	mg/L		1					
<b>Mercury Analysis-CVAA</b>												
<b>7470, Mercury Liquid "As Received"</b>												
Mercury	U	0.000200	0.0000670	0.000200	mg/L	1.00	1	JP2	08/01/23	1326	2468385	8
<b>Metals Analysis-ICP-MS</b>												
<b>6020, Metals (15+) "As Received"</b>												
Aluminum	U	0.0500	0.0193	0.0500	mg/L	1.00	1	PRB	08/10/23	2154	2468541	9
Arsenic	U	0.00500	0.00200	0.00500	mg/L	1.00	1					
Barium		0.228	0.000670	0.00400	mg/L	1.00	1					
Beryllium	U	0.000500	0.000200	0.000500	mg/L	1.00	1					
Boron		0.0270	0.00520	0.0150	mg/L	1.00	1					
Cadmium	U	0.00100	0.000300	0.00100	mg/L	1.00	1					
Calcium		25.2	0.0800	0.200	mg/L	1.00	1					
Chromium	U	0.0100	0.00300	0.0100	mg/L	1.00	1					
Cobalt	U	0.00100	0.000300	0.00100	mg/L	1.00	1					

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road

Kevil, Kentucky 42053

Contact: Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW391SG4-23  
Sample ID: 631127001

Project: FRNP00511  
Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Metals Analysis-ICP-MS</b>												
<b>6020, Metals (15+) "As Received"</b>												
Copper	J	0.00115	0.000300	0.00200	mg/L	1.00	1					
Iron	J	0.0631	0.0330	0.100	mg/L	1.00	1					
Lead	U	0.00200	0.000500	0.00200	mg/L	1.00	1					
Manganese	J	0.00141	0.00100	0.00500	mg/L	1.00	1					
Molybdenum	U	0.00100	0.000200	0.00100	mg/L	1.00	1					
Nickel	U	0.00200	0.000600	0.00200	mg/L	1.00	1					
Potassium		1.48	0.0800	0.300	mg/L	1.00	1					
Selenium	U	0.00500	0.00150	0.00500	mg/L	1.00	1					
Silver	U	0.00100	0.000300	0.00100	mg/L	1.00	1					
Sodium		30.4	0.0800	0.250	mg/L	1.00	1					
Thallium	U	0.00200	0.000600	0.00200	mg/L	1.00	1					
Uranium	U	0.000200	0.0000670	0.000200	mg/L	1.00	1					
Vanadium	U	0.0200	0.00330	0.0200	mg/L	1.00	1					
Zinc	U	0.0200	0.00330	0.0200	mg/L	1.00	1					
Rhodium	U	0.00500	0.00160	0.00500	mg/L	1.00	1	PRB	08/11/23	0123	2468541	10
Tantalum	U	0.00500	0.00100	0.00500	mg/L	1.00	1					
Antimony	U	0.00300	0.00100	0.00300	mg/L	1.00	1	PRB	08/11/23	0255	2468541	11
Magnesium		10.1	0.0100	0.0300	mg/L	1.00	1					
<b>Solids Analysis</b>												
<b>160.1, Dissolved Solids "As Received"</b>												
Total Dissolved Solids		188	2.38	10.0	mg/L			CH6	08/02/23	1337	2469708	12
<b>Spectrometric Analysis</b>												
<b>410.4, Chem. Oxygen Demand "As Received"</b>												
COD	U	20.0	8.95	20.0	mg/L		1	HH2	07/31/23	1530	2468429	13
<b>Volatile Organics</b>												
<b>8260D, Volatiles- full suite "As Received"</b>												
1,1,1,2-Tetrachloroethane	U	1.00	0.333	1.00	ug/L		1	KP2	08/01/23	1214	2468743	14
1,1,1-Trichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1,2,2-Tetrachloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1,2-Trichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1-Dichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1					
1,2,3-Trichloropropane	U	1.00	0.333	1.00	ug/L		1					
1,2-Dibromoethane	U	1.00	0.333	1.00	ug/L		1					

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road

Kevil, Kentucky 42053

Contact: Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW391SG4-23  
Sample ID: 631127001

Project: FRNP00511  
Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time Batch	Method
Volatile Organics											
8260D, Volatiles- full suite "As Received"											
1,2-Dichlorobenzene	U	1.00	0.333	1.00	ug/L		1				
1,2-Dichloroethane	U	1.00	0.333	1.00	ug/L		1				
1,2-Dichloropropane	U	1.00	0.333	1.00	ug/L		1				
1,4-Dichlorobenzene	U	1.00	0.333	1.00	ug/L		1				
2-Butanone	U	5.00	1.67	5.00	ug/L		1				
2-Hexanone	U	5.00	1.67	5.00	ug/L		1				
4-Methyl-2-pentanone	U	5.00	1.67	5.00	ug/L		1				
Acetone	U	5.00	1.74	5.00	ug/L		1				
Acrolein	U	5.00	1.67	5.00	ug/L		1				
Acrylonitrile	U	5.00	1.67	5.00	ug/L		1				
Benzene	U	1.00	0.333	1.00	ug/L		1				
Bromochloromethane	U	1.00	0.333	1.00	ug/L		1				
Bromodichloromethane	U	1.00	0.333	1.00	ug/L		1				
Bromoform	U	1.00	0.333	1.00	ug/L		1				
Bromomethane	UL	1.00	0.337	1.00	ug/L		1				
Carbon disulfide	U	5.00	1.67	5.00	ug/L		1				
Carbon tetrachloride	U	1.00	0.333	1.00	ug/L		1				
Chlorobenzene	U	1.00	0.333	1.00	ug/L		1				
Chloroethane	UL	1.00	0.333	1.00	ug/L		1				
Chloroform	U	1.00	0.333	1.00	ug/L		1				
Chloromethane	LY1U	1.00	0.333	1.00	ug/L		1				
Dibromochloromethane	U	1.00	0.333	1.00	ug/L		1				
Dibromomethane	U	1.00	0.333	1.00	ug/L		1				
Ethylbenzene	U	1.00	0.333	1.00	ug/L		1				
Iodomethane	U	5.00	1.67	5.00	ug/L		1				
Methylene chloride	J	0.610	0.500	5.00	ug/L		1				
Styrene	U	1.00	0.333	1.00	ug/L		1				
Tetrachloroethylene	U	1.00	0.333	1.00	ug/L		1				
Toluene	U	1.00	0.333	1.00	ug/L		1				
Trichloroethylene		2.69	0.333	1.00	ug/L		1				
Trichlorofluoromethane	U	1.00	0.333	1.00	ug/L		1				
Vinyl acetate	U	5.00	1.67	5.00	ug/L		1				
Vinyl chloride	LU	1.00	0.333	1.00	ug/L		1				
Xylenes (total)	U	3.00	1.00	3.00	ug/L		1				
cis-1,2-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1				
cis-1,3-Dichloropropylene	U	1.00	0.333	1.00	ug/L		1				

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## *Certificate of Analysis*

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
 Address : 5600 Hobbs Road  
  
 Kevil, Kentucky 42053  
 Contact: Ms. Jaime Morrow  
 Project: C-746-S&T Landfill Quarterly(SG23-04)

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Client Sample ID: MW391SG4-23	Project: FRNP00511
Sample ID: 631127001	Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Volatile Organics</b>												
8260D, Volatiles- full suite "As Received"												
trans-1,2-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1					
trans-1,3-Dichloropropylene	U	1.00	0.333	1.00	ug/L		1					
trans-1,4-Dichloro-2-butene	U	5.00	1.67	5.00	ug/L		1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 8011 PREP	8011 Prep	LOF	08/03/23	1335	2468090
SW846 3005A	ICP-MS 3005A PREP	JD2	08/02/23	0745	2468540
SW846 7470A Prep	EPA 7470A Mercury Prep Liquid	AXS5	07/31/23	1226	2468384
SW846 9010C Distillation	SW846 9010C Prep	ES2	08/01/23	1001	2468243

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 8011	
2	SW846 9060A	
3	SW846 9012B	
4	SW846 9020B	
5	EPA 300.0	
6	SW846 9056A	
7	SW846 9056A	
8	SW846 7470A	
9	SW846 3005A/6020B	
10	SW846 3005A/6020B	
11	SW846 3005A/6020B	
12	EPA 160.1	
13	EPA 410.4	
14	SW846 8260D	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
1-Chloro-2-fluorobenzene	8011, VOA Compounds Liquid "As Received"	9.76 ug/L	6.82	143	(46%-159%)
Bromofluorobenzene	8260D, Volatiles- full suite "As Received"	45.4 ug/L	50.0	91	(72%-125%)
1,2-Dichloroethane-d4	8260D, Volatiles- full suite "As Received"	49.8 ug/L	50.0	100	(73%-129%)
Toluene-d8	8260D, Volatiles- full suite "As Received"	49.9 ug/L	50.0	100	(75%-123%)

**Notes:**

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## Certificate of Analysis

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Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road  
Kevil, Kentucky 42053  
Contact: Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

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Client Sample ID:	MW391SG4-23	Project:	FRNP00511
Sample ID:	631127001	Client ID:	FRNP005

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Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time Batch	Method
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Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road

Kevil, Kentucky 42053

Contact: Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW391SG4-23      Project: FRNP00511  
Sample ID: 631127002      Client ID: FRNP005  
Matrix: WG  
Collect Date: 27-JUL-23 10:57  
Receive Date: 28-JUL-23  
Collector: Client

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Metals Analysis-ICP-MS												
6020, Dissolved Metals (3 Elements) "As Received"												
Barium		0.223	0.000670	0.00400	mg/L	1.00	1	PRB	08/10/23	2157	2468541	1
Chromium	U	0.0100	0.00300	0.0100	mg/L	1.00	1					
Uranium	U	0.000200	0.0000670	0.000200	mg/L	1.00	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3005A	ICP-MS 3005A PREP	JD2	08/02/23	0745	2468540
EPA 160	Laboratory Filtration	RXB5	07/31/23	1055	2468406

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 3005A/6020B	

### Notes:

Column headers are defined as follows:

DF: Dilution Factor      Lc/LC: Critical Level  
DL: Detection Limit      PF: Prep Factor  
MDA: Minimum Detectable Activity      RL: Reporting Limit  
MDC: Minimum Detectable Concentration      SQL: Sample Quantitation Limit

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road  
Kevil, Kentucky 42053  
Contact: Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW392SG4-23 Project: FRNP00511  
Sample ID: 631127003 Client ID: FRNP005  
Matrix: WG  
Collect Date: 27-JUL-23 12:20  
Receive Date: 28-JUL-23  
Collector: Client

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
504.1/8011 Analysis of EDB/DBCP												
8011, VOA Compounds Liquid "As Received"												
1,2-Dibromo-3-chloropropane	U	0.0189	0.00849	0.0189	ug/L	0.944	1	LOF	08/03/23	1747	2468092	1
Carbon Analysis												
9060A, Total Organic Carbon "As Received"												
Total Organic Carbon Average	J	0.741	0.330	2.00	mg/L		1	RM3	08/01/23	0132	2468684	2
Flow Injection Analysis												
9012B, Total Cyanide "As Received"												
Cyanide, Total	U	0.200	0.00167	0.200	mg/L	1.00	1	AXH3	08/01/23	1448	2468244	3
Halogen Analysis												
9020B, TOX (Organic Halogen) "As Received"												
Total Organic Halogens	J	3.68	3.33	10.0	ug/L		1	RM3	08/14/23	1412	2476025	4
Ion Chromatography												
300.0, Iodide in Liquid "As Received"												
Iodide	U	0.500	0.167	0.500	mg/L		1	LXA2	08/04/23	1820	2468036	5
SW846 9056A Anions (5) "As Received"												
Bromide	W	0.700	0.0670	0.200	mg/L		1	JLD1	07/28/23	1217	2467686	6
Fluoride	J	0.218	0.0330	4.00	mg/L		1					
Nitrate-N	J	0.634	0.0330	10.0	mg/L		1					
Sulfate		8.31	0.133	0.400	mg/L		1					
Chloride	J	45.0	0.670	250	mg/L		10	JLD1	07/28/23	1911	2467686	7
Mercury Analysis-CVAA												
7470, Mercury Liquid "As Received"												
Mercury	U	0.000200	0.0000670	0.000200	mg/L	1.00	1	JP2	08/01/23	1328	2468385	8
Metals Analysis-ICP-MS												
6020, Metals (15+) "As Received"												
Aluminum		0.0603	0.0193	0.0500	mg/L	1.00	1	PRB	08/10/23	2201	2468541	9
Arsenic	U	0.00500	0.00200	0.00500	mg/L	1.00	1					
Barium		0.290	0.000670	0.00400	mg/L	1.00	1					
Beryllium	U	0.000500	0.000200	0.000500	mg/L	1.00	1					
Boron		0.0232	0.00520	0.0150	mg/L	1.00	1					
Cadmium	U	0.00100	0.000300	0.00100	mg/L	1.00	1					
Calcium		23.8	0.0800	0.200	mg/L	1.00	1					
Chromium	U	0.0100	0.00300	0.0100	mg/L	1.00	1					
Cobalt	U	0.00100	0.000300	0.00100	mg/L	1.00	1					

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road

Kevil, Kentucky 42053

Contact: Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW392SG4-23  
Sample ID: 631127003

Project: FRNP00511  
Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Metals Analysis-ICP-MS</b>												
<b>6020, Metals (15+) "As Received"</b>												
Copper	J	0.00131	0.000300	0.00200	mg/L	1.00	1					
Iron	J	0.0921	0.0330	0.100	mg/L	1.00	1					
Lead	U	0.00200	0.000500	0.00200	mg/L	1.00	1					
Manganese		0.134	0.00100	0.00500	mg/L	1.00	1					
Molybdenum	U	0.00100	0.000200	0.00100	mg/L	1.00	1					
Nickel	J	0.00140	0.000600	0.00200	mg/L	1.00	1					
Potassium		1.99	0.0800	0.300	mg/L	1.00	1					
Selenium	U	0.00500	0.00150	0.00500	mg/L	1.00	1					
Silver	U	0.00100	0.000300	0.00100	mg/L	1.00	1					
Sodium		23.8	0.0800	0.250	mg/L	1.00	1					
Thallium	U	0.00200	0.000600	0.00200	mg/L	1.00	1					
Uranium	U	0.000200	0.0000670	0.000200	mg/L	1.00	1					
Vanadium	U	0.0200	0.00330	0.0200	mg/L	1.00	1					
Zinc	J	0.00428	0.00330	0.0200	mg/L	1.00	1					
Antimony	U	0.00300	0.00100	0.00300	mg/L	1.00	1	PRB	08/11/23	0303	2468541	10
Magnesium		9.47	0.0100	0.0300	mg/L	1.00	1					
Rhodium	U	0.00500	0.00160	0.00500	mg/L	1.00	1	PRB	08/11/23	0125	2468541	11
Tantalum	U	0.00500	0.00100	0.00500	mg/L	1.00	1					
<b>Solids Analysis</b>												
<b>160.1, Dissolved Solids "As Received"</b>												
Total Dissolved Solids		178	2.38	10.0	mg/L			CH6	08/02/23	1337	2469708	12
<b>Spectrometric Analysis</b>												
<b>410.4, Chem. Oxygen Demand "As Received"</b>												
COD	U	20.0	8.95	20.0	mg/L		1	HH2	07/31/23	1530	2468429	13
<b>Volatile Organics</b>												
<b>8260D, Volatiles- full suite "As Received"</b>												
1,1,1,2-Tetrachloroethane	U	1.00	0.333	1.00	ug/L		1	KP2	08/01/23	1238	2468743	14
1,1,1-Trichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1,2,2-Tetrachloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1,2-Trichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1-Dichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1					
1,2,3-Trichloropropane	U	1.00	0.333	1.00	ug/L		1					
1,2-Dibromoethane	U	1.00	0.333	1.00	ug/L		1					





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## Certificate of Analysis

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Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road

Contact: Kevil, Kentucky 42053  
Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW392SG4-23  
Sample ID: 631127003

Project: FRNP00511  
Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Volatile Organics												
8260D, Volatiles- full suite "As Received"												
trans-1,2-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1					
trans-1,3-Dichloropropylene	U	1.00	0.333	1.00	ug/L		1					
trans-1,4-Dichloro-2-butene	U	5.00	1.67	5.00	ug/L		1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 7470A Prep	EPA 7470A Mercury Prep Liquid	AXS5	07/31/23	1226	2468384
SW846 9010C Distillation	SW846 9010C Prep	ES2	08/01/23	1001	2468243
SW846 8011 PREP	8011 Prep	LOF	08/03/23	1335	2468090
SW846 3005A	ICP-MS 3005A PREP	JD2	08/02/23	0745	2468540

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 8011	
2	SW846 9060A	
3	SW846 9012B	
4	SW846 9020B	
5	EPA 300.0	
6	SW846 9056A	
7	SW846 9056A	
8	SW846 7470A	
9	SW846 3005A/6020B	
10	SW846 3005A/6020B	
11	SW846 3005A/6020B	
12	EPA 160.1	
13	EPA 410.4	
14	SW846 8260D	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
1-Chloro-2-fluorobenzene	8011, VOA Compounds Liquid "As Received"	7.45 ug/L	6.74	111	(46%-159%)
Bromofluorobenzene	8260D, Volatiles- full suite "As Received"	44.4 ug/L	50.0	89	(72%-125%)
1,2-Dichloroethane-d4	8260D, Volatiles- full suite "As Received"	48.6 ug/L	50.0	97	(73%-129%)
Toluene-d8	8260D, Volatiles- full suite "As Received"	49.0 ug/L	50.0	98	(75%-123%)

Notes:

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road  
Kevil, Kentucky 42053  
Contact: Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

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Client Sample ID:	MW392SG4-23	Project:	FRNP00511
Sample ID:	631127003	Client ID:	FRNP005

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Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
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Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road

Kevil, Kentucky 42053

Contact: Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

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Client Sample ID:	MW392SG4-23	Project:	FRNP00511
Sample ID:	631127004	Client ID:	FRNP005
Matrix:	WG		
Collect Date:	27-JUL-23 12:20		
Receive Date:	28-JUL-23		
Collector:	Client		

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Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Metals Analysis-ICP-MS												
6020, Dissolved Metals (3 Elements) "As Received"												
Barium		0.293	0.000670	0.00400	mg/L	1.00	1	PRB	08/10/23	2226	2468541	1
Chromium	U	0.0100	0.00300	0.0100	mg/L	1.00	1					
Uranium	U	0.000200	0.0000670	0.000200	mg/L	1.00	1					

The following Prep Methods were performed:

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Method	Description	Analyst	Date	Time	Prep Batch
EPA 160	Laboratory Filtration	RXB5	07/31/23	1055	2468406
SW846 3005A	ICP-MS 3005A PREP	JD2	08/02/23	0745	2468540

The following Analytical Methods were performed:

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Method	Description	Analyst Comments
1	SW846 3005A/6020B	

### Notes:

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road

Kevil, Kentucky 42053

Contact: Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW393SG4-23 Project: FRNP00511  
Sample ID: 631127005 Client ID: FRNP005  
Matrix: WG  
Collect Date: 27-JUL-23 13:17  
Receive Date: 28-JUL-23  
Collector: Client

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
504.1/8011 Analysis of EDB/DBCP												
8011, VOA Compounds Liquid "As Received"												
1,2-Dibromo-3-chloropropane	U	0.0187	0.00842	0.0187	ug/L	0.936	1	LOF	08/03/23	1950	2468092	1
Carbon Analysis												
9060A, Total Organic Carbon "As Received"												
Total Organic Carbon Average		2.29	0.330	2.00	mg/L		1	RM3	08/01/23	0331	2468684	2
Flow Injection Analysis												
9012B, Total Cyanide "As Received"												
Cyanide, Total	U	0.200	0.00167	0.200	mg/L	1.00	1	AXH3	08/01/23	1453	2468244	3
Halogen Analysis												
9020B, TOX (Organic Halogen) "As Received"												
Total Organic Halogens		14.4	3.33	10.0	ug/L		1	RM3	08/08/23	2045	2472705	4
Ion Chromatography												
300.0, Iodide in Liquid "As Received"												
Iodide	U	0.500	0.167	0.500	mg/L		1	LXA2	08/04/23	1858	2468036	5
SW846 9056A Anions (5) "As Received"												
Bromide	JW	0.131	0.0670	0.200	mg/L		1	JLD1	07/28/23	1249	2467686	6
Fluoride	J	0.205	0.0330	4.00	mg/L		1					
Nitrate-N	J	0.121	0.0330	10.0	mg/L		1					
Chloride	J	9.23	0.335	250	mg/L		5	JLD1	07/28/23	2047	2467686	7
Sulfate		21.7	0.665	2.00	mg/L		5					
Mercury Analysis-CVAA												
7470, Mercury Liquid "As Received"												
Mercury	U	0.000200	0.0000670	0.000200	mg/L	1.00	1	JP2	08/01/23	1336	2468385	8
Metals Analysis-ICP-MS												
6020, Metals (15+) "As Received"												
Antimony	U	0.00300	0.00100	0.00300	mg/L	1.00	1	PRB	08/11/23	0346	2468541	9
Magnesium		3.91	0.0100	0.0300	mg/L	1.00	1					
Sodium		83.6	0.800	2.50	mg/L	1.00	10	PRB	08/11/23	0750	2468541	10
Rhodium	U	0.00500	0.00160	0.00500	mg/L	1.00	1	PRB	08/11/23	0139	2468541	11
Tantalum	U	0.00500	0.00100	0.00500	mg/L	1.00	1					
Aluminum	U	0.0500	0.0193	0.0500	mg/L	1.00	1	PRB	08/10/23	2244	2468541	12
Arsenic	J	0.00383	0.00200	0.00500	mg/L	1.00	1					
Barium		0.0719	0.000670	0.00400	mg/L	1.00	1					
Beryllium	U	0.000500	0.000200	0.000500	mg/L	1.00	1					

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road

Kevil, Kentucky 42053

Contact: Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW393SG4-23  
Sample ID: 631127005

Project: FRNP00511  
Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Metals Analysis-ICP-MS</b>												
<b>6020, Metals (15+) "As Received"</b>												
Boron		0.0176	0.00520	0.0150	mg/L	1.00	1					
Cadmium	U	0.00100	0.000300	0.00100	mg/L	1.00	1					
Calcium		15.8	0.0800	0.200	mg/L	1.00	1					
Chromium	U	0.0100	0.00300	0.0100	mg/L	1.00	1					
Cobalt	U	0.00100	0.000300	0.00100	mg/L	1.00	1					
Copper	J	0.00103	0.000300	0.00200	mg/L	1.00	1					
Iron		0.394	0.0330	0.100	mg/L	1.00	1					
Lead	U	0.00200	0.000500	0.00200	mg/L	1.00	1					
Manganese		0.0108	0.00100	0.00500	mg/L	1.00	1					
Molybdenum	J	0.000320	0.000200	0.00100	mg/L	1.00	1					
Nickel	U	0.00200	0.000600	0.00200	mg/L	1.00	1					
Potassium		0.477	0.0800	0.300	mg/L	1.00	1					
Selenium	U	0.00500	0.00150	0.00500	mg/L	1.00	1					
Silver	U	0.00100	0.000300	0.00100	mg/L	1.00	1					
Thallium	U	0.00200	0.000600	0.00200	mg/L	1.00	1					
Uranium	U	0.000200	0.0000670	0.000200	mg/L	1.00	1					
Vanadium	U	0.0200	0.00330	0.0200	mg/L	1.00	1					
Zinc	U	0.0200	0.00330	0.0200	mg/L	1.00	1					
<b>Solids Analysis</b>												
<b>160.1, Dissolved Solids "As Received"</b>												
Total Dissolved Solids		270	2.38	10.0	mg/L			CH6	08/02/23	1337	2469708	13
<b>Spectrometric Analysis</b>												
<b>410.4, Chem. Oxygen Demand "As Received"</b>												
COD	U	20.0	8.95	20.0	mg/L		1	HH2	07/31/23	1530	2468429	14
<b>Volatile Organics</b>												
<b>8260D, Volatiles- full suite "As Received"</b>												
1,1,1,2-Tetrachloroethane	U	1.00	0.333	1.00	ug/L		1	KP2	08/01/23	1303	2468743	15
1,1,1-Trichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1,2,2-Tetrachloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1,2-Trichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1-Dichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1					
1,2,3-Trichloropropane	U	1.00	0.333	1.00	ug/L		1					
1,2-Dibromoethane	U	1.00	0.333	1.00	ug/L		1					

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road

Kevil, Kentucky 42053

Contact: Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW393SG4-23  
Sample ID: 631127005

Project: FRNP00511  
Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time Batch	Method
Volatile Organics											
8260D, Volatiles- full suite "As Received"											
1,2-Dichlorobenzene	U	1.00	0.333	1.00	ug/L		1				
1,2-Dichloroethane	U	1.00	0.333	1.00	ug/L		1				
1,2-Dichloropropane	U	1.00	0.333	1.00	ug/L		1				
1,4-Dichlorobenzene	U	1.00	0.333	1.00	ug/L		1				
2-Butanone	U	5.00	1.67	5.00	ug/L		1				
2-Hexanone	U	5.00	1.67	5.00	ug/L		1				
4-Methyl-2-pentanone	U	5.00	1.67	5.00	ug/L		1				
Acetone	U	5.00	1.74	5.00	ug/L		1				
Acrolein	U	5.00	1.67	5.00	ug/L		1				
Acrylonitrile	U	5.00	1.67	5.00	ug/L		1				
Benzene	U	1.00	0.333	1.00	ug/L		1				
Bromochloromethane	U	1.00	0.333	1.00	ug/L		1				
Bromodichloromethane	U	1.00	0.333	1.00	ug/L		1				
Bromoform	U	1.00	0.333	1.00	ug/L		1				
Bromomethane	UL	1.00	0.337	1.00	ug/L		1				
Carbon disulfide	U	5.00	1.67	5.00	ug/L		1				
Carbon tetrachloride	U	1.00	0.333	1.00	ug/L		1				
Chlorobenzene	U	1.00	0.333	1.00	ug/L		1				
Chloroethane	UL	1.00	0.333	1.00	ug/L		1				
Chloroform	U	1.00	0.333	1.00	ug/L		1				
Chloromethane	LY1U	1.00	0.333	1.00	ug/L		1				
Dibromochloromethane	U	1.00	0.333	1.00	ug/L		1				
Dibromomethane	U	1.00	0.333	1.00	ug/L		1				
Ethylbenzene	U	1.00	0.333	1.00	ug/L		1				
Iodomethane	U	5.00	1.67	5.00	ug/L		1				
Methylene chloride	J	0.570	0.500	5.00	ug/L		1				
Styrene	U	1.00	0.333	1.00	ug/L		1				
Tetrachloroethylene	U	1.00	0.333	1.00	ug/L		1				
Toluene	U	1.00	0.333	1.00	ug/L		1				
Trichloroethylene	U	1.00	0.333	1.00	ug/L		1				
Trichlorofluoromethane	U	1.00	0.333	1.00	ug/L		1				
Vinyl acetate	U	5.00	1.67	5.00	ug/L		1				
Vinyl chloride	LU	1.00	0.333	1.00	ug/L		1				
Xylenes (total)	U	3.00	1.00	3.00	ug/L		1				
cis-1,2-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1				
cis-1,3-Dichloropropylene	U	1.00	0.333	1.00	ug/L		1				

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
 Address : 5600 Hobbs Road  
  
 Kevil, Kentucky 42053  
 Contact: Ms. Jaime Morrow  
 Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW393SG4-23	Project: FRNP00511
Sample ID: 631127005	Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Volatile Organics												
8260D, Volatiles- full suite "As Received"												
trans-1,2-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1					
trans-1,3-Dichloropropylene	U	1.00	0.333	1.00	ug/L		1					
trans-1,4-Dichloro-2-butene	U	5.00	1.67	5.00	ug/L		1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 8011 PREP	8011 Prep	LOF	08/03/23	1335	2468090
SW846 7470A Prep	EPA 7470A Mercury Prep Liquid	AXS5	07/31/23	1226	2468384
SW846 3005A	ICP-MS 3005A PREP	JD2	08/02/23	0745	2468540
SW846 9010C Distillation	SW846 9010C Prep	ES2	08/01/23	1001	2468243

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 8011	
2	SW846 9060A	
3	SW846 9012B	
4	SW846 9020B	
5	EPA 300.0	
6	SW846 9056A	
7	SW846 9056A	
8	SW846 7470A	
9	SW846 3005A/6020B	
10	SW846 3005A/6020B	
11	SW846 3005A/6020B	
12	SW846 3005A/6020B	
13	EPA 160.1	
14	EPA 410.4	
15	SW846 8260D	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
1-Chloro-2-fluorobenzene	8011, VOA Compounds Liquid "As Received"	6.87 ug/L	6.69	103	(46%-159%)
Bromofluorobenzene	8260D, Volatiles- full suite "As Received"	45.2 ug/L	50.0	90	(72%-125%)
1,2-Dichloroethane-d4	8260D, Volatiles- full suite "As Received"	47.8 ug/L	50.0	96	(73%-129%)
Toluene-d8	8260D, Volatiles- full suite "As Received"	50.1 ug/L	50.0	100	(75%-123%)

**Notes:**





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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road  
Kevil, Kentucky 42053  
Contact: Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW393SG4-23 Project: FRNP00511  
Sample ID: 631127006 Client ID: FRNP005  
Matrix: WG  
Collect Date: 27-JUL-23 13:17  
Receive Date: 28-JUL-23  
Collector: Client

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Metals Analysis-ICP-MS												
6020, Dissolved Metals (3 Elements) "As Received"												
Barium		0.0554	0.000670	0.00400	mg/L	1.00	1	PRB	08/10/23	2248	2468541	1
Chromium	U	0.0100	0.00300	0.0100	mg/L	1.00	1					
Uranium	U	0.000200	0.0000670	0.000200	mg/L	1.00	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 160	Laboratory Filtration	RXB5	07/31/23	1055	2468406
SW846 3005A	ICP-MS 3005A PREP	JD2	08/02/23	0745	2468540

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 3005A/6020B	

### Notes:

Column headers are defined as follows:

DF: Dilution Factor                      Lc/LC: Critical Level  
DL: Detection Limit                      PF: Prep Factor  
MDA: Minimum Detectable Activity      RL: Reporting Limit  
MDC: Minimum Detectable Concentration      SQL: Sample Quantitation Limit

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
 Address : 5600 Hobbs Road  
  
 Kevil, Kentucky 42053  
 Contact: Ms. Jaime Morrow  
 Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW394SG4-23	Project: FRNP00511
Sample ID: 631127007	Client ID: FRNP005
Matrix: WG	
Collect Date: 27-JUL-23 07:55	
Receive Date: 28-JUL-23	
Collector: Client	

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
504.1/8011 Analysis of EDB/DBCP												
8011, VOA Compounds Liquid "As Received"												
1,2-Dibromo-3-chloropropane	U	0.0187	0.00842	0.0187	ug/L	0.936	1	LOF	08/03/23	2015	2468092	1
Carbon Analysis												
9060A, Total Organic Carbon "As Received"												
Total Organic Carbon Average	J	0.746	0.330	2.00	mg/L		1	RM3	08/01/23	0411	2468684	2
Flow Injection Analysis												
9012B, Total Cyanide "As Received"												
Cyanide, Total	U	0.200	0.00167	0.200	mg/L	1.00	1	AXH3	08/01/23	1454	2468244	3
Halogen Analysis												
9020B, TOX (Organic Halogen) "As Received"												
Total Organic Halogens		12.4	3.33	10.0	ug/L		1	RM3	08/08/23	2117	2472705	4
Ion Chromatography												
300.0, Iodide in Liquid "As Received"												
Iodide	U	0.500	0.167	0.500	mg/L		1	LXA2	08/04/23	1911	2468036	5
SW846 9056A Anions (5) "As Received"												
Bromide	W	0.619	0.0670	0.200	mg/L		1	JLD1	07/28/23	1321	2467686	6
Fluoride	J	0.135	0.0330	4.00	mg/L		1					
Nitrate-N	J	1.08	0.0330	10.0	mg/L		1					
Sulfate		12.2	0.133	0.400	mg/L		1					
Chloride	J	45.7	0.670	250	mg/L		10	JLD1	07/28/23	2222	2467686	7
Mercury Analysis-CVAA												
7470, Mercury Liquid "As Received"												
Mercury	U	0.000200	0.0000670	0.000200	mg/L	1.00	1	JP2	08/01/23	1337	2468385	8
Metals Analysis-ICP-MS												
6020, Metals (15+) "As Received"												
Aluminum	U	0.0500	0.0193	0.0500	mg/L	1.00	1	PRB	08/10/23	2251	2468541	9
Arsenic	U	0.00500	0.00200	0.00500	mg/L	1.00	1					
Barium		0.259	0.000670	0.00400	mg/L	1.00	1					
Beryllium	U	0.000500	0.000200	0.000500	mg/L	1.00	1					
Boron		0.0200	0.00520	0.0150	mg/L	1.00	1					
Cadmium	U	0.00100	0.000300	0.00100	mg/L	1.00	1					
Calcium		26.5	0.0800	0.200	mg/L	1.00	1					
Chromium	U	0.0100	0.00300	0.0100	mg/L	1.00	1					
Cobalt	U	0.00100	0.000300	0.00100	mg/L	1.00	1					

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## Certificate of Analysis

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Company : Four Rivers Nuclear Partnership, LLC  
 Address : 5600 Hobbs Road  
  
 Kevil, Kentucky 42053  
 Contact: Ms. Jaime Morrow  
 Project: C-746-S&T Landfill Quarterly(SG23-04)

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Client Sample ID: MW394SG4-23	Project: FRNP00511
Sample ID: 631127007	Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Metals Analysis-ICP-MS</b>												
<b>6020, Metals (15+) "As Received"</b>												
Copper		0.00369	0.000300	0.00200	mg/L	1.00	1					
Iron	U	0.100	0.0330	0.100	mg/L	1.00	1					
Lead	U	0.00200	0.000500	0.00200	mg/L	1.00	1					
Manganese	U	0.00500	0.00100	0.00500	mg/L	1.00	1					
Molybdenum	U	0.00100	0.000200	0.00100	mg/L	1.00	1					
Nickel		0.00414	0.000600	0.00200	mg/L	1.00	1					
Potassium		1.26	0.0800	0.300	mg/L	1.00	1					
Selenium	U	0.00500	0.00150	0.00500	mg/L	1.00	1					
Silver	U	0.00100	0.000300	0.00100	mg/L	1.00	1					
Sodium		31.8	0.0800	0.250	mg/L	1.00	1					
Thallium	U	0.00200	0.000600	0.00200	mg/L	1.00	1					
Uranium	U	0.000200	0.0000670	0.000200	mg/L	1.00	1					
Vanadium	U	0.0200	0.00330	0.0200	mg/L	1.00	1					
Zinc	J	0.00991	0.00330	0.0200	mg/L	1.00	1					
Antimony	U	0.00300	0.00100	0.00300	mg/L	1.00	1	PRB	08/11/23	0353	2468541	10
Magnesium		10.7	0.0100	0.0300	mg/L	1.00	1					
Rhodium	U	0.00500	0.00160	0.00500	mg/L	1.00	1	PRB	08/11/23	0140	2468541	11
Tantalum	U	0.00500	0.00100	0.00500	mg/L	1.00	1					
<b>Solids Analysis</b>												
<b>160.1, Dissolved Solids "As Received"</b>												
Total Dissolved Solids		201	2.38	10.0	mg/L			CH6	08/02/23	1337	2469708	12
<b>Spectrometric Analysis</b>												
<b>410.4, Chem. Oxygen Demand "As Received"</b>												
COD	U	20.0	8.95	20.0	mg/L		1	HH2	07/31/23	1530	2468429	13
<b>Volatile Organics</b>												
<b>8260D, Volatiles- full suite "As Received"</b>												
1,1,1,2-Tetrachloroethane	U	1.00	0.333	1.00	ug/L		1	KP2	08/01/23	1327	2468743	14
1,1,1-Trichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1,2,2-Tetrachloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1,2-Trichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1-Dichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1					
1,2,3-Trichloropropane	U	1.00	0.333	1.00	ug/L		1					
1,2-Dibromoethane	U	1.00	0.333	1.00	ug/L		1					



# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road

Contact: Kevil, Kentucky 42053  
Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW394SG4-23  
Sample ID: 631127007

Project: FRNP00511  
Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Volatile Organics												
8260D, Volatiles- full suite "As Received"												
trans-1,2-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1					
trans-1,3-Dichloropropylene	U	1.00	0.333	1.00	ug/L		1					
trans-1,4-Dichloro-2-butene	U	5.00	1.67	5.00	ug/L		1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 7470A Prep	EPA 7470A Mercury Prep Liquid	AXS5	07/31/23	1226	2468384
SW846 3005A	ICP-MS 3005A PREP	JD2	08/02/23	0745	2468540
SW846 9010C Distillation	SW846 9010C Prep	ES2	08/01/23	1001	2468243
SW846 8011 PREP	8011 Prep	LOF	08/03/23	1335	2468090

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 8011	
2	SW846 9060A	
3	SW846 9012B	
4	SW846 9020B	
5	EPA 300.0	
6	SW846 9056A	
7	SW846 9056A	
8	SW846 7470A	
9	SW846 3005A/6020B	
10	SW846 3005A/6020B	
11	SW846 3005A/6020B	
12	EPA 160.1	
13	EPA 410.4	
14	SW846 8260D	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
1-Chloro-2-fluorobenzene	8011, VOA Compounds Liquid "As Received"	7.18 ug/L	6.69	107	(46%-159%)
Bromofluorobenzene	8260D, Volatiles- full suite "As Received"	45.1 ug/L	50.0	90	(72%-125%)
1,2-Dichloroethane-d4	8260D, Volatiles- full suite "As Received"	49.0 ug/L	50.0	98	(73%-129%)
Toluene-d8	8260D, Volatiles- full suite "As Received"	49.6 ug/L	50.0	99	(75%-123%)

Notes:



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Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road

Kevil, Kentucky 42053

Contact: Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID:	MW394SG4-23	Project:	FRNP00511
Sample ID:	631127008	Client ID:	FRNP005
Matrix:	WG		
Collect Date:	27-JUL-23 07:55		
Receive Date:	28-JUL-23		
Collector:	Client		

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Metals Analysis-ICP-MS												
6020, Dissolved Metals (3 Elements) "As Received"												
Barium		0.267	0.000670	0.00400	mg/L	1.00	1	PRB	08/10/23	2302	2468541	1
Chromium	U	0.0100	0.00300	0.0100	mg/L	1.00	1					
Uranium	U	0.000200	0.0000670	0.000200	mg/L	1.00	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3005A	ICP-MS 3005A PREP	JD2	08/02/23	0745	2468540
EPA 160	Laboratory Filtration	RXB5	07/31/23	1055	2468406

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 3005A/6020B	

### Notes:

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit



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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
 Address : 5600 Hobbs Road  
 Kevil, Kentucky 42053  
 Contact: Ms. Jaime Morrow  
 Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW395SG4-23	Project: FRNP00511
Sample ID: 631127009	Client ID: FRNP005
Matrix: WG	
Collect Date: 27-JUL-23 08:41	
Receive Date: 28-JUL-23	
Collector: Client	

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>504.1/8011 Analysis of EDB/DBCP</b>												
<b>8011, VOA Compounds Liquid "As Received"</b>												
1,2-Dibromo-3-chloropropane	U	0.0190	0.00855	0.0190	ug/L	0.950	1	LOF	08/03/23	2039	2468092	1
<b>Carbon Analysis</b>												
<b>9060A, Total Organic Carbon "As Received"</b>												
Total Organic Carbon Average	J	0.705	0.330	2.00	mg/L		1	RM3	08/01/23	0450	2468684	2
<b>Flow Injection Analysis</b>												
<b>9012B, Total Cyanide "As Received"</b>												
Cyanide, Total	U	0.200	0.00167	0.200	mg/L	1.00	1	AXH3	08/01/23	1455	2468244	3
<b>Halogen Analysis</b>												
<b>9020B, TOX (Organic Halogen) "As Received"</b>												
Total Organic Halogens	BJ	7.98	3.33	10.0	ug/L		1	RM3	08/10/23	1502	2474234	4
<b>Ion Chromatography</b>												
<b>300.0, Iodide in Liquid "As Received"</b>												
Iodide	U	0.500	0.167	0.500	mg/L		1	LXA2	08/04/23	1924	2468036	5
<b>SW846 9056A Anions (5) "As Received"</b>												
Chloride	J	44.3	0.670	250	mg/L		10	JLD1	07/28/23	2254	2467686	6
Bromide	W	0.614	0.0670	0.200	mg/L		1	JLD1	07/28/23	1352	2467686	7
Fluoride	J	0.130	0.0330	4.00	mg/L		1					
Nitrate-N	J	1.07	0.0330	10.0	mg/L		1					
Sulfate		11.5	0.133	0.400	mg/L		1					
<b>Mercury Analysis-CVAA</b>												
<b>7470, Mercury Liquid "As Received"</b>												
Mercury	U	0.000200	0.0000670	0.000200	mg/L	1.00	1	JP2	08/01/23	1339	2468385	8
<b>Metals Analysis-ICP-MS</b>												
<b>6020, Metals (15+) "As Received"</b>												
Rhodium	U	0.00500	0.00160	0.00500	mg/L	1.00	1	PRB	08/11/23	0142	2468541	9
Tantalum	U	0.00500	0.00100	0.00500	mg/L	1.00	1					
Antimony	U	0.00300	0.00100	0.00300	mg/L	1.00	1	PRB	08/11/23	0408	2468541	10
Magnesium		10.5	0.0100	0.0300	mg/L	1.00	1					
Aluminum	U	0.0500	0.0193	0.0500	mg/L	1.00	1	PRB	08/10/23	2306	2468541	11
Arsenic	U	0.00500	0.00200	0.00500	mg/L	1.00	1					
Barium		0.283	0.000670	0.00400	mg/L	1.00	1					
Beryllium	U	0.000500	0.000200	0.000500	mg/L	1.00	1					
Boron		0.0193	0.00520	0.0150	mg/L	1.00	1					

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road

Kevil, Kentucky 42053

Contact: Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW395SG4-23  
Sample ID: 631127009

Project: FRNP00511  
Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Metals Analysis-ICP-MS</b>												
<b>6020, Metals (15+) "As Received"</b>												
Cadmium	U	0.00100	0.000300	0.00100	mg/L	1.00	1					
Calcium		26.2	0.0800	0.200	mg/L	1.00	1					
Chromium	U	0.0100	0.00300	0.0100	mg/L	1.00	1					
Cobalt	U	0.00100	0.000300	0.00100	mg/L	1.00	1					
Copper	J	0.00185	0.000300	0.00200	mg/L	1.00	1					
Iron		0.103	0.0330	0.100	mg/L	1.00	1					
Lead	U	0.00200	0.000500	0.00200	mg/L	1.00	1					
Manganese		0.0328	0.00100	0.00500	mg/L	1.00	1					
Molybdenum	J	0.000205	0.000200	0.00100	mg/L	1.00	1					
Nickel	J	0.00155	0.000600	0.00200	mg/L	1.00	1					
Potassium		1.59	0.0800	0.300	mg/L	1.00	1					
Selenium	U	0.00500	0.00150	0.00500	mg/L	1.00	1					
Silver	U	0.00100	0.000300	0.00100	mg/L	1.00	1					
Sodium		28.5	0.0800	0.250	mg/L	1.00	1					
Thallium	U	0.00200	0.000600	0.00200	mg/L	1.00	1					
Uranium	U	0.000200	0.0000670	0.000200	mg/L	1.00	1					
Vanadium	U	0.0200	0.00330	0.0200	mg/L	1.00	1					
Zinc	J	0.00909	0.00330	0.0200	mg/L	1.00	1					
<b>Solids Analysis</b>												
<b>160.1, Dissolved Solids "As Received"</b>												
Total Dissolved Solids		188	2.38	10.0	mg/L			CH6	08/02/23	1337	2469708	12
<b>Spectrometric Analysis</b>												
<b>410.4, Chem. Oxygen Demand "As Received"</b>												
COD	U	20.0	8.95	20.0	mg/L		1	HH2	07/31/23	1530	2468429	13
<b>Volatile Organics</b>												
<b>8260D, Volatiles- full suite "As Received"</b>												
1,1,1,2-Tetrachloroethane	U	1.00	0.333	1.00	ug/L		1	KP2	08/01/23	1352	2468743	14
1,1,1-Trichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1,2,2-Tetrachloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1,2-Trichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1-Dichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1					
1,2,3-Trichloropropane	U	1.00	0.333	1.00	ug/L		1					
1,2-Dibromoethane	U	1.00	0.333	1.00	ug/L		1					

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road

Kevil, Kentucky 42053

Contact: Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW395SG4-23  
Sample ID: 631127009

Project: FRNP00511  
Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time Batch	Method
Volatile Organics											
8260D, Volatiles- full suite "As Received"											
1,2-Dichlorobenzene	U	1.00	0.333	1.00	ug/L		1				
1,2-Dichloroethane	U	1.00	0.333	1.00	ug/L		1				
1,2-Dichloropropane	U	1.00	0.333	1.00	ug/L		1				
1,4-Dichlorobenzene	U	1.00	0.333	1.00	ug/L		1				
2-Butanone	U	5.00	1.67	5.00	ug/L		1				
2-Hexanone	U	5.00	1.67	5.00	ug/L		1				
4-Methyl-2-pentanone	U	5.00	1.67	5.00	ug/L		1				
Acetone	U	5.00	1.74	5.00	ug/L		1				
Acrolein	U	5.00	1.67	5.00	ug/L		1				
Acrylonitrile	U	5.00	1.67	5.00	ug/L		1				
Benzene	U	1.00	0.333	1.00	ug/L		1				
Bromochloromethane	U	1.00	0.333	1.00	ug/L		1				
Bromodichloromethane	U	1.00	0.333	1.00	ug/L		1				
Bromoform	U	1.00	0.333	1.00	ug/L		1				
Bromomethane	UL	1.00	0.337	1.00	ug/L		1				
Carbon disulfide	U	5.00	1.67	5.00	ug/L		1				
Carbon tetrachloride	U	1.00	0.333	1.00	ug/L		1				
Chlorobenzene	U	1.00	0.333	1.00	ug/L		1				
Chloroethane	UL	1.00	0.333	1.00	ug/L		1				
Chloroform	U	1.00	0.333	1.00	ug/L		1				
Chloromethane	LY1U	1.00	0.333	1.00	ug/L		1				
Dibromochloromethane	U	1.00	0.333	1.00	ug/L		1				
Dibromomethane	U	1.00	0.333	1.00	ug/L		1				
Ethylbenzene	U	1.00	0.333	1.00	ug/L		1				
Iodomethane	U	5.00	1.67	5.00	ug/L		1				
Methylene chloride	U	5.00	0.500	5.00	ug/L		1				
Styrene	U	1.00	0.333	1.00	ug/L		1				
Tetrachloroethylene	U	1.00	0.333	1.00	ug/L		1				
Toluene	U	1.00	0.333	1.00	ug/L		1				
Trichloroethylene		5.18	0.333	1.00	ug/L		1				
Trichlorofluoromethane	U	1.00	0.333	1.00	ug/L		1				
Vinyl acetate	U	5.00	1.67	5.00	ug/L		1				
Vinyl chloride	LU	1.00	0.333	1.00	ug/L		1				
Xylenes (total)	U	3.00	1.00	3.00	ug/L		1				
cis-1,2-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1				
cis-1,3-Dichloropropylene	U	1.00	0.333	1.00	ug/L		1				

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
 Address : 5600 Hobbs Road  
  
 Kevil, Kentucky 42053  
 Contact: Ms. Jaime Morrow  
 Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW395SG4-23	Project: FRNP00511
Sample ID: 631127009	Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Volatile Organics												
8260D, Volatiles- full suite "As Received"												
trans-1,2-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1					
trans-1,3-Dichloropropylene	U	1.00	0.333	1.00	ug/L		1					
trans-1,4-Dichloro-2-butene	U	5.00	1.67	5.00	ug/L		1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 7470A Prep	EPA 7470A Mercury Prep Liquid	AXS5	07/31/23	1226	2468384
SW846 9010C Distillation	SW846 9010C Prep	ES2	08/01/23	1001	2468243
SW846 8011 PREP	8011 Prep	LOF	08/03/23	1335	2468090
SW846 3005A	ICP-MS 3005A PREP	JD2	08/02/23	0745	2468540

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 8011	
2	SW846 9060A	
3	SW846 9012B	
4	SW846 9020B	
5	EPA 300.0	
6	SW846 9056A	
7	SW846 9056A	
8	SW846 7470A	
9	SW846 3005A/6020B	
10	SW846 3005A/6020B	
11	SW846 3005A/6020B	
12	EPA 160.1	
13	EPA 410.4	
14	SW846 8260D	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
1-Chloro-2-fluorobenzene	8011, VOA Compounds Liquid "As Received"	7.12 ug/L	6.79	105	(46%-159%)
Bromofluorobenzene	8260D, Volatiles- full suite "As Received"	44.4 ug/L	50.0	89	(72%-125%)
1,2-Dichloroethane-d4	8260D, Volatiles- full suite "As Received"	48.2 ug/L	50.0	96	(73%-129%)
Toluene-d8	8260D, Volatiles- full suite "As Received"	49.2 ug/L	50.0	98	(75%-123%)

**Notes:**

# GEL LABORATORIES LLC

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road  
Kevil, Kentucky 42053  
Contact: Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

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Client Sample ID:	MW395SG4-23	Project:	FRNP00511
Sample ID:	631127009	Client ID:	FRNP005

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Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
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Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road

Kevil, Kentucky 42053

Contact: Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW395SG4-23      Project: FRNP00511  
Sample ID: 631127010      Client ID: FRNP005  
Matrix: WG  
Collect Date: 27-JUL-23 08:41  
Receive Date: 28-JUL-23  
Collector: Client

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Metals Analysis-ICP-MS												
6020, Dissolved Metals (3 Elements) "As Received"												
Barium		0.274	0.000670	0.00400	mg/L	1.00	1	PRB	08/10/23	2309	2468541	1
Chromium	U	0.0100	0.00300	0.0100	mg/L	1.00	1					
Uranium	U	0.000200	0.0000670	0.000200	mg/L	1.00	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3005A	ICP-MS 3005A PREP	JD2	08/02/23	0745	2468540
EPA 160	Laboratory Filtration	RXB5	07/31/23	1055	2468406

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 3005A/6020B	

### Notes:

Column headers are defined as follows:

DF: Dilution Factor      Lc/LC: Critical Level  
DL: Detection Limit      PF: Prep Factor  
MDA: Minimum Detectable Activity      RL: Reporting Limit  
MDC: Minimum Detectable Concentration      SQL: Sample Quantitation Limit

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road

Kevil, Kentucky 42053

Contact: Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW396SG4-23 Project: FRNP00511  
Sample ID: 631127011 Client ID: FRNP005  
Matrix: WG  
Collect Date: 27-JUL-23 09:24  
Receive Date: 28-JUL-23  
Collector: Client

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
504.1/8011 Analysis of EDB/DBCP												
8011, VOA Compounds Liquid "As Received"												
1,2-Dibromo-3-chloropropane	U	0.0186	0.00839	0.0186	ug/L	0.932	1	LOF	08/03/23	2104	2468092	1
Carbon Analysis												
9060A, Total Organic Carbon "As Received"												
Total Organic Carbon Average		3.92	0.330	2.00	mg/L		1	RM3	08/01/23	0529	2468684	2
Flow Injection Analysis												
9012B, Total Cyanide "As Received"												
Cyanide, Total	U	0.200	0.00167	0.200	mg/L	1.00	1	AXH3	08/01/23	1456	2468244	3
Halogen Analysis												
9020B, TOX (Organic Halogen) "As Received"												
Total Organic Halogens	B	54.3	3.33	10.0	ug/L		1	RM3	08/10/23	2231	2474234	4
Ion Chromatography												
300.0, Iodide in Liquid "As Received"												
Iodide	U	0.500	0.167	0.500	mg/L		1	LXA2	08/04/23	1937	2468036	5
SW846 9056A Anions (5) "As Received"												
Bromide	W	0.840	0.0670	0.200	mg/L		1	JLD1	07/28/23	1424	2467686	6
Fluoride	J	0.651	0.0330	4.00	mg/L		1					
Nitrate-N	J	0.153	0.0330	10.0	mg/L		1					
Chloride	J	52.1	0.670	250	mg/L		10	JLD1	07/28/23	2326	2467686	7
Sulfate		30.5	1.33	4.00	mg/L		10					
Mercury Analysis-CVAA												
7470, Mercury Liquid "As Received"												
Mercury	U	0.000200	0.0000670	0.000200	mg/L	1.00	1	JP2	08/01/23	1341	2468385	8
Metals Analysis-ICP-MS												
6020, Metals (15+) "As Received"												
Antimony	U	0.00300	0.00100	0.00300	mg/L	1.00	1	PRB	08/11/23	0415	2468541	9
Magnesium		13.6	0.0100	0.0300	mg/L	1.00	1					
Rhodium	U	0.00500	0.00160	0.00500	mg/L	1.00	1	PRB	08/11/23	0144	2468541	10
Tantalum	U	0.00500	0.00100	0.00500	mg/L	1.00	1					
Sodium		99.2	0.800	2.50	mg/L	1.00	10	PRB	08/11/23	0754	2468541	11
Aluminum	U	0.0500	0.0193	0.0500	mg/L	1.00	1	PRB	08/10/23	2313	2468541	12
Arsenic	U	0.00500	0.00200	0.00500	mg/L	1.00	1					
Barium		0.377	0.000670	0.00400	mg/L	1.00	1					
Beryllium	U	0.000500	0.000200	0.000500	mg/L	1.00	1					

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
 Address : 5600 Hobbs Road  
  
 Kevil, Kentucky 42053  
 Contact: Ms. Jaime Morrow  
 Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW396SG4-23	Project: FRNP00511
Sample ID: 631127011	Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Metals Analysis-ICP-MS</b>												
<b>6020, Metals (15+) "As Received"</b>												
Boron	J	0.00825	0.00520	0.0150	mg/L	1.00	1					
Cadmium	U	0.00100	0.000300	0.00100	mg/L	1.00	1					
Calcium		31.2	0.0800	0.200	mg/L	1.00	1					
Chromium	U	0.0100	0.00300	0.0100	mg/L	1.00	1					
Cobalt	U	0.00100	0.000300	0.00100	mg/L	1.00	1					
Copper	J	0.00112	0.000300	0.00200	mg/L	1.00	1					
Iron		0.116	0.0330	0.100	mg/L	1.00	1					
Lead	U	0.00200	0.000500	0.00200	mg/L	1.00	1					
Manganese		0.0319	0.00100	0.00500	mg/L	1.00	1					
Molybdenum	J	0.000400	0.000200	0.00100	mg/L	1.00	1					
Nickel	J	0.000628	0.000600	0.00200	mg/L	1.00	1					
Potassium		0.817	0.0800	0.300	mg/L	1.00	1					
Selenium	U	0.00500	0.00150	0.00500	mg/L	1.00	1					
Silver	U	0.00100	0.000300	0.00100	mg/L	1.00	1					
Thallium	U	0.00200	0.000600	0.00200	mg/L	1.00	1					
Uranium	U	0.000200	0.0000670	0.000200	mg/L	1.00	1					
Vanadium	U	0.0200	0.00330	0.0200	mg/L	1.00	1					
Zinc	J	0.00353	0.00330	0.0200	mg/L	1.00	1					
<b>Solids Analysis</b>												
<b>160.1, Dissolved Solids "As Received"</b>												
Total Dissolved Solids		391	2.38	10.0	mg/L			CH6	08/02/23	1337	2469708	13
<b>Spectrometric Analysis</b>												
<b>410.4, Chem. Oxygen Demand "As Received"</b>												
COD	U	20.0	8.95	20.0	mg/L		1	HH2	07/31/23	1530	2468429	14
<b>Volatile Organics</b>												
<b>8260D, Volatiles- full suite "As Received"</b>												
1,1,1,2-Tetrachloroethane	U	1.00	0.333	1.00	ug/L		1	KP2	08/01/23	1416	2468743	15
1,1,1-Trichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1,2,2-Tetrachloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1,2-Trichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1-Dichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1					
1,2,3-Trichloropropane	U	1.00	0.333	1.00	ug/L		1					
1,2-Dibromoethane	U	1.00	0.333	1.00	ug/L		1					



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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road

Kevil, Kentucky 42053

Contact: Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW396SG4-23  
Sample ID: 631127011

Project: FRNP00511  
Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time Batch	Method
Volatile Organics											
8260D, Volatiles- full suite "As Received"											
1,2-Dichlorobenzene	U	1.00	0.333	1.00	ug/L		1				
1,2-Dichloroethane	U	1.00	0.333	1.00	ug/L		1				
1,2-Dichloropropane	U	1.00	0.333	1.00	ug/L		1				
1,4-Dichlorobenzene	U	1.00	0.333	1.00	ug/L		1				
2-Butanone	U	5.00	1.67	5.00	ug/L		1				
2-Hexanone	U	5.00	1.67	5.00	ug/L		1				
4-Methyl-2-pentanone	U	5.00	1.67	5.00	ug/L		1				
Acetone	U	5.00	1.74	5.00	ug/L		1				
Acrolein	U	5.00	1.67	5.00	ug/L		1				
Acrylonitrile	U	5.00	1.67	5.00	ug/L		1				
Benzene	U	1.00	0.333	1.00	ug/L		1				
Bromochloromethane	U	1.00	0.333	1.00	ug/L		1				
Bromodichloromethane	U	1.00	0.333	1.00	ug/L		1				
Bromoform	U	1.00	0.333	1.00	ug/L		1				
Bromomethane	UL	1.00	0.337	1.00	ug/L		1				
Carbon disulfide	U	5.00	1.67	5.00	ug/L		1				
Carbon tetrachloride	U	1.00	0.333	1.00	ug/L		1				
Chlorobenzene	U	1.00	0.333	1.00	ug/L		1				
Chloroethane	LU	1.00	0.333	1.00	ug/L		1				
Chloroform	U	1.00	0.333	1.00	ug/L		1				
Chloromethane	LY1U	1.00	0.333	1.00	ug/L		1				
Dibromochloromethane	U	1.00	0.333	1.00	ug/L		1				
Dibromomethane	U	1.00	0.333	1.00	ug/L		1				
Ethylbenzene	U	1.00	0.333	1.00	ug/L		1				
Iodomethane	U	5.00	1.67	5.00	ug/L		1				
Methylene chloride	U	5.00	0.500	5.00	ug/L		1				
Styrene	U	1.00	0.333	1.00	ug/L		1				
Tetrachloroethylene	U	1.00	0.333	1.00	ug/L		1				
Toluene	U	1.00	0.333	1.00	ug/L		1				
Trichloroethylene	U	1.00	0.333	1.00	ug/L		1				
Trichlorofluoromethane	U	1.00	0.333	1.00	ug/L		1				
Vinyl acetate	U	5.00	1.67	5.00	ug/L		1				
Vinyl chloride	LU	1.00	0.333	1.00	ug/L		1				
Xylenes (total)	U	3.00	1.00	3.00	ug/L		1				
cis-1,2-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1				
cis-1,3-Dichloropropylene	U	1.00	0.333	1.00	ug/L		1				

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
 Address : 5600 Hobbs Road  
  
 Kevil, Kentucky 42053  
 Contact: Ms. Jaime Morrow  
 Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW396SG4-23	Project: FRNP00511
Sample ID: 631127011	Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Volatile Organics												
8260D, Volatiles- full suite "As Received"												
trans-1,2-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1					
trans-1,3-Dichloropropylene	U	1.00	0.333	1.00	ug/L		1					
trans-1,4-Dichloro-2-butene	U	5.00	1.67	5.00	ug/L		1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 8011 PREP	8011 Prep	LOF	08/03/23	1335	2468090
SW846 3005A	ICP-MS 3005A PREP	JD2	08/02/23	0745	2468540
SW846 9010C Distillation	SW846 9010C Prep	ES2	08/01/23	1001	2468243
SW846 7470A Prep	EPA 7470A Mercury Prep Liquid	AXS5	07/31/23	1226	2468384

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 8011	
2	SW846 9060A	
3	SW846 9012B	
4	SW846 9020B	
5	EPA 300.0	
6	SW846 9056A	
7	SW846 9056A	
8	SW846 7470A	
9	SW846 3005A/6020B	
10	SW846 3005A/6020B	
11	SW846 3005A/6020B	
12	SW846 3005A/6020B	
13	EPA 160.1	
14	EPA 410.4	
15	SW846 8260D	

Surrogate/Tracer	Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
1-Chloro-2-fluorobenzene		8011, VOA Compounds Liquid "As Received"	6.34 ug/L	6.66	95	(46%-159%)
Bromofluorobenzene		8260D, Volatiles- full suite "As Received"	45.6 ug/L	50.0	91	(72%-125%)
1,2-Dichloroethane-d4		8260D, Volatiles- full suite "As Received"	49.4 ug/L	50.0	99	(73%-129%)
Toluene-d8		8260D, Volatiles- full suite "As Received"	49.5 ug/L	50.0	99	(75%-123%)

**Notes:**

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## Certificate of Analysis

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Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road  
Kevil, Kentucky 42053  
Contact: Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW396SG4-23  
Sample ID: 631127011

Project: FRNP00511  
Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
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Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road

Kevil, Kentucky 42053

Contact: Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

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Client Sample ID:	MW396SG4-23	Project:	FRNP00511
Sample ID:	631127012	Client ID:	FRNP005
Matrix:	WG		
Collect Date:	27-JUL-23 09:24		
Receive Date:	28-JUL-23		
Collector:	Client		

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Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Metals Analysis-ICP-MS												
6020, Dissolved Metals (3 Elements) "As Received"												
Barium		0.375	0.000670	0.00400	mg/L	1.00	1	PRB	08/10/23	2317	2468541	1
Chromium	U	0.0100	0.00300	0.0100	mg/L	1.00	1					
Uranium	U	0.000200	0.0000670	0.000200	mg/L	1.00	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 160	Laboratory Filtration	RXB5	07/31/23	1055	2468406
SW846 3005A	ICP-MS 3005A PREP	JD2	08/02/23	0745	2468540

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 3005A/6020B	

### Notes:

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road  
Kevil, Kentucky 42053  
Contact: Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW397SG4-23 Project: FRNP00511  
Sample ID: 631127013 Client ID: FRNP005  
Matrix: WG  
Collect Date: 27-JUL-23 10:11  
Receive Date: 28-JUL-23  
Collector: Client

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
504.1/8011 Analysis of EDB/DBCP												
8011, VOA Compounds Liquid "As Received"												
1,2-Dibromo-3-chloropropane	U	0.0192	0.00865	0.0192	ug/L	0.962	1	LOF	08/03/23	2128	2468092	1
Carbon Analysis												
9060A, Total Organic Carbon "As Received"												
Total Organic Carbon Average	J	0.632	0.330	2.00	mg/L		1	RM3	08/01/23	0630	2468684	2
Flow Injection Analysis												
9012B, Total Cyanide "As Received"												
Cyanide, Total	U	0.200	0.00167	0.200	mg/L	1.00	1	AXH3	08/01/23	1457	2468244	3
Halogen Analysis												
9020B, TOX (Organic Halogen) "As Received"												
Total Organic Halogens	BJ	4.42	3.33	10.0	ug/L		1	RM3	08/10/23	1639	2474234	4
Ion Chromatography												
300.0, Iodide in Liquid "As Received"												
Iodide	U	0.500	0.167	0.500	mg/L		1	LXA2	08/04/23	2015	2468036	5
SW846 9056A Anions (5) "As Received"												
Bromide	W	0.392	0.0670	0.200	mg/L		1	JLD1	07/28/23	1600	2467686	6
Fluoride	J	0.149	0.0330	4.00	mg/L		1					
Nitrate-N	J	1.06	0.0330	10.0	mg/L		1					
Sulfate		12.1	0.133	0.400	mg/L		1					
Chloride	J	34.6	0.335	250	mg/L		5	JLD1	07/28/23	2358	2467686	7
Mercury Analysis-CVAA												
7470, Mercury Liquid "As Received"												
Mercury	U	0.000200	0.0000670	0.000200	mg/L	1.00	1	JP2	08/01/23	1346	2468385	8
Metals Analysis-ICP-MS												
6020, Metals (15+) "As Received"												
Aluminum	U	0.0500	0.0193	0.0500	mg/L	1.00	1	PRB	08/10/23	2320	2468541	9
Arsenic	U	0.00500	0.00200	0.00500	mg/L	1.00	1					
Barium		0.136	0.000670	0.00400	mg/L	1.00	1					
Beryllium	U	0.000500	0.000200	0.000500	mg/L	1.00	1					
Boron	J	0.00773	0.00520	0.0150	mg/L	1.00	1					
Cadmium	U	0.00100	0.000300	0.00100	mg/L	1.00	1					
Calcium		17.6	0.0800	0.200	mg/L	1.00	1					
Chromium	U	0.0100	0.00300	0.0100	mg/L	1.00	1					
Cobalt	U	0.00100	0.000300	0.00100	mg/L	1.00	1					

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road

Kevil, Kentucky 42053

Contact: Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW397SG4-23  
Sample ID: 631127013

Project: FRNP00511  
Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Metals Analysis-ICP-MS</b>												
<b>6020, Metals (15+) "As Received"</b>												
Copper	J	0.000818	0.000300	0.00200	mg/L	1.00	1					
Iron	U	0.100	0.0330	0.100	mg/L	1.00	1					
Lead	U	0.00200	0.000500	0.00200	mg/L	1.00	1					
Manganese	U	0.00500	0.00100	0.00500	mg/L	1.00	1					
Molybdenum	U	0.00100	0.000200	0.00100	mg/L	1.00	1					
Nickel	U	0.00200	0.000600	0.00200	mg/L	1.00	1					
Potassium		1.74	0.0800	0.300	mg/L	1.00	1					
Selenium	U	0.00500	0.00150	0.00500	mg/L	1.00	1					
Silver	U	0.00100	0.000300	0.00100	mg/L	1.00	1					
Sodium		30.0	0.0800	0.250	mg/L	1.00	1					
Thallium	U	0.00200	0.000600	0.00200	mg/L	1.00	1					
Uranium	U	0.000200	0.0000670	0.000200	mg/L	1.00	1					
Vanadium	U	0.0200	0.00330	0.0200	mg/L	1.00	1					
Zinc	U	0.0200	0.00330	0.0200	mg/L	1.00	1					
Rhodium	U	0.00500	0.00160	0.00500	mg/L	1.00	1	PRB	08/11/23	0146	2468541	10
Tantalum	U	0.00500	0.00100	0.00500	mg/L	1.00	1					
Antimony	U	0.00300	0.00100	0.00300	mg/L	1.00	1	PRB	08/11/23	0422	2468541	11
Magnesium		7.07	0.0100	0.0300	mg/L	1.00	1					
<b>Solids Analysis</b>												
<b>160.1, Dissolved Solids "As Received"</b>												
Total Dissolved Solids		152	2.38	10.0	mg/L			CH6	08/02/23	1337	2469708	12
<b>Spectrometric Analysis</b>												
<b>410.4, Chem. Oxygen Demand "As Received"</b>												
COD	U	20.0	8.95	20.0	mg/L		1	HH2	07/31/23	1530	2468429	13
<b>Volatile Organics</b>												
<b>8260D, Volatiles- full suite "As Received"</b>												
1,1,1,2-Tetrachloroethane	U	1.00	0.333	1.00	ug/L		1	KP2	08/01/23	1441	2468743	14
1,1,1-Trichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1,2,2-Tetrachloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1,2-Trichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1-Dichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1					
1,2,3-Trichloropropane	U	1.00	0.333	1.00	ug/L		1					
1,2-Dibromoethane	U	1.00	0.333	1.00	ug/L		1					

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## Certificate of Analysis

Report Date: November 2, 2023

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Address : 5600 Hobbs Road

Contact: Kevil, Kentucky 42053  
Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW397SG4-23  
Sample ID: 631127013

Project: FRNP00511  
Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time Batch	Method
Volatile Organics											
8260D, Volatiles- full suite "As Received"											
1,2-Dichlorobenzene	U	1.00	0.333	1.00	ug/L		1				
1,2-Dichloroethane	U	1.00	0.333	1.00	ug/L		1				
1,2-Dichloropropane	U	1.00	0.333	1.00	ug/L		1				
1,4-Dichlorobenzene	U	1.00	0.333	1.00	ug/L		1				
2-Butanone	U	5.00	1.67	5.00	ug/L		1				
2-Hexanone	U	5.00	1.67	5.00	ug/L		1				
4-Methyl-2-pentanone	U	5.00	1.67	5.00	ug/L		1				
Acetone	U	5.00	1.74	5.00	ug/L		1				
Acrolein	U	5.00	1.67	5.00	ug/L		1				
Acrylonitrile	U	5.00	1.67	5.00	ug/L		1				
Benzene	U	1.00	0.333	1.00	ug/L		1				
Bromochloromethane	U	1.00	0.333	1.00	ug/L		1				
Bromodichloromethane	U	1.00	0.333	1.00	ug/L		1				
Bromoform	U	1.00	0.333	1.00	ug/L		1				
Bromomethane	UL	1.00	0.337	1.00	ug/L		1				
Carbon disulfide	U	5.00	1.67	5.00	ug/L		1				
Carbon tetrachloride	U	1.00	0.333	1.00	ug/L		1				
Chlorobenzene	U	1.00	0.333	1.00	ug/L		1				
Chloroethane	UL	1.00	0.333	1.00	ug/L		1				
Chloroform	U	1.00	0.333	1.00	ug/L		1				
Chloromethane	LY1U	1.00	0.333	1.00	ug/L		1				
Dibromochloromethane	U	1.00	0.333	1.00	ug/L		1				
Dibromomethane	U	1.00	0.333	1.00	ug/L		1				
Ethylbenzene	U	1.00	0.333	1.00	ug/L		1				
Iodomethane	U	5.00	1.67	5.00	ug/L		1				
Methylene chloride	U	5.00	0.500	5.00	ug/L		1				
Styrene	U	1.00	0.333	1.00	ug/L		1				
Tetrachloroethylene	U	1.00	0.333	1.00	ug/L		1				
Toluene	U	1.00	0.333	1.00	ug/L		1				
Trichloroethylene	U	1.00	0.333	1.00	ug/L		1				
Trichlorofluoromethane	U	1.00	0.333	1.00	ug/L		1				
Vinyl acetate	U	5.00	1.67	5.00	ug/L		1				
Vinyl chloride	LU	1.00	0.333	1.00	ug/L		1				
Xylenes (total)	U	3.00	1.00	3.00	ug/L		1				
cis-1,2-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1				
cis-1,3-Dichloropropylene	U	1.00	0.333	1.00	ug/L		1				

# GEL LABORATORIES LLC

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road  
  
Kevil, Kentucky 42053  
Contact: Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW397SG4-23 Project: FRNP00511  
Sample ID: 631127013 Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Volatile Organics												
8260D, Volatiles- full suite "As Received"												
trans-1,2-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1					
trans-1,3-Dichloropropylene	U	1.00	0.333	1.00	ug/L		1					
trans-1,4-Dichloro-2-butene	U	5.00	1.67	5.00	ug/L		1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3005A	ICP-MS 3005A PREP	JD2	08/02/23	0745	2468540
SW846 7470A Prep	EPA 7470A Mercury Prep Liquid	AXS5	07/31/23	1226	2468384
SW846 9010C Distillation	SW846 9010C Prep	ES2	08/01/23	1001	2468243
SW846 8011 PREP	8011 Prep	LOF	08/03/23	1335	2468090

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 8011	
2	SW846 9060A	
3	SW846 9012B	
4	SW846 9020B	
5	EPA 300.0	
6	SW846 9056A	
7	SW846 9056A	
8	SW846 7470A	
9	SW846 3005A/6020B	
10	SW846 3005A/6020B	
11	SW846 3005A/6020B	
12	EPA 160.1	
13	EPA 410.4	
14	SW846 8260D	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
1-Chloro-2-fluorobenzene	8011, VOA Compounds Liquid "As Received"	7.79 ug/L	6.87	113	(46%-159%)
Bromofluorobenzene	8260D, Volatiles- full suite "As Received"	45.5 ug/L	50.0	91	(72%-125%)
1,2-Dichloroethane-d4	8260D, Volatiles- full suite "As Received"	47.9 ug/L	50.0	96	(73%-129%)
Toluene-d8	8260D, Volatiles- full suite "As Received"	49.4 ug/L	50.0	99	(75%-123%)

Notes:



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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road  
Kevil, Kentucky 42053  
Contact: Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

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Client Sample ID:	MW397SG4-23	Project:	FRNP00511
Sample ID:	631127013	Client ID:	FRNP005

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Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
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Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road

Kevil, Kentucky 42053

Contact: Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW397SG4-23      Project: FRNP00511  
Sample ID: 631127014      Client ID: FRNP005  
Matrix: WG  
Collect Date: 27-JUL-23 10:11  
Receive Date: 28-JUL-23  
Collector: Client

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Metals Analysis-ICP-MS												
6020, Dissolved Metals (3 Elements) "As Received"												
Barium		0.141	0.000670	0.00400	mg/L	1.00	1	PRB	08/10/23	2324	2468541	1
Chromium	U	0.0100	0.00300	0.0100	mg/L	1.00	1					
Uranium	U	0.000200	0.0000670	0.000200	mg/L	1.00	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 160	Laboratory Filtration	RXB5	07/31/23	1055	2468406
SW846 3005A	ICP-MS 3005A PREP	JD2	08/02/23	0745	2468540

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 3005A/6020B	

### Notes:

Column headers are defined as follows:

DF: Dilution Factor      Lc/LC: Critical Level  
DL: Detection Limit      PF: Prep Factor  
MDA: Minimum Detectable Activity      RL: Reporting Limit  
MDC: Minimum Detectable Concentration      SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
 Address : 5600 Hobbs Road  
 Kevil, Kentucky 42053  
 Contact: Ms. Jaime Morrow  
 Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: TB2SG4-23	Project: FRNP00511
Sample ID: 631127015	Client ID: FRNP005
Matrix: WATER	
Collect Date: 27-JUL-23 06:25	
Receive Date: 28-JUL-23	
Collector: Client	

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
504.1/8011 Analysis of EDB/DBCP												
8011, VOA Compounds Liquid "As Received"												
1,2-Dibromo-3-chloropropane	U	0.0191	0.00858	0.0191	ug/L	0.954	1	LOF	08/03/23	2153	2468092	1
Volatile Organics												
8260D, Volatiles- full suite "As Received"												
1,1,1,2-Tetrachloroethane	U	1.00	0.333	1.00	ug/L		1	KP2	08/01/23	1149	2468743	2
1,1,1-Trichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1,2,2-Tetrachloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1,2-Trichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1-Dichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1					
1,2,3-Trichloropropane	U	1.00	0.333	1.00	ug/L		1					
1,2-Dibromoethane	U	1.00	0.333	1.00	ug/L		1					
1,2-Dichlorobenzene	U	1.00	0.333	1.00	ug/L		1					
1,2-Dichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,2-Dichloropropane	U	1.00	0.333	1.00	ug/L		1					
1,4-Dichlorobenzene	U	1.00	0.333	1.00	ug/L		1					
2-Butanone	U	5.00	1.67	5.00	ug/L		1					
2-Hexanone	U	5.00	1.67	5.00	ug/L		1					
4-Methyl-2-pentanone	U	5.00	1.67	5.00	ug/L		1					
Acetone	U	5.00	1.74	5.00	ug/L		1					
Acrolein	U	5.00	1.67	5.00	ug/L		1					
Acrylonitrile	U	5.00	1.67	5.00	ug/L		1					
Benzene	U	1.00	0.333	1.00	ug/L		1					
Bromochloromethane	U	1.00	0.333	1.00	ug/L		1					
Bromodichloromethane	U	1.00	0.333	1.00	ug/L		1					
Bromoform	U	1.00	0.333	1.00	ug/L		1					
Bromomethane	UL	1.00	0.337	1.00	ug/L		1					
Carbon disulfide	U	5.00	1.67	5.00	ug/L		1					
Carbon tetrachloride	U	1.00	0.333	1.00	ug/L		1					
Chlorobenzene		4.92	0.333	1.00	ug/L		1					
Chloroethane	UL	1.00	0.333	1.00	ug/L		1					
Chloroform	U	1.00	0.333	1.00	ug/L		1					
Chloromethane	LYIU	1.00	0.333	1.00	ug/L		1					
Dibromochloromethane	U	1.00	0.333	1.00	ug/L		1					
Dibromomethane	U	1.00	0.333	1.00	ug/L		1					
Ethylbenzene	U	1.00	0.333	1.00	ug/L		1					
Iodomethane	U	5.00	1.67	5.00	ug/L		1					

# GEL LABORATORIES LLC

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
 Address : 5600 Hobbs Road  
  
 Kevil, Kentucky 42053  
 Contact: Ms. Jaime Morrow  
 Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: TB2SG4-23	Project: FRNP00511
Sample ID: 631127015	Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Volatile Organics</b>												
<b>8260D, Volatiles- full suite "As Received"</b>												
Methylene chloride	U	5.00	0.500	5.00	ug/L		1					
Styrene	U	1.00	0.333	1.00	ug/L		1					
Tetrachloroethylene	U	1.00	0.333	1.00	ug/L		1					
Toluene	U	1.00	0.333	1.00	ug/L		1					
Trichloroethylene	U	1.00	0.333	1.00	ug/L		1					
Trichlorofluoromethane	U	1.00	0.333	1.00	ug/L		1					
Vinyl acetate	U	5.00	1.67	5.00	ug/L		1					
Vinyl chloride	LU	1.00	0.333	1.00	ug/L		1					
Xylenes (total)	U	3.00	1.00	3.00	ug/L		1					
cis-1,2-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1					
cis-1,3-Dichloropropylene	U	1.00	0.333	1.00	ug/L		1					
trans-1,2-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1					
trans-1,3-Dichloropropylene	U	1.00	0.333	1.00	ug/L		1					
trans-1,4-Dichloro-2-butene	U	5.00	1.67	5.00	ug/L		1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 8011 PREP	8011 Prep	LOF	08/03/23	1335	2468090

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 8011	
2	SW846 8260D	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
1-Chloro-2-fluorobenzene	8011, VOA Compounds Liquid "As Received"	6.78 ug/L	6.81	100	(46%-159%)
Bromofluorobenzene	8260D, Volatiles- full suite "As Received"	44.9 ug/L	50.0	90	(72%-125%)
1,2-Dichloroethane-d4	8260D, Volatiles- full suite "As Received"	50.6 ug/L	50.0	101	(73%-129%)
Toluene-d8	8260D, Volatiles- full suite "As Received"	49.5 ug/L	50.0	99	(75%-123%)

**Notes:**

# GEL LABORATORIES LLC

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road  
Kevil, Kentucky 42053  
Contact: Ms. Jaime Morrow  
Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: TB2SG4-23  
Sample ID: 631127015

Project: FRNP00511  
Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
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Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Company : Four Rivers Nuclear Partnership,  
Address : LLC  
5600 Hobbs Road

Kevil, Kentucky 42053

Report Date: November 2, 2023

Contact: Ms. Jaime Morrow

Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW391SG4-23  
Sample ID: 631127001  
Matrix: WG  
Collect Date: 27-JUL-23  
Receive Date: 28-JUL-23  
Collector: Client

Project: FRNP00511  
Client ID: FRNP005

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Alpha Spec Analysis</b>														
<i>AlphaSpec Ra226, Liquid "As Received"</i>														
Radium-226	U	0.322	+/-0.362	0.512	+/-0.363	5.00	pCi/L			CM4	08/11/23	1244	2472113	1
<i>Th-01-RC M, Th Isotopes, Liquid "As Received"</i>														
Thorium-230	U	-0.380	+/-1.20	3.03	+/-1.20	50.0	pCi/L			EJ1	08/01/23	0839	2467918	2
<b>Rad Gas Flow Proportional Counting</b>														
<i>905.0 Mod, Sr90, liquid "As Received"</i>														
Strontium-90	U	1.51	+/-4.15	7.39	+/-4.15	8.00	pCi/L			KP1	08/02/23	1532	2468498	3
<i>9310,Alpha/Beta Activity, liquid "As Received"</i>														
Alpha	U	3.12	+/-4.35	7.48	+/-4.39	15.0	pCi/L			KP1	08/01/23	1226	2468496	4
Beta		11.1	+/-6.34	9.37	+/-6.61	50.0	pCi/L							
<b>Rad Liquid Scintillation Analysis</b>														
<i>906.0 Mod, Tritium Dist, Liquid "As Received"</i>														
Tritium	U	123	+/-157	265	+/-159	300	pCi/L			GS3	08/01/23	1007	2468313	5
<i>Tc-02-RC-MOD, Tc99, Liquid "As Received"</i>														
Technetium-99	U	4.13	+/-10.5	18.1	+/-10.5	25.0	pCi/L			AG2	08/06/23	2005	2467713	6

**The following Analytical Methods were performed**

Method	Description
1	Eichrom Industries, AN-1418
2	DOE EML HASL-300, Th-01-RC Modified
3	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified
4	EPA 900.0/SW846 9310
5	EPA 906.0 Modified
6	DOE EML HASL-300, Tc-02-RC Modified

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Barium-133 Tracer	AlphaSpec Ra226, Liquid "As Received"	2472113	94.9	(30%-110%)
Thorium-229 Tracer	Th-01-RC M, Th Isotopes, Liquid "As Received"	2467918	90.1	(30%-110%)
Strontium Carrier	905.0 Mod, Sr90, liquid "As Received"	2468498	80	(30%-110%)
Technetium-99m Tracer	Tc-02-RC-MOD, Tc99, Liquid "As Received"	2467713	97.3	(30%-110%)

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## Certificate of Analysis

Company : Four Rivers Nuclear Partnership,  
Address : LLC  
5600 Hobbs Road

Kevil, Kentucky 42053

Report Date: November 2, 2023

Contact: Ms. Jaime Morrow

Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW391SG4-23

Project: FRNP00511

Sample ID: 631127001

Client ID: FRNP005

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Surrogate/Tracer	Recovery	Test						Batch ID	Recovery%	Acceptable Limits				

### Notes:

The MDC is a sample specific MDC.

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

### Column headers are defined as follows:

DF: Dilution Factor

Mtd.: Method

DL: Detection Limit

PF: Prep Factor

Lc/LC: Critical Level

RL: Reporting Limit

MDA: Minimum Detectable Activity

TPU: Total Propagated Uncertainty

MDC: Minimum Detectable Concentration

# GEL LABORATORIES LLC

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## Certificate of Analysis

Company : Four Rivers Nuclear Partnership,  
Address : LLC  
5600 Hobbs Road

Kevil, Kentucky 42053

Report Date: November 2, 2023

Contact: Ms. Jaime Morrow

Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW392SG4-23

Project: FRNP00511

Sample ID: 631127003

Client ID: FRNP005

Matrix: WG

Collect Date: 27-JUL-23

Receive Date: 28-JUL-23

Collector: Client

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Alpha Spec Analysis</b>														
<i>AlphaSpec Ra226, Liquid "As Received"</i>														
Radium-226	U	0.143	+/-0.343	0.621	+/-0.343	5.00	pCi/L			CM4	08/11/23	1244	2472113	1
<i>Th-01-RC M, Th Isotopes, Liquid "As Received"</i>														
Thorium-230	U	0.411	+/-1.24	2.33	+/-1.25	50.0	pCi/L			EJ1	08/01/23	0839	2467918	2
<b>Rad Gas Flow Proportional Counting</b>														
<i>905.0 Mod, Sr90, liquid "As Received"</i>														
Strontium-90	U	0.854	+/-3.06	5.63	+/-3.06	8.00	pCi/L			KP1	08/02/23	1532	2468498	3
<i>9310,Alpha/Beta Activity, liquid "As Received"</i>														
Alpha	U	-0.495	+/-2.34	6.20	+/-2.34	15.0	pCi/L			KP1	08/01/23	1226	2468496	4
Beta	U	2.85	+/-5.45	9.62	+/-5.47	50.0	pCi/L							
<b>Rad Liquid Scintillation Analysis</b>														
<i>906.0 Mod, Tritium Dist, Liquid "As Received"</i>														
Tritium	U	78.5	+/-158	268	+/-159	300	pCi/L			GS3	08/01/23	1148	2468313	5
<i>Tc-02-RC-MOD, Tc99, Liquid "As Received"</i>														
Technetium-99	U	1.18	+/-10.4	18.2	+/-10.4	25.0	pCi/L			AG2	08/06/23	2021	2467713	6

**The following Analytical Methods were performed**

Method	Description
1	Eichrom Industries, AN-1418
2	DOE EML HASL-300, Th-01-RC Modified
3	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified
4	EPA 900.0/SW846 9310
5	EPA 906.0 Modified
6	DOE EML HASL-300, Tc-02-RC Modified

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Barium-133 Tracer	AlphaSpec Ra226, Liquid "As Received"	2472113	86.7	(30%-110%)
Thorium-229 Tracer	Th-01-RC M, Th Isotopes, Liquid "As Received"	2467918	103	(30%-110%)
Strontium Carrier	905.0 Mod, Sr90, liquid "As Received"	2468498	80	(30%-110%)
Technetium-99m Tracer	Tc-02-RC-MOD, Tc99, Liquid "As Received"	2467713	96.9	(30%-110%)



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## Certificate of Analysis

Company : Four Rivers Nuclear Partnership,  
Address : LLC  
5600 Hobbs Road

Kevil, Kentucky 42053

Report Date: November 2, 2023

Contact: Ms. Jaime Morrow

Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW392SG4-23

Project: FRNP00511

Sample ID: 631127003

Client ID: FRNP005

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Surrogate/Tracer	Recovery	Test						Batch ID	Recovery%	Acceptable Limits				

### Notes:

The MDC is a sample specific MDC.

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

### Column headers are defined as follows:

DF: Dilution Factor

Mtd.: Method

DL: Detection Limit

PF: Prep Factor

Lc/LC: Critical Level

RL: Reporting Limit

MDA: Minimum Detectable Activity

TPU: Total Propagated Uncertainty

MDC: Minimum Detectable Concentration

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Company : Four Rivers Nuclear Partnership,  
Address : LLC  
5600 Hobbs Road

Kevil, Kentucky 42053

Report Date: November 2, 2023

Contact: Ms. Jaime Morrow

Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW393SG4-23

Project: FRNP00511

Sample ID: 631127005

Client ID: FRNP005

Matrix: WG

Collect Date: 27-JUL-23

Receive Date: 28-JUL-23

Collector: Client

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Alpha Spec Analysis</b>														
<i>AlphaSpec Ra226, Liquid "As Received"</i>														
Radium-226	U	0.129	+/-0.310	0.562	+/-0.310	5.00	pCi/L			CM4	08/11/23	1244	2472113	1
<i>Th-01-RC M, Th Isotopes, Liquid "As Received"</i>														
Thorium-230	U	1.65	+/-1.79	2.60	+/-1.82	50.0	pCi/L			EJ1	08/01/23	0839	2467918	2
<b>Rad Gas Flow Proportional Counting</b>														
<i>905.0 Mod, Sr90, liquid "As Received"</i>														
Strontium-90	U	3.30	+/-4.23	7.20	+/-4.27	8.00	pCi/L			KP1	08/02/23	1532	2468498	3
<i>9310, Alpha/Beta Activity, liquid "As Received"</i>														
Alpha	U	-0.908	+/-3.56	8.55	+/-3.56	15.0	pCi/L			KP1	08/01/23	1226	2468496	4
Beta	U	1.50	+/-5.22	9.51	+/-5.23	50.0	pCi/L							
<b>Rad Liquid Scintillation Analysis</b>														
<i>906.0 Mod, Tritium Dist, Liquid "As Received"</i>														
Tritium	U	169	+/-160	267	+/-163	300	pCi/L			GS3	08/01/23	1330	2468313	5
<i>Tc-02-RC-MOD, Tc99, Liquid "As Received"</i>														
Technetium-99	U	-3.00	+/-10.5	18.8	+/-10.5	25.0	pCi/L			AG2	08/06/23	2038	2467713	6

**The following Analytical Methods were performed**

Method	Description
1	Eichrom Industries, AN-1418
2	DOE EML HASL-300, Th-01-RC Modified
3	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified
4	EPA 900.0/SW846 9310
5	EPA 906.0 Modified
6	DOE EML HASL-300, Tc-02-RC Modified

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Barium-133 Tracer	AlphaSpec Ra226, Liquid "As Received"	2472113	91.1	(30%-110%)
Thorium-229 Tracer	Th-01-RC M, Th Isotopes, Liquid "As Received"	2467918	92.6	(30%-110%)
Strontium Carrier	905.0 Mod, Sr90, liquid "As Received"	2468498	68.2	(30%-110%)
Technetium-99m Tracer	Tc-02-RC-MOD, Tc99, Liquid "As Received"	2467713	93.6	(30%-110%)

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Company : Four Rivers Nuclear Partnership,  
Address : LLC  
5600 Hobbs Road

Kevil, Kentucky 42053

Report Date: November 2, 2023

Contact: Ms. Jaime Morrow

Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW393SG4-23

Project: FRNP00511

Sample ID: 631127005

Client ID: FRNP005

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Surrogate/Tracer	Recovery	Test						Batch ID	Recovery%	Acceptable Limits				

### Notes:

The MDC is a sample specific MDC.

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

### Column headers are defined as follows:

DF: Dilution Factor

Mtd.: Method

DL: Detection Limit

PF: Prep Factor

Lc/LC: Critical Level

RL: Reporting Limit

MDA: Minimum Detectable Activity

TPU: Total Propagated Uncertainty

MDC: Minimum Detectable Concentration

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## Certificate of Analysis

Company : Four Rivers Nuclear Partnership,  
Address : LLC  
5600 Hobbs Road

Kevil, Kentucky 42053

Report Date: November 2, 2023

Contact: Ms. Jaime Morrow

Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW394SG4-23

Project: FRNP00511

Sample ID: 631127007

Client ID: FRNP005

Matrix: WG

Collect Date: 27-JUL-23

Receive Date: 28-JUL-23

Collector: Client

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Alpha Spec Analysis</b>														
<i>AlphaSpec Ra226, Liquid "As Received"</i>														
Radium-226	U	-0.102	+/-0.290	0.706	+/-0.290	5.00	pCi/L			CM4	08/11/23	1244	2472113	1
<i>Th-01-RC M, Th Isotopes, Liquid "As Received"</i>														
Thorium-230	U	0.654	+/-1.71	3.16	+/-1.72	50.0	pCi/L			EJ1	08/01/23	0839	2467918	2
<b>Rad Gas Flow Proportional Counting</b>														
<i>905.0 Mod, Sr90, liquid "As Received"</i>														
Strontium-90	U	1.62	+/-3.66	6.55	+/-3.67	8.00	pCi/L			KP1	08/02/23	1532	2468498	3
<i>9310,Alpha/Beta Activity, liquid "As Received"</i>														
Alpha	U	2.27	+/-3.98	7.24	+/-4.00	15.0	pCi/L			KP1	08/01/23	1226	2468496	4
Beta	U	4.40	+/-5.48	9.28	+/-5.53	50.0	pCi/L							
<b>Rad Liquid Scintillation Analysis</b>														
<i>906.0 Mod, Tritium Dist, Liquid "As Received"</i>														
Tritium	U	103	+/-160	271	+/-161	300	pCi/L			GS3	08/01/23	1511	2468313	5
<i>Tc-02-RC-MOD, Tc99, Liquid "As Received"</i>														
Technetium-99	U	4.32	+/-10.9	18.8	+/-10.9	25.0	pCi/L			AG2	08/06/23	2055	2467713	6

**The following Analytical Methods were performed**

Method	Description
1	Eichrom Industries, AN-1418
2	DOE EML HASL-300, Th-01-RC Modified
3	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified
4	EPA 900.0/SW846 9310
5	EPA 906.0 Modified
6	DOE EML HASL-300, Tc-02-RC Modified

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Barium-133 Tracer	AlphaSpec Ra226, Liquid "As Received"	2472113	92.5	(30%-110%)
Thorium-229 Tracer	Th-01-RC M, Th Isotopes, Liquid "As Received"	2467918	98.4	(30%-110%)
Strontium Carrier	905.0 Mod, Sr90, liquid "As Received"	2468498	72.9	(30%-110%)
Technetium-99m Tracer	Tc-02-RC-MOD, Tc99, Liquid "As Received"	2467713	94	(30%-110%)

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## Certificate of Analysis

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5600 Hobbs Road

Kevil, Kentucky 42053

Report Date: November 2, 2023

Contact: Ms. Jaime Morrow

Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW394SG4-23

Project: FRNP00511

Sample ID: 631127007

Client ID: FRNP005

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Surrogate/Tracer	Recovery	Test						Batch ID	Recovery%	Acceptable Limits				

### Notes:

The MDC is a sample specific MDC.

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

### Column headers are defined as follows:

DF: Dilution Factor

Mtd.: Method

DL: Detection Limit

PF: Prep Factor

Lc/LC: Critical Level

RL: Reporting Limit

MDA: Minimum Detectable Activity

TPU: Total Propagated Uncertainty

MDC: Minimum Detectable Concentration

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## Certificate of Analysis

Company : Four Rivers Nuclear Partnership,  
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Kevil, Kentucky 42053

Report Date: November 2, 2023

Contact: Ms. Jaime Morrow

Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW395SG4-23

Project: FRNP00511

Sample ID: 631127009

Client ID: FRNP005

Matrix: WG

Collect Date: 27-JUL-23

Receive Date: 28-JUL-23

Collector: Client

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Alpha Spec Analysis</b>														
<i>AlphaSpec Ra226, Liquid "As Received"</i>														
Radium-226	U	0.324	+/-0.359	0.473	+/-0.359	5.00	pCi/L			CM4	08/11/23	1244	2472113	1
<i>Th-01-RC M, Th Isotopes, Liquid "As Received"</i>														
Thorium-230	U	0.718	+/-1.39	2.37	+/-1.40	50.0	pCi/L			EJ1	08/01/23	0839	2467918	2
<b>Rad Gas Flow Proportional Counting</b>														
<i>905.0 Mod, Sr90, liquid "As Received"</i>														
Strontium-90	U	1.52	+/-2.82	5.07	+/-2.83	8.00	pCi/L			KP1	08/08/23	1219	2468498	3
<i>9310,Alpha/Beta Activity, liquid "As Received"</i>														
Alpha	U	0.526	+/-2.42	5.33	+/-2.42	15.0	pCi/L			KP1	08/01/23	1226	2468496	4
Beta		8.57	+/-5.46	8.23	+/-5.64	50.0	pCi/L							
<b>Rad Liquid Scintillation Analysis</b>														
<i>906.0 Mod, Tritium Dist, Liquid "As Received"</i>														
Tritium	U	159	+/-153	257	+/-156	300	pCi/L			GS3	08/01/23	1653	2468313	5
<i>Tc-02-RC-MOD, Tc99, Liquid "As Received"</i>														
Technetium-99	U	3.76	+/-11.4	19.8	+/-11.4	25.0	pCi/L			AG2	08/06/23	2111	2467713	6

**The following Analytical Methods were performed**

Method	Description
1	Eichrom Industries, AN-1418
2	DOE EML HASL-300, Th-01-RC Modified
3	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified
4	EPA 900.0/SW846 9310
5	EPA 906.0 Modified
6	DOE EML HASL-300, Tc-02-RC Modified

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Barium-133 Tracer	AlphaSpec Ra226, Liquid "As Received"	2472113	90.2	(30%-110%)
Thorium-229 Tracer	Th-01-RC M, Th Isotopes, Liquid "As Received"	2467918	90.9	(30%-110%)
Strontium Carrier	905.0 Mod, Sr90, liquid "As Received"	2468498	72.9	(30%-110%)
Technetium-99m Tracer	Tc-02-RC-MOD, Tc99, Liquid "As Received"	2467713	89.3	(30%-110%)

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Kevil, Kentucky 42053

Report Date: November 2, 2023

Contact: Ms. Jaime Morrow

Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW395SG4-23

Project: FRNP00511

Sample ID: 631127009

Client ID: FRNP005

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Surrogate/Tracer	Recovery	Test						Batch ID	Recovery%	Acceptable Limits				

### Notes:

The MDC is a sample specific MDC.

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

### Column headers are defined as follows:

DF: Dilution Factor

Mtd.: Method

DL: Detection Limit

PF: Prep Factor

Lc/LC: Critical Level

RL: Reporting Limit

MDA: Minimum Detectable Activity

TPU: Total Propagated Uncertainty

MDC: Minimum Detectable Concentration

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## Certificate of Analysis

Company : Four Rivers Nuclear Partnership,  
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Report Date: November 2, 2023

Contact: Ms. Jaime Morrow

Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW396SG4-23

Project: FRNP00511

Sample ID: 631127011

Client ID: FRNP005

Matrix: WG

Collect Date: 27-JUL-23

Receive Date: 28-JUL-23

Collector: Client

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Alpha Spec Analysis</b>														
<i>AlphaSpec Ra226, Liquid "As Received"</i>														
Radium-226	U	0.133	+/-0.294	0.515	+/-0.294	5.00	pCi/L			CM4	08/11/23	1244	2472113	1
<i>Th-01-RC M, Th Isotopes, Liquid "As Received"</i>														
Thorium-230	U	1.10	+/-1.60	2.59	+/-1.61	50.0	pCi/L			EJ1	08/01/23	0839	2467918	2
<b>Rad Gas Flow Proportional Counting</b>														
<i>905.0 Mod, Sr90, liquid "As Received"</i>														
Strontium-90	U	-0.262	+/-3.39	6.51	+/-3.39	8.00	pCi/L			KP1	08/02/23	1532	2468498	3
<i>9310, Alpha/Beta Activity, liquid "As Received"</i>														
Alpha	U	-1.10	+/-3.92	9.26	+/-3.92	15.0	pCi/L			KP1	08/01/23	1226	2468496	4
Beta	U	1.61	+/-6.54	11.8	+/-6.55	50.0	pCi/L							
<b>Rad Liquid Scintillation Analysis</b>														
<i>906.0 Mod, Tritium Dist, Liquid "As Received"</i>														
Tritium	U	91.8	+/-155	263	+/-156	300	pCi/L			GS3	08/01/23	1834	2468313	5
<i>Tc-02-RC-MOD, Tc99, Liquid "As Received"</i>														
Technetium-99	U	3.97	+/-11.7	20.2	+/-11.7	25.0	pCi/L			AG2	08/06/23	2128	2467713	6

**The following Analytical Methods were performed**

Method	Description
1	Eichrom Industries, AN-1418
2	DOE EML HASL-300, Th-01-RC Modified
3	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified
4	EPA 900.0/SW846 9310
5	EPA 906.0 Modified
6	DOE EML HASL-300, Tc-02-RC Modified

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Barium-133 Tracer	AlphaSpec Ra226, Liquid "As Received"	2472113	89.6	(30%-110%)
Thorium-229 Tracer	Th-01-RC M, Th Isotopes, Liquid "As Received"	2467918	94	(30%-110%)
Strontium Carrier	905.0 Mod, Sr90, liquid "As Received"	2468498	80	(30%-110%)
Technetium-99m Tracer	Tc-02-RC-MOD, Tc99, Liquid "As Received"	2467713	87.5	(30%-110%)



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Company : Four Rivers Nuclear Partnership,  
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Kevil, Kentucky 42053

Report Date: November 2, 2023

Contact: Ms. Jaime Morrow

Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW396SG4-23

Project: FRNP00511

Sample ID: 631127011

Client ID: FRNP005

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Surrogate/Tracer	Recovery	Test						Batch ID	Recovery%	Acceptable Limits				

### Notes:

The MDC is a sample specific MDC.

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

### Column headers are defined as follows:

DF: Dilution Factor

Mtd.: Method

DL: Detection Limit

PF: Prep Factor

Lc/LC: Critical Level

RL: Reporting Limit

MDA: Minimum Detectable Activity

TPU: Total Propagated Uncertainty

MDC: Minimum Detectable Concentration

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## Certificate of Analysis

Company : Four Rivers Nuclear Partnership,  
Address : LLC  
5600 Hobbs Road

Kevil, Kentucky 42053

Report Date: November 2, 2023

Contact: Ms. Jaime Morrow

Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW397SG4-23

Project: FRNP00511

Sample ID: 631127013

Client ID: FRNP005

Matrix: WG

Collect Date: 27-JUL-23

Receive Date: 28-JUL-23

Collector: Client

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Alpha Spec Analysis</b>														
<i>AlphaSpec Ra226, Liquid "As Received"</i>														
Radium-226	U	-0.0409	+/-0.185	0.467	+/-0.185	5.00	pCi/L			CM4	08/11/23	1244	2472113	1
<i>Th-01-RC M, Th Isotopes, Liquid "As Received"</i>														
Thorium-230	U	0.174	+/-1.12	2.29	+/-1.13	50.0	pCi/L			EJ1	08/01/23	0839	2467918	2
<b>Rad Gas Flow Proportional Counting</b>														
<i>905.0 Mod, Sr90, liquid "As Received"</i>														
Strontium-90	U	0.766	+/-3.18	5.87	+/-3.18	8.00	pCi/L			KP1	08/02/23	1532	2468498	3
<i>9310, Alpha/Beta Activity, liquid "As Received"</i>														
Alpha	U	1.12	+/-2.76	5.49	+/-2.77	15.0	pCi/L			KP1	08/01/23	1226	2468496	4
Beta		13.8	+/-6.43	8.98	+/-6.84	50.0	pCi/L							
<b>Rad Liquid Scintillation Analysis</b>														
<i>906.0 Mod, Tritium Dist, Liquid "As Received"</i>														
Tritium	U	150	+/-157	264	+/-160	300	pCi/L			GS3	08/01/23	2016	2468313	5
<i>Tc-02-RC-MOD, Tc99, Liquid "As Received"</i>														
Technetium-99		27.7	+/-12.3	19.1	+/-12.7	25.0	pCi/L			AG2	08/06/23	2144	2467713	6

**The following Analytical Methods were performed**

Method	Description
1	Eichrom Industries, AN-1418
2	DOE EML HASL-300, Th-01-RC Modified
3	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified
4	EPA 900.0/SW846 9310
5	EPA 906.0 Modified
6	DOE EML HASL-300, Tc-02-RC Modified

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Barium-133 Tracer	AlphaSpec Ra226, Liquid "As Received"	2472113	92	(30%-110%)
Thorium-229 Tracer	Th-01-RC M, Th Isotopes, Liquid "As Received"	2467918	103	(30%-110%)
Strontium Carrier	905.0 Mod, Sr90, liquid "As Received"	2468498	77.6	(30%-110%)
Technetium-99m Tracer	Tc-02-RC-MOD, Tc99, Liquid "As Received"	2467713	92.7	(30%-110%)

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## Certificate of Analysis

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5600 Hobbs Road

Kevil, Kentucky 42053

Report Date: November 2, 2023

Contact: Ms. Jaime Morrow

Project: C-746-S&T Landfill Quarterly(SG23-04)

Client Sample ID: MW397SG4-23

Project: FRNP00511

Sample ID: 631127013

Client ID: FRNP005

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Surrogate/Tracer	Recovery	Test						Batch ID	Recovery%	Acceptable Limits				

### Notes:

The MDC is a sample specific MDC.

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

### Column headers are defined as follows:

DF: Dilution Factor

Mtd.: Method

DL: Detection Limit

PF: Prep Factor

Lc/LC: Critical Level

RL: Reporting Limit

MDA: Minimum Detectable Activity

TPU: Total Propagated Uncertainty

MDC: Minimum Detectable Concentration

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**ATTACHMENT C4**

**GEL LABORATORIES CERTIFICATE OF ANALYSIS**

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road

Kevil, Kentucky 42053

Contact: Ms. Jaime Morrow  
Project: C-746-U Landfill Quarterly(UG23-04)

Client Sample ID: MW369UG4-23	Project: FRNP00507
Sample ID: 630713001	Client ID: FRNP005
Matrix: WG	
Collect Date: 25-JUL-23 07:39	
Receive Date: 26-JUL-23	
Collector: Client	

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
504.1/8011 Analysis of EDB/DBCP												
8011 VOA- 1,2-Dibromo-3-chloropropane "As Received"												
1,2-Dibromo-3-chloropropane	U	0.0193	0.00867	0.0193	ug/L	0.963	1	LOF	08/02/23	1713	2468087	1
Carbon Analysis												
9060A, Total Organic Carbon "As Received"												
Total Organic Carbon Average	J	0.817	0.330	2.00	mg/L		1	RM3	07/29/23	0255	2466615	2
Flow Injection Analysis												
9012B, Cyanide, Total "As Received"												
Cyanide, Total	U	0.200	0.00167	0.200	mg/L	1.00	1	KLP1	07/27/23	1440	2465823	3
Halogen Analysis												
9020B, TOX (Organic Halogen) "As Received"												
Total Organic Halogens	J	5.18	3.33	10.0	ug/L		1	RM3	08/04/23	2044	2471469	4
Ion Chromatography												
300.0, Iodide in Liquid "As Received"												
Iodide	U	0.500	0.167	0.500	mg/L		1	LXA2	07/26/23	1851	2466163	5
SW846 9056A Anions (5 elements) "As Received"												
Bromide	W	0.325	0.0670	0.200	mg/L		1	JLD1	07/26/23	1236	2465609	6
Fluoride	J	0.228	0.0330	4.00	mg/L		1					
Sulfate		7.91	0.133	0.400	mg/L		1					
Chloride	JW	28.3	0.335	250	mg/L		5	JLD1	07/26/23	2034	2465609	7
Nitrate-N	J	0.933	0.165	10.0	mg/L		5					
Mercury Analysis-CVAA												
7470, Mercury Liquid "As Received"												
Mercury	U	0.000200	0.0000670	0.000200	mg/L	1.00	1	JP2	07/28/23	1044	2466244	8
Metals Analysis-ICP-MS												
6020, Metals (15+ elements) "As Received"												
Rhodium	U	0.00500	0.00160	0.00500	mg/L	1.00	1	PRB	08/11/23	0048	2466146	9
Tantalum	U	0.00500	0.00100	0.00500	mg/L	1.00	1					
Uranium	U	0.000200	0.0000670	0.000200	mg/L	1.00	1	PRB	08/10/23	2002	2466146	10
Boron		0.0161	0.00520	0.0150	mg/L	1.00	1	PRB	08/11/23	1206	2466146	11
Aluminum		0.112	0.0193	0.0500	mg/L	1.00	1	PRB	08/11/23	0531	2466146	12
Antimony	U	0.00300	0.00100	0.00300	mg/L	1.00	1					
Arsenic	U	0.00500	0.00200	0.00500	mg/L	1.00	1					
Barium		0.363	0.000670	0.00400	mg/L	1.00	1					
Beryllium	U	0.000500	0.000200	0.000500	mg/L	1.00	1					

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2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road

Contact: Kevil, Kentucky 42053  
Ms. Jaime Morrow  
Project: C-746-U Landfill Quarterly(UG23-04)

Client Sample ID: MW369UG4-23  
Sample ID: 630713001

Project: FRNP00507  
Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Metals Analysis-ICP-MS												
6020, Metals (15+ elements) "As Received"												
Cadmium	U	0.00100	0.000300	0.00100	mg/L	1.00	1					
Calcium		15.7	0.0800	0.200	mg/L	1.00	1					
Chromium	U	0.0100	0.00300	0.0100	mg/L	1.00	1					
Cobalt		0.00583	0.000300	0.00100	mg/L	1.00	1					
Copper		0.00504	0.000300	0.00200	mg/L	1.00	1					
Iron		0.360	0.0330	0.100	mg/L	1.00	1					
Lead	U	0.00200	0.000500	0.00200	mg/L	1.00	1					
Magnesium		6.17	0.0100	0.0300	mg/L	1.00	1					
Manganese		0.0332	0.00100	0.00500	mg/L	1.00	1					
Molybdenum	U	0.00100	0.000200	0.00100	mg/L	1.00	1					
Nickel		0.00462	0.000600	0.00200	mg/L	1.00	1					
Potassium		0.519	0.0800	0.300	mg/L	1.00	1					
Selenium	J	0.00218	0.00150	0.00500	mg/L	1.00	1					
Silver	U	0.00100	0.000300	0.00100	mg/L	1.00	1					
Sodium		47.6	0.0800	0.250	mg/L	1.00	1					
Thallium	U	0.00200	0.000600	0.00200	mg/L	1.00	1					
Vanadium	U	0.0200	0.00330	0.0200	mg/L	1.00	1					
Zinc	J	0.0123	0.00330	0.0200	mg/L	1.00	1					
Semi-Volatiles-PCB												
8082A, PCB Liquids "As Received"												
Aroclor-1016	U	0.0962	0.0320	0.0962	ug/L	0.000962	1	JXM	08/16/23	1049	2476246	13
Aroclor-1221	U	0.0962	0.0320	0.0962	ug/L	0.000962	1					
Aroclor-1232	U	0.0962	0.0320	0.0962	ug/L	0.000962	1					
Aroclor-1242	U	0.0962	0.0320	0.0962	ug/L	0.000962	1					
Aroclor-1248	U	0.0962	0.0320	0.0962	ug/L	0.000962	1					
Aroclor-1254	U	0.0962	0.0320	0.0962	ug/L	0.000962	1					
Aroclor-1260	U	0.0962	0.0320	0.0962	ug/L	0.000962	1					
Aroclor-1268	U	0.0962	0.0320	0.0962	ug/L	0.000962	1					
Aroclor-Total	U	0.0962	0.0320	0.0962	ug/L	0.000962	1					
Solids Analysis												
160.1, Dissolved Solids "As Received"												
Total Dissolved Solids		175	2.38	10.0	mg/L			CH6	07/28/23	0944	2467003	14
Spectrometric Analysis												
410.4, Chem. Oxygen Demand "As Received"												



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Kevil, Kentucky 42053

Contact: Ms. Jaime Morrow  
Project: C-746-U Landfill Quarterly(UG23-04)

Client Sample ID: MW369UG4-23  
Sample ID: 630713001

Project: FRNP00507  
Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Spectrometric Analysis</b>												
410.4, Chem. Oxygen Demand "As Received"												
COD	U	20.0	8.95	20.0	mg/L		1	JW2	07/27/23	1453	2465849	15
<b>Volatile Organics</b>												
8260D, Volatiles- full suite "As Received"												
1,1,1,2-Tetrachloroethane	U	1.00	0.333	1.00	ug/L		1	JM6	07/27/23	0948	2465652	16
1,1,1-Trichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1,2,2-Tetrachloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1,2-Trichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1-Dichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1					
1,2,3-Trichloropropane	U	1.00	0.333	1.00	ug/L		1					
1,2-Dibromoethane	U	1.00	0.333	1.00	ug/L		1					
1,2-Dichlorobenzene	U	1.00	0.333	1.00	ug/L		1					
1,2-Dichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,2-Dichloropropane	U	1.00	0.333	1.00	ug/L		1					
1,4-Dichlorobenzene	U	1.00	0.333	1.00	ug/L		1					
2-Butanone	U	5.00	1.67	5.00	ug/L		1					
2-Hexanone	U	5.00	1.67	5.00	ug/L		1					
4-Methyl-2-pentanone	U	5.00	1.67	5.00	ug/L		1					
Acetone	U	5.00	1.74	5.00	ug/L		1					
Acrolein	U	5.00	1.67	5.00	ug/L		1					
Acrylonitrile	U	5.00	1.67	5.00	ug/L		1					
Benzene	U	1.00	0.333	1.00	ug/L		1					
Bromochloromethane	U	1.00	0.333	1.00	ug/L		1					
Bromodichloromethane	U	1.00	0.333	1.00	ug/L		1					
Bromoform	U	1.00	0.333	1.00	ug/L		1					
Bromomethane	U	1.00	0.337	1.00	ug/L		1					
Carbon disulfide	U	5.00	1.67	5.00	ug/L		1					
Carbon tetrachloride	U	1.00	0.333	1.00	ug/L		1					
Chlorobenzene	U	1.00	0.333	1.00	ug/L		1					
Chloroethane	U	1.00	0.333	1.00	ug/L		1					
Chloroform	U	1.00	0.333	1.00	ug/L		1					
Chloromethane	U	1.00	0.333	1.00	ug/L		1					
Dibromochloromethane	U	1.00	0.333	1.00	ug/L		1					
Dibromomethane	U	1.00	0.333	1.00	ug/L		1					
Ethylbenzene	U	1.00	0.333	1.00	ug/L		1					
Iodomethane	U	5.00	1.67	5.00	ug/L		1					

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Contact: Kevil, Kentucky 42053  
Ms. Jaime Morrow  
Project: C-746-U Landfill Quarterly(UG23-04)

Client Sample ID: MW369UG4-23  
Sample ID: 630713001

Project: FRNP00507  
Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Volatile Organics												
8260D, Volatiles- full suite "As Received"												
Methylene chloride	U	5.00	0.500	5.00	ug/L		1					
Styrene	U	1.00	0.333	1.00	ug/L		1					
Tetrachloroethylene	U	1.00	0.333	1.00	ug/L		1					
Toluene	U	1.00	0.333	1.00	ug/L		1					
Trichloroethylene		2.27	0.333	1.00	ug/L		1					
Trichlorofluoromethane	U	1.00	0.333	1.00	ug/L		1					
Vinyl acetate	U	5.00	1.67	5.00	ug/L		1					
Vinyl chloride	U	1.00	0.333	1.00	ug/L		1					
Xylenes (total)	U	3.00	1.00	3.00	ug/L		1					
cis-1,2-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1					
cis-1,3-Dichloropropylene	U	1.00	0.333	1.00	ug/L		1					
trans-1,2-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1					
trans-1,3-Dichloropropylene	U	1.00	0.333	1.00	ug/L		1					
trans-1,4-Dichloro-2-butene	U	5.00	1.67	5.00	ug/L		1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 9010C Distillation	SW846 9010C Prep	ES2	07/27/23	1111	2466361
SW846 8011 PREP	8011 Prep	LOF	08/02/23	1201	2468080
SW846 3005A	ICP-MS 3005A PREP	CD3	07/28/23	1430	2466144
SW846 7470A Prep	EPA 7470A Mercury Prep Liquid	EK1	07/27/23	1130	2466243
SW846 3535A	SW3535A PCB SPE Extraction	LW1	08/16/23	0520	2476245

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Contact: Kevil, Kentucky 42053  
 Ms. Jaime Morrow  
 Project: C-746-U Landfill Quarterly(UG23-04)

Client Sample ID: MW369UG4-23	Project: FRNP00507
Sample ID: 630713001	Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
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The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 8011	
2	SW846 9060A	
3	SW846 9012B	
4	SW846 9020B	
5	EPA 300.0	
6	SW846 9056A	
7	SW846 9056A	
8	SW846 7470A	
9	SW846 3005A/6020B	
10	SW846 3005A/6020B	
11	SW846 3005A/6020B	
12	SW846 3005A/6020B	
13	SW846 3535A/8082A	
14	EPA 160.1	
15	EPA 410.4	
16	SW846 8260D	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
1-Chloro-2-fluorobenzene	8011 VOA- 1,2-Dibromo-3-chloropropane "As Received"	9.08 ug/L	6.88	132	(46%-159%)
Decachlorobiphenyl	8082A, PCB Liquids "As Received"	0.196 ug/L	0.192	102	(32%-135%)
4cmx	8082A, PCB Liquids "As Received"	0.127 ug/L	0.192	66	(26%-108%)
Bromofluorobenzene	8260D, Volatiles- full suite "As Received"	52.3 ug/L	50.0	105	(72%-125%)
1,2-Dichloroethane-d4	8260D, Volatiles- full suite "As Received"	47.3 ug/L	50.0	95	(73%-129%)
Toluene-d8	8260D, Volatiles- full suite "As Received"	50.2 ug/L	50.0	100	(75%-123%)

**Notes:**

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

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Kevil, Kentucky 42053

Contact: Ms. Jaime Morrow  
Project: C-746-U Landfill Quarterly(UG23-04)

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Client Sample ID:	MW369UG4-23	Project:	FRNP00507
Sample ID:	630713002	Client ID:	FRNP005
Matrix:	WG		
Collect Date:	25-JUL-23 07:39		
Receive Date:	26-JUL-23		
Collector:	Client		

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Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Metals Analysis-ICP-MS												
6020, Dissolved Metals (3 Elements) "As Received"												
Barium		0.366	0.000670	0.00400	mg/L	1.00	1	PRB	08/11/23	0534	2466146	1
Chromium	U	0.0100	0.00300	0.0100	mg/L	1.00	1					
Uranium	U	0.000200	0.0000670	0.000200	mg/L	1.00	1	PRB	08/10/23	2006	2466146	2

The following Prep Methods were performed:

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Method	Description	Analyst	Date	Time	Prep Batch
SW846 3005A	ICP-MS 3005A PREP	CD3	07/28/23	1430	2466144
EPA 160	Laboratory Filtration	AXS5	07/26/23	1420	2465786

The following Analytical Methods were performed:

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Method	Description	Analyst Comments
1	SW846 3005A/6020B	
2	SW846 3005A/6020B	

### Notes:

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

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Kevil, Kentucky 42053

Contact: Ms. Jaime Morrow  
Project: C-746-U Landfill Quarterly(UG23-04)

Client Sample ID: MW370UG4-23      Project: FRNP00507  
Sample ID: 630713003      Client ID: FRNP005  
Matrix: WG  
Collect Date: 25-JUL-23 08:25  
Receive Date: 26-JUL-23  
Collector: Client

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
504.1/8011 Analysis of EDB/DBCP												
8011 VOA- 1,2-Dibromo-3-chloropropane "As Received"												
1,2-Dibromo-3-chloropropane	U	0.0187	0.00841	0.0187	ug/L	0.935	1	LOF	08/02/23	1738	2468087	1
Carbon Analysis												
9060A, Total Organic Carbon "As Received"												
Total Organic Carbon Average	J	0.765	0.330	2.00	mg/L		1	RM3	07/29/23	0356	2466615	2
Flow Injection Analysis												
9012B, Cyanide, Total "As Received"												
Cyanide, Total	U	0.200	0.00167	0.200	mg/L	1.00	1	KLP1	07/27/23	1441	2465823	3
Halogen Analysis												
9020B, TOX (Organic Halogen) "As Received"												
Total Organic Halogens	BJ	7.64	3.33	10.0	ug/L		1	RM3	08/10/23	1320	2474234	4
Ion Chromatography												
300.0, Iodide in Liquid "As Received"												
Iodide	U	0.500	0.167	0.500	mg/L		1	LXA2	07/26/23	1903	2466163	5
SW846 9056A Anions (5 elements) "As Received"												
Bromide	W	0.675	0.0670	0.200	mg/L		1	JLD1	07/26/23	1308	2465609	6
Fluoride	J	0.170	0.0330	4.00	mg/L		1					
Chloride	JW	44.0	0.335	250	mg/L		5	JLD1	07/26/23	2210	2465609	7
Nitrate-N	J	1.02	0.165	10.0	mg/L		5					
Sulfate		20.3	0.665	2.00	mg/L		5					
Mercury Analysis-CVAA												
7470, Mercury Liquid "As Received"												
Mercury	U	0.000200	0.0000670	0.000200	mg/L	1.00	1	JP2	07/28/23	1049	2466244	8
Metals Analysis-ICP-MS												
6020, Metals (15+ elements) "As Received"												
Uranium	U	0.000200	0.0000670	0.000200	mg/L	1.00	1	PRB	08/10/23	2009	2466146	9
Rhodium	U	0.00500	0.00160	0.00500	mg/L	1.00	1	PRB	08/11/23	0050	2466146	10
Tantalum	U	0.00500	0.00100	0.00500	mg/L	1.00	1					
Boron		0.124	0.00520	0.0150	mg/L	1.00	1	PRB	08/11/23	1208	2466146	11
Aluminum	U	0.0500	0.0193	0.0500	mg/L	1.00	1	PRB	08/11/23	0538	2466146	12
Antimony	U	0.00300	0.00100	0.00300	mg/L	1.00	1					
Arsenic	U	0.00500	0.00200	0.00500	mg/L	1.00	1					
Barium		0.223	0.000670	0.00400	mg/L	1.00	1					
Beryllium	U	0.000500	0.000200	0.000500	mg/L	1.00	1					

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Client Sample ID: MW370UG4-23  
Sample ID: 630713003

Project: FRNP00507  
Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Metals Analysis-ICP-MS</b>												
<b>6020, Metals (15+ elements) "As Received"</b>												
Cadmium	U	0.00100	0.000300	0.00100	mg/L	1.00	1					
Calcium		29.3	0.0800	0.200	mg/L	1.00	1					
Chromium	U	0.0100	0.00300	0.0100	mg/L	1.00	1					
Cobalt	U	0.00100	0.000300	0.00100	mg/L	1.00	1					
Copper	J	0.00196	0.000300	0.00200	mg/L	1.00	1					
Iron	U	0.100	0.0330	0.100	mg/L	1.00	1					
Lead	U	0.00200	0.000500	0.00200	mg/L	1.00	1					
Magnesium		12.1	0.0100	0.0300	mg/L	1.00	1					
Manganese	J	0.00140	0.00100	0.00500	mg/L	1.00	1					
Molybdenum	U	0.00100	0.000200	0.00100	mg/L	1.00	1					
Nickel	J	0.000752	0.000600	0.00200	mg/L	1.00	1					
Potassium		2.49	0.0800	0.300	mg/L	1.00	1					
Selenium	U	0.00500	0.00150	0.00500	mg/L	1.00	1					
Silver	U	0.00100	0.000300	0.00100	mg/L	1.00	1					
Sodium		42.8	0.0800	0.250	mg/L	1.00	1					
Thallium	U	0.00200	0.000600	0.00200	mg/L	1.00	1					
Vanadium	U	0.0200	0.00330	0.0200	mg/L	1.00	1					
Zinc	J	0.00572	0.00330	0.0200	mg/L	1.00	1					
<b>Semi-Volatiles-PCB</b>												
<b>8082A, PCB Liquids "As Received"</b>												
Aroclor-1016	U	0.100	0.0333	0.100	ug/L	0.00100	1	JXM	08/16/23	1104	2476246	13
Aroclor-1221	U	0.100	0.0333	0.100	ug/L	0.00100	1					
Aroclor-1232	U	0.100	0.0333	0.100	ug/L	0.00100	1					
Aroclor-1242	U	0.100	0.0333	0.100	ug/L	0.00100	1					
Aroclor-1248	U	0.100	0.0333	0.100	ug/L	0.00100	1					
Aroclor-1254	U	0.100	0.0333	0.100	ug/L	0.00100	1					
Aroclor-1260	U	0.100	0.0333	0.100	ug/L	0.00100	1					
Aroclor-1268	U	0.100	0.0333	0.100	ug/L	0.00100	1					
Aroclor-Total	U	0.100	0.0333	0.100	ug/L	0.00100	1					
<b>Solids Analysis</b>												
<b>160.1, Dissolved Solids "As Received"</b>												
Total Dissolved Solids		211	2.38	10.0	mg/L			CH6	07/28/23	0944	2467003	14
<b>Spectrometric Analysis</b>												
<b>410.4, Chem. Oxygen Demand "As Received"</b>												

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Client Sample ID: MW370UG4-23

Project: FRNP00507

Sample ID: 630713003

Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Spectrometric Analysis												
410.4, Chem. Oxygen Demand "As Received"												
COD	U	20.0	8.95	20.0	mg/L		1	JW2	07/27/23	1453	2465849	15
Volatile Organics												
8260D, Volatiles- full suite "As Received"												
1,1,1,2-Tetrachloroethane	U	1.00	0.333	1.00	ug/L		1	JM6	07/27/23	1016	2465652	16
1,1,1-Trichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1,2,2-Tetrachloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1,2-Trichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1-Dichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1					
1,2,3-Trichloropropane	U	1.00	0.333	1.00	ug/L		1					
1,2-Dibromoethane	U	1.00	0.333	1.00	ug/L		1					
1,2-Dichlorobenzene	U	1.00	0.333	1.00	ug/L		1					
1,2-Dichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,2-Dichloropropane	U	1.00	0.333	1.00	ug/L		1					
1,4-Dichlorobenzene	U	1.00	0.333	1.00	ug/L		1					
2-Butanone	U	5.00	1.67	5.00	ug/L		1					
2-Hexanone	U	5.00	1.67	5.00	ug/L		1					
4-Methyl-2-pentanone	U	5.00	1.67	5.00	ug/L		1					
Acetone	U	5.00	1.74	5.00	ug/L		1					
Acrolein	U	5.00	1.67	5.00	ug/L		1					
Acrylonitrile	U	5.00	1.67	5.00	ug/L		1					
Benzene	U	1.00	0.333	1.00	ug/L		1					
Bromochloromethane	U	1.00	0.333	1.00	ug/L		1					
Bromodichloromethane	U	1.00	0.333	1.00	ug/L		1					
Bromoform	U	1.00	0.333	1.00	ug/L		1					
Bromomethane	U	1.00	0.337	1.00	ug/L		1					
Carbon disulfide	U	5.00	1.67	5.00	ug/L		1					
Carbon tetrachloride	U	1.00	0.333	1.00	ug/L		1					
Chlorobenzene	U	1.00	0.333	1.00	ug/L		1					
Chloroethane	U	1.00	0.333	1.00	ug/L		1					
Chloroform	U	1.00	0.333	1.00	ug/L		1					
Chloromethane	U	1.00	0.333	1.00	ug/L		1					
Dibromochloromethane	U	1.00	0.333	1.00	ug/L		1					
Dibromomethane	U	1.00	0.333	1.00	ug/L		1					
Ethylbenzene	U	1.00	0.333	1.00	ug/L		1					
Iodomethane	U	5.00	1.67	5.00	ug/L		1					

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
 Address : 5600 Hobbs Road

Kevil, Kentucky 42053  
 Contact: Ms. Jaime Morrow  
 Project: C-746-U Landfill Quarterly(UG23-04)

Client Sample ID: MW370UG4-23  
 Sample ID: 630713003

Project: FRNP00507  
 Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Volatile Organics												
8260D, Volatiles- full suite "As Received"												
Methylene chloride	U	5.00	0.500	5.00	ug/L		1					
Styrene	U	1.00	0.333	1.00	ug/L		1					
Tetrachloroethylene	U	1.00	0.333	1.00	ug/L		1					
Toluene	U	1.00	0.333	1.00	ug/L		1					
Trichloroethylene		5.48	0.333	1.00	ug/L		1					
Trichlorofluoromethane	U	1.00	0.333	1.00	ug/L		1					
Vinyl acetate	U	5.00	1.67	5.00	ug/L		1					
Vinyl chloride	U	1.00	0.333	1.00	ug/L		1					
Xylenes (total)	U	3.00	1.00	3.00	ug/L		1					
cis-1,2-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1					
cis-1,3-Dichloropropylene	U	1.00	0.333	1.00	ug/L		1					
trans-1,2-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1					
trans-1,3-Dichloropropylene	U	1.00	0.333	1.00	ug/L		1					
trans-1,4-Dichloro-2-butene	U	5.00	1.67	5.00	ug/L		1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 8011 PREP	8011 Prep	LOF	08/02/23	1201	2468080
SW846 3005A	ICP-MS 3005A PREP	CD3	07/28/23	1430	2466144
SW846 9010C Distillation	SW846 9010C Prep	ES2	07/27/23	1111	2466361
SW846 3535A	SW3535A PCB SPE Extraction	LW1	08/16/23	0520	2476245
SW846 7470A Prep	EPA 7470A Mercury Prep Liquid	EK1	07/27/23	1130	2466243



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Company : Four Rivers Nuclear Partnership, LLC  
 Address : 5600 Hobbs Road

Contact: Kevil, Kentucky 42053  
 Ms. Jaime Morrow  
 Project: C-746-U Landfill Quarterly(UG23-04)

Client Sample ID: MW370UG4-23	Project: FRNP00507
Sample ID: 630713003	Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst Date	Time Batch	Method
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The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 8011	
2	SW846 9060A	
3	SW846 9012B	
4	SW846 9020B	
5	EPA 300.0	
6	SW846 9056A	
7	SW846 9056A	
8	SW846 7470A	
9	SW846 3005A/6020B	
10	SW846 3005A/6020B	
11	SW846 3005A/6020B	
12	SW846 3005A/6020B	
13	SW846 3535A/8082A	
14	EPA 160.1	
15	EPA 410.4	
16	SW846 8260D	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
1-Chloro-2-fluorobenzene	8011 VOA- 1,2-Dibromo-3-chloropropane "As Received"	6.06 ug/L	6.68	91	(46%-159%)
Decachlorobiphenyl	8082A, PCB Liquids "As Received"	0.170 ug/L	0.200	85	(32%-135%)
4cmx	8082A, PCB Liquids "As Received"	0.113 ug/L	0.200	57	(26%-108%)
Bromofluorobenzene	8260D, Volatiles- full suite "As Received"	54.6 ug/L	50.0	109	(72%-125%)
1,2-Dichloroethane-d4	8260D, Volatiles- full suite "As Received"	47.9 ug/L	50.0	96	(73%-129%)
Toluene-d8	8260D, Volatiles- full suite "As Received"	50.8 ug/L	50.0	102	(75%-123%)

**Notes:**

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
 Address : 5600 Hobbs Road  
  
 Kevil, Kentucky 42053  
 Contact: Ms. Jaime Morrow  
 Project: C-746-U Landfill Quarterly(UG23-04)

Client Sample ID: MW370UG4-23	Project: FRNP00507
Sample ID: 630713004	Client ID: FRNP005
Matrix: WG	
Collect Date: 25-JUL-23 08:25	
Receive Date: 26-JUL-23	
Collector: Client	

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Metals Analysis-ICP-MS												
6020, Dissolved Metals (3 Elements) "As Received"												
Uranium	U	0.000200	0.0000670	0.000200	mg/L	1.00	1	PRB	08/10/23	2034	2466146	1
Barium		0.223	0.000670	0.00400	mg/L	1.00	1	PRB	08/11/23	0603	2466146	2
Chromium	U	0.0100	0.00300	0.0100	mg/L	1.00	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 160	Laboratory Filtration	AXS5	07/26/23	1420	2465786
SW846 3005A	ICP-MS 3005A PREP	CD3	07/28/23	1430	2466144

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 3005A/6020B	
2	SW846 3005A/6020B	

**Notes:**

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road

Kevil, Kentucky 42053

Contact: Ms. Jaime Morrow  
Project: C-746-U Landfill Quarterly(UG23-04)

Client Sample ID: MW371UG4-23      Project: FRNP00507  
Sample ID: 630713005      Client ID: FRNP005  
Matrix: WG  
Collect Date: 25-JUL-23 09:26  
Receive Date: 26-JUL-23  
Collector: Client

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
504.1/8011 Analysis of EDB/DBCP												
8011 VOA- 1,2-Dibromo-3-chloropropane "As Received"												
1,2-Dibromo-3-chloropropane	U	0.0190	0.00854	0.0190	ug/L	0.949	1	LOF	08/02/23	1852	2468087	1
Carbon Analysis												
9060A, Total Organic Carbon "As Received"												
Total Organic Carbon Average	J	1.72	0.330	2.00	mg/L		1	RM3	07/29/23	0554	2466615	2
Flow Injection Analysis												
9012B, Cyanide, Total "As Received"												
Cyanide, Total	J	0.0168	0.00167	0.200	mg/L	1.00	1	KLP1	07/27/23	1445	2465823	3
Halogen Analysis												
9020B, TOX (Organic Halogen) "As Received"												
Total Organic Halogens	J	5.30	3.33	10.0	ug/L		1	RM3	08/07/23	1429	2472135	4
Ion Chromatography												
300.0, Iodide in Liquid "As Received"												
Iodide	U	0.500	0.167	0.500	mg/L		1	LXA2	07/26/23	1942	2466163	5
SW846 9056A Anions (5 elements) "As Received"												
Nitrate-N	J	0.166	0.165	10.0	mg/L		5	JLD1	07/26/23	2345	2465609	6
Sulfate		28.6	0.665	2.00	mg/L		5					
Bromide	UW	0.200	0.0670	0.200	mg/L		1	JLD1	07/26/23	1340	2465609	7
Chloride	JW	3.49	0.0670	250	mg/L		1					
Fluoride	J	0.180	0.0330	4.00	mg/L		1					
Mercury Analysis-CVAA												
7470, Mercury Liquid "As Received"												
Mercury	U	0.000200	0.0000670	0.000200	mg/L	1.00	1	JP2	07/28/23	1057	2466244	8
Metals Analysis-ICP-MS												
6020, Metals (15+ elements) "As Received"												
Boron	J	0.00544	0.00520	0.0150	mg/L	1.00	1	PRB	08/11/23	1222	2466146	9
Aluminum		0.178	0.0193	0.0500	mg/L	1.00	1	PRB	08/11/23	0621	2466146	10
Antimony	U	0.00300	0.00100	0.00300	mg/L	1.00	1					
Arsenic	U	0.00500	0.00200	0.00500	mg/L	1.00	1					
Barium		0.115	0.000670	0.00400	mg/L	1.00	1					
Beryllium	U	0.000500	0.000200	0.000500	mg/L	1.00	1					
Cadmium	U	0.00100	0.000300	0.00100	mg/L	1.00	1					
Chromium	U	0.0100	0.00300	0.0100	mg/L	1.00	1					
Cobalt	U	0.00100	0.000300	0.00100	mg/L	1.00	1					

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Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road

Contact: Kevil, Kentucky 42053  
Ms. Jaime Morrow  
Project: C-746-U Landfill Quarterly(UG23-04)

Client Sample ID: MW371UG4-23 Project: FRNP00507  
Sample ID: 630713005 Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Metals Analysis-ICP-MS</b>												
<b>6020, Metals (15+ elements) "As Received"</b>												
Copper	J	0.00141	0.000300	0.00200	mg/L	1.00	1					
Iron		0.143	0.0330	0.100	mg/L	1.00	1					
Lead	U	0.00200	0.000500	0.00200	mg/L	1.00	1					
Magnesium		14.5	0.0100	0.0300	mg/L	1.00	1					
Manganese	J	0.00230	0.00100	0.00500	mg/L	1.00	1					
Molybdenum	J	0.000440	0.000200	0.00100	mg/L	1.00	1					
Nickel	J	0.00163	0.000600	0.00200	mg/L	1.00	1					
Potassium		0.375	0.0800	0.300	mg/L	1.00	1					
Selenium	U	0.00500	0.00150	0.00500	mg/L	1.00	1					
Silver	U	0.00100	0.000300	0.00100	mg/L	1.00	1					
Thallium	U	0.00200	0.000600	0.00200	mg/L	1.00	1					
Vanadium	J	0.00428	0.00330	0.0200	mg/L	1.00	1					
Zinc	J	0.00463	0.00330	0.0200	mg/L	1.00	1					
Uranium		0.00120	0.0000670	0.000200	mg/L	1.00	1	PRB	08/10/23	2052	2466146	11
Calcium		60.9	0.800	2.00	mg/L	1.00	10	PRB	08/11/23	1231	2466146	12
Sodium		65.3	0.800	2.50	mg/L	1.00	10					
Rhodium	U	0.00500	0.00160	0.00500	mg/L	1.00	1	PRB	08/11/23	0104	2466146	13
Tantalum	U	0.00500	0.00100	0.00500	mg/L	1.00	1					
<b>Semi-Volatiles-PCB</b>												
<b>8082A, PCB Liquids "As Received"</b>												
Aroclor-1016	U	0.0984	0.0328	0.0984	ug/L	0.000984	1	JXM	08/16/23	1147	2476246	14
Aroclor-1221	U	0.0984	0.0328	0.0984	ug/L	0.000984	1					
Aroclor-1232	U	0.0984	0.0328	0.0984	ug/L	0.000984	1					
Aroclor-1242	U	0.0984	0.0328	0.0984	ug/L	0.000984	1					
Aroclor-1248	U	0.0984	0.0328	0.0984	ug/L	0.000984	1					
Aroclor-1254	U	0.0984	0.0328	0.0984	ug/L	0.000984	1					
Aroclor-1260	U	0.0984	0.0328	0.0984	ug/L	0.000984	1					
Aroclor-1268	U	0.0984	0.0328	0.0984	ug/L	0.000984	1					
Aroclor-Total	U	0.0984	0.0328	0.0984	ug/L	0.000984	1					
<b>Solids Analysis</b>												
<b>160.1, Dissolved Solids "As Received"</b>												
Total Dissolved Solids		362	2.38	10.0	mg/L			CH6	07/28/23	0944	2467003	15
<b>Spectrometric Analysis</b>												
<b>410.4, Chem. Oxygen Demand "As Received"</b>												

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road

Contact: Kevil, Kentucky 42053  
Project: Ms. Jaime Morrow  
C-746-U Landfill Quarterly(UG23-04)

Client Sample ID: MW371UG4-23  
Sample ID: 630713005

Project: FRNP00507  
Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Spectrometric Analysis												
410.4, Chem. Oxygen Demand "As Received"												
COD	U	20.0	8.95	20.0	mg/L		1	JW2	07/27/23	1454	2465849	16
Volatile Organics												
8260D, Volatiles- full suite "As Received"												
1,1,1,2-Tetrachloroethane	U	1.00	0.333	1.00	ug/L		1	JM6	07/27/23	1044	2465652	17
1,1,1-Trichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1,2,2-Tetrachloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1,2-Trichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1-Dichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1					
1,2,3-Trichloropropane	U	1.00	0.333	1.00	ug/L		1					
1,2-Dibromoethane	U	1.00	0.333	1.00	ug/L		1					
1,2-Dichlorobenzene	U	1.00	0.333	1.00	ug/L		1					
1,2-Dichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,2-Dichloropropane	U	1.00	0.333	1.00	ug/L		1					
1,4-Dichlorobenzene	U	1.00	0.333	1.00	ug/L		1					
2-Butanone	U	5.00	1.67	5.00	ug/L		1					
2-Hexanone	U	5.00	1.67	5.00	ug/L		1					
4-Methyl-2-pentanone	U	5.00	1.67	5.00	ug/L		1					
Acetone	U	5.00	1.74	5.00	ug/L		1					
Acrolein	U	5.00	1.67	5.00	ug/L		1					
Acrylonitrile	U	5.00	1.67	5.00	ug/L		1					
Benzene	U	1.00	0.333	1.00	ug/L		1					
Bromochloromethane	U	1.00	0.333	1.00	ug/L		1					
Bromodichloromethane	U	1.00	0.333	1.00	ug/L		1					
Bromoform	U	1.00	0.333	1.00	ug/L		1					
Bromomethane	U	1.00	0.337	1.00	ug/L		1					
Carbon disulfide	U	5.00	1.67	5.00	ug/L		1					
Carbon tetrachloride	U	1.00	0.333	1.00	ug/L		1					
Chlorobenzene	U	1.00	0.333	1.00	ug/L		1					
Chloroethane	U	1.00	0.333	1.00	ug/L		1					
Chloroform	U	1.00	0.333	1.00	ug/L		1					
Chloromethane	U	1.00	0.333	1.00	ug/L		1					
Dibromochloromethane	U	1.00	0.333	1.00	ug/L		1					
Dibromomethane	U	1.00	0.333	1.00	ug/L		1					
Ethylbenzene	U	1.00	0.333	1.00	ug/L		1					
Iodomethane	U	5.00	1.67	5.00	ug/L		1					

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Contact: Kevil, Kentucky 42053  
Ms. Jaime Morrow  
Project: C-746-U Landfill Quarterly(UG23-04)

Client Sample ID: MW371UG4-23  
Sample ID: 630713005

Project: FRNP00507  
Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Volatile Organics												
8260D, Volatiles- full suite "As Received"												
Methylene chloride	U	5.00	0.500	5.00	ug/L		1					
Styrene	U	1.00	0.333	1.00	ug/L		1					
Tetrachloroethylene	U	1.00	0.333	1.00	ug/L		1					
Toluene	U	1.00	0.333	1.00	ug/L		1					
Trichloroethylene	U	1.00	0.333	1.00	ug/L		1					
Trichlorofluoromethane	U	1.00	0.333	1.00	ug/L		1					
Vinyl acetate	U	5.00	1.67	5.00	ug/L		1					
Vinyl chloride	U	1.00	0.333	1.00	ug/L		1					
Xylenes (total)	U	3.00	1.00	3.00	ug/L		1					
cis-1,2-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1					
cis-1,3-Dichloropropylene	U	1.00	0.333	1.00	ug/L		1					
trans-1,2-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1					
trans-1,3-Dichloropropylene	U	1.00	0.333	1.00	ug/L		1					
trans-1,4-Dichloro-2-butene	U	5.00	1.67	5.00	ug/L		1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3005A	ICP-MS 3005A PREP	CD3	07/28/23	1430	2466144
SW846 8011 PREP	8011 Prep	LOF	08/02/23	1201	2468080
SW846 7470A Prep	EPA 7470A Mercury Prep Liquid	EK1	07/27/23	1130	2466243
SW846 9010C Distillation	SW846 9010C Prep	ES2	07/27/23	1111	2466361
SW846 3535A	SW3535A PCB SPE Extraction	LW1	08/16/23	0520	2476245

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 Address : 5600 Hobbs Road

Contact: Kevil, Kentucky 42053  
 Ms. Jaime Morrow  
 Project: C-746-U Landfill Quarterly(UG23-04)

Client Sample ID: MW371UG4-23	Project: FRNP00507
Sample ID: 630713005	Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time Batch	Method
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The following Analytical Methods were performed:

Method	Description	Analyst	Comments
1	SW846 8011		
2	SW846 9060A		
3	SW846 9012B		
4	SW846 9020B		
5	EPA 300.0		
6	SW846 9056A		
7	SW846 9056A		
8	SW846 7470A		
9	SW846 3005A/6020B		
10	SW846 3005A/6020B		
11	SW846 3005A/6020B		
12	SW846 3005A/6020B		
13	SW846 3005A/6020B		
14	SW846 3535A/8082A		
15	EPA 160.1		
16	EPA 410.4		
17	SW846 8260D		

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
1-Chloro-2-fluorobenzene	8011 VOA- 1,2-Dibromo-3-chloropropane "As Received"	7.25 ug/L	6.78	107	(46%-159%)
Decachlorobiphenyl	8082A, PCB Liquids "As Received"	0.174 ug/L	0.197	88	(32%-135%)
4cmx	8082A, PCB Liquids "As Received"	0.116 ug/L	0.197	59	(26%-108%)
Bromofluorobenzene	8260D, Volatiles- full suite "As Received"	54.7 ug/L	50.0	109	(72%-125%)
1,2-Dichloroethane-d4	8260D, Volatiles- full suite "As Received"	48.3 ug/L	50.0	97	(73%-129%)
Toluene-d8	8260D, Volatiles- full suite "As Received"	49.4 ug/L	50.0	99	(75%-123%)

**Notes:**

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

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Kevil, Kentucky 42053

Contact: Ms. Jaime Morrow  
Project: C-746-U Landfill Quarterly(UG23-04)

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Client Sample ID: MW371UG4-23      Project: FRNP00507  
Sample ID: 630713006      Client ID: FRNP005  
Matrix: WG  
Collect Date: 25-JUL-23 09:26  
Receive Date: 26-JUL-23  
Collector: Client

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Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Metals Analysis-ICP-MS												
6020, Dissolved Metals (3 Elements) "As Received"												
Barium		0.117	0.000670	0.00400	mg/L	1.00	1	PRB	08/11/23	0625	2466146	1
Chromium	U	0.0100	0.00300	0.0100	mg/L	1.00	1					
Uranium		0.00118	0.0000670	0.000200	mg/L	1.00	1	PRB	08/10/23	2056	2466146	2

### The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3005A	ICP-MS 3005A PREP	CD3	07/28/23	1430	2466144
EPA 160	Laboratory Filtration	AXS5	07/26/23	1420	2465786

### The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 3005A/6020B	
2	SW846 3005A/6020B	

### Notes:

*Column headers are defined as follows:*

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit



# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
 Address : 5600 Hobbs Road

Kevil, Kentucky 42053

Contact: Ms. Jaime Morrow  
 Project: C-746-U Landfill Quarterly(UG23-04)

Client Sample ID: MW372UG4-23	Project: FRNP00507
Sample ID: 630713007	Client ID: FRNP005
Matrix: WG	
Collect Date: 25-JUL-23 10:55	
Receive Date: 26-JUL-23	
Collector: Client	

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
504.1/8011 Analysis of EDB/DBCP												
8011 VOA- 1,2-Dibromo-3-chloropropane "As Received"												
1,2-Dibromo-3-chloropropane	U	0.0189	0.00849	0.0189	ug/L	0.943	1	LOF	08/02/23	1917	2468087	1
Carbon Analysis												
9060A, Total Organic Carbon "As Received"												
Total Organic Carbon Average	J	0.881	0.330	2.00	mg/L		1	RM3	07/29/23	0633	2466615	2
Flow Injection Analysis												
9012B, Cyanide, Total "As Received"												
Cyanide, Total	J	0.00437	0.00167	0.200	mg/L	1.00	1	KLP1	07/27/23	1449	2465823	3
Halogen Analysis												
9020B, TOX (Organic Halogen) "As Received"												
Total Organic Halogens	J	9.56	3.33	10.0	ug/L		1	RM3	08/07/23	1549	2472135	4
Ion Chromatography												
300.0, Iodide in Liquid "As Received"												
Iodide	U	0.500	0.167	0.500	mg/L		1	LXA2	07/26/23	1955	2466163	5
SW846 9056A Anions (5 elements) "As Received"												
Chloride	JW	38.7	0.335	250	mg/L		5	JLD1	07/27/23	0017	2465609	6
Nitrate-N	J	0.742	0.165	10.0	mg/L		5					
Bromide	W	0.595	0.0670	0.200	mg/L		1	JLD1	07/26/23	1412	2465609	7
Fluoride	J	0.175	0.0330	4.00	mg/L		1					
Sulfate		145	3.33	10.0	mg/L		25	JLD1	07/27/23	0049	2465609	8
Mercury Analysis-CVAA												
7470, Mercury Liquid "As Received"												
Mercury	U	0.000200	0.0000670	0.000200	mg/L	1.00	1	JP2	07/28/23	1059	2466244	9
Metals Analysis-ICP-MS												
6020, Metals (15+ elements) "As Received"												
Rhodium	U	0.00500	0.00160	0.00500	mg/L	1.00	1	PRB	08/11/23	0106	2466146	10
Tantalum	U	0.00500	0.00100	0.00500	mg/L	1.00	1					
Boron		1.29	0.0520	0.150	mg/L	1.00	10	PRB	08/11/23	1233	2466146	11
Calcium		61.0	0.800	2.00	mg/L	1.00	10					
Sodium		56.9	0.800	2.50	mg/L	1.00	10					
Uranium	U	0.000200	0.0000670	0.000200	mg/L	1.00	1	PRB	08/10/23	2100	2466146	12
Aluminum	U	0.0500	0.0193	0.0500	mg/L	1.00	1	PRB	08/11/23	0628	2466146	13
Antimony	U	0.00300	0.00100	0.00300	mg/L	1.00	1					
Arsenic	U	0.00500	0.00200	0.00500	mg/L	1.00	1					

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road

Contact: Kevil, Kentucky 42053  
Ms. Jaime Morrow  
Project: C-746-U Landfill Quarterly(UG23-04)

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Client Sample ID: MW372UG4-23	Project: FRNP00507
Sample ID: 630713007	Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Metals Analysis-ICP-MS</b>												
<b>6020, Metals (15+ elements) "As Received"</b>												
Barium		0.0596	0.000670	0.00400	mg/L	1.00	1					
Beryllium	U	0.000500	0.000200	0.000500	mg/L	1.00	1					
Cadmium	U	0.00100	0.000300	0.00100	mg/L	1.00	1					
Chromium	U	0.0100	0.00300	0.0100	mg/L	1.00	1					
Cobalt	J	0.000305	0.000300	0.00100	mg/L	1.00	1					
Copper	J	0.00127	0.000300	0.00200	mg/L	1.00	1					
Iron	U	0.100	0.0330	0.100	mg/L	1.00	1					
Lead	U	0.00200	0.000500	0.00200	mg/L	1.00	1					
Magnesium		21.1	0.0100	0.0300	mg/L	1.00	1					
Manganese	J	0.00157	0.00100	0.00500	mg/L	1.00	1					
Molybdenum	J	0.000202	0.000200	0.00100	mg/L	1.00	1					
Nickel	J	0.000929	0.000600	0.00200	mg/L	1.00	1					
Potassium		2.30	0.0800	0.300	mg/L	1.00	1					
Selenium	U	0.00500	0.00150	0.00500	mg/L	1.00	1					
Silver	U	0.00100	0.000300	0.00100	mg/L	1.00	1					
Thallium	U	0.00200	0.000600	0.00200	mg/L	1.00	1					
Vanadium	U	0.0200	0.00330	0.0200	mg/L	1.00	1					
Zinc	J	0.00431	0.00330	0.0200	mg/L	1.00	1					
<b>Semi-Volatiles-PCB</b>												
<b>8082A, PCB Liquids "As Received"</b>												
Aroclor-1016	U	0.102	0.0338	0.102	ug/L	0.00102	1	JXM	08/16/23	1201	2476246	14
Aroclor-1221	U	0.102	0.0338	0.102	ug/L	0.00102	1					
Aroclor-1232	U	0.102	0.0338	0.102	ug/L	0.00102	1					
Aroclor-1242	U	0.102	0.0338	0.102	ug/L	0.00102	1					
Aroclor-1248	U	0.102	0.0338	0.102	ug/L	0.00102	1					
Aroclor-1254	U	0.102	0.0338	0.102	ug/L	0.00102	1					
Aroclor-1260	U	0.102	0.0338	0.102	ug/L	0.00102	1					
Aroclor-1268	U	0.102	0.0338	0.102	ug/L	0.00102	1					
Aroclor-Total	U	0.102	0.0338	0.102	ug/L	0.00102	1					
<b>Solids Analysis</b>												
<b>160.1, Dissolved Solids "As Received"</b>												
Total Dissolved Solids		423	2.38	10.0	mg/L			CH6	07/28/23	0944	2467003	15
<b>Spectrometric Analysis</b>												
<b>410.4, Chem. Oxygen Demand "As Received"</b>												

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## Certificate of Analysis

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Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road

Contact: Kevil, Kentucky 42053  
Ms. Jaime Morrow  
Project: C-746-U Landfill Quarterly(UG23-04)

Client Sample ID: MW372UG4-23  
Sample ID: 630713007

Project: FRNP00507  
Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Spectrometric Analysis												
410.4, Chem. Oxygen Demand "As Received"												
COD	U	20.0	8.95	20.0	mg/L		1	JW2	07/27/23	1454	2465849	16
Volatile Organics												
8260D, Volatiles- full suite "As Received"												
1,1,1,2-Tetrachloroethane	U	1.00	0.333	1.00	ug/L		1	JM6	07/27/23	1304	2465652	17
1,1,1-Trichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1,2,2-Tetrachloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1,2-Trichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1-Dichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1					
1,2,3-Trichloropropane	U	1.00	0.333	1.00	ug/L		1					
1,2-Dibromoethane	U	1.00	0.333	1.00	ug/L		1					
1,2-Dichlorobenzene	U	1.00	0.333	1.00	ug/L		1					
1,2-Dichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,2-Dichloropropane	U	1.00	0.333	1.00	ug/L		1					
1,4-Dichlorobenzene	U	1.00	0.333	1.00	ug/L		1					
2-Butanone	U	5.00	1.67	5.00	ug/L		1					
2-Hexanone	U	5.00	1.67	5.00	ug/L		1					
4-Methyl-2-pentanone	U	5.00	1.67	5.00	ug/L		1					
Acetone	U	5.00	1.74	5.00	ug/L		1					
Acrolein	U	5.00	1.67	5.00	ug/L		1					
Acrylonitrile	U	5.00	1.67	5.00	ug/L		1					
Benzene	U	1.00	0.333	1.00	ug/L		1					
Bromochloromethane	U	1.00	0.333	1.00	ug/L		1					
Bromodichloromethane	U	1.00	0.333	1.00	ug/L		1					
Bromoform	U	1.00	0.333	1.00	ug/L		1					
Bromomethane	U	1.00	0.337	1.00	ug/L		1					
Carbon disulfide	U	5.00	1.67	5.00	ug/L		1					
Carbon tetrachloride	U	1.00	0.333	1.00	ug/L		1					
Chlorobenzene	U	1.00	0.333	1.00	ug/L		1					
Chloroethane	U	1.00	0.333	1.00	ug/L		1					
Chloroform	U	1.00	0.333	1.00	ug/L		1					
Chloromethane	U	1.00	0.333	1.00	ug/L		1					
Dibromochloromethane	U	1.00	0.333	1.00	ug/L		1					
Dibromomethane	U	1.00	0.333	1.00	ug/L		1					
Ethylbenzene	U	1.00	0.333	1.00	ug/L		1					
Iodomethane	U	5.00	1.67	5.00	ug/L		1					

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Address : 5600 Hobbs Road

Contact: Kevil, Kentucky 42053  
Ms. Jaime Morrow  
Project: C-746-U Landfill Quarterly(UG23-04)

Client Sample ID: MW372UG4-23  
Sample ID: 630713007

Project: FRNP00507  
Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Volatile Organics												
8260D, Volatiles- full suite "As Received"												
Methylene chloride	U	5.00	0.500	5.00	ug/L		1					
Styrene	U	1.00	0.333	1.00	ug/L		1					
Tetrachloroethylene	U	1.00	0.333	1.00	ug/L		1					
Toluene	U	1.00	0.333	1.00	ug/L		1					
Trichloroethylene		5.09	0.333	1.00	ug/L		1					
Trichlorofluoromethane	U	1.00	0.333	1.00	ug/L		1					
Vinyl acetate	U	5.00	1.67	5.00	ug/L		1					
Vinyl chloride	U	1.00	0.333	1.00	ug/L		1					
Xylenes (total)	U	3.00	1.00	3.00	ug/L		1					
cis-1,2-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1					
cis-1,3-Dichloropropylene	U	1.00	0.333	1.00	ug/L		1					
trans-1,2-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1					
trans-1,3-Dichloropropylene	U	1.00	0.333	1.00	ug/L		1					
trans-1,4-Dichloro-2-butene	U	5.00	1.67	5.00	ug/L		1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 7470A Prep	EPA 7470A Mercury Prep Liquid	EK1	07/27/23	1130	2466243
SW846 3005A	ICP-MS 3005A PREP	CD3	07/28/23	1430	2466144
SW846 9010C Distillation	SW846 9010C Prep	ES2	07/27/23	1111	2466361
SW846 3535A	SW3535A PCB SPE Extraction	LW1	08/16/23	0520	2476245
SW846 8011 PREP	8011 Prep	LOF	08/02/23	1201	2468080

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road

Contact: Kevil, Kentucky 42053  
Ms. Jaime Morrow  
Project: C-746-U Landfill Quarterly(UG23-04)

Client Sample ID: MW372UG4-23	Project: FRNP00507
Sample ID: 630713007	Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time Batch	Method
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The following Analytical Methods were performed:

Method	Description	Analyst	Comments
1	SW846 8011		
2	SW846 9060A		
3	SW846 9012B		
4	SW846 9020B		
5	EPA 300.0		
6	SW846 9056A		
7	SW846 9056A		
8	SW846 9056A		
9	SW846 7470A		
10	SW846 3005A/6020B		
11	SW846 3005A/6020B		
12	SW846 3005A/6020B		
13	SW846 3005A/6020B		
14	SW846 3535A/8082A		
15	EPA 160.1		
16	EPA 410.4		
17	SW846 8260D		

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
1-Chloro-2-fluorobenzene	8011 VOA- 1,2-Dibromo-3-chloropropane "As Received"	5.96 ug/L	6.74	88	(46%-159%)
Decachlorobiphenyl	8082A, PCB Liquids "As Received"	0.228 ug/L	0.203	112	(32%-135%)
4cmx	8082A, PCB Liquids "As Received"	0.139 ug/L	0.203	69	(26%-108%)
Bromofluorobenzene	8260D, Volatiles- full suite "As Received"	54.8 ug/L	50.0	110	(72%-125%)
1,2-Dichloroethane-d4	8260D, Volatiles- full suite "As Received"	49.4 ug/L	50.0	99	(73%-129%)
Toluene-d8	8260D, Volatiles- full suite "As Received"	49.7 ug/L	50.0	99	(75%-123%)

**Notes:**

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
 Address : 5600 Hobbs Road

Kevil, Kentucky 42053

Contact: Ms. Jaime Morrow  
 Project: C-746-U Landfill Quarterly(UG23-04)

Client Sample ID: MW372UG4-23	Project: FRNP00507
Sample ID: 630713008	Client ID: FRNP005
Matrix: WG	
Collect Date: 25-JUL-23 10:55	
Receive Date: 26-JUL-23	
Collector: Client	

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Metals Analysis-ICP-MS</b>												
6020, Dissolved Metals (3 Elements) "As Received"												
Uranium	U	0.000200	0.0000670	0.000200	mg/L	1.00	1	PRB	08/10/23	2111	2466146	1
Barium		0.0630	0.000670	0.00400	mg/L	1.00	1	PRB	08/11/23	0639	2466146	2
Chromium	U	0.0100	0.00300	0.0100	mg/L	1.00	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3005A	ICP-MS 3005A PREP	CD3	07/28/23	1430	2466144
EPA 160	Laboratory Filtration	AXS5	07/26/23	1420	2465786

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 3005A/6020B	
2	SW846 3005A/6020B	

**Notes:**

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road

Kevil, Kentucky 42053

Contact: Ms. Jaime Morrow  
Project: C-746-U Landfill Quarterly(UG23-04)

Client Sample ID: MW373UG4-23	Project: FRNP00507
Sample ID: 630713009	Client ID: FRNP005
Matrix: WG	
Collect Date: 25-JUL-23 11:39	
Receive Date: 26-JUL-23	
Collector: Client	

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>504.1/8011 Analysis of EDB/DBCP</b>												
<b>8011 VOA- 1,2-Dibromo-3-chloropropane "As Received"</b>												
1,2-Dibromo-3-chloropropane	U	0.0191	0.00858	0.0191	ug/L	0.954	1	LOF	08/02/23	1941	2468087	1
<b>Carbon Analysis</b>												
<b>9060A, Total Organic Carbon "As Received"</b>												
Total Organic Carbon Average	J	1.22	0.330	2.00	mg/L		1	RM3	07/29/23	0712	2466615	2
<b>Flow Injection Analysis</b>												
<b>9012B, Cyanide, Total "As Received"</b>												
Cyanide, Total	J	0.00361	0.00167	0.200	mg/L	1.00	1	KLP1	07/27/23	1450	2465823	3
<b>Halogen Analysis</b>												
<b>9020B, TOX (Organic Halogen) "As Received"</b>												
Total Organic Halogens	J	9.20	3.33	10.0	ug/L		1	RM3	08/07/23	1627	2472135	4
<b>Ion Chromatography</b>												
<b>300.0, Iodide in Liquid "As Received"</b>												
Iodide	U	0.500	0.167	0.500	mg/L		1	LXA2	07/26/23	2008	2466163	5
<b>SW846 9056A Anions (5 elements) "As Received"</b>												
Bromide	JW	0.463	0.335	1.00	mg/L		5	JLD1	07/27/23	0121	2465609	6
Nitrate-N	J	0.658	0.165	10.0	mg/L		5					
Fluoride	J	0.187	0.0330	4.00	mg/L		1	JLD1	07/26/23	1547	2465609	7
Chloride	JW	32.1	1.68	250	mg/L		25	JLD1	07/27/23	0153	2465609	8
Sulfate		180	3.33	10.0	mg/L		25					
<b>Mercury Analysis-CVAA</b>												
<b>7470, Mercury Liquid "As Received"</b>												
Mercury	U	0.000200	0.0000670	0.000200	mg/L	1.00	1	JP2	07/28/23	1101	2466244	9
<b>Metals Analysis-ICP-MS</b>												
<b>6020, Metals (15+ elements) "As Received"</b>												
Aluminum	U	0.0500	0.0193	0.0500	mg/L	1.00	1	PRB	08/11/23	0643	2466146	10
Antimony	U	0.00300	0.00100	0.00300	mg/L	1.00	1					
Arsenic	U	0.00500	0.00200	0.00500	mg/L	1.00	1					
Barium		0.0342	0.000670	0.00400	mg/L	1.00	1					
Beryllium	U	0.000500	0.000200	0.000500	mg/L	1.00	1					
Cadmium	U	0.00100	0.000300	0.00100	mg/L	1.00	1					
Chromium	U	0.0100	0.00300	0.0100	mg/L	1.00	1					
Cobalt	U	0.00100	0.000300	0.00100	mg/L	1.00	1					
Copper	J	0.00112	0.000300	0.00200	mg/L	1.00	1					

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
 Address : 5600 Hobbs Road

Contact: Ms. Jaime Morrow  
 Project: C-746-U Landfill Quarterly(UG23-04)

Client Sample ID: MW373UG4-23 Project: FRNP00507  
 Sample ID: 630713009 Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Metals Analysis-ICP-MS</b>												
<b>6020, Metals (15+ elements) "As Received"</b>												
Iron	J	0.0429	0.0330	0.100	mg/L	1.00	1					
Lead	U	0.00200	0.000500	0.00200	mg/L	1.00	1					
Magnesium		26.6	0.0100	0.0300	mg/L	1.00	1					
Manganese		0.0518	0.00100	0.00500	mg/L	1.00	1					
Molybdenum	U	0.00100	0.000200	0.00100	mg/L	1.00	1					
Nickel	J	0.00168	0.000600	0.00200	mg/L	1.00	1					
Potassium		2.73	0.0800	0.300	mg/L	1.00	1					
Selenium	U	0.00500	0.00150	0.00500	mg/L	1.00	1					
Silver	U	0.00100	0.000300	0.00100	mg/L	1.00	1					
Thallium	U	0.00200	0.000600	0.00200	mg/L	1.00	1					
Vanadium	U	0.0200	0.00330	0.0200	mg/L	1.00	1					
Zinc	J	0.00448	0.00330	0.0200	mg/L	1.00	1					
Uranium	U	0.000200	0.0000670	0.000200	mg/L	1.00	1	PRB	08/10/23	2114	2466146	11
Rhodium	U	0.00500	0.00160	0.00500	mg/L	1.00	1	PRB	08/11/23	0108	2466146	12
Tantalum	U	0.00500	0.00100	0.00500	mg/L	1.00	1					
Boron		2.01	0.104	0.300	mg/L	1.00	20	PRB	08/11/23	1250	2466146	13
Calcium		78.7	1.60	4.00	mg/L	1.00	20					
Sodium		62.9	1.60	5.00	mg/L	1.00	20					
<b>Semi-Volatiles-PCB</b>												
<b>8082A, PCB Liquids "As Received"</b>												
Aroclor-1016	U	0.102	0.0341	0.102	ug/L	0.00102	1	JXM	08/16/23	1216	2476246	14
Aroclor-1221	U	0.102	0.0341	0.102	ug/L	0.00102	1					
Aroclor-1232	U	0.102	0.0341	0.102	ug/L	0.00102	1					
Aroclor-1242	U	0.102	0.0341	0.102	ug/L	0.00102	1					
Aroclor-1248	U	0.102	0.0341	0.102	ug/L	0.00102	1					
Aroclor-1254	U	0.102	0.0341	0.102	ug/L	0.00102	1					
Aroclor-1260	U	0.102	0.0341	0.102	ug/L	0.00102	1					
Aroclor-1268	U	0.102	0.0341	0.102	ug/L	0.00102	1					
Aroclor-Total	U	0.102	0.0341	0.102	ug/L	0.00102	1					
<b>Solids Analysis</b>												
<b>160.1, Dissolved Solids "As Received"</b>												
Total Dissolved Solids		514	2.38	10.0	mg/L			CH6	07/28/23	0944	2467003	15
<b>Spectrometric Analysis</b>												
<b>410.4, Chem. Oxygen Demand "As Received"</b>												



# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
 Address : 5600 Hobbs Road

Kevil, Kentucky 42053

Contact: Ms. Jaime Morrow  
 Project: C-746-U Landfill Quarterly(UG23-04)

Client Sample ID: MW373UG4-23  
 Sample ID: 630713009

Project: FRNP00507  
 Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Spectrometric Analysis</b>												
410.4, Chem. Oxygen Demand "As Received"												
COD	U	20.0	8.95	20.0	mg/L		1	JW2	07/27/23	1454	2465849	16
<b>Volatile Organics</b>												
8260D, Volatiles- full suite "As Received"												
1,1,1,2-Tetrachloroethane	U	1.00	0.333	1.00	ug/L		1	JM6	07/27/23	1332	2465652	17
1,1,1-Trichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1,2,2-Tetrachloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1,2-Trichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1-Dichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1					
1,2,3-Trichloropropane	U	1.00	0.333	1.00	ug/L		1					
1,2-Dibromoethane	U	1.00	0.333	1.00	ug/L		1					
1,2-Dichlorobenzene	U	1.00	0.333	1.00	ug/L		1					
1,2-Dichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,2-Dichloropropane	U	1.00	0.333	1.00	ug/L		1					
1,4-Dichlorobenzene	U	1.00	0.333	1.00	ug/L		1					
2-Butanone	U	5.00	1.67	5.00	ug/L		1					
2-Hexanone	U	5.00	1.67	5.00	ug/L		1					
4-Methyl-2-pentanone	U	5.00	1.67	5.00	ug/L		1					
Acetone	U	5.00	1.74	5.00	ug/L		1					
Acrolein	U	5.00	1.67	5.00	ug/L		1					
Acrylonitrile	U	5.00	1.67	5.00	ug/L		1					
Benzene	U	1.00	0.333	1.00	ug/L		1					
Bromochloromethane	U	1.00	0.333	1.00	ug/L		1					
Bromodichloromethane	U	1.00	0.333	1.00	ug/L		1					
Bromoform	U	1.00	0.333	1.00	ug/L		1					
Bromomethane	U	1.00	0.337	1.00	ug/L		1					
Carbon disulfide	U	5.00	1.67	5.00	ug/L		1					
Carbon tetrachloride	U	1.00	0.333	1.00	ug/L		1					
Chlorobenzene	U	1.00	0.333	1.00	ug/L		1					
Chloroethane	U	1.00	0.333	1.00	ug/L		1					
Chloroform	U	1.00	0.333	1.00	ug/L		1					
Chloromethane	U	1.00	0.333	1.00	ug/L		1					
Dibromochloromethane	U	1.00	0.333	1.00	ug/L		1					
Dibromomethane	U	1.00	0.333	1.00	ug/L		1					
Ethylbenzene	U	1.00	0.333	1.00	ug/L		1					
Iodomethane	U	5.00	1.67	5.00	ug/L		1					

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Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road

Kevil, Kentucky 42053

Contact: Ms. Jaime Morrow  
Project: C-746-U Landfill Quarterly(UG23-04)

Client Sample ID: MW373UG4-23  
Sample ID: 630713009

Project: FRNP00507  
Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Volatile Organics												
8260D, Volatiles- full suite "As Received"												
Methylene chloride	U	5.00	0.500	5.00	ug/L		1					
Styrene	U	1.00	0.333	1.00	ug/L		1					
Tetrachloroethylene	U	1.00	0.333	1.00	ug/L		1					
Toluene	U	1.00	0.333	1.00	ug/L		1					
Trichloroethylene		3.53	0.333	1.00	ug/L		1					
Trichlorofluoromethane	U	1.00	0.333	1.00	ug/L		1					
Vinyl acetate	U	5.00	1.67	5.00	ug/L		1					
Vinyl chloride	U	1.00	0.333	1.00	ug/L		1					
Xylenes (total)	U	3.00	1.00	3.00	ug/L		1					
cis-1,2-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1					
cis-1,3-Dichloropropylene	U	1.00	0.333	1.00	ug/L		1					
trans-1,2-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1					
trans-1,3-Dichloropropylene	U	1.00	0.333	1.00	ug/L		1					
trans-1,4-Dichloro-2-butene	U	5.00	1.67	5.00	ug/L		1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 7470A Prep	EPA 7470A Mercury Prep Liquid	EK1	07/27/23	1130	2466243
SW846 8011 PREP	8011 Prep	LOF	08/02/23	1201	2468080
SW846 3005A	ICP-MS 3005A PREP	CD3	07/28/23	1430	2466144
SW846 3535A	SW3535A PCB SPE Extraction	LW1	08/16/23	0520	2476245
SW846 9010C Distillation	SW846 9010C Prep	ES2	07/27/23	1111	2466361

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## Certificate of Analysis

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Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road

Contact: Kevil, Kentucky 42053  
Project: Ms. Jaime Morrow  
C-746-U Landfill Quarterly(UG23-04)

Client Sample ID: MW373UG4-23	Project: FRNP00507
Sample ID: 630713009	Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time Batch	Method
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The following Analytical Methods were performed:

Method	Description	Analyst	Comments
1	SW846 8011		
2	SW846 9060A		
3	SW846 9012B		
4	SW846 9020B		
5	EPA 300.0		
6	SW846 9056A		
7	SW846 9056A		
8	SW846 9056A		
9	SW846 7470A		
10	SW846 3005A/6020B		
11	SW846 3005A/6020B		
12	SW846 3005A/6020B		
13	SW846 3005A/6020B		
14	SW846 3535A/8082A		
15	EPA 160.1		
16	EPA 410.4		
17	SW846 8260D		

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
1-Chloro-2-fluorobenzene	8011 VOA- 1,2-Dibromo-3-chloropropane "As Received"	7.69 ug/L	6.81	113	(46%-159%)
Decachlorobiphenyl	8082A, PCB Liquids "As Received"	0.204 ug/L	0.205	100	(32%-135%)
4cmx	8082A, PCB Liquids "As Received"	0.124 ug/L	0.205	61	(26%-108%)
Bromofluorobenzene	8260D, Volatiles- full suite "As Received"	53.2 ug/L	50.0	106	(72%-125%)
1,2-Dichloroethane-d4	8260D, Volatiles- full suite "As Received"	49.6 ug/L	50.0	99	(73%-129%)
Toluene-d8	8260D, Volatiles- full suite "As Received"	51.0 ug/L	50.0	102	(75%-123%)

**Notes:**

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road

Kevil, Kentucky 42053

Contact: Ms. Jaime Morrow  
Project: C-746-U Landfill Quarterly(UG23-04)

Client Sample ID:	MW373UG4-23	Project:	FRNP00507
Sample ID:	630713010	Client ID:	FRNP005
Matrix:	WG		
Collect Date:	25-JUL-23 11:39		
Receive Date:	26-JUL-23		
Collector:	Client		

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Metals Analysis-ICP-MS												
6020, Dissolved Metals (3 Elements) "As Received"												
Uranium	U	0.000200	0.0000670	0.000200	mg/L	1.00	1	PRB	08/10/23	2118	2466146	1
Barium		0.0327	0.000670	0.00400	mg/L	1.00	1	PRB	08/11/23	0646	2466146	2
Chromium	U	0.0100	0.00300	0.0100	mg/L	1.00	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3005A	ICP-MS 3005A PREP	CD3	07/28/23	1430	2466144
EPA 160	Laboratory Filtration	AXS5	07/26/23	1420	2465786

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 3005A/6020B	
2	SW846 3005A/6020B	

### Notes:

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
 Address : 5600 Hobbs Road

Kevil, Kentucky 42053

Contact: Ms. Jaime Morrow  
 Project: C-746-U Landfill Quarterly(UG23-04)

Client Sample ID: MW374UG4-23	Project: FRNP00507
Sample ID: 630713011	Client ID: FRNP005
Matrix: WG	
Collect Date: 25-JUL-23 12:23	
Receive Date: 26-JUL-23	
Collector: Client	

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>504.1/8011 Analysis of EDB/DBCP</b>												
<b>8011 VOA- 1,2-Dibromo-3-chloropropane "As Received"</b>												
1,2-Dibromo-3-chloropropane	U	0.0191	0.00859	0.0191	ug/L	0.954	1	LOF	08/02/23	2006	2468087	1
<b>Carbon Analysis</b>												
<b>9060A, Total Organic Carbon "As Received"</b>												
Total Organic Carbon Average		2.09	0.330	2.00	mg/L		1	RM3	07/29/23	0751	2466615	2
<b>Flow Injection Analysis</b>												
<b>9012B, Cyanide, Total "As Received"</b>												
Cyanide, Total	J	0.00181	0.00167	0.200	mg/L	1.00	1	KLP1	07/27/23	1451	2465823	3
<b>Halogen Analysis</b>												
<b>9020B, TOX (Organic Halogen) "As Received"</b>												
Total Organic Halogens		14.7	3.33	10.0	ug/L		1	RM3	08/07/23	1731	2472135	4
<b>Ion Chromatography</b>												
<b>300.0, Iodide in Liquid "As Received"</b>												
Iodide	U	0.500	0.167	0.500	mg/L		1	LXA2	07/26/23	2021	2466163	5
<b>SW846 9056A Anions (5 elements) "As Received"</b>												
Chloride	JW	45.0	0.670	250	mg/L		10	JLD1	07/27/23	0225	2465609	6
Bromide	W	0.575	0.0670	0.200	mg/L		1	JLD1	07/26/23	1619	2465609	7
Fluoride	J	0.208	0.0330	4.00	mg/L		1					
Nitrate-N	J	0.415	0.0330	10.0	mg/L		1					
Sulfate		15.6	0.133	0.400	mg/L		1					
<b>Mercury Analysis-CVAA</b>												
<b>7470, Mercury Liquid "As Received"</b>												
Mercury	U	0.000200	0.0000670	0.000200	mg/L	1.00	1	JP2	07/28/23	1102	2466244	8
<b>Metals Analysis-ICP-MS</b>												
<b>6020, Metals (15+ elements) "As Received"</b>												
Boron		0.0356	0.00520	0.0150	mg/L	1.00	1	PRB	08/11/23	1228	2466146	9
Rhodium	U	0.00500	0.00160	0.00500	mg/L	1.00	1	PRB	08/11/23	0110	2466146	10
Tantalum	U	0.00500	0.00100	0.00500	mg/L	1.00	1					
Sodium		121	0.800	2.50	mg/L	1.00	10	PRB	08/11/23	1237	2466146	11
Uranium		0.000366	0.0000670	0.000200	mg/L	1.00	1	PRB	08/10/23	2121	2466146	12
Aluminum	U	0.0500	0.0193	0.0500	mg/L	1.00	1	PRB	08/11/23	0650	2466146	13
Antimony	U	0.00300	0.00100	0.00300	mg/L	1.00	1					
Arsenic	U	0.00500	0.00200	0.00500	mg/L	1.00	1					
Barium		0.141	0.000670	0.00400	mg/L	1.00	1					

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Address : 5600 Hobbs Road

Contact: Kevil, Kentucky 42053  
Ms. Jaime Morrow  
Project: C-746-U Landfill Quarterly(UG23-04)

Client Sample ID: MW374UG4-23  
Sample ID: 630713011

Project: FRNP00507  
Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Metals Analysis-ICP-MS</b>												
<b>6020, Metals (15+ elements) "As Received"</b>												
Beryllium	U	0.000500	0.000200	0.000500	mg/L	1.00	1					
Cadmium	U	0.00100	0.000300	0.00100	mg/L	1.00	1					
Calcium		23.8	0.0800	0.200	mg/L	1.00	1					
Chromium	U	0.0100	0.00300	0.0100	mg/L	1.00	1					
Cobalt	U	0.00100	0.000300	0.00100	mg/L	1.00	1					
Copper	J	0.000689	0.000300	0.00200	mg/L	1.00	1					
Iron		0.184	0.0330	0.100	mg/L	1.00	1					
Lead	U	0.00200	0.000500	0.00200	mg/L	1.00	1					
Magnesium		5.79	0.0100	0.0300	mg/L	1.00	1					
Manganese		0.0852	0.00100	0.00500	mg/L	1.00	1					
Molybdenum	J	0.000252	0.000200	0.00100	mg/L	1.00	1					
Nickel	U	0.00200	0.000600	0.00200	mg/L	1.00	1					
Potassium		0.393	0.0800	0.300	mg/L	1.00	1					
Selenium		0.00737	0.00150	0.00500	mg/L	1.00	1					
Silver	U	0.00100	0.000300	0.00100	mg/L	1.00	1					
Thallium	U	0.00200	0.000600	0.00200	mg/L	1.00	1					
Vanadium	U	0.0200	0.00330	0.0200	mg/L	1.00	1					
Zinc	U	0.0200	0.00330	0.0200	mg/L	1.00	1					
<b>Semi-Volatiles-PCB</b>												
<b>8082A, PCB Liquids "As Received"</b>												
Aroclor-1016	U	0.0969	0.0323	0.0969	ug/L	0.000969	1	JXM	08/16/23	1230	2476246	14
Aroclor-1221	U	0.0969	0.0323	0.0969	ug/L	0.000969	1					
Aroclor-1232	U	0.0969	0.0323	0.0969	ug/L	0.000969	1					
Aroclor-1242	U	0.0969	0.0323	0.0969	ug/L	0.000969	1					
Aroclor-1248	U	0.0969	0.0323	0.0969	ug/L	0.000969	1					
Aroclor-1254	U	0.0969	0.0323	0.0969	ug/L	0.000969	1					
Aroclor-1260	U	0.0969	0.0323	0.0969	ug/L	0.000969	1					
Aroclor-1268	U	0.0969	0.0323	0.0969	ug/L	0.000969	1					
Aroclor-Total	U	0.0969	0.0323	0.0969	ug/L	0.000969	1					
<b>Solids Analysis</b>												
<b>160.1, Dissolved Solids "As Received"</b>												
Total Dissolved Solids		363	2.38	10.0	mg/L			CH6	07/28/23	0944	2467003	15
<b>Spectrometric Analysis</b>												
<b>410.4, Chem. Oxygen Demand "As Received"</b>												



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Contact: Ms. Jaime Morrow

Project: C-746-U Landfill Quarterly(UG23-04)

Client Sample ID: MW374UG4-23

Sample ID: 630713011

Project: FRNP00507

Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Volatile Organics												
8260D, Volatiles- full suite "As Received"												
Methylene chloride	U	5.00	0.500	5.00	ug/L		1					
Styrene	U	1.00	0.333	1.00	ug/L		1					
Tetrachloroethylene	U	1.00	0.333	1.00	ug/L		1					
Toluene	U	1.00	0.333	1.00	ug/L		1					
Trichloroethylene	J	0.340	0.333	1.00	ug/L		1					
Trichlorofluoromethane	U	1.00	0.333	1.00	ug/L		1					
Vinyl acetate	U	5.00	1.67	5.00	ug/L		1					
Vinyl chloride	U	1.00	0.333	1.00	ug/L		1					
Xylenes (total)	U	3.00	1.00	3.00	ug/L		1					
cis-1,2-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1					
cis-1,3-Dichloropropylene	U	1.00	0.333	1.00	ug/L		1					
trans-1,2-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1					
trans-1,3-Dichloropropylene	U	1.00	0.333	1.00	ug/L		1					
trans-1,4-Dichloro-2-butene	U	5.00	1.67	5.00	ug/L		1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 8011 PREP	8011 Prep	LOF	08/02/23	1201	2468080
SW846 7470A Prep	EPA 7470A Mercury Prep Liquid	EK1	07/27/23	1130	2466243
SW846 3005A	ICP-MS 3005A PREP	CD3	07/28/23	1430	2466144
SW846 3535A	SW3535A PCB SPE Extraction	LW1	08/16/23	0520	2476245
SW846 9010C Distillation	SW846 9010C Prep	ES2	07/27/23	1111	2466361



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Client Sample ID: MW374UG4-23	Project: FRNP00507
Sample ID: 630713011	Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time Batch	Method
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The following Analytical Methods were performed:

Method	Description	Analyst	Comments
1	SW846 8011		
2	SW846 9060A		
3	SW846 9012B		
4	SW846 9020B		
5	EPA 300.0		
6	SW846 9056A		
7	SW846 9056A		
8	SW846 7470A		
9	SW846 3005A/6020B		
10	SW846 3005A/6020B		
11	SW846 3005A/6020B		
12	SW846 3005A/6020B		
13	SW846 3005A/6020B		
14	SW846 3535A/8082A		
15	EPA 160.1		
16	EPA 410.4		
17	SW846 8260D		

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
1-Chloro-2-fluorobenzene	8011 VOA- 1,2-Dibromo-3-chloropropane "As Received"	7.12 ug/L	6.82	104	(46%-159%)
Decachlorobiphenyl	8082A, PCB Liquids "As Received"	0.174 ug/L	0.194	90	(32%-135%)
4cmx	8082A, PCB Liquids "As Received"	0.115 ug/L	0.194	60	(26%-108%)
Bromofluorobenzene	8260D, Volatiles- full suite "As Received"	53.1 ug/L	50.0	106	(72%-125%)
1,2-Dichloroethane-d4	8260D, Volatiles- full suite "As Received"	49.0 ug/L	50.0	98	(73%-129%)
Toluene-d8	8260D, Volatiles- full suite "As Received"	50.5 ug/L	50.0	101	(75%-123%)

**Notes:**

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road

Kevil, Kentucky 42053

Contact: Ms. Jaime Morrow  
Project: C-746-U Landfill Quarterly(UG23-04)

Client Sample ID: MW374UG4-23      Project: FRNP00507  
Sample ID: 630713012      Client ID: FRNP005  
Matrix: WG  
Collect Date: 25-JUL-23 12:23  
Receive Date: 26-JUL-23  
Collector: Client

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Metals Analysis-ICP-MS												
6020, Dissolved Metals (3 Elements) "As Received"												
Barium		0.135	0.000670	0.00400	mg/L	1.00	1	PRB	08/11/23	0654	2466146	1
Chromium	U	0.0100	0.00300	0.0100	mg/L	1.00	1					
Uranium		0.000358	0.0000670	0.000200	mg/L	1.00	1	PRB	08/10/23	2125	2466146	2

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3005A	ICP-MS 3005A PREP	CD3	07/28/23	1430	2466144
EPA 160	Laboratory Filtration	AXS5	07/26/23	1420	2465786

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 3005A/6020B	
2	SW846 3005A/6020B	

### Notes:

Column headers are defined as follows:

DF: Dilution Factor      Lc/LC: Critical Level  
DL: Detection Limit      PF: Prep Factor  
MDA: Minimum Detectable Activity      RL: Reporting Limit  
MDC: Minimum Detectable Concentration      SQL: Sample Quantitation Limit

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road

Kevil, Kentucky 42053

Contact: Ms. Jaime Morrow  
Project: C-746-U Landfill Quarterly(UG23-04)

Client Sample ID: MW375UG4-23	Project: FRNP00507
Sample ID: 630713013	Client ID: FRNP005
Matrix: WG	
Collect Date: 25-JUL-23 10:17	
Receive Date: 26-JUL-23	
Collector: Client	

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>504.1/8011 Analysis of EDB/DBCP</b>												
<b>8011 VOA- 1,2-Dibromo-3-chloropropane "As Received"</b>												
1,2-Dibromo-3-chloropropane	U	0.0188	0.00847	0.0188	ug/L	0.941	1	LOF	08/02/23	2030	2468087	1
<b>Carbon Analysis</b>												
<b>9060A, Total Organic Carbon "As Received"</b>												
Total Organic Carbon Average	J	0.743	0.330	2.00	mg/L		1	RM3	07/29/23	0830	2466615	2
<b>Flow Injection Analysis</b>												
<b>9012B, Cyanide, Total "As Received"</b>												
Cyanide, Total	J	0.00176	0.00167	0.200	mg/L	1.00	1	KLP1	07/27/23	1452	2465823	3
<b>Halogen Analysis</b>												
<b>9020B, TOX (Organic Halogen) "As Received"</b>												
Total Organic Halogens	J	4.28	3.33	10.0	ug/L		1	RM3	08/07/23	1808	2472135	4
<b>Ion Chromatography</b>												
<b>300.0, Iodide in Liquid "As Received"</b>												
Iodide	U	0.500	0.167	0.500	mg/L		1	LXA2	07/26/23	2059	2466163	5
<b>SW846 9056A Anions (5 elements) "As Received"</b>												
Bromide	UW	0.200	0.0670	0.200	mg/L		1	JLD1	07/26/23	1651	2465609	6
Chloride	JW	3.27	0.0670	250	mg/L		1					
Fluoride	J	0.300	0.0330	4.00	mg/L		1					
Nitrate-N	J	0.897	0.0330	10.0	mg/L		1					
Sulfate		23.5	0.266	0.800	mg/L		2	JLD1	07/27/23	0257	2465609	7
<b>Mercury Analysis-CVAA</b>												
<b>7470, Mercury Liquid "As Received"</b>												
Mercury	U	0.000200	0.0000670	0.000200	mg/L	1.00	1	JP2	07/28/23	1104	2466244	8
<b>Metals Analysis-ICP-MS</b>												
<b>6020, Metals (15+ elements) "As Received"</b>												
Aluminum	J	0.0268	0.0193	0.0500	mg/L	1.00	1	PRB	08/11/23	0657	2466146	9
Antimony	U	0.00300	0.00100	0.00300	mg/L	1.00	1					
Arsenic	U	0.00500	0.00200	0.00500	mg/L	1.00	1					
Barium		0.174	0.000670	0.00400	mg/L	1.00	1					
Beryllium	U	0.000500	0.000200	0.000500	mg/L	1.00	1					
Cadmium	U	0.00100	0.000300	0.00100	mg/L	1.00	1					
Calcium		13.2	0.0800	0.200	mg/L	1.00	1					
Chromium	U	0.0100	0.00300	0.0100	mg/L	1.00	1					
Cobalt	U	0.00100	0.000300	0.00100	mg/L	1.00	1					

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road

Contact: Kevil, Kentucky 42053  
Ms. Jaime Morrow  
Project: C-746-U Landfill Quarterly(UG23-04)

Client Sample ID: MW375UG4-23  
Sample ID: 630713013

Project: FRNP00507  
Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Metals Analysis-ICP-MS												
6020, Metals (15+ elements) "As Received"												
Copper	J	0.00112	0.000300	0.00200	mg/L	1.00	1					
Iron	J	0.0367	0.0330	0.100	mg/L	1.00	1					
Lead	U	0.00200	0.000500	0.00200	mg/L	1.00	1					
Magnesium		5.19	0.0100	0.0300	mg/L	1.00	1					
Manganese	J	0.00154	0.00100	0.00500	mg/L	1.00	1					
Molybdenum	U	0.00100	0.000200	0.00100	mg/L	1.00	1					
Nickel	J	0.00133	0.000600	0.00200	mg/L	1.00	1					
Potassium	J	0.254	0.0800	0.300	mg/L	1.00	1					
Selenium	J	0.00257	0.00150	0.00500	mg/L	1.00	1					
Silver	U	0.00100	0.000300	0.00100	mg/L	1.00	1					
Thallium	U	0.00200	0.000600	0.00200	mg/L	1.00	1					
Vanadium	U	0.0200	0.00330	0.0200	mg/L	1.00	1					
Zinc	J	0.00595	0.00330	0.0200	mg/L	1.00	1					
Uranium	U	0.000200	0.0000670	0.000200	mg/L	1.00	1	PRB	08/10/23	2129	2466146	10
Sodium		52.7	0.800	2.50	mg/L	1.00	10	PRB	08/11/23	1239	2466146	11
Rhodium	U	0.00500	0.00160	0.00500	mg/L	1.00	1	PRB	08/11/23	0112	2466146	12
Tantalum	U	0.00500	0.00100	0.00500	mg/L	1.00	1					
Boron	J	0.0138	0.00520	0.0150	mg/L	1.00	1	PRB	08/11/23	1230	2466146	13
Semi-Volatiles-PCB												
8082A, PCB Liquids "As Received"												
Aroclor-1016	U	0.0974	0.0324	0.0974	ug/L	0.000974	1	JXM	08/16/23	1309	2476246	14
Aroclor-1221	U	0.0974	0.0324	0.0974	ug/L	0.000974	1					
Aroclor-1232	U	0.0974	0.0324	0.0974	ug/L	0.000974	1					
Aroclor-1242	U	0.0974	0.0324	0.0974	ug/L	0.000974	1					
Aroclor-1248	U	0.0974	0.0324	0.0974	ug/L	0.000974	1					
Aroclor-1254	U	0.0974	0.0324	0.0974	ug/L	0.000974	1					
Aroclor-1260	U	0.0974	0.0324	0.0974	ug/L	0.000974	1					
Aroclor-1268	U	0.0974	0.0324	0.0974	ug/L	0.000974	1					
Aroclor-Total	U	0.0974	0.0324	0.0974	ug/L	0.000974	1					
Solids Analysis												
160.1, Dissolved Solids "As Received"												
Total Dissolved Solids		171	2.38	10.0	mg/L			CH6	07/28/23	0944	2467003	15
Spectrometric Analysis												
410.4, Chem. Oxygen Demand "As Received"												

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road

Kevil, Kentucky 42053

Contact: Ms. Jaime Morrow  
Project: C-746-U Landfill Quarterly(UG23-04)

Client Sample ID: MW375UG4-23

Project: FRNP00507

Sample ID: 630713013

Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Spectrometric Analysis												
410.4, Chem. Oxygen Demand "As Received"												
COD	U	20.0	8.95	20.0	mg/L		1	JW2	07/27/23	1455	2465849	16
Volatile Organics												
8260D, Volatiles- full suite "As Received"												
1,1,1,2-Tetrachloroethane	U	1.00	0.333	1.00	ug/L		1	JM6	07/27/23	1429	2465652	17
1,1,1-Trichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1,2,2-Tetrachloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1,2-Trichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1-Dichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1					
1,2,3-Trichloropropane	U	1.00	0.333	1.00	ug/L		1					
1,2-Dibromoethane	U	1.00	0.333	1.00	ug/L		1					
1,2-Dichlorobenzene	U	1.00	0.333	1.00	ug/L		1					
1,2-Dichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,2-Dichloropropane	U	1.00	0.333	1.00	ug/L		1					
1,4-Dichlorobenzene	U	1.00	0.333	1.00	ug/L		1					
2-Butanone	U	5.00	1.67	5.00	ug/L		1					
2-Hexanone	U	5.00	1.67	5.00	ug/L		1					
4-Methyl-2-pentanone	U	5.00	1.67	5.00	ug/L		1					
Acetone	U	5.00	1.74	5.00	ug/L		1					
Acrolein	U	5.00	1.67	5.00	ug/L		1					
Acrylonitrile	U	5.00	1.67	5.00	ug/L		1					
Benzene	U	1.00	0.333	1.00	ug/L		1					
Bromochloromethane	U	1.00	0.333	1.00	ug/L		1					
Bromodichloromethane	U	1.00	0.333	1.00	ug/L		1					
Bromoform	U	1.00	0.333	1.00	ug/L		1					
Bromomethane	U	1.00	0.337	1.00	ug/L		1					
Carbon disulfide	U	5.00	1.67	5.00	ug/L		1					
Carbon tetrachloride	U	1.00	0.333	1.00	ug/L		1					
Chlorobenzene	U	1.00	0.333	1.00	ug/L		1					
Chloroethane	U	1.00	0.333	1.00	ug/L		1					
Chloroform	U	1.00	0.333	1.00	ug/L		1					
Chloromethane	U	1.00	0.333	1.00	ug/L		1					
Dibromochloromethane	U	1.00	0.333	1.00	ug/L		1					
Dibromomethane	U	1.00	0.333	1.00	ug/L		1					
Ethylbenzene	U	1.00	0.333	1.00	ug/L		1					
Iodomethane	U	5.00	1.67	5.00	ug/L		1					

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## *Certificate of Analysis*

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
 Address : 5600 Hobbs Road

Kevil, Kentucky 42053

Contact: Ms. Jaime Morrow  
 Project: C-746-U Landfill Quarterly(UG23-04)

---

Client Sample ID: MW375UG4-23	Project: FRNP00507
Sample ID: 630713013	Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Volatile Organics</b>												
<b>8260D, Volatiles- full suite "As Received"</b>												
Methylene chloride	U	5.00	0.500	5.00	ug/L		1					
Styrene	U	1.00	0.333	1.00	ug/L		1					
Tetrachloroethylene	U	1.00	0.333	1.00	ug/L		1					
Toluene	U	1.00	0.333	1.00	ug/L		1					
Trichloroethylene	J	0.640	0.333	1.00	ug/L		1					
Trichlorofluoromethane	U	1.00	0.333	1.00	ug/L		1					
Vinyl acetate	U	5.00	1.67	5.00	ug/L		1					
Vinyl chloride	U	1.00	0.333	1.00	ug/L		1					
Xylenes (total)	U	3.00	1.00	3.00	ug/L		1					
cis-1,2-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1					
cis-1,3-Dichloropropylene	U	1.00	0.333	1.00	ug/L		1					
trans-1,2-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1					
trans-1,3-Dichloropropylene	U	1.00	0.333	1.00	ug/L		1					
trans-1,4-Dichloro-2-butene	U	5.00	1.67	5.00	ug/L		1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3005A	ICP-MS 3005A PREP	CD3	07/28/23	1430	2466144
SW846 7470A Prep	EPA 7470A Mercury Prep Liquid	EK1	07/27/23	1130	2466243
SW846 3535A	SW3535A PCB SPE Extraction	LW1	08/16/23	0520	2476245
SW846 9010C Distillation	SW846 9010C Prep	ES2	07/27/23	1111	2466361
SW846 8011 PREP	8011 Prep	LOF	08/02/23	1201	2468080

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road

Contact: Kevil, Kentucky 42053  
Ms. Jaime Morrow  
Project: C-746-U Landfill Quarterly(UG23-04)

Client Sample ID: MW375UG4-23	Project: FRNP00507
Sample ID: 630713013	Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time Batch	Method
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The following Analytical Methods were performed:

Method	Description	Analyst	Comments
1	SW846 8011		
2	SW846 9060A		
3	SW846 9012B		
4	SW846 9020B		
5	EPA 300.0		
6	SW846 9056A		
7	SW846 9056A		
8	SW846 7470A		
9	SW846 3005A/6020B		
10	SW846 3005A/6020B		
11	SW846 3005A/6020B		
12	SW846 3005A/6020B		
13	SW846 3005A/6020B		
14	SW846 3535A/8082A		
15	EPA 160.1		
16	EPA 410.4		
17	SW846 8260D		

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
1-Chloro-2-fluorobenzene	8011 VOA- 1,2-Dibromo-3-chloropropane "As Received"	7.57 ug/L	6.72	113	(46%-159%)
Decachlorobiphenyl	8082A, PCB Liquids "As Received"	0.201 ug/L	0.195	103	(32%-135%)
4cmx	8082A, PCB Liquids "As Received"	0.131 ug/L	0.195	67	(26%-108%)
Bromofluorobenzene	8260D, Volatiles- full suite "As Received"	53.6 ug/L	50.0	107	(72%-125%)
1,2-Dichloroethane-d4	8260D, Volatiles- full suite "As Received"	50.1 ug/L	50.0	100	(73%-129%)
Toluene-d8	8260D, Volatiles- full suite "As Received"	52.6 ug/L	50.0	105	(75%-123%)

**Notes:**

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road

Kevil, Kentucky 42053

Contact: Ms. Jaime Morrow  
Project: C-746-U Landfill Quarterly(UG23-04)

Client Sample ID:	MW375UG4-23	Project:	FRNP00507
Sample ID:	630713014	Client ID:	FRNP005
Matrix:	WG		
Collect Date:	25-JUL-23 10:17		
Receive Date:	26-JUL-23		
Collector:	Client		

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Metals Analysis-ICP-MS												
6020, Dissolved Metals (3 Elements) "As Received"												
Uranium	U	0.000200	0.0000670	0.000200	mg/L	1.00	1	PRB	08/10/23	2132	2466146	1
Barium		0.171	0.000670	0.00400	mg/L	1.00	1	PRB	08/11/23	0701	2466146	2
Chromium	U	0.0100	0.00300	0.0100	mg/L	1.00	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 160	Laboratory Filtration	AXS5	07/26/23	1420	2465786
SW846 3005A	ICP-MS 3005A PREP	CD3	07/28/23	1430	2466144

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 3005A/6020B	
2	SW846 3005A/6020B	

### Notes:

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit



# GEL LABORATORIES LLC

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road

Kevil, Kentucky 42053

Contact: Ms. Jaime Morrow

Project: C-746-U Landfill Quarterly(UG23-04)

Client Sample ID: TB4UG4-23

Project: FRNP00507

Sample ID: 630713015

Client ID: FRNP005

Matrix: WATER

Collect Date: 25-JUL-23 06:25

Receive Date: 26-JUL-23

Collector: Client

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
504.1/8011 Analysis of EDB/DBCP												
8011 VOA- 1,2-Dibromo-3-chloropropane "As Received"												
1,2-Dibromo-3-chloropropane	U	0.0189	0.00849	0.0189	ug/L	0.943	1	LOF	08/02/23	2055	2468087	1
Volatile Organics												
8260D, Volatiles- full suite "As Received"												
1,1,1,2-Tetrachloroethane	U	1.00	0.333	1.00	ug/L		1	JM6	07/27/23	1236	2465652	2
1,1,1-Trichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1,2,2-Tetrachloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1,2-Trichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1-Dichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,1-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1					
1,2,3-Trichloropropane	U	1.00	0.333	1.00	ug/L		1					
1,2-Dibromoethane	U	1.00	0.333	1.00	ug/L		1					
1,2-Dichlorobenzene	U	1.00	0.333	1.00	ug/L		1					
1,2-Dichloroethane	U	1.00	0.333	1.00	ug/L		1					
1,2-Dichloropropane	U	1.00	0.333	1.00	ug/L		1					
1,4-Dichlorobenzene	U	1.00	0.333	1.00	ug/L		1					
2-Butanone	J	2.30	1.67	5.00	ug/L		1					
2-Hexanone	U	5.00	1.67	5.00	ug/L		1					
4-Methyl-2-pentanone	U	5.00	1.67	5.00	ug/L		1					
Acetone	J	4.88	1.74	5.00	ug/L		1					
Acrolein	U	5.00	1.67	5.00	ug/L		1					
Acrylonitrile	U	5.00	1.67	5.00	ug/L		1					
Benzene	U	1.00	0.333	1.00	ug/L		1					
Bromochloromethane	U	1.00	0.333	1.00	ug/L		1					
Bromodichloromethane	U	1.00	0.333	1.00	ug/L		1					
Bromoform	U	1.00	0.333	1.00	ug/L		1					
Bromomethane	U	1.00	0.337	1.00	ug/L		1					
Carbon disulfide	U	5.00	1.67	5.00	ug/L		1					
Carbon tetrachloride	U	1.00	0.333	1.00	ug/L		1					
Chlorobenzene		5.39	0.333	1.00	ug/L		1					
Chloroethane	U	1.00	0.333	1.00	ug/L		1					
Chloroform	U	1.00	0.333	1.00	ug/L		1					
Chloromethane	U	1.00	0.333	1.00	ug/L		1					
Dibromochloromethane	U	1.00	0.333	1.00	ug/L		1					
Dibromomethane	U	1.00	0.333	1.00	ug/L		1					
Ethylbenzene	U	1.00	0.333	1.00	ug/L		1					
Iodomethane	U	5.00	1.67	5.00	ug/L		1					

# GEL LABORATORIES LLC

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road

Kevil, Kentucky 42053

Contact: Ms. Jaime Morrow  
Project: C-746-U Landfill Quarterly(UG23-04)

Client Sample ID: TB4UG4-23	Project: FRNP00507
Sample ID: 630713015	Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Volatile Organics</b>												
<b>8260D, Volatiles- full suite "As Received"</b>												
Methylene chloride	U	5.00	0.500	5.00	ug/L		1					
Styrene	U	1.00	0.333	1.00	ug/L		1					
Tetrachloroethylene	U	1.00	0.333	1.00	ug/L		1					
Toluene	U	1.00	0.333	1.00	ug/L		1					
Trichloroethylene	U	1.00	0.333	1.00	ug/L		1					
Trichlorofluoromethane	U	1.00	0.333	1.00	ug/L		1					
Vinyl acetate	U	5.00	1.67	5.00	ug/L		1					
Vinyl chloride	U	1.00	0.333	1.00	ug/L		1					
Xylenes (total)	U	3.00	1.00	3.00	ug/L		1					
cis-1,2-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1					
cis-1,3-Dichloropropylene	U	1.00	0.333	1.00	ug/L		1					
trans-1,2-Dichloroethylene	U	1.00	0.333	1.00	ug/L		1					
trans-1,3-Dichloropropylene	U	1.00	0.333	1.00	ug/L		1					
trans-1,4-Dichloro-2-butene	U	5.00	1.67	5.00	ug/L		1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 8011 PREP	8011 Prep	LOF	08/02/23	1201	2468080

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 8011	
2	SW846 8260D	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
1-Chloro-2-fluorobenzene	8011 VOA- 1,2-Dibromo-3-chloropropane "As Received"	7.16 ug/L	6.73	106	(46%-159%)
Bromofluorobenzene	8260D, Volatiles- full suite "As Received"	52.5 ug/L	50.0	105	(72%-125%)
1,2-Dichloroethane-d4	8260D, Volatiles- full suite "As Received"	48.2 ug/L	50.0	96	(73%-129%)
Toluene-d8	8260D, Volatiles- full suite "As Received"	50.9 ug/L	50.0	102	(75%-123%)

**Notes:**

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## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road

Contact: Kevil, Kentucky 42053  
Ms. Jaime Morrow  
Project: C-746-U Landfill Quarterly(UG23-04)

Client Sample ID: TB4UG4-23  
Sample ID: 630713015

Project: FRNP00507  
Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
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Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

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## Certificate of Analysis

Company : Four Rivers Nuclear Partnership,  
Address : LLC  
5600 Hobbs Road

Kevil, Kentucky 42053

Report Date: November 2, 2023

Contact: Ms. Jaime Morrow

Project: C-746-U Landfill Quarterly(UG23-04)

Client Sample ID: MW369UG4-23  
Sample ID: 630713001  
Matrix: WG  
Collect Date: 25-JUL-23  
Receive Date: 26-JUL-23  
Collector: Client

Project: FRNP00507  
Client ID: FRNP005

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Alpha Spec Analysis</b>														
<i>AN-1418 AlphaSpec Ra226, Liquid "As Received"</i>														
Radium-226	U	0.427	+/-0.413	0.561	+/-0.414	5.00	pCi/L			CM4	08/03/23	0813	2465813	1
<i>Th-01-RC M, Th Isotopes, Liquid "As Received"</i>														
Thorium-230	U	0.529	+/-1.69	3.17	+/-1.70	50.0	pCi/L			CM4	07/28/23	0903	2465845	2
Thorium-232	U	-0.145	+/-0.879	2.16	+/-0.881		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>														
<i>904.0Mod, Ra228, Liquid "As Received"</i>														
Radium-228	U	2.75	+/-2.09	3.24	+/-2.21	4.99	pCi/L			JE1	08/10/23	1144	2472073	3
<i>905.0Mod, Sr90, liquid "As Received"</i>														
Strontium-90	U	3.71	+/-3.13	4.94	+/-3.19	8.00	pCi/L			ST2	07/31/23	1419	2466689	4
<i>9310, Alpha/Beta Activity, liquid "As Received"</i>														
Alpha	U	-0.652	+/-1.65	4.94	+/-1.65	15.0	pCi/L			JXK3	07/31/23	1522	2466763	5
Beta		42.3	+/-8.00	7.46	+/-10.6	50.0	pCi/L							
<b>Rad Liquid Scintillation Analysis</b>														
<i>906.0M, Tritium Dist, Liquid "As Received"</i>														
Tritium	U	-0.366	+/-119	214	+/-119	300	pCi/L			GS3	07/29/23	0746	2466390	6
<i>Tc-02-RC-MOD, Tc99, Liquid "As Received"</i>														
Technetium-99		56.1	+/-13.9	21.2	+/-15.3	25.0	pCi/L			AG2	08/08/23	0343	2465820	7

**The following Analytical Methods were performed**

Method	Description
1	Eichrom Industries, AN-1418
2	DOE EML HASL-300, Th-01-RC Modified
3	EPA 904.0/SW846 9320 Modified
4	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified
5	EPA 900.0/SW846 9310
6	EPA 906.0 Modified
7	DOE EML HASL-300, Tc-02-RC Modified

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Barium-133 Tracer	AN-1418 AlphaSpec Ra226, Liquid "As Received"	2465813	95.8	(30%-110%)
Thorium-229 Tracer	Th-01-RC M, Th Isotopes, Liquid "As Received"	2465845	84.1	(30%-110%)
Barium-133 Tracer	904.0Mod, Ra228, Liquid "As Received"	2472073	79.8	(30%-110%)
Strontium Carrier	905.0Mod, Sr90, liquid "As Received"	2466689	80	(30%-110%)
Technetium-99m Tracer	Tc-02-RC-MOD, Tc99, Liquid "As Received"	2465820	93.6	(30%-110%)

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5600 Hobbs Road

Kevil, Kentucky 42053

Report Date: November 2, 2023

Contact: Ms. Jaime Morrow

Project: C-746-U Landfill Quarterly(UG23-04)

Client Sample ID: MW369UG4-23

Project: FRNP00507

Sample ID: 630713001

Client ID: FRNP005

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Surrogate/Tracer	Recovery	Test						Batch ID	Recovery%	Acceptable Limits				

### Notes:

The MDC is a sample specific MDC.

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

### Column headers are defined as follows:

DF: Dilution Factor

Mtd.: Method

DL: Detection Limit

PF: Prep Factor

Lc/LC: Critical Level

RL: Reporting Limit

MDA: Minimum Detectable Activity

TPU: Total Propagated Uncertainty

MDC: Minimum Detectable Concentration

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## Certificate of Analysis

Company : Four Rivers Nuclear Partnership,  
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5600 Hobbs Road

Kevil, Kentucky 42053

Report Date: November 2, 2023

Contact: Ms. Jaime Morrow

Project: C-746-U Landfill Quarterly(UG23-04)

Client Sample ID: MW370UG4-23

Project: FRNP00507

Sample ID: 630713003

Client ID: FRNP005

Matrix: WG

Collect Date: 25-JUL-23

Receive Date: 26-JUL-23

Collector: Client

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Alpha Spec Analysis</b>														
<i>AN-1418 AlphaSpec Ra226, Liquid "As Received"</i>														
Radium-226	U	0.420	+/-0.370	0.433	+/-0.371	5.00	pCi/L			CM4	08/03/23	0813	2465813	1
<i>Th-01-RC M, Th Isotopes, Liquid "As Received"</i>														
Thorium-230	U	1.68	+/-2.32	3.55	+/-2.35	50.0	pCi/L			CM4	07/28/23	0904	2465845	2
Thorium-232	U	-0.0431	+/-0.886	1.77	+/-0.888		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>														
<i>904.0Mod, Ra228, Liquid "As Received"</i>														
Radium-228	U	1.19	+/-2.10	3.70	+/-2.12	4.99	pCi/L			JE1	08/10/23	1144	2472073	3
<i>905.0Mod, Sr90, liquid "As Received"</i>														
Strontium-90	U	6.33	+/-4.52	7.14	+/-4.63	8.00	pCi/L			ST2	07/31/23	1418	2466689	4
<i>9310, Alpha/Beta Activity, liquid "As Received"</i>														
Alpha	U	0.582	+/-2.76	5.83	+/-2.76	15.0	pCi/L			JXK3	07/31/23	1522	2466763	5
Beta		15.3	+/-5.73	7.44	+/-6.28	50.0	pCi/L							
<b>Rad Liquid Scintillation Analysis</b>														
<i>906.0M, Tritium Dist, Liquid "As Received"</i>														
Tritium	U	61.8	+/-125	216	+/-125	300	pCi/L			GS3	07/29/23	0822	2466390	6
<i>Tc-02-RC-MOD, Tc99, Liquid "As Received"</i>														
Technetium-99	U	20.3	+/-13.3	21.9	+/-13.5	25.0	pCi/L			AG2	08/08/23	0415	2465820	7

**The following Analytical Methods were performed**

Method	Description
1	Eichrom Industries, AN-1418
2	DOE EML HASL-300, Th-01-RC Modified
3	EPA 904.0/SW846 9320 Modified
4	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified
5	EPA 900.0/SW846 9310
6	EPA 906.0 Modified
7	DOE EML HASL-300, Tc-02-RC Modified

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Barium-133 Tracer	AN-1418 AlphaSpec Ra226, Liquid "As Received"	2465813	94	(30%-110%)
Thorium-229 Tracer	Th-01-RC M, Th Isotopes, Liquid "As Received"	2465845	93.6	(30%-110%)
Barium-133 Tracer	904.0Mod, Ra228, Liquid "As Received"	2472073	72.6	(30%-110%)
Strontium Carrier	905.0Mod, Sr90, liquid "As Received"	2466689	87.1	(30%-110%)
Technetium-99m Tracer	Tc-02-RC-MOD, Tc99, Liquid "As Received"	2465820	95	(30%-110%)

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## Certificate of Analysis

Company : Four Rivers Nuclear Partnership,  
Address : LLC  
5600 Hobbs Road

Kevil, Kentucky 42053

Report Date: November 2, 2023

Contact: Ms. Jaime Morrow

Project: C-746-U Landfill Quarterly(UG23-04)

Client Sample ID: MW370UG4-23

Project: FRNP00507

Sample ID: 630713003

Client ID: FRNP005

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Surrogate/Tracer	Recovery	Test						Batch ID	Recovery%	Acceptable Limits				

### Notes:

The MDC is a sample specific MDC.

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

### Column headers are defined as follows:

DF: Dilution Factor

Mtd.: Method

DL: Detection Limit

PF: Prep Factor

Lc/LC: Critical Level

RL: Reporting Limit

MDA: Minimum Detectable Activity

TPU: Total Propagated Uncertainty

MDC: Minimum Detectable Concentration

# GEL LABORATORIES LLC

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## Certificate of Analysis

Company : Four Rivers Nuclear Partnership,  
Address : LLC  
5600 Hobbs Road

Kevil, Kentucky 42053

Report Date: November 2, 2023

Contact: Ms. Jaime Morrow

Project: C-746-U Landfill Quarterly(UG23-04)

Client Sample ID: MW371UG4-23

Project: FRNP00507

Sample ID: 630713005

Client ID: FRNP005

Matrix: WG

Collect Date: 25-JUL-23

Receive Date: 26-JUL-23

Collector: Client

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Alpha Spec Analysis</b>														
<i>AN-1418 AlphaSpec Ra226, Liquid "As Received"</i>														
Radium-226	U	0.322	+/-0.314	0.389	+/-0.315	5.00	pCi/L			CM4	08/03/23	0813	2465813	1
<i>Th-01-RC M, Th Isotopes, Liquid "As Received"</i>														
Thorium-230	U	1.39	+/-1.85	2.76	+/-1.87	50.0	pCi/L			CM4	07/28/23	0904	2465845	2
Thorium-232	U	-0.212	+/-0.749	2.04	+/-0.750		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>														
<i>904.0Mod, Ra228, Liquid "As Received"</i>														
Radium-228	U	1.99	+/-1.97	3.22	+/-2.04	4.99	pCi/L			JE1	08/10/23	1144	2472073	3
<i>905.0Mod, Sr90, liquid "As Received"</i>														
Strontium-90	U	2.83	+/-3.27	5.49	+/-3.30	8.00	pCi/L			ST2	07/31/23	1418	2466689	4
<i>9310, Alpha/Beta Activity, liquid "As Received"</i>														
Alpha		6.67	+/-4.52	5.31	+/-4.67	15.0	pCi/L			JXK3	07/31/23	1522	2466763	5
Beta	U	5.72	+/-4.70	7.45	+/-4.79	50.0	pCi/L							
<b>Rad Liquid Scintillation Analysis</b>														
<i>906.0M, Tritium Dist, Liquid "As Received"</i>														
Tritium	U	30.0	+/-121	213	+/-121	300	pCi/L			GS3	07/29/23	0859	2466390	6
<i>Tc-02-RC-MOD, Tc99, Liquid "As Received"</i>														
Technetium-99	U	11.5	+/-13.0	21.9	+/-13.1	25.0	pCi/L			AG2	08/08/23	0446	2465820	7

**The following Analytical Methods were performed**

Method	Description
1	Eichrom Industries, AN-1418
2	DOE EML HASL-300, Th-01-RC Modified
3	EPA 904.0/SW846 9320 Modified
4	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified
5	EPA 900.0/SW846 9310
6	EPA 906.0 Modified
7	DOE EML HASL-300, Tc-02-RC Modified

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Barium-133 Tracer	AN-1418 AlphaSpec Ra226, Liquid "As Received"	2465813	97.4	(30%-110%)
Thorium-229 Tracer	Th-01-RC M, Th Isotopes, Liquid "As Received"	2465845	101	(30%-110%)
Barium-133 Tracer	904.0Mod, Ra228, Liquid "As Received"	2472073	79.9	(30%-110%)
Strontium Carrier	905.0Mod, Sr90, liquid "As Received"	2466689	84.7	(30%-110%)
Technetium-99m Tracer	Tc-02-RC-MOD, Tc99, Liquid "As Received"	2465820	90.5	(30%-110%)



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Kevil, Kentucky 42053

Report Date: November 2, 2023

Contact: Ms. Jaime Morrow

Project: C-746-U Landfill Quarterly(UG23-04)

Client Sample ID: MW371UG4-23

Project: FRNP00507

Sample ID: 630713005

Client ID: FRNP005

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Surrogate/Tracer	Recovery	Test						Batch ID	Recovery%	Acceptable Limits				

### Notes:

The MDC is a sample specific MDC.

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

### Column headers are defined as follows:

DF: Dilution Factor

Mtd.: Method

DL: Detection Limit

PF: Prep Factor

Lc/LC: Critical Level

RL: Reporting Limit

MDA: Minimum Detectable Activity

TPU: Total Propagated Uncertainty

MDC: Minimum Detectable Concentration

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## Certificate of Analysis

Company : Four Rivers Nuclear Partnership,  
Address : LLC  
5600 Hobbs Road

Kevil, Kentucky 42053

Report Date: November 2, 2023

Contact: Ms. Jaime Morrow

Project: C-746-U Landfill Quarterly(UG23-04)

Client Sample ID: MW372UG4-23

Project: FRNP00507

Sample ID: 630713007

Client ID: FRNP005

Matrix: WG

Collect Date: 25-JUL-23

Receive Date: 26-JUL-23

Collector: Client

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Alpha Spec Analysis</b>														
<i>AN-1418 AlphaSpec Ra226, Liquid "As Received"</i>														
Radium-226	U	0.0809	+/-0.223	0.386	+/-0.223	5.00	pCi/L			CM4	08/03/23	0813	2465813	1
<i>Th-01-RC M, Th Isotopes, Liquid "As Received"</i>														
Thorium-230	U	2.33	+/-2.25	3.01	+/-2.28	50.0	pCi/L			CM4	07/28/23	0904	2465845	2
Thorium-232	U	0.859	+/-1.43	2.07	+/-1.44		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>														
<i>904.0Mod, Ra228, Liquid "As Received"</i>														
Radium-228	U	1.60	+/-2.49	4.35	+/-2.53	4.99	pCi/L			JE1	08/10/23	1418	2472073	3
<i>905.0Mod, Sr90, liquid "As Received"</i>														
Strontium-90	U	0.725	+/-3.29	6.04	+/-3.29	8.00	pCi/L			ST2	07/31/23	1418	2466689	4
<i>9310, Alpha/Beta Activity, liquid "As Received"</i>														
Alpha	U	2.37	+/-4.08	7.33	+/-4.10	15.0	pCi/L			JXK3	07/31/23	1522	2466763	5
Beta		18.9	+/-6.36	7.96	+/-7.08	50.0	pCi/L							
<b>Rad Liquid Scintillation Analysis</b>														
<i>906.0M, Tritium Dist, Liquid "As Received"</i>														
Tritium	U	7.49	+/-121	215	+/-121	300	pCi/L			GS3	07/29/23	0936	2466390	6
<i>Tc-02-RC-MOD, Tc99, Liquid "As Received"</i>														
Technetium-99	U	20.0	+/-12.9	21.2	+/-13.1	25.0	pCi/L			AG2	08/08/23	0518	2465820	7

**The following Analytical Methods were performed**

Method	Description
1	Eichrom Industries, AN-1418
2	DOE EML HASL-300, Th-01-RC Modified
3	EPA 904.0/SW846 9320 Modified
4	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified
5	EPA 900.0/SW846 9310
6	EPA 906.0 Modified
7	DOE EML HASL-300, Tc-02-RC Modified

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Barium-133 Tracer	AN-1418 AlphaSpec Ra226, Liquid "As Received"	2465813	95.8	(30%-110%)
Thorium-229 Tracer	Th-01-RC M, Th Isotopes, Liquid "As Received"	2465845	96.8	(30%-110%)
Barium-133 Tracer	904.0Mod, Ra228, Liquid "As Received"	2472073	76.4	(30%-110%)
Strontium Carrier	905.0Mod, Sr90, liquid "As Received"	2466689	84.7	(30%-110%)
Technetium-99m Tracer	Tc-02-RC-MOD, Tc99, Liquid "As Received"	2465820	93	(30%-110%)

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## Certificate of Analysis

Company : Four Rivers Nuclear Partnership,  
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5600 Hobbs Road

Kevil, Kentucky 42053

Report Date: November 2, 2023

Contact: Ms. Jaime Morrow

Project: C-746-U Landfill Quarterly(UG23-04)

Client Sample ID: MW372UG4-23

Project: FRNP00507

Sample ID: 630713007

Client ID: FRNP005

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Surrogate/Tracer	Recovery	Test						Batch ID	Recovery%	Acceptable Limits				

### Notes:

The MDC is a sample specific MDC.

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

### Column headers are defined as follows:

DF: Dilution Factor

Mtd.: Method

DL: Detection Limit

PF: Prep Factor

Lc/LC: Critical Level

RL: Reporting Limit

MDA: Minimum Detectable Activity

TPU: Total Propagated Uncertainty

MDC: Minimum Detectable Concentration

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## Certificate of Analysis

Company : Four Rivers Nuclear Partnership,  
Address : LLC  
5600 Hobbs Road

Kevil, Kentucky 42053

Report Date: November 2, 2023

Contact: Ms. Jaime Morrow

Project: C-746-U Landfill Quarterly(UG23-04)

Client Sample ID: MW373UG4-23

Project: FRNP00507

Sample ID: 630713009

Client ID: FRNP005

Matrix: WG

Collect Date: 25-JUL-23

Receive Date: 26-JUL-23

Collector: Client

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Alpha Spec Analysis</b>														
<i>AN-1418 AlphaSpec Ra226, Liquid "As Received"</i>														
Radium-226	U	0.0298	+/-0.221	0.458	+/-0.221	5.00	pCi/L			CM4	08/04/23	0822	2465813	1
<i>Th-01-RC M, Th Isotopes, Liquid "As Received"</i>														
Thorium-230	U	2.12	+/-2.51	3.47	+/-2.54	50.0	pCi/L			CM4	07/28/23	0904	2465845	2
Thorium-232	U	0.436	+/-1.35	1.91	+/-1.35		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>														
<i>904.0Mod, Ra228, Liquid "As Received"</i>														
Radium-228	U	0.476	+/-2.16	3.95	+/-2.16	4.99	pCi/L			JE1	08/10/23	1144	2472073	3
<i>905.0Mod, Sr90, liquid "As Received"</i>														
Strontium-90	U	2.72	+/-3.61	6.17	+/-3.64	8.00	pCi/L			ST2	07/31/23	1418	2466689	4
<i>9310, Alpha/Beta Activity, liquid "As Received"</i>														
Alpha	U	2.01	+/-3.36	6.04	+/-3.38	15.0	pCi/L			JXK3	07/31/23	1522	2466763	5
Beta	U	5.93	+/-4.88	7.79	+/-4.98	50.0	pCi/L							
<b>Rad Liquid Scintillation Analysis</b>														
<i>906.0M, Tritium Dist, Liquid "As Received"</i>														
Tritium	U	40.1	+/-123	215	+/-123	300	pCi/L			GS3	07/29/23	1013	2466390	6
<i>Tc-02-RC-MOD, Tc99, Liquid "As Received"</i>														
Technetium-99	U	13.3	+/-12.7	21.2	+/-12.8	25.0	pCi/L			AG2	08/08/23	0549	2465820	7

**The following Analytical Methods were performed**

Method	Description
1	Eichrom Industries, AN-1418
2	DOE EML HASL-300, Th-01-RC Modified
3	EPA 904.0/SW846 9320 Modified
4	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified
5	EPA 900.0/SW846 9310
6	EPA 906.0 Modified
7	DOE EML HASL-300, Tc-02-RC Modified

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Barium-133 Tracer	AN-1418 AlphaSpec Ra226, Liquid "As Received"	2465813	97	(30%-110%)
Thorium-229 Tracer	Th-01-RC M, Th Isotopes, Liquid "As Received"	2465845	72	(30%-110%)
Barium-133 Tracer	904.0Mod, Ra228, Liquid "As Received"	2472073	82.3	(30%-110%)
Strontium Carrier	905.0Mod, Sr90, liquid "As Received"	2466689	80	(30%-110%)
Technetium-99m Tracer	Tc-02-RC-MOD, Tc99, Liquid "As Received"	2465820	94	(30%-110%)

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Report Date: November 2, 2023

Contact: Ms. Jaime Morrow

Project: C-746-U Landfill Quarterly(UG23-04)

Client Sample ID: MW373UG4-23

Project: FRNP00507

Sample ID: 630713009

Client ID: FRNP005

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Surrogate/Tracer	Recovery	Test						Batch ID	Recovery%	Acceptable Limits				

### Notes:

The MDC is a sample specific MDC.

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

### Column headers are defined as follows:

DF: Dilution Factor

Mtd.: Method

DL: Detection Limit

PF: Prep Factor

Lc/LC: Critical Level

RL: Reporting Limit

MDA: Minimum Detectable Activity

TPU: Total Propagated Uncertainty

MDC: Minimum Detectable Concentration

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Report Date: November 2, 2023

Contact: Ms. Jaime Morrow

Project: C-746-U Landfill Quarterly(UG23-04)

Client Sample ID: MW374UG4-23

Project: FRNP00507

Sample ID: 630713011

Client ID: FRNP005

Matrix: WG

Collect Date: 25-JUL-23

Receive Date: 26-JUL-23

Collector: Client

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Alpha Spec Analysis</b>														
<i>AN-1418 AlphaSpec Ra226, Liquid "As Received"</i>														
Radium-226	U	0.264	+/-0.370	0.574	+/-0.371	5.00	pCi/L			CM4	08/04/23	0822	2465813	1
<i>Th-01-RC M, Th Isotopes, Liquid "As Received"</i>														
Thorium-230	U	0.916	+/-1.58	2.59	+/-1.59	50.0	pCi/L			CM4	07/28/23	0904	2465845	2
Thorium-232	U	0.608	+/-1.12	1.36	+/-1.12		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>														
<i>904.0Mod, Ra228, Liquid "As Received"</i>														
Radium-228	U	0.514	+/-2.42	4.43	+/-2.42	4.99	pCi/L			JE1	08/10/23	1144	2472073	3
<i>905.0Mod, Sr90, liquid "As Received"</i>														
Strontium-90	U	3.15	+/-3.49	5.85	+/-3.53	8.00	pCi/L			ST2	08/01/23	1113	2466689	4
<i>9310, Alpha/Beta Activity, liquid "As Received"</i>														
Alpha	U	2.92	+/-4.39	7.70	+/-4.42	15.0	pCi/L			JXK3	07/31/23	1522	2466763	5
Beta	U	1.75	+/-4.29	7.67	+/-4.30	50.0	pCi/L							
<b>Rad Liquid Scintillation Analysis</b>														
<i>906.0M, Tritium Dist, Liquid "As Received"</i>														
Tritium	U	37.5	+/-123	216	+/-123	300	pCi/L			GS3	07/29/23	1050	2466390	6
<i>Tc-02-RC-MOD, Tc99, Liquid "As Received"</i>														
Technetium-99	U	-0.154	+/-12.0	20.7	+/-12.0	25.0	pCi/L			AG2	08/08/23	0620	2465820	7

**The following Analytical Methods were performed**

Method	Description
1	Eichrom Industries, AN-1418
2	DOE EML HASL-300, Th-01-RC Modified
3	EPA 904.0/SW846 9320 Modified
4	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified
5	EPA 900.0/SW846 9310
6	EPA 906.0 Modified
7	DOE EML HASL-300, Tc-02-RC Modified

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Barium-133 Tracer	AN-1418 AlphaSpec Ra226, Liquid "As Received"	2465813	99.5	(30%-110%)
Thorium-229 Tracer	Th-01-RC M, Th Isotopes, Liquid "As Received"	2465845	105	(30%-110%)
Barium-133 Tracer	904.0Mod, Ra228, Liquid "As Received"	2472073	75.6	(30%-110%)
Strontium Carrier	905.0Mod, Sr90, liquid "As Received"	2466689	84.7	(30%-110%)
Technetium-99m Tracer	Tc-02-RC-MOD, Tc99, Liquid "As Received"	2465820	96.2	(30%-110%)

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Report Date: November 2, 2023

Contact: Ms. Jaime Morrow

Project: C-746-U Landfill Quarterly(UG23-04)

Client Sample ID: MW374UG4-23

Project: FRNP00507

Sample ID: 630713011

Client ID: FRNP005

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Surrogate/Tracer	Recovery	Test						Batch ID	Recovery%	Acceptable Limits				

### Notes:

The MDC is a sample specific MDC.

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

### Column headers are defined as follows:

DF: Dilution Factor

Mtd.: Method

DL: Detection Limit

PF: Prep Factor

Lc/LC: Critical Level

RL: Reporting Limit

MDA: Minimum Detectable Activity

TPU: Total Propagated Uncertainty

MDC: Minimum Detectable Concentration

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Report Date: November 2, 2023

Contact: Ms. Jaime Morrow

Project: C-746-U Landfill Quarterly(UG23-04)

Client Sample ID: MW375UG4-23

Project: FRNP00507

Sample ID: 630713013

Client ID: FRNP005

Matrix: WG

Collect Date: 25-JUL-23

Receive Date: 26-JUL-23

Collector: Client

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Alpha Spec Analysis</b>														
<i>AN-1418 AlphaSpec Ra226, Liquid "As Received"</i>														
Radium-226	U	0.196	+/-0.303	0.455	+/-0.303	5.00	pCi/L			CM4	08/04/23	0822	2465813	1
<i>Th-01-RC M, Th Isotopes, Liquid "As Received"</i>														
Thorium-230	U	1.58	+/-2.12	3.17	+/-2.14	50.0	pCi/L			CM4	07/28/23	0904	2465845	2
Thorium-232	U	0.760	+/-1.38	1.64	+/-1.38		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>														
<i>904.0Mod, Ra228, Liquid "As Received"</i>														
Radium-228		7.23	+/-3.33	4.80	+/-3.80	4.99	pCi/L			JE1	08/14/23	0840	2472073	3
<i>905.0Mod, Sr90, liquid "As Received"</i>														
Strontium-90	U	-3.61	+/-3.24	7.17	+/-3.24	8.00	pCi/L			ST2	07/31/23	1418	2466689	4
<i>9310, Alpha/Beta Activity, liquid "As Received"</i>														
Alpha	U	-0.289	+/-2.58	6.15	+/-2.59	15.0	pCi/L			JXK3	07/31/23	1522	2466763	5
Beta	U	3.01	+/-4.39	7.56	+/-4.42	50.0	pCi/L							
<b>Rad Liquid Scintillation Analysis</b>														
<i>906.0M, Tritium Dist, Liquid "As Received"</i>														
Tritium	U	-26.4	+/-117	213	+/-117	300	pCi/L			GS3	07/29/23	1127	2466390	6
<i>Tc-02-RC-MOD, Tc99, Liquid "As Received"</i>														
Technetium-99	U	-4.50	+/-12.1	21.2	+/-12.1	25.0	pCi/L			AG2	08/08/23	0652	2465820	7

**The following Analytical Methods were performed**

Method	Description
1	Eichrom Industries, AN-1418
2	DOE EML HASL-300, Th-01-RC Modified
3	EPA 904.0/SW846 9320 Modified
4	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified
5	EPA 900.0/SW846 9310
6	EPA 906.0 Modified
7	DOE EML HASL-300, Tc-02-RC Modified

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Barium-133 Tracer	AN-1418 AlphaSpec Ra226, Liquid "As Received"	2465813	96	(30%-110%)
Thorium-229 Tracer	Th-01-RC M, Th Isotopes, Liquid "As Received"	2465845	88.2	(30%-110%)
Barium-133 Tracer	904.0Mod, Ra228, Liquid "As Received"	2472073	76.7	(30%-110%)
Strontium Carrier	905.0Mod, Sr90, liquid "As Received"	2466689	75.3	(30%-110%)
Technetium-99m Tracer	Tc-02-RC-MOD, Tc99, Liquid "As Received"	2465820	93.8	(30%-110%)



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Report Date: November 2, 2023

Contact: Ms. Jaime Morrow

Project: C-746-U Landfill Quarterly(UG23-04)

Client Sample ID: MW375UG4-23

Project: FRNP00507

Sample ID: 630713013

Client ID: FRNP005

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Surrogate/Tracer	Recovery	Test						Batch ID	Recovery%	Acceptable Limits				

### Notes:

The MDC is a sample specific MDC.

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

### Column headers are defined as follows:

DF: Dilution Factor

Mtd.: Method

DL: Detection Limit

PF: Prep Factor

Lc/LC: Critical Level

RL: Reporting Limit

MDA: Minimum Detectable Activity

TPU: Total Propagated Uncertainty

MDC: Minimum Detectable Concentration

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**APPENDIX D**  
**STATISTICAL ANALYSES AND**  
**QUALIFICATION STATEMENT**

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# GROUNDWATER STATISTICAL COMMENTS

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## Introduction

The statistical analyses conducted on the third quarter 2023 groundwater data collected from the C-746-S&T Landfills monitoring wells (MWs) were performed in accordance with Permit GSTR0003, Standard Requirement 3, using the U.S. Environmental Protection Agency (EPA) guidance document, *EPA Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Interim Final Guidance* (1989).

The statistical evaluation was conducted separately for the three groundwater systems: the Upper Continental Recharge System (UCRS), the Upper Regional Gravel Aquifer (URGA), and the Lower Regional Gravel Aquifer (LRGA). For each groundwater system, data from wells considered to represent background conditions were compared with test wells (downgradient or sidegradient wells) (Exhibit D.1). The third quarter 2023 data used to conduct the statistical analyses were collected in July 2023. The statistical analyses for this report first used data from the initial eight quarters that had been sampled for each parameter to develop the historical background value, beginning with the first two baseline sampling events in 2002, when available. Then a second set of statistical analyses, using the last eight quarters, was run on analytes that had at least one compliance well that exceeded the historical background. The sampling dates associated with both the historical and the current background data are listed next to the result in the statistical analysis sheets of this appendix.

## Statistical Analysis Process

Constituents of concern that have Kentucky maximum contaminant levels (MCLs) and results that do not exceed their respective MCL are not included in the statistical evaluation. Parameters that have MCLs can be found in 401 KAR 47:030 § 6. For parameters with no established MCL and for those parameters that exceed their MCLs, the most recent results are compared to historical background concentrations, as follows: the data are divided into censored and uncensored observations. The one-sided tolerance interval statistical test is conducted only on parameters that have at least one uncensored (detected) observation. The current result is compared to the results of the one-sided tolerance interval statistical test to determine if the current data exceed the historical background concentration calculated using the first eight quarters of data. The tolerance interval statistical analysis is conducted separately for each parameter in each well (no pooling of downgradient data).

For the statistical analysis of pH, a two-sided tolerance interval statistical test is conducted for pH. The test well results are compared to both an upper and lower tolerance limit (TL) to determine if statistically significant deviations in concentrations exist with respect to upgradient (background) well data from the first eight quarters.

Statistical analyses are performed on the first eight quarters of historical background data, not on the data for the current quarter. Once a statistical result is obtained using the background data, the result for the current quarter is compared to that value. If the value is exceeded, the well is considered to have an exceedance of the statistically derived historical background concentration.

**Exhibit D.1. Station Identification for Monitoring  
Wells Analyzed**

<b>Station</b>	<b>Type</b>	<b>Groundwater Unit</b>
MW220	BG	URGA
MW221	SG	URGA
MW222	SG	URGA
MW223	SG	URGA
MW224	SG	URGA
MW369	TW	URGA
MW370	TW	LRGA
MW372	TW	URGA
MW373	TW	LRGA
MW384	SG	URGA
MW385	SG	LRGA
MW386 <sup>a</sup>	SG	UCRS
MW387	TW	URGA
MW388	TW	LRGA
MW389 <sup>a,b</sup>	TW	UCRS
MW390 <sup>a</sup>	TW	UCRS
MW391	TW	URGA
MW392	TW	LRGA
MW393 <sup>a</sup>	TW	UCRS
MW394	BG	URGA
MW395	BG	LRGA
MW396 <sup>a</sup>	BG	UCRS
MW397	BG	LRGA

<sup>a</sup> The gradients in UCRS wells are downward. The UCRS wells identified as up-, side-, or downgradient are those wells located in the same general direction as the RGA wells considered to be up-, side-, or downgradient.

<sup>b</sup> Well was dry this quarter and a groundwater sample could not be collected.

BG: upgradient or background wells

TW: compliance or test wells

SG: sidegradient wells

For those parameters that are determined to exceed the historical background concentration, a second one-sided tolerance interval statistical test, or a two-sided tolerance interval statistical test in the case of pH, is conducted. The second one-sided tolerance interval statistical test is conducted to determine whether the current concentration in downgradient wells exceeds the current background, as determined by a comparison against the statistically derived upper TL using the most recent eight quarters of data for the relevant background wells. The tolerance interval statistical analysis is conducted separately for each parameter in each well (no pooling of downgradient data).

For the statistical analysis of pH, a two-sided tolerance interval statistical test is conducted, if required. The test well pH results are compared to both an upper and lower TL to determine if the current pH is different from the current background level to a statistically significant level. Statistical analyses are performed on the last eight quarters of background data, not on the data for the current quarter. Once a statistical result is obtained using the background data, the result for the current quarter is compared to that value. If the value is exceeded (or is below the LTL for pH), the well has a statistically significant difference in concentration compared to the current background concentration.

A stepwise list of the one-sided tolerance interval statistical procedure applied to the data is summarized below.<sup>1</sup>

1. The TL is calculated for the background data (first using the first eight quarters, then using the last eight quarters).
  - For each parameter, the background data are used to establish a baseline. On this data set, the mean (X) and the standard deviation (S) are computed.
  - The data set is checked for normality using coefficient of variation (CV). If  $CV \leq 1.0$ , then the data are assumed to be normally distributed. Data sets with  $CV > 1.0$  are assumed to be log-normally distributed; for data sets with  $CV > 1.0$ , the data are log-transformed and analyzed.
  - The factor (K) for one-sided upper TL with 95% minimum coverage is determined (Table 5, Appendix B; *EPA Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Interim Final Guidance*, 1989) based on the number of background data points.
  - The one-sided upper TL is calculated using the following equation:  
$$TL = X + (K \times S)$$
2. Each observation from downgradient wells is compared to the calculated one-sided upper TL in Step 1. If an observation value exceeds the TL (or is below the LTL for pH), then there is statistically significant evidence that the well concentration exceeds the historical background.

### Type of Data Used

Exhibit D.1 presents the background wells (identified as “BG”), the compliance or test wells (identified as “TW”), and the sidegradient wells (identified as “SG”) for the C-746-S&T Residential and Inert Landfills. Exhibit D.2 presents the parameters from the available data set for which a statistical test was performed using the one-sided tolerance interval.

Exhibits D.3, D.4, and D.5 list the number of analyses (observations), nondetects (censored observations), and detects (uncensored observations) by parameter in the UCRS, the URGA, and the LRGA, respectively. Those parameters displayed with bold-face type indicate the one-sided tolerance interval statistical test was performed. The data presented in Exhibits D.3, D.4, and D.5 were collected during the current quarter, third quarter 2023. The observations are representative of the current quarter data. Historical background data are presented in Attachment D1. The sampling dates associated with background data are listed next to the result in Attachment D1. When field duplicate data are available, the higher of the two readings is retained for further evaluation. When a data point has been rejected following data validation or data assessment, this result is not used, and the next available data point is used for the background or current quarter data. A result has been considered a nondetect if it has a “U” validation code.

---

<sup>1</sup> For pH, two-sided TLs (upper and lower) were calculated with an adjusted K factor using the following equations.

$$\text{upper TL} = X + (K \times S)$$
$$\text{lower TL} = X - (K \times S)$$

**Exhibit D.2. List of Parameters Tested Using the One-Sided Upper Tolerance Level Test with Historical Background**

---

<b>Parameters</b>
Aluminum
Boron
Bromide
Calcium
Chloride
<i>cis</i> -1,2-Dichloroethene
Cobalt
Conductivity
Copper
Cyanide
Dissolved Oxygen
Dissolved Solids
Iron
Magnesium
Manganese
Methylene Chloride
Molybdenum
Nickel
Oxidation-Reduction Potential <sup>1</sup>
pH <sup>2</sup>
Potassium
Sodium
Sulfate
Technetium-99
Total Organic Carbon (TOC)
Total Organic Halides (TOX)
Trichloroethene
Vanadium
Zinc

---

<sup>1</sup> Oxidation-Reduction Potential calibrated as Eh.

<sup>2</sup> For pH, the test well results were compared to both an upper and lower TL to determine if the current result differs to a statistically significant degree from the historical background values.



**Exhibit D.3. Summary of Censored and Uncensored Data—UCRS**

<b>Parameters</b>	<b>Observations</b>	<b>Censored Observation</b>	<b>Uncensored Observation</b>	<b>Statistical Analysis?</b>
1,1,1,2-Tetrachloroethane	4	4	0	No
1,1,2,2-Tetrachloroethane	4	4	0	No
1,1,2-Trichloroethane	4	4	0	No
1,1-Dichloroethane	4	4	0	No
1,2,3-Trichloropropane	4	4	0	No
1,2-Dibromo-3-chloropropane	4	4	0	No
1,2-Dibromoethane	4	4	0	No
1,2-Dichlorobenzene	4	4	0	No
1,2-Dichloropropane	4	4	0	No
2-Butanone	4	4	0	No
2-Hexanone	4	4	0	No
4-Methyl-2-pentanone	4	4	0	No
Acetone	4	4	0	No
Acrolein	4	4	0	No
Acrylonitrile	4	4	0	No
<b>Aluminum</b>	<b>4</b>	<b>3</b>	<b>1</b>	<b>Yes</b>
Antimony	4	4	0	No
Beryllium	4	4	0	No
<b>Boron</b>	<b>4</b>	<b>0</b>	<b>4</b>	<b>Yes</b>
<b>Bromide</b>	<b>4</b>	<b>0</b>	<b>4</b>	<b>Yes</b>
Bromochloromethane	4	4	0	No
Bromodichloromethane	4	4	0	No
Bromoform	4	4	0	No
Bromomethane	4	4	0	No
<b>Calcium</b>	<b>4</b>	<b>0</b>	<b>4</b>	<b>Yes</b>
Carbon disulfide	4	4	0	No
Chemical Oxygen Demand (COD)	4	4	0	No
<b>Chloride</b>	<b>4</b>	<b>0</b>	<b>4</b>	<b>Yes</b>
Chlorobenzene	4	4	0	No
Chloroethane	4	4	0	No
Chloroform	4	4	0	No
Chloromethane	4	4	0	No
<i>cis</i> -1,2-Dichloroethene	4	4	0	No
<i>cis</i> -1,3-Dichloropropene	4	4	0	No
<b>Cobalt</b>	<b>4</b>	<b>3</b>	<b>1</b>	<b>Yes</b>
<b>Conductivity</b>	<b>4</b>	<b>0</b>	<b>4</b>	<b>Yes</b>
<b>Copper</b>	<b>4</b>	<b>0</b>	<b>4</b>	<b>Yes</b>
Cyanide	4	4	0	No
Dibromochloromethane	4	4	0	No
Dibromomethane	4	4	0	No
Dimethylbenzene, Total	4	4	0	No
<b>Dissolved Oxygen</b>	<b>4</b>	<b>0</b>	<b>4</b>	<b>Yes</b>
<b>Dissolved Solids</b>	<b>4</b>	<b>0</b>	<b>4</b>	<b>Yes</b>
Ethylbenzene	4	4	0	No
Iodide	4	4	0	No

Exhibit D.3. Summary of Censored and Uncensored Data—UCRS (Continued)

Parameters	Observations	Censored Observation	Uncensored Observation	Statistical Analysis?
Iodomethane	4	4	0	No
<b>Iron</b>	<b>4</b>	<b>1</b>	<b>3</b>	<b>Yes</b>
<b>Magnesium</b>	<b>4</b>	<b>0</b>	<b>4</b>	<b>Yes</b>
<b>Manganese</b>	<b>4</b>	<b>1</b>	<b>3</b>	<b>Yes</b>
<b>Methylene chloride</b>	<b>4</b>	<b>3</b>	<b>1</b>	<b>Yes</b>
<b>Molybdenum</b>	<b>4</b>	<b>0</b>	<b>4</b>	<b>Yes</b>
<b>Nickel</b>	<b>4</b>	<b>1</b>	<b>3</b>	<b>Yes</b>
<b>Oxidation-Reduction Potential</b>	<b>4</b>	<b>0</b>	<b>4</b>	<b>Yes</b>
<b>pH</b>	<b>4</b>	<b>0</b>	<b>4</b>	<b>Yes</b>
<b>Potassium</b>	<b>4</b>	<b>0</b>	<b>4</b>	<b>Yes</b>
Radium-226	4	4	0	No
Rhodium	4	4	0	No
<b>Sodium</b>	<b>4</b>	<b>0</b>	<b>4</b>	<b>Yes</b>
Styrene	4	4	0	No
<b>Sulfate</b>	<b>4</b>	<b>0</b>	<b>4</b>	<b>Yes</b>
Tantalum	4	4	0	No
<b>Technetium-99</b>	<b>4</b>	<b>3</b>	<b>1</b>	<b>Yes</b>
Tetrachloroethene	4	4	0	No
Thallium	4	4	0	No
Thorium-230	4	4	0	No
Toluene	4	4	0	No
<b>Total Organic Carbon (TOC)</b>	<b>4</b>	<b>0</b>	<b>4</b>	<b>Yes</b>
<b>Total Organic Halides (TOX)</b>	<b>4</b>	<b>0</b>	<b>4</b>	<b>Yes</b>
<i>trans</i> -1,2-Dichloroethene	4	4	0	No
<i>trans</i> -1,3-Dichloropropene	4	4	0	No
<i>trans</i> -1,4-Dichloro-2-Butene	4	4	0	No
Trichlorofluoromethane	4	4	0	No
<b>Vanadium</b>	<b>4</b>	<b>3</b>	<b>1</b>	<b>Yes</b>
Vinyl Acetate	4	4	0	No
<b>Zinc</b>	<b>4</b>	<b>2</b>	<b>2</b>	<b>Yes</b>

**Bold** denotes parameters with at least one uncensored observation.

**Exhibit D.4. Summary of Censored and Uncensored Data—URGA**

<b>Parameters</b>	<b>Observations</b>	<b>Censored Observation</b>	<b>Uncensored Observation</b>	<b>Statistical Analysis?</b>
1,1,1,2-Tetrachloroethane	11	11	0	No
1,1,2,2-Tetrachloroethane	11	11	0	No
1,1,2-Trichloroethane	11	11	0	No
1,1-Dichloroethane	11	11	0	No
1,2,3-Trichloropropane	11	11	0	No
1,2-Dibromo-3-chloropropane	11	11	0	No
1,2-Dibromoethane	11	11	0	No
1,2-Dichlorobenzene	11	11	0	No
1,2-Dichloropropane	11	11	0	No
2-Butanone	11	11	0	No
2-Hexanone	11	11	0	No
4-Methyl-2-pentanone	11	11	0	No
Acetone	11	11	0	No
Acrolein	11	11	0	No
Acrylonitrile	11	11	0	No
<b>Aluminum</b>	<b>11</b>	<b>10</b>	<b>1</b>	<b>Yes</b>
Antimony	11	11	0	No
Beryllium	11	11	0	No
<b>Boron</b>	<b>11</b>	<b>0</b>	<b>11</b>	<b>Yes</b>
<b>Bromide</b>	<b>11</b>	<b>0</b>	<b>11</b>	<b>Yes</b>
Bromochloromethane	11	11	0	No
Bromodichloromethane	11	11	0	No
Bromoform	11	11	0	No
Bromomethane	11	11	0	No
<b>Calcium</b>	<b>11</b>	<b>0</b>	<b>11</b>	<b>Yes</b>
Carbon disulfide	11	11	0	No
Chemical Oxygen Demand (COD)	11	11	0	No
<b>Chloride</b>	<b>11</b>	<b>0</b>	<b>11</b>	<b>Yes</b>
Chlorobenzene	11	11	0	No
Chloroethane	11	11	0	No
Chloroform	11	11	0	No
Chloromethane	11	11	0	No
<i>cis</i> -1,2-Dichloroethene	11	11	0	No
<i>cis</i> -1,3-Dichloropropene	11	11	0	No
<b>Cobalt</b>	<b>11</b>	<b>8</b>	<b>3</b>	<b>Yes</b>
<b>Conductivity</b>	<b>11</b>	<b>0</b>	<b>11</b>	<b>Yes</b>
<b>Copper</b>	<b>11</b>	<b>0</b>	<b>11</b>	<b>Yes</b>
<b>Cyanide</b>	<b>11</b>	<b>10</b>	<b>1</b>	<b>Yes</b>
Dibromochloromethane	11	11	0	No
Dibromomethane	11	11	0	No
Dimethylbenzene, Total	11	11	0	No
<b>Dissolved Oxygen</b>	<b>11</b>	<b>0</b>	<b>11</b>	<b>Yes</b>
<b>Dissolved Solids</b>	<b>11</b>	<b>0</b>	<b>11</b>	<b>Yes</b>
Ethylbenzene	11	11	0	No
Iodide	11	11	0	No

Exhibit D.4. Summary of Censored and Uncensored Data—URGA (Continued)

Parameters	Observations	Censored Observation	Uncensored Observation	Statistical Analysis?
Iodomethane	11	11	0	No
<b>Iron</b>	<b>11</b>	<b>5</b>	<b>6</b>	<b>Yes</b>
<b>Magnesium</b>	<b>11</b>	<b>0</b>	<b>11</b>	<b>Yes</b>
<b>Manganese</b>	<b>11</b>	<b>3</b>	<b>8</b>	<b>Yes</b>
<b>Methylene chloride</b>	<b>11</b>	<b>10</b>	<b>1</b>	<b>Yes</b>
<b>Molybdenum</b>	<b>11</b>	<b>5</b>	<b>6</b>	<b>Yes</b>
<b>Nickel</b>	<b>11</b>	<b>2</b>	<b>9</b>	<b>Yes</b>
<b>Oxidation-Reduction Potential</b>	<b>11</b>	<b>0</b>	<b>11</b>	<b>Yes</b>
<b>pH</b>	<b>11</b>	<b>0</b>	<b>11</b>	<b>Yes</b>
<b>Potassium</b>	<b>11</b>	<b>0</b>	<b>11</b>	<b>Yes</b>
Radium-226	11	11	0	No
Rhodium	11	11	0	No
<b>Sodium</b>	<b>11</b>	<b>0</b>	<b>11</b>	<b>Yes</b>
Styrene	11	11	0	No
<b>Sulfate</b>	<b>11</b>	<b>0</b>	<b>11</b>	<b>Yes</b>
Tantalum	11	11	0	No
<b>Technetium-99</b>	<b>11</b>	<b>8</b>	<b>3</b>	<b>Yes</b>
Tetrachloroethene	11	11	0	No
Thallium	11	11	0	No
Thorium-230	11	11	0	No
Toluene	11	11	0	No
<b>Total Organic Carbon (TOC)</b>	<b>11</b>	<b>0</b>	<b>11</b>	<b>Yes</b>
<b>Total Organic Halides (TOX)</b>	<b>11</b>	<b>3</b>	<b>8</b>	<b>Yes</b>
<i>trans</i> -1,2-Dichloroethene	11	11	0	No
<i>trans</i> -1,3-Dichloropropene	11	11	0	No
<i>trans</i> -1,4-Dichloro-2-Butene	11	11	0	No
<b>Trichloroethene</b>	<b>11</b>	<b>5</b>	<b>6</b>	<b>Yes</b>
Trichlorofluoromethane	11	11	0	No
Vanadium	11	11	0	No
Vinyl Acetate	11	11	0	No
<b>Zinc</b>	<b>11</b>	<b>3</b>	<b>8</b>	<b>Yes</b>

**Bold** denotes parameters with at least one uncensored observation.

**Exhibit D.5. Summary of Censored and Uncensored Data—LRGA**

<b>Parameters</b>	<b>Observations</b>	<b>Censored Observation</b>	<b>Uncensored Observation</b>	<b>Statistical Analysis?</b>
1,1,1,2-Tetrachloroethane	7	7	0	No
1,1,2,2-Tetrachloroethane	7	7	0	No
1,1,2-Trichloroethane	7	7	0	No
1,1-Dichloroethane	7	7	0	No
1,2,3-Trichloropropane	7	7	0	No
1,2-Dibromo-3-chloropropane	7	7	0	No
1,2-Dibromoethane	7	7	0	No
1,2-Dichlorobenzene	7	7	0	No
1,2-Dichloropropane	7	7	0	No
2-Butanone	7	7	0	No
2-Hexanone	7	7	0	No
4-Methyl-2-pentanone	7	7	0	No
Acetone	7	7	0	No
Acrolein	7	7	0	No
Acrylonitrile	7	7	0	No
<b>Aluminum</b>	<b>7</b>	<b>6</b>	<b>1</b>	<b>Yes</b>
Antimony	7	7	0	No
Beryllium	7	7	0	No
<b>Boron</b>	<b>7</b>	<b>0</b>	<b>7</b>	<b>Yes</b>
<b>Bromide</b>	<b>7</b>	<b>0</b>	<b>7</b>	<b>Yes</b>
Bromochloromethane	7	7	0	No
Bromodichloromethane	7	7	0	No
Bromoform	7	7	0	No
Bromomethane	7	7	0	No
<b>Calcium</b>	<b>7</b>	<b>0</b>	<b>7</b>	<b>Yes</b>
Carbon disulfide	7	7	0	No
Chemical Oxygen Demand (COD)	7	7	0	No
<b>Chloride</b>	<b>7</b>	<b>0</b>	<b>7</b>	<b>Yes</b>
Chlorobenzene	7	7	0	No
Chloroethane	7	7	0	No
Chloroform	7	7	0	No
Chloromethane	7	7	0	No
<b>cis-1,2-Dichloroethene</b>	<b>7</b>	<b>6</b>	<b>1</b>	<b>Yes</b>
cis-1,3-Dichloropropene	7	7	0	No
Cobalt	7	7	0	No
<b>Conductivity</b>	<b>7</b>	<b>0</b>	<b>7</b>	<b>Yes</b>
<b>Copper</b>	<b>7</b>	<b>0</b>	<b>7</b>	<b>Yes</b>
<b>Cyanide</b>	<b>7</b>	<b>6</b>	<b>1</b>	<b>Yes</b>
Dibromochloromethane	7	7	0	No
Dibromomethane	7	7	0	No
Dimethylbenzene, Total	7	7	0	No
<b>Dissolved Oxygen</b>	<b>7</b>	<b>0</b>	<b>7</b>	<b>Yes</b>
<b>Dissolved Solids</b>	<b>7</b>	<b>0</b>	<b>7</b>	<b>Yes</b>
Ethylbenzene	7	7	0	No
Iodide	7	7	0	No
Iodomethane	7	7	0	No
<b>Iron</b>	<b>7</b>	<b>4</b>	<b>3</b>	<b>Yes</b>
<b>Magnesium</b>	<b>7</b>	<b>0</b>	<b>7</b>	<b>Yes</b>

**Exhibit D.5. Summary of Censored and Uncensored Data—LRGA (Continued)**

<b>Parameters</b>	<b>Observations</b>	<b>Censored Observation</b>	<b>Uncensored Observation</b>	<b>Statistical Analysis?</b>
<b>Manganese</b>	7	2	5	<b>Yes</b>
<b>Methylene chloride</b>	7	6	1	<b>Yes</b>
<b>Molybdenum</b>	7	5	2	<b>Yes</b>
<b>Nickel</b>	7	2	5	<b>Yes</b>
<b>Oxidation-Reduction Potential</b>	7	0	7	<b>Yes</b>
<b>pH</b>	7	0	7	<b>Yes</b>
<b>Potassium</b>	7	0	7	<b>Yes</b>
Radium-226	7	7	0	No
Rhodium	7	7	0	No
<b>Sodium</b>	7	0	7	<b>Yes</b>
Styrene	7	7	0	No
<b>Sulfate</b>	7	0	7	<b>Yes</b>
Tantalum	7	7	0	No
<b>Technetium-99</b>	7	5	2	<b>Yes</b>
Tetrachloroethene	7	7	0	No
Thallium	7	7	0	No
Thorium-230	7	7	0	No
Toluene	7	7	0	No
<b>Total Organic Carbon (TOC)</b>	7	0	7	<b>Yes</b>
<b>Total Organic Halides (TOX)</b>	7	3	4	<b>Yes</b>
<i>trans</i> -1,2-Dichloroethene	7	7	0	No
<i>trans</i> -1,3-Dichloropropene	7	7	0	No
<i>trans</i> -1,4-Dichloro-2-Butene	7	7	0	No
<b>Trichloroethene</b>	7	3	4	<b>Yes</b>
Trichlorofluoromethane	7	7	0	No
Vanadium	7	7	0	No
Vinyl Acetate	7	7	0	No
<b>Zinc</b>	7	1	6	<b>Yes</b>

**Bold** denotes parameters with at least one uncensored observation.

## **Discussion of Results from Historical Background Comparison**

For the UCRS, URGA, and LRGA, the concentrations of this quarter were compared to the results of the one-sided tolerance interval tests that were calculated using historical background and presented in Attachment D1. For the UCRS, URGA, and LRGA, the test was applied to 26, 27, and 27 parameters, respectively, including those listed in bold print in Exhibits D.3, D.4, and D.5, which includes trichloroethene that exceeded its MCL. A summary of exceedances when compared to statistically derived historical background by well number is shown in Exhibit D.6.

### **UCRS**

This quarter's results identified exceedances of historical background upper tolerance limit (UTL) for oxidation-reduction potential and technetium-99.

### **URGA**

This quarter's results identified exceedances of historical background UTL for calcium, conductivity, dissolved solids, magnesium, oxidation-reduction potential, sulfate, and technetium-99.

### **LRGA**

This quarter's results identified exceedances of historical background UTL for calcium, conductivity, dissolved solids, magnesium, oxidation-reduction potential, sulfate, and technetium-99.

## **Statistical Summary**

Summaries of the results of the statistical tests conducted on data obtained from wells in the UCRS, the URGA, and in the LRGA are presented in Exhibit D.7, Exhibit D.8, and Exhibit D.9, respectively.

**Exhibit D.6. Summary of Exceedances of Statistically Derived Historical Background Concentrations**

<b>UCRS</b>	<b>URGA</b>	<b>LRGA</b>
<b>MW386:</b> Oxidation-reduction potential*	<b>MW220:</b> Sulfate	<b>MW370:</b> Oxidation-reduction potential* and sulfate
<b>MW390:</b> Oxidation-reduction potential* and technetium-99	<b>MW222:</b> Oxidation-reduction potential*	<b>MW373:</b> Calcium, conductivity, dissolved solids, magnesium, oxidation-reduction potential,* and sulfate
<b>MW393:</b> Oxidation-reduction potential*	<b>MW223:</b> Oxidation-reduction potential*	<b>MW385:</b> Oxidation-reduction potential,* sulfate, and technetium-99
<b>MW396:</b> Oxidation-reduction potential*	<b>MW369:</b> Oxidation-reduction potential* and technetium-99	<b>MW388:</b> Oxidation-reduction potential* and sulfate
	<b>MW372:</b> Calcium, conductivity, dissolved solids, magnesium, and sulfate	<b>MW392:</b> Oxidation-reduction potential*
	<b>MW384:</b> Oxidation-reduction potential,* sulfate, and technetium-99	<b>MW395:</b> Oxidation-reduction potential*
	<b>MW387:</b> Magnesium, oxidation-reduction potential,* sulfate, and technetium-99	<b>MW397:</b> Oxidation-reduction potential*
	<b>MW391:</b> Oxidation-reduction potential*	
	<b>MW394:</b> Oxidation-reduction potential*	

\*Oxidation-Reduction Potential calibrated as Eh.



**Exhibit D.7. Test Summaries for Qualified Parameters for Historical Background—UCRS**

<b>Parameter</b>	<b>Performed Test</b>	<b>CV Normality Test<sup>a</sup></b>	<b>Results of Tolerance Interval Test Conducted</b>
Aluminum	Tolerance Interval	0.57	No exceedance of statistically derived historical background concentration.
Boron	Tolerance Interval	1.28	No exceedance of statistically derived historical background concentration.
Bromide	Tolerance Interval	0.24	No exceedance of statistically derived historical background concentration.
Calcium	Tolerance Interval	0.20	No exceedance of statistically derived historical background concentration.
Chloride	Tolerance Interval	0.05	No exceedance of statistically derived historical background concentration.
Cobalt	Tolerance Interval	1.34	No exceedance of statistically derived historical background concentration.
Conductivity	Tolerance Interval	0.12	No exceedance of statistically derived historical background concentration.
Copper	Tolerance Interval	0.48	No exceedance of statistically derived historical background concentration.
Dissolved Oxygen	Tolerance Interval	1.20	No exceedance of statistically derived historical background concentration.
Dissolved Solids	Tolerance Interval	0.19	No exceedance of statistically derived historical background concentration.
Iron	Tolerance Interval	0.48	No exceedance of statistically derived historical background concentration.
Magnesium	Tolerance Interval	0.20	No exceedance of statistically derived historical background concentration.
Manganese	Tolerance Interval	0.46	No exceedance of statistically derived historical background concentration.
Methylene Chloride	Tolerance Interval	0.56	No exceedance of statistically derived historical background concentration.
Molybdenum	Tolerance Interval	1.51	No exceedance of statistically derived historical background concentration.
Nickel	Tolerance Interval	1.27	No exceedance of statistically derived historical background concentration.
Oxidation-Reduction Potential <sup>b</sup>	Tolerance Interval	4.77	Current results exceed statistically derived historical background concentration in MW386, MW390, MW393, and MW396.
pH	Tolerance Interval	0.05	No exceedance of statistically derived historical background concentration.
Potassium	Tolerance Interval	0.28	No exceedance of statistically derived historical background concentration.
Sodium	Tolerance Interval	0.30	No exceedance of statistically derived historical background concentration.

**Exhibit D.7. Test Summaries for Qualified Parameters for Historical Background—UCRS (Continued)**

<b>Parameter</b>	<b>Performed Test</b>	<b>CV Normality Test<sup>a</sup></b>	<b>Results of Tolerance Interval Test Conducted</b>
Sulfate	Tolerance Interval	0.40	No exceedance of statistically derived historical background concentration.
Technetium-99	Tolerance Interval	0.86	Current results exceed statistically derived historical background concentration in MW390.
TOC	Tolerance Interval	0.47	No exceedance of statistically derived historical background concentration.
TOX	Tolerance Interval	0.38	No exceedance of statistically derived historical background concentration.
Vanadium	Tolerance Interval	0.11	No exceedance of statistically derived historical background concentration.
Zinc	Tolerance Interval	0.79	No exceedance of statistically derived historical background concentration.

CV: coefficient of variation

<sup>a</sup>If CV > 1.0, used log-transformed data.

<sup>b</sup>Oxidation-Reduction Potential calibrated as Eh.

**Exhibit D.8. Test Summaries for Qualified Parameters for Historical Background—URGA**

<b>Parameter</b>	<b>Performed Test</b>	<b>CV Normality Test<sup>a</sup></b>	<b>Results of Tolerance Interval Test Conducted</b>
Aluminum	Tolerance Interval	0.28	No exceedance of statistically derived historical background concentration.
Boron	Tolerance Interval	1.45	No exceedance of statistically derived historical background concentration.
Bromide	Tolerance Interval	0.00	No exceedance of statistically derived historical background concentration.
Calcium	Tolerance Interval	0.17	Current results exceed statistically derived historical background concentrations in MW372.
Chloride	Tolerance Interval	0.23	No exceedance of statistically derived historical background concentration.
Cobalt	Tolerance Interval	2.44	No exceedance of statistically derived historical background concentration.
Conductivity	Tolerance Interval	0.28	Current results exceed statistically derived historical background concentration in MW372.
Copper	Tolerance Interval	0.43	No exceedance of statistically derived historical background concentration.
Cyanide	Tolerance Interval	0.43	No exceedance of statistically derived historical background concentration.
Dissolved Oxygen	Tolerance Interval	0.50	No exceedance of statistically derived historical background concentration.
Dissolved Solids	Tolerance Interval	0.12	Current results exceed statistically derived historical background concentration in MW372.
Iron	Tolerance Interval	1.17	No exceedance of statistically derived historical background concentration.
Magnesium	Tolerance Interval	0.16	Current results exceed statistically derived historical background concentration in MW372 and MW387.
Manganese	Tolerance Interval	2.16	No exceedance of statistically derived historical background concentration.
Methylene Chloride	Tolerance Interval	0.16	No exceedance of statistically derived historical background concentration.
Molybdenum	Tolerance Interval	1.26	No exceedance of statistically derived historical background concentration.
Nickel	Tolerance Interval	1.79	No exceedance of statistically derived historical background concentration.
Oxidation-Reduction Potential <sup>b</sup>	Tolerance Interval	0.48	Current results exceed statistically derived historical background concentration in MW222, MW223, MW369, MW384, MW387, MW391, and MW394.
pH	Tolerance Interval	0.05	No exceedance of statistically derived historical background concentration.
Potassium	Tolerance Interval	1.40	No exceedance of statistically derived historical background concentration.
Sodium	Tolerance Interval	0.24	No exceedance of statistically derived historical background concentration.

**Exhibit D.8. Test Summaries for Qualified Parameters for Historical Background—URGA (Continued)**

<b>Parameter</b>	<b>Performed Test</b>	<b>CV Normality Test<sup>a</sup></b>	<b>Results of Tolerance Interval Test Conducted</b>
Sulfate	Tolerance Interval	0.25	Current results exceed statistically derived historical background concentration in MW220, MW372, MW384, and MW387.
Technetium-99	Tolerance Interval	0.99	Current results exceed statistically derived historical background concentration in MW369, MW384, and MW387.
TOC	Tolerance Interval	0.49	No exceedance of statistically derived historical background concentration.
TOX	Tolerance Interval	2.57	No exceedance of statistically derived historical background concentration.
Trichloroethene <sup>c</sup>	Tolerance Interval	0.95	No exceedance of statistically derived historical background concentration.
Zinc	Tolerance Interval	0.72	No exceedance of statistically derived historical background concentration.

CV: coefficient of variation

<sup>a</sup>If CV > 1.0, used log-transformed data.

<sup>b</sup>Oxidation-Reduction Potential calibrated as Eh.

<sup>c</sup>Tolerance interval was calculated based on an MCL exceedance.

**Exhibit D.9. Test Summaries for Qualified Parameters for Historical Background—LRGA**

<b>Parameter</b>	<b>Performed Test</b>	<b>CV Normality Test<sup>a</sup></b>	<b>Results of Tolerance Interval Test Conducted</b>
Aluminum	Tolerance Interval	0.86	No exceedance of statistically derived historical background concentration.
Boron	Tolerance Interval	1.24	No exceedance of statistically derived historical background concentration.
Bromide	Tolerance Interval	0.00	No exceedance of statistically derived historical background concentration.
Calcium	Tolerance Interval	0.50	Current results exceed statistically derived historical background concentration in MW373.
Chloride	Tolerance Interval	0.22	No exceedance of statistically derived historical background concentration.
<i>cis</i> -1,2-Dichloroethene	Tolerance Interval	0.00	No exceedance of statistically derived historical background concentration.
Conductivity	Tolerance Interval	0.14	Current results exceed statistically derived historical background concentration in MW373.
Copper	Tolerance Interval	0.47	No exceedance of statistically derived historical background concentration.
Cyanide	Tolerance Interval	0.00	No exceedance of statistically derived historical background concentration.
Dissolved Oxygen	Tolerance Interval	0.52	No exceedance of statistically derived historical background concentration.
Dissolved Solids	Tolerance Interval	0.16	Current results exceed statistically derived historical background concentration in MW373.
Iron	Tolerance Interval	1.29	No exceedance of statistically derived historical background concentration.
Magnesium	Tolerance Interval	0.51	Current results exceed statistically derived historical background concentration in MW373.
Manganese	Tolerance Interval	1.49	No exceedance of statistically derived historical background concentration.
Methylene Chloride	Tolerance Interval	0.55	No exceedance of statistically derived historical background concentration.
Molybdenum	Tolerance Interval	1.45	No exceedance of statistically derived historical background concentration.
Nickel	Tolerance Interval	1.09	No exceedance of statistically derived historical background concentration.
Oxidation-Reduction Potential <sup>b</sup>	Tolerance Interval	0.33	Current results exceed statistically derived historical background concentration in MW370, MW373, MW385, MW388, MW392, MW395, and MW397.
pH	Tolerance Interval	0.04	No exceedance of statistically derived historical background concentration.
Potassium	Tolerance Interval	0.40	No exceedance of statistically derived historical background concentration.

**Exhibit D.9. Test Summaries for Qualified Parameters for Historical Background—LRGA (Continued)**

<b>Parameter</b>	<b>Performed Test</b>	<b>CV Normality Test<sup>a</sup></b>	<b>Results of Tolerance Interval Test Conducted</b>
Sodium	Tolerance Interval	0.47	No exceedance of statistically derived historical background concentration.
Sulfate	Tolerance Interval	0.20	Current results exceed statistically derived historical background concentration in MW370, MW373, MW385, and MW388.
Technetium-99	Tolerance Interval	0.80	Current results exceed statistically derived historical background concentration in MW385.
TOC	Tolerance Interval	0.55	No exceedance of statistically derived historical background concentration.
TOX	Tolerance Interval	0.59	No exceedance of statistically derived historical background concentration.
Trichloroethene <sup>c</sup>	Tolerance Interval	0.78	No exceedance of statistically derived historical background concentration.
Zinc	Tolerance Interval	0.76	No exceedance of statistically derived historical background concentration.

CV: coefficient of variation

<sup>a</sup> If CV > 1.0, used log-transformed data.

<sup>b</sup> Oxidation-Reduction Potential calibrated as Eh.

<sup>c</sup> Tolerance interval was calculated based on an MCL exceedance.

## Discussion of Results from Current Background Comparison

For concentrations in wells in the UCRS, URGA, and LRGA that exceeded the TL test using historical background, the concentrations were compared to the one-sided TL calculated using the most recent eight quarters of data and are presented in Attachment D2. For the UCRS, URGA, and LRGA, the test was applied to 2, 7, and 7 parameters, respectively, because these parameter concentrations exceeded the historical background TL.

For downgradient wells only, a summary of instances where concentrations exceeded the TL calculated using current background data is shown in Exhibit D.10.

**Exhibit D.10. Summary of Exceedances (Downgradient Wells) of the TL Calculated Using Current Background Concentrations**

<b>URGA</b>	<b>LRGA</b>
<b>MW369:</b> Technetium-99	<b>MW370:</b> Sulfate
<b>MW372:</b> Calcium, conductivity, dissolved solids, magnesium, and sulfate	<b>MW373:</b> Calcium, conductivity, dissolved solids, magnesium, and sulfate
<b>MW387:</b> Magnesium, sulfate, and technetium-99	<b>MW388:</b> Sulfate

### UCRS

Because gradients in the UCRS are downward (vertical), there are no hydrogeologically downgradient UCRS wells. It should be noted; however, that the technetium-99 concentration in UCRS well MW390 exceeded the current TL this quarter.

### URGA

This quarter's results identified current background exceedances in downgradient wells for calcium, conductivity, dissolved solids, magnesium, sulfate, and technetium-99.

### LRGA

This quarter's results identified current background exceedances in downgradient wells for calcium, conductivity, dissolved solids, magnesium, and sulfate.

### **Statistical Summary**

Summaries of the statistical tests conducted on data obtained from wells in the UCRS, the URGA, and the LRGA are presented in Exhibit D.11, Exhibit D.12, and Exhibit D.13, respectively.

**Exhibit D.11. Test Summaries for Qualified Parameters for Current Background—UCRS**

<b>Parameter</b>	<b>Performed Test</b>	<b>CV Normality Test<sup>a</sup></b>	<b>Results of Tolerance Interval Test Conducted</b>
Oxidation-Reduction Potential <sup>b</sup>	Tolerance Interval	0.31	None of the test wells exceeded the upper TL, which is evidence that concentrations in these wells are not different from current background concentrations to a statistically significant level.
Technetium-99	Tolerance Interval	6.79	Because gradients in UCRS wells are downward, there are no UCRS wells that are hydrogeologically downgradient of the landfill; however, MW390 exceeded the upper TL, which is evidence of elevated concentration with respect to current background data.

<sup>a</sup> If CV > 1.0, used log-transformed data.

<sup>b</sup> Oxidation-Reduction Potential calibrated as Eh.



**Exhibit D.12. Test Summaries for Qualified Parameters for Current Background—URGA**

<b>Parameter</b>	<b>Performed Test</b>	<b>CV Normality Test<sup>a</sup></b>	<b>Results of Tolerance Interval Test Conducted</b>
Calcium	Tolerance Interval	0.13	MW372 exceeded the upper TL, which is evidence of elevated concentration with respect to current background data.
Conductivity	Tolerance Interval	0.09	MW372 exceeded the upper TL, which is evidence of elevated concentration with respect to current background data.
Dissolved Solids	Tolerance Interval	0.16	MW372 exceeded the upper TL, which is evidence of elevated concentration with respect to current background data.
Magnesium	Tolerance Interval	0.14	MW372 and MW387 exceeded the upper TL, which is evidence of elevated concentration with respect to current background data.
Oxidation-Reduction Potential <sup>b</sup>	Tolerance Interval	0.10	None of the test wells exceeded the upper TL, which is evidence that concentrations in these wells are not different from current background concentrations to a statistically significant level.
Sulfate	Tolerance Interval	0.26	MW372 and MW387 exceeded the upper TL, which is evidence of elevated concentration with respect to current background data.
Technetium-99	Tolerance Interval	0.56	MW369, MW384 and MW387 exceeded the upper TL, which is evidence of elevated concentration with respect to current background data.

CV: coefficient of variation

<sup>a</sup> If CV > 1.0, used log-transformed data.

<sup>b</sup> Oxidation-Reduction Potential calibrated as Eh.

**Exhibit D.13. Test Summaries for Qualified Parameters for Current Background—LRGA**

<b>Parameter</b>	<b>Performed Test</b>	<b>CV Normality Test<sup>a</sup></b>	<b>Results of Tolerance Interval Test Conducted</b>
Calcium	Tolerance Interval	0.18	MW373 exceeded the upper TL, which is evidence of elevated concentration with respect to current background data.
Conductivity	Tolerance Interval	0.10	MW373 exceeded the upper TL, which is evidence of elevated concentration with respect to current background data.
Dissolved Solids	Tolerance Interval	0.14	MW373 exceeded the upper TL, which is evidence of elevated concentration with respect to current background data.
Magnesium	Tolerance Interval	0.18	MW373 exceeded the upper TL, which is evidence of elevated concentration with respect to current background data.
Oxidation-Reduction Potential <sup>b</sup>	Tolerance Interval	0.17	None of the test wells exceeded the upper TL, which is evidence that concentrations in these wells are not different from current background concentrations to a statistically significant level.
Sulfate	Tolerance Interval	0.02	MW370, MW373, MW385, and MW388 exceeded the upper TL, which is evidence of elevated concentration with respect to current background data.
Technetium-99	Tolerance Interval	0.45	MW385 exceeded the upper TL, which is evidence of elevated concentration with respect to current background data.

<sup>a</sup> If CV > 1.0, used log-transformed data.

<sup>b</sup> Oxidation-Reduction Potential calibrated as Eh.

**ATTACHMENT D1**

**COMPARISON OF CURRENT DATA TO  
ONE-SIDED UPPER TOLERANCE INTERVAL TEST  
CALCULATED USING  
HISTORICAL BACKGROUND DATA**

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# C-746-S/T Third Quarter 2023 Statistical Analysis      Historical Background Comparison

**Aluminum**

**UNITS: mg/L**

**UCRS**

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is evidence of an exceedance of the statistically-derived historical background concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

**Statistics-Background Data**      X= 0.320    S= 0.182    CV(1)=0.567    K factor\*\*= 3.188    TL(1)= 9.00E-01    LL(1)=N/A

**Statistics-Transformed Background Data**      X= -1.259    S= 0.503    CV(2)=-0.400    K factor\*\*= 3.188    TL(2)= 3.45E-01    LL(2)=N/A

**Historical Background Data from Upgradient Wells with Transformed Result**

Well Number:	MW396	
Date Collected	Result	LN(Result)
8/13/2002	3.93E-01	-9.34E-01
9/16/2002	2.00E-01	-1.61E+00
10/16/2002	2.00E-01	-1.61E+00
1/13/2003	5.01E-01	-6.91E-01
4/8/2003	2.00E-01	-1.61E+00
7/16/2003	2.00E-01	-1.61E+00
10/14/2003	2.00E-01	-1.61E+00
1/14/2004	6.68E-01	-4.03E-01

**Dry/Partially Dry Wells**

Well No.	Gradient
MW389	Downgradient

**Because CV(1) is less than or equal to 1, assume normal distribution and continue with statistical analysis utilizing TL(1).**

**Current Quarter Data**

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW386	Sidegradient	No	5.00E-02	N/A	-3.00E+00	N/A
MW390	Downgradient	Yes	2.41E-02	NO	-3.73E+00	N/A
MW393	Downgradient	No	5.00E-02	N/A	-3.00E+00	N/A
MW396	Upgradient	No	5.00E-02	N/A	-3.00E+00	N/A

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for a well did not exceed the MCL value, that well was not included in the statistical evaluation.

**Conclusion of Statistical Analysis on Historical Data**

**None of the test wells exceeded the Upper Tolerance Limit, which is evidence that concentrations in these wells are not different from historical background concentrations to a statistically-significant level.**

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum (((background result-X)^2)/[count of background results - 1])]^0.5

TL Upper Tolerance Limit, TL = X + (K \* S), LL Lower Tolerance Limit, LL = X - (K \* S)

X Mean, X = (sum of background results)/(count of background results)

\*\* Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009.

# C-746-S/T Third Quarter 2023 Statistical Analysis      Historical Background Comparison

**Boron**

**UNITS: mg/L**

**UCRS**

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is evidence of an exceedance of the statistically-derived historical background concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

**Statistics-Background Data**      X= 0.650    S= 0.833    CV(1)=1.282    K factor\*\*= 3.188    TL(1)= 3.31E+00    LL(1)=N/A

**Statistics-Transformed Background Data**      X= -1.034    S= 1.066    CV(2)=-1.031    K factor\*\*= 3.188    TL(2)= 2.36E+00    LL(2)=N/A

**Historical Background Data from Upgradient Wells with Transformed Result**

Well Number: MW396		
Date Collected	Result	LN(Result)
8/13/2002	2.00E+00	6.93E-01
9/16/2002	2.00E+00	6.93E-01
10/16/2002	2.00E-01	-1.61E+00
1/13/2003	2.00E-01	-1.61E+00
4/8/2003	2.00E-01	-1.61E+00
7/16/2003	2.00E-01	-1.61E+00
10/14/2003	2.00E-01	-1.61E+00
1/14/2004	2.00E-01	-1.61E+00

**Dry/Partially Dry Wells**

Well No.	Gradient
MW389	Downgradient

**Because CV(1) is greater than 1, the natural logarithm of background and test well results were calculated utilizing TL(2) for comparison.**

**Current Quarter Data**

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW386	Sidegradient	Yes	1.34E-02	N/A	-4.31E+00	NO
MW390	Downgradient	Yes	1.34E-02	N/A	-4.31E+00	NO
MW393	Downgradient	Yes	1.76E-02	N/A	-4.04E+00	NO
MW396	Upgradient	Yes	8.25E-03	N/A	-4.80E+00	NO

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for a well did not exceed the MCL value, that well was not included in the statistical evaluation.

**Conclusion of Statistical Analysis on Historical Data**

**None of the test wells exceeded the Upper Tolerance Limit, which is evidence that concentrations in these wells are not different from historical background concentrations to a statistically-significant level.**

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation,  $CV = S/X$  If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation,  $S = [\text{Sum}([(background\ result - X)^2]/[\text{count of background results} - 1])]^{0.5}$

TL Upper Tolerance Limit,  $TL = X + (K * S)$ ,      LL Lower Tolerance Limit,  $LL = X - (K * S)$

X Mean,  $X = (\text{sum of background results})/(\text{count of background results})$

\*\* Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009.      D1-4

**C-746-S/T Third Quarter 2023 Statistical Analysis      Historical Background Comparison**

**Bromide**

**UNITS: mg/L**

**UCRS**

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is evidence of an exceedance of the statistically-derived historical background concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

**Statistics-Background Data**      X= 1.388    S= 0.327    CV(1)=0.236    K factor\*\*= 3.188    TL(1)= 2.43E+00    LL(1)=N/A

**Statistics-Transformed Background Data**      X= 0.301    S= 0.252    CV(2)=0.838    K factor\*\*= 3.188    TL(2)= 1.10E+00    LL(2)=N/A

**Historical Background Data from Upgradient Wells with Transformed Result**

Well Number: MW396		
Date Collected	Result	LN(Result)
8/13/2002	1.50E+00	4.05E-01
9/16/2002	1.60E+00	4.70E-01
10/16/2002	1.60E+00	4.70E-01
1/13/2003	1.00E+00	0.00E+00
4/8/2003	1.00E+00	0.00E+00
7/16/2003	1.00E+00	0.00E+00
10/14/2003	1.70E+00	5.31E-01
1/14/2004	1.70E+00	5.31E-01

**Dry/Partially Dry Wells**

Well No.	Gradient
MW389	Downgradient

**Because CV(1) is less than or equal to 1, assume normal distribution and continue with statistical analysis utilizing TL(1).**

**Current Quarter Data**

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW386	Sidegradient	Yes	1.26E-01	NO	-2.07E+00	N/A
MW390	Downgradient	Yes	3.45E-01	NO	-1.06E+00	N/A
MW393	Downgradient	Yes	1.31E-01	NO	-2.03E+00	N/A
MW396	Upgradient	Yes	8.40E-01	NO	-1.74E-01	N/A

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for a well did not exceed the MCL value, that well was not included in the statistical evaluation.

**Conclusion of Statistical Analysis on Historical Data**

**None of the test wells exceeded the Upper Tolerance Limit, which is evidence that concentrations in these wells are not different from historical background concentrations to a statistically-significant level.**

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum ((background result-X)^2)/[count of background results - 1]]^0.5

TL Upper Tolerance Limit, TL = X + (K \* S), LL Lower Tolerance Limit, LL = X - (K \* S)

X Mean, X = (sum of background results)/(count of background results)

\*\* Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009.

# C-746-S/T Third Quarter 2023 Statistical Analysis      Historical Background Comparison

**Calcium**

**UNITS: mg/L**

**UCRS**

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is evidence of an exceedance of the statistically-derived historical background concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

**Statistics-Background Data**      X= 41.825    S= 8.445    CV(1)=0.202    K factor\*\*= 3.188    TL(1)= 6.87E+01    LL(1)=N/A

**Statistics-Transformed Background Data**      X= 3.711    S= 0.241    CV(2)=0.065    K factor\*\*= 3.188    TL(2)= 4.48E+00    LL(2)=N/A

**Historical Background Data from Upgradient Wells with Transformed Result**

Well Number: MW396		
Date Collected	Result	LN(Result)
8/13/2002	3.84E+01	3.65E+00
9/16/2002	4.29E+01	3.76E+00
10/16/2002	4.02E+01	3.69E+00
1/13/2003	4.67E+01	3.84E+00
4/8/2003	4.98E+01	3.91E+00
7/16/2003	4.33E+01	3.77E+00
10/14/2003	4.97E+01	3.91E+00
1/14/2004	2.36E+01	3.16E+00

**Dry/Partially Dry Wells**

Well No.	Gradient
MW389	Downgradient

**Because CV(1) is less than or equal to 1, assume normal distribution and continue with statistical analysis utilizing TL(1).**

**Current Quarter Data**

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW386	Sidegradient	Yes	2.03E+01	NO	3.01E+00	N/A
MW390	Downgradient	Yes	2.50E+01	NO	3.22E+00	N/A
MW393	Downgradient	Yes	1.58E+01	NO	2.76E+00	N/A
MW396	Upgradient	Yes	3.12E+01	NO	3.44E+00	N/A

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for a well did not exceed the MCL value, that well was not included in the statistical evaluation.

**Conclusion of Statistical Analysis on Historical Data**

**None of the test wells exceeded the Upper Tolerance Limit, which is evidence that concentrations in these wells are not different from historical background concentrations to a statistically-significant level.**

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum ((background result-X)^2)/[count of background results - 1]]^0.5

TL Upper Tolerance Limit, TL = X + (K \* S), LL Lower Tolerance Limit, LL = X - (K \* S)

X Mean, X = (sum of background results)/(count of background results)

\*\* Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009.      D1-6





**C-746-S/T Third Quarter 2023 Statistical Analysis      Historical Background Comparison**

**Cobalt**

**UNITS: mg/L**

**UCRS**

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is evidence of an exceedance of the statistically-derived historical background concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

**Statistics-Background Data**      X= 0.008    S= 0.011    CV(1)=1.340    K factor\*\*= 3.188    TL(1)= 4.18E-02    LL(1)=N/A

**Statistics-Transformed Background Data**      X= -5.645    S= 1.339    CV(2)=-0.237    K factor\*\*= 3.188    TL(2)= -1.38E+00    LL(2)=N/A

**Historical Background Data from Upgradient Wells with Transformed Result**

Well Number:	MW396	
Date Collected	Result	LN(Result)
8/13/2002	2.50E-02	-3.69E+00
9/16/2002	2.50E-02	-3.69E+00
10/16/2002	1.00E-03	-6.91E+00
1/13/2003	3.24E-03	-5.73E+00
4/8/2003	4.36E-03	-5.44E+00
7/16/2003	2.76E-03	-5.89E+00
10/14/2003	1.00E-03	-6.91E+00
1/14/2004	1.00E-03	-6.91E+00

**Dry/Partially Dry Wells**

Well No.	Gradient
MW389	Downgradient

**Because CV(1) is greater than 1, the natural logarithm of background and test well results were calculated utilizing TL(2) for comparison.**

**Current Quarter Data**

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW386	Sidegradient	Yes	3.44E-04	N/A	-7.97E+00	NO
MW390	Downgradient	No	1.00E-03	N/A	-6.91E+00	N/A
MW393	Downgradient	No	1.00E-03	N/A	-6.91E+00	N/A
MW396	Upgradient	No	1.00E-03	N/A	-6.91E+00	N/A

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for a well did not exceed the MCL value, that well was not included in the statistical evaluation.

**Conclusion of Statistical Analysis on Historical Data**

**None of the test wells exceeded the Upper Tolerance Limit, which is evidence that concentrations in these wells are not different from historical background concentrations to a statistically-significant level.**

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum (((background result-X)^2)/[count of background results - 1])]^0.5

TL Upper Tolerance Limit, TL = X + (K \* S), LL Lower Tolerance Limit, LL = X - (K \* S)

X Mean, X = (sum of background results)/(count of background results)

\*\* Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009. D1-8

# C-746-S/T Third Quarter 2023 Statistical Analysis      Historical Background Comparison

**Conductivity**

**UNITS: umho/cm**

**UCRS**

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is evidence of an exceedance of the statistically-derived historical background concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

**Statistics-Background Data**      X= 922.500   S= 107.616   CV(1)=0.117      **K factor\*\*= 3.188**      TL(1)= 1.27E+03   LL(1)=N/A

**Statistics-Transformed Background Data**      X= 6.822   S= 0.111   CV(2)=0.016      **K factor\*\*= 3.188**      TL(2)= 7.17E+00   LL(2)=N/A

**Historical Background Data from Upgradient Wells with Transformed Result**

Well Number: MW396		
Date Collected	Result	LN(Result)
8/13/2002	7.84E+02	6.66E+00
9/30/2002	8.71E+02	6.77E+00
10/16/2002	8.68E+02	6.77E+00
1/13/2003	9.12E+02	6.82E+00
4/8/2003	9.42E+02	6.85E+00
7/16/2003	9.10E+02	6.81E+00
10/14/2003	9.35E+02	6.84E+00
1/14/2004	1.16E+03	7.05E+00

**Dry/Partially Dry Wells**

Well No.	Gradient
MW389	Downgradient

**Because CV(1) is less than or equal to 1, assume normal distribution and continue with statistical analysis utilizing TL(1).**

**Current Quarter Data**

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW386	Sidegradient	Yes	5.76E+02	NO	6.36E+00	N/A
MW390	Downgradient	Yes	6.18E+02	NO	6.43E+00	N/A
MW393	Downgradient	Yes	4.53E+02	NO	6.12E+00	N/A
MW396	Upgradient	Yes	6.73E+02	NO	6.51E+00	N/A

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for a well did not exceed the MCL value, that well was not included in the statistical evaluation.

**Conclusion of Statistical Analysis on Historical Data**

**None of the test wells exceeded the Upper Tolerance Limit, which is evidence that concentrations in these wells are not different from historical background concentrations to a statistically-significant level.**

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum ((background result-X)^2)/[count of background results - 1]]^0.5

TL Upper Tolerance Limit, TL = X + (K \* S),      LL Lower Tolerance Limit, LL = X - (K \* S)

X Mean, X = (sum of background results)/(count of background results)

\*\* Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009.      D1-9

<b>C-746-S/T Third Quarter 2023 Statistical Analysis</b>	<b>Historical Background Comparison</b>
<b>Copper</b>	<b>UNITS: mg/L</b>
	<b>UCRS</b>

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is evidence of an exceedance of the statistically-derived historical background concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

**Statistics-Background Data**      X= 0.028    S= 0.014    CV(1)=0.481    K factor\*\*= 3.188    TL(1)= 7.16E-02    LL(1)=N/A

**Statistics-Transformed Background Data**      X= -3.650    S= 0.414    CV(2)=-0.113    K factor\*\*= 3.188    TL(2)= -2.33E+00    LL(2)=N/A

**Historical Background Data from Upgradient Wells with Transformed Result**

Well Number: MW396		
Date Collected	Result	LN(Result)
8/13/2002	5.00E-02	-3.00E+00
9/16/2002	5.00E-02	-3.00E+00
10/16/2002	2.60E-02	-3.65E+00
1/13/2003	2.00E-02	-3.91E+00
4/8/2003	2.00E-02	-3.91E+00
7/16/2003	2.00E-02	-3.91E+00
10/14/2003	2.00E-02	-3.91E+00
1/14/2004	2.00E-02	-3.91E+00

**Dry/Partially Dry Wells**

Well No.	Gradient
MW389	Downgradient

**Because CV(1) is less than or equal to 1, assume normal distribution and continue with statistical analysis utilizing TL(1).**

**Current Quarter Data**

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW386	Sidegradient	Yes	1.14E-03	NO	-6.78E+00	N/A
MW390	Downgradient	Yes	2.10E-03	NO	-6.17E+00	N/A
MW393	Downgradient	Yes	1.03E-03	NO	-6.88E+00	N/A
MW396	Upgradient	Yes	1.12E-03	NO	-6.79E+00	N/A

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for a well did not exceed the MCL value, that well was not included in the statistical evaluation.

**Conclusion of Statistical Analysis on Historical Data**

**None of the test wells exceeded the Upper Tolerance Limit, which is evidence that concentrations in these wells are not different from historical background concentrations to a statistically-significant level.**

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum (((background result-X)^2)/[count of background results - 1])]^0.5

TL Upper Tolerance Limit, TL = X + (K \* S), LL Lower Tolerance Limit, LL = X - (K \* S)

X Mean, X = (sum of background results)/(count of background results)

\*\* Read from Table 5, Appendix B of *Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009.*      D1-10

# C-746-S/T Third Quarter 2023 Statistical Analysis      Historical Background Comparison

**Dissolved Oxygen**

**UNITS: mg/L**

**UCRS**

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is evidence of an exceedance of the statistically-derived historical background concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

**Statistics-Background Data**      X= 1.395    S= 1.677    CV(1)=1.202    K factor\*\*= 3.188    TL(1)= 6.74E+00    LL(1)=N/A

**Statistics-Transformed Background Data**      X= -0.043    S= 0.814    CV(2)=-18.867    K factor\*\*= 3.188    TL(2)= 2.55E+00    LL(2)=N/A

**Historical Background Data from Upgradient Wells with Transformed Result**

Well Number:	MW396	
Date Collected	Result	LN(Result)
8/13/2002	5.45E+00	1.70E+00
9/16/2002	4.00E-01	-9.16E-01
10/16/2002	5.40E-01	-6.16E-01
1/13/2003	7.20E-01	-3.29E-01
4/8/2003	6.90E-01	-3.71E-01
7/16/2003	1.10E+00	9.53E-02
10/14/2003	7.10E-01	-3.42E-01
1/14/2004	1.55E+00	4.38E-01

**Dry/Partially Dry Wells**

Well No.	Gradient
MW389	Downgradient

**Because CV(1) is greater than 1, the natural logarithm of background and test well results were calculated utilizing TL(2) for comparison.**

**Current Quarter Data**

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW386	Sidegradient	Yes	1.33E+00	N/A	2.85E-01	NO
MW390	Downgradient	Yes	4.57E+00	N/A	1.52E+00	NO
MW393	Downgradient	Yes	1.73E+00	N/A	5.48E-01	NO
MW396	Upgradient	Yes	1.20E+00	N/A	1.82E-01	NO

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for a well did not exceed the MCL value, that well was not included in the statistical evaluation.

**Conclusion of Statistical Analysis on Historical Data**

**None of the test wells exceeded the Upper Tolerance Limit, which is evidence that concentrations in these wells are not different from historical background concentrations to a statistically-significant level.**

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum (((background result-X)^2)/[count of background results - 1])]^0.5

TL Upper Tolerance Limit, TL = X + (K \* S), LL Lower Tolerance Limit, LL = X - (K \* S)

X Mean, X = (sum of background results)/(count of background results)

\*\* Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009.      D1-11

# C-746-S/T Third Quarter 2023 Statistical Analysis      Historical Background Comparison

**Dissolved Solids**

**UNITS: mg/L**

**UCRS**

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is evidence of an exceedance of the statistically-derived historical background concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

**Statistics-Background Data**      X= 550.375   S= 104.330   CV(1)=0.190      **K factor\*\*= 3.188**      TL(1)= 8.83E+02   LL(1)=N/A

**Statistics-Transformed Background Data**      X= 6.298   S= 0.162   CV(2)=0.026      **K factor\*\*= 3.188**      TL(2)= 6.82E+00   LL(2)=N/A

**Historical Background Data from Upgradient Wells with Transformed Result**

Well Number:	MW396	
Date Collected	Result	LN(Result)
8/13/2002	5.02E+02	6.22E+00
9/16/2002	5.06E+02	6.23E+00
10/16/2002	5.43E+02	6.30E+00
1/13/2003	5.21E+02	6.26E+00
4/8/2003	5.04E+02	6.22E+00
7/16/2003	5.32E+02	6.28E+00
10/14/2003	4.90E+02	6.19E+00
1/14/2004	8.05E+02	6.69E+00

**Dry/Partially Dry Wells**

Well No.	Gradient
MW389	Downgradient

**Because CV(1) is less than or equal to 1, assume normal distribution and continue with statistical analysis utilizing TL(1).**

**Current Quarter Data**

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW386	Sidegradient	Yes	3.31E+02	NO	5.80E+00	N/A
MW390	Downgradient	Yes	3.32E+02	NO	5.81E+00	N/A
MW393	Downgradient	Yes	2.70E+02	NO	5.60E+00	N/A
MW396	Upgradient	Yes	3.91E+02	NO	5.97E+00	N/A

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for a well did not exceed the MCL value, that well was not included in the statistical evaluation.

**Conclusion of Statistical Analysis on Historical Data**

**None of the test wells exceeded the Upper Tolerance Limit, which is evidence that concentrations in these wells are not different from historical background concentrations to a statistically-significant level.**

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum ((background result-X)^2)/[count of background results - 1]]^0.5

TL Upper Tolerance Limit, TL = X + (K \* S),      LL Lower Tolerance Limit, LL = X - (K \* S)

X Mean, X = (sum of background results)/(count of background results)

\*\* Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009.      D1-12



# C-746-S/T Third Quarter 2023 Statistical Analysis      Historical Background Comparison

**Iron**

**UNITS: mg/L**

**UCRS**

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is evidence of an exceedance of the statistically-derived historical background concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

**Statistics-Background Data**      X= 7.796    S= 3.723    CV(1)=0.478    K factor\*\*= 3.188    TL(1)= 1.97E+01    LL(1)=N/A

**Statistics-Transformed Background Data**      X= 1.880    S= 0.723    CV(2)=0.384    K factor\*\*= 3.188    TL(2)= 4.18E+00    LL(2)=N/A

**Historical Background Data from Upgradient Wells with Transformed Result**

Well Number:	MW396	
Date Collected	Result	LN(Result)
8/13/2002	1.80E+00	5.88E-01
9/16/2002	9.53E+00	2.25E+00
10/16/2002	7.43E+00	2.01E+00
1/13/2003	9.93E+00	2.30E+00
4/8/2003	1.02E+01	2.32E+00
7/16/2003	9.16E+00	2.21E+00
10/14/2003	1.19E+01	2.48E+00
1/14/2004	2.42E+00	8.84E-01

**Dry/Partially Dry Wells**

Well No.	Gradient
MW389	Downgradient

**Because CV(1) is less than or equal to 1, assume normal distribution and continue with statistical analysis utilizing TL(1).**

**Current Quarter Data**

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW386	Sidegradient	Yes	8.83E-02	NO	-2.43E+00	N/A
MW390	Downgradient	No	1.00E-01	N/A	-2.30E+00	N/A
MW393	Downgradient	Yes	3.94E-01	NO	-9.31E-01	N/A
MW396	Upgradient	Yes	1.16E-01	NO	-2.15E+00	N/A

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for a well did not exceed the MCL value, that well was not included in the statistical evaluation.

**Conclusion of Statistical Analysis on Historical Data**

**None of the test wells exceeded the Upper Tolerance Limit, which is evidence that concentrations in these wells are not different from historical background concentrations to a statistically-significant level.**

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation,  $CV = S/X$  If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation,  $S = [\text{Sum}([(background\ result-X)^2]/[\text{count of background results} - 1])]^{0.5}$

TL Upper Tolerance Limit,  $TL = X + (K * S)$ ,      LL Lower Tolerance Limit,  $LL = X - (K * S)$

X Mean,  $X = (\text{sum of background results})/(\text{count of background results})$

\*\* Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009.      D1-13

# C-746-S/T Third Quarter 2023 Statistical Analysis      Historical Background Comparison

**Magnesium**

**UNITS: mg/L**

**UCRS**

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is evidence of an exceedance of the statistically-derived historical background concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

**Statistics-Background Data**      X= 16.876    S= 3.313    CV(1)=0.196    **K factor\*\*= 3.188**    TL(1)= 2.74E+01    LL(1)=N/A

**Statistics-Transformed Background Data**      X= 2.804    S= 0.240    CV(2)=0.086    **K factor\*\*= 3.188**    TL(2)= 3.57E+00    LL(2)=N/A

**Historical Background Data from Upgradient Wells with Transformed Result**

Well Number: MW396		
Date Collected	Result	LN(Result)
8/13/2002	1.55E+01	2.74E+00
9/16/2002	1.73E+01	2.85E+00
10/16/2002	1.78E+01	2.88E+00
1/13/2003	1.92E+01	2.95E+00
4/8/2003	1.78E+01	2.88E+00
7/16/2003	1.78E+01	2.88E+00
10/14/2003	2.02E+01	3.01E+00
1/14/2004	9.41E+00	2.24E+00

**Dry/Partially Dry Wells**

Well No.	Gradient
MW389	Downgradient

**Because CV(1) is less than or equal to 1, assume normal distribution and continue with statistical analysis utilizing TL(1).**

**Current Quarter Data**

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW386	Sidegradient	Yes	8.58E+00	NO	2.15E+00	N/A
MW390	Downgradient	Yes	1.06E+01	NO	2.36E+00	N/A
MW393	Downgradient	Yes	3.91E+00	NO	1.36E+00	N/A
MW396	Upgradient	Yes	1.36E+01	NO	2.61E+00	N/A

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for a well did not exceed the MCL value, that well was not included in the statistical evaluation.

**Conclusion of Statistical Analysis on Historical Data**

**None of the test wells exceeded the Upper Tolerance Limit, which is evidence that concentrations in these wells are not different from historical background concentrations to a statistically-significant level.**

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum ((background result-X)^2)/[count of background results - 1]]^0.5

TL Upper Tolerance Limit, TL = X + (K \* S), LL Lower Tolerance Limit, LL = X - (K \* S)

X Mean, X = (sum of background results)/(count of background results)

\*\* Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009.      D1-14



# C-746-S/T Third Quarter 2023 Statistical Analysis      Historical Background Comparison

**Manganese**

**UNITS: mg/L**

**UCRS**

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is evidence of an exceedance of the statistically-derived historical background concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

**Statistics-Background Data**      X= 0.774    S= 0.353    CV(1)=0.456    K factor\*\*= 3.188    TL(1)= 1.90E+00    LL(1)=N/A

**Statistics-Transformed Background Data**      X= -0.566    S= 1.192    CV(2)=-2.105    K factor\*\*= 3.188    TL(2)= 3.23E+00    LL(2)=N/A

**Historical Background Data from Upgradient Wells with Transformed Result**

Well Number:	MW396	
Date Collected	Result	LN(Result)
8/13/2002	5.70E-01	-5.62E-01
9/16/2002	6.47E-01	-4.35E-01
10/16/2002	8.80E-01	-1.28E-01
1/13/2003	1.13E+00	1.24E-01
4/8/2003	9.65E-01	-3.56E-02
7/16/2003	9.83E-01	-1.71E-02
10/14/2003	9.84E-01	-1.61E-02
1/14/2004	3.14E-02	-3.46E+00

**Dry/Partially Dry Wells**

Well No.	Gradient
MW389	Downgradient

**Because CV(1) is less than or equal to 1, assume normal distribution and continue with statistical analysis utilizing TL(1).**

**Current Quarter Data**

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW386	Sidegradient	Yes	3.12E-02	NO	-3.47E+00	N/A
MW390	Downgradient	No	5.00E-03	N/A	-5.30E+00	N/A
MW393	Downgradient	Yes	1.08E-02	NO	-4.53E+00	N/A
MW396	Upgradient	Yes	3.19E-02	NO	-3.45E+00	N/A

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for a well did not exceed the MCL value, that well was not included in the statistical evaluation.

**Conclusion of Statistical Analysis on Historical Data**

**None of the test wells exceeded the Upper Tolerance Limit, which is evidence that concentrations in these wells are not different from historical background concentrations to a statistically-significant level.**

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum ((background result-X)^2)/[count of background results - 1]]^0.5

TL Upper Tolerance Limit, TL = X + (K \* S), LL Lower Tolerance Limit, LL = X - (K \* S)

X Mean, X = (sum of background results)/(count of background results)

\*\* Read from Table 5, Appendix B of *Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009.*      D1-15

**C-746-S/T Third Quarter 2023 Statistical Analysis      Historical Background Comparison**

**Methylene chloride**

**UNITS: UG/L**

**UCRS**

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is evidence of an exceedance of the statistically-derived historical background concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

**Statistics-Background Data**      X= 5.625    S= 3.159    CV(1)=0.562    K factor\*\*= 3.188    TL(1)= 1.57E+01    LL(1)=N/A

**Statistics-Transformed Background Data**      X= 1.614    S= 0.500    CV(2)=0.310    K factor\*\*= 3.188    TL(2)= 3.21E+00    LL(2)=N/A

**Historical Background Data from Upgradient Wells with Transformed Result**

Well Number: MW396		
Date Collected	Result	LN(Result)
8/13/2002	1.30E+01	2.56E+00
9/30/2002	2.00E+00	6.93E-01
10/16/2002	5.00E+00	1.61E+00
1/13/2003	5.00E+00	1.61E+00
4/8/2003	5.00E+00	1.61E+00
7/16/2003	5.00E+00	1.61E+00
10/14/2003	5.00E+00	1.61E+00
1/14/2004	5.00E+00	1.61E+00

**Dry/Partially Dry Wells**

Well No.	Gradient
MW389	Downgradient

**Because CV(1) is less than or equal to 1, assume normal distribution and continue with statistical analysis utilizing TL(1).**

**Current Quarter Data**

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW386	Sidegradient	No	5.00E+00	N/A	1.61E+00	N/A
MW390	Downgradient	No	5.00E+00	N/A	1.61E+00	N/A
MW393	Downgradient	Yes	5.70E-01	NO	-5.62E-01	N/A
MW396	Upgradient	No	5.00E+00	N/A	1.61E+00	N/A

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for a well did not exceed the MCL value, that well was not included in the statistical evaluation.

**Conclusion of Statistical Analysis on Historical Data**

**None of the test wells exceeded the Upper Tolerance Limit, which is evidence that concentrations in these wells are not different from historical background concentrations to a statistically-significant level.**

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum ((background result-X)^2)/[count of background results - 1]]^0.5

TL Upper Tolerance Limit, TL = X + (K \* S), LL Lower Tolerance Limit, LL = X - (K \* S)

X Mean, X = (sum of background results)/(count of background results)

\*\* Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009. D1-16

**C-746-S/T Third Quarter 2023 Statistical Analysis      Historical Background Comparison**

**Molybdenum**

**UNITS: mg/L**

**UCRS**

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is evidence of an exceedance of the statistically-derived historical background concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

**Statistics-Background Data**      X= 0.007    S= 0.011    CV(1)=1.507    K factor\*\*= 3.188    TL(1)= 4.22E-02    LL(1)=N/A

**Statistics-Transformed Background Data**      X= -5.928    S= 1.420    CV(2)=-0.240    K factor\*\*= 3.188    TL(2)= -1.40E+00    LL(2)=N/A

**Historical Background Data from Upgradient Wells with Transformed Result**

Well Number:	MW396	
Date Collected	Result	LN(Result)
8/13/2002	2.50E-02	-3.69E+00
9/16/2002	2.50E-02	-3.69E+00
10/16/2002	1.00E-03	-6.91E+00
1/13/2003	1.28E-03	-6.66E+00
4/8/2003	2.71E-03	-5.91E+00
7/16/2003	1.17E-03	-6.75E+00
10/14/2003	1.00E-03	-6.91E+00
1/14/2004	1.00E-03	-6.91E+00

**Dry/Partially Dry Wells**

Well No.	Gradient
MW389	Downgradient

**Because CV(1) is greater than 1, the natural logarithm of background and test well results were calculated utilizing TL(2) for comparison.**

**Current Quarter Data**

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW386	Sidegradient	Yes	6.43E-04	N/A	-7.35E+00	NO
MW390	Downgradient	Yes	3.54E-04	N/A	-7.95E+00	NO
MW393	Downgradient	Yes	3.20E-04	N/A	-8.05E+00	NO
MW396	Upgradient	Yes	4.00E-04	N/A	-7.82E+00	NO

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for a well did not exceed the MCL value, that well was not included in the statistical evaluation.

**Conclusion of Statistical Analysis on Historical Data**

**None of the test wells exceeded the Upper Tolerance Limit, which is evidence that concentrations in these wells are not different from historical background concentrations to a statistically-significant level.**

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation,  $CV = S/X$  If CV is less than or equal to 1 assume normal distribution.  
 S Standard Deviation,  $S = [\text{Sum}([(background\ result-X)^2]/[\text{count of background results} - 1])]^{0.5}$   
 TL Upper Tolerance Limit,  $TL = X + (K * S)$ ,      LL Lower Tolerance Limit,  $LL = X - (K * S)$   
 X Mean,  $X = (\text{sum of background results})/(\text{count of background results})$

\*\* Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009.      D1-17

# C-746-S/T Third Quarter 2023 Statistical Analysis      Historical Background Comparison

**Nickel**

**UNITS: mg/L**

**UCRS**

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is evidence of an exceedance of the statistically-derived historical background concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

**Statistics-Background Data**      X= 0.016    S= 0.021    CV(1)=1.272    K factor\*\*= 3.188    TL(1)= 8.26E-02    LL(1)=N/A

**Statistics-Transformed Background Data**      X= -4.706    S= 1.057    CV(2)=-0.225    K factor\*\*= 3.188    TL(2)= -1.34E+00    LL(2)=N/A

**Historical Background Data from Upgradient Wells with Transformed Result**

**Dry/Partially Dry Wells**

**Because CV(1) is greater than 1, the natural logarithm of background and test well results were calculated utilizing TL(2) for comparison.**

Well Number: MW396

Date Collected	Result	LN(Result)
8/13/2002	5.00E-02	-3.00E+00
9/16/2002	5.00E-02	-3.00E+00
10/16/2002	5.00E-03	-5.30E+00
1/13/2003	5.00E-03	-5.30E+00
4/8/2003	5.71E-03	-5.17E+00
7/16/2003	5.00E-03	-5.30E+00
10/14/2003	5.00E-03	-5.30E+00
1/14/2004	5.00E-03	-5.30E+00

Well No.	Gradient
MW389	Downgradient

**Current Quarter Data**

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW386	Sidegradient	Yes	1.13E-03	N/A	-6.79E+00	NO
MW390	Downgradient	Yes	1.20E-03	N/A	-6.73E+00	NO
MW393	Downgradient	No	2.00E-03	N/A	-6.21E+00	N/A
MW396	Upgradient	Yes	6.28E-04	N/A	-7.37E+00	NO

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for a well did not exceed the MCL value, that well was not included in the statistical evaluation.

**Conclusion of Statistical Analysis on Historical Data**

**None of the test wells exceeded the Upper Tolerance Limit, which is evidence that concentrations in these wells are not different from historical background concentrations to a statistically-significant level.**

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation,  $CV = S/X$  If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation,  $S = [\text{Sum}([(background\ result-X)^2]/[\text{count of background results} - 1])]^{0.5}$

TL Upper Tolerance Limit,  $TL = X + (K * S)$ ,      LL Lower Tolerance Limit,  $LL = X - (K * S)$

X Mean,  $X = (\text{sum of background results})/(\text{count of background results})$

\*\* Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009.      D1-18

**C-746-S/T Third Quarter 2023 Statistical Analysis      Historical Background Comparison**

**Oxidation-Reduction Potential**

**UNITS: mV**

**UCRS**

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is evidence of an exceedance of the statistically-derived historical background concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

**Statistics-Background Data**      X= 13.000    S= 61.952    CV(1)=4.766      **K factor\*\*= 3.188**    TL(1)= 2.11E+02    LL(1)=N/A

**Statistics-Transformed Background Data**      X= 4.364    S= 0.333    CV(2)=0.076      **K factor\*\*= 3.188**    TL(2)= 4.74E+00    LL(2)=N/A

**Historical Background Data from Upgradient Wells with Transformed Result**

Well Number:	MW396	
Date Collected	Result	LN(Result)
8/13/2002	6.00E+01	4.09E+00
4/8/2003	7.10E+01	4.26E+00
7/16/2003	-5.60E+01	#Func!
10/14/2003	-5.40E+01	#Func!
1/14/2004	-2.20E+01	#Func!
4/12/2004	-6.00E+00	#Func!
7/20/2004	-3.00E+00	#Func!
10/12/2004	1.14E+02	4.74E+00

**Dry/Partially Dry Wells**

Well No.	Gradient
MW389	Downgradient

**Because CV(1) is greater than 1, the natural logarithm of background and test well results were calculated utilizing TL(2) for comparison.**

**#Because the natural log was not possible for all background values, the TL was considered equal to the maximum background value.**

**Current Quarter Data**

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW386	Sidegradient	Yes	3.42E+02	N/A	5.83E+00	YES
MW390	Downgradient	Yes	4.19E+02	N/A	6.04E+00	YES
MW393	Downgradient	Yes	3.91E+02	N/A	5.97E+00	YES
MW396	Upgradient	Yes	3.15E+02	N/A	5.75E+00	YES

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for a well did not exceed the MCL value, that well was not included in the statistical evaluation.

**Conclusion of Statistical Analysis on Historical Data**

**The test well(s) listed exceeded the Upper Tolerance Limit, which is evidence of elevated concentration with respect to historical background data.**

**Wells with Exceedances**

- MW386
- MW390
- MW393
- MW396

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum (((background result-X)^2)/[count of background results - 1])]^0.5

TL Upper Tolerance Limit, TL = X + (K \* S), LL Lower Tolerance Limit, LL = X - (K \* S)

X Mean, X = (sum of background results)/(count of background results)

\*\* Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009.      D1-19

# C-746-S/T Third Quarter 2023 Statistical Analysis      Historical Background Comparison

**pH**

**UNITS: Std Unit**

**UCRS**

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is evidence of an exceedance of the statistically-derived historical background concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

**Statistics-Background Data**      X= 6.460    S= 0.350    CV(1)=0.054    K factor\*\*= 3.736    TL(1)= 7.77E+00    LL(1)=5.15E+00

**Statistics-Transformed Background Data**      X= 1.864    S= 0.054    CV(2)=0.029    K factor\*\*= 3.736    TL(2)= 2.07E+00    LL(2)=1.66E+00

**Historical Background Data from Upgradient Wells with Transformed Result**

**Dry/Partially Dry Wells**

**Because CV(1) is less than or equal to 1, assume normal distribution and continue with statistical analysis utilizing TL(1).**

Well Number: MW396

Date Collected	Result	LN(Result)
8/13/2002	6.17E+00	1.82E+00
9/16/2002	6.40E+00	1.86E+00
10/16/2002	5.90E+00	1.77E+00
1/13/2003	6.40E+00	1.86E+00
4/8/2003	6.65E+00	1.89E+00
7/16/2003	6.40E+00	1.86E+00
10/14/2003	6.71E+00	1.90E+00
1/14/2004	7.05E+00	1.95E+00

Well No.	Gradient
MW389	Downgradient

**Current Quarter Data**

Well No.	Gradient	Detected?	Result	Result >TL(1)? Result <LL(1)?	LN(Result)	LN(Result) >TL(2)? LN(Result) <LL(2)?
MW386	Sidegradient	Yes	6.76E+00	NO	1.91E+00	N/A
MW390	Downgradient	Yes	6.30E+00	NO	1.84E+00	N/A
MW393	Downgradient	Yes	6.23E+00	NO	1.83E+00	N/A
MW396	Upgradient	Yes	6.50E+00	NO	1.87E+00	N/A

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for a well did not exceed the MCL value, that well was not included in the statistical evaluation.

**Conclusion of Statistical Analysis on Historical Data**

**None of the test wells exceeded the Upper Tolerance Limit, which is evidence that concentrations in these wells are not different from historical background concentrations to a statistically-significant level.**

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation,  $CV = S/X$  If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation,  $S = [\text{Sum}([(background\ result-X)^2]/[\text{count of background results} - 1])]^{0.5}$

TL Upper Tolerance Limit,  $TL = X + (K * S)$ , LL Lower Tolerance Limit,  $LL = X - (K * S)$

X Mean,  $X = (\text{sum of background results})/(\text{count of background results})$

\*\* Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009.      D1-20



**C-746-S/T Third Quarter 2023 Statistical Analysis      Historical Background Comparison**

**Potassium**

**UNITS: mg/L**

**UCRS**

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is evidence of an exceedance of the statistically-derived historical background concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

**Statistics-Background Data**      X= 1.411    S= 0.399    CV(1)=0.282    K factor\*\*= 3.188    TL(1)= 2.68E+00    LL(1)=N/A

**Statistics-Transformed Background Data**      X= 0.311    S= 0.271    CV(2)=0.870    K factor\*\*= 3.188    TL(2)= 1.18E+00    LL(2)=N/A

**Historical Background Data from Upgradient Wells with Transformed Result**

Well Number:	MW396	
Date Collected	Result	LN(Result)
8/13/2002	2.00E+00	6.93E-01
9/16/2002	2.00E+00	6.93E-01
10/16/2002	9.78E-01	-2.22E-02
1/13/2003	1.08E+00	7.70E-02
4/8/2003	1.12E+00	1.13E-01
7/16/2003	1.38E+00	3.22E-01
10/14/2003	1.24E+00	2.15E-01
1/14/2004	1.49E+00	3.99E-01

**Dry/Partially Dry Wells**

Well No.	Gradient
MW389	Downgradient

**Because CV(1) is less than or equal to 1, assume normal distribution and continue with statistical analysis utilizing TL(1).**

**Current Quarter Data**

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW386	Sidegradient	Yes	2.55E-01	NO	-1.37E+00	N/A
MW390	Downgradient	Yes	3.20E-01	NO	-1.14E+00	N/A
MW393	Downgradient	Yes	4.77E-01	NO	-7.40E-01	N/A
MW396	Upgradient	Yes	8.17E-01	NO	-2.02E-01	N/A

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for a well did not exceed the MCL value, that well was not included in the statistical evaluation.

**Conclusion of Statistical Analysis on Historical Data**

**None of the test wells exceeded the Upper Tolerance Limit, which is evidence that concentrations in these wells are not different from historical background concentrations to a statistically-significant level.**

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum ((background result-X)^2)/[count of background results - 1]]^0.5

TL Upper Tolerance Limit, TL = X + (K \* S), LL Lower Tolerance Limit, LL = X - (K \* S)

X Mean, X = (sum of background results)/(count of background results)

\*\* Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009. D1-21

# C-746-S/T Third Quarter 2023 Statistical Analysis      Historical Background Comparison

**Sodium**

**UNITS: mg/L**

**UCRS**

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is evidence of an exceedance of the statistically-derived historical background concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

**Statistics-Background Data**      X= 106.825   S= 32.041   CV(1)=0.300   **K factor\*\*= 3.188**   TL(1)= 2.09E+02   LL(1)=N/A

**Statistics-Transformed Background Data**      X= 4.595   S= 0.492   CV(2)=0.107   **K factor\*\*= 3.188**   TL(2)= 6.16E+00   LL(2)=N/A

**Historical Background Data from Upgradient Wells with Transformed Result**

Well Number: MW396		
Date Collected	Result	LN(Result)
8/13/2002	1.15E+02	4.74E+00
9/16/2002	1.16E+02	4.75E+00
10/16/2002	1.17E+02	4.76E+00
1/13/2003	1.22E+02	4.80E+00
4/8/2003	1.06E+02	4.66E+00
7/16/2003	1.17E+02	4.76E+00
10/14/2003	1.32E+02	4.88E+00
1/14/2004	2.96E+01	3.39E+00

**Dry/Partially Dry Wells**

Well No.	Gradient
MW389	Downgradient

**Because CV(1) is less than or equal to 1, assume normal distribution and continue with statistical analysis utilizing TL(1).**

**Current Quarter Data**

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW386	Sidegradient	Yes	9.51E+01	NO	4.55E+00	N/A
MW390	Downgradient	Yes	8.43E+01	NO	4.43E+00	N/A
MW393	Downgradient	Yes	8.36E+01	NO	4.43E+00	N/A
MW396	Upgradient	Yes	9.92E+01	NO	4.60E+00	N/A

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for a well did not exceed the MCL value, that well was not included in the statistical evaluation.

**Conclusion of Statistical Analysis on Historical Data**

**None of the test wells exceeded the Upper Tolerance Limit, which is evidence that concentrations in these wells are not different from historical background concentrations to a statistically-significant level.**

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum ((background result-X)^2)/[count of background results - 1]]^0.5

TL Upper Tolerance Limit, TL = X + (K \* S), LL Lower Tolerance Limit, LL = X - (K \* S)

X Mean, X = (sum of background results)/(count of background results)

\*\* Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009.      D1-22



**C-746-S/T Third Quarter 2023 Statistical Analysis      Historical Background Comparison**

**Sulfate**

**UNITS: mg/L**

**UCRS**

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is evidence of an exceedance of the statistically-derived historical background concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

**Statistics-Background Data**      X= 22.463    S= 8.876    CV(1)=0.395    K factor\*\*= 3.188    TL(1)= 5.08E+01    LL(1)=N/A

**Statistics-Transformed Background Data**      X= 3.054    S= 0.351    CV(2)=0.115    K factor\*\*= 3.188    TL(2)= 4.17E+00    LL(2)=N/A

**Historical Background Data from Upgradient Wells with Transformed Result**

Well Number:	MW396	
Date Collected	Result	LN(Result)
8/13/2002	4.19E+01	3.74E+00
9/16/2002	2.63E+01	3.27E+00
10/16/2002	2.06E+01	3.03E+00
1/13/2003	1.66E+01	2.81E+00
4/8/2003	2.39E+01	3.17E+00
7/16/2003	1.88E+01	2.93E+00
10/14/2003	1.29E+01	2.56E+00
1/14/2004	1.87E+01	2.93E+00

**Dry/Partially Dry Wells**

Well No.	Gradient
MW389	Downgradient

**Because CV(1) is less than or equal to 1, assume normal distribution and continue with statistical analysis utilizing TL(1).**

**Current Quarter Data**

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW386	Sidegradient	Yes	4.14E+01	NO	3.72E+00	N/A
MW390	Downgradient	Yes	3.52E+01	NO	3.56E+00	N/A
MW393	Downgradient	Yes	2.17E+01	NO	3.08E+00	N/A
MW396	Upgradient	Yes	3.05E+01	NO	3.42E+00	N/A

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for a well did not exceed the MCL value, that well was not included in the statistical evaluation.

**Conclusion of Statistical Analysis on Historical Data**

**None of the test wells exceeded the Upper Tolerance Limit, which is evidence that concentrations in these wells are not different from historical background concentrations to a statistically-significant level.**

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum (((background result-X)^2)/[count of background results - 1])]^0.5

TL Upper Tolerance Limit, TL = X + (K \* S), LL Lower Tolerance Limit, LL = X - (K \* S)

X Mean, X = (sum of background results)/(count of background results)

\*\* Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009. D1-23

# C-746-S/T Third Quarter 2023 Statistical Analysis      Historical Background Comparison

**Technetium-99**

**UNITS: pCi/L**

**UCRS**

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is evidence of an exceedance of the statistically-derived historical background concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

**Statistics-Background Data**      X= 7.624    S= 6.558    CV(1)=0.860    K factor\*\*= 3.188    TL(1)= 2.85E+01    LL(1)=N/A

**Statistics-Transformed Background Data**      X= 1.498    S= 1.321    CV(2)=0.882    K factor\*\*= 3.188    TL(2)= 5.71E+00    LL(2)=N/A

**Historical Background Data from Upgradient Wells with Transformed Result**

Well Number:	MW396	
Date Collected	Result	LN(Result)
8/13/2002	1.67E+01	2.82E+00
9/16/2002	6.39E+00	1.85E+00
10/16/2002	4.55E+00	1.52E+00
1/13/2003	1.65E+01	2.80E+00
4/8/2003	3.04E+00	1.11E+00
7/16/2003	3.54E-01	-1.04E+00
10/14/2003	1.19E+01	2.48E+00
1/14/2004	1.56E+00	4.45E-01

**Dry/Partially Dry Wells**

Well No.	Gradient
MW389	Downgradient

**Because CV(1) is less than or equal to 1, assume normal distribution and continue with statistical analysis utilizing TL(1).**

**Current Quarter Data**

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW386	Sidegradient	No	4.62E+00	N/A	1.53E+00	N/A
MW390	Downgradient	Yes	4.90E+01	YES	3.89E+00	N/A
MW393	Downgradient	No	-3.00E+00	N/A	#Error	N/A
MW396	Upgradient	No	3.97E+00	N/A	1.38E+00	N/A

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for a well did not exceed the MCL value, that well was not included in the statistical evaluation.

**Conclusion of Statistical Analysis on Historical Data**

**The test well(s) listed exceeded the Upper Tolerance Limit, which is evidence of elevated concentration with respect to historical background data.**

**Wells with Exceedances**

MW390

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV    Coefficient-of-Variation, CV = S/X    If CV is less than or equal to 1 assume normal distribution.

S    Standard Deviation, S = [Sum ((background result-X)^2)/[count of background results - 1]]^0.5

TL    Upper Tolerance Limit, TL = X + (K \* S),      LL    Lower Tolerance Limit, LL = X - (K \* S)

X    Mean, X = (sum of background results)/(count of background results)

\*\* Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009.      D1-24

# C-746-S/T Third Quarter 2023 Statistical Analysis      Historical Background Comparison

**Total Organic Carbon (TOC)**

**UNITS: mg/L**

**UCRS**

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is evidence of an exceedance of the statistically-derived historical background concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

**Statistics-Background Data**      X= 9.988    S= 4.696    CV(1)=0.470    K factor\*\*= 3.188    TL(1)= 2.50E+01    LL(1)=N/A

**Statistics-Transformed Background Data**      X= 2.210    S= 0.454    CV(2)=0.205    K factor\*\*= 3.188    TL(2)= 3.66E+00    LL(2)=N/A

**Historical Background Data from Upgradient Wells with Transformed Result**

**Dry/Partially Dry Wells**

**Because CV(1) is less than or equal to 1, assume normal distribution and continue with statistical analysis utilizing TL(1).**

Well Number: MW396

Date Collected	Result	LN(Result)
8/13/2002	1.90E+01	2.94E+00
9/16/2002	1.46E+01	2.68E+00
10/16/2002	1.04E+01	2.34E+00
1/13/2003	4.40E+00	1.48E+00
4/8/2003	7.00E+00	1.95E+00
7/16/2003	7.30E+00	1.99E+00
10/14/2003	9.10E+00	2.21E+00
1/14/2004	8.10E+00	2.09E+00

Well No.	Gradient
MW389	Downgradient

**Current Quarter Data**

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW386	Sidegradient	Yes	4.22E+00	NO	1.44E+00	N/A
MW390	Downgradient	Yes	1.89E+00	NO	6.37E-01	N/A
MW393	Downgradient	Yes	2.29E+00	NO	8.29E-01	N/A
MW396	Upgradient	Yes	3.92E+00	NO	1.37E+00	N/A

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for a well did not exceed the MCL value, that well was not included in the statistical evaluation.

**Conclusion of Statistical Analysis on Historical Data**

**None of the test wells exceeded the Upper Tolerance Limit, which is evidence that concentrations in these wells are not different from historical background concentrations to a statistically-significant level.**

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum ((background result-X)^2)/[count of background results - 1]]^0.5

TL Upper Tolerance Limit, TL = X + (K \* S), LL Lower Tolerance Limit, LL = X - (K \* S)

X Mean, X = (sum of background results)/(count of background results)

\*\* Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009.      D1-25

**C-746-S/T Third Quarter 2023 Statistical Analysis      Historical Background Comparison**

**Total Organic Halides (TOX)**

**UNITS: ug/L**

**UCRS**

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is evidence of an exceedance of the statistically-derived historical background concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

**Statistics-Background Data**      X= 142.650 S= 53.533 CV(1)=0.375      K factor\*\*= 3.188      TL(1)= 3.13E+02      LL(1)=N/A

**Statistics-Transformed Background Data**      X= 4.896      S= 0.390      CV(2)=0.080      K factor\*\*= 3.188      TL(2)= 6.14E+00      LL(2)=N/A

**Historical Background Data from Upgradient Wells with Transformed Result**

Well Number:	MW396	
Date Collected	Result	LN(Result)
8/13/2002	1.93E+02	5.26E+00
9/16/2002	1.90E+02	5.25E+00
10/16/2002	2.21E+02	5.40E+00
1/13/2003	1.06E+02	4.66E+00
4/8/2003	7.78E+01	4.35E+00
7/16/2003	1.22E+02	4.80E+00
10/14/2003	8.64E+01	4.46E+00
1/14/2004	1.45E+02	4.98E+00

**Dry/Partially Dry Wells**

Well No.	Gradient
MW389	Downgradient

**Because CV(1) is less than or equal to 1, assume normal distribution and continue with statistical analysis utilizing TL(1).**

**Current Quarter Data**

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW386	Sidegradient	Yes	1.16E+02	NO	4.75E+00	N/A
MW390	Downgradient	Yes	1.29E+01	NO	2.56E+00	N/A
MW393	Downgradient	Yes	1.44E+01	NO	2.67E+00	N/A
MW396	Upgradient	Yes	5.43E+01	NO	3.99E+00	N/A

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for a well did not exceed the MCL value, that well was not included in the statistical evaluation.

**Conclusion of Statistical Analysis on Historical Data**

**None of the test wells exceeded the Upper Tolerance Limit, which is evidence that concentrations in these wells are not different from historical background concentrations to a statistically-significant level.**

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum ((background result-X)^2)/[count of background results - 1]]^0.5

TL Upper Tolerance Limit, TL = X + (K \* S), LL Lower Tolerance Limit, LL = X - (K \* S)

X Mean, X = (sum of background results)/(count of background results)

\*\* Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009. D1-26

# C-746-S/T Third Quarter 2023 Statistical Analysis      Historical Background Comparison

**Vanadium**

**UNITS: mg/L**

**UCRS**

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is evidence of an exceedance of the statistically-derived historical background concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

**Statistics-Background Data**      X= 0.021    S= 0.002    CV(1)=0.109    **K factor\*\*= 3.188**    TL(1)= 2.86E-02    LL(1)=N/A

**Statistics-Transformed Background Data**      X= -3.856    S= 0.103    CV(2)=-0.027    **K factor\*\*= 3.188**    TL(2)= -3.53E+00    LL(2)=N/A

**Historical Background Data from Upgradient Wells with Transformed Result**

Well Number:	MW396	
Date Collected	Result	LN(Result)
8/13/2002	2.50E-02	-3.69E+00
9/16/2002	2.50E-02	-3.69E+00
10/16/2002	2.00E-02	-3.91E+00
1/13/2003	2.00E-02	-3.91E+00
4/8/2003	2.00E-02	-3.91E+00
7/16/2003	2.00E-02	-3.91E+00
10/14/2003	2.00E-02	-3.91E+00
1/14/2004	2.00E-02	-3.91E+00

**Dry/Partially Dry Wells**

Well No.	Gradient
MW389	Downgradient

**Because CV(1) is less than or equal to 1, assume normal distribution and continue with statistical analysis utilizing TL(1).**

**Current Quarter Data**

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW386	Sidegradient	No	2.00E-02	N/A	-3.91E+00	N/A
MW390	Downgradient	Yes	3.63E-03	NO	-5.62E+00	N/A
MW393	Downgradient	No	2.00E-02	N/A	-3.91E+00	N/A
MW396	Upgradient	No	2.00E-02	N/A	-3.91E+00	N/A

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for a well did not exceed the MCL value, that well was not included in the statistical evaluation.

**Conclusion of Statistical Analysis on Historical Data**

**None of the test wells exceeded the Upper Tolerance Limit, which is evidence that concentrations in these wells are not different from historical background concentrations to a statistically-significant level.**

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum ((background result-X)^2)/[count of background results - 1]]^0.5

TL Upper Tolerance Limit, TL = X + (K \* S), LL Lower Tolerance Limit, LL = X - (K \* S)

X Mean, X = (sum of background results)/(count of background results)

\*\* Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009.      D1-27

# C-746-S/T Third Quarter 2023 Statistical Analysis      Historical Background Comparison

**Zinc**

**UNITS: mg/L**

**UCRS**

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is evidence of an exceedance of the statistically-derived historical background concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

**Statistics-Background Data**      X= 0.044    S= 0.035    CV(1)=0.786    **K factor\*\*= 3.188**    TL(1)= 1.56E-01    LL(1)=N/A

**Statistics-Transformed Background Data**      X= -3.342    S= 0.682    CV(2)=-0.204    **K factor\*\*= 3.188**    TL(2)= -1.17E+00    LL(2)=N/A

**Historical Background Data from Upgradient Wells with Transformed Result**

**Dry/Partially Dry Wells**

**Because CV(1) is less than or equal to 1, assume normal distribution and continue with statistical analysis utilizing TL(1).**

Well Number: MW396

Date Collected	Result	LN(Result)
8/13/2002	1.00E-01	-2.30E+00
9/16/2002	1.00E-01	-2.30E+00
10/16/2002	2.50E-02	-3.69E+00
1/13/2003	3.50E-02	-3.35E+00
4/8/2003	3.50E-02	-3.35E+00
7/16/2003	2.00E-02	-3.91E+00
10/14/2003	2.00E-02	-3.91E+00
1/14/2004	2.00E-02	-3.91E+00

Well No.	Gradient
MW389	Downgradient

**Current Quarter Data**

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW386	Sidegradient	No	2.00E-02	N/A	-3.91E+00	N/A
MW390	Downgradient	Yes	6.90E-03	NO	-4.98E+00	N/A
MW393	Downgradient	No	2.00E-02	N/A	-3.91E+00	N/A
MW396	Upgradient	Yes	3.53E-03	NO	-5.65E+00	N/A

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for a well did not exceed the MCL value, that well was not included in the statistical evaluation.

**Conclusion of Statistical Analysis on Historical Data**

**None of the test wells exceeded the Upper Tolerance Limit, which is evidence that concentrations in these wells are not different from historical background concentrations to a statistically-significant level.**

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum (((background result-X)^2)/[count of background results - 1])]^0.5

TL Upper Tolerance Limit, TL = X + (K \* S), LL Lower Tolerance Limit, LL = X - (K \* S)

X Mean, X = (sum of background results)/(count of background results)

\*\* Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009.      D1-28



**C-746-S/T Third Quarter 2023 Statistical Analysis      Historical Background Comparison**

**Aluminum**

**UNITS: mg/L**

**URGA**

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is evidence of an exceedance of the statistically-derived historical background concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

**Statistics-Background Data**      X= 0.221    S= 0.061    CV(1)=0.277      K factor\*\*= 2.523    TL(1)= 3.76E-01    LL(1)=N/A

**Statistics-Transformed Background Data**      X= -1.534    S= 0.212    CV(2)=-0.138      K factor\*\*= 2.523    TL(2)= -9.99E-01    LL(2)=N/A

**Historical Background Data from Upgradient Wells with Transformed Result**

**Because CV(1) is less than or equal to 1, assume normal distribution and continue with statistical analysis utilizing TL(1).**

Well Number: MW220

Date Collected	Result	LN(Result)
10/14/2002	2.00E-01	-1.61E+00
1/15/2003	2.00E-01	-1.61E+00
4/10/2003	2.00E-01	-1.61E+00
7/14/2003	2.00E-01	-1.61E+00
10/13/2003	4.27E-01	-8.51E-01
1/13/2004	3.09E-01	-1.17E+00
4/13/2004	2.00E-01	-1.61E+00
7/21/2004	2.02E-01	-1.60E+00

**Current Quarter Data**

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	No	5.00E-02	N/A	-3.00E+00	N/A
MW221	Sidegradient	No	5.00E-02	N/A	-3.00E+00	N/A
MW222	Sidegradient	No	5.00E-02	N/A	-3.00E+00	N/A
MW223	Sidegradient	No	5.00E-02	N/A	-3.00E+00	N/A
MW224	Sidegradient	No	5.00E-02	N/A	-3.00E+00	N/A
MW369	Downgradient	Yes	1.12E-01	NO	-2.19E+00	N/A
MW372	Downgradient	No	5.00E-02	N/A	-3.00E+00	N/A
MW384	Sidegradient	No	5.00E-02	N/A	-3.00E+00	N/A
MW387	Downgradient	No	5.00E-02	N/A	-3.00E+00	N/A
MW391	Downgradient	No	5.00E-02	N/A	-3.00E+00	N/A
MW394	Upgradient	No	5.00E-02	N/A	-3.00E+00	N/A

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for a well did not exceed the MCL value, that well was not included in the statistical evaluation.

Well Number: MW394

Date Collected	Result	LN(Result)
8/13/2002	2.00E-01	-1.61E+00
9/16/2002	2.00E-01	-1.61E+00
10/16/2002	2.00E-01	-1.61E+00
1/13/2003	2.00E-01	-1.61E+00
4/10/2003	2.00E-01	-1.61E+00
7/16/2003	2.00E-01	-1.61E+00
10/14/2003	2.00E-01	-1.61E+00
1/13/2004	2.00E-01	-1.61E+00

**Conclusion of Statistical Analysis on Historical Data**

**None of the test wells exceeded the Upper Tolerance Limit, which is evidence that concentrations in these wells are not different from historical background concentrations to a statistically-significant level.**

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum ((background result-X)^2)/[count of background results - 1]]^0.5

TL Upper Tolerance Limit, TL = X + (K \* S), LL Lower Tolerance Limit, LL = X - (K \* S)

X Mean, X = (sum of background results)/(count of background results)

\*\* Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009. D1-29

# C-746-S/T Third Quarter 2023 Statistical Analysis      Historical Background Comparison

**Boron**

**UNITS: mg/L**

**URGA**

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is evidence of an exceedance of the statistically-derived historical background concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

**Statistics-Background Data**      X= 0.425    S= 0.615    CV(1)=1.447    **K factor\*\*= 2.523**    TL(1)= 1.98E+00    LL(1)=N/A

**Statistics-Transformed Background Data**      X= -1.322    S= 0.786    CV(2)=-0.595    **K factor\*\*= 2.523**    TL(2)= 6.63E-01    LL(2)=N/A

**Historical Background Data from Upgradient Wells with Transformed Result**

**Because CV(1) is greater than 1, the natural logarithm of background and test well results were calculated utilizing TL(2) for comparison.**

Well Number: MW220

Date Collected	Result	LN(Result)
10/14/2002	2.00E-01	-1.61E+00
1/15/2003	2.00E-01	-1.61E+00
4/10/2003	2.00E-01	-1.61E+00
7/14/2003	2.00E-01	-1.61E+00
10/13/2003	2.00E-01	-1.61E+00
1/13/2004	2.00E-01	-1.61E+00
4/13/2004	2.00E-01	-1.61E+00
7/21/2004	2.00E-01	-1.61E+00

Well Number: MW394

Date Collected	Result	LN(Result)
8/13/2002	2.00E+00	6.93E-01
9/16/2002	2.00E+00	6.93E-01
10/16/2002	2.00E-01	-1.61E+00
1/13/2003	2.00E-01	-1.61E+00
4/10/2003	2.00E-01	-1.61E+00
7/16/2003	2.00E-01	-1.61E+00
10/14/2003	2.00E-01	-1.61E+00
1/13/2004	2.00E-01	-1.61E+00

**Current Quarter Data**

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	Yes	8.42E-03	N/A	-4.78E+00	NO
MW221	Sidegradient	Yes	1.63E-02	N/A	-4.12E+00	NO
MW222	Sidegradient	Yes	8.72E-03	N/A	-4.74E+00	NO
MW223	Sidegradient	Yes	8.46E-03	N/A	-4.77E+00	NO
MW224	Sidegradient	Yes	2.51E-02	N/A	-3.68E+00	NO
MW369	Downgradient	Yes	1.61E-02	N/A	-4.13E+00	NO
MW372	Downgradient	Yes	1.29E+00	N/A	2.55E-01	NO
MW384	Sidegradient	Yes	3.67E-02	N/A	-3.30E+00	NO
MW387	Downgradient	Yes	4.32E-02	N/A	-3.14E+00	NO
MW391	Downgradient	Yes	2.70E-02	N/A	-3.61E+00	NO
MW394	Upgradient	Yes	2.00E-02	N/A	-3.91E+00	NO

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for a well did not exceed the MCL value, that well was not included in the statistical evaluation.

**Conclusion of Statistical Analysis on Historical Data**

**None of the test wells exceeded the Upper Tolerance Limit, which is evidence that concentrations in these wells are not different from historical background concentrations to a statistically-significant level.**

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum ((background result-X)^2)/[count of background results - 1]]^0.5

TL Upper Tolerance Limit, TL = X + (K \* S), LL Lower Tolerance Limit, LL = X - (K \* S)

X Mean, X = (sum of background results)/(count of background results)

\*\* Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009. D1-30



**C-746-S/T Third Quarter 2023 Statistical Analysis      Historical Background Comparison**

**Bromide**

**UNITS: mg/L**

**URGA**

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is evidence of an exceedance of the statistically-derived historical background concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

**Statistics-Background Data**      X= 1.000    S= 0.000    CV(1)=0.000    K factor\*\*= 2.523    TL(1)= 1.00E+00    LL(1)=N/A

**Statistics-Transformed Background Data**      X= 0.000    S= 0.000    CV(2)=#Num!    K factor\*\*= 2.523    TL(2)= 0.00E+00    LL(2)=N/A

**Historical Background Data from Upgradient Wells with Transformed Result**

**Because CV(1) is less than or equal to 1, assume normal distribution and continue with statistical analysis utilizing TL(1).**

Well Number: MW220

Date Collected	Result	LN(Result)
10/14/2002	1.00E+00	0.00E+00
1/15/2003	1.00E+00	0.00E+00
4/10/2003	1.00E+00	0.00E+00
7/14/2003	1.00E+00	0.00E+00
10/13/2003	1.00E+00	0.00E+00
1/13/2004	1.00E+00	0.00E+00
4/13/2004	1.00E+00	0.00E+00
7/21/2004	1.00E+00	0.00E+00

**Current Quarter Data**

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	Yes	1.98E-01	NO	-1.62E+00	N/A
MW221	Sidegradient	Yes	5.22E-01	NO	-6.50E-01	N/A
MW222	Sidegradient	Yes	4.27E-01	NO	-8.51E-01	N/A
MW223	Sidegradient	Yes	4.77E-01	NO	-7.40E-01	N/A
MW224	Sidegradient	Yes	3.55E-01	NO	-1.04E+00	N/A
MW369	Downgradient	Yes	3.25E-01	NO	-1.12E+00	N/A
MW372	Downgradient	Yes	5.95E-01	NO	-5.19E-01	N/A
MW384	Sidegradient	Yes	4.45E-01	NO	-8.10E-01	N/A
MW387	Downgradient	Yes	5.18E-01	NO	-6.58E-01	N/A
MW391	Downgradient	Yes	6.01E-01	NO	-5.09E-01	N/A
MW394	Upgradient	Yes	6.19E-01	NO	-4.80E-01	N/A

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for a well did not exceed the MCL value, that well was not included in the statistical evaluation.

Well Number: MW394

Date Collected	Result	LN(Result)
8/13/2002	1.00E+00	0.00E+00
9/16/2002	1.00E+00	0.00E+00
10/16/2002	1.00E+00	0.00E+00
1/13/2003	1.00E+00	0.00E+00
4/10/2003	1.00E+00	0.00E+00
7/16/2003	1.00E+00	0.00E+00
10/14/2003	1.00E+00	0.00E+00
1/13/2004	1.00E+00	0.00E+00

**Conclusion of Statistical Analysis on Historical Data**

**None of the test wells exceeded the Upper Tolerance Limit, which is evidence that concentrations in these wells are not different from historical background concentrations to a statistically-significant level.**

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum ((background result-X)^2)/[count of background results - 1]]^0.5

TL Upper Tolerance Limit, TL = X + (K \* S), LL Lower Tolerance Limit, LL = X - (K \* S)

X Mean, X = (sum of background results)/(count of background results)

\*\* Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009. D1-31

# C-746-S/T Third Quarter 2023 Statistical Analysis      Historical Background Comparison

**Calcium**

**UNITS: mg/L**

**URGA**

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is evidence of an exceedance of the statistically-derived historical background concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

**Statistics-Background Data**      X= 27.638    S= 4.743    CV(1)=0.172      **K factor\*\*= 2.523**    TL(1)= 3.96E+01    LL(1)=N/A

**Statistics-Transformed Background Data**      X= 3.304    S= 0.183    CV(2)=0.055      **K factor\*\*= 2.523**    TL(2)= 3.76E+00    LL(2)=N/A

**Historical Background Data from Upgradient Wells with Transformed Result**

**Because CV(1) is less than or equal to 1, assume normal distribution and continue with statistical analysis utilizing TL(1).**

Well Number: MW220

Date Collected	Result	LN(Result)
10/14/2002	2.36E+01	3.16E+00
1/15/2003	2.59E+01	3.25E+00
4/10/2003	3.04E+01	3.41E+00
7/14/2003	3.39E+01	3.52E+00
10/13/2003	2.13E+01	3.06E+00
1/13/2004	2.03E+01	3.01E+00
4/13/2004	2.38E+01	3.17E+00
7/21/2004	1.90E+01	2.94E+00

**Current Quarter Data**

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	Yes	2.21E+01	NO	3.10E+00	N/A
MW221	Sidegradient	Yes	2.08E+01	NO	3.03E+00	N/A
MW222	Sidegradient	Yes	1.80E+01	NO	2.89E+00	N/A
MW223	Sidegradient	Yes	2.23E+01	NO	3.10E+00	N/A
MW224	Sidegradient	Yes	2.38E+01	NO	3.17E+00	N/A
MW369	Downgradient	Yes	1.57E+01	NO	2.75E+00	N/A
MW372	Downgradient	Yes	6.10E+01	YES	4.11E+00	N/A
MW384	Sidegradient	Yes	2.66E+01	NO	3.28E+00	N/A
MW387	Downgradient	Yes	3.78E+01	NO	3.63E+00	N/A
MW391	Downgradient	Yes	2.52E+01	NO	3.23E+00	N/A
MW394	Upgradient	Yes	2.65E+01	NO	3.28E+00	N/A

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for a well did not exceed the MCL value, that well was not included in the statistical evaluation.

Well Number: MW394

Date Collected	Result	LN(Result)
8/13/2002	2.95E+01	3.38E+00
9/16/2002	2.99E+01	3.40E+00
10/16/2002	3.12E+01	3.44E+00
1/13/2003	3.07E+01	3.42E+00
4/10/2003	3.44E+01	3.54E+00
7/16/2003	2.96E+01	3.39E+00
10/14/2003	3.03E+01	3.41E+00
1/13/2004	2.84E+01	3.35E+00

**Conclusion of Statistical Analysis on Historical Data**

**The test well(s) listed exceeded the Upper Tolerance Limit, which is evidence of elevated concentration with respect to historical background data.**

**Wells with Exceedances**

MW372

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum ((background result-X)^2)/[count of background results - 1]]^0.5

TL Upper Tolerance Limit, TL = X + (K \* S), LL Lower Tolerance Limit, LL = X - (K \* S)

X Mean, X = (sum of background results)/(count of background results)

\*\* Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009.      D1-32

**C-746-S/T Third Quarter 2023 Statistical Analysis      Historical Background Comparison**

**Chloride**

**UNITS: mg/L**

**URGA**

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is evidence of an exceedance of the statistically-derived historical background concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

**Statistics-Background Data**      X= 49.044    S= 11.278    CV(1)=0.230      **K factor\*\*= 2.523**    TL(1)= 7.75E+01    LL(1)=N/A

**Statistics-Transformed Background Data**      X= 3.866    S= 0.244    CV(2)=0.063      **K factor\*\*= 2.523**    TL(2)= 4.48E+00    LL(2)=N/A

**Historical Background Data from Upgradient Wells with Transformed Result**

**Because CV(1) is less than or equal to 1, assume normal distribution and continue with statistical analysis utilizing TL(1).**

Well Number: MW220

Date Collected	Result	LN(Result)
10/14/2002	4.46E+01	3.80E+00
1/15/2003	4.32E+01	3.77E+00
4/10/2003	3.15E+01	3.45E+00
7/14/2003	3.08E+01	3.43E+00
10/13/2003	4.09E+01	3.71E+00
1/13/2004	4.08E+01	3.71E+00
4/13/2004	3.75E+01	3.62E+00
7/21/2004	4.08E+01	3.71E+00

**Current Quarter Data**

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	Yes	1.77E+01	NO	2.87E+00	N/A
MW221	Sidegradient	Yes	3.44E+01	NO	3.54E+00	N/A
MW222	Sidegradient	Yes	3.03E+01	NO	3.41E+00	N/A
MW223	Sidegradient	Yes	3.39E+01	NO	3.52E+00	N/A
MW224	Sidegradient	Yes	2.19E+01	NO	3.09E+00	N/A
MW369	Downgradient	Yes	2.83E+01	NO	3.34E+00	N/A
MW372	Downgradient	Yes	3.87E+01	NO	3.66E+00	N/A
MW384	Sidegradient	Yes	3.18E+01	NO	3.46E+00	N/A
MW387	Downgradient	Yes	3.83E+01	NO	3.65E+00	N/A
MW391	Downgradient	Yes	4.25E+01	NO	3.75E+00	N/A
MW394	Upgradient	Yes	4.57E+01	NO	3.82E+00	N/A

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for a well did not exceed the MCL value, that well was not included in the statistical evaluation.

**Conclusion of Statistical Analysis on Historical Data**

**None of the test wells exceeded the Upper Tolerance Limit, which is evidence that concentrations in these wells are not different from historical background concentrations to a statistically-significant level.**

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum ((background result-X)^2)/[count of background results - 1]]^0.5

TL Upper Tolerance Limit, TL = X + (K \* S), LL Lower Tolerance Limit, LL = X - (K \* S)

X Mean, X = (sum of background results)/(count of background results)

\*\* Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009. D1-33

**C-746-S/T Third Quarter 2023 Statistical Analysis      Historical Background Comparison**

**Cobalt**

**UNITS: mg/L**

**URGA**

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is evidence of an exceedance of the statistically-derived historical background concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

**Statistics-Background Data**      X= 0.016    S= 0.040    CV(1)=2.440    K factor\*\*= 2.523    TL(1)= 1.16E-01    LL(1)=N/A

**Statistics-Transformed Background Data**      X= -5.582    S= 1.573    CV(2)=-0.282    K factor\*\*= 2.523    TL(2)= -1.61E+00    LL(2)=N/A

**Historical Background Data from Upgradient Wells with Transformed Result**

**Because CV(1) is greater than 1, the natural logarithm of background and test well results were calculated utilizing TL(2) for comparison.**

Well Number: MW220

Date Collected	Result	LN(Result)
10/14/2002	4.10E-03	-5.50E+00
1/15/2003	4.96E-03	-5.31E+00
4/10/2003	2.89E-03	-5.85E+00
7/14/2003	1.61E-01	-1.83E+00
10/13/2003	2.26E-02	-3.79E+00
1/13/2004	4.64E-03	-5.37E+00
4/13/2004	1.00E-03	-6.91E+00
7/21/2004	2.64E-03	-5.94E+00

**Current Quarter Data**

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	No	1.00E-03	N/A	-6.91E+00	N/A
MW221	Sidegradient	No	1.00E-03	N/A	-6.91E+00	N/A
MW222	Sidegradient	Yes	3.80E-04	N/A	-7.88E+00	NO
MW223	Sidegradient	No	1.00E-03	N/A	-6.91E+00	N/A
MW224	Sidegradient	No	1.00E-03	N/A	-6.91E+00	N/A
MW369	Downgradient	Yes	5.83E-03	N/A	-5.14E+00	NO
MW372	Downgradient	Yes	3.05E-04	N/A	-8.10E+00	NO
MW384	Sidegradient	No	1.00E-03	N/A	-6.91E+00	N/A
MW387	Downgradient	No	1.00E-03	N/A	-6.91E+00	N/A
MW391	Downgradient	No	1.00E-03	N/A	-6.91E+00	N/A
MW394	Upgradient	No	1.00E-03	N/A	-6.91E+00	N/A

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for a well did not exceed the MCL value, that well was not included in the statistical evaluation.

Well Number: MW394

Date Collected	Result	LN(Result)
8/13/2002	2.50E-02	-3.69E+00
9/16/2002	2.50E-02	-3.69E+00
10/16/2002	1.00E-03	-6.91E+00
1/13/2003	1.00E-03	-6.91E+00
4/10/2003	1.00E-03	-6.91E+00
7/16/2003	1.00E-03	-6.91E+00
10/14/2003	1.00E-03	-6.91E+00
1/13/2004	1.00E-03	-6.91E+00

**Conclusion of Statistical Analysis on Historical Data**

**None of the test wells exceeded the Upper Tolerance Limit, which is evidence that concentrations in these wells are not different from historical background concentrations to a statistically-significant level.**

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum ((background result-X)^2)/[count of background results - 1]]^0.5

TL Upper Tolerance Limit, TL = X + (K \* S), LL Lower Tolerance Limit, LL = X - (K \* S)

X Mean, X = (sum of background results)/(count of background results)

\*\* Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009. D1-34

**C-746-S/T Third Quarter 2023 Statistical Analysis      Historical Background Comparison**  
**Conductivity      UNITS: umho/cm      URGA**

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is evidence of an exceedance of the statistically-derived historical background concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

**Statistics-Background Data**      X= 382.132 S= 107.134 CV(1)=0.280      K factor\*\*= 2.523      TL(1)= 6.52E+02      LL(1)=N/A  
**Statistics-Transformed Background Data**      X= 5.716      S= 1.164      CV(2)=0.204      K factor\*\*= 2.523      TL(2)= 8.65E+00      LL(2)=N/A

**Historical Background Data from Upgradient Wells with Transformed Result**

**Because CV(1) is less than or equal to 1, assume normal distribution and continue with statistical analysis utilizing TL(1).**

Well Number: MW220

Date Collected	Result	LN(Result)
10/14/2002	3.68E+02	5.91E+00
1/15/2003	4.33E+02	6.07E+00
4/10/2003	4.89E+02	6.19E+00
7/14/2003	4.30E+02	6.06E+00
10/13/2003	3.46E+02	5.85E+00
1/13/2004	3.65E+02	5.90E+00
4/13/2004	4.16E+02	6.03E+00
7/21/2004	3.53E+02	5.87E+00

**Current Quarter Data**

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	Yes	3.54E+02	NO	5.87E+00	N/A
MW221	Sidegradient	Yes	3.98E+02	NO	5.99E+00	N/A
MW222	Sidegradient	Yes	3.60E+02	NO	5.89E+00	N/A
MW223	Sidegradient	Yes	3.96E+02	NO	5.98E+00	N/A
MW224	Sidegradient	Yes	4.42E+02	NO	6.09E+00	N/A
MW369	Downgradient	Yes	3.50E+02	NO	5.86E+00	N/A
MW372	Downgradient	Yes	7.59E+02	YES	6.63E+00	N/A
MW384	Sidegradient	Yes	4.81E+02	NO	6.18E+00	N/A
MW387	Downgradient	Yes	5.70E+02	NO	6.35E+00	N/A
MW391	Downgradient	Yes	3.82E+02	NO	5.95E+00	N/A
MW394	Upgradient	Yes	4.15E+02	NO	6.03E+00	N/A

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for a well did not exceed the MCL value, that well was not included in the statistical evaluation.

**Conclusion of Statistical Analysis on Historical Data**

**The test well(s) listed exceeded the Upper Tolerance Limit, which is evidence of elevated concentration with respect to historical background data.**

**Wells with Exceedances**

MW372

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum (((background result-X)^2)/[count of background results - 1])]^0.5

TL Upper Tolerance Limit, TL = X + (K \* S), LL Lower Tolerance Limit, LL = X - (K \* S)

X Mean, X = (sum of background results)/(count of background results)

\*\* Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009. D1-35



<b>C-746-S/T Third Quarter 2023 Statistical Analysis</b>	<b>Historical Background Comparison</b>
<b>Copper</b>	<b>URGA</b>
<b>UNITS: mg/L</b>	

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is evidence of an exceedance of the statistically-derived historical background concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

<b>Statistics-Background Data</b>	<b>X</b> = 0.024	<b>S</b> = 0.010	<b>CV(1)</b> =0.429	<b>K factor**</b> = 2.523	<b>TL(1)</b> = 4.96E-02	<b>LL(1)</b> =N/A
<b>Statistics-Transformed Background Data</b>	<b>X</b> = -3.794	<b>S</b> = 0.312	<b>CV(2)</b> =-0.082	<b>K factor**</b> = 2.523	<b>TL(2)</b> = -3.01E+00	<b>LL(2)</b> =N/A

**Historical Background Data from Upgradient Wells with Transformed Result**

**Because CV(1) is less than or equal to 1, assume normal distribution and continue with statistical analysis utilizing TL(1).**

Well Number: MW220

Date Collected	Result	LN(Result)
10/14/2002	2.11E-02	-3.86E+00
1/15/2003	2.00E-02	-3.91E+00
4/10/2003	2.00E-02	-3.91E+00
7/14/2003	2.00E-02	-3.91E+00
10/13/2003	2.00E-02	-3.91E+00
1/13/2004	2.00E-02	-3.91E+00
4/13/2004	2.00E-02	-3.91E+00
7/21/2004	2.00E-02	-3.91E+00

**Current Quarter Data**

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	Yes	1.60E-03	NO	-6.44E+00	N/A
MW221	Sidegradient	Yes	2.49E-03	NO	-6.00E+00	N/A
MW222	Sidegradient	Yes	1.19E-03	NO	-6.73E+00	N/A
MW223	Sidegradient	Yes	1.34E-03	NO	-6.62E+00	N/A
MW224	Sidegradient	Yes	9.46E-04	NO	-6.96E+00	N/A
MW369	Downgradient	Yes	5.04E-03	NO	-5.29E+00	N/A
MW372	Downgradient	Yes	1.27E-03	NO	-6.67E+00	N/A
MW384	Sidegradient	Yes	1.21E-03	NO	-6.72E+00	N/A
MW387	Downgradient	Yes	3.42E-03	NO	-5.68E+00	N/A
MW391	Downgradient	Yes	1.15E-03	NO	-6.77E+00	N/A
MW394	Upgradient	Yes	3.69E-03	NO	-5.60E+00	N/A

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for a well did not exceed the MCL value, that well was not included in the statistical evaluation.

Well Number: MW394

Date Collected	Result	LN(Result)
8/13/2002	5.00E-02	-3.00E+00
9/16/2002	5.00E-02	-3.00E+00
10/16/2002	2.00E-02	-3.91E+00
1/13/2003	2.00E-02	-3.91E+00
4/10/2003	2.00E-02	-3.91E+00
7/16/2003	2.00E-02	-3.91E+00
10/14/2003	2.00E-02	-3.91E+00
1/13/2004	2.00E-02	-3.91E+00

**Conclusion of Statistical Analysis on Historical Data**

**None of the test wells exceeded the Upper Tolerance Limit, which is evidence that concentrations in these wells are not different from historical background concentrations to a statistically-significant level.**

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation,  $CV = S/X$  If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation,  $S = [\text{Sum}([(background\ result - X)^2]/[\text{count of background results} - 1])]^{0.5}$

TL Upper Tolerance Limit,  $TL = X + (K * S)$ , LL Lower Tolerance Limit,  $LL = X - (K * S)$

X Mean,  $X = (\text{sum of background results})/(\text{count of background results})$

\*\* Read from Table 5, Appendix B of *Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009.*

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**C-746-S/T Third Quarter 2023 Statistical Analysis      Historical Background Comparison**  
**Cyanide      UNITS: mg/L      URG**

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is evidence of an exceedance of the statistically-derived historical background concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

**Statistics-Background Data**      **X**= 0.024    **S**= 0.010    **CV(1)**=0.431    **K factor\*\***= 2.523    **TL(1)**= 4.96E-02    **LL(1)**=N/A  
**Statistics-Transformed Background Data**      **X**= -3.797    **S**= 0.313    **CV(2)**=-0.082    **K factor\*\***= 2.523    **TL(2)**= -3.01E+00    **LL(2)**=N/A

**Historical Background Data from Upgradient Wells with Transformed Result**

**Because CV(1) is less than or equal to 1, assume normal distribution and continue with statistical analysis utilizing TL(1).**

Well Number: MW220

Date Collected	Result	LN(Result)
10/14/2002	2.00E-02	-3.91E+00
1/15/2003	2.00E-02	-3.91E+00
4/10/2003	2.00E-02	-3.91E+00
7/14/2003	2.00E-02	-3.91E+00
10/13/2003	2.00E-02	-3.91E+00
1/13/2004	2.00E-02	-3.91E+00
4/13/2004	5.00E-02	-3.00E+00
7/21/2004	5.00E-02	-3.00E+00

**Current Quarter Data**

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	No	2.00E-01	N/A	-1.61E+00	N/A
MW221	Sidegradient	No	2.00E-01	N/A	-1.61E+00	N/A
MW222	Sidegradient	No	2.00E-01	N/A	-1.61E+00	N/A
MW223	Sidegradient	No	2.00E-01	N/A	-1.61E+00	N/A
MW224	Sidegradient	No	2.00E-01	N/A	-1.61E+00	N/A
MW369	Downgradient	No	2.00E-01	N/A	-1.61E+00	N/A
MW372	Downgradient	Yes	4.37E-03	NO	-5.43E+00	N/A
MW384	Sidegradient	No	2.00E-01	N/A	-1.61E+00	N/A
MW387	Downgradient	No	2.00E-01	N/A	-1.61E+00	N/A
MW391	Downgradient	No	2.00E-01	N/A	-1.61E+00	N/A
MW394	Upgradient	No	2.00E-01	N/A	-1.61E+00	N/A

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for a well did not exceed the MCL value, that well was not included in the statistical evaluation.

Well Number: MW394

Date Collected	Result	LN(Result)
8/13/2002	2.00E-02	-3.91E+00
9/16/2002	2.00E-02	-3.91E+00
10/16/2002	2.00E-02	-3.91E+00
1/13/2003	2.00E-02	-3.91E+00
4/10/2003	2.00E-02	-3.91E+00
7/16/2003	2.00E-02	-3.91E+00
10/14/2003	2.00E-02	-3.91E+00
1/13/2004	2.00E-02	-3.91E+00

**Conclusion of Statistical Analysis on Historical Data**

**None of the test wells exceeded the Upper Tolerance Limit, which is evidence that concentrations in these wells are not different from historical background concentrations to a statistically-significant level.**

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation,  $CV = S/X$  If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation,  $S = [\text{Sum}([(background\ result - X)^2]/[\text{count of background results} - 1])]^{0.5}$

TL Upper Tolerance Limit,  $TL = X + (K * S)$ , LL Lower Tolerance Limit,  $LL = X - (K * S)$

X Mean,  $X = (\text{sum of background results})/(\text{count of background results})$

\*\* Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009. D1-37

**C-746-S/T Third Quarter 2023 Statistical Analysis      Historical Background Comparison**

**Dissolved Oxygen**

**UNITS: mg/L**

**URGA**

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is evidence of an exceedance of the statistically-derived historical background concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

**Statistics-Background Data**      X= 3.784    S= 1.887    CV(1)=0.499    K factor\*\*= 2.523    TL(1)= 8.54E+00    LL(1)=N/A

**Statistics-Transformed Background Data**      X= 1.182    S= 0.612    CV(2)=0.518    K factor\*\*= 2.523    TL(2)= 2.73E+00    LL(2)=N/A

**Historical Background Data from Upgradient Wells with Transformed Result**

**Because CV(1) is less than or equal to 1, assume normal distribution and continue with statistical analysis utilizing TL(1).**

Well Number: MW220

Date Collected	Result	LN(Result)
10/14/2002	6.79E+00	1.92E+00
1/15/2003	7.25E+00	1.98E+00
4/10/2003	3.60E+00	1.28E+00
7/14/2003	9.40E-01	-6.19E-02
10/13/2003	1.65E+00	5.01E-01
1/13/2004	3.48E+00	1.25E+00
4/13/2004	1.05E+00	4.88E-02
7/21/2004	4.46E+00	1.50E+00

**Current Quarter Data**

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	Yes	6.11E+00	NO	1.81E+00	N/A
MW221	Sidegradient	Yes	5.82E+00	NO	1.76E+00	N/A
MW222	Sidegradient	Yes	4.37E+00	NO	1.47E+00	N/A
MW223	Sidegradient	Yes	2.83E+00	NO	1.04E+00	N/A
MW224	Sidegradient	Yes	3.53E+00	NO	1.26E+00	N/A
MW369	Downgradient	Yes	2.85E+00	NO	1.05E+00	N/A
MW372	Downgradient	Yes	1.91E+00	NO	6.47E-01	N/A
MW384	Sidegradient	Yes	4.27E+00	NO	1.45E+00	N/A
MW387	Downgradient	Yes	4.53E+00	NO	1.51E+00	N/A
MW391	Downgradient	Yes	4.57E+00	NO	1.52E+00	N/A
MW394	Upgradient	Yes	4.93E+00	NO	1.60E+00	N/A

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for a well did not exceed the MCL value, that well was not included in the statistical evaluation.

**Conclusion of Statistical Analysis on Historical Data**

**None of the test wells exceeded the Upper Tolerance Limit, which is evidence that concentrations in these wells are not different from historical background concentrations to a statistically-significant level.**

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum ((background result-X)^2)/[count of background results - 1]]^0.5

TL Upper Tolerance Limit, TL = X + (K \* S), LL Lower Tolerance Limit, LL = X - (K \* S)

X Mean, X = (sum of background results)/(count of background results)

\*\* Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009. D1-38



# C-746-S/T Third Quarter 2023 Statistical Analysis      Historical Background Comparison

**Dissolved Solids**

**UNITS: mg/L**

**URGA**

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is evidence of an exceedance of the statistically-derived historical background concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

**Statistics-Background Data**      X= 232.688    S= 27.490    CV(1)=0.118      K factor\*\*= 2.523    TL(1)= 3.02E+02    LL(1)=N/A

**Statistics-Transformed Background Data**      X= 5.443    S= 0.118    CV(2)=0.022      K factor\*\*= 2.523    TL(2)= 5.74E+00    LL(2)=N/A

**Historical Background Data from Upgradient Wells with Transformed Result**

**Because CV(1) is less than or equal to 1, assume normal distribution and continue with statistical analysis utilizing TL(1).**

Well Number: MW220

Date Collected	Result	LN(Result)
10/14/2002	2.08E+02	5.34E+00
1/15/2003	2.57E+02	5.55E+00
4/10/2003	2.88E+02	5.66E+00
7/14/2003	2.62E+02	5.57E+00
10/13/2003	1.97E+02	5.28E+00
1/13/2004	1.98E+02	5.29E+00
4/13/2004	2.45E+02	5.50E+00
7/21/2004	2.04E+02	5.32E+00

Well Number: MW394

Date Collected	Result	LN(Result)
8/13/2002	2.47E+02	5.51E+00
9/16/2002	2.59E+02	5.56E+00
10/16/2002	2.01E+02	5.30E+00
1/13/2003	2.28E+02	5.43E+00
4/10/2003	2.49E+02	5.52E+00
7/16/2003	2.40E+02	5.48E+00
10/14/2003	2.30E+02	5.44E+00
1/13/2004	2.10E+02	5.35E+00

**Current Quarter Data**

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	Yes	1.76E+02	NO	5.17E+00	N/A
MW221	Sidegradient	Yes	2.05E+02	NO	5.32E+00	N/A
MW222	Sidegradient	Yes	1.84E+02	NO	5.21E+00	N/A
MW223	Sidegradient	Yes	2.09E+02	NO	5.34E+00	N/A
MW224	Sidegradient	Yes	2.35E+02	NO	5.46E+00	N/A
MW369	Downgradient	Yes	1.75E+02	NO	5.16E+00	N/A
MW372	Downgradient	Yes	4.23E+02	YES	6.05E+00	N/A
MW384	Sidegradient	Yes	2.38E+02	NO	5.47E+00	N/A
MW387	Downgradient	Yes	2.81E+02	NO	5.64E+00	N/A
MW391	Downgradient	Yes	1.88E+02	NO	5.24E+00	N/A
MW394	Upgradient	Yes	2.01E+02	NO	5.30E+00	N/A

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for a well did not exceed the MCL value, that well was not included in the statistical evaluation.

**Conclusion of Statistical Analysis on Historical Data**

**The test well(s) listed exceeded the Upper Tolerance Limit, which is evidence of elevated concentration with respect to historical background data.**

**Wells with Exceedances**

MW372

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum ((background result-X)^2)/[count of background results - 1]]^0.5

TL Upper Tolerance Limit, TL = X + (K \* S), LL Lower Tolerance Limit, LL = X - (K \* S)

X Mean, X = (sum of background results)/(count of background results)

\*\* Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009.      D1-39

# C-746-S/T Third Quarter 2023 Statistical Analysis      Historical Background Comparison

**Iron**

**UNITS: mg/L**

**URGA**

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is evidence of an exceedance of the statistically-derived historical background concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

**Statistics-Background Data**      X= 0.897    S= 1.050    CV(1)=1.170    **K factor\*\*= 2.523**    TL(1)= 3.55E+00    LL(1)=N/A

**Statistics-Transformed Background Data**      X= -0.565    S= 0.951    CV(2)=-1.683    **K factor\*\*= 2.523**    TL(2)= 1.83E+00    LL(2)=N/A

**Historical Background Data from Upgradient Wells with Transformed Result**

**Because CV(1) is greater than 1, the natural logarithm of background and test well results were calculated utilizing TL(2) for comparison.**

Well Number: MW220

Date Collected	Result	LN(Result)
10/14/2002	2.00E-01	-1.61E+00
1/15/2003	2.00E-01	-1.61E+00
4/10/2003	4.29E-01	-8.46E-01
7/14/2003	4.33E+00	1.47E+00
10/13/2003	1.81E+00	5.93E-01
1/13/2004	7.93E-01	-2.32E-01
4/13/2004	1.30E-01	-2.04E+00
7/21/2004	3.82E-01	-9.62E-01

**Current Quarter Data**

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	No	1.00E-01	N/A	-2.30E+00	N/A
MW221	Sidegradient	No	1.00E-01	N/A	-2.30E+00	N/A
MW222	Sidegradient	No	1.00E-01	N/A	-2.30E+00	N/A
MW223	Sidegradient	No	1.00E-01	N/A	-2.30E+00	N/A
MW224	Sidegradient	Yes	7.00E-02	N/A	-2.66E+00	NO
MW369	Downgradient	Yes	3.60E-01	N/A	-1.02E+00	NO
MW372	Downgradient	Yes	3.30E-02	N/A	-3.41E+00	NO
MW384	Sidegradient	Yes	4.78E-02	N/A	-3.04E+00	NO
MW387	Downgradient	Yes	5.49E-02	N/A	-2.90E+00	NO
MW391	Downgradient	Yes	6.31E-02	N/A	-2.76E+00	NO
MW394	Upgradient	No	1.00E-01	N/A	-2.30E+00	N/A

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for a well did not exceed the MCL value, that well was not included in the statistical evaluation.

Well Number: MW394

Date Collected	Result	LN(Result)
8/13/2002	1.34E+00	2.93E-01
9/16/2002	3.28E-01	-1.11E+00
10/16/2002	1.38E+00	3.22E-01
1/13/2003	1.30E+00	2.62E-01
4/10/2003	4.94E-01	-7.05E-01
7/16/2003	6.20E-01	-4.78E-01
10/14/2003	3.70E-01	-9.94E-01
1/13/2004	2.51E-01	-1.38E+00

**Conclusion of Statistical Analysis on Historical Data**

**None of the test wells exceeded the Upper Tolerance Limit, which is evidence that concentrations in these wells are not different from historical background concentrations to a statistically-significant level.**

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum ((background result-X)^2)/[count of background results - 1]]^0.5

TL Upper Tolerance Limit, TL = X + (K \* S), LL Lower Tolerance Limit, LL = X - (K \* S)

X Mean, X = (sum of background results)/(count of background results)

\*\* Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009.      D1-40

**C-746-S/T Third Quarter 2023 Statistical Analysis      Historical Background Comparison**

**Magnesium**

**UNITS: mg/L**

**URGA**

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is evidence of an exceedance of the statistically-derived historical background concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

**Statistics-Background Data**      X= 10.796    S= 1.703    CV(1)=0.158    K factor\*\*= 2.523    TL(1)= 1.51E+01    LL(1)=N/A

**Statistics-Transformed Background Data**      X= 2.368    S= 0.158    CV(2)=0.067    K factor\*\*= 2.523    TL(2)= 2.77E+00    LL(2)=N/A

**Historical Background Data from Upgradient Wells with Transformed Result**

**Because CV(1) is less than or equal to 1, assume normal distribution and continue with statistical analysis utilizing TL(1).**

Well Number: MW220

Date Collected	Result	LN(Result)
10/14/2002	9.16E+00	2.21E+00
1/15/2003	1.00E+01	2.30E+00
4/10/2003	1.08E+01	2.38E+00
7/14/2003	1.47E+01	2.69E+00
10/13/2003	9.03E+00	2.20E+00
1/13/2004	8.49E+00	2.14E+00
4/13/2004	9.70E+00	2.27E+00
7/21/2004	8.06E+00	2.09E+00

**Current Quarter Data**

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	Yes	8.97E+00	NO	2.19E+00	N/A
MW221	Sidegradient	Yes	8.93E+00	NO	2.19E+00	N/A
MW222	Sidegradient	Yes	7.66E+00	NO	2.04E+00	N/A
MW223	Sidegradient	Yes	9.06E+00	NO	2.20E+00	N/A
MW224	Sidegradient	Yes	9.90E+00	NO	2.29E+00	N/A
MW369	Downgradient	Yes	6.17E+00	NO	1.82E+00	N/A
MW372	Downgradient	Yes	2.11E+01	YES	3.05E+00	N/A
MW384	Sidegradient	Yes	1.13E+01	NO	2.42E+00	N/A
MW387	Downgradient	Yes	1.57E+01	YES	2.75E+00	N/A
MW391	Downgradient	Yes	1.01E+01	NO	2.31E+00	N/A
MW394	Upgradient	Yes	1.07E+01	NO	2.37E+00	N/A

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for a well did not exceed the MCL value, that well was not included in the statistical evaluation.

Well Number: MW394

Date Collected	Result	LN(Result)
8/13/2002	1.18E+01	2.47E+00
9/16/2002	1.21E+01	2.49E+00
10/16/2002	1.13E+01	2.42E+00
1/13/2003	1.03E+01	2.33E+00
4/10/2003	1.17E+01	2.46E+00
7/16/2003	1.20E+01	2.48E+00
10/14/2003	1.22E+01	2.50E+00
1/13/2004	1.14E+01	2.43E+00

**Conclusion of Statistical Analysis on Historical Data**

**The test well(s) listed exceeded the Upper Tolerance Limit, which is evidence of elevated concentration with respect to historical background data.**

**Wells with Exceedances**

- MW372
- MW387

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum ((background result-X)^2)/[count of background results - 1]]^0.5

TL Upper Tolerance Limit, TL = X + (K \* S), LL Lower Tolerance Limit, LL = X - (K \* S)

X Mean, X = (sum of background results)/(count of background results)

\*\* Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009. D1-41

**C-746-S/T Third Quarter 2023 Statistical Analysis      Historical Background Comparison**

**Manganese**

**UNITS: mg/L**

**URGA**

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is evidence of an exceedance of the statistically-derived historical background concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

**Statistics-Background Data**      X= 0.287    S= 0.619    CV(1)=2.156    **K factor\*\*= 2.523**    TL(1)= 1.85E+00    LL(1)=N/A

**Statistics-Transformed Background Data**      X= -2.455    S= 1.619    CV(2)=-0.659    **K factor\*\*= 2.523**    TL(2)= 1.63E+00    LL(2)=N/A

**Historical Background Data from Upgradient Wells with Transformed Result**

**Because CV(1) is greater than 1, the natural logarithm of background and test well results were calculated utilizing TL(2) for comparison.**

Well Number: MW220

Date Collected	Result	LN(Result)
10/14/2002	3.06E-02	-3.49E+00
1/15/2003	2.91E-02	-3.54E+00
4/10/2003	1.37E-02	-4.29E+00
7/14/2003	2.54E+00	9.32E-01
10/13/2003	3.78E-01	-9.73E-01
1/13/2004	1.59E-01	-1.84E+00
4/13/2004	7.07E-03	-4.95E+00
7/21/2004	8.41E-02	-2.48E+00

**Current Quarter Data**

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	No	5.00E-03	N/A	-5.30E+00	N/A
MW221	Sidegradient	No	5.00E-03	N/A	-5.30E+00	N/A
MW222	Sidegradient	Yes	5.42E-03	N/A	-5.22E+00	NO
MW223	Sidegradient	Yes	3.33E-03	N/A	-5.70E+00	NO
MW224	Sidegradient	Yes	4.06E-03	N/A	-5.51E+00	NO
MW369	Downgradient	Yes	3.32E-02	N/A	-3.41E+00	NO
MW372	Downgradient	Yes	1.57E-03	N/A	-6.46E+00	NO
MW384	Sidegradient	Yes	1.15E-03	N/A	-6.77E+00	NO
MW387	Downgradient	Yes	1.83E-03	N/A	-6.30E+00	NO
MW391	Downgradient	Yes	1.41E-03	N/A	-6.56E+00	NO
MW394	Upgradient	No	5.00E-03	N/A	-5.30E+00	N/A

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for a well did not exceed the MCL value, that well was not included in the statistical evaluation.

Well Number: MW394

Date Collected	Result	LN(Result)
8/13/2002	5.42E-01	-6.12E-01
9/16/2002	1.55E-01	-1.86E+00
10/16/2002	1.03E-01	-2.27E+00
1/13/2003	1.28E-01	-2.06E+00
4/10/2003	5.00E-03	-5.30E+00
7/16/2003	2.72E-01	-1.30E+00
10/14/2003	7.95E-02	-2.53E+00
1/13/2004	6.58E-02	-2.72E+00

**Conclusion of Statistical Analysis on Historical Data**

**None of the test wells exceeded the Upper Tolerance Limit, which is evidence that concentrations in these wells are not different from historical background concentrations to a statistically-significant level.**

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum ((background result-X)^2)/[count of background results - 1]]^0.5

TL Upper Tolerance Limit, TL = X + (K \* S), LL Lower Tolerance Limit, LL = X - (K \* S)

X Mean, X = (sum of background results)/(count of background results)

\*\* Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009. D1-42

**C-746-S/T Third Quarter 2023 Statistical Analysis      Historical Background Comparison**

**Methylene chloride**

**UNITS: ug/L**

**URGA**

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is evidence of an exceedance of the statistically-derived historical background concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

**Statistics-Background Data**      X= 4.813    S= 0.750    CV(1)=0.156    K factor\*\*= 2.523    TL(1)= 6.70E+00    LL(1)=N/A

**Statistics-Transformed Background Data**      X= 1.552    S= 0.229    CV(2)=0.148    K factor\*\*= 2.523    TL(2)= 2.13E+00    LL(2)=N/A

**Historical Background Data from Upgradient Wells with Transformed Result**

**Because CV(1) is less than or equal to 1, assume normal distribution and continue with statistical analysis utilizing TL(1).**

Well Number: MW220

Date Collected	Result	LN(Result)
10/14/2002	5.00E+00	1.61E+00
1/15/2003	5.00E+00	1.61E+00
4/10/2003	5.00E+00	1.61E+00
7/14/2003	5.00E+00	1.61E+00
10/13/2003	5.00E+00	1.61E+00
1/13/2004	5.00E+00	1.61E+00
4/13/2004	5.00E+00	1.61E+00
7/21/2004	5.00E+00	1.61E+00

**Current Quarter Data**

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	No	5.00E+00	N/A	1.61E+00	N/A
MW221	Sidegradient	No	5.00E+00	N/A	1.61E+00	N/A
MW222	Sidegradient	No	5.00E+00	N/A	1.61E+00	N/A
MW223	Sidegradient	No	5.00E+00	N/A	1.61E+00	N/A
MW224	Sidegradient	No	5.00E+00	N/A	1.61E+00	N/A
MW369	Downgradient	No	5.00E+00	N/A	1.61E+00	N/A
MW372	Downgradient	No	5.00E+00	N/A	1.61E+00	N/A
MW384	Sidegradient	No	5.00E+00	N/A	1.61E+00	N/A
MW387	Downgradient	No	5.00E+00	N/A	1.61E+00	N/A
MW391	Downgradient	Yes	6.10E-01	NO	-4.94E-01	N/A
MW394	Upgradient	No	5.00E+00	N/A	1.61E+00	N/A

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for a well did not exceed the MCL value, that well was not included in the statistical evaluation.

**Conclusion of Statistical Analysis on Historical Data**

**None of the test wells exceeded the Upper Tolerance Limit, which is evidence that concentrations in these wells are not different from historical background concentrations to a statistically-significant level.**

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum ((background result-X)^2)/[count of background results - 1]]^0.5

TL Upper Tolerance Limit, TL = X + (K \* S), LL Lower Tolerance Limit, LL = X - (K \* S)

X Mean, X = (sum of background results)/(count of background results)

\*\* Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009. D1-43



**C-746-S/T Third Quarter 2023 Statistical Analysis      Historical Background Comparison**

**Molybdenum**

**UNITS: mg/L**

**URGA**

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is evidence of an exceedance of the statistically-derived historical background concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

**Statistics-Background Data**      X= 0.006    S= 0.008    CV(1)=1.261    K factor\*\*= 2.523    TL(1)= 2.64E-02    LL(1)=N/A

**Statistics-Transformed Background Data**      X= -5.747    S= 1.205    CV(2)=-0.210    K factor\*\*= 2.523    TL(2)= -2.71E+00    LL(2)=N/A

**Historical Background Data from Upgradient Wells with Transformed Result**

**Because CV(1) is greater than 1, the natural logarithm of background and test well results were calculated utilizing TL(2) for comparison.**

Well Number: MW220

Date Collected	Result	LN(Result)
10/14/2002	5.58E-03	-5.19E+00
1/15/2003	9.83E-03	-4.62E+00
4/10/2003	1.09E-02	-4.52E+00
7/14/2003	2.45E-03	-6.01E+00
10/13/2003	5.66E-03	-5.17E+00
1/13/2004	5.72E-03	-5.16E+00
4/13/2004	1.00E-03	-6.91E+00
7/21/2004	3.92E-03	-5.54E+00

**Current Quarter Data**

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	Yes	5.26E-04	N/A	-7.55E+00	NO
MW221	Sidegradient	Yes	3.74E-03	N/A	-5.59E+00	NO
MW222	Sidegradient	Yes	1.76E-03	N/A	-6.34E+00	NO
MW223	Sidegradient	Yes	5.83E-03	N/A	-5.14E+00	NO
MW224	Sidegradient	Yes	1.11E-03	N/A	-6.80E+00	NO
MW369	Downgradient	No	1.00E-03	N/A	-6.91E+00	N/A
MW372	Downgradient	Yes	2.02E-04	N/A	-8.51E+00	NO
MW384	Sidegradient	No	1.00E-03	N/A	-6.91E+00	N/A
MW387	Downgradient	No	1.00E-03	N/A	-6.91E+00	N/A
MW391	Downgradient	No	1.00E-03	N/A	-6.91E+00	N/A
MW394	Upgradient	No	1.00E-03	N/A	-6.91E+00	N/A

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for a well did not exceed the MCL value, that well was not included in the statistical evaluation.

Well Number: MW394

Date Collected	Result	LN(Result)
8/13/2002	2.50E-02	-3.69E+00
9/16/2002	2.50E-02	-3.69E+00
10/16/2002	1.00E-03	-6.91E+00
1/13/2003	1.00E-03	-6.91E+00
4/10/2003	1.00E-03	-6.91E+00
7/16/2003	1.00E-03	-6.91E+00
10/14/2003	1.00E-03	-6.91E+00
1/13/2004	1.00E-03	-6.91E+00

**Conclusion of Statistical Analysis on Historical Data**

**None of the test wells exceeded the Upper Tolerance Limit, which is evidence that concentrations in these wells are not different from historical background concentrations to a statistically-significant level.**

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum ((background result-X)^2)/[count of background results - 1]]^0.5

TL Upper Tolerance Limit, TL = X + (K \* S), LL Lower Tolerance Limit, LL = X - (K \* S)

X Mean, X = (sum of background results)/(count of background results)

\*\* Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009. D1-44

# C-746-S/T Third Quarter 2023 Statistical Analysis      Historical Background Comparison

**Nickel**

**UNITS: mg/L**

**URGA**

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is evidence of an exceedance of the statistically-derived historical background concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

**Statistics-Background Data**      X= 0.127    S= 0.228    CV(1)=1.790    K factor\*\*= 2.523    TL(1)= 7.01E-01    LL(1)=N/A

**Statistics-Transformed Background Data**      X= -3.617    S= 1.837    CV(2)=-0.508    K factor\*\*= 2.523    TL(2)= 1.02E+00    LL(2)=N/A

**Historical Background Data from Upgradient Wells with Transformed Result**

**Because CV(1) is greater than 1, the natural logarithm of background and test well results were calculated utilizing TL(2) for comparison.**

Well Number: MW220

Date Collected	Result	LN(Result)
10/14/2002	4.18E-01	-8.72E-01
1/15/2003	7.38E-01	-3.04E-01
4/10/2003	5.44E-01	-6.09E-01
7/14/2003	1.06E-01	-2.24E+00
10/13/2003	5.29E-02	-2.94E+00
1/13/2004	2.09E-02	-3.87E+00
4/13/2004	5.00E-03	-5.30E+00
7/21/2004	1.92E-02	-3.95E+00

Well Number: MW394

Date Collected	Result	LN(Result)
8/13/2002	5.00E-02	-3.00E+00
9/16/2002	5.00E-02	-3.00E+00
10/16/2002	5.00E-03	-5.30E+00
1/13/2003	5.00E-03	-5.30E+00
4/10/2003	5.00E-03	-5.30E+00
7/16/2003	5.00E-03	-5.30E+00
10/14/2003	5.00E-03	-5.30E+00
1/13/2004	5.00E-03	-5.30E+00

**Current Quarter Data**

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	Yes	6.57E-03	N/A	-5.03E+00	NO
MW221	Sidegradient	Yes	2.42E-02	N/A	-3.72E+00	NO
MW222	Sidegradient	Yes	1.88E-02	N/A	-3.97E+00	NO
MW223	Sidegradient	Yes	2.00E-01	N/A	-1.61E+00	NO
MW224	Sidegradient	Yes	1.17E-02	N/A	-4.45E+00	NO
MW369	Downgradient	Yes	4.62E-03	N/A	-5.38E+00	NO
MW372	Downgradient	Yes	9.29E-04	N/A	-6.98E+00	NO
MW384	Sidegradient	No	2.00E-03	N/A	-6.21E+00	N/A
MW387	Downgradient	Yes	1.38E-03	N/A	-6.59E+00	NO
MW391	Downgradient	No	2.00E-03	N/A	-6.21E+00	N/A
MW394	Upgradient	Yes	4.14E-03	N/A	-5.49E+00	NO

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for a well did not exceed the MCL value, that well was not included in the statistical evaluation.

**Conclusion of Statistical Analysis on Historical Data**

**None of the test wells exceeded the Upper Tolerance Limit, which is evidence that concentrations in these wells are not different from historical background concentrations to a statistically-significant level.**

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum ((background result-X)^2)/[count of background results - 1]]^0.5

TL Upper Tolerance Limit, TL = X + (K \* S), LL Lower Tolerance Limit, LL = X - (K \* S)

X Mean, X = (sum of background results)/(count of background results)

\*\* Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009. D1-45

**C-746-S/T Third Quarter 2023 Statistical Analysis      Historical Background Comparison**

**Oxidation-Reduction Potential**

**UNITS: mV**

**URGA**

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is evidence of an exceedance of the statistically-derived historical background concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

**Statistics-Background Data**      X= 179.872   S= 86.318   CV(1)=0.480   **K factor\*\*= 2.523**   TL(1)= 3.98E+02   LL(1)=N/A

**Statistics-Transformed Background Data**      X= 4.861   S= 1.252   CV(2)=0.258   **K factor\*\*= 2.523**   TL(2)= 8.02E+00   LL(2)=N/A

**Historical Background Data from Upgradient Wells with Transformed Result**

**Because CV(1) is less than or equal to 1, assume normal distribution and continue with statistical analysis utilizing TL(1).**

Well Number: MW220

Date Collected	Result	LN(Result)
10/14/2002	2.05E+02	5.32E+00
1/15/2003	1.95E+00	6.68E-01
4/10/2003	2.03E+02	5.31E+00
7/14/2003	3.00E+01	3.40E+00
10/13/2003	1.07E+02	4.67E+00
1/13/2004	2.95E+02	5.69E+00
4/13/2004	1.90E+02	5.25E+00
7/21/2004	3.19E+02	5.77E+00

**Current Quarter Data**

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	Yes	3.77E+02	NO	5.93E+00	N/A
MW221	Sidegradient	Yes	3.61E+02	NO	5.89E+00	N/A
MW222	Sidegradient	Yes	4.05E+02	YES	6.00E+00	N/A
MW223	Sidegradient	Yes	4.00E+02	YES	5.99E+00	N/A
MW224	Sidegradient	Yes	3.71E+02	NO	5.92E+00	N/A
MW369	Downgradient	Yes	4.06E+02	YES	6.01E+00	N/A
MW372	Downgradient	Yes	3.87E+02	NO	5.96E+00	N/A
MW384	Sidegradient	Yes	4.69E+02	YES	6.15E+00	N/A
MW387	Downgradient	Yes	4.10E+02	YES	6.02E+00	N/A
MW391	Downgradient	Yes	4.43E+02	YES	6.09E+00	N/A
MW394	Upgradient	Yes	4.94E+02	YES	6.20E+00	N/A

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for a well did not exceed the MCL value, that well was not included in the statistical evaluation.

**Conclusion of Statistical Analysis on Historical Data**

**The test well(s) listed exceeded the Upper Tolerance Limit, which is evidence of elevated concentration with respect to historical background data.**

**Wells with Exceedances**

- MW222
- MW223
- MW369
- MW384
- MW387
- MW391
- MW394

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum ((background result-X)^2)/[count of background results - 1]]^0.5

TL Upper Tolerance Limit, TL = X + (K \* S), LL Lower Tolerance Limit, LL = X - (K \* S)

X Mean, X = (sum of background results)/(count of background results)

\*\* Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009. D1-46



# C-746-S/T Third Quarter 2023 Statistical Analysis      Historical Background Comparison

**pH**

**UNITS: Std Unit**

**URGA**

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is evidence of an exceedance of the statistically-derived historical background concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

**Statistics-Background Data**      X= 6.138    S= 0.282    CV(1)=0.046    **K factor\*\*= 2.904**    TL(1)= 6.96E+00    LL(1)=5.32E+00

**Statistics-Transformed Background Data**      X= 1.813    S= 0.047    CV(2)=0.026    **K factor\*\*= 2.904**    TL(2)= 1.95E+00    LL(2)=1.68E+00

**Historical Background Data from Upgradient Wells with Transformed Result**

**Because CV(1) is less than or equal to 1, assume normal distribution and continue with statistical analysis utilizing TL(1).**

Well Number: MW220

Date Collected	Result	LN(Result)
10/14/2002	6.04E+00	1.80E+00
1/15/2003	6.31E+00	1.84E+00
4/10/2003	6.50E+00	1.87E+00
7/14/2003	6.30E+00	1.84E+00
10/13/2003	6.34E+00	1.85E+00
1/13/2004	6.33E+00	1.85E+00
4/13/2004	6.30E+00	1.84E+00
7/21/2004	5.90E+00	1.77E+00

**Current Quarter Data**

Well No.	Gradient	Detected?	Result	Result >TL(1)? Result <LL(1)?	LN(Result)	LN(Result) >TL(2)? LN(Result) <LL(2)?
MW220	Upgradient	Yes	6.09E+00	NO	1.81E+00	N/A
MW221	Sidegradient	Yes	6.10E+00	NO	1.81E+00	N/A
MW222	Sidegradient	Yes	6.08E+00	NO	1.81E+00	N/A
MW223	Sidegradient	Yes	6.03E+00	NO	1.80E+00	N/A
MW224	Sidegradient	Yes	6.13E+00	NO	1.81E+00	N/A
MW369	Downgradient	Yes	5.96E+00	NO	1.79E+00	N/A
MW372	Downgradient	Yes	6.05E+00	NO	1.80E+00	N/A
MW384	Sidegradient	Yes	6.14E+00	NO	1.81E+00	N/A
MW387	Downgradient	Yes	6.15E+00	NO	1.82E+00	N/A
MW391	Downgradient	Yes	6.00E+00	NO	1.79E+00	N/A
MW394	Upgradient	Yes	5.90E+00	NO	1.77E+00	N/A

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for a well did not exceed the MCL value, that well was not included in the statistical evaluation.

**Conclusion of Statistical Analysis on Historical Data**

**None of the test wells exceeded the Upper Tolerance Limit, which is evidence that concentrations in these wells are not different from historical background concentrations to a statistically-significant level.**

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum ((background result-X)^2)/[count of background results - 1]]^0.5

TL Upper Tolerance Limit, TL = X + (K \* S), LL Lower Tolerance Limit, LL = X - (K \* S)

X Mean, X = (sum of background results)/(count of background results)

\*\* Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009. D1-47

# C-746-S/T Third Quarter 2023 Statistical Analysis      Historical Background Comparison

**Potassium**

**UNITS: mg/L**

**URGA**

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is evidence of an exceedance of the statistically-derived historical background concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

**Statistics-Background Data**      X= 6.654    S= 9.310    CV(1)=1.399    **K factor\*\*= 2.523**    TL(1)= 3.01E+01    LL(1)=N/A

**Statistics-Transformed Background Data**      X= 1.130    S= 1.208    CV(2)=1.069    **K factor\*\*= 2.523**    TL(2)= 4.18E+00    LL(2)=N/A

**Historical Background Data from Upgradient Wells with Transformed Result**

**Because CV(1) is greater than 1, the natural logarithm of background and test well results were calculated utilizing TL(2) for comparison.**

Well Number: MW220

Date Collected	Result	LN(Result)
10/14/2002	6.70E+00	1.90E+00
1/15/2003	2.97E+01	3.39E+00
4/10/2003	2.49E+01	3.21E+00
7/14/2003	1.13E+00	1.22E-01
10/13/2003	3.43E+00	1.23E+00
1/13/2004	6.71E+00	1.90E+00
4/13/2004	1.93E+01	2.96E+00
7/21/2004	3.97E+00	1.38E+00

**Current Quarter Data**

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	Yes	1.62E+00	N/A	4.82E-01	NO
MW221	Sidegradient	Yes	2.19E+00	N/A	7.84E-01	NO
MW222	Sidegradient	Yes	7.69E-01	N/A	-2.63E-01	NO
MW223	Sidegradient	Yes	2.32E+00	N/A	8.42E-01	NO
MW224	Sidegradient	Yes	1.06E+00	N/A	5.83E-02	NO
MW369	Downgradient	Yes	5.19E-01	N/A	-6.56E-01	NO
MW372	Downgradient	Yes	2.30E+00	N/A	8.33E-01	NO
MW384	Sidegradient	Yes	1.45E+00	N/A	3.72E-01	NO
MW387	Downgradient	Yes	1.76E+00	N/A	5.65E-01	NO
MW391	Downgradient	Yes	1.48E+00	N/A	3.92E-01	NO
MW394	Upgradient	Yes	1.26E+00	N/A	2.31E-01	NO

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for a well did not exceed the MCL value, that well was not included in the statistical evaluation.

Well Number: MW394

Date Collected	Result	LN(Result)
8/13/2002	2.00E+00	6.93E-01
9/16/2002	2.00E+00	6.93E-01
10/16/2002	1.03E+00	2.96E-02
1/13/2003	1.10E+00	9.53E-02
4/10/2003	1.24E+00	2.15E-01
7/16/2003	1.14E+00	1.31E-01
10/14/2003	1.05E+00	4.88E-02
1/13/2004	1.07E+00	6.77E-02

**Conclusion of Statistical Analysis on Historical Data**

**None of the test wells exceeded the Upper Tolerance Limit, which is evidence that concentrations in these wells are not different from historical background concentrations to a statistically-significant level.**

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum ((background result-X)^2)/[count of background results - 1]]^0.5

TL Upper Tolerance Limit, TL = X + (K \* S), LL Lower Tolerance Limit, LL = X - (K \* S)

X Mean, X = (sum of background results)/(count of background results)

\*\* Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009.      D1-48

**C-746-S/T Third Quarter 2023 Statistical Analysis      Historical Background Comparison**

**Sodium**

**UNITS: mg/L**

**URGA**

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is evidence of an exceedance of the statistically-derived historical background concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

**Statistics-Background Data**      X= 36.363    S= 8.666    CV(1)=0.238      K factor\*\*= 2.523    TL(1)= 5.82E+01    LL(1)=N/A

**Statistics-Transformed Background Data**      X= 3.570    S= 0.222    CV(2)=0.062      K factor\*\*= 2.523    TL(2)= 4.13E+00    LL(2)=N/A

**Historical Background Data from Upgradient Wells with Transformed Result**

**Because CV(1) is less than or equal to 1, assume normal distribution and continue with statistical analysis utilizing TL(1).**

Well Number: MW220

Date Collected	Result	LN(Result)
10/14/2002	3.54E+01	3.57E+00
1/15/2003	4.06E+01	3.70E+00
4/10/2003	5.10E+01	3.93E+00
7/14/2003	5.82E+01	4.06E+00
10/13/2003	3.81E+01	3.64E+00
1/13/2004	3.70E+01	3.61E+00
4/13/2004	4.32E+01	3.77E+00
7/21/2004	3.38E+01	3.52E+00

**Current Quarter Data**

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	Yes	3.85E+01	NO	3.65E+00	N/A
MW221	Sidegradient	Yes	4.52E+01	NO	3.81E+00	N/A
MW222	Sidegradient	Yes	4.39E+01	NO	3.78E+00	N/A
MW223	Sidegradient	Yes	4.44E+01	NO	3.79E+00	N/A
MW224	Sidegradient	Yes	5.64E+01	NO	4.03E+00	N/A
MW369	Downgradient	Yes	4.76E+01	NO	3.86E+00	N/A
MW372	Downgradient	Yes	5.69E+01	NO	4.04E+00	N/A
MW384	Sidegradient	Yes	5.28E+01	NO	3.97E+00	N/A
MW387	Downgradient	Yes	5.22E+01	NO	3.96E+00	N/A
MW391	Downgradient	Yes	3.04E+01	NO	3.41E+00	N/A
MW394	Upgradient	Yes	3.18E+01	NO	3.46E+00	N/A

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for a well did not exceed the MCL value, that well was not included in the statistical evaluation.

**Conclusion of Statistical Analysis on Historical Data**

**None of the test wells exceeded the Upper Tolerance Limit, which is evidence that concentrations in these wells are not different from historical background concentrations to a statistically-significant level.**

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.  
 S Standard Deviation, S = [Sum (((background result-X)^2)/[count of background results - 1])]^0.5  
 TL Upper Tolerance Limit, TL = X + (K \* S),      LL Lower Tolerance Limit, LL = X - (K \* S)  
 X Mean, X = (sum of background results)/(count of background results)

\*\* Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009.      D1-49

# C-746-S/T Third Quarter 2023 Statistical Analysis      Historical Background Comparison

**Sulfate**

**UNITS: mg/L**

**URGA**

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is evidence of an exceedance of the statistically-derived historical background concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

**Statistics-Background Data**      X= 10.481    S= 2.648    CV(1)=0.253      K factor\*\*= 2.523    TL(1)= 1.72E+01    LL(1)=N/A

**Statistics-Transformed Background Data**      X= 2.322    S= 0.239    CV(2)=0.103      K factor\*\*= 2.523    TL(2)= 2.92E+00    LL(2)=N/A

**Historical Background Data from Upgradient Wells with Transformed Result**

**Because CV(1) is less than or equal to 1, assume normal distribution and continue with statistical analysis utilizing TL(1).**

Well Number: MW220

Date Collected	Result	LN(Result)
10/14/2002	1.04E+01	2.34E+00
1/15/2003	9.80E+00	2.28E+00
4/10/2003	1.54E+01	2.73E+00
7/14/2003	1.49E+01	2.70E+00
10/13/2003	1.35E+01	2.60E+00
1/13/2004	1.03E+01	2.33E+00
4/13/2004	1.43E+01	2.66E+00
7/21/2004	1.05E+01	2.35E+00

**Current Quarter Data**

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	Yes	1.78E+01	YES	2.88E+00	N/A
MW221	Sidegradient	Yes	1.52E+01	NO	2.72E+00	N/A
MW222	Sidegradient	Yes	1.23E+01	NO	2.51E+00	N/A
MW223	Sidegradient	Yes	1.42E+01	NO	2.65E+00	N/A
MW224	Sidegradient	Yes	1.68E+01	NO	2.82E+00	N/A
MW369	Downgradient	Yes	7.91E+00	NO	2.07E+00	N/A
MW372	Downgradient	Yes	1.45E+02	YES	4.98E+00	N/A
MW384	Sidegradient	Yes	2.37E+01	YES	3.17E+00	N/A
MW387	Downgradient	Yes	3.15E+01	YES	3.45E+00	N/A
MW391	Downgradient	Yes	1.29E+01	NO	2.56E+00	N/A
MW394	Upgradient	Yes	1.22E+01	NO	2.50E+00	N/A

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for a well did not exceed the MCL value, that well was not included in the statistical evaluation.

Well Number: MW394

Date Collected	Result	LN(Result)
8/13/2002	1.12E+01	2.42E+00
9/16/2002	8.30E+00	2.12E+00
10/16/2002	8.00E+00	2.08E+00
1/13/2003	8.50E+00	2.14E+00
4/10/2003	7.90E+00	2.07E+00
7/16/2003	8.40E+00	2.13E+00
10/14/2003	8.20E+00	2.10E+00
1/13/2004	8.10E+00	2.09E+00

**Conclusion of Statistical Analysis on Historical Data**

**The test well(s) listed exceeded the Upper Tolerance Limit, which is evidence of elevated concentration with respect to historical background data.**

**Wells with Exceedances**

- MW220
- MW372
- MW384
- MW387

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum ((background result-X)^2)/[count of background results - 1]]^0.5

TL Upper Tolerance Limit, TL = X + (K \* S), LL Lower Tolerance Limit, LL = X - (K \* S)

X Mean, X = (sum of background results)/(count of background results)

\*\* Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009.      D1-50

**C-746-S/T Third Quarter 2023 Statistical Analysis      Historical Background Comparison**

**Technetium-99**

**UNITS: pCi/L**

**URGA**

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is evidence of an exceedance of the statistically-derived historical background concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

**Statistics-Background Data**      X= 9.354    S= 9.280    CV(1)=0.992    K factor\*\*= 2.523    TL(1)= 3.28E+01    LL(1)=N/A

**Statistics-Transformed Background Data**      X= 2.270    S= 0.849    CV(2)=0.374    K factor\*\*= 2.523    TL(2)= 3.26E+00    LL(2)=N/A

**Historical Background Data from Upgradient Wells with Transformed Result**

**Because CV(1) is less than or equal to 1, assume normal distribution and continue with statistical analysis utilizing TL(1).**

**#Because the natural log was not possible for all background values, the TL was considered equal to the maximum background value.**

Well Number: MW220

Date Collected	Result	LN(Result)
10/14/2002	1.97E+01	2.98E+00
1/15/2003	2.61E+01	3.26E+00
4/10/2003	3.56E+00	1.27E+00
7/14/2003	0.00E+00	#Func!
10/13/2003	2.10E+01	3.04E+00
1/13/2004	6.32E+00	1.84E+00
4/13/2004	3.00E+00	1.10E+00
7/21/2004	1.46E+01	2.68E+00

Well Number: MW394

Date Collected	Result	LN(Result)
8/13/2002	1.40E+01	2.64E+00
9/16/2002	5.45E+00	1.70E+00
10/16/2002	2.49E+00	9.12E-01
1/13/2003	1.83E+01	2.91E+00
4/10/2003	-1.45E+00	#Func!
7/16/2003	-1.71E+00	#Func!
10/14/2003	1.83E+01	2.91E+00
1/13/2004	0.00E+00	#Func!

**Current Quarter Data**

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	No	1.91E+01	N/A	2.95E+00	N/A
MW221	Sidegradient	No	1.95E+01	N/A	2.97E+00	N/A
MW222	Sidegradient	No	1.43E+01	N/A	2.66E+00	N/A
MW223	Sidegradient	No	9.63E+00	N/A	2.26E+00	N/A
MW224	Sidegradient	No	6.75E+00	N/A	1.91E+00	N/A
MW369	Downgradient	Yes	5.61E+01	YES	4.03E+00	N/A
MW372	Downgradient	No	2.00E+01	N/A	3.00E+00	N/A
MW384	Sidegradient	Yes	7.38E+01	YES	4.30E+00	N/A
MW387	Downgradient	Yes	4.58E+01	YES	3.82E+00	N/A
MW391	Downgradient	No	4.13E+00	N/A	1.42E+00	N/A
MW394	Upgradient	No	4.32E+00	N/A	1.46E+00	N/A

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for a well did not exceed the MCL value, that well was not included in the statistical evaluation.

**Conclusion of Statistical Analysis on Historical Data**

**The test well(s) listed exceeded the Upper Tolerance Limit, which is evidence of elevated concentration with respect to historical background data.**

**Wells with Exceedances**

- MW369
- MW384
- MW387

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum ((background result-X)^2)/[count of background results - 1]]^0.5

TL Upper Tolerance Limit, TL = X + (K \* S), LL Lower Tolerance Limit, LL = X - (K \* S)

X Mean, X = (sum of background results)/(count of background results)

\*\* Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009. D1-51



# C-746-S/T Third Quarter 2023 Statistical Analysis      Historical Background Comparison

**Total Organic Carbon (TOC)**

**UNITS: mg/L**

**URGA**

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is evidence of an exceedance of the statistically-derived historical background concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

**Statistics-Background Data**      X= 1.494    S= 0.737    CV(1)=0.493    **K factor\*\*= 2.523**    TL(1)= 3.35E+00    LL(1)=N/A

**Statistics-Transformed Background Data**      X= 0.315    S= 0.402    CV(2)=1.279    **K factor\*\*= 2.523**    TL(2)= 1.33E+00    LL(2)=N/A

**Historical Background Data from Upgradient Wells with Transformed Result**

**Because CV(1) is less than or equal to 1, assume normal distribution and continue with statistical analysis utilizing TL(1).**

Well Number: MW220

Date Collected	Result	LN(Result)
10/14/2002	1.00E+00	0.00E+00
1/15/2003	1.10E+00	9.53E-02
4/10/2003	1.00E+00	0.00E+00
7/14/2003	3.30E+00	1.19E+00
10/13/2003	1.80E+00	5.88E-01
1/13/2004	1.00E+00	0.00E+00
4/13/2004	2.00E+00	6.93E-01
7/21/2004	3.10E+00	1.13E+00

**Current Quarter Data**

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	Yes	9.01E-01	NO	-1.04E-01	N/A
MW221	Sidegradient	Yes	8.91E-01	NO	-1.15E-01	N/A
MW222	Sidegradient	Yes	9.42E-01	NO	-5.98E-02	N/A
MW223	Sidegradient	Yes	7.27E-01	NO	-3.19E-01	N/A
MW224	Sidegradient	Yes	1.16E+00	NO	1.48E-01	N/A
MW369	Downgradient	Yes	8.17E-01	NO	-2.02E-01	N/A
MW372	Downgradient	Yes	8.81E-01	NO	-1.27E-01	N/A
MW384	Sidegradient	Yes	1.19E+00	NO	1.74E-01	N/A
MW387	Downgradient	Yes	1.09E+00	NO	8.62E-02	N/A
MW391	Downgradient	Yes	8.23E-01	NO	-1.95E-01	N/A
MW394	Upgradient	Yes	7.46E-01	NO	-2.93E-01	N/A

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for a well did not exceed the MCL value, that well was not included in the statistical evaluation.

Well Number: MW394

Date Collected	Result	LN(Result)
8/13/2002	1.30E+00	2.62E-01
9/16/2002	1.00E+00	0.00E+00
10/16/2002	1.00E+00	0.00E+00
1/13/2003	1.60E+00	4.70E-01
4/10/2003	1.00E+00	0.00E+00
7/16/2003	1.40E+00	3.36E-01
10/14/2003	1.30E+00	2.62E-01
1/13/2004	1.00E+00	0.00E+00

**Conclusion of Statistical Analysis on Historical Data**

**None of the test wells exceeded the Upper Tolerance Limit, which is evidence that concentrations in these wells are not different from historical background concentrations to a statistically-significant level.**

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum ((background result-X)^2)/[count of background results - 1]]^0.5

TL Upper Tolerance Limit, TL = X + (K \* S), LL Lower Tolerance Limit, LL = X - (K \* S)

X Mean, X = (sum of background results)/(count of background results)

\*\* Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009. D1-52

# C-746-S/T Third Quarter 2023 Statistical Analysis      Historical Background Comparison

**Total Organic Halides (TOX)**

**UNITS: ug/L**

**URGA**

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is evidence of an exceedance of the statistically-derived historical background concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

**Statistics-Background Data**      X= 63.475    S= 163.135    CV(1)=2.570      **K factor\*\*= 2.523**    TL(1)= 4.75E+02    LL(1)=N/A

**Statistics-Transformed Background Data**      X= 3.103    S= 1.145    CV(2)=0.369      **K factor\*\*= 2.523**    TL(2)= 5.99E+00    LL(2)=N/A

**Historical Background Data from Upgradient Wells with Transformed Result**

**Because CV(1) is greater than 1, the natural logarithm of background and test well results were calculated utilizing TL(2) for comparison.**

Well Number: MW220

Date Collected	Result	LN(Result)
10/14/2002	5.00E+01	3.91E+00
1/15/2003	1.00E+01	2.30E+00
4/10/2003	1.00E+01	2.30E+00
7/14/2003	1.00E+01	2.30E+00
10/13/2003	1.00E+01	2.30E+00
1/13/2004	1.00E+01	2.30E+00
4/13/2004	1.00E+01	2.30E+00
7/21/2004	1.00E+01	2.30E+00

Well Number: MW394

Date Collected	Result	LN(Result)
8/13/2002	5.00E+01	3.91E+00
9/16/2002	6.72E+02	6.51E+00
10/16/2002	5.00E+01	3.91E+00
1/13/2003	3.61E+01	3.59E+00
4/10/2003	1.00E+01	2.30E+00
7/16/2003	4.27E+01	3.75E+00
10/14/2003	2.20E+01	3.09E+00
1/13/2004	1.28E+01	2.55E+00

**Current Quarter Data**

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	Yes	1.17E+01	N/A	2.46E+00	NO
MW221	Sidegradient	No	5.48E+00	N/A	1.70E+00	N/A
MW222	Sidegradient	No	5.88E+00	N/A	1.77E+00	N/A
MW223	Sidegradient	Yes	5.22E+00	N/A	1.65E+00	NO
MW224	Sidegradient	No	9.54E+00	N/A	2.26E+00	N/A
MW369	Downgradient	Yes	5.18E+00	N/A	1.64E+00	NO
MW372	Downgradient	Yes	9.56E+00	N/A	2.26E+00	NO
MW384	Sidegradient	Yes	6.54E+00	N/A	1.88E+00	NO
MW387	Downgradient	Yes	6.76E+00	N/A	1.91E+00	NO
MW391	Downgradient	Yes	6.26E+00	N/A	1.83E+00	NO
MW394	Upgradient	Yes	1.24E+01	N/A	2.52E+00	NO

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for a well did not exceed the MCL value, that well was not included in the statistical evaluation.

**Conclusion of Statistical Analysis on Historical Data**

**None of the test wells exceeded the Upper Tolerance Limit, which is evidence that concentrations in these wells are not different from historical background concentrations to a statistically-significant level.**

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum ((background result-X)^2)/[count of background results - 1]]^0.5

TL Upper Tolerance Limit, TL = X + (K \* S), LL Lower Tolerance Limit, LL = X - (K \* S)

X Mean, X = (sum of background results)/(count of background results)

\*\* Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009.      D1-53

**C-746-S/T Third Quarter 2023 Statistical Analysis      Historical Background Comparison**

**Trichloroethene**

**UNITS: ug/L**

**URGA**

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is evidence of an exceedance of the statistically-derived historical background concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

**Statistics-Background Data**      X= 8.813    S= 8.376    CV(1)=0.951    K factor\*\*= 2.523    TL(1)= 2.99E+01    LL(1)=N/A

**Statistics-Transformed Background Data**      X= 1.395    S= 1.449    CV(2)=1.039    K factor\*\*= 2.523    TL(2)= 5.05E+00    LL(2)=N/A

**Historical Background Data from Upgradient Wells with Transformed Result**

**Because CV(1) is less than or equal to 1, assume normal distribution and continue with statistical analysis utilizing TL(1).**

Well Number: MW220

Date Collected	Result	LN(Result)
10/14/2002	1.00E+00	0.00E+00
1/15/2003	1.00E+00	0.00E+00
4/10/2003	1.00E+00	0.00E+00
7/14/2003	1.00E+00	0.00E+00
10/13/2003	1.00E+00	0.00E+00
1/13/2004	1.00E+00	0.00E+00
4/13/2004	1.00E+00	0.00E+00
7/21/2004	1.00E+00	0.00E+00

**Current Quarter Data**

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	No	1.00E+00	N/A	0.00E+00	N/A
MW221	Sidegradient	No	1.00E+00	N/A	0.00E+00	N/A
MW222	Sidegradient	No	1.00E+00	N/A	0.00E+00	N/A
MW223	Sidegradient	No	1.00E+00	N/A	0.00E+00	N/A
MW224	Sidegradient	No	1.00E+00	N/A	0.00E+00	N/A
MW369	Downgradient	Yes	2.27E+00	N/A	8.20E-01	N/A
MW372	Downgradient	Yes	5.09E+00	NO	1.63E+00	N/A
MW384	Sidegradient	Yes	5.10E-01	N/A	-6.73E-01	N/A
MW387	Downgradient	Yes	3.80E-01	N/A	-9.68E-01	N/A
MW391	Downgradient	Yes	2.69E+00	N/A	9.90E-01	N/A
MW394	Upgradient	Yes	6.47E+00	NO	1.87E+00	N/A

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for a well did not exceed the MCL value, that well was not included in the statistical evaluation.

Well Number: MW394

Date Collected	Result	LN(Result)
8/13/2002	1.60E+01	2.77E+00
9/30/2002	2.00E+01	3.00E+00
10/16/2002	1.70E+01	2.83E+00
1/13/2003	1.50E+01	2.71E+00
4/10/2003	1.00E+01	2.30E+00
7/16/2003	1.90E+01	2.94E+00
10/14/2003	2.00E+01	3.00E+00
1/13/2004	1.60E+01	2.77E+00

**Conclusion of Statistical Analysis on Historical Data**

**None of the test wells exceeded the Upper Tolerance Limit, which is evidence that concentrations in these wells are not different from historical background concentrations to a statistically-significant level.**

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum ((background result-X)^2)/[count of background results - 1]]^0.5

TL Upper Tolerance Limit, TL = X + (K \* S), LL Lower Tolerance Limit, LL = X - (K \* S)

X Mean, X = (sum of background results)/(count of background results)

\*\* Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009. D1-54



# C-746-S/T Third Quarter 2023 Statistical Analysis      Historical Background Comparison

**Zinc**

**UNITS: mg/L**

**URGA**

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is evidence of an exceedance of the statistically-derived historical background concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

**Statistics-Background Data**      X= 0.036    S= 0.026    CV(1)=0.722      K factor\*\*= 2.523    TL(1)= 1.01E-01    LL(1)=N/A

**Statistics-Transformed Background Data**      X= -3.485    S= 0.525    CV(2)=-0.151      K factor\*\*= 2.523    TL(2)= -2.16E+00    LL(2)=N/A

**Historical Background Data from Upgradient Wells with Transformed Result**

**Because CV(1) is less than or equal to 1, assume normal distribution and continue with statistical analysis utilizing TL(1).**

Well Number: MW220

Date Collected	Result	LN(Result)
10/14/2002	2.50E-02	-3.69E+00
1/15/2003	3.50E-02	-3.35E+00
4/10/2003	3.50E-02	-3.35E+00
7/14/2003	3.89E-02	-3.25E+00
10/13/2003	2.60E-02	-3.65E+00
1/13/2004	2.00E-02	-3.91E+00
4/13/2004	2.00E-02	-3.91E+00
7/21/2004	2.00E-02	-3.91E+00

**Current Quarter Data**

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	No	2.00E-02	N/A	-3.91E+00	N/A
MW221	Sidegradient	Yes	5.82E-03	NO	-5.15E+00	N/A
MW222	Sidegradient	Yes	3.83E-03	NO	-5.56E+00	N/A
MW223	Sidegradient	Yes	3.47E-03	NO	-5.66E+00	N/A
MW224	Sidegradient	No	2.00E-02	N/A	-3.91E+00	N/A
MW369	Downgradient	Yes	1.23E-02	NO	-4.40E+00	N/A
MW372	Downgradient	Yes	4.31E-03	NO	-5.45E+00	N/A
MW384	Sidegradient	Yes	3.39E-03	NO	-5.69E+00	N/A
MW387	Downgradient	Yes	7.05E-03	NO	-4.95E+00	N/A
MW391	Downgradient	No	2.00E-02	N/A	-3.91E+00	N/A
MW394	Upgradient	Yes	9.91E-03	NO	-4.61E+00	N/A

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for a well did not exceed the MCL value, that well was not included in the statistical evaluation.

Well Number: MW394

Date Collected	Result	LN(Result)
8/13/2002	1.00E-01	-2.30E+00
9/16/2002	1.00E-01	-2.30E+00
10/16/2002	2.50E-02	-3.69E+00
1/13/2003	3.50E-02	-3.35E+00
4/10/2003	3.50E-02	-3.35E+00
7/16/2003	2.00E-02	-3.91E+00
10/14/2003	2.00E-02	-3.91E+00
1/13/2004	2.00E-02	-3.91E+00

**Conclusion of Statistical Analysis on Historical Data**

**None of the test wells exceeded the Upper Tolerance Limit, which is evidence that concentrations in these wells are not different from historical background concentrations to a statistically-significant level.**

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum ((background result-X)^2)/[count of background results - 1]]^0.5

TL Upper Tolerance Limit, TL = X + (K \* S), LL Lower Tolerance Limit, LL = X - (K \* S)

X Mean, X = (sum of background results)/(count of background results)

\*\* Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009. D1-55

# C-746-S/T Third Quarter 2023 Statistical Analysis      Historical Background Comparison

**Aluminum**

**UNITS: mg/L**

**LRGA**

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is evidence of an exceedance of the statistically-derived historical background concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

**Statistics-Background Data**      X= 0.258    S= 0.221    CV(1)=0.856      K factor\*\*= 2.523    TL(1)= 8.15E-01    LL(1)=N/A

**Statistics-Transformed Background Data**      X= -2.266    S= 2.485    CV(2)=-1.097      K factor\*\*= 2.523    TL(2)= 4.00E+00    LL(2)=N/A

**Historical Background Data from Upgradient Wells with Transformed Result**

**Because CV(1) is less than or equal to 1, assume normal distribution and continue with statistical analysis utilizing TL(1).**

Well Number: MW395

Date Collected	Result	LN(Result)
8/13/2002	2.00E-01	-1.61E+00
9/16/2002	2.00E-01	-1.61E+00
10/16/2002	2.00E-04	-8.52E+00
1/13/2003	7.37E-01	-3.05E-01
4/10/2003	2.00E-01	-1.61E+00
7/16/2003	2.00E-01	-1.61E+00
10/14/2003	2.00E-01	-1.61E+00
1/13/2004	2.00E-01	-1.61E+00

**Current Quarter Data**

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW370	Downgradient	No	5.00E-02	N/A	-3.00E+00	N/A
MW373	Downgradient	No	5.00E-02	N/A	-3.00E+00	N/A
MW385	Sidegradient	No	5.00E-02	N/A	-3.00E+00	N/A
MW388	Downgradient	No	5.00E-02	N/A	-3.00E+00	N/A
MW392	Downgradient	Yes	6.03E-02	NO	-2.81E+00	N/A
MW395	Upgradient	No	5.00E-02	N/A	-3.00E+00	N/A
MW397	Upgradient	No	5.00E-02	N/A	-3.00E+00	N/A

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for a well did not exceed the MCL value, that well was not included in the statistical evaluation.

Well Number: MW397

Date Collected	Result	LN(Result)
8/13/2002	8.24E-01	-1.94E-01
9/16/2002	2.00E-01	-1.61E+00
10/17/2002	2.00E-04	-8.52E+00
1/13/2003	3.63E-01	-1.01E+00
4/8/2003	2.00E-01	-1.61E+00
7/16/2003	2.00E-01	-1.61E+00
10/14/2003	2.00E-01	-1.61E+00
1/13/2004	2.00E-01	-1.61E+00

**Conclusion of Statistical Analysis on Historical Data**

**None of the test wells exceeded the Upper Tolerance Limit, which is evidence that concentrations in these wells are not different from historical background concentrations to a statistically-significant level.**

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum ((background result-X)^2)/[count of background results - 1]]^0.5

TL Upper Tolerance Limit, TL = X + (K \* S), LL Lower Tolerance Limit, LL = X - (K \* S)

X Mean, X = (sum of background results)/(count of background results)

\*\* Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009. D1-56

# C-746-S/T Third Quarter 2023 Statistical Analysis      Historical Background Comparison

**Boron**

**UNITS: mg/L**

**LRGA**

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is evidence of an exceedance of the statistically-derived historical background concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

**Statistics-Background Data**      X= 0.650    S= 0.805    CV(1)=1.238    K factor\*\*= 2.523    TL(1)= 2.68E+00    LL(1)=N/A

**Statistics-Transformed Background Data**      X= -1.034    S= 1.030    CV(2)=-0.996    K factor\*\*= 2.523    TL(2)= 1.56E+00    LL(2)=N/A

**Historical Background Data from Upgradient Wells with Transformed Result**

**Because CV(1) is greater than 1, the natural logarithm of background and test well results were calculated utilizing TL(2) for comparison.**

Well Number: MW395

Date Collected	Result	LN(Result)
8/13/2002	2.00E+00	6.93E-01
9/16/2002	2.00E+00	6.93E-01
10/16/2002	2.00E-01	-1.61E+00
1/13/2003	2.00E-01	-1.61E+00
4/10/2003	2.00E-01	-1.61E+00
7/16/2003	2.00E-01	-1.61E+00
10/14/2003	2.00E-01	-1.61E+00
1/13/2004	2.00E-01	-1.61E+00

Well Number: MW397

Date Collected	Result	LN(Result)
8/13/2002	2.00E+00	6.93E-01
9/16/2002	2.00E+00	6.93E-01
10/17/2002	2.00E-01	-1.61E+00
1/13/2003	2.00E-01	-1.61E+00
4/8/2003	2.00E-01	-1.61E+00
7/16/2003	2.00E-01	-1.61E+00
10/14/2003	2.00E-01	-1.61E+00
1/13/2004	2.00E-01	-1.61E+00

**Current Quarter Data**

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW370	Downgradient	Yes	1.24E-01	N/A	-2.09E+00	NO
MW373	Downgradient	Yes	2.01E+00	N/A	6.98E-01	NO
MW385	Sidegradient	Yes	5.25E-02	N/A	-2.95E+00	NO
MW388	Downgradient	Yes	2.69E-02	N/A	-3.62E+00	NO
MW392	Downgradient	Yes	2.32E-02	N/A	-3.76E+00	NO
MW395	Upgradient	Yes	1.93E-02	N/A	-3.95E+00	NO
MW397	Upgradient	Yes	7.73E-03	N/A	-4.86E+00	NO

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for a well did not exceed the MCL value, that well was not included in the statistical evaluation.

**Conclusion of Statistical Analysis on Historical Data**

**None of the test wells exceeded the Upper Tolerance Limit, which is evidence that concentrations in these wells are not different from historical background concentrations to a statistically-significant level.**

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum ((background result-X)^2)/[count of background results - 1]]^0.5

TL Upper Tolerance Limit, TL = X + (K \* S), LL Lower Tolerance Limit, LL = X - (K \* S)

X Mean, X = (sum of background results)/(count of background results)

\*\* Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009. D1-57

# C-746-S/T Third Quarter 2023 Statistical Analysis      Historical Background Comparison

**Bromide**

**UNITS: mg/L**

**LRGA**

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is evidence of an exceedance of the statistically-derived historical background concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

**Statistics-Background Data**      X= 1.000    S= 0.000    CV(1)=0.000    K factor\*\*= 2.523    TL(1)= 1.00E+00    LL(1)=N/A

**Statistics-Transformed Background Data**      X= 0.000    S= 0.000    CV(2)=#Num!    K factor\*\*= 2.523    TL(2)= 0.00E+00    LL(2)=N/A

**Historical Background Data from Upgradient Wells with Transformed Result**

**Because CV(1) is less than or equal to 1, assume normal distribution and continue with statistical analysis utilizing TL(1).**

Well Number: MW395

Date Collected	Result	LN(Result)
8/13/2002	1.00E+00	0.00E+00
9/16/2002	1.00E+00	0.00E+00
10/16/2002	1.00E+00	0.00E+00
1/13/2003	1.00E+00	0.00E+00
4/10/2003	1.00E+00	0.00E+00
7/16/2003	1.00E+00	0.00E+00
10/14/2003	1.00E+00	0.00E+00
1/13/2004	1.00E+00	0.00E+00

**Current Quarter Data**

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW370	Downgradient	Yes	6.75E-01	NO	-3.93E-01	N/A
MW373	Downgradient	Yes	4.63E-01	NO	-7.70E-01	N/A
MW385	Sidegradient	Yes	2.36E-01	NO	-1.44E+00	N/A
MW388	Downgradient	Yes	5.03E-01	NO	-6.87E-01	N/A
MW392	Downgradient	Yes	7.00E-01	NO	-3.57E-01	N/A
MW395	Upgradient	Yes	6.14E-01	NO	-4.88E-01	N/A
MW397	Upgradient	Yes	3.92E-01	NO	-9.36E-01	N/A

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for a well did not exceed the MCL value, that well was not included in the statistical evaluation.

Well Number: MW397

Date Collected	Result	LN(Result)
8/13/2002	1.00E+00	0.00E+00
9/16/2002	1.00E+00	0.00E+00
10/17/2002	1.00E+00	0.00E+00
1/13/2003	1.00E+00	0.00E+00
4/8/2003	1.00E+00	0.00E+00
7/16/2003	1.00E+00	0.00E+00
10/14/2003	1.00E+00	0.00E+00
1/13/2004	1.00E+00	0.00E+00

**Conclusion of Statistical Analysis on Historical Data**

**None of the test wells exceeded the Upper Tolerance Limit, which is evidence that concentrations in these wells are not different from historical background concentrations to a statistically-significant level.**

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum ((background result-X)^2)/[count of background results - 1]]^0.5

TL Upper Tolerance Limit, TL = X + (K \* S), LL Lower Tolerance Limit, LL = X - (K \* S)

X Mean, X = (sum of background results)/(count of background results)

\*\* Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009.      D1-58

# C-746-S/T Third Quarter 2023 Statistical Analysis      Historical Background Comparison

**Calcium**

**UNITS: mg/L**

**LRGA**

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is evidence of an exceedance of the statistically-derived historical background concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

**Statistics-Background Data**      X= 23.103    S= 11.538    CV(1)=0.499      **K factor\*\*= 2.523**    TL(1)= 5.22E+01    LL(1)=N/A

**Statistics-Transformed Background Data**      X= 2.357    S= 2.411    CV(2)=1.023      **K factor\*\*= 2.523**    TL(2)= 8.44E+00    LL(2)=N/A

**Historical Background Data from Upgradient Wells with Transformed Result**

**Because CV(1) is less than or equal to 1, assume normal distribution and continue with statistical analysis utilizing TL(1).**

Well Number: MW395

Date Collected	Result	LN(Result)
8/13/2002	3.22E+01	3.47E+00
9/16/2002	3.30E+01	3.50E+00
10/16/2002	2.95E-02	-3.52E+00
1/13/2003	3.21E+01	3.47E+00
4/10/2003	4.02E+01	3.69E+00
7/16/2003	3.24E+01	3.48E+00
10/14/2003	3.39E+01	3.52E+00
1/13/2004	3.12E+01	3.44E+00

**Current Quarter Data**

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW370	Downgradient	Yes	2.93E+01	NO	3.38E+00	N/A
MW373	Downgradient	Yes	7.87E+01	YES	4.37E+00	N/A
MW385	Sidegradient	Yes	2.75E+01	NO	3.31E+00	N/A
MW388	Downgradient	Yes	2.55E+01	NO	3.24E+00	N/A
MW392	Downgradient	Yes	2.38E+01	NO	3.17E+00	N/A
MW395	Upgradient	Yes	2.62E+01	NO	3.27E+00	N/A
MW397	Upgradient	Yes	1.76E+01	NO	2.87E+00	N/A

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for a well did not exceed the MCL value, that well was not included in the statistical evaluation.

Well Number: MW397

Date Collected	Result	LN(Result)
8/13/2002	1.94E+01	2.97E+00
9/16/2002	1.90E+01	2.94E+00
10/17/2002	1.79E-02	-4.02E+00
1/13/2003	1.78E+01	2.88E+00
4/8/2003	2.03E+01	3.01E+00
7/16/2003	1.94E+01	2.97E+00
10/14/2003	1.99E+01	2.99E+00
1/13/2004	1.88E+01	2.93E+00

**Conclusion of Statistical Analysis on Historical Data**

**The test well(s) listed exceeded the Upper Tolerance Limit, which is evidence of elevated concentration with respect to historical background data.**

**Wells with Exceedances**

MW373

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum ((background result-X)^2)/[count of background results - 1]]^0.5

TL Upper Tolerance Limit, TL = X + (K \* S), LL Lower Tolerance Limit, LL = X - (K \* S)

X Mean, X = (sum of background results)/(count of background results)

\*\* Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009.      D1-59



# C-746-S/T Third Quarter 2023 Statistical Analysis      Historical Background Comparison

**Chloride**

**UNITS: mg/L**

**LRGA**

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is evidence of an exceedance of the statistically-derived historical background concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

**Statistics-Background Data**      X= 51.844    S= 11.652    CV(1)=0.225      **K factor\*\*= 2.523**    TL(1)= 8.12E+01    LL(1)=N/A

**Statistics-Transformed Background Data**      X= 3.924    S= 0.229    CV(2)=0.058      **K factor\*\*= 2.523**    TL(2)= 4.50E+00    LL(2)=N/A

**Historical Background Data from Upgradient Wells with Transformed Result**

**Because CV(1) is less than or equal to 1, assume normal distribution and continue with statistical analysis utilizing TL(1).**

Well Number: MW395

Date Collected	Result	LN(Result)
8/13/2002	6.22E+01	4.13E+00
9/16/2002	6.47E+01	4.17E+00
10/16/2002	6.22E+01	4.13E+00
1/13/2003	6.35E+01	4.15E+00
4/10/2003	6.41E+01	4.16E+00
7/16/2003	6.40E+01	4.16E+00
10/14/2003	6.32E+01	4.15E+00
1/13/2004	6.06E+01	4.10E+00

**Current Quarter Data**

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW370	Downgradient	Yes	4.40E+01	NO	3.78E+00	N/A
MW373	Downgradient	Yes	3.21E+01	NO	3.47E+00	N/A
MW385	Sidegradient	Yes	2.29E+01	NO	3.13E+00	N/A
MW388	Downgradient	Yes	3.68E+01	NO	3.61E+00	N/A
MW392	Downgradient	Yes	4.50E+01	NO	3.81E+00	N/A
MW395	Upgradient	Yes	4.43E+01	NO	3.79E+00	N/A
MW397	Upgradient	Yes	3.46E+01	NO	3.54E+00	N/A

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for a well did not exceed the MCL value, that well was not included in the statistical evaluation.

Well Number: MW397

Date Collected	Result	LN(Result)
8/13/2002	3.89E+01	3.66E+00
9/16/2002	3.98E+01	3.68E+00
10/17/2002	3.93E+01	3.67E+00
1/13/2003	4.05E+01	3.70E+00
4/8/2003	4.21E+01	3.74E+00
7/16/2003	4.20E+01	3.74E+00
10/14/2003	4.08E+01	3.71E+00
1/13/2004	4.16E+01	3.73E+00

**Conclusion of Statistical Analysis on Historical Data**

**None of the test wells exceeded the Upper Tolerance Limit, which is evidence that concentrations in these wells are not different from historical background concentrations to a statistically-significant level.**

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum ((background result-X)^2)/[count of background results - 1]]^0.5

TL Upper Tolerance Limit, TL = X + (K \* S), LL Lower Tolerance Limit, LL = X - (K \* S)

X Mean, X = (sum of background results)/(count of background results)

\*\* Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009.      D1-60







# C-746-S/T Third Quarter 2023 Statistical Analysis Historical Background Comparison

## Copper UNITS: mg/L LRG

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is evidence of an exceedance of the statistically-derived historical background concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

**Statistics-Background Data** X= 0.028 S= 0.013 CV(1)=0.474 K factor\*\*= 2.523 TL(1)= 6.15E-02 LL(1)=N/A

**Statistics-Transformed Background Data** X= -3.662 S= 0.406 CV(2)=-0.111 K factor\*\*= 2.523 TL(2)= -2.64E+00 LL(2)=N/A

### Historical Background Data from Upgradient Wells with Transformed Result

Because CV(1) is less than or equal to 1, assume normal distribution and continue with statistical analysis utilizing TL(1).

Well Number: MW395

Date Collected	Result	LN(Result)
8/13/2002	5.00E-02	-3.00E+00
9/16/2002	5.00E-02	-3.00E+00
10/16/2002	2.81E-02	-3.57E+00
1/13/2003	2.00E-02	-3.91E+00
4/10/2003	2.00E-02	-3.91E+00
7/16/2003	2.00E-02	-3.91E+00
10/14/2003	2.00E-02	-3.91E+00
1/13/2004	2.00E-02	-3.91E+00

Well Number: MW397

Date Collected	Result	LN(Result)
8/13/2002	5.00E-02	-3.00E+00
9/16/2002	5.00E-02	-3.00E+00
10/17/2002	2.00E-02	-3.91E+00
1/13/2003	2.00E-02	-3.91E+00
4/8/2003	2.00E-02	-3.91E+00
7/16/2003	2.00E-02	-3.91E+00
10/14/2003	2.00E-02	-3.91E+00
1/13/2004	2.00E-02	-3.91E+00

### Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW370	Downgradient	Yes	1.96E-03	NO	-6.23E+00	N/A
MW373	Downgradient	Yes	1.12E-03	NO	-6.79E+00	N/A
MW385	Sidegradient	Yes	1.08E-03	NO	-6.83E+00	N/A
MW388	Downgradient	Yes	1.16E-03	NO	-6.76E+00	N/A
MW392	Downgradient	Yes	1.31E-03	NO	-6.64E+00	N/A
MW395	Upgradient	Yes	1.85E-03	NO	-6.29E+00	N/A
MW397	Upgradient	Yes	8.18E-04	NO	-7.11E+00	N/A

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for a well did not exceed the MCL value, that well was not included in the statistical evaluation.

### Conclusion of Statistical Analysis on Historical Data

None of the test wells exceeded the Upper Tolerance Limit, which is evidence that concentrations in these wells are not different from historical background concentrations to a statistically-significant level.

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation,  $CV = S/X$  If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation,  $S = \sqrt{\frac{\sum [(background\ result - X)^2]}{[count\ of\ background\ results - 1]}}$

TL Upper Tolerance Limit,  $TL = X + (K * S)$ , LL Lower Tolerance Limit,  $LL = X - (K * S)$

X Mean,  $X = (\sum\ of\ background\ results) / (count\ of\ background\ results)$

\*\* Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009. D1-63

<b>C-746-S/T Third Quarter 2023 Statistical Analysis</b>	<b>Historical Background Comparison</b>
<b>Cyanide</b>	<b>UNITS: mg/L</b>
	<b>LRGA</b>

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is evidence of an exceedance of the statistically-derived historical background concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

<b>Statistics-Background Data</b>	X= 0.020	S= 0.000	CV(1)=0.000	K factor**= 2.523	TL(1)= 2.00E-02	LL(1)=N/A
<b>Statistics-Transformed Background Data</b>	X= -3.912	S= 0.000	CV(2)=0.000	K factor**= 2.523	TL(2)= -3.91E+00	LL(2)=N/A

<b>Historical Background Data from Upgradient Wells with Transformed Result</b>
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**Because CV(1) is less than or equal to 1, assume normal distribution and continue with statistical analysis utilizing TL(1).**

Well Number: MW395

Date Collected	Result	LN(Result)
8/13/2002	2.00E-02	-3.91E+00
9/16/2002	2.00E-02	-3.91E+00
10/16/2002	2.00E-02	-3.91E+00
1/13/2003	2.00E-02	-3.91E+00
4/10/2003	2.00E-02	-3.91E+00
7/16/2003	2.00E-02	-3.91E+00
10/14/2003	2.00E-02	-3.91E+00
1/13/2004	2.00E-02	-3.91E+00

Well Number: MW397

Date Collected	Result	LN(Result)
8/13/2002	2.00E-02	-3.91E+00
9/16/2002	2.00E-02	-3.91E+00
10/17/2002	2.00E-02	-3.91E+00
1/13/2003	2.00E-02	-3.91E+00
4/8/2003	2.00E-02	-3.91E+00
7/16/2003	2.00E-02	-3.91E+00
10/14/2003	2.00E-02	-3.91E+00
1/13/2004	2.00E-02	-3.91E+00

<b>Current Quarter Data</b>
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Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW370	Downgradient	No	2.00E-01	N/A	-1.61E+00	N/A
MW373	Downgradient	Yes	3.61E-03	NO	-5.62E+00	N/A
MW385	Sidegradient	No	2.00E-01	N/A	-1.61E+00	N/A
MW388	Downgradient	No	2.00E-01	N/A	-1.61E+00	N/A
MW392	Downgradient	No	2.00E-01	N/A	-1.61E+00	N/A
MW395	Upgradient	No	2.00E-01	N/A	-1.61E+00	N/A
MW397	Upgradient	No	2.00E-01	N/A	-1.61E+00	N/A

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for a well did not exceed the MCL value, that well was not included in the statistical evaluation.

<b>Conclusion of Statistical Analysis on Historical Data</b>
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**None of the test wells exceeded the Upper Tolerance Limit, which is evidence that concentrations in these wells are not different from historical background concentrations to a statistically-significant level.**

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation,  $CV = S/X$  If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation,  $S = [\text{Sum}([(background\ result-X)^2]/[\text{count of background results} - 1])]^{0.5}$

TL Upper Tolerance Limit,  $TL = X + (K * S)$ , LL Lower Tolerance Limit,  $LL = X - (K * S)$

X Mean,  $X = (\text{sum of background results})/(\text{count of background results})$

\*\* Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009. D1-64

# C-746-S/T Third Quarter 2023 Statistical Analysis      Historical Background Comparison

**Dissolved Oxygen**

**UNITS: mg/L**

**LRGA**

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is evidence of an exceedance of the statistically-derived historical background concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

**Statistics-Background Data**      X= 4.678    S= 2.431    CV(1)=0.520    K factor\*\*= 2.523    TL(1)= 1.08E+01    LL(1)=N/A

**Statistics-Transformed Background Data**      X= 1.414    S= 0.550    CV(2)=0.389    K factor\*\*= 2.523    TL(2)= 2.80E+00    LL(2)=N/A

**Historical Background Data from Upgradient Wells with Transformed Result**

**Because CV(1) is less than or equal to 1, assume normal distribution and continue with statistical analysis utilizing TL(1).**

Well Number: MW395

Date Collected	Result	LN(Result)
8/13/2002	7.29E+00	1.99E+00
9/30/2002	4.03E+00	1.39E+00
10/16/2002	3.85E+00	1.35E+00
1/13/2003	2.36E+00	8.59E-01
4/10/2003	1.14E+00	1.31E-01
7/16/2003	1.76E+00	5.65E-01
10/14/2003	4.05E+00	1.40E+00
1/13/2004	4.26E+00	1.45E+00

**Current Quarter Data**

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW370	Downgradient	Yes	4.01E+00	NO	1.39E+00	N/A
MW373	Downgradient	Yes	1.69E+00	NO	5.25E-01	N/A
MW385	Sidegradient	Yes	9.20E-01	NO	-8.34E-02	N/A
MW388	Downgradient	Yes	4.39E+00	NO	1.48E+00	N/A
MW392	Downgradient	Yes	1.08E+00	NO	7.70E-02	N/A
MW395	Upgradient	Yes	1.90E+00	NO	6.42E-01	N/A
MW397	Upgradient	Yes	5.99E+00	NO	1.79E+00	N/A

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for a well did not exceed the MCL value, that well was not included in the statistical evaluation.

Well Number: MW397

Date Collected	Result	LN(Result)
8/13/2002	1.16E+01	2.45E+00
9/16/2002	5.86E+00	1.77E+00
10/17/2002	5.94E+00	1.78E+00
1/13/2003	4.66E+00	1.54E+00
4/8/2003	3.77E+00	1.33E+00
7/16/2003	3.47E+00	1.24E+00
10/14/2003	5.34E+00	1.68E+00
1/13/2004	5.51E+00	1.71E+00

**Conclusion of Statistical Analysis on Historical Data**

**None of the test wells exceeded the Upper Tolerance Limit, which is evidence that concentrations in these wells are not different from historical background concentrations to a statistically-significant level.**

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum ((background result-X)^2)/[count of background results - 1]]^0.5

TL Upper Tolerance Limit, TL = X + (K \* S), LL Lower Tolerance Limit, LL = X - (K \* S)

X Mean, X = (sum of background results)/(count of background results)

\*\* Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009. D1-65

# C-746-S/T Third Quarter 2023 Statistical Analysis      Historical Background Comparison

**Dissolved Solids**

**UNITS: mg/L**

**LRGA**

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is evidence of an exceedance of the statistically-derived historical background concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

**Statistics-Background Data**      X= 219.250   S= 34.107   CV(1)=0.156      **K factor\*\*= 2.523**      TL(1)= 3.05E+02   LL(1)=N/A

**Statistics-Transformed Background Data**      X= 5.379   S= 0.152   CV(2)=0.028      **K factor\*\*= 2.523**      TL(2)= 5.76E+00   LL(2)=N/A

**Historical Background Data from Upgradient Wells with Transformed Result**

**Because CV(1) is less than or equal to 1, assume normal distribution and continue with statistical analysis utilizing TL(1).**

Well Number: MW395

Date Collected	Result	LN(Result)
8/13/2002	2.49E+02	5.52E+00
9/16/2002	2.72E+02	5.61E+00
10/16/2002	2.55E+02	5.54E+00
1/13/2003	2.11E+02	5.35E+00
4/10/2003	2.89E+02	5.67E+00
7/16/2003	2.36E+02	5.46E+00
10/14/2003	2.24E+02	5.41E+00
1/13/2004	2.35E+02	5.46E+00

**Current Quarter Data**

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW370	Downgradient	Yes	2.11E+02	NO	5.35E+00	N/A
MW373	Downgradient	Yes	5.14E+02	YES	6.24E+00	N/A
MW385	Sidegradient	Yes	1.91E+02	NO	5.25E+00	N/A
MW388	Downgradient	Yes	1.98E+02	NO	5.29E+00	N/A
MW392	Downgradient	Yes	1.78E+02	NO	5.18E+00	N/A
MW395	Upgradient	Yes	1.88E+02	NO	5.24E+00	N/A
MW397	Upgradient	Yes	1.52E+02	NO	5.02E+00	N/A

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for a well did not exceed the MCL value, that well was not included in the statistical evaluation.

Well Number: MW397

Date Collected	Result	LN(Result)
8/13/2002	1.87E+02	5.23E+00
9/16/2002	1.97E+02	5.28E+00
10/17/2002	1.83E+02	5.21E+00
1/13/2003	1.82E+02	5.20E+00
4/8/2003	2.17E+02	5.38E+00
7/16/2003	1.96E+02	5.28E+00
10/14/2003	1.98E+02	5.29E+00
1/13/2004	1.77E+02	5.18E+00

**Conclusion of Statistical Analysis on Historical Data**

**The test well(s) listed exceeded the Upper Tolerance Limit, which is evidence of elevated concentration with respect to historical background data.**

**Wells with Exceedances**

MW373

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum ((background result-X)^2)/[count of background results - 1]]^0.5

TL Upper Tolerance Limit, TL = X + (K \* S), LL Lower Tolerance Limit, LL = X - (K \* S)

X Mean, X = (sum of background results)/(count of background results)

\*\* Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009.      D1-66

# C-746-S/T Third Quarter 2023 Statistical Analysis      Historical Background Comparison

**Iron**

**UNITS: mg/L**

**LRGA**

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is evidence of an exceedance of the statistically-derived historical background concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

**Statistics-Background Data**      X= 0.400    S= 0.514    CV(1)=1.286    K factor\*\*= 2.523    TL(1)= 1.70E+00    LL(1)=N/A

**Statistics-Transformed Background Data**      X= -2.197    S= 2.634    CV(2)=-1.199    K factor\*\*= 2.523    TL(2)= 4.45E+00    LL(2)=N/A

**Historical Background Data from Upgradient Wells with Transformed Result**

**Because CV(1) is greater than 1, the natural logarithm of background and test well results were calculated utilizing TL(2) for comparison.**

Well Number: MW395

Date Collected	Result	LN(Result)
8/13/2002	2.94E-01	-1.22E+00
9/16/2002	2.00E-01	-1.61E+00
10/16/2002	2.00E-04	-8.52E+00
1/13/2003	1.33E+00	2.85E-01
4/10/2003	1.31E+00	2.70E-01
7/16/2003	2.00E-01	-1.61E+00
10/14/2003	1.00E-01	-2.30E+00
1/13/2004	1.00E-01	-2.30E+00

**Current Quarter Data**

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW370	Downgradient	No	1.00E-01	N/A	-2.30E+00	N/A
MW373	Downgradient	Yes	4.29E-02	N/A	-3.15E+00	NO
MW385	Sidegradient	No	1.00E-01	N/A	-2.30E+00	N/A
MW388	Downgradient	No	1.00E-01	N/A	-2.30E+00	N/A
MW392	Downgradient	Yes	9.21E-02	N/A	-2.38E+00	NO
MW395	Upgradient	Yes	1.03E-01	N/A	-2.27E+00	NO
MW397	Upgradient	No	1.00E-01	N/A	-2.30E+00	N/A

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for a well did not exceed the MCL value, that well was not included in the statistical evaluation.

Well Number: MW397

Date Collected	Result	LN(Result)
8/13/2002	1.58E+00	4.57E-01
9/16/2002	2.32E-01	-1.46E+00
10/17/2002	2.00E-04	-8.52E+00
1/13/2003	4.53E-01	-7.92E-01
4/8/2003	2.00E-01	-1.61E+00
7/16/2003	2.00E-01	-1.61E+00
10/14/2003	1.00E-01	-2.30E+00
1/13/2004	1.00E-01	-2.30E+00

**Conclusion of Statistical Analysis on Historical Data**

**None of the test wells exceeded the Upper Tolerance Limit, which is evidence that concentrations in these wells are not different from historical background concentrations to a statistically-significant level.**

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum ((background result-X)^2)/[count of background results - 1]]^0.5

TL Upper Tolerance Limit, TL = X + (K \* S), LL Lower Tolerance Limit, LL = X - (K \* S)

X Mean, X = (sum of background results)/(count of background results)

\*\* Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009. D1-67



# C-746-S/T Third Quarter 2023 Statistical Analysis      Historical Background Comparison

**Magnesium**

**UNITS: mg/L**

**LRGA**

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is evidence of an exceedance of the statistically-derived historical background concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

**Statistics-Background Data**      X= 9.102    S= 4.685    CV(1)=0.515    K factor\*\*= 2.523    TL(1)= 2.09E+01    LL(1)=N/A

**Statistics-Transformed Background Data**      X= 1.423    S= 2.408    CV(2)=1.692    K factor\*\*= 2.523    TL(2)= 7.50E+00    LL(2)=N/A

**Historical Background Data from Upgradient Wells with Transformed Result**

**Because CV(1) is less than or equal to 1, assume normal distribution and continue with statistical analysis utilizing TL(1).**

Well Number: MW395

Date Collected	Result	LN(Result)
8/13/2002	1.25E+01	2.53E+00
9/16/2002	1.30E+01	2.56E+00
10/16/2002	1.27E-02	-4.37E+00
1/13/2003	1.12E+01	2.42E+00
4/10/2003	1.75E+01	2.86E+00
7/16/2003	1.29E+01	2.56E+00
10/14/2003	1.34E+01	2.60E+00
1/13/2004	1.24E+01	2.52E+00

**Current Quarter Data**

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW370	Downgradient	Yes	1.21E+01	NO	2.49E+00	N/A
MW373	Downgradient	Yes	2.66E+01	YES	3.28E+00	N/A
MW385	Sidegradient	Yes	1.06E+01	NO	2.36E+00	N/A
MW388	Downgradient	Yes	1.09E+01	NO	2.39E+00	N/A
MW392	Downgradient	Yes	9.47E+00	NO	2.25E+00	N/A
MW395	Upgradient	Yes	1.05E+01	NO	2.35E+00	N/A
MW397	Upgradient	Yes	7.07E+00	NO	1.96E+00	N/A

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for a well did not exceed the MCL value, that well was not included in the statistical evaluation.

Well Number: MW397

Date Collected	Result	LN(Result)
8/13/2002	7.83E+00	2.06E+00
9/16/2002	7.64E+00	2.03E+00
10/17/2002	6.58E-03	-5.02E+00
1/13/2003	6.69E+00	1.90E+00
4/8/2003	7.28E+00	1.99E+00
7/16/2003	7.82E+00	2.06E+00
10/14/2003	7.94E+00	2.07E+00
1/13/2004	7.51E+00	2.02E+00

**Conclusion of Statistical Analysis on Historical Data**

**The test well(s) listed exceeded the Upper Tolerance Limit, which is evidence of elevated concentration with respect to historical background data.**

**Wells with Exceedances**

MW373

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum ((background result-X)^2)/[count of background results - 1]]^0.5

TL Upper Tolerance Limit, TL = X + (K \* S), LL Lower Tolerance Limit, LL = X - (K \* S)

X Mean, X = (sum of background results)/(count of background results)

\*\* Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009.      D1-68

# C-746-S/T Third Quarter 2023 Statistical Analysis      Historical Background Comparison

**Manganese**

**UNITS: mg/L**

**LRGA**

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is evidence of an exceedance of the statistically-derived historical background concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

**Statistics-Background Data**      X= 0.131    S= 0.195    CV(1)=1.487    K factor\*\*= 2.523    TL(1)= 6.24E-01    LL(1)=N/A

**Statistics-Transformed Background Data**      X= -3.104    S= 1.529    CV(2)=-0.493    K factor\*\*= 2.523    TL(2)= 7.55E-01    LL(2)=N/A

**Historical Background Data from Upgradient Wells with Transformed Result**

**Because CV(1) is greater than 1, the natural logarithm of background and test well results were calculated utilizing TL(2) for comparison.**

Well Number: MW395

Date Collected	Result	LN(Result)
8/13/2002	3.61E-01	-1.02E+00
9/16/2002	2.80E-02	-3.58E+00
10/16/2002	2.60E-02	-3.65E+00
1/13/2003	7.13E-02	-2.64E+00
4/10/2003	6.29E-01	-4.64E-01
7/16/2003	2.97E-01	-1.21E+00
10/14/2003	1.98E-02	-3.92E+00
1/13/2004	1.26E-02	-4.37E+00

**Current Quarter Data**

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW370	Downgradient	Yes	1.40E-03	N/A	-6.57E+00	NO
MW373	Downgradient	Yes	5.18E-02	N/A	-2.96E+00	NO
MW385	Sidegradient	Yes	5.00E-03	N/A	-5.30E+00	NO
MW388	Downgradient	No	5.00E-03	N/A	-5.30E+00	N/A
MW392	Downgradient	Yes	1.34E-01	N/A	-2.01E+00	NO
MW395	Upgradient	Yes	3.28E-02	N/A	-3.42E+00	NO
MW397	Upgradient	No	5.00E-03	N/A	-5.30E+00	N/A

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for a well did not exceed the MCL value, that well was not included in the statistical evaluation.

Well Number: MW397

Date Collected	Result	LN(Result)
8/13/2002	4.66E-01	-7.64E-01
9/16/2002	7.70E-02	-2.56E+00
10/17/2002	2.80E-02	-3.58E+00
1/13/2003	1.64E-02	-4.11E+00
4/8/2003	4.07E-02	-3.20E+00
7/16/2003	1.67E-02	-4.09E+00
10/14/2003	5.55E-03	-5.19E+00
1/13/2004	5.00E-03	-5.30E+00

**Conclusion of Statistical Analysis on Historical Data**

**None of the test wells exceeded the Upper Tolerance Limit, which is evidence that concentrations in these wells are not different from historical background concentrations to a statistically-significant level.**

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum ((background result-X)^2)/[count of background results - 1]]^0.5

TL Upper Tolerance Limit, TL = X + (K \* S), LL Lower Tolerance Limit, LL = X - (K \* S)

X Mean, X = (sum of background results)/(count of background results)

\*\* Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009.      D1-69

# C-746-S/T Third Quarter 2023 Statistical Analysis      Historical Background Comparison

**Methylene chloride**

**UNITS: ug/L**

**LRGA**

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is evidence of an exceedance of the statistically-derived historical background concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

**Statistics-Background Data**      X= 5.625    S= 3.074    CV(1)=0.547    K factor\*\*= 2.523    TL(1)= 1.34E+01    LL(1)=N/A

**Statistics-Transformed Background Data**      X= 1.614    S= 0.483    CV(2)=0.300    K factor\*\*= 2.523    TL(2)= 2.83E+00    LL(2)=N/A

**Historical Background Data from Upgradient Wells with Transformed Result**

**Because CV(1) is less than or equal to 1, assume normal distribution and continue with statistical analysis utilizing TL(1).**

Well Number: MW395

Date Collected	Result	LN(Result)
8/13/2002	1.40E+01	2.64E+00
9/30/2002	2.00E+00	6.93E-01
10/16/2002	5.00E+00	1.61E+00
1/13/2003	5.00E+00	1.61E+00
4/10/2003	5.00E+00	1.61E+00
7/16/2003	5.00E+00	1.61E+00
10/14/2003	5.00E+00	1.61E+00
1/13/2004	5.00E+00	1.61E+00

**Current Quarter Data**

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW370	Downgradient	No	5.00E+00	N/A	1.61E+00	N/A
MW373	Downgradient	No	5.00E+00	N/A	1.61E+00	N/A
MW385	Sidegradient	No	5.00E+00	N/A	1.61E+00	N/A
MW388	Downgradient	No	5.00E+00	N/A	1.61E+00	N/A
MW392	Downgradient	Yes	6.90E-01	NO	-3.71E-01	N/A
MW395	Upgradient	No	5.00E+00	N/A	1.61E+00	N/A
MW397	Upgradient	No	5.00E+00	N/A	1.61E+00	N/A

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for a well did not exceed the MCL value, that well was not included in the statistical evaluation.

Well Number: MW397

Date Collected	Result	LN(Result)
8/13/2002	1.20E+01	2.48E+00
9/30/2002	2.00E+00	6.93E-01
10/17/2002	5.00E+00	1.61E+00
1/13/2003	5.00E+00	1.61E+00
4/8/2003	5.00E+00	1.61E+00
7/16/2003	5.00E+00	1.61E+00
10/14/2003	5.00E+00	1.61E+00
1/13/2004	5.00E+00	1.61E+00

**Conclusion of Statistical Analysis on Historical Data**

**None of the test wells exceeded the Upper Tolerance Limit, which is evidence that concentrations in these wells are not different from historical background concentrations to a statistically-significant level.**

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV    Coefficient-of-Variation, CV = S/X    If CV is less than or equal to 1 assume normal distribution.

S    Standard Deviation, S = [Sum ((background result-X)^2)/[count of background results - 1]]^0.5

TL    Upper Tolerance Limit, TL = X + (K \* S),      LL    Lower Tolerance Limit, LL = X - (K \* S)

X    Mean, X = (sum of background results)/(count of background results)

\*\* Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009.      D1-70



# C-746-S/T Third Quarter 2023 Statistical Analysis      Historical Background Comparison

**Molybdenum**

**UNITS: mg/L**

**LRGA**

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is evidence of an exceedance of the statistically-derived historical background concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

**Statistics-Background Data**      X= 0.007    S= 0.011    CV(1)=1.451    K factor\*\*= 2.523    TL(1)= 3.41E-02    LL(1)=N/A

**Statistics-Transformed Background Data**      X= -5.990    S= 1.443    CV(2)=-0.241    K factor\*\*= 2.523    TL(2)= -2.35E+00    LL(2)=N/A

**Historical Background Data from Upgradient Wells with Transformed Result**

**Because CV(1) is greater than 1, the natural logarithm of background and test well results were calculated utilizing TL(2) for comparison.**

Well Number: MW395

Date Collected	Result	LN(Result)
8/13/2002	2.50E-02	-3.69E+00
9/16/2002	2.50E-02	-3.69E+00
10/16/2002	1.00E-03	-6.91E+00
1/13/2003	6.09E-03	-5.10E+00
4/10/2003	1.00E-03	-6.91E+00
7/16/2003	1.00E-03	-6.91E+00
10/14/2003	1.00E-03	-6.91E+00
1/13/2004	1.00E-03	-6.91E+00

**Current Quarter Data**

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW370	Downgradient	No	1.00E-03	N/A	-6.91E+00	N/A
MW373	Downgradient	No	1.00E-03	N/A	-6.91E+00	N/A
MW385	Sidegradient	Yes	2.49E-04	N/A	-8.30E+00	NO
MW388	Downgradient	No	1.00E-03	N/A	-6.91E+00	N/A
MW392	Downgradient	No	1.00E-03	N/A	-6.91E+00	N/A
MW395	Upgradient	Yes	2.05E-04	N/A	-8.49E+00	NO
MW397	Upgradient	No	1.00E-03	N/A	-6.91E+00	N/A

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for a well did not exceed the MCL value, that well was not included in the statistical evaluation.

Well Number: MW397

Date Collected	Result	LN(Result)
8/13/2002	2.50E-02	-3.69E+00
9/16/2002	2.50E-02	-3.69E+00
10/17/2002	1.00E-03	-6.91E+00
1/13/2003	1.00E-03	-6.91E+00
4/8/2003	1.00E-03	-6.91E+00
7/16/2003	1.00E-03	-6.91E+00
10/14/2003	1.00E-03	-6.91E+00
1/13/2004	1.00E-03	-6.91E+00

**Conclusion of Statistical Analysis on Historical Data**

**None of the test wells exceeded the Upper Tolerance Limit, which is evidence that concentrations in these wells are not different from historical background concentrations to a statistically-significant level.**

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum ((background result-X)^2)/[count of background results - 1]]^0.5

TL Upper Tolerance Limit, TL = X + (K \* S), LL Lower Tolerance Limit, LL = X - (K \* S)

X Mean, X = (sum of background results)/(count of background results)

\*\* Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009.      D1-71

# C-746-S/T Third Quarter 2023 Statistical Analysis      Historical Background Comparison

**Nickel**

**UNITS: mg/L**

**LRGA**

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is evidence of an exceedance of the statistically-derived historical background concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

**Statistics-Background Data**      X= 0.018    S= 0.020    CV(1)=1.089    K factor\*\*= 2.523    TL(1)= 6.83E-02    LL(1)=N/A

**Statistics-Transformed Background Data**      X= -4.540    S= 1.020    CV(2)=-0.225    K factor\*\*= 2.523    TL(2)= -1.97E+00    LL(2)=N/A

**Historical Background Data from Upgradient Wells with Transformed Result**

**Because CV(1) is greater than 1, the natural logarithm of background and test well results were calculated utilizing TL(2) for comparison.**

Well Number: MW395

Date Collected	Result	LN(Result)
8/13/2002	5.00E-02	-3.00E+00
9/16/2002	5.00E-02	-3.00E+00
10/16/2002	7.02E-03	-4.96E+00
1/13/2003	2.90E-02	-3.54E+00
4/10/2003	9.10E-03	-4.70E+00
7/16/2003	6.27E-03	-5.07E+00
10/14/2003	5.00E-03	-5.30E+00
1/13/2004	5.00E-03	-5.30E+00

**Current Quarter Data**

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW370	Downgradient	Yes	7.52E-04	N/A	-7.19E+00	NO
MW373	Downgradient	Yes	1.68E-03	N/A	-6.39E+00	NO
MW385	Sidegradient	Yes	8.08E-04	N/A	-7.12E+00	NO
MW388	Downgradient	No	2.00E-03	N/A	-6.21E+00	N/A
MW392	Downgradient	Yes	1.40E-03	N/A	-6.57E+00	NO
MW395	Upgradient	Yes	1.55E-03	N/A	-6.47E+00	NO
MW397	Upgradient	No	2.00E-03	N/A	-6.21E+00	N/A

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for a well did not exceed the MCL value, that well was not included in the statistical evaluation.

Well Number: MW397

Date Collected	Result	LN(Result)
8/13/2002	5.00E-02	-3.00E+00
9/16/2002	5.00E-02	-3.00E+00
10/17/2002	5.00E-03	-5.30E+00
1/13/2003	5.02E-03	-5.29E+00
4/8/2003	5.00E-03	-5.30E+00
7/16/2003	5.00E-03	-5.30E+00
10/14/2003	5.00E-03	-5.30E+00
1/13/2004	5.00E-03	-5.30E+00

**Conclusion of Statistical Analysis on Historical Data**

**None of the test wells exceeded the Upper Tolerance Limit, which is evidence that concentrations in these wells are not different from historical background concentrations to a statistically-significant level.**

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum ((background result-X)^2)/[count of background results - 1]]^0.5

TL Upper Tolerance Limit, TL = X + (K \* S), LL Lower Tolerance Limit, LL = X - (K \* S)

X Mean, X = (sum of background results)/(count of background results)

\*\* Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009.      D1-72

# C-746-S/T Third Quarter 2023 Statistical Analysis      Historical Background Comparison

## Oxidation-Reduction Potential

UNITS: mV

LRGA

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is evidence of an exceedance of the statistically-derived historical background concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

**Statistics-Background Data**      X= 157.250   S= 52.376   CV(1)=0.333      **K factor\*\*= 2.523**      TL(1)= 2.89E+02   LL(1)=N/A

**Statistics-Transformed Background Data**      X= 5.003   S= 0.348   CV(2)=0.069      **K factor\*\*= 2.523**      TL(2)= 5.88E+00   LL(2)=N/A

**Historical Background Data from Upgradient Wells with Transformed Result**

**Because CV(1) is less than or equal to 1, assume normal distribution and continue with statistical analysis utilizing TL(1).**

Well Number: MW395

Date Collected	Result	LN(Result)
8/13/2002	8.00E+01	4.38E+00
9/16/2002	1.45E+02	4.98E+00
10/16/2002	1.25E+02	4.83E+00
1/13/2003	8.50E+01	4.44E+00
4/10/2003	1.59E+02	5.07E+00
7/16/2003	9.80E+01	4.58E+00
10/14/2003	1.38E+02	4.93E+00
1/13/2004	2.33E+02	5.45E+00

**Current Quarter Data**

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW370	Downgradient	Yes	3.88E+02	YES	5.96E+00	N/A
MW373	Downgradient	Yes	3.84E+02	YES	5.95E+00	N/A
MW385	Sidegradient	Yes	3.86E+02	YES	5.96E+00	N/A
MW388	Downgradient	Yes	4.32E+02	YES	6.07E+00	N/A
MW392	Downgradient	Yes	4.28E+02	YES	6.06E+00	N/A
MW395	Upgradient	Yes	3.02E+02	YES	5.71E+00	N/A
MW397	Upgradient	Yes	4.05E+02	YES	6.00E+00	N/A

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for a well did not exceed the MCL value, that well was not included in the statistical evaluation.

Well Number: MW397

Date Collected	Result	LN(Result)
8/13/2002	1.15E+02	4.74E+00
9/30/2002	1.40E+02	4.94E+00
10/17/2002	1.85E+02	5.22E+00
1/13/2003	2.30E+02	5.44E+00
4/8/2003	1.55E+02	5.04E+00
7/16/2003	1.88E+02	5.24E+00
10/14/2003	1.87E+02	5.23E+00
1/13/2004	2.53E+02	5.53E+00

**Conclusion of Statistical Analysis on Historical Data**

**The test well(s) listed exceeded the Upper Tolerance Limit, which is evidence of elevated concentration with respect to historical background data.**

**Wells with Exceedances**

- MW370
- MW373
- MW385
- MW388
- MW392
- MW395
- MW397

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV    Coefficient-of-Variation, CV = S/X    If CV is less than or equal to 1 assume normal distribution.

S      Standard Deviation, S = [Sum ((background result-X)^2)/[count of background results - 1]]^0.5

TL    Upper Tolerance Limit, TL = X + (K \* S),      LL    Lower Tolerance Limit, LL = X - (K \* S)

X      Mean, X = (sum of background results)/(count of background results)

\*\* Read from Table 5, Appendix B of *Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009.*      D1-73

# C-746-S/T Third Quarter 2023 Statistical Analysis      Historical Background Comparison

**pH**

**UNITS: Std Unit**

**LRGA**

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is evidence of an exceedance of the statistically-derived historical background concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

**Statistics-Background Data**      X= 6.048    S= 0.248    CV(1)=0.041    K factor\*\*= 2.904    TL(1)= 6.77E+00    LL(1)=5.33E+00

**Statistics-Transformed Background Data**      X= 1.799    S= 0.042    CV(2)=0.023    K factor\*\*= 2.904    TL(2)= 1.92E+00    LL(2)=1.68E+00

**Historical Background Data from Upgradient Wells with Transformed Result**

**Because CV(1) is less than or equal to 1, assume normal distribution and continue with statistical analysis utilizing TL(1).**

Well Number: MW395

Date Collected	Result	LN(Result)
8/13/2002	5.80E+00	1.76E+00
9/16/2002	6.00E+00	1.79E+00
10/16/2002	5.47E+00	1.70E+00
1/13/2003	6.00E+00	1.79E+00
4/10/2003	6.18E+00	1.82E+00
7/16/2003	6.00E+00	1.79E+00
10/14/2003	6.31E+00	1.84E+00
1/13/2004	6.24E+00	1.83E+00

**Current Quarter Data**

Well No.	Gradient	Detected?	Result	Result >TL(1)? Result <LL(1)?	LN(Result)	LN(Result) >TL(2)? LN(Result) <LL(2)?
MW370	Downgradient	Yes	6.12E+00	NO	1.81E+00	N/A
MW373	Downgradient	Yes	6.08E+00	NO	1.81E+00	N/A
MW385	Sidegradient	Yes	6.41E+00	NO	1.86E+00	N/A
MW388	Downgradient	Yes	6.13E+00	NO	1.81E+00	N/A
MW392	Downgradient	Yes	5.93E+00	NO	1.78E+00	N/A
MW395	Upgradient	Yes	5.94E+00	NO	1.78E+00	N/A
MW397	Upgradient	Yes	5.94E+00	NO	1.78E+00	N/A

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for a well did not exceed the MCL value, that well was not included in the statistical evaluation.

Well Number: MW397

Date Collected	Result	LN(Result)
8/13/2002	5.84E+00	1.76E+00
9/30/2002	6.00E+00	1.79E+00
10/17/2002	5.75E+00	1.75E+00
1/13/2003	6.00E+00	1.79E+00
4/8/2003	6.30E+00	1.84E+00
7/16/2003	6.20E+00	1.82E+00
10/14/2003	6.36E+00	1.85E+00
1/13/2004	6.32E+00	1.84E+00

**Conclusion of Statistical Analysis on Historical Data**

**None of the test wells exceeded the Upper Tolerance Limit, which is evidence that concentrations in these wells are not different from historical background concentrations to a statistically-significant level.**

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum ((background result-X)^2)/[count of background results - 1]]^0.5

TL Upper Tolerance Limit, TL = X + (K \* S), LL Lower Tolerance Limit, LL = X - (K \* S)

X Mean, X = (sum of background results)/(count of background results)

\*\* Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009.      D1-74

# C-746-S/T Third Quarter 2023 Statistical Analysis      Historical Background Comparison

**Potassium**

**UNITS: mg/L**

**LRGA**

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is evidence of an exceedance of the statistically-derived historical background concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

**Statistics-Background Data**      X= 1.590    S= 0.642    CV(1)=0.404    **K factor\*\*= 2.523**    TL(1)= 3.21E+00    LL(1)=N/A

**Statistics-Transformed Background Data**      X= -0.306    S= 2.457    CV(2)=-8.028    **K factor\*\*= 2.523**    TL(2)= 5.89E+00    LL(2)=N/A

**Historical Background Data from Upgradient Wells with Transformed Result**

**Because CV(1) is less than or equal to 1, assume normal distribution and continue with statistical analysis utilizing TL(1).**

Well Number: MW395

Date Collected	Result	LN(Result)
8/13/2002	2.00E+00	6.93E-01
9/16/2002	2.00E+00	6.93E-01
10/16/2002	1.29E-03	-6.65E+00
1/13/2003	1.51E+00	4.12E-01
4/10/2003	1.67E+00	5.13E-01
7/16/2003	1.73E+00	5.48E-01
10/14/2003	1.70E+00	5.31E-01
1/13/2004	1.58E+00	4.57E-01

**Current Quarter Data**

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW370	Downgradient	Yes	2.49E+00	NO	9.12E-01	N/A
MW373	Downgradient	Yes	2.73E+00	NO	1.00E+00	N/A
MW385	Sidegradient	Yes	1.59E+00	NO	4.64E-01	N/A
MW388	Downgradient	Yes	1.78E+00	NO	5.77E-01	N/A
MW392	Downgradient	Yes	1.99E+00	NO	6.88E-01	N/A
MW395	Upgradient	Yes	1.59E+00	NO	4.64E-01	N/A
MW397	Upgradient	Yes	1.74E+00	NO	5.54E-01	N/A

Well Number: MW397

Date Collected	Result	LN(Result)
8/13/2002	2.03E+00	7.08E-01
9/16/2002	2.00E+00	6.93E-01
10/17/2002	1.45E-03	-6.54E+00
1/13/2003	1.69E+00	5.25E-01
4/8/2003	1.73E+00	5.48E-01
7/16/2003	2.00E+00	6.93E-01
10/14/2003	1.92E+00	6.52E-01
1/13/2004	1.87E+00	6.26E-01

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for a well did not exceed the MCL value, that well was not included in the statistical evaluation.

**Conclusion of Statistical Analysis on Historical Data**

**None of the test wells exceeded the Upper Tolerance Limit, which is evidence that concentrations in these wells are not different from historical background concentrations to a statistically-significant level.**

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV    Coefficient-of-Variation, CV = S/X    If CV is less than or equal to 1 assume normal distribution.  
 S    Standard Deviation, S = [Sum ((background result-X)^2)/[count of background results - 1]]^0.5  
 TL    Upper Tolerance Limit, TL = X + (K \* S),      LL    Lower Tolerance Limit, LL = X - (K \* S)  
 X    Mean, X = (sum of background results)/(count of background results)

\*\* Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009.      D1-75



**C-746-S/T Third Quarter 2023 Statistical Analysis      Historical Background Comparison**

**Sodium**

**UNITS: mg/L**

**LRGA**

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is evidence of an exceedance of the statistically-derived historical background concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

**Statistics-Background Data**      X= 29.560   S= 13.894   CV(1)=0.470      **K factor\*\*= 2.523**      TL(1)= 6.46E+01   LL(1)=N/A

**Statistics-Transformed Background Data**      X= 2.615   S= 2.411   CV(2)=0.922      **K factor\*\*= 2.523**      TL(2)= 8.70E+00   LL(2)=N/A

**Historical Background Data from Upgradient Wells with Transformed Result**

**Because CV(1) is less than or equal to 1, assume normal distribution and continue with statistical analysis utilizing TL(1).**

Well Number: MW395

Date Collected	Result	LN(Result)
8/13/2002	2.70E+01	3.30E+00
9/16/2002	2.72E+01	3.30E+00
10/16/2002	2.53E-02	-3.68E+00
1/13/2003	2.26E+01	3.12E+00
4/10/2003	5.39E+01	3.99E+00
7/16/2003	3.00E+01	3.40E+00
10/14/2003	2.91E+01	3.37E+00
1/13/2004	2.64E+01	3.27E+00

**Current Quarter Data**

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW370	Downgradient	Yes	4.28E+01	NO	3.76E+00	N/A
MW373	Downgradient	Yes	6.29E+01	NO	4.14E+00	N/A
MW385	Sidegradient	Yes	3.86E+01	NO	3.65E+00	N/A
MW388	Downgradient	Yes	4.27E+01	NO	3.75E+00	N/A
MW392	Downgradient	Yes	2.38E+01	NO	3.17E+00	N/A
MW395	Upgradient	Yes	2.85E+01	NO	3.35E+00	N/A
MW397	Upgradient	Yes	3.00E+01	NO	3.40E+00	N/A

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for a well did not exceed the MCL value, that well was not included in the statistical evaluation.

Well Number: MW397

Date Collected	Result	LN(Result)
8/13/2002	3.52E+01	3.56E+00
9/16/2002	3.43E+01	3.54E+00
10/17/2002	3.36E-02	-3.39E+00
1/13/2003	3.13E+01	3.44E+00
4/8/2003	4.61E+01	3.83E+00
7/16/2003	3.84E+01	3.65E+00
10/14/2003	3.71E+01	3.61E+00
1/13/2004	3.43E+01	3.54E+00

**Conclusion of Statistical Analysis on Historical Data**

**None of the test wells exceeded the Upper Tolerance Limit, which is evidence that concentrations in these wells are not different from historical background concentrations to a statistically-significant level.**

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum ((background result-X)^2)/[count of background results - 1]]^0.5

TL Upper Tolerance Limit, TL = X + (K \* S), LL Lower Tolerance Limit, LL = X - (K \* S)

X Mean, X = (sum of background results)/(count of background results)

\*\* Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009.      D1-76

# C-746-S/T Third Quarter 2023 Statistical Analysis      Historical Background Comparison

**Sulfate**

**UNITS: mg/L**

**LRGA**

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is evidence of an exceedance of the statistically-derived historical background concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

**Statistics-Background Data**      X= 10.756    S= 2.147    CV(1)=0.200      **K factor\*\*= 2.523**    TL(1)= 1.62E+01    LL(1)=N/A

**Statistics-Transformed Background Data**      X= 2.356    S= 0.203    CV(2)=0.086      **K factor\*\*= 2.523**    TL(2)= 2.87E+00    LL(2)=N/A

**Historical Background Data from Upgradient Wells with Transformed Result**

**Because CV(1) is less than or equal to 1, assume normal distribution and continue with statistical analysis utilizing TL(1).**

Well Number: MW395

Date Collected	Result	LN(Result)
8/13/2002	1.03E+01	2.33E+00
9/16/2002	9.10E+00	2.21E+00
10/16/2002	8.80E+00	2.17E+00
1/13/2003	9.00E+00	2.20E+00
4/10/2003	8.30E+00	2.12E+00
7/16/2003	8.20E+00	2.10E+00
10/14/2003	8.30E+00	2.12E+00
1/13/2004	8.20E+00	2.10E+00

**Current Quarter Data**

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW370	Downgradient	Yes	2.03E+01	YES	3.01E+00	N/A
MW373	Downgradient	Yes	1.80E+02	YES	5.19E+00	N/A
MW385	Sidegradient	Yes	1.93E+01	YES	2.96E+00	N/A
MW388	Downgradient	Yes	2.00E+01	YES	3.00E+00	N/A
MW392	Downgradient	Yes	8.31E+00	NO	2.12E+00	N/A
MW395	Upgradient	Yes	1.15E+01	NO	2.44E+00	N/A
MW397	Upgradient	Yes	1.21E+01	NO	2.49E+00	N/A

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for a well did not exceed the MCL value, that well was not included in the statistical evaluation.

Well Number: MW397

Date Collected	Result	LN(Result)
8/13/2002	1.40E+01	2.64E+00
9/16/2002	1.28E+01	2.55E+00
10/17/2002	1.23E+01	2.51E+00
1/13/2003	1.27E+01	2.54E+00
4/8/2003	1.28E+01	2.55E+00
7/16/2003	1.31E+01	2.57E+00
10/14/2003	1.21E+01	2.49E+00
1/13/2004	1.21E+01	2.49E+00

**Conclusion of Statistical Analysis on Historical Data**

**The test well(s) listed exceeded the Upper Tolerance Limit, which is evidence of elevated concentration with respect to historical background data.**

**Wells with Exceedances**

- MW370
- MW373
- MW385
- MW388

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum ((background result-X)^2)/[count of background results - 1]]^0.5

TL Upper Tolerance Limit, TL = X + (K \* S), LL Lower Tolerance Limit, LL = X - (K \* S)

X Mean, X = (sum of background results)/(count of background results)

\*\* Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009.      D1-77

**C-746-S/T Third Quarter 2023 Statistical Analysis      Historical Background Comparison**

**Technetium-99**

**UNITS: pCi/L**

**LRGA**

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is evidence of an exceedance of the statistically-derived historical background concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

**Statistics-Background Data**      X= 11.359    S= 9.138    CV(1)=0.805    K factor\*\*= 2.523    TL(1)= 3.44E+01    LL(1)=N/A

**Statistics-Transformed Background Data**      X= 2.398    S= 0.859    CV(2)=0.358    K factor\*\*= 2.523    TL(2)= 3.25E+00    LL(2)=N/A

**Historical Background Data from Upgradient Wells with Transformed Result**

**Because CV(1) is less than or equal to 1, assume normal distribution and continue with statistical analysis utilizing TL(1).**

Well Number: MW395

Date Collected	Result	LN(Result)
8/13/2002	2.08E+01	3.03E+00
9/16/2002	1.62E+01	2.79E+00
10/16/2002	8.28E+00	2.11E+00
1/13/2003	1.30E+01	2.56E+00
4/10/2003	-9.37E+00	#Func!
7/16/2003	8.26E-01	-1.91E-01
10/14/2003	1.41E+01	2.65E+00
1/13/2004	0.00E+00	#Func!

**#Because the natural log was not possible for all background values, the TL was considered equal to the maximum background value.**

**Current Quarter Data**

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW370	Downgradient	No	2.03E+01	N/A	3.01E+00	N/A
MW373	Downgradient	No	1.33E+01	N/A	2.59E+00	N/A
MW385	Sidegradient	Yes	3.78E+01	YES	3.63E+00	N/A
MW388	Downgradient	No	1.64E+01	N/A	2.80E+00	N/A
MW392	Downgradient	No	1.18E+00	N/A	1.66E-01	N/A
MW395	Upgradient	No	3.76E+00	N/A	1.32E+00	N/A
MW397	Upgradient	Yes	2.77E+01	NO	3.32E+00	N/A

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for a well did not exceed the MCL value, that well was not included in the statistical evaluation.

Well Number: MW397

Date Collected	Result	LN(Result)
8/13/2002	6.06E+00	1.80E+00
9/16/2002	1.73E+01	2.85E+00
10/17/2002	2.57E+01	3.25E+00
1/13/2003	2.09E+01	3.04E+00
4/8/2003	2.01E+01	3.00E+00
7/16/2003	9.20E+00	2.22E+00
10/14/2003	1.01E+01	2.31E+00
1/13/2004	8.54E+00	2.14E+00

**Conclusion of Statistical Analysis on Historical Data**

**The test well(s) listed exceeded the Upper Tolerance Limit, which is evidence of elevated concentration with respect to historical background data.**

**Wells with Exceedances**

MW385

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum ((background result-X)^2)/[count of background results - 1]]^0.5

TL Upper Tolerance Limit, TL = X + (K \* S), LL Lower Tolerance Limit, LL = X - (K \* S)

X Mean, X = (sum of background results)/(count of background results)

\*\* Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009. D1-78



# C-746-S/T Third Quarter 2023 Statistical Analysis      Historical Background Comparison

**Total Organic Carbon (TOC)**

**UNITS: mg/L**

**LRGA**

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is evidence of an exceedance of the statistically-derived historical background concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

**Statistics-Background Data**      X= 1.544    S= 0.856    CV(1)=0.554    **K factor\*\*= 2.523**    TL(1)= 3.70E+00    LL(1)=N/A

**Statistics-Transformed Background Data**      X= 0.325    S= 0.452    CV(2)=1.393    **K factor\*\*= 2.523**    TL(2)= 1.46E+00    LL(2)=N/A

**Historical Background Data from Upgradient Wells with Transformed Result**

**Because CV(1) is less than or equal to 1, assume normal distribution and continue with statistical analysis utilizing TL(1).**

Well Number: MW395

Date Collected	Result	LN(Result)
8/13/2002	1.60E+00	4.70E-01
9/16/2002	1.10E+00	9.53E-02
10/16/2002	1.00E+00	0.00E+00
1/13/2003	2.00E+00	6.93E-01
4/10/2003	3.40E+00	1.22E+00
7/16/2003	2.00E+00	6.93E-01
10/14/2003	1.00E+00	0.00E+00
1/13/2004	1.00E+00	0.00E+00

**Current Quarter Data**

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW370	Downgradient	Yes	7.65E-01	NO	-2.68E-01	N/A
MW373	Downgradient	Yes	1.22E+00	NO	1.99E-01	N/A
MW385	Sidegradient	Yes	8.28E-01	NO	-1.89E-01	N/A
MW388	Downgradient	Yes	1.07E+00	NO	6.77E-02	N/A
MW392	Downgradient	Yes	7.41E-01	NO	-3.00E-01	N/A
MW395	Upgradient	Yes	7.05E-01	NO	-3.50E-01	N/A
MW397	Upgradient	Yes	6.32E-01	NO	-4.59E-01	N/A

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for a well did not exceed the MCL value, that well was not included in the statistical evaluation.

Well Number: MW397

Date Collected	Result	LN(Result)
8/13/2002	1.00E+00	0.00E+00
9/16/2002	1.00E+00	0.00E+00
10/17/2002	1.00E+00	0.00E+00
1/13/2003	3.60E+00	1.28E+00
4/8/2003	1.90E+00	6.42E-01
7/16/2003	1.10E+00	9.53E-02
10/14/2003	1.00E+00	0.00E+00
1/13/2004	1.00E+00	0.00E+00

**Conclusion of Statistical Analysis on Historical Data**

**None of the test wells exceeded the Upper Tolerance Limit, which is evidence that concentrations in these wells are not different from historical background concentrations to a statistically-significant level.**

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum ((background result-X)^2)/[count of background results - 1]]^0.5

TL Upper Tolerance Limit, TL = X + (K \* S), LL Lower Tolerance Limit, LL = X - (K \* S)

X Mean, X = (sum of background results)/(count of background results)

\*\* Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009.      D1-79

# C-746-S/T Third Quarter 2023 Statistical Analysis      Historical Background Comparison

**Total Organic Halides (TOX)**

**UNITS: ug/L**

**LRGA**

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is evidence of an exceedance of the statistically-derived historical background concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

**Statistics-Background Data**      X= 31.513    S= 18.609    CV(1)=0.591      **K factor\*\*= 2.523**    TL(1)= 7.85E+01    LL(1)=N/A

**Statistics-Transformed Background Data**      X= 3.240    S= 0.707    CV(2)=0.218      **K factor\*\*= 2.523**    TL(2)= 5.02E+00    LL(2)=N/A

**Historical Background Data from Upgradient Wells with Transformed Result**

**Because CV(1) is less than or equal to 1, assume normal distribution and continue with statistical analysis utilizing TL(1).**

Well Number: MW395

Date Collected	Result	LN(Result)
8/13/2002	5.00E+01	3.91E+00
9/16/2002	5.00E+01	3.91E+00
10/16/2002	5.00E+01	3.91E+00
1/13/2003	1.83E+01	2.91E+00
4/10/2003	5.12E+01	3.94E+00
7/16/2003	4.26E+01	3.75E+00
10/14/2003	1.23E+01	2.51E+00
1/13/2004	1.00E+01	2.30E+00

**Current Quarter Data**

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW370	Downgradient	No	7.64E+00	N/A	2.03E+00	N/A
MW373	Downgradient	Yes	9.20E+00	NO	2.22E+00	N/A
MW385	Sidegradient	Yes	1.05E+01	NO	2.35E+00	N/A
MW388	Downgradient	Yes	4.76E+00	NO	1.56E+00	N/A
MW392	Downgradient	Yes	3.68E+00	NO	1.30E+00	N/A
MW395	Upgradient	No	7.98E+00	N/A	2.08E+00	N/A
MW397	Upgradient	No	4.42E+00	N/A	1.49E+00	N/A

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for a well did not exceed the MCL value, that well was not included in the statistical evaluation.

Well Number: MW397

Date Collected	Result	LN(Result)
8/13/2002	5.00E+01	3.91E+00
9/16/2002	5.00E+01	3.91E+00
10/17/2002	5.00E+01	3.91E+00
1/13/2003	1.20E+01	2.48E+00
4/8/2003	1.99E+01	2.99E+00
7/16/2003	1.79E+01	2.88E+00
10/14/2003	1.00E+01	2.30E+00
1/13/2004	1.00E+01	2.30E+00

**Conclusion of Statistical Analysis on Historical Data**

**None of the test wells exceeded the Upper Tolerance Limit, which is evidence that concentrations in these wells are not different from historical background concentrations to a statistically-significant level.**

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum ((background result-X)^2)/[count of background results - 1]]^0.5

TL Upper Tolerance Limit, TL = X + (K \* S), LL Lower Tolerance Limit, LL = X - (K \* S)

X Mean, X = (sum of background results)/(count of background results)

\*\* Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009.      D1-80

# C-746-S/T Third Quarter 2023 Statistical Analysis      Historical Background Comparison

**Trichloroethene**

**UNITS: ug/L**

**LRGA**

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is evidence of an exceedance of the statistically-derived historical background concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

**Statistics-Background Data**      X= 7.313    S= 5.701    CV(1)=0.780    K factor\*\*= 2.523    TL(1)= 2.17E+01    LL(1)=N/A

**Statistics-Transformed Background Data**      X= 1.467    S= 1.213    CV(2)=0.827    K factor\*\*= 2.523    TL(2)= 4.53E+00    LL(2)=N/A

**Historical Background Data from Upgradient Wells with Transformed Result**

**Because CV(1) is less than or equal to 1, assume normal distribution and continue with statistical analysis utilizing TL(1).**

Well Number: MW395

Date Collected	Result	LN(Result)
8/13/2002	1.10E+01	2.40E+00
9/30/2002	1.40E+01	2.64E+00
10/16/2002	1.20E+01	2.48E+00
1/13/2003	1.40E+01	2.64E+00
4/10/2003	1.40E+01	2.64E+00
7/16/2003	1.30E+01	2.56E+00
10/14/2003	1.20E+01	2.48E+00
1/13/2004	1.10E+01	2.40E+00

Well Number: MW397

Date Collected	Result	LN(Result)
8/13/2002	5.00E+00	1.61E+00
9/30/2002	5.00E+00	1.61E+00
10/17/2002	1.00E+00	0.00E+00
1/13/2003	1.00E+00	0.00E+00
4/8/2003	1.00E+00	0.00E+00
7/16/2003	1.00E+00	0.00E+00
10/14/2003	1.00E+00	0.00E+00
1/13/2004	1.00E+00	0.00E+00

**Current Quarter Data**

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW370	Downgradient	Yes	5.48E+00	NO	1.70E+00	N/A
MW373	Downgradient	Yes	3.53E+00	N/A	1.26E+00	N/A
MW385	Sidegradient	No	1.00E+00	N/A	0.00E+00	N/A
MW388	Downgradient	No	1.00E+00	N/A	0.00E+00	N/A
MW392	Downgradient	Yes	4.88E+00	N/A	1.59E+00	N/A
MW395	Upgradient	Yes	5.18E+00	NO	1.64E+00	N/A
MW397	Upgradient	No	1.00E+00	N/A	0.00E+00	N/A

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for a well did not exceed the MCL value, that well was not included in the statistical evaluation.

**Conclusion of Statistical Analysis on Historical Data**

**None of the test wells exceeded the Upper Tolerance Limit, which is evidence that concentrations in these wells are not different from historical background concentrations to a statistically-significant level.**

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum ((background result-X)^2)/[count of background results - 1]]^0.5

TL Upper Tolerance Limit, TL = X + (K \* S), LL Lower Tolerance Limit, LL = X - (K \* S)

X Mean, X = (sum of background results)/(count of background results)

\*\* Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009.      D1-81

# C-746-S/T Third Quarter 2023 Statistical Analysis      Historical Background Comparison

**Zinc**

**UNITS: mg/L**

**LRGA**

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is evidence of an exceedance of the statistically-derived historical background concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

**Statistics-Background Data**      X= 0.044    S= 0.034    CV(1)=0.760    K factor\*\*= 2.523    TL(1)= 1.29E-01    LL(1)=N/A

**Statistics-Transformed Background Data**      X= -3.342    S= 0.659    CV(2)=-0.197    K factor\*\*= 2.523    TL(2)= -1.68E+00    LL(2)=N/A

**Historical Background Data from Upgradient Wells with Transformed Result**

**Because CV(1) is less than or equal to 1, assume normal distribution and continue with statistical analysis utilizing TL(1).**

Well Number: MW395

Date Collected	Result	LN(Result)
8/13/2002	1.00E-01	-2.30E+00
9/16/2002	1.00E-01	-2.30E+00
10/16/2002	2.50E-02	-3.69E+00
1/13/2003	3.50E-02	-3.35E+00
4/10/2003	3.50E-02	-3.35E+00
7/16/2003	2.00E-02	-3.91E+00
10/14/2003	2.00E-02	-3.91E+00
1/13/2004	2.00E-02	-3.91E+00

**Current Quarter Data**

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW370	Downgradient	Yes	5.72E-03	NO	-5.16E+00	N/A
MW373	Downgradient	Yes	4.48E-03	NO	-5.41E+00	N/A
MW385	Sidegradient	Yes	4.78E-03	NO	-5.34E+00	N/A
MW388	Downgradient	Yes	5.12E-03	NO	-5.27E+00	N/A
MW392	Downgradient	Yes	4.28E-03	NO	-5.45E+00	N/A
MW395	Upgradient	Yes	9.09E-03	NO	-4.70E+00	N/A
MW397	Upgradient	No	2.00E-02	N/A	-3.91E+00	N/A

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for a well did not exceed the MCL value, that well was not included in the statistical evaluation.

Well Number: MW397

Date Collected	Result	LN(Result)
8/13/2002	1.00E-01	-2.30E+00
9/16/2002	1.00E-01	-2.30E+00
10/17/2002	2.50E-02	-3.69E+00
1/13/2003	3.50E-02	-3.35E+00
4/8/2003	3.50E-02	-3.35E+00
7/16/2003	2.00E-02	-3.91E+00
10/14/2003	2.00E-02	-3.91E+00
1/13/2004	2.00E-02	-3.91E+00

**Conclusion of Statistical Analysis on Historical Data**

**None of the test wells exceeded the Upper Tolerance Limit, which is evidence that concentrations in these wells are not different from historical background concentrations to a statistically-significant level.**

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum ((background result-X)^2)/[count of background results - 1]]^0.5

TL Upper Tolerance Limit, TL = X + (K \* S), LL Lower Tolerance Limit, LL = X - (K \* S)

X Mean, X = (sum of background results)/(count of background results)

\*\* Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009.      D1-82

**ATTACHMENT D2**

**COMPARISON OF CURRENT DATA TO  
ONE-SIDED UPPER TOLERANCE INTERVAL TEST  
CALCULATED USING  
CURRENT BACKGROUND DATA**

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The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is statistically significant evidence of elevated concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

**Statistics-Background Data**      X= 274.750   S= 86.285   CV(1)=0.314      **K factor\*\*= 3.188**      TL(1)= 5.50E+02   LL(1)=N/A

**Statistics-Transformed Background Data**      X= 5.574   S= 0.309   CV(2)=0.055      **K factor\*\*= 3.188**      TL(2)= 6.56E+00   LL(2)=N/A

**Current Background Data from Upgradient Wells with Transformed Result**

**Because CV(1) is less than or equal to 1, assume normal distribution and continue with statistical analysis utilizing TL(1).**

Well Number: MW396

Date Collected	Result	LN(Result)
7/21/2021	4.00E+02	5.99E+00
10/18/2021	1.81E+02	5.20E+00
1/13/2022	1.91E+02	5.25E+00
4/19/2022	3.36E+02	5.82E+00
7/20/2022	3.83E+02	5.95E+00
10/17/2022	2.17E+02	5.38E+00
1/25/2023	2.40E+02	5.48E+00
4/27/2023	2.50E+02	5.52E+00

**Current Quarter Data**

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW386	Sidegradient	Yes	3.42E+02	NO	5.83E+00	N/A
MW390	Downgradient	Yes	4.19E+02	NO	6.04E+00	N/A
MW393	Downgradient	Yes	3.91E+02	NO	5.97E+00	N/A
MW396	Upgradient	Yes	3.15E+02	NO	5.75E+00	N/A

**Conclusion of Statistical Analysis on Current Data**

**None of the test wells exceeded the Upper Tolerance Limit, which is evidence that concentrations in these wells are not different from current background concentrations to a statistically-significant level.**

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum ((background result-X)^2)/[count of background results -1]]^0.5

TL Upper Tolerance Limit, TL = X + (K \* S), LL Lower Tolerance Limit, LL = X - (K \* S)

X Mean, X = (sum of background results)/(count of background results)

\*\* Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009.

**Technetium-99**

**UNITS: pCi/L**

**UCRS**

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is statistically significant evidence of elevated concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

**Statistics-Background Data**      X= 1.100    S= 7.464    CV(1)=6.786    K factor\*\*= 3.188    TL(1)= 2.49E+01    LL(1)=N/A

**Statistics-Transformed Background Data**      X= 2.213    S= 0.258    CV(2)=0.117    K factor\*\*= 3.188    TL(2)= 2.47E+00    LL(2)=N/A

**Current Background Data from Upgradient Wells with Transformed Result**

Well Number: MW396

Date Collected	Result	LN(Result)
7/21/2021	-2.66E+00	#Func!
10/18/2021	-3.65E+00	#Func!
1/13/2022	-1.23E+00	#Func!
4/19/2022	1.18E+01	2.47E+00
7/20/2022	-1.59E+00	#Func!
10/17/2022	7.04E+00	1.95E+00
1/25/2023	-1.01E+01	#Func!
4/27/2023	9.19E+00	2.22E+00

**Because CV(1) is greater than 1, the natural logarithm of background and test well results were calculated utilizing TL(2) for comparison.**

**#Because the natural log was not possible for all background values, the TL was considered equal to the maximum background value.**

**Current Quarter Data**

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW390	Downgradient	Yes	4.90E+01	N/A	3.89E+00	YES

**Conclusion of Statistical Analysis on Current Data**

**The test well(s) listed exceeded the Upper Tolerance Limit, which is evidence of elevated concentration with respect to current background data.**

**Wells with Exceedances**

MW390

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum ((background result-X)^2)/[count of background results -1]]^0.5

TL Upper Tolerance Limit, TL = X + (K \* S), LL Lower Tolerance Limit, LL = X - (K \* S)

X Mean, X = (sum of background results)/(count of background results)

\*\* Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009.



**C-746-S/T Third Quarter 2023 Statistical Analysis      Current Background Comparison**

**Calcium**

**UNITS: mg/L**

**URGA**

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is statistically significant evidence of elevated concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

**Statistics-Background Data**      X= 24.588    S= 3.075    CV(1)=0.125    K factor\*\*= 2.523    TL(1)= 3.23E+01    LL(1)=N/A

**Statistics-Transformed Background Data**      X= 3.195    S= 0.128    CV(2)=0.040    K factor\*\*= 2.523    TL(2)= 3.52E+00    LL(2)=N/A

**Current Background Data from Upgradient Wells with Transformed Result**

**Because CV(1) is less than or equal to 1, assume normal distribution and continue with statistical analysis utilizing TL(1).**

Well Number: MW220

Date Collected	Result	LN(Result)
7/19/2021	2.22E+01	3.10E+00
10/27/2021	2.13E+01	3.06E+00
1/19/2022	2.20E+01	3.09E+00
4/13/2022	2.91E+01	3.37E+00
7/18/2022	2.04E+01	3.02E+00
10/18/2022	2.05E+01	3.02E+00
1/23/2023	2.01E+01	3.00E+00
5/1/2023	2.82E+01	3.34E+00

**Current Quarter Data**

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW372	Downgradient	Yes	6.10E+01	YES	4.11E+00	N/A

Well Number: MW394

Date Collected	Result	LN(Result)
7/21/2021	2.49E+01	3.21E+00
10/18/2021	2.46E+01	3.20E+00
1/13/2022	2.54E+01	3.23E+00
4/19/2022	2.82E+01	3.34E+00
7/20/2022	2.61E+01	3.26E+00
10/17/2022	2.66E+01	3.28E+00
1/25/2023	2.69E+01	3.29E+00
4/27/2023	2.69E+01	3.29E+00

**Conclusion of Statistical Analysis on Current Data**

**The test well(s) listed exceeded the Upper Tolerance Limit, which is evidence of elevated concentration with respect to current background data.**

**Wells with Exceedances**

MW372

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum ((background result-X)^2)/[count of background results -1]]^0.5

TL Upper Tolerance Limit, TL = X + (K \* S), LL Lower Tolerance Limit, LL = X - (K \* S)

X Mean, X = (sum of background results)/(count of background results)

\*\* Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009.

**Conductivity**

**UNITS: umho/cm**

**URGA**

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is statistically significant evidence of elevated concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

**Statistics-Background Data**      X= 385.813   S= 33.120   CV(1)=0.086      **K factor\*\*= 2.523**      TL(1)= 4.69E+02   LL(1)=N/A

**Statistics-Transformed Background Data**      X= 5.952   S= 0.088   CV(2)=0.015      **K factor\*\*= 2.523**      TL(2)= 6.17E+00   LL(2)=N/A

**Current Background Data from Upgradient Wells with Transformed Result**

**Because CV(1) is less than or equal to 1, assume normal distribution and continue with statistical analysis utilizing TL(1).**

Well Number: MW220

Date Collected	Result	LN(Result)
7/19/2021	3.59E+02	5.88E+00
10/27/2021	3.41E+02	5.83E+00
1/19/2022	3.76E+02	5.93E+00
4/13/2022	4.36E+02	6.08E+00
7/18/2022	3.50E+02	5.86E+00
10/18/2022	3.32E+02	5.81E+00
1/23/2023	3.34E+02	5.81E+00
5/1/2023	4.20E+02	6.04E+00

**Current Quarter Data**

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW372	Downgradient	Yes	7.59E+02	YES	6.63E+00	N/A

Well Number: MW394

Date Collected	Result	LN(Result)
7/21/2021	4.00E+02	5.99E+00
10/18/2021	3.94E+02	5.98E+00
1/13/2022	4.01E+02	5.99E+00
4/19/2022	4.13E+02	6.02E+00
7/20/2022	3.87E+02	5.96E+00
10/17/2022	4.17E+02	6.03E+00
1/25/2023	4.04E+02	6.00E+00
4/27/2023	4.09E+02	6.01E+00

**Conclusion of Statistical Analysis on Current Data**

**The test well(s) listed exceeded the Upper Tolerance Limit, which is evidence of elevated concentration with respect to current background data.**

**Wells with Exceedances**

MW372

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum ((background result-X)^2)/[count of background results -1]]^0.5

TL Upper Tolerance Limit, TL = X + (K \* S), LL Lower Tolerance Limit, LL = X - (K \* S)

X Mean, X = (sum of background results)/(count of background results)

\*\* Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009.

**Dissolved Solids**

**UNITS: mg/L**

**URGA**

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is statistically significant evidence of elevated concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

**Statistics-Background Data**      X= 204.688   S= 32.143   CV(1)=0.157      **K factor\*\*= 2.523**      TL(1)= 2.86E+02   LL(1)=N/A

**Statistics-Transformed Background Data**      X= 5.311      S= 0.147      CV(2)=0.028      **K factor\*\*= 2.523**      TL(2)= 5.68E+00   LL(2)=N/A

**Current Background Data from Upgradient Wells with Transformed Result**

**Because CV(1) is less than or equal to 1, assume normal distribution and continue with statistical analysis utilizing TL(1).**

Well Number: MW220

Date Collected	Result	LN(Result)
7/19/2021	1.96E+02	5.28E+00
10/27/2021	1.94E+02	5.27E+00
1/19/2022	1.79E+02	5.19E+00
4/13/2022	2.36E+02	5.46E+00
7/18/2022	1.64E+02	5.10E+00
10/18/2022	1.79E+02	5.19E+00
1/23/2023	1.72E+02	5.15E+00
5/1/2023	2.02E+02	5.31E+00

**Current Quarter Data**

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW372	Downgradient	Yes	4.23E+02	YES	6.05E+00	N/A

Well Number: MW394

Date Collected	Result	LN(Result)
7/21/2021	2.90E+02	5.67E+00
10/18/2021	2.19E+02	5.39E+00
1/13/2022	2.30E+02	5.44E+00
4/19/2022	2.43E+02	5.49E+00
7/20/2022	1.93E+02	5.26E+00
10/17/2022	1.98E+02	5.29E+00
1/25/2023	1.84E+02	5.21E+00
4/27/2023	1.96E+02	5.28E+00

**Conclusion of Statistical Analysis on Current Data**

**The test well(s) listed exceeded the Upper Tolerance Limit, which is evidence of elevated concentration with respect to current background data.**

**Wells with Exceedances**

MW372

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum ((background result-X)^2)/[count of background results -1]]^0.5

TL Upper Tolerance Limit, TL = X + (K \* S), LL Lower Tolerance Limit, LL = X - (K \* S)

X Mean, X = (sum of background results)/(count of background results)

\*\* Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009.

**Magnesium**

**UNITS: mg/L**

**URGA**

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is statistically significant evidence of elevated concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

**Statistics-Background Data**      X= 10.313    S= 1.412    CV(1)=0.137    K factor\*\*= 2.523    TL(1)= 1.39E+01    LL(1)=N/A

**Statistics-Transformed Background Data**      X= 2.324    S= 0.141    CV(2)=0.061    K factor\*\*= 2.523    TL(2)= 2.68E+00    LL(2)=N/A

**Current Background Data from Upgradient Wells with Transformed Result**

**Because CV(1) is less than or equal to 1, assume normal distribution and continue with statistical analysis utilizing TL(1).**

Well Number: MW220

Date Collected	Result	LN(Result)
7/19/2021	9.29E+00	2.23E+00
10/27/2021	8.31E+00	2.12E+00
1/19/2022	9.20E+00	2.22E+00
4/13/2022	1.21E+01	2.49E+00
7/18/2022	8.67E+00	2.16E+00
10/18/2022	8.36E+00	2.12E+00
1/23/2023	8.28E+00	2.11E+00
5/1/2023	1.19E+01	2.48E+00

**Current Quarter Data**

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW372	Downgradient	Yes	2.11E+01	YES	3.05E+00	N/A
MW387	Downgradient	Yes	1.57E+01	YES	2.75E+00	N/A

Well Number: MW394

Date Collected	Result	LN(Result)
7/21/2021	1.07E+01	2.37E+00
10/18/2021	1.03E+01	2.33E+00
1/13/2022	1.05E+01	2.35E+00
4/19/2022	1.18E+01	2.47E+00
7/20/2022	1.17E+01	2.46E+00
10/17/2022	1.12E+01	2.42E+00
1/25/2023	1.14E+01	2.43E+00
4/27/2023	1.13E+01	2.42E+00

**Conclusion of Statistical Analysis on Current Data**

**The test well(s) listed exceeded the Upper Tolerance Limit, which is evidence of elevated concentration with respect to current background data.**

**Wells with Exceedances**

MW372  
MW387

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum ((background result-X)^2)/[count of background results -1]]^0.5

TL Upper Tolerance Limit, TL = X + (K \* S), LL Lower Tolerance Limit, LL = X - (K \* S)

X Mean, X = (sum of background results)/(count of background results)

\*\* Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009.

**C-746-S/T Third Quarter 2023 Statistical Analysis**

**Current Background Comparison**

**Oxidation-Reduction Potential**

**UNITS: mV**

**URGA**

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is statistically significant evidence of elevated concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

**Statistics-Background Data**      X= 417.188 S= 40.359 CV(1)=0.097      K factor\*\*= 2.523      TL(1)= 5.19E+02      LL(1)=N/A

**Statistics-Transformed Background Data**      X= 6.029      S= 0.097      CV(2)=0.016      K factor\*\*= 2.523      TL(2)= 6.27E+00      LL(2)=N/A

**Current Background Data from Upgradient Wells with Transformed Result**

**Because CV(1) is less than or equal to 1, assume normal distribution and continue with statistical analysis utilizing TL(1).**

Well Number: MW220

Date Collected	Result	LN(Result)
7/19/2021	4.06E+02	6.01E+00
10/27/2021	4.43E+02	6.09E+00
1/19/2022	4.06E+02	6.01E+00
4/13/2022	4.12E+02	6.02E+00
7/18/2022	4.11E+02	6.02E+00
10/18/2022	3.98E+02	5.99E+00
1/23/2023	3.66E+02	5.90E+00
5/1/2023	4.77E+02	6.17E+00

Well Number: MW394

Date Collected	Result	LN(Result)
7/21/2021	4.08E+02	6.01E+00
10/18/2021	3.70E+02	5.91E+00
1/13/2022	3.93E+02	5.97E+00
4/19/2022	4.32E+02	6.07E+00
7/20/2022	4.87E+02	6.19E+00
10/17/2022	3.46E+02	5.85E+00
1/25/2023	4.69E+02	6.15E+00
4/27/2023	4.51E+02	6.11E+00

**Current Quarter Data**

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW222	Sidegradient	Yes	4.05E+02	NO	6.00E+00	N/A
MW223	Sidegradient	Yes	4.00E+02	NO	5.99E+00	N/A
MW369	Downgradient	Yes	4.06E+02	NO	6.01E+00	N/A
MW384	Sidegradient	Yes	4.69E+02	NO	6.15E+00	N/A
MW387	Downgradient	Yes	4.10E+02	NO	6.02E+00	N/A
MW391	Downgradient	Yes	4.43E+02	NO	6.09E+00	N/A
MW394	Upgradient	Yes	4.94E+02	NO	6.20E+00	N/A

**Conclusion of Statistical Analysis on Current Data**

**None of the test wells exceeded the Upper Tolerance Limit, which is evidence that concentrations in these wells are not different from current background concentrations to a statistically-significant level.**

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum ((background result-X)^2)/[count of background results -1]]^0.5

TL Upper Tolerance Limit, TL = X + (K \* S), LL Lower Tolerance Limit, LL = X - (K \* S)

X Mean, X = (sum of background results)/(count of background results)

\*\* Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009.

**C-746-S/T Third Quarter 2023 Statistical Analysis      Current Background Comparison**

**Sulfate**

**UNITS: mg/L**

**URGA**

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is statistically significant evidence of elevated concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

**Statistics-Background Data**      X= 15.238    S= 3.994    CV(1)=0.262    K factor\*\*= 2.523    TL(1)= 2.53E+01    LL(1)=N/A

**Statistics-Transformed Background Data**      X= 2.694    S= 0.247    CV(2)=0.092    K factor\*\*= 2.523    TL(2)= 3.32E+00    LL(2)=N/A

**Current Background Data from Upgradient Wells with Transformed Result**

**Because CV(1) is less than or equal to 1, assume normal distribution and continue with statistical analysis utilizing TL(1).**

Well Number: MW220

Date Collected	Result	LN(Result)
7/19/2021	1.70E+01	2.83E+00
10/27/2021	1.69E+01	2.83E+00
1/19/2022	1.92E+01	2.95E+00
4/13/2022	2.49E+01	3.21E+00
7/18/2022	1.85E+01	2.92E+00
10/18/2022	1.57E+01	2.75E+00
1/23/2023	1.64E+01	2.80E+00
5/1/2023	2.00E+01	3.00E+00

Well Number: MW394

Date Collected	Result	LN(Result)
7/21/2021	1.18E+01	2.47E+00
10/18/2021	1.19E+01	2.48E+00
1/13/2022	1.17E+01	2.46E+00
4/19/2022	1.17E+01	2.46E+00
7/20/2022	1.22E+01	2.50E+00
10/17/2022	1.21E+01	2.49E+00
1/25/2023	1.21E+01	2.49E+00
4/27/2023	1.17E+01	2.46E+00

**Current Quarter Data**

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	Yes	1.78E+01	NO	2.88E+00	N/A
MW372	Downgradient	Yes	1.45E+02	YES	4.98E+00	N/A
MW384	Sidegradient	Yes	2.37E+01	NO	3.17E+00	N/A
MW387	Downgradient	Yes	3.15E+01	YES	3.45E+00	N/A

**Conclusion of Statistical Analysis on Current Data**

**The test well(s) listed exceeded the Upper Tolerance Limit, which is evidence of elevated concentration with respect to current background data.**

**Wells with Exceedances**

MW372  
MW387

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum ((background result-X)^2)/[count of background results -1]]^0.5

TL Upper Tolerance Limit, TL = X + (K \* S), LL Lower Tolerance Limit, LL = X - (K \* S)

X Mean, X = (sum of background results)/(count of background results)

\*\* Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009. D2-10



**C-746-S/T Third Quarter 2023 Statistical Analysis**

**Current Background Comparison**

**Technetium-99**

**UNITS: pCi/L**

**URGA**

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is statistically significant evidence of elevated concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

**Statistics-Background Data**      X= 10.849    S= 6.048    CV(1)=0.557    K factor\*\*= 2.523    TL(1)= 2.61E+01    LL(1)=N/A

**Statistics-Transformed Background Data**      X= 2.097    S= 1.004    CV(2)=0.479    K factor\*\*= 2.523    TL(2)= 4.63E+00    LL(2)=N/A

**Current Background Data from Upgradient Wells with Transformed Result**

**Because CV(1) is less than or equal to 1, assume normal distribution and continue with statistical analysis utilizing TL(1).**

Well Number: MW220

Date Collected	Result	LN(Result)
7/19/2021	1.33E+01	2.59E+00
10/27/2021	1.27E+01	2.54E+00
1/19/2022	1.74E+01	2.86E+00
4/13/2022	1.60E+01	2.77E+00
7/18/2022	1.92E+01	2.95E+00
10/18/2022	2.13E+01	3.06E+00
1/23/2023	1.42E+01	2.65E+00
5/1/2023	1.13E+01	2.42E+00

Well Number: MW394

Date Collected	Result	LN(Result)
7/21/2021	9.97E+00	2.30E+00
10/18/2021	6.06E+00	1.80E+00
1/13/2022	5.46E+00	1.70E+00
4/19/2022	4.38E-01	-8.26E-01
7/20/2022	6.73E+00	1.91E+00
10/17/2022	1.11E+01	2.41E+00
1/25/2023	1.64E+00	4.95E-01
4/27/2023	6.79E+00	1.92E+00

**Current Quarter Data**

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW369	Downgradient	Yes	5.61E+01	YES	4.03E+00	N/A
MW384	Sidegradient	Yes	7.38E+01	YES	4.30E+00	N/A
MW387	Downgradient	Yes	4.58E+01	YES	3.82E+00	N/A

**Conclusion of Statistical Analysis on Current Data**

**The test well(s) listed exceeded the Upper Tolerance Limit, which is evidence of elevated concentration with respect to current background data.**

**Wells with Exceedances**

- MW369
- MW384
- MW387

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum ((background result-X)^2)/[count of background results -1]]^0.5

TL Upper Tolerance Limit, TL = X + (K \* S), LL Lower Tolerance Limit, LL = X - (K \* S)

X Mean, X = (sum of background results)/(count of background results)

\*\* Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009. D2-11

**Calcium**

**UNITS: mg/L**

**LRGA**

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is statistically significant evidence of elevated concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

**Statistics-Background Data**      X= 22.131    S= 3.940    CV(1)=0.178    K factor\*\*= 2.523    TL(1)= 3.21E+01    LL(1)=N/A

**Statistics-Transformed Background Data**      X= 3.082    S= 0.179    CV(2)=0.058    K factor\*\*= 2.523    TL(2)= 3.53E+00    LL(2)=N/A

**Current Background Data from Upgradient Wells with Transformed Result**

**Because CV(1) is less than or equal to 1, assume normal distribution and continue with statistical analysis utilizing TL(1).**

Well Number: MW395

Date Collected	Result	LN(Result)
7/21/2021	2.50E+01	3.22E+00
10/18/2021	2.43E+01	3.19E+00
1/13/2022	2.55E+01	3.24E+00
4/19/2022	2.64E+01	3.27E+00
7/20/2022	2.49E+01	3.21E+00
10/17/2022	2.69E+01	3.29E+00
1/25/2023	2.69E+01	3.29E+00
4/27/2023	2.71E+01	3.30E+00

**Current Quarter Data**

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW373	Downgradient	Yes	7.87E+01	YES	4.37E+00	N/A

Well Number: MW397

Date Collected	Result	LN(Result)
7/19/2021	1.83E+01	2.91E+00
10/14/2021	1.81E+01	2.90E+00
1/13/2022	1.82E+01	2.90E+00
4/19/2022	1.85E+01	2.92E+00
7/18/2022	1.85E+01	2.92E+00
10/18/2022	1.87E+01	2.93E+00
1/23/2023	1.81E+01	2.90E+00
5/1/2023	1.87E+01	2.93E+00

**Conclusion of Statistical Analysis on Current Data**

**The test well(s) listed exceeded the Upper Tolerance Limit, which is evidence of elevated concentration with respect to current background data.**

**Wells with Exceedances**

MW373

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum ((background result-X)^2)/[count of background results -1]]^0.5

TL Upper Tolerance Limit, TL = X + (K \* S), LL Lower Tolerance Limit, LL = X - (K \* S)

X Mean, X = (sum of background results)/(count of background results)

\*\* Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009.



**C-746-S/T Third Quarter 2023 Statistical Analysis      Current Background Comparison**

**Conductivity**

**UNITS: umho/cm**

**LRGA**

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is statistically significant evidence of elevated concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

**Statistics-Background Data**      X= 352.813   S= 34.159   CV(1)=0.097      **K factor\*\*= 2.523**      TL(1)= 4.39E+02   LL(1)=N/A

**Statistics-Transformed Background Data**      X= 5.861   S= 0.098   CV(2)=0.017      **K factor\*\*= 2.523**      TL(2)= 6.11E+00   LL(2)=N/A

**Current Background Data from Upgradient Wells with Transformed Result**

**Because CV(1) is less than or equal to 1, assume normal distribution and continue with statistical analysis utilizing TL(1).**

Well Number: MW395

Date Collected	Result	LN(Result)
7/21/2021	3.72E+02	5.92E+00
10/18/2021	3.75E+02	5.93E+00
1/13/2022	3.76E+02	5.93E+00
4/19/2022	3.83E+02	5.95E+00
7/20/2022	3.80E+02	5.94E+00
10/17/2022	3.88E+02	5.96E+00
1/25/2023	3.93E+02	5.97E+00
4/27/2023	4.05E+02	6.00E+00

**Current Quarter Data**

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW373	Downgradient	Yes	9.10E+02	YES	6.81E+00	N/A

Well Number: MW397

Date Collected	Result	LN(Result)
7/19/2021	3.26E+02	5.79E+00
10/14/2021	2.95E+02	5.69E+00
1/13/2022	3.40E+02	5.83E+00
4/19/2022	3.26E+02	5.79E+00
7/18/2022	3.20E+02	5.77E+00
10/18/2022	3.24E+02	5.78E+00
1/23/2023	3.22E+02	5.77E+00
5/1/2023	3.20E+02	5.77E+00

**Conclusion of Statistical Analysis on Current Data**

**The test well(s) listed exceeded the Upper Tolerance Limit, which is evidence of elevated concentration with respect to current background data.**

**Wells with Exceedances**

MW373

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum ((background result-X)^2)/[count of background results -1]]^0.5

TL Upper Tolerance Limit, TL = X + (K \* S),      LL Lower Tolerance Limit, LL = X - (K \* S)

X Mean, X = (sum of background results)/(count of background results)

\*\* Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009.

**C-746-S/T Third Quarter 2023 Statistical Analysis      Current Background Comparison**

**Dissolved Solids**

**UNITS: mg/L**

**LRGA**

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is statistically significant evidence of elevated concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

**Statistics-Background Data**      X= 176.688   S= 25.019   CV(1)=0.142      **K factor\*\*= 2.523**      TL(1)= 2.40E+02   LL(1)=N/A

**Statistics-Transformed Background Data**      X= 5.164   S= 0.148   CV(2)=0.029      **K factor\*\*= 2.523**      TL(2)= 5.54E+00   LL(2)=N/A

**Current Background Data from Upgradient Wells with Transformed Result**

**Because CV(1) is less than or equal to 1, assume normal distribution and continue with statistical analysis utilizing TL(1).**

Well Number: MW395

Date Collected	Result	LN(Result)
7/21/2021	2.04E+02	5.32E+00
10/18/2021	1.94E+02	5.27E+00
1/13/2022	2.01E+02	5.30E+00
4/19/2022	2.10E+02	5.35E+00
7/20/2022	1.99E+02	5.29E+00
10/17/2022	1.96E+02	5.28E+00
1/25/2023	1.80E+02	5.19E+00
4/27/2023	1.94E+02	5.27E+00

**Current Quarter Data**

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW373	Downgradient	Yes	5.14E+02	YES	6.24E+00	N/A

Well Number: MW397

Date Collected	Result	LN(Result)
7/19/2021	1.73E+02	5.15E+00
10/14/2021	1.66E+02	5.11E+00
1/13/2022	1.41E+02	4.95E+00
4/19/2022	1.80E+02	5.19E+00
7/18/2022	1.46E+02	4.98E+00
10/18/2022	1.57E+02	5.06E+00
1/23/2023	1.58E+02	5.06E+00
5/1/2023	1.28E+02	4.85E+00

**Conclusion of Statistical Analysis on Current Data**

**The test well(s) listed exceeded the Upper Tolerance Limit, which is evidence of elevated concentration with respect to current background data.**

**Wells with Exceedances**

MW373

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum ((background result-X)^2)/[count of background results -1]]^0.5

TL Upper Tolerance Limit, TL = X + (K \* S), LL Lower Tolerance Limit, LL = X - (K \* S)

X Mean, X = (sum of background results)/(count of background results)

\*\* Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009.

**C-746-S/T Third Quarter 2023 Statistical Analysis      Current Background Comparison**

**Magnesium**

**UNITS: mg/L**

**LRGA**

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is statistically significant evidence of elevated concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

**Statistics-Background Data**      X= 9.342    S= 1.714    CV(1)=0.183    K factor\*\*= 2.523    TL(1)= 1.37E+01    LL(1)=N/A

**Statistics-Transformed Background Data**      X= 2.219    S= 0.185    CV(2)=0.083    K factor\*\*= 2.523    TL(2)= 2.68E+00    LL(2)=N/A

**Current Background Data from Upgradient Wells with Transformed Result**

**Because CV(1) is less than or equal to 1, assume normal distribution and continue with statistical analysis utilizing TL(1).**

Well Number: MW395

Date Collected	Result	LN(Result)
7/21/2021	1.06E+01	2.36E+00
10/18/2021	1.03E+01	2.33E+00
1/13/2022	1.06E+01	2.36E+00
4/19/2022	1.10E+01	2.40E+00
7/20/2022	1.12E+01	2.42E+00
10/17/2022	1.13E+01	2.42E+00
1/25/2023	1.14E+01	2.43E+00
4/27/2023	1.14E+01	2.43E+00

**Current Quarter Data**

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW373	Downgradient	Yes	2.66E+01	YES	3.28E+00	N/A

Well Number: MW397

Date Collected	Result	LN(Result)
7/19/2021	7.62E+00	2.03E+00
10/14/2021	7.57E+00	2.02E+00
1/13/2022	7.53E+00	2.02E+00
4/19/2022	7.79E+00	2.05E+00
7/18/2022	7.71E+00	2.04E+00
10/18/2022	7.84E+00	2.06E+00
1/23/2023	7.66E+00	2.04E+00
5/1/2023	7.95E+00	2.07E+00

**Conclusion of Statistical Analysis on Current Data**

**The test well(s) listed exceeded the Upper Tolerance Limit, which is evidence of elevated concentration with respect to current background data.**

**Wells with Exceedances**

MW373

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum ((background result-X)^2)/[count of background results -1]]^0.5

TL Upper Tolerance Limit, TL = X + (K \* S), LL Lower Tolerance Limit, LL = X - (K \* S)

X Mean, X = (sum of background results)/(count of background results)

\*\* Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009.

<b>C-746-S/T Third Quarter 2023 Statistical Analysis</b>	<b>Current Background Comparison</b>
<b>Oxidation-Reduction Potential</b>	<b>LRGA</b>
<b>UNITS: mV</b>	

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is statistically significant evidence of elevated concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

**Statistics-Background Data**      X= 384.125   S= 66.445   CV(1)=0.173      **K factor\*\*= 2.523**      TL(1)= 5.52E+02   LL(1)=N/A

**Statistics-Transformed Background Data**      X= 5.933   S= 0.212   CV(2)=0.036      **K factor\*\*= 2.523**      TL(2)= 6.47E+00   LL(2)=N/A

<b>Current Background Data from Upgradient Wells with Transformed Result</b>
--

**Because CV(1) is less than or equal to 1, assume normal distribution and continue with statistical analysis utilizing TL(1).**

Well Number: MW395

Date Collected	Result	LN(Result)
7/21/2021	4.14E+02	6.03E+00
10/18/2021	3.91E+02	5.97E+00
1/13/2022	3.95E+02	5.98E+00
4/19/2022	4.12E+02	6.02E+00
7/20/2022	4.25E+02	6.05E+00
10/17/2022	3.26E+02	5.79E+00
1/25/2023	4.25E+02	6.05E+00
4/27/2023	1.90E+02	5.25E+00

Well Number: MW397

Date Collected	Result	LN(Result)
7/19/2021	4.22E+02	6.05E+00
10/14/2021	3.15E+02	5.75E+00
1/13/2022	3.52E+02	5.86E+00
4/19/2022	4.40E+02	6.09E+00
7/18/2022	4.15E+02	6.03E+00
10/18/2022	3.71E+02	5.92E+00
1/23/2023	3.77E+02	5.93E+00
5/1/2023	4.76E+02	6.17E+00

<b>Current Quarter Data</b>
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Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW370	Downgradient	Yes	3.88E+02	NO	5.96E+00	N/A
MW373	Downgradient	Yes	3.84E+02	NO	5.95E+00	N/A
MW385	Sidegradient	Yes	3.86E+02	NO	5.96E+00	N/A
MW388	Downgradient	Yes	4.32E+02	NO	6.07E+00	N/A
MW392	Downgradient	Yes	4.28E+02	NO	6.06E+00	N/A
MW395	Upgradient	Yes	3.02E+02	NO	5.71E+00	N/A
MW397	Upgradient	Yes	4.05E+02	NO	6.00E+00	N/A

<b>Conclusion of Statistical Analysis on Current Data</b>
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**None of the test wells exceeded the Upper Tolerance Limit, which is evidence that concentrations in these wells are not different from current background concentrations to a statistically-significant level.**

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation,  $CV = S/X$  If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation,  $S = [\text{Sum}([(background\ result-X)^2]/[\text{count of background results} - 1])]^{0.5}$

TL Upper Tolerance Limit,  $TL = X + (K * S)$ ,      LL Lower Tolerance Limit,  $LL = X - (K * S)$

X Mean,  $X = (\text{sum of background results})/(\text{count of background results})$

\*\* Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009.

**C-746-S/T Third Quarter 2023 Statistical Analysis      Current Background Comparison**

**Sulfate**

**UNITS: mg/L**

**LRGA**

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is statistically significant evidence of elevated concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

**Statistics-Background Data**      X= 11.713    S= 0.287    CV(1)=0.025    K factor\*\*= 2.523    TL(1)= 1.24E+01    LL(1)=N/A

**Statistics-Transformed Background Data**      X= 2.460    S= 0.025    CV(2)=0.010    K factor\*\*= 2.523    TL(2)= 2.52E+00    LL(2)=N/A

**Current Background Data from Upgradient Wells with Transformed Result**

**Because CV(1) is less than or equal to 1, assume normal distribution and continue with statistical analysis utilizing TL(1).**

Well Number: MW395

Date Collected	Result	LN(Result)
7/21/2021	1.18E+01	2.47E+00
10/18/2021	1.19E+01	2.48E+00
1/13/2022	1.16E+01	2.45E+00
4/19/2022	1.16E+01	2.45E+00
7/20/2022	1.19E+01	2.48E+00
10/17/2022	1.17E+01	2.46E+00
1/25/2023	1.17E+01	2.46E+00
4/27/2023	1.10E+01	2.40E+00

Well Number: MW397

Date Collected	Result	LN(Result)
7/19/2021	1.13E+01	2.42E+00
10/14/2021	1.20E+01	2.48E+00
1/13/2022	1.17E+01	2.46E+00
4/19/2022	1.18E+01	2.47E+00
7/18/2022	1.19E+01	2.48E+00
10/18/2022	1.14E+01	2.43E+00
1/23/2023	1.20E+01	2.48E+00
5/1/2023	1.21E+01	2.49E+00

**Current Quarter Data**

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW370	Downgradient	Yes	2.03E+01	YES	3.01E+00	N/A
MW373	Downgradient	Yes	1.80E+02	YES	5.19E+00	N/A
MW385	Sidegradient	Yes	1.93E+01	YES	2.96E+00	N/A
MW388	Downgradient	Yes	2.00E+01	YES	3.00E+00	N/A

**Conclusion of Statistical Analysis on Current Data**

**The test well(s) listed exceeded the Upper Tolerance Limit, which is evidence of elevated concentration with respect to current background data.**

**Wells with Exceedances**

- MW370
- MW373
- MW385
- MW388

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum ((background result-X)^2)/[count of background results -1]]^0.5

TL Upper Tolerance Limit, TL = X + (K \* S), LL Lower Tolerance Limit, LL = X - (K \* S)

X Mean, X = (sum of background results)/(count of background results)

\*\* Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009. D2-17

<b>C-746-S/T Third Quarter 2023 Statistical Analysis</b>	<b>Current Background Comparison</b>
<b>Technetium-99</b>	<b>UNITS: pCi/L</b>
	<b>LRGA</b>

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is statistically significant evidence of elevated concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

<b>Statistics-Background Data</b>	X= 11.487	S= 5.113	CV(1)=0.445	K factor**= 2.523	TL(1)= 2.44E+01	LL(1)=N/A
<b>Statistics-Transformed Background Data</b>	X= 2.330	S= 0.529	CV(2)=0.227	K factor**= 2.523	TL(2)= 3.66E+00	LL(2)=N/A

<b>Current Background Data from Upgradient Wells with Transformed Result</b>
--

**Because CV(1) is less than or equal to 1, assume normal distribution and continue with statistical analysis utilizing TL(1).**

Well Number: MW395

Date Collected	Result	LN(Result)
7/21/2021	9.45E+00	2.25E+00
10/18/2021	8.55E+00	2.15E+00
1/13/2022	5.03E+00	1.62E+00
4/19/2022	1.74E+01	2.86E+00
7/20/2022	1.11E+01	2.41E+00
10/17/2022	8.43E+00	2.13E+00
1/25/2023	1.25E+01	2.53E+00
4/27/2023	2.51E+00	9.20E-01

<b>Current Quarter Data</b>
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Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW385	Sidegradient	Yes	3.78E+01	YES	3.63E+00	N/A

Well Number: MW397

Date Collected	Result	LN(Result)
7/19/2021	1.38E+01	2.62E+00
10/14/2021	1.28E+01	2.55E+00
1/13/2022	1.81E+01	2.90E+00
4/19/2022	8.11E+00	2.09E+00
7/18/2022	1.04E+01	2.34E+00
10/18/2022	2.30E+01	3.14E+00
1/23/2023	8.51E+00	2.14E+00
5/1/2023	1.41E+01	2.65E+00

<b>Conclusion of Statistical Analysis on Current Data</b>
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**The test well(s) listed exceeded the Upper Tolerance Limit, which is evidence of elevated concentration with respect to current background data.**

<b>Wells with Exceedances</b>
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MW385

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation,  $CV = S/X$  If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation,  $S = [\text{Sum}([(background\ result - X)^2] / [\text{count of background results} - 1])]^{0.5}$

TL Upper Tolerance Limit,  $TL = X + (K * S)$ , LL Lower Tolerance Limit,  $LL = X - (K * S)$

X Mean,  $X = (\text{sum of background results}) / (\text{count of background results})$

\*\* Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009. D2-18

**ATTACHMENT D3**

**STATISTICIAN QUALIFICATION STATEMENT**

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November 1, 2023

Mr. Dennis Greene  
Four Rivers Nuclear Partnership, LLC  
5511 Hobbs Road  
Kevil, KY 42053

Dear Mr. Greene:

As an Environmental Scientist, with a bachelor's degree in Earth Sciences/Geology, I have over 30 years of experience in reviewing and assessing laboratory analytical results associated with environmental sampling and investigation activities. For the generation of these statistical analyses, my work was reviewed by a qualified independent technical reviewer with Four Rivers Nuclear Partnership, LLC.

For this project, the statistical analyses conducted on the third quarter 2023 monitoring well data collected from the C-746-S&T and C-746-U Landfills were performed in accordance with guidance provided in the U.S. Environmental Protection Agency guidance document, *EPA Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Interim Final Guidance* (1989).

Sincerely,



Bryan Smith

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**APPENDIX E**  
**GROUNDWATER FLOW RATE AND DIRECTION**

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## GROUNDWATER FLOW RATE AND DIRECTION

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Whenever monitoring wells (MWs) are sampled, 401 KAR 48:300, Section 11, requires determination of groundwater flow rate and direction of flow in the uppermost aquifer. The uppermost aquifer below the C-746-S&T Landfills is the Regional Gravel Aquifer (RGA). Water level measurements currently are recorded in several wells at the landfill on a quarterly basis. These measurements were used to plot the potentiometric surface of the RGA for the third quarter 2023 and to determine the groundwater flow rate and direction.

Water levels during this reporting period were measured on July 25, 2023. As shown on Figure E.1, MW389, screened in the Upper Continental Recharge System (UCRS), is usually dry, while other UCRS wells have recordable water levels. During this reporting period, MW389 did not have sufficient water for collection of a groundwater sample for laboratory analysis.

The UCRS has a strong vertical hydraulic gradient; therefore, the limited number of available UCRS wells, screened over different elevations, is not sufficient for mapping the potentiometric surface. Figure E.1 shows the location of UCRS MWs. The Upper Regional Gravel Aquifer (URGA) and Lower Regional Gravel Aquifer (LRGA) data were corrected for barometric pressure, if necessary, and converted to elevations to plot the potentiometric surface of the RGA, as a whole, as shown on Table E.1. Figure E.2 is a composite or average map of the URGA and LRGA elevations where well clusters exist. The contour lines are placed based on the average water level elevations of the clusters.<sup>1</sup> During July, RGA groundwater flow was directed inward and then north towards the Ohio River. Based on the site potentiometric map (Figure E.2), the hydraulic gradient beneath the landfill, as measured along the defined groundwater flow directions, is  $2.04 \times 10^{-4}$  ft/ft. Additional water level measurements in July (Figure E.3) document the vicinity groundwater hydraulic gradient for the RGA to be  $3.53 \times 10^{-4}$  ft/ft, northward. The hydraulic gradients are shown in Table E.2.

The average linear groundwater flow velocity ( $v$ ) is determined by multiplying the hydraulic gradient ( $i$ ) by the hydraulic conductivity ( $K$ ) [resulting in the specific discharge ( $q$ )] and dividing by the effective porosity ( $n_e$ ). The RGA hydraulic conductivity values used are reported in the administrative application for the New Solid Waste Landfill Permit No. 073-00045NWC1 and range from 425 to 725 ft/day (0.150 to 0.256 cm/s). RGA effective porosity is assumed to be 25%. Vicinity and site flow velocities were calculated using the low and high values for hydraulic conductivity, as shown in Table E.3.

Regional groundwater flow near the C-746-S&T Landfills typically trends northeastward toward the Ohio River. As demonstrated on the potentiometric map for July 2023, RGA groundwater flow from the landfill area was directed to the north.

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<sup>1</sup> Additional water level measurements, in wells at the C-746-U Landfill and in wells of the surrounding region (MW98, MW100, MW125, MW139, MW165A, MW173, MW193, MW197, and MW200), were used to contour the RGA potentiometric surface.

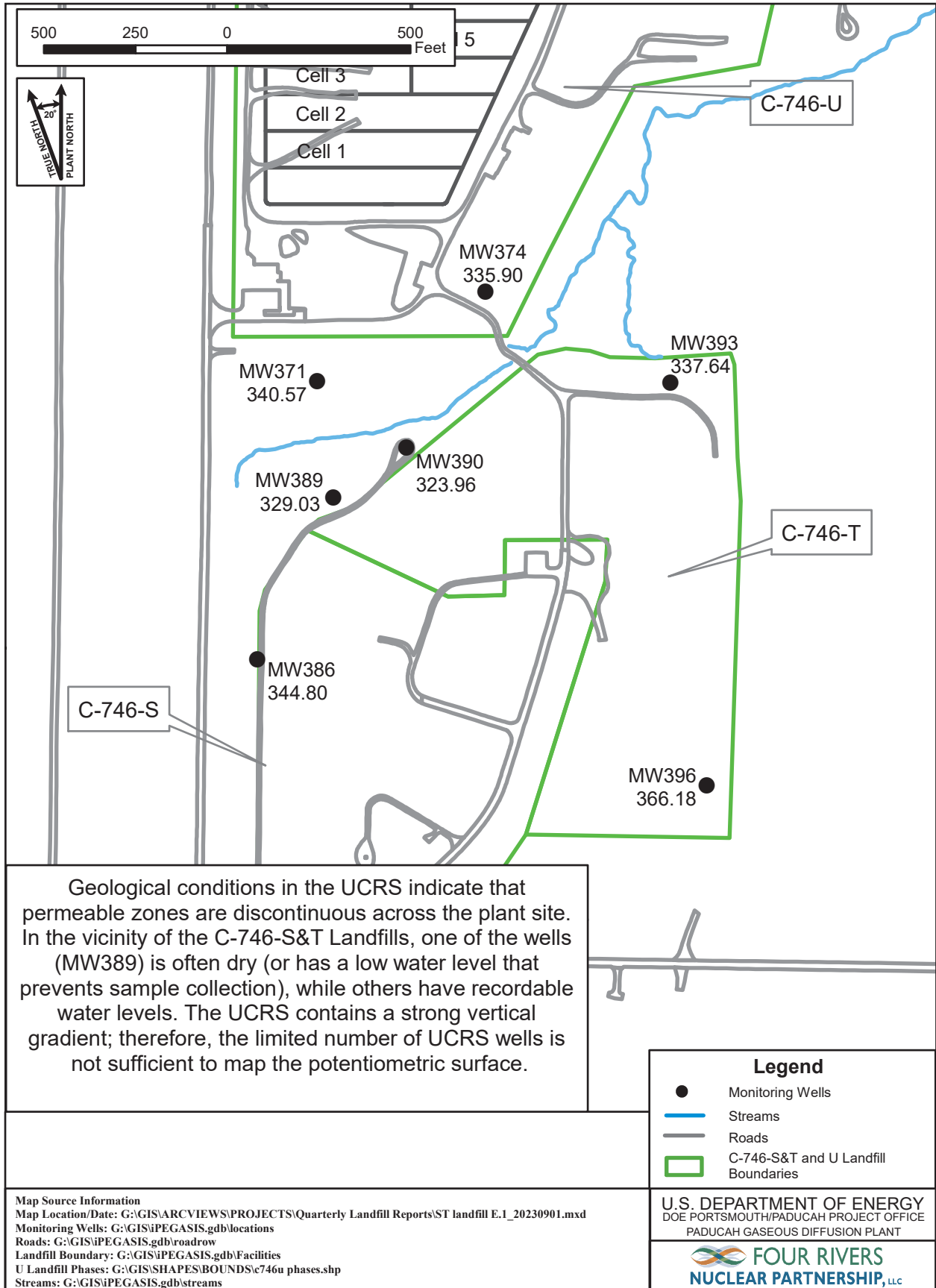


Figure E.1. Potentiometric Measurements of the Upper Continental Recharge System at the C-746-S&T Landfills, July 24-25, 2023

**Table E.1. C-746-S&T Landfills Third Quarter 2023 (July) Water Levels**

C-746-S&T Landfills (July 2023) Water Levels										
Date	Time	Well	Formation	Datum Elev (ft amsl)	BP (in Hg)	Delta BP (ft H2O)	Raw Data		*Corrected Data	
							DTW (ft)	Elev (ft amsl)	DTW (ft)	Elev (ft amsl)
7/25/2023	9:20	MW220	URGA	382.01	30.11	-0.01	57.84	324.17	57.83	324.18
7/25/2023	9:29	MW221	URGA	391.38	30.11	-0.01	67.43	323.95	67.42	323.96
7/25/2023	9:25	MW222	URGA	395.27	30.11	-0.01	71.31	323.96	71.30	323.97
7/25/2023	9:27	MW223	URGA	394.38	30.11	-0.01	70.42	323.96	70.41	323.97
7/25/2023	9:23	MW224	URGA	395.69	30.11	-0.01	71.66	324.03	71.65	324.04
7/25/2023	9:34	MW225	URGA	385.73	30.11	-0.01	61.70	324.03	61.69	324.04
7/25/2023	9:44	MW353	LRGA	375.05	30.11	-0.01	50.63	324.42	50.62	324.43
7/24/2023	8:40	MW369	URGA	364.23	30.10	0.00	40.24	323.99	40.24	323.99
7/24/2023	8:41	MW370	LRGA	365.12	30.10	0.00	41.12	324.00	41.12	324.00
7/24/2023	8:42	MW371	UCRS	364.64	30.10	0.00	24.07	340.57	24.07	340.57
7/24/2023	8:35	MW372	URGA	359.42	30.10	0.00	35.40	324.02	35.40	324.02
7/24/2023	8:37	MW373	LRGA	359.73	30.10	0.00	35.71	324.02	35.71	324.02
7/24/2023	8:36	MW374	UCRS	359.44	30.10	0.00	23.54	335.90	23.54	335.90
7/25/2023	9:13	MW384	URGA	365.29	30.11	-0.01	41.26	324.03	41.25	324.04
7/25/2023	9:15	MW385	LRGA	365.74	30.11	-0.01	41.65	324.09	41.64	324.10
7/25/2023	9:14	MW386	UCRS	365.32	30.11	-0.01	20.53	344.79	20.52	344.80
7/25/2023	9:10	MW387	URGA	363.48	30.11	-0.01	39.50	323.98	39.49	323.99
7/25/2023	9:09	MW388	LRGA	363.45	30.11	-0.01	39.46	323.99	39.45	324.00
7/25/2023	9:06	MW389	UCRS	364.11	30.11	-0.01	35.09	329.02	35.08	329.03
7/25/2023	9:03	MW390	UCRS	360.39	30.11	-0.01	36.44	323.95	36.43	323.96
7/25/2023	8:48	MW391	URGA	366.67	30.10	0.00	42.75	323.92	42.75	323.92
7/25/2023	8:50	MW392	LRGA	365.85	30.10	0.00	41.94	323.91	41.94	323.91
7/25/2023	8:49	MW393	UCRS	366.62	30.10	0.00	28.98	337.64	28.98	337.64
7/25/2023	8:56	MW394	URGA	378.46	30.11	-0.01	54.32	324.14	54.31	324.15
7/25/2023	8:58	MW395	LRGA	379.12	30.11	-0.01	55.00	324.12	54.99	324.13
7/25/2023	8:57	MW396	UCRS	378.75	30.11	-0.01	12.58	366.17	12.57	366.18
7/25/2023	9:00	MW397	LRGA	387.00	30.11	-0.01	62.84	324.16	62.83	324.17
7/25/2023	7:51	MW418	URGA	367.21	30.10	0.00	43.17	324.04	43.17	324.04
7/25/2023	7:52	MW419	LRGA	367.05	30.10	0.00	43.02	324.03	43.02	324.03
Reference Barometric Pressure					<b>30.10</b>					
Elev = elevation										
amsl = above mean sea level										
BP = barometric pressure										
DTW = depth to water in feet below datum										
URGA = Upper Regional Gravel Aquifer										
LRGA = Lower Regional Gravel Aquifer										
UCRS = Upper Continental Recharge System										
*Assumes a barometric efficiency of 1.0										

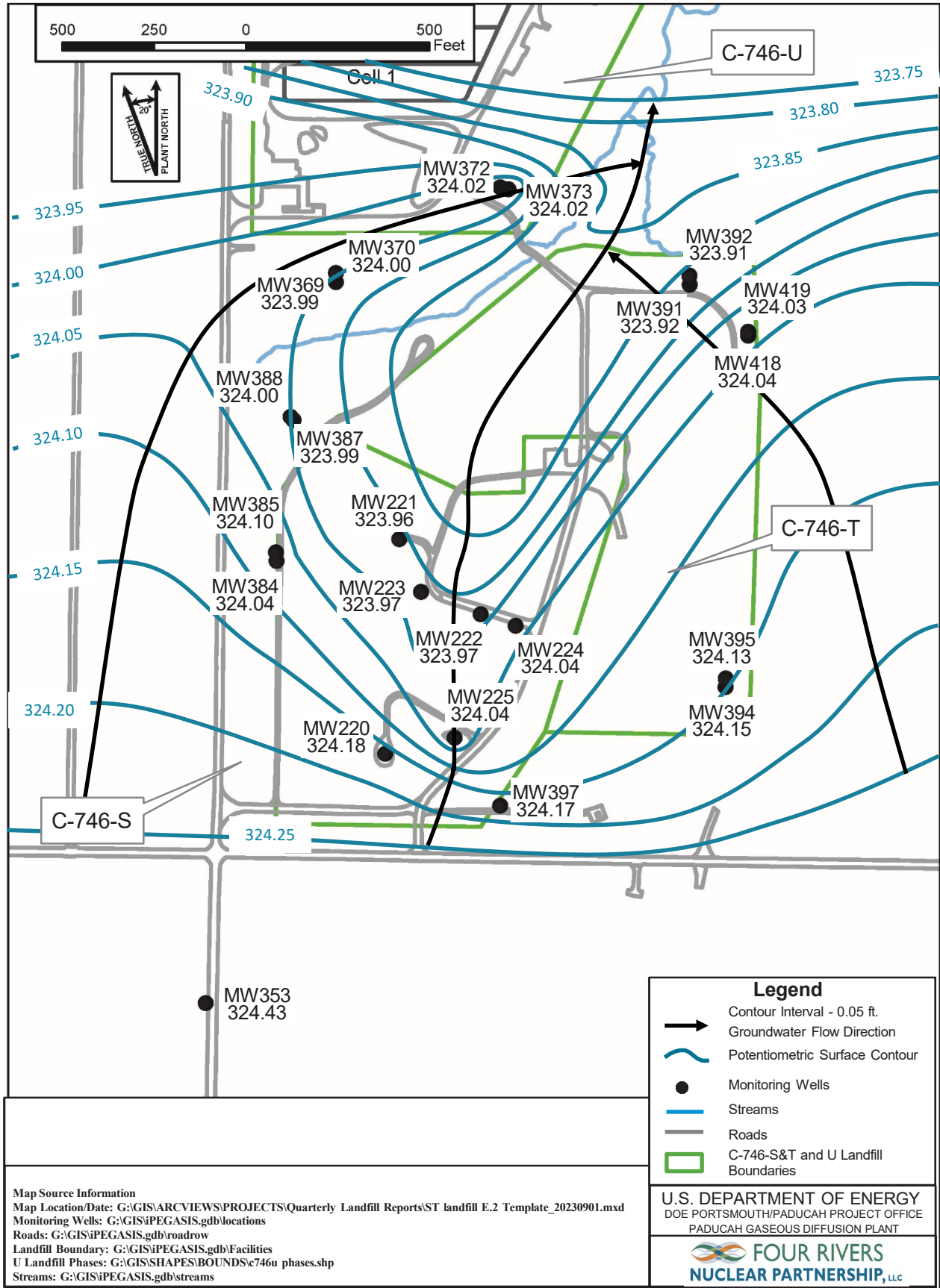


Figure E.2. Composite Potentiometric Surface of the Regional Gravel Aquifer at the C-746-S&T Landfills, July 24-25, 2023



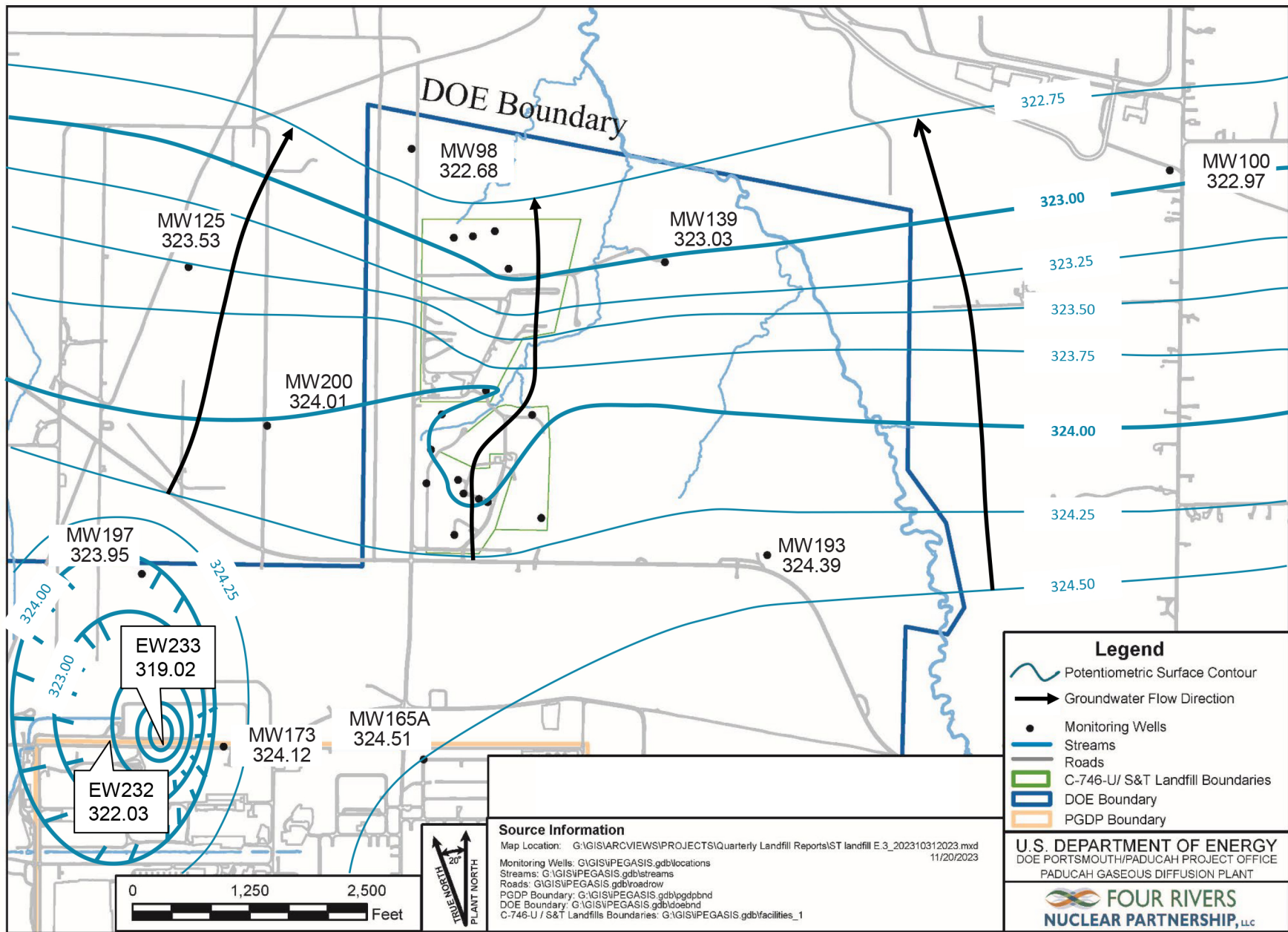


Figure E.3. Vicinity Potentiometric Surface of the Regional Gravel Aquifer, July 25, 2023

**Table E.2. C-746-S&T Landfills Hydraulic Gradients**

	ft/ft
Beneath Landfill Mound	$2.04 \times 10^{-4}$
Vicinity	$3.53 \times 10^{-4}$

**Table E.3. C-746-S&T Landfills Groundwater Flow Rate**

Hydraulic Conductivity (K)		Specific Discharge (q)		Average Linear Velocity (v)	
ft/day	cm/s	ft/day	cm/s	ft/day	cm/s
<u>Beneath Landfill Mound</u>					
725	0.256	0.148	5.22E-05	0.592	2.09E-04
425	0.150	0.087	3.06E-05	0.347	1.22E-04
<u>Vicinity</u>					
725	0.256	0.256	9.03E-05	1.02	3.61E-04
425	0.150	0.150	5.29E-05	0.600	2.12E-04

**APPENDIX F**  
**NOTIFICATIONS**

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## NOTIFICATIONS

In accordance with 401 *KAR* 48:300 § 7, the notification for parameters that exceed the maximum contaminant level (MCL) has been submitted to the Kentucky Division of Waste Management. The parameters are listed on page F-4. The notification for parameters that do not have MCLs but had statistically significant increased concentrations relative to historical background concentrations is provided below.

### STATISTICAL ANALYSIS OF PARAMETERS NOTIFICATION

The statistical analyses conducted on the third quarter 2023 groundwater data collected from the C-746-S&T Landfills monitoring wells were performed in accordance with *Groundwater Monitoring Plan for the Solid Waste Permitted Landfills (C-746-S Residential Landfill, C-746-T Inert Landfill, and C-746-U Contained Landfill) at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky* (LATA Kentucky 2014).

The following are the permit required parameters in 40 *CFR* § 302.4, Appendix A, which had statistically significant, increased concentrations relative to historical background concentrations.

	<u>Parameter</u>	<u>Monitoring Well</u>
<b>Upper Continental Recharge System</b>	Technetium-99	MW390
<b>Upper Regional Gravel Aquifer</b>	Technetium-99	MW369, MW384, MW387
<b>Lower Regional Gravel Aquifer</b>	Technetium-99	MW385

NOTE: Although technetium-99 is not cited in 40 *CFR* § 302.4, Appendix A, this radionuclide is being reported along with the parameters of this regulation.

8/22/2023

**Four Rivers Nuclear Partnership, LLC  
PROJECT ENVIRONMENTAL MEASUREMENTS SYSTEM  
C-746-S&T LANDFILLS  
SOLID WASTE PERMIT NUMBER SW07300014, SW07300015, SW07300045  
MAXIMUM CONTAMINANT LEVEL (MCL) EXCEEDANCE REPORT  
Quarterly Groundwater Sampling**

<b>AKGWA</b>	<b>Station</b>	<b>Analysis</b>	<b>Method</b>	<b>Results</b>	<b>Units</b>	<b>MCL</b>
8004-4818	MW370	Trichloroethene	8260D	5.48	ug/L	5
8004-4808	MW372	Trichloroethene	8260D	5.09	ug/L	5
8004-4802	MW394	Trichloroethene	8260D	6.47	ug/L	5
8004-4801	MW395	Trichloroethene	8260D	5.18	ug/L	5

NOTE 1: MCLs are defined in 401 KAR 47:030.

NOTE 2: MW369, MW370, MW372, and MW373 are down-gradient wells for the C-746-S and C-746-T Landfills and upgradient for the C-746-U Landfill. These wells are sampled with the C-746-U Landfill monitoring well network. These wells are reported on the exceedance reports for C-746-S, C-746-T, and C-746-U.

**APPENDIX G**  
**CHART OF MCL AND UTL EXCEEDANCES**

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**Chart of MCL and Historical UTL Exceedances for the C-746-S&T Landfills**

Groundwater Flow System	UCRS					URGA										LRGA							
	S	D	D	D	U	S	S	S	S	S	D	D	D	D	U	U	S	D	D	D	D	U	U
Monitoring Well	386	389	390	393	396	221	222	223	224	384	369	372	387	391	220	394	385	370	373	388	392	395	397
<b>ACETONE</b>																							
Quarter 3, 2003							*					*											
Quarter 4, 2003											*								*				
Quarter 1, 2005									*														
Quarter 4, 2019															*								
<b>ALPHA ACTIVITY</b>																							
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Quarter 4, 2008											■												
Quarter 4, 2010											■												
<b>ALUMINUM</b>																							
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<b>BARIUM</b>																							
Quarter 3, 2003							■	■															
Quarter 4, 2003							■	■															
<b>BETA ACTIVITY</b>																							
Quarter 4, 2002												■											
Quarter 1, 2003												■							■				

**Chart of MCL and Historical UTL Exceedances for the C-746-S&T Landfills (Continued)**

Groundwater Flow System	UCRS					URGA										LRGA							
	S	D	D	D	U	S	S	S	S	S	D	D	D	D	U	U	S	D	D	D	D	U	U
Monitoring Well	386	389	390	393	396	221	222	223	224	384	369	372	387	391	220	394	385	370	373	388	392	395	397
<b>BETA ACTIVITY</b>																							
Quarter 2, 2003			■	■														■			■		
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**Chart of MCL and Historical UTL Exceedances for the C-746-S&T Landfills (Continued)**

Groundwater Flow System	UCRS					URGA										LRGA							
	S	D	D	U	U	S	S	S	S	S	D	D	D	U	U	S	D	D	D	U	U		
Monitoring Well	386	389	390	393	396	221	222	223	224	384	369	372	387	391	220	394	385	370	373	388	392	395	397
<b>BETA ACTIVITY</b>																							
Quarter 4, 2018										■		■	■					■	■		■		
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**Chart of MCL and Historical UTL Exceedances for the C-746-S&T Landfills (Continued)**

Groundwater Flow System	UCRS					URGA										LRGA							
	S	D	D	U	U	S	S	S	S	S	D	D	D	U	U	S	D	D	D	U	U		
Monitoring Well	386	389	390	393	396	221	222	223	224	384	369	372	387	391	220	394	385	370	373	388	392	395	397
<b>CALCIUM</b>																							
Quarter 4, 2012												*							*				
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Quarter 3, 2020												*	*					*	*				
Quarter 4, 2020												*	*					*	*				
Quarter 1, 2021												*	*					*	*				
Quarter 2, 2021												*						*	*				
Quarter 3, 2021												*	*					*	*				
Quarter 4, 2021												*	*					*	*				
Quarter 1, 2022												*	*					*	*				
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Quarter 3, 2022												*	*					*	*				
Quarter 4, 2022												*	*					*	*				
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<b>CARBON DISULFIDE</b>																							
Quarter 4, 2010												*											
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<b>CHEMICAL OXYGEN DEMAND</b>																							
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Quarter 2, 2005	*																						
Quarter 3, 2005	*										*	*								*			
Quarter 4, 2005	*										*												
Quarter 1, 2006	*																						
Quarter 2, 2006	*																						
Quarter 3, 2006	*																						
Quarter 4, 2006																*							
Quarter 1, 2007	*									*													
Quarter 2, 2007	*																						
Quarter 3, 2007	*																						
Quarter 4, 2007	*																						
Quarter 1, 2008	*																						
Quarter 2, 2008	*																						

**Chart of MCL and Historical UTL Exceedances for the C-746-S&T Landfills (Continued)**

Groundwater Flow System	UCRS					URGA										LRGA							
	S	D	D	U	U	S	S	S	S	S	D	D	D	U	U	S	D	D	D	U	U		
Monitoring Well	386	389	390	393	396	221	222	223	224	384	369	372	387	391	220	394	385	370	373	388	392	395	397
<b>CHEMICAL OXYGEN DEMAND</b>																							
Quarter 3, 2008	*																						
Quarter 4, 2008	*																						
Quarter 1, 2009	*																						
Quarter 2, 2009	*																		*				
Quarter 3, 2009	*																						
Quarter 4, 2009	*																						
Quarter 1, 2010	*																						
Quarter 2, 2010	*																						
Quarter 3, 2010	*																						
Quarter 4, 2010	*																						
Quarter 3, 2011	*																						
Quarter 4, 2011	*																						
Quarter 1, 2012	*																						
Quarter 1, 2013	*																						
Quarter 3, 2013	*																						
Quarter 3, 2014	*								*			*						*					
Quarter 4, 2014								*															
Quarter 2, 2015																*							
Quarter 3, 2015															*								
Quarter 3, 2016			*								*												
Quarter 4, 2016																*							
Quarter 2, 2017								*															
Quarter 3, 2017	*														*								
Quarter 4, 2017							*																
Quarter 2, 2018													*									*	
Quarter 3, 2018												*											
Quarter 4, 2018														*								*	
Quarter 2, 2019				*							*	*					*					*	
Quarter 3, 2019											*	*					*			*		*	
Quarter 4, 2019	*			*				*		*	*				*						*		
Quarter 1, 2020					*				*												*		
Quarter 2, 2020															*								
Quarter 4, 2020															*								
Quarter 1, 2021											*												
Quarter 2, 2021						*									*								
Quarter 4, 2021	*																						
Quarter 1, 2022						*		*	*				*	*			*	*					
Quarter 2, 2022						*							*										
Quarter 4, 2022	*																						
Quarter 1, 2023																*							
Quarter 2, 2023					*							*											
<b>CHLORIDE</b>																							
Quarter 1, 2003			*																				
Quarter 4, 2003			*																				
Quarter 3, 2003			*																				
Quarter 4, 2003			*																				
Quarter 1, 2004			*																				
Quarter 2, 2004			*																				
Quarter 3, 2004			*																				
Quarter 4, 2004			*																				
Quarter 1, 2005			*																				
Quarter 2, 2005			*																				
Quarter 3, 2005			*																				
Quarter 4, 2005			*																				
Quarter 1, 2006																	*						
Quarter 2, 2006			*																				
Quarter 3, 2006			*																				
Quarter 4, 2006			*																				
Quarter 1, 2007			*																				
Quarter 2, 2007			*																				
Quarter 3, 2007			*																				
Quarter 4, 2007			*																				
Quarter 1, 2008			*																				
Quarter 2, 2008			*																				
Quarter 3, 2008			*																				
Quarter 4, 2008			*																				

**Chart of MCL and Historical UTL Exceedances for the C-746-S&T Landfills (Continued)**

Groundwater Flow System	UCRS					URGA										LRGA							
	S	D	D	U	U	S	S	S	S	S	D	D	D	U	U	S	D	D	D	U	U		
<b>Monitoring Well</b>	386	389	390	393	396	221	222	223	224	384	369	372	387	391	220	394	385	370	373	388	392	395	397
<b>CHLORIDE</b>																							
Quarter 1, 2009			*																				
Quarter 2, 2009			*																				
Quarter 3, 2009			*																				
Quarter 4, 2009			*																				
Quarter 1, 2010			*																				
Quarter 2, 2010			*																				
Quarter 3, 2010			*																				
Quarter 4, 2010			*																				
Quarter 2, 2011			*																				
Quarter 3, 2011			*																				
Quarter 4, 2011			*																				
Quarter 3, 2012			*																				
Quarter 3, 2013			*																				
Quarter 4, 2013			*																				
Quarter 4, 2014			*																				
Quarter 2, 2019																					*		
<b>CHROMIUM</b>																							
Quarter 4, 2002									■														
Quarter 1, 2003									■													■	
Quarter 2, 2003								■	■														
Quarter 3, 2009						■																	
Quarter 1, 2019						■																	
<b>COBALT</b>																							
Quarter 3, 2003								*															
<b>CONDUCTIVITY</b>																							
Quarter 4, 2002										*										*			
Quarter 1, 2003			*							*										*			
Quarter 2, 2003			*							*										*			
Quarter 3, 2003			*					*		*										*			
Quarter 4, 2003			*							*										*			
Quarter 1, 2004										*										*			
Quarter 2, 2004										*										*			
Quarter 3, 2004										*										*			
Quarter 4, 2004			*							*										*			
Quarter 1, 2005										*	*									*			
Quarter 2, 2005										*	*									*			
Quarter 3, 2005										*	*									*			
Quarter 4, 2005										*	*									*			
Quarter 1, 2006										*	*									*			
Quarter 2, 2006										*	*									*			
Quarter 3, 2006										*	*									*			
Quarter 4, 2006										*	*							*		*			
Quarter 1, 2007										*	*							*		*			
Quarter 2, 2007										*	*							*		*			
Quarter 3, 2007										*	*							*		*			
Quarter 4, 2007										*	*							*		*			
Quarter 1, 2008										*	*							*		*			
Quarter 2, 2008										*	*							*		*			
Quarter 3, 2008										*	*							*		*			
Quarter 4, 2008										*	*							*		*			
Quarter 1, 2009										*	*							*		*			
Quarter 2, 2009										*	*							*		*			
Quarter 3, 2009										*	*							*		*			
Quarter 4, 2009										*	*			*				*		*			
Quarter 1, 2010										*	*							*		*			
Quarter 2, 2010										*	*							*		*			
Quarter 3, 2010										*	*							*		*			
Quarter 4, 2010										*	*							*		*			
Quarter 1, 2011										*	*							*		*			
Quarter 2, 2011										*	*							*		*			
Quarter 3, 2011										*	*							*		*			
Quarter 4, 2011										*	*							*		*			
Quarter 1, 2012										*	*							*		*			
Quarter 2, 2012										*	*							*		*			
Quarter 3, 2012										*	*							*		*			

**Chart of MCL and Historical UTL Exceedances for the C-746-S&T Landfills (Continued)**

Groundwater Flow System	UCRS					URGA										LRGA							
	S	D	D	D	U	S	S	S	S	S	D	D	D	D	U	U	S	D	D	D	U	U	
Monitoring Well	386	389	390	393	396	221	222	223	224	384	369	372	387	391	220	394	385	370	373	388	392	395	397
<b>CONDUCTIVITY</b>																							
Quarter 4, 2012											*								*				
Quarter 1, 2013											*								*				
Quarter 2, 2013											*								*				
Quarter 3, 2013											*								*				
Quarter 4, 2013											*								*				
Quarter 1, 2014											*								*				
Quarter 2, 2014											*								*				
Quarter 3, 2014											*								*				
Quarter 4, 2014											*								*				
Quarter 1, 2015											*								*				
Quarter 2, 2015											*								*				
Quarter 3, 2015											*								*				
Quarter 4, 2015											*								*				
Quarter 1, 2016											*								*				
Quarter 2, 2016											*								*				
Quarter 3, 2016											*								*				
Quarter 4, 2016											*								*				
Quarter 1, 2017											*								*				
Quarter 2, 2017											*								*				
Quarter 3, 2017											*								*				
Quarter 4, 2017											*								*				
Quarter 1, 2018											*								*				
Quarter 2, 2018											*								*				
Quarter 3, 2018											*								*				
Quarter 4, 2018											*								*				
Quarter 1, 2019											*								*				
Quarter 2, 2019											*								*				
Quarter 3, 2019											*								*				
Quarter 4, 2019											*								*				
Quarter 1, 2020											*								*				
Quarter 2, 2020											*								*	*			
Quarter 3, 2020											*								*				
Quarter 4, 2020											*								*				
Quarter 1, 2021											*								*				
Quarter 2, 2021											*								*				
Quarter 3, 2021											*								*				
Quarter 4, 2021											*								*				
Quarter 1, 2022											*								*				
Quarter 2, 2022											*								*				
Quarter 3, 2022											*						*		*				
Quarter 4, 2022											*						*	*	*				
Quarter 1, 2023											*								*				
Quarter 2, 2023											*								*				
Quarter 3, 2023											*								*				
<b>DISSOLVED OXYGEN</b>																							
Quarter 3, 2006			*					*															
<b>DISSOLVED SOLIDS</b>																							
Quarter 4, 2002											*								*				
Quarter 1, 2003			*								*								*				
Quarter 2, 2003			*								*								*				
Quarter 3, 2003			*			*	*				*	*							*				
Quarter 4, 2003			*			*	*	*			*	*							*				
Quarter 1, 2004			*								*	*							*				
Quarter 2, 2004											*	*							*				
Quarter 3, 2004											*	*							*				
Quarter 4, 2004											*	*							*				
Quarter 1, 2005											*	*							*				
Quarter 2, 2005											*	*							*				
Quarter 3, 2005											*	*					*	*	*	*	*	*	
Quarter 4, 2005											*	*					*	*	*	*	*	*	
Quarter 1, 2006											*	*					*	*	*	*	*	*	
Quarter 2, 2006											*	*					*	*	*	*	*	*	
Quarter 3, 2006											*	*					*	*	*	*	*	*	
Quarter 4, 2006											*	*					*	*	*	*	*	*	
Quarter 1, 2007											*	*					*	*	*	*	*	*	
Quarter 2, 2007											*	*					*	*	*	*	*	*	
Quarter 3, 2007											*	*					*	*	*	*	*	*	
Quarter 4, 2007											*	*					*	*	*	*	*	*	

**Chart of MCL and Historical UTL Exceedances for the C-746-S&T Landfills (Continued)**

Groundwater Flow System	UCRS					URGA										LRGA							
	S	D	D	U	U	S	S	S	S	S	D	D	D	U	U	S	D	D	D	U	U		
Monitoring Well	386	389	390	393	396	221	222	223	224	384	369	372	387	391	220	394	385	370	373	388	392	395	397
<b>DISSOLVED SOLIDS</b>																							
Quarter 1, 2008												*								*			
Quarter 2, 2008												*								*			
Quarter 3, 2008												*								*			
Quarter 4, 2008										*		*								*			
Quarter 1, 2009												*								*			
Quarter 2, 2009												*	*							*			
Quarter 3, 2009												*	*							*			
Quarter 4, 2009												*	*							*			
Quarter 1, 2010												*	*							*			
Quarter 2, 2010										*		*	*							*			
Quarter 3, 2010										*		*								*			
Quarter 4, 2010										*		*								*			
Quarter 1, 2011										*		*								*			
Quarter 2, 2011												*	*							*			
Quarter 3, 2011												*								*			
Quarter 4, 2011												*								*			
Quarter 1, 2012											*	*	*							*			
Quarter 2, 2012												*								*			
Quarter 3, 2012										*		*	*							*			
Quarter 4, 2012										*		*	*							*			
Quarter 1, 2013										*		*								*			
Quarter 2, 2013												*								*			
Quarter 3, 2013												*								*			
Quarter 4, 2013												*								*			
Quarter 1, 2014												*	*							*			
Quarter 2, 2014												*								*			
Quarter 3, 2014									*			*	*							*			
Quarter 4, 2014												*	*							*			
Quarter 1, 2015												*								*			
Quarter 2, 2015												*								*			
Quarter 3, 2015												*								*			
Quarter 4, 2015									*			*							*	*			
Quarter 1, 2016												*								*			
Quarter 2, 2016												*	*	*						*			
Quarter 3, 2016												*								*			
Quarter 4, 2016												*								*			
Quarter 1, 2017												*								*			
Quarter 2, 2017												*								*			
Quarter 3, 2017												*		*	*					*			
Quarter 4, 2017												*								*			
Quarter 1, 2018												*								*			
Quarter 2, 2018												*								*			
Quarter 3, 2018												*		*						*			
Quarter 4, 2018												*								*			
Quarter 1, 2019												*								*			
Quarter 2, 2019												*								*			
Quarter 3, 2019												*	*							*			
Quarter 4, 2019												*								*			
Quarter 1, 2020												*	*							*			
Quarter 2, 2020												*	*							*			
Quarter 3, 2020										*		*	*				*			*			
Quarter 4, 2020												*	*							*			
Quarter 1, 2021												*								*			
Quarter 2, 2021												*	*							*			
Quarter 3, 2021												*	*							*			
Quarter 4, 2021												*	*							*			
Quarter 2, 2022												*	*							*			
Quarter 2, 2022												*	*							*			
Quarter 3, 2022												*								*			
Quarter 4, 2022												*								*			
Quarter 1, 2023												*								*			
Quarter 2, 2023												*								*			
Quarter 3, 2023												*								*			
<b>IODIDE</b>																							
Quarter 4, 2002																							*
Quarter 2, 2003							*																
Quarter 3, 2003													*										
Quarter 1, 2004				*																			
Quarter 3, 2010																						*	
Quarter 2, 2013										*													



**Chart of MCL and Historical UTL Exceedances for the C-746-S&T Landfills (Continued)**

Groundwater Flow System	UCRS					URGA										LRGA							
	S	D	D	D	U	S	S	S	S	S	D	D	D	D	U	U	S	D	D	D	U	U	
Monitoring Well	386	389	390	393	396	221	222	223	224	384	369	372	387	391	220	394	385	370	373	388	392	395	397
<b>IRON</b>																							
Quarter 1, 2003							*				*	*			*								
Quarter 2, 2003											*	*	*	*									
Quarter 3, 2003							*	*	*		*	*	*										
Quarter 4, 2003											*												
Quarter 1, 2004											*												
Quarter 2, 2004											*	*											
Quarter 3, 2004											*												
Quarter 4, 2004											*												
Quarter 1, 2005												*											
Quarter 2, 2005												*	*										
Quarter 1, 2006							*																
Quarter 2, 2006												*											
Quarter 3, 2006												*											
Quarter 1, 2007												*	*										
Quarter 2, 2007												*											
Quarter 2, 2008												*											
Quarter 3, 2008												*											
<b>MAGNESIUM</b>																							
Quarter 1, 2003				*																			
Quarter 2, 2003				*								*								*			
Quarter 3, 2003				*			*					*								*			
Quarter 4, 2003				*								*								*			
Quarter 1, 2004				*								*		*						*			
Quarter 2, 2004				*								*								*			
Quarter 3, 2004				*								*								*			
Quarter 4, 2004				*								*								*			
Quarter 1, 2005												*								*			
Quarter 2, 2005												*								*			
Quarter 3, 2005												*								*			
Quarter 4, 2005												*								*			
Quarter 1, 2006												*								*			
Quarter 2, 2006												*								*			
Quarter 3, 2006												*								*			
Quarter 4, 2006												*								*			
Quarter 1, 2007												*								*			
Quarter 2, 2007												*								*			
Quarter 3, 2007												*								*			
Quarter 4, 2007												*								*			
Quarter 1, 2008												*								*			
Quarter 2, 2008												*								*			
Quarter 3, 2008												*								*			
Quarter 4, 2008												*								*			
Quarter 1, 2009												*								*			
Quarter 2, 2009												*								*			
Quarter 3, 2009												*	*							*			
Quarter 4, 2009												*								*			
Quarter 1, 2010												*								*			
Quarter 2, 2010												*	*							*			
Quarter 3, 2010												*								*			
Quarter 4, 2010												*								*			
Quarter 1, 2011												*								*			
Quarter 2, 2011												*	*							*			
Quarter 3, 2011												*								*			
Quarter 4, 2011												*								*			
Quarter 1, 2012												*								*			
Quarter 2, 2012												*								*			
Quarter 3, 2012												*	*							*			
Quarter 4, 2012												*	*							*			
Quarter 1, 2013												*								*			
Quarter 2, 2013												*								*			
Quarter 3, 2013												*								*			
Quarter 4, 2013												*								*			
Quarter 1, 2014																			*	*			

**Chart of MCL and Historical UTL Exceedances for the C-746-S&T Landfills (Continued)**

Groundwater Flow System	UCRS					URGA										LRGA							
	S	D	D	U	U	S	S	S	S	S	S	D	D	D	U	U	S	D	D	D	U	U	
Monitoring Well	386	389	390	393	396	221	222	223	224	384	369	372	387	391	220	394	385	370	373	388	392	395	397
<b>MAGNESIUM</b>																							
Quarter 2, 2014												*	*							*			
Quarter 3, 2014												*	*							*			
Quarter 4, 2014												*	*							*			
Quarter 1, 2015												*	*							*			
Quarter 2, 2015												*	*							*			
Quarter 3, 2015												*	*							*			
Quarter 4, 2015												*	*							*			
Quarter 1, 2016												*	*							*			
Quarter 2, 2016												*	*	*						*			
Quarter 3, 2016												*	*	*						*			
Quarter 4, 2016												*	*	*						*			
Quarter 1, 2017												*	*	*						*			
Quarter 2, 2017												*	*	*						*			
Quarter 3, 2017												*	*	*						*			
Quarter 4, 2017												*	*	*						*			
Quarter 1, 2018												*	*	*						*			
Quarter 2, 2018												*	*	*						*			
Quarter 3, 2018												*	*	*						*			
Quarter 4, 2018												*	*	*						*			
Quarter 1, 2019												*	*	*						*			
Quarter 2, 2019												*	*	*						*			
Quarter 3, 2019												*	*	*						*			
Quarter 4, 2019												*	*	*						*			
Quarter 1, 2020												*	*	*						*			
Quarter 2, 2020												*	*	*						*			
Quarter 3, 2020												*	*	*						*			
Quarter 4, 2020												*	*	*						*			
Quarter 1, 2021												*	*	*						*			
Quarter 2, 2021												*	*	*						*			
Quarter 3, 2021												*	*	*						*			
Quarter 4, 2021												*	*	*						*			
Quarter 1, 2022												*	*	*						*			
Quarter 2, 2022												*	*	*						*			
Quarter 3, 2022												*	*	*						*			
Quarter 4, 2022												*	*	*						*			
Quarter 1, 2023												*	*	*						*			
Quarter 2, 2023												*	*	*						*			
Quarter 3, 2023												*	*	*						*			
<b>MANGANESE</b>																							
Quarter 4, 2002																							*
Quarter 3, 2003								*	*														
Quarter 4, 2003								*	*														
Quarter 1, 2004								*	*														
Quarter 2, 2004								*	*														
Quarter 4, 2004								*	*														
Quarter 1, 2005								*	*														
Quarter 3, 2005																							*
Quarter 3, 2009		*																					
Quarter 1, 2022		*																					
<b>OXIDATION-REDUCTION POTENTIAL</b>																							
Quarter 4, 2003				*																			
Quarter 2, 2004				*																			
Quarter 3, 2004				*																*			
Quarter 4, 2004				*			*																
Quarter 1, 2005				*																*			
Quarter 2, 2005		*		*																			
Quarter 3, 2005		*		*																			
Quarter 4, 2005				*																			
Quarter 2, 2006				*																			
Quarter 3, 2006				*																*			
Quarter 4, 2006				*																			
Quarter 1, 2007				*																			
Quarter 2, 2007				*				*															
Quarter 3, 2007				*				*															
Quarter 4, 2007				*				*															
Quarter 1, 2008				*				*		*													
Quarter 2, 2008	*		*	*		*							*				*		*	*			
Quarter 3, 2008			*	*		*						*					*		*	*			
Quarter 4, 2008			*	*		*	*	*	*			*					*	*	*	*			

Chart of MCL and Historical UTL Exceedances for the C-746-S&T Landfills (Continued)

Groundwater Flow System	UCRS					URGA										LRGA							
	S	D	D	D	U	S	S	S	S	S	D	D	D	D	U	U	S	D	D	D	U	U	
Monitoring Well	386	389	390	393	396	221	222	223	224	384	369	372	387	391	220	394	385	370	373	388	392	395	397
<b>OXIDATION-REDUCTION POTENTIAL</b>																							
Quarter 1, 2009			*				*	*	*				*	*				*	*				
Quarter 3, 2009			*	*		*											*	*	*	*			
Quarter 4, 2009			*			*			*									*	*	*			
Quarter 1, 2010	*		*						*				*				*	*	*	*			
Quarter 2, 2010	*		*	*					*				*				*	*	*	*			
Quarter 3, 2010	*		*	*		*											*	*	*	*			
Quarter 4, 2010			*					*			*			*			*	*	*	*			
Quarter 1, 2011	*		*	*		*	*	*	*		*		*	*			*	*	*	*	*	*	
Quarter 2, 2011	*		*	*		*	*	*	*	*	*	*	*	*			*	*	*	*	*	*	
Quarter 3, 2011	*		*	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
Quarter 4, 2011	*		*	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
Quarter 1, 2012	*		*	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
Quarter 2, 2012	*		*	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
Quarter 3, 2012	*		*	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
Quarter 4, 2012			*	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
Quarter 1, 2013			*	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
Quarter 2, 2013	*		*	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
Quarter 3, 2013	*		*	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
Quarter 4, 2013			*	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
Quarter 1, 2014	*		*	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
Quarter 2, 2014	*		*	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
Quarter 3, 2014			*	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
Quarter 4, 2014	*		*	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
Quarter 1, 2015	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
Quarter 2, 2015	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
Quarter 3, 2015	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
Quarter 4, 2015	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
Quarter 1, 2016	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
Quarter 2, 2016	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
Quarter 3, 2016	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
Quarter 4, 2016	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
Quarter 1, 2017	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
Quarter 2, 2017	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
Quarter 3, 2017	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
Quarter 4, 2017	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
Quarter 1, 2018	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
Quarter 2, 2018	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
Quarter 3, 2018	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
Quarter 4, 2018	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
Quarter 1, 2019	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
Quarter 2, 2019	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
Quarter 3, 2019	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
Quarter 4, 2019	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
Quarter 1, 2020	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
Quarter 2, 2020	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
Quarter 3, 2020	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
Quarter 4, 2020	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
Quarter 1, 2021	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
Quarter 2, 2021	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
Quarter 3, 2021	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
Quarter 4, 2021	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
Quarter 1, 2022	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
Quarter 2, 2022	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
Quarter 3, 2022	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
Quarter 4, 2022	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
Quarter 1, 2023	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
Quarter 2, 2023	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
Quarter 3, 2023	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
<b>PCB-1016</b>																							
Quarter 4, 2003						*	*	*	*	*	*						*						
Quarter 3, 2004										*	*												
Quarter 3, 2005						*				*	*												
Quarter 1, 2006										*	*												
Quarter 2, 2006										*	*												
Quarter 4, 2006										*	*												
Quarter 1, 2007										*	*	*					*	*	*	*	*	*	
Quarter 2, 2007										*	*	*					*	*	*	*	*	*	
Quarter 3, 2007										*	*	*					*	*	*	*	*	*	
Quarter 2, 2008										*	*	*					*	*	*	*	*	*	
Quarter 3, 2008										*	*	*					*	*	*	*	*	*	
Quarter 4, 2008										*	*	*					*	*	*	*	*	*	

**Chart of MCL and Historical UTL Exceedances for the C-746-S&T Landfills (Continued)**

Groundwater Flow System	UCRS					URGA										LRGA							
	S	D	D	D	U	S	S	S	S	S	D	D	D	D	U	U	S	D	D	D	D	U	U
<b>Monitoring Well</b>	386	389	390	393	396	221	222	223	224	384	369	372	387	391	220	394	385	370	373	388	392	395	397
<b>PCB-1016</b>																							
Quarter 1, 2009											*												
Quarter 2, 2009											*												
Quarter 3, 2009											*												
Quarter 4, 2009											*												
Quarter 1, 2010											*												
Quarter 2, 2010											*												
Quarter 3, 2010											*												
Quarter 4, 2010											*												
<b>PCB-1232</b>																							
Quarter 1, 2011											*												
<b>PCB-1248</b>																							
Quarter 2, 2008											*												
<b>PCB-1260</b>																							
Quarter 2, 2006																		*					
<b>pH</b>																							
Quarter 4, 2002																		*					
Quarter 2, 2003																		*					
Quarter 3, 2003																		*					
Quarter 4, 2003								*										*					
Quarter 1, 2004							*											*					
Quarter 2, 2004																		*					
Quarter 3, 2004																		*					
Quarter 4, 2004																		*					
Quarter 3, 2005										*								*			*		
Quarter 4, 2005										*								*					
Quarter 1, 2006																		*					
Quarter 2, 2006																		*					
Quarter 3, 2006																		*					
Quarter 3, 2007																		*					
Quarter 4, 2007																		*					
Quarter 4, 2008																		*					
Quarter 1, 2009																		*					
Quarter 1, 2011																		*					
Quarter 2, 2011											*												
Quarter 3, 2011											*												
Quarter 1, 2012													*										
Quarter 1, 2013										*		*						*					
Quarter 4, 2014																						*	
Quarter 2, 2016																		*	*				
<b>POTASSIUM</b>																							
Quarter 4, 2002																		*	*				
Quarter 3, 2004																		*	*				
Quarter 2, 2005																		*	*				
Quarter 3, 2005																		*	*				
Quarter 4, 2005																		*	*				
Quarter 2, 2006																		*	*				
Quarter 3, 2006																		*	*				
Quarter 4, 2006																		*	*				
Quarter 4, 2008																		*	*				
Quarter 3, 2012																		*	*				
Quarter 1, 2013																		*	*				
Quarter 2, 2013																		*	*				
Quarter 3, 2013																		*	*				
<b>RADIUM-226</b>																							
Quarter 4, 2002												*	*									*	
Quarter 2, 2004																					*		
Quarter 2, 2005										*													
Quarter 1, 2009											*												
Quarter 3, 2014										*	*												
Quarter 4, 2014										*	*							*					
Quarter 1, 2015							*			*	*							*					
Quarter 2, 2015							*			*	*							*					
Quarter 3, 2015							*			*	*							*					

**Chart of MCL and Historical UTL Exceedances for the C-746-S&T Landfills (Continued)**

Groundwater Flow System	UCRS					URGA										LRGA							
	S	D	D	U	U	S	S	S	S	S	D	D	D	D	U	U	S	D	D	D	U	U	
Monitoring Well	386	389	390	393	396	221	222	223	224	384	369	372	387	391	220	394	385	370	373	388	392	395	397
<b>RADIUM-226</b>																							
Quarter 4, 2015					*	*									*		*				*	*	
Quarter 2, 2016			*						*	*	*	*	*	*	*		*						
Quarter 3, 2016																	*						
Quarter 4, 2016	*		*			*			*				*		*					*		*	
Quarter 1, 2017			*						*	*							*			*	*		
Quarter 2, 2017																	*	*		*	*		
Quarter 3, 2017					*				*	*	*									*			
Quarter 4, 2017																			*		*		
Quarter 1, 2018												*							*		*		
Quarter 4, 2018													*						*				
Quarter 1, 2020																			*				
Quarter 2, 2020															*								
<b>RADIUM-228</b>																							
Quarter 2, 2005																							
Quarter 3, 2005																							
Quarter 4, 2005																							
Quarter 1, 2006																							
<b>SELENIUM</b>																							
Quarter 4, 2002																							
Quarter 1, 2003																							
Quarter 2, 2003																							
Quarter 3, 2003																							
Quarter 4, 2003																							
<b>SODIUM</b>																							
Quarter 4, 2002																				*		*	
Quarter 1, 2003					*				*	*	*												
Quarter 2, 2003				*					*	*	*		*										
Quarter 3, 2003								*	*	*	*												
Quarter 4, 2003								*	*	*	*												
Quarter 1, 2004									*	*	*		*										
Quarter 2, 2004									*	*	*												
Quarter 3, 2004									*	*	*												
Quarter 4, 2004									*	*	*												
Quarter 1, 2005									*	*	*								*		*		
Quarter 2, 2005									*	*	*								*		*		
Quarter 3, 2005									*	*	*								*		*		
Quarter 4, 2005									*	*	*												
Quarter 1, 2006									*	*	*												
Quarter 2, 2006									*	*	*												
Quarter 3, 2006									*	*	*	*							*		*		
Quarter 4, 2006									*	*	*					*							
Quarter 1, 2007									*	*	*	*						*					
Quarter 2, 2007									*	*	*												
Quarter 3, 2007									*	*	*												
Quarter 4, 2007									*	*	*												
Quarter 1, 2008									*	*	*												
Quarter 3, 2008									*	*	*	*											
Quarter 4, 2008									*	*	*												
Quarter 1, 2009									*	*	*	*							*		*		
Quarter 3, 2009									*	*	*	*											
Quarter 4, 2009									*	*	*	*											
Quarter 1, 2010									*	*	*	*											
Quarter 2, 2010									*	*	*	*											
Quarter 3, 2010									*	*	*	*											
Quarter 4, 2010									*	*	*	*											
Quarter 1, 2011									*	*	*	*											
Quarter 2, 2011									*	*	*	*											
Quarter 4, 2011									*	*	*	*							*		*		
Quarter 1, 2012									*	*	*	*							*		*		
Quarter 3, 2012									*	*	*	*							*		*		
Quarter 4, 2012									*	*	*	*							*		*		

**Chart of MCL and Historical UTL Exceedances for the C-746-S&T Landfills (Continued)**

Groundwater Flow System	UCRS					URGA										LRGA							
	S	D	D	U	U	S	S	S	S	S	S	D	D	D	U	U	S	D	D	D	U	U	
<b>Monitoring Well</b>	386	389	390	393	396	221	222	223	224	384	369	372	387	391	220	394	385	370	373	388	392	395	397
<b>SODIUM</b>																							
Quarter 1, 2013									*		*								*				
Quarter 2, 2013											*								*				
Quarter 3, 2013											*								*				
Quarter 4, 2013											*								*				
Quarter 1, 2014											*								*				
Quarter 2, 2014									*		*								*				
Quarter 3, 2014											*								*				
Quarter 4, 2014									*	*	*	*											
Quarter 1, 2015												*											
Quarter 2, 2015												*											
Quarter 3, 2015											*	*											
Quarter 4, 2015									*	*	*												
Quarter 2, 2016											*												
Quarter 3, 2016											*												*
Quarter 1, 2017										*	*	*	*					*					
Quarter 2, 2017									*	*	*												
Quarter 2, 2018												*											
Quarter 3, 2018													*										
Quarter 1, 2019												*											
Quarter 2, 2019												*											
Quarter 4, 2019												*											
Quarter 1, 2020											*	*							*				
Quarter 2, 2020											*	*	*						*				
Quarter 3, 2020											*	*											
Quarter 4, 2020											*	*											
Quarter 1, 2021											*	*	*										
Quarter 2, 2021											*	*											
Quarter 3, 2021											*	*											
Quarter 4, 2021											*	*											
Quarter 1, 2022											*	*	*										
Quarter 2, 2022											*	*											
Quarter 3, 2022											*	*	*										
Quarter 4, 2022											*	*											
Quarter 2, 2023									*		*												
<b>STRONTIUM-90</b>																							
Quarter 2, 2003										■													
Quarter 1, 2004										■													
<b>SULFATE</b>																							
Quarter 4, 2002																				*			
Quarter 1, 2003											*	*					*		*				
Quarter 2, 2003										*	*	*						*	*				
Quarter 3, 2003										*	*	*						*	*				
Quarter 4, 2003										*	*	*						*	*				
Quarter 1, 2004										*	*	*						*	*				
Quarter 2, 2004										*	*	*				*	*	*	*				
Quarter 3, 2004								*		*	*	*					*	*	*				
Quarter 4, 2004								*		*	*	*					*	*	*				
Quarter 1, 2005								*		*	*	*			*	*	*	*	*				
Quarter 2, 2005								*		*	*	*			*	*	*	*	*				
Quarter 3, 2005								*		*	*	*			*	*	*	*	*				
Quarter 4, 2005								*		*	*	*			*	*	*	*	*				
Quarter 1, 2006								*		*	*	*			*	*	*	*	*				
Quarter 2, 2006								*	*	*	*	*			*	*	*	*	*				
Quarter 3, 2006								*	*	*	*	*			*	*	*	*	*				
Quarter 4, 2006								*	*	*	*	*			*	*	*	*	*				
Quarter 1, 2007								*	*	*	*	*			*	*	*	*	*				
Quarter 2, 2007								*	*	*	*	*			*	*	*	*	*				
Quarter 3, 2007								*	*	*	*	*			*	*	*	*	*				
Quarter 4, 2007								*	*	*	*	*			*	*	*	*	*				
Quarter 1, 2008								*	*	*	*	*			*	*	*	*	*				
Quarter 2, 2008							*		*	*	*	*	*		*	*	*	*	*				
Quarter 3, 2008								*	*	*	*	*			*	*	*	*	*				
Quarter 4, 2008								*	*	*	*	*			*	*	*	*	*				
Quarter 1, 2009								*	*	*	*	*			*	*	*	*	*				
Quarter 2, 2009								*	*	*	*	*			*	*	*	*	*				
Quarter 3, 2009								*	*	*	*	*			*	*	*	*	*				
Quarter 4, 2009	*							*	*	*	*	*			*	*	*	*	*				
Quarter 1, 2010	*							*	*	*	*	*			*	*	*	*	*				

**Chart of MCL and Historical UTL Exceedances for the C-746-S&T Landfills (Continued)**

Groundwater Flow System	UCRS					URGA										LRGA							
	S	D	D	U	U	S	S	S	S	S	S	D	D	D	U	U	S	D	D	D	U	U	
Monitoring Well	386	389	390	393	396	221	222	223	224	384	369	372	387	391	220	394	385	370	373	388	392	395	397
<b>SULFATE</b>																							
Quarter 2, 2010									*	*		*	*				*	*	*	*			
Quarter 3, 2010										*		*	*				*	*	*	*			
Quarter 4, 2010	*									*		*	*				*	*	*	*			
Quarter 1, 2011	*									*		*	*				*	*	*	*			
Quarter 2, 2011	*									*		*	*	*			*	*	*	*			
Quarter 3, 2011	*									*		*	*	*			*	*	*	*			
Quarter 4, 2011	*									*		*	*				*	*	*	*			
Quarter 1, 2012	*									*		*	*				*	*	*	*			
Quarter 2, 2012	*									*		*	*				*	*	*	*			
Quarter 3, 2012	*									*		*	*				*	*	*	*			
Quarter 4, 2012										*		*	*				*	*	*	*			
Quarter 1, 2013										*		*	*				*	*	*	*			
Quarter 2, 2013										*		*	*	*			*	*	*	*			
Quarter 3, 2013										*		*	*	*			*	*	*	*			
Quarter 4, 2013										*		*	*				*	*	*	*			
Quarter 1, 2014								*		*		*	*				*	*	*	*			
Quarter 2, 2014										*		*	*	*			*	*	*	*			
Quarter 3, 2014										*		*	*	*			*	*	*	*			
Quarter 4, 2014										*		*	*				*	*	*	*			
Quarter 1, 2015										*		*	*	*	*		*	*	*	*			
Quarter 2, 2015										*	*	*	*	*	*		*	*	*	*			
Quarter 3, 2015								*		*		*	*	*	*		*	*	*	*			
Quarter 4, 2015										*		*	*	*	*		*	*	*	*			
Quarter 1, 2016								*		*		*	*	*	*		*	*	*	*			
Quarter 2, 2016								*		*		*	*	*	*		*	*	*	*			
Quarter 3, 2016								*		*		*	*	*	*		*	*	*	*			
Quarter 4, 2016										*		*	*	*	*		*	*	*	*			
Quarter 1, 2017										*		*	*	*	*		*	*	*	*			
Quarter 2, 2017								*		*		*	*	*	*		*	*	*	*			
Quarter 3, 2017								*		*		*	*	*	*		*	*	*	*			
Quarter 4, 2017										*		*	*	*	*		*	*	*	*			
Quarter 1, 2018										*		*	*	*	*		*	*	*	*			
Quarter 2, 2018								*		*	*	*	*	*	*		*	*	*	*			
Quarter 3, 2018								*		*		*	*	*	*		*	*	*	*			
Quarter 4, 2018										*		*	*	*	*		*	*	*	*			
Quarter 1, 2019								*		*		*	*	*	*		*	*	*	*			
Quarter 2, 2019								*		*		*	*	*	*		*	*	*	*			
Quarter 3, 2019			*					*		*		*	*	*	*		*	*	*	*	*	*	
Quarter 4, 2019			*					*		*		*	*	*	*		*	*	*	*	*	*	
Quarter 1, 2020								*		*		*	*	*	*		*	*	*	*	*	*	
Quarter 2, 2020								*		*		*	*	*	*		*	*	*	*	*	*	
Quarter 3, 2020			*							*		*	*				*	*	*	*	*	*	
Quarter 4, 2020										*		*	*				*	*	*	*	*	*	
Quarter 1, 2021										*		*	*				*	*	*	*	*	*	
Quarter 2, 2021								*		*		*	*	*	*		*	*	*	*	*	*	
Quarter 3, 2021										*		*	*				*	*	*	*	*	*	
Quarter 4, 2021										*		*	*				*	*	*	*	*	*	
Quarter 1, 2022										*		*	*	*	*		*	*	*	*	*	*	
Quarter 2, 2022										*	*	*	*	*	*		*	*	*	*	*	*	
Quarter 3, 2022			*							*		*	*	*	*		*	*	*	*	*	*	
Quarter 4, 2022										*		*	*				*	*	*	*	*	*	
Quarter 1, 2023										*		*	*				*	*	*	*	*	*	
Quarter 2, 2023										*		*	*	*	*		*	*	*	*	*	*	
Quarter 3, 2023										*		*	*	*	*		*	*	*	*	*	*	
<b>TECHNETIUM-99</b>																							
Quarter 4, 2002																			*				
Quarter 1, 2003													*				*		*				
Quarter 2, 2003	*		*							*		*					*		*				
Quarter 3, 2003			*							*		*					*		*		*		
Quarter 4, 2003			*							*		*	*				*		*	*	*		
Quarter 1, 2004			*							*		*	*				*		*	*	*		
Quarter 2, 2004			*							*		*	*				*		*	*	*		
Quarter 3, 2004			*							*		*	*				*		*	*	*		
Quarter 4, 2004			*							*		*	*				*		*	*	*		
Quarter 1, 2005			*							*		*	*				*		*	*	*		
Quarter 2, 2005			*							*		*	*				*		*	*	*		
Quarter 3, 2005			*							*		*	*	*	*		*		*	*	*		
Quarter 4, 2005			*							*		*	*				*		*	*	*		

**Chart of MCL and Historical UTL Exceedances for the C-746-S&T Landfills (Continued)**

Groundwater Flow System	UCRS					URGA										LRGA							
	S	D	D	U	U	S	S	S	S	S	S	D	D	D	U	U	S	D	D	D	U	U	
<b>Monitoring Well</b>	386	389	390	393	396	221	222	223	224	384	369	372	387	391	220	394	385	370	373	388	392	395	397
<b>TECHNETIUM-99</b>																							
Quarter 1, 2006										*	*	*							*	*			
Quarter 2, 2006			*							*	*	*					*	*	*	*			
Quarter 3, 2006			*							*	*	*					*	*	*	*			
Quarter 4, 2006	*									*	*	*							*	*			
Quarter 1, 2007			*							*	*	*					*	*	*	*			
Quarter 2, 2007			*							*	*	*					*	*	*	*			
Quarter 3, 2007			*							*	*	*	*				*	*	*	*			
Quarter 4, 2007			*							*	*	*	*				*	*	*	*			
Quarter 1, 2008			*							*	*	*	*				*	*	*	*			
Quarter 2, 2008			*							*	*	*	*				*	*	*	*			
Quarter 3, 2008										*	*	*	*				*	*	*	*			
Quarter 4, 2008			*							*	*	*	*				*	*	*	*			
Quarter 1, 2009			*							*	*	*	*				*	*	*	*			
Quarter 2, 2009			*							*	*	*	*				*	*	*	*			
Quarter 3, 2009			*							*	*	*	*				*	*	*	*			
Quarter 4, 2009			*							*	*	*	*				*	*	*	*			
Quarter 1, 2010			*							*	*	*	*				*	*	*	*			
Quarter 2, 2010			*							*	*	*	*				*	*	*	*			
Quarter 3, 2010			*							*	*	*	*				*	*	*	*			
Quarter 4, 2010			*							*	*	*	*				*	*	*	*			
Quarter 1, 2011										*	*	*	*				*	*	*	*			
Quarter 2, 2011			*							*	*	*	*				*	*	*	*			
Quarter 3, 2011			*							*	*	*	*				*	*	*	*			
Quarter 4, 2011			*							*	*	*	*				*	*	*	*			
Quarter 1, 2012			*							*	*	*	*				*	*	*	*			
Quarter 2, 2012			*							*	*	*	*				*	*	*	*			
Quarter 3, 2012			*							*	*	*	*				*	*	*	*			
Quarter 4, 2012										*	*	*	*				*	*	*	*			
Quarter 1, 2013										*	*	*	*				*	*	*	*			
Quarter 2, 2013										*	*	*	*				*	*	*	*			
Quarter 3, 2013			*							*	*	*	*				*	*	*	*			
Quarter 4, 2013			*							*	*	*	*				*	*	*	*			
Quarter 1, 2014			*							*	*	*	*				*	*	*	*			
Quarter 2, 2014			*							*	*	*	*	*			*	*	*	*			
Quarter 3, 2014			*							*	*	*	*				*	*	*	*			
Quarter 4, 2014			*							*	*	*	*				*	*	*	*			
Quarter 1, 2015			*							*	*	*	*				*	*	*	*			
Quarter 2, 2015			*							*	*	*	*				*	*	*	*			
Quarter 3, 2015			*							*	*	*	*				*	*	*	*			
Quarter 4, 2015			*							*	*	*	*				*	*	*	*			
Quarter 1, 2016			*							*	*	*	*				*	*	*	*			
Quarter 2, 2016			*			*				*	*	*	*				*	*	*	*			
Quarter 3, 2016			*							*	*	*	*				*	*	*	*			
Quarter 4, 2016			*							*	*	*	*				*	*	*	*			
Quarter 1, 2017			*							*	*	*	*				*	*	*	*			
Quarter 2, 2017			*							*	*	*	*				*	*	*	*			
Quarter 3, 2017			*							*	*	*	*				*	*	*	*			
Quarter 4, 2017			*							*	*	*	*				*	*	*	*			
Quarter 1, 2018			*							*	*	*	*				*	*	*	*			
Quarter 2, 2018			*							*	*	*	*				*	*	*	*			
Quarter 3, 2018			*							*	*	*	*				*	*	*	*			
Quarter 4, 2018			*							*	*	*	*				*	*	*	*			
Quarter 1, 2019			*							*	*	*	*				*	*	*	*			
Quarter 2, 2019			*							*	*	*	*				*	*	*	*			
Quarter 3, 2019			*							*	*	*	*				*	*	*	*			
Quarter 4, 2019			*							*	*	*	*				*	*	*	*			
Quarter 1, 2020			*							*	*	*	*				*	*	*	*			
Quarter 2, 2020			*							*	*	*	*				*	*	*	*			
Quarter 3, 2020			*							*	*	*	*				*	*	*	*			
Quarter 4, 2020			*							*	*	*	*				*	*	*	*			
Quarter 1, 2021			*							*	*	*	*				*	*	*	*			
Quarter 2, 2021			*							*	*	*	*				*	*	*	*			
Quarter 3, 2021			*							*	*	*	*				*	*	*	*			
Quarter 4, 2021			*							*	*	*	*				*	*	*	*			



**Chart of MCL and Historical UTL Exceedances for the C-746-S&T Landfills (Continued)**

Groundwater Flow System	UCRS					URGA										LRGA							
	S	D	D	D	U	S	S	S	S	S	D	D	D	D	U	U	S	D	D	D	U	U	
Monitoring Well	386	389	390	393	396	221	222	223	224	384	369	372	387	391	220	394	385	370	373	388	392	395	397
<b>TECHNETIUM-99</b>																							
Quarter 1, 2022			*							*	*	*	*				*						
Quarter 2, 2022			*							*	*	*	*				*			*			
Quarter 3, 2022			*							*	*	*	*				*						
Quarter 4, 2022			*							*	*	*	*				*			*			
Quarter 1, 2023										*	*	*	*				*						
Quarter 2, 2023			*							*	*	*	*				*						
Quarter 3, 2023			*							*	*	*	*				*						
<b>THORIUM-230</b>																							
Quarter 1, 2012	*									*					*								
Quarter 4, 2014	*		*							*				*									
Quarter 3, 2015	*									*	*		*		*								
Quarter 1, 2017			*							*							*						
<b>THORIUM-234</b>																							
Quarter 2, 2003						*			*					*									
Quarter 4, 2007									*														
<b>TOLUENE</b>																							
Quarter 2, 2014										*	*		*										
<b>TOTAL ORGANIC CARBON</b>																							
Quarter 4, 2002																							*
Quarter 1, 2003				*						*	*							*	*			*	*
Quarter 2, 2003										*	*		*										*
Quarter 3, 2003							*	*	*	*	*	*	*										*
Quarter 4, 2003							*		*	*	*	*	*										*
Quarter 1, 2004										*													
Quarter 2, 2004										*	*												
Quarter 3, 2004										*													
Quarter 4, 2004										*													
Quarter 1, 2005										*													
Quarter 2, 2005										*													*
Quarter 3, 2005										*		*											*
Quarter 4, 2005										*													*
Quarter 1, 2006										*													
Quarter 2, 2006										*		*											
Quarter 4, 2006																	*						
Quarter 1, 2007	*									*													
Quarter 3, 2007	*					*	*	*	*	*			*	*			*						
Quarter 2, 2011											*												
Quarter 3, 2012	*																						
Quarter 3, 2016																				*			
<b>TOTAL ORGANIC HALIDES</b>																							
Quarter 4, 2002																		*	*			*	*
Quarter 1, 2003				*														*				*	*
Quarter 3, 2003				*																		*	*
Quarter 2, 2004																							*
Quarter 3, 2004	*																						
Quarter 1, 2005	*																						
Quarter 2, 2005	*																						
Quarter 3, 2005	*																						
Quarter 4, 2005	*																						
Quarter 1, 2006	*																						
Quarter 2, 2006	*																						
Quarter 3, 2006	*																						
Quarter 4, 2006																	*						
Quarter 1, 2007	*																						
Quarter 2, 2007	*																						
Quarter 3, 2007	*																						
Quarter 4, 2007	*																					*	*
Quarter 1, 2008	*																						
Quarter 4, 2008	*																						
Quarter 4, 2008	*																						
Quarter 1, 2009	*																						
Quarter 2, 2009	*																					*	*
Quarter 3, 2009	*																						
Quarter 4, 2009	*																						
Quarter 1, 2010	*																						
Quarter 2, 2010	*																						
Quarter 3, 2010	*																						

**Chart of MCL and Historical UTL Exceedances for the C-746-S&T Landfills (Continued)**

Groundwater Flow System	UCRS					URGA									LRGA								
	S	D	D	D	U	S	S	S	S	S	D	D	D	D	U	U	S	D	D	D	D	U	U
<b>Monitoring Well</b>	386	389	390	393	396	221	222	223	224	384	369	372	387	391	220	394	385	370	373	388	392	395	397
<b>TOTAL ORGANIC HALIDES</b>																							
Quarter 4, 2010	*																						
Quarter 1, 2011	*																						
Quarter 3, 2013																					*		
<b>TRICHLOROETHENE</b>																							
Quarter 4, 2002																							
Quarter 1, 2003																							
Quarter 2, 2003																							
Quarter 3, 2003																							
Quarter 4, 2003																							
Quarter 1, 2004																							
Quarter 2, 2004																							
Quarter 3, 2004																							
Quarter 4, 2004																							
Quarter 1, 2005																							
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Quarter 1, 2014																							
Quarter 2, 2014																							
Quarter 3, 2014																							
Quarter 4, 2014																							
Quarter 1, 2015																							
Quarter 2, 2015																							
Quarter 3, 2015																							
Quarter 4, 2015																							
Quarter 1, 2016																							
Quarter 2, 2016																							
Quarter 3, 2016																							
Quarter 4, 2016																							

**Chart of MCL and Historical UTL Exceedances for the C-746-S&T Landfills (Continued)**

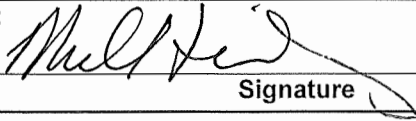
Groundwater Flow System	UCRS					URGA									LRGA								
	S	D	D	D	U	S	S	S	S	S	D	D	D	D	U	U	S	D	D	D	D	U	U
Monitoring Well	386	389	390	393	396	221	222	223	224	384	369	372	387	391	220	394	385	370	373	388	392	395	397
<b>TRICHLOROETHENE</b>																							
Quarter 1, 2017												■		■		■				■		■	
Quarter 2, 2017												■		■		■				■		■	
Quarter 3, 2017												■		■		■				■		■	
Quarter 4, 2017											■			■		■				■		■	
Quarter 1, 2018												■		■		■				■		■	
Quarter 2, 2018												■	■	■		■				■		■	
Quarter 3, 2018												■		■		■				■		■	
Quarter 4, 2018												■		■		■				■		■	
Quarter 1, 2019												■		■		■				■		■	
Quarter 2, 2019														■		■				■		■	
Quarter 3, 2019														■		■				■		■	
Quarter 4, 2019														■		■				■		■	
Quarter 1, 2020												■		■		■				■		■	
Quarter 2, 2020														■		■				■		■	
Quarter 3, 2020														■		■				■		■	
Quarter 4, 2020														■		■				■		■	
Quarter 1, 2021														■		■				■		■	
Quarter 2, 2021														■		■				■		■	
Quarter 3, 2021					■									■		■				■		■	
Quarter 4, 2021														■		■				■		■	
Quarter 1, 2022														■		■				■		■	
Quarter 2, 2022														■		■				■		■	
Quarter 3, 2022														■		■				■		■	
Quarter 4, 2022														■		■				■		■	
Quarter 1, 2023											■	■		■		■				■		■	
Quarter 2, 2023												■		■		■				■		■	
Quarter 3, 2023												■		■		■				■		■	
<b>TURBIDITY</b>																							
Quarter 4, 2002																						*	
Quarter 1, 2003								*				*		*									
<b>URANIUM</b>																							
Quarter 4, 2002																		*	*				
Quarter 1, 2003																		*	*				
Quarter 4, 2003								*															
Quarter 1, 2004								*	*	*				*			*						
Quarter 4, 2004																*							
Quarter 4, 2006																	*			*			
<b>ZINC</b>																							
Quarter 3, 2003												*											
Quarter 4, 2003								*		*		*											
Quarter 4, 2004								*		*		*											
Quarter 4, 2007								*	*	*													
* Statistical test results indicate an elevated concentration (i.e., a statistically significant increase).																							
■ MCL Exceedance																							
■ Previously reported as an MCL exceedance; however, result was equal to MCL.																							
UCRS = Upper Continental Recharge System																							
URGA = Upper Regional Gravel Aquifer																							
LRGA = Lower Regional Gravel Aquifer																							
S = Sidegradient; D = Downgradient; U = Upgradient																							

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**APPENDIX H**  
**METHANE MONITORING DATA**

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**CP3-WM-0017-F03 - C-746-S & T LANDFILL METHANE MONITORING REPORT**

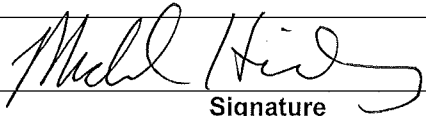
<b>Date:</b>	August 10, 2023	<b>Time:</b>	1400	<b>Monitor:</b>	Michael Hideg													
<b>Weather Conditions:</b> Mostly Sunny, Approximately 81° F, humidity: 67%																		
<b>Monitoring Equipment:</b> Multi RAE – Serial # 11880																		
<b>Monitoring Location</b>					<b>Reading (% LEL)</b>													
<b>Ogden Landing Road Entrance</b>	Checked at ground level				0													
<b>North Landfill Gate</b>	Checked at ground level				0													
<b>West Side of Landfill:</b> North 37° 07.652' West 88° 48.029'	Checked at ground level				0													
<b>East Side of Landfill:</b> North 37° 07.628' West 88° 47.798'	Checked at ground level				0													
<b>Cell 1 Gas Vent (17)</b>	1 0	2 0	3 0	4 0	5 0	6 0	7 0	8 0	9 0	10 0	11 0	12 0	13 0	14 0	15 0	16 0	17 0	0
<b>Cell 2 Gas Vent (3)</b>	1 0	2 0	3 0															0
<b>Cell 3 Gas Vent (7)</b>	1 0	2 0	3 0	4 0	5 0	6 0	7 0											0
<b>Landfill Office</b>	Checked at ground level															0		
<b>Suspect or Problem Areas</b>	None noted															N/A		
<b>Remarks:</b> All gas vents checked 1" from opening.																		
<b>Performed by:</b> 																		
				Signature	8/23/23						Date							

CP3-WM-0017-F04 - C-746-U LANDFILL METHANE MONITORING REPORT

PADUCAH GASEOUS DIFFUSION PLANT

Permit #: 073-00045

McCracken County, Kentucky

Date:	August 10, 2023	Time:	1400	Monitor:	Michael Hideg
Weather Conditions: Mostly sunny, Approximately 81°, humidity: 67%					
Monitoring Equipment: Multi RAE – Serial # 11880					
Monitoring Location					Reading (% LEL)
C-746-U1	Checked at close to ground level				0
C-746-U2	Checked at close to ground level				0
C-746-U-T-14	Checked at close to ground level				0
C-746-U15	Checked at close to ground level				0
MG1	Checked inside casing				0
MG2	Checked inside casing				0
MG3	Checked inside casing				0
MG4	Checked inside casing				0
Suspect or Problem Areas	No problems noted				None
Remarks:	N/A				
Performed by:				8/23/23	
	Signature			Date	



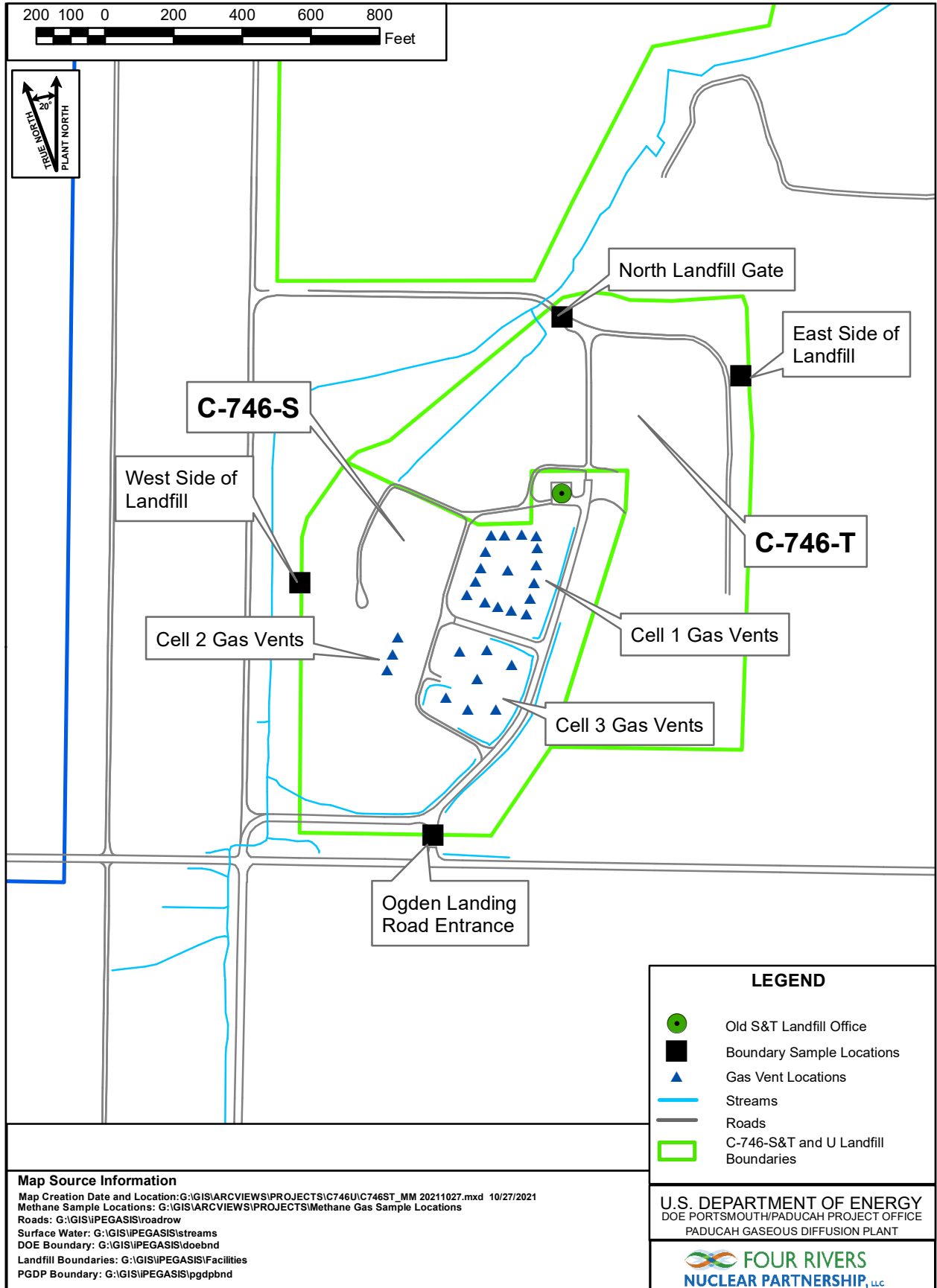


Figure H.1. C-746-S&T Landfill Methane Monitoring Locations

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**APPENDIX I**

**SURFACE WATER ANALYSES AND LABORATORY REPORTS**

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**Paducah OREIS**  
**SURFACE WATER MONITORING REPORT**

**Facility:** C-746-S&T Landfill      **County:** McCracken      **Permit #:** SW07300014,SW07300015,SW07300045

**Sampling Point:** L135      UPSTREAM      **Period:** 3rd Quarter 2023

**SAMPLE ID:** L135SS4-23      **Sample Type:** REG

Parameter	Qualifier	Result	Units	Reporting Limit	Date Collected	Counting Error (+/-)	TPU	Method	Validation
Chloride		0.912	mg/L	0.2	7/19/2023			EPA-300.0	X
Sulfate		1.99	mg/L	0.4	7/19/2023			EPA-300.0	X
Conductivity		24	umho/cm		7/19/2023				X
pH		6.72	Std Unit		7/19/2023				X
Iron		0.39	mg/L	0.1	7/19/2023			EPA-200.8	X
Sodium		1.1	mg/L	0.25	7/19/2023			EPA-200.8	X
Uranium		0.000749	mg/L	0.0002	7/19/2023			EPA-200.8	X
Alpha activity	U	4.36	pCi/L	5.69	7/19/2023	3.98	4.05	SW846-9310	X
Beta activity		17.8	pCi/L	9.6	7/19/2023	7.2	7.78	SW846-9310	X
Dissolved Solids		47	mg/L	10	7/19/2023			EPA-160.1	X
Suspended Solids		10.6	mg/L	2.5	7/19/2023			EPA-160.2	X
Chemical Oxygen Demand (COD)		37.3	mg/L	20	7/19/2023			EPA-410.4	X
Total Solids		46	mg/L	10	7/19/2023			SM-2540 B 17	X
Total Organic Carbon (TOC)		10.7	mg/L	2	7/19/2023			SW846-9060A	X

**Paducah OREIS  
SURFACE WATER MONITORING REPORT**

**Facility:** C-746-S&T Landfill      **County:** McCracken      **Permit #:** SW07300014,SW07300015,SW07300045

**Sampling Point:** L136      INSTREAM      **Period:** 3rd Quarter 2023

**SAMPLE ID:** L136SS4-23      **Sample Type:** REG

Parameter	Qualifier	Result	Units	Reporting Limit	Date Collected	Counting Error (+/-)	TPU	Method	Validation
Chloride		0.996	mg/L	0.2	7/19/2023			EPA-300.0	X
Sulfate		5.55	mg/L	0.4	7/19/2023			EPA-300.0	X
Conductivity		204	umho/cm		7/19/2023				X
pH		7.13	Std Unit		7/19/2023				X
Iron	J	0.0394	mg/L	0.1	7/19/2023			EPA-200.8	X
Sodium		1.27	mg/L	0.25	7/19/2023			EPA-200.8	X
Uranium		0.000322	mg/L	0.0002	7/19/2023			EPA-200.8	X
Alpha activity	U	2.6	pCi/L	6.73	7/19/2023	3.84	3.87	SW846-9310	X
Beta activity	U	7.23	pCi/L	9.41	7/19/2023	5.91	6.04	SW846-9310	X
Dissolved Solids		122	mg/L	10	7/19/2023			EPA-160.1	X
Suspended Solids	J	1.9	mg/L	2.5	7/19/2023			EPA-160.2	X
Chemical Oxygen Demand (COD)		44.1	mg/L	20	7/19/2023			EPA-410.4	X
Total Solids		138	mg/L	10	7/19/2023			SM-2540 B 17	X
Total Organic Carbon (TOC)		16.6	mg/L	2	7/19/2023			SW846-9060A	X

**Paducah OREIS**  
**SURFACE WATER MONITORING REPORT**

**Facility:** C-746-S&T Landfill      **County:** McCracken      **Permit #:** SW07300014,SW07300015,SW07300045

**Sampling Point:** L154      INSTREAM      **Period:** 3rd Quarter 2023

**SAMPLE ID:** L154US4-23      **Sample Type:** REG

Parameter	Qualifier	Result	Units	Reporting Limit	Date Collected	Counting Error (+/-)	TPU	Method	Validation
Chloride	W	0.576	mg/L	0.2	7/19/2023			EPA-300.0	X
Sulfate		2.02	mg/L	0.4	7/19/2023			EPA-300.0	X
Conductivity		51	umho/cm		7/19/2023				X
pH		6.63	Std Unit		7/19/2023				X
Iron		0.592	mg/L	0.1	7/19/2023			EPA-200.8	X
Sodium		0.7	mg/L	0.25	7/19/2023			EPA-200.8	X
Uranium		0.000336	mg/L	0.0002	7/19/2023			EPA-200.8	X
Alpha activity	U	3.12	pCi/L	7.51	7/19/2023	4.37	4.4	SW846-9310	X
Beta activity		12.8	pCi/L	9.82	7/19/2023	6.77	7.1	SW846-9310	X
Dissolved Solids		21	mg/L	10	7/19/2023			EPA-160.1	X
Suspended Solids		20.7	mg/L	2.5	7/19/2023			EPA-160.2	X
Chemical Oxygen Demand (COD)		30.2	mg/L	20	7/19/2023			EPA-410.4	X
Total Solids		47	mg/L	10	7/19/2023			SM-2540 B 17	X
Total Organic Carbon (TOC)		9.27	mg/L	1	7/19/2023			SW846-9060A	X

<b>Qualifier Code Definitions</b>	
B	Analyte found in the associated blank
H	Analysis performed outside holding time requirement
J	Estimated value
L	LCS or LCSD recovery outside of control limits
L1	LCS/LCSD RPD outside acceptance criteria
N	Sample spike (MS/MSD) recovery not within control limits
N1	MS/MSD RPD outside acceptance criteria
P	Difference between results from two GC columns outside control limits
S	Sample surrogate recovery outside acceptance criteria
T	Tracer recovery outside control limits of 30-110%
U	Analyte analyzed for but not detected at or below the lowest concentration reported.
W	Post-digestion spike recovery out of control limits
W1	Post-digestion spike and post-digestion spike duplicate RPD out of control limits
X	Other specific flags and footnotes may be required to properly define the results.
Y1	MS/MSD recovery outside acceptance criteria
Y2	MS/MSD RPD outside acceptance criteria

<b>RGA Type Code Definitions</b>	
LRGA	Lower Regional Gravel Aquifer
UCRS	Upper Continental Recharge System
URGA	Upper Regional Gravel Aquifer
NA	

<b>Sample Type Code Definitions</b>	
REG	Regular
FR	Field Replicate (code used for Field Duplicate)
RI	Equipment Rinsate Blank
FB	Field Blank
TB	Trip Blank

<b>Validation Code Definitions</b>	
=	Validated result, no additional qualifier necessary
J	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
U	The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
UJ	Analyte not detected above the reported detection limit, and the reported detection limit is approximated due to quality deficiency.
X	Not validated



**ATTACHMENT I1**

**GEL LABORATORIES CERTIFICATE OF ANALYSIS**

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# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
 Address : 5600 Hobbs Road

Kevil, Kentucky 42053

Contact: Ms. Jaime Morrow

Project: C-746-S&T Landfill Surface Water Quarterly(SS23-04)

Client Sample ID: L135SS4-23	Project: FRNP00515
Sample ID: 630011001	Client ID: FRNP005
Matrix: WS	
Collect Date: 19-JUL-23 13:20	
Receive Date: 21-JUL-23	
Collector: Client	

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Carbon Analysis</b>												
<b>9060A, Total Organic Carbon "As Received"</b>												
Total Organic Carbon Average		10.7	0.330	2.00	mg/L		1	RM3	07/28/23	1506	2466615	1
<b>Ion Chromatography</b>												
<b>EPA 300.0 Anions (Chloride and Sulfate) "As Received"</b>												
Chloride		0.912	0.0670	0.200	mg/L		1	LXA2	07/22/23	1925	2463905	2
Sulfate		1.99	0.133	0.400	mg/L		1					
<b>Metals Analysis-ICP-MS</b>												
<b>200.8/200.2 MIMICP Metals- Fe Na U "As Received"</b>												
Iron		0.390	0.0330	0.100	mg/L	1.00	1	RM4	07/25/23	1531	2464320	3
Sodium		1.10	0.0800	0.250	mg/L	1.00	1					
Uranium		0.000749	0.0000670	0.000200	mg/L	1.00	1					
<b>Solids Analysis</b>												
<b>EPA 160.1 Solids, Dissolved "As Received"</b>												
Total Dissolved Solids		47.0	2.38	10.0	mg/L			CH6	07/24/23	1334	2464011	4
<b>EPA 160.2 Total Suspended Liq "As Received"</b>												
Total Suspended Solids		10.6	0.570	2.50	mg/L			CH6	07/25/23	0944	2464546	5
<b>SM 2540 B Solids, Total "As Received"</b>												
Total Solids		46.0	6.29	10.0	mg/L			CH6	07/26/23	0813	2465544	6
<b>Spectrometric Analysis</b>												
<b>EPA 410.4 Chem. Oxygen Demand "As Received"</b>												
COD		37.3	8.95	20.0	mg/L		1	HH2	07/24/23	1531	2464167	7

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 200.2	ICP-MS 200.2 PREP	CD3	07/24/23	1610	2464319

***Certificate of Analysis***

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road  
  
Kevil, Kentucky 42053  
Contact: Ms. Jaime Morrow  
Project: C-746-S&T Landfill Surface Water Quarterly(SS23-04)

Client Sample ID: L135SS4-23	Project: FRNP00515
Sample ID: 630011001	Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
The following Analytical Methods were performed:												
Method	Description	Analyst Comments										
1	SW846 9060A											
2	EPA 300.0											
3	EPA 200.8											
4	EPA 160.1											
5	EPA 160.2											
6	SM 2540B											
7	EPA 410.4											

**Notes:**

*Column headers are defined as follows:*

- |                                       |                                |
|---------------------------------------|--------------------------------|
| DF: Dilution Factor                   | Lc/LC: Critical Level          |
| DL: Detection Limit                   | PF: Prep Factor                |
| MDA: Minimum Detectable Activity      | RL: Reporting Limit            |
| MDC: Minimum Detectable Concentration | SQL: Sample Quantitation Limit |

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
 Address : 5600 Hobbs Road  
 Kevil, Kentucky 42053  
 Contact: Ms. Jaime Morrow  
 Project: C-746-S&T Landfill Surface Water Quarterly(SS23-04)

---

Client Sample ID: L136SS4-23	Project: FRNP00515
Sample ID: 630011002	Client ID: FRNP005
Matrix: WS	
Collect Date: 19-JUL-23 13:40	
Receive Date: 21-JUL-23	
Collector: Client	

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Carbon Analysis</b>												
9060A, Total Organic Carbon "As Received"												
Total Organic Carbon Average		16.6	0.330	2.00	mg/L		1	RM3	07/28/23	1549	2466615	1
<b>Ion Chromatography</b>												
EPA 300.0 Anions (Chloride and Sulfate) "As Received"												
Chloride		0.996	0.0670	0.200	mg/L		1	LXA2	07/22/23	2159	2463905	2
Sulfate		5.55	0.133	0.400	mg/L		1					
<b>Metals Analysis-ICP-MS</b>												
200.8/200.2 MIMICP Metals- Fe Na U "As Received"												
Iron	J	0.0394	0.0330	0.100	mg/L	1.00	1	RM4	07/25/23	1535	2464320	3
Sodium		1.27	0.0800	0.250	mg/L	1.00	1					
Uranium		0.000322	0.0000670	0.000200	mg/L	1.00	1					
<b>Solids Analysis</b>												
EPA 160.1 Solids, Dissolved "As Received"												
Total Dissolved Solids		122	2.38	10.0	mg/L			CH6	07/24/23	1334	2464011	4
EPA 160.2 Total Suspended Liq "As Received"												
Total Suspended Solids	J	1.90	0.570	2.50	mg/L			CH6	07/25/23	0944	2464546	5
SM 2540 B Solids, Total "As Received"												
Total Solids		138	6.29	10.0	mg/L			CH6	07/26/23	0813	2465544	6
<b>Spectrometric Analysis</b>												
EPA 410.4 Chem. Oxygen Demand "As Received"												
COD		44.1	8.95	20.0	mg/L		1	HH2	07/24/23	1531	2464167	7

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 200.2	ICP-MS 200.2 PREP	CD3	07/24/23	1610	2464319

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: November 2, 2023

Company : Four Rivers Nuclear Partnership, LLC  
Address : 5600 Hobbs Road  
Kevil, Kentucky 42053  
Contact: Ms. Jaime Morrow  
Project: C-746-S&T Landfill Surface Water Quarterly(SS23-04)

Client Sample ID: L136SS4-23      Project: FRNP00515  
Sample ID: 630011002      Client ID: FRNP005

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time Batch	Method
The following Analytical Methods were performed:											
Method	Description	Analyst Comments									
1	SW846 9060A										
2	EPA 300.0										
3	EPA 200.8										
4	EPA 160.1										
5	EPA 160.2										
6	SM 2540B										
7	EPA 410.4										

### Notes:

Column headers are defined as follows:

DF: Dilution Factor      Lc/LC: Critical Level  
DL: Detection Limit      PF: Prep Factor  
MDA: Minimum Detectable Activity      RL: Reporting Limit  
MDC: Minimum Detectable Concentration      SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Company : Four Rivers Nuclear Partnership,  
Address : LLC  
5600 Hobbs Road

Kevil, Kentucky 42053

Report Date: November 2, 2023

Contact: Ms. Jaime Morrow

Project: C-746-S&T Landfill Surface Water Quarterly(SS23-04)

Client Sample ID: L135SS4-23  
Sample ID: 630011001  
Matrix: WS  
Collect Date: 19-JUL-23  
Receive Date: 21-JUL-23  
Collector: Client

Project: FRNP00515  
Client ID: FRNP005

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
-----------	-----------	--------	-------------	-----	-----	----	-------	----	----	---------	------	------	-------	------

### Rad Gas Flow Proportional Counting

*GFPC, Gross A/B, liquid "As Received"*

Alpha	U	4.36	+/-3.98	5.69	+/-4.05	15.0	pCi/L			JB6	07/31/23	1002	2464211	1
Beta		17.8	+/-7.20	9.60	+/-7.78	50.0	pCi/L							

### The following Analytical Methods were performed

Method	Description
1	EPA 900.0/SW846 9310

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
---------------------------	------	----------	-----------	-------------------

**Notes:**  
The MDC is a sample specific MDC.  
TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Mtd.: Method
DL: Detection Limit	PF: Prep Factor
Lc/LC: Critical Level	RL: Reporting Limit
MDA: Minimum Detectable Activity	TPU: Total Propagated Uncertainty
MDC: Minimum Detectable Concentration	

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Company : Four Rivers Nuclear Partnership,  
Address : LLC  
5600 Hobbs Road

Kevil, Kentucky 42053

Report Date: November 2, 2023

Contact: Ms. Jaime Morrow

Project: C-746-S&T Landfill Surface Water Quarterly(SS23-04)

Client Sample ID: L136SS4-23

Project: FRNP00515

Sample ID: 630011002

Client ID: FRNP005

Matrix: WS

Collect Date: 19-JUL-23

Receive Date: 21-JUL-23

Collector: Client

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Gas Flow Proportional Counting</b>														
<i>GFPC, Gross A/B, liquid "As Received"</i>														
Alpha	U	2.60	+/-3.84	6.73	+/-3.87	15.0	pCi/L			JB6	07/31/23	1002	2464211	1
Beta	U	7.23	+/-5.91	9.41	+/-6.04	50.0	pCi/L							

### The following Analytical Methods were performed

Method	Description
1	EPA 900.0/SW846 9310

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
---------------------------	------	----------	-----------	-------------------

**Notes:**  
The MDC is a sample specific MDC.  
TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

### Column headers are defined as follows:

DF: Dilution Factor  
DL: Detection Limit  
Lc/LC: Critical Level  
MDA: Minimum Detectable Activity  
MDC: Minimum Detectable Concentration

Mtd.: Method  
PF: Prep Factor  
RL: Reporting Limit  
TPU: Total Propagated Uncertainty



**APPENDIX J**

**ANALYTICAL LABORATORY CERTIFICATION**

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# Accredited Laboratory

A2LA has accredited

**GEL LABORATORIES, LLC**

*Charleston, SC*

for technical competence in the field of

**Environmental Testing**

In recognition of the successful completion of the A2LA evaluation process that includes an assessment of the laboratory's compliance with ISO/IEC 17025:2017, the 2009 and 2016 TNI Environmental Testing Laboratory Standard, the requirements of the Department of Defense Environmental Laboratory Accreditation Program (DoD ELAP), and the requirements of the Department of Energy Consolidated Audit Program (DOECAP) as detailed in Version 5.4 of the DoD/DOE Quality System Manual for Environmental Laboratories (QSM), accreditation is granted to this laboratory to perform recognized EPA methods as defined on the associated A2LA Environmental Scope of Accreditation. This accreditation demonstrates technical competence for this defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communiqué dated April 2017).



Presented this 26<sup>th</sup> day of June 2023.

A blue ink signature of Mr. Trace McInturff, written over a horizontal line.

Mr. Trace McInturff, Vice President, Accreditation Services  
For the Accreditation Council  
Certificate Number 2567.01  
Valid to June 30, 2025

*For the tests to which this accreditation applies, please refer to the laboratory's Environmental Scope of Accreditation.*

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**APPENDIX K**  
**LABORATORY ANALYTICAL METHODS**

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**LABORATORY ANALYTICAL METHODS**

<b>Analytical Method</b>	<b>Preparation Method</b>	<b>Product</b>
SM 2540B		Solids, Total
SW846 8260D		Volatile Organic Compounds (VOC) by Gas Chromatograph/Mass Spectrometer
SW846 8011	SW846 8011 PREP	Analysis of 1,2-Dibromoethane (EDB), 1,2-Dibromo-3-Chloropropane (DBCP) and 1,2,3-Trichloropropane in Water by GC/ECD Using Methods 504.1 or 8011
SW846 8082A	SW846 3535A	Analysis of Polychlorinated Biphenyls by GC/ECD by ECD
SW846 6020B	SW846 3005A	Determination of Metals by ICP-MS
SW846 7470A	SW846 7470A Prep	Mercury Analysis Using the Perkin Elmer Automated Mercury Analyzer
SW846 9060A		Carbon, Total Organic
SW846 9012B	SW846 9010C Distillation	Cyanide, Total
EPA 300.0		Ion Chromatography Iodide
SW846 9056A		Ion Chromatography
EPA 160.1		Solids, Total Dissolved
EPA 160.2		Solids, Total Suspended
EPA 200.8	EPA 200.2	Determination of Metals by ICP-MS
EPA 410.4		COD
Eichrom Industries, AN-1418		AlphaSpec Ra226, Liquid
DOE EML HASL-300, Th-01-RC Modified		Th-01-RC M, Th Isotopes, Liquid
EPA 904.0 Modified		904.0Mod, Ra228, Liquid
SW846 9310		9310, Alpha/Beta Activity, liquid
EPA 905.0 Modified		905.0Mod, Sr90, liquid
DOE EML HASL-300, Tc-02-RC Modified		Tc-02-RC-MOD, Tc99, Liquid
EPA 906.0 Modified		906.0M, Tritium Dist, Liquid
SW846 9020B		Total Organic Halogens (TOX)

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## **APPENDIX L**

### **MICRO-PURGING STABILITY PARAMETERS**

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**Micro-Purge Stability Parameters  
for the C-746-S&T Landfills**

	Temperature (°F)	Conductivity (umho/cm)	pH (Std. Unit)	Dissolved oxygen (mg/L)	Turbidity (NTU)		Temperature (°F)	Conductivity (umho/cm)	pH (Std. Unit)	Dissolved oxygen (mg/L)	Turbidity (NTU)
<b>MW220</b>											
<b>Date Collected:7/28/2023</b>											
1035	67.7	359	6.04	5.80	3.08						
1038	68.5	358	5.99	5.99	3.41						
1041	69.0	357	5.96	5.90	3.55						
<b>MW222</b>											
<b>Date Collected:7/28/2023</b>											
0825	66.4	363	6.16	4.84	3.69						
0828	67.0	361	6.10	4.43	3.73						
0831	67.7	360	6.08	4.37	3.68						
<b>MW224</b>											
<b>Date Collected:7/28/2023</b>											
0915	66.9	440	6.08	3.34	4.95						
0918	67.3	438	6.04	3.03	5.04						
0921	67.7	439	6.02	2.96	5.10						
<b>MW370</b>											
<b>Date Collected:7/25/2023</b>											
0818	70.7	468	6.20	4.09	4.67						
0821	71.9	470	6.14	4.00	4.60						
0824	72.6	468	6.12	4.01	4.50						
<b>MW373</b>											
<b>Date Collected:7/25/2023</b>											
1132	73.1	904	6.11	2.11	1.40						
1135	72.7	907	6.08	1.73	1.53						
1138	72.0	910	6.08	1.69	1.60						
<b>MW385</b>											
<b>Date Collected:7/26/2023</b>											
1240	66.7	466	6.45	1.36	2.56						
1243	66.9	463	6.42	1.00	2.40						
1246	67.2	460	6.41	0.92	2.50						
<b>MW387</b>											
<b>Date Collected:7/26/2023</b>											
0935	65.2	570	6.14	4.61	3.42						
0938	65.1	570	6.14	4.56	3.20						
0941	65.8	570	6.15	4.53	3.11						
<b>MW390</b>											
<b>Date Collected:7/26/2023</b>											
0830	66.3	620	6.30	4.37	2.77						
0833	67.5	618	6.29	4.53	2.84						
0836	68.4	618	6.30	4.57	2.81						
<b>MW392</b>											
<b>Date Collected:7/27/2023</b>											
1213	69.3	349	5.96	1.15	1.97						
1216	69.8	350	5.95	1.10	2.00						
1219	69.9	350	5.93	1.08	2.10						
<b>MW394</b>											
<b>Date Collected:7/27/2023</b>											
0748	68.6	415	5.93	4.99	2.09						
0751	68.3	416	5.90	4.94	2.02						
0754	68.4	415	5.90	4.93	1.97						
<b>MW396</b>											
<b>Date Collected:7/27/2023</b>											
0917	73.4	675	6.33	1.96	3.39						
0920	70.0	670	6.51	1.28	3.18						
0923	70.3	673	6.50	1.20	3.09						
<b>MW220 Resample</b>											
<b>Date Collected:7/31/2023</b>											
1313	68.5	352	6.12	5.98	2.86						
1316	69.0	353	6.09	6.09	2.60						
1319	69.5	354	6.09	6.11	2.80						
<b>MW224 Resample</b>											
<b>Date Collected:7/31/2023</b>											
1233	71.7	441	6.13	4.69	2.35						
1236	71.9	441	6.14	3.59	2.03						
1239	72.1	442	6.13	3.53	2.00						
<b>MW221</b>											
<b>Date Collected:7/28/2023</b>											
0632	65.4	398	6.00	5.79	3.78						
0635	65.7	397	5.97	5.42	3.40						
0638	65.8	395	5.96	5.40	3.29						
<b>MW223</b>											
<b>Date Collected:7/28/2023</b>											
0719	64.4	398	6.11	3.33	2.75						
0722	64.6	397	6.03	2.89	2.91						
0725	65.0	396	6.03	2.83	2.84						
<b>MW369</b>											
<b>Date Collected:7/25/2023</b>											
0732	64.7	352	6.00	3.28	6.01						
0735	65.0	352	5.99	2.89	6.08						
0738	65.9	350	5.96	2.85	6.00						
<b>MW372</b>											
<b>Date Collected:7/25/2023</b>											
1048	68.2	757	6.12	2.50	1.66						
1051	69.0	758	6.07	1.96	1.60						
1054	69.4	759	6.05	1.91	1.52						
<b>MW384</b>											
<b>Date Collected:7/26/2023</b>											
1156	67.5	479	6.10	4.56	3.15						
1159	68.0	480	6.16	4.33	2.92						
1202	68.1	481	6.14	4.27	2.84						
<b>MW386</b>											
<b>Date Collected:7/26/2023</b>											
1337	68.7	572	6.86	2.89	2.37						
1340	67.9	574	6.80	1.37	3.06						
1343	67.9	576	6.76	1.33	3.12						
<b>MW388</b>											
<b>Date Collected:7/26/2023</b>											
1114	67.6	440	6.15	4.99	2.84						
1117	67.0	442	6.12	4.44	2.80						
1120	67.1	443	6.13	4.39	2.91						
<b>MW391</b>											
<b>Date Collected:7/27/2023</b>											
1050	64.6	382	6.04	4.99	2.77						
1053	64.1	381	6.01	4.62	2.89						
1056	64.7	382	6.00	4.57	2.34						
<b>MW393</b>											
<b>Date Collected:7/27/2023</b>											
1310	69.4	453	6.24	1.93	6.46						
1313	69.9	452	6.23	1.79	6.40						
1316	70.1	453	6.23	1.73	6.33						
<b>MW395</b>											
<b>Date Collected:7/27/2023</b>											
0834	70.3	388	5.99	2.01	2.89						
0837	70.8	387	5.94	1.87	2.77						
0840	71.0	385	5.94	1.90	2.69						
<b>MW397</b>											
<b>Date Collected:7/27/2023</b>											
1004	64.7	321	6.03	5.88	2.20						
1007	65.0	320	5.94	5.97	2.31						
1010	65.3	319	5.94	5.99	2.24						
<b>MW221 Resample</b>											
<b>Date Collected:7/31/2023</b>											
1154	68.8	398	6.11	5.71	2.92						
1157	69.0	397	6.11	5.80	2.32						
1200	69.3	398	6.10	5.82	2.28						

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