

**C-746-S&T Landfills
First Quarter Calendar Year 2018
(January–March)
Compliance Monitoring Report,
Paducah Gaseous Diffusion Plant,
Paducah, Kentucky**



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(January–March)
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Paducah Gaseous Diffusion Plant,
Paducah, Kentucky**

Date Issued—May 2018

U.S. DEPARTMENT OF ENERGY
Office of Environmental Management

Prepared by
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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>
CY	calendar year
<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
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 First Quarter Calendar Year 2018 (January–March) Compliance Monitoring Report, Paducah Gaseous Diffusion Plant, Paducah, Kentucky*, is being submitted in accordance with Solid Waste Landfill Permit Number 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 recorded on the Kentucky Division of Waste Management (KDWM) Groundwater Sample Analyses forms, which 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), 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 (CY) 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.

1.1 BACKGROUND

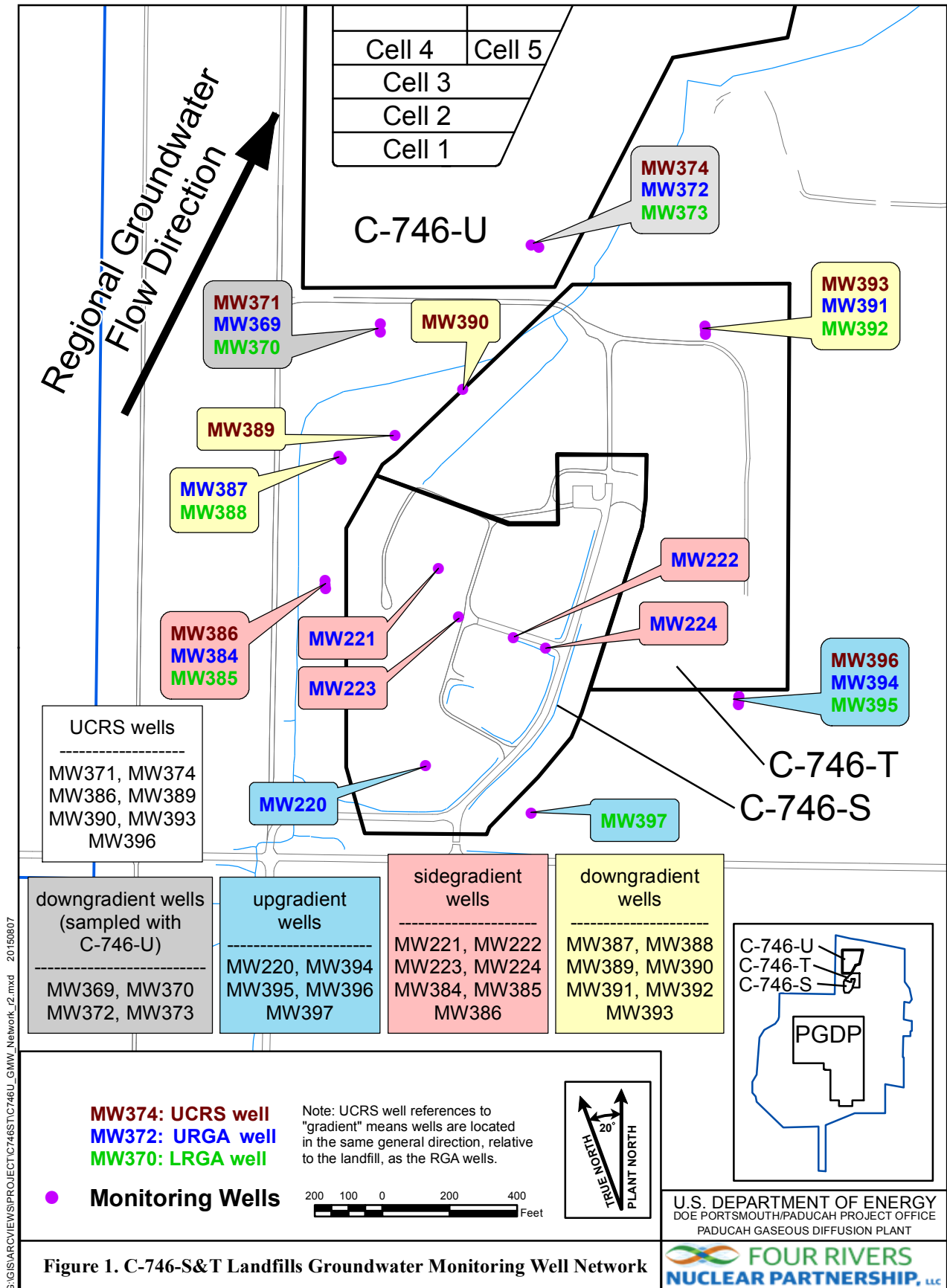
The C-746-S&T Landfills are closed, solid waste landfills located north of the Paducah Site and south of the C-746-U Landfill. Construction and operation of the C-746-S Residential Landfill were permitted in April 1981 under Solid Waste Landfill Permit Number 073-00014. The permitted C-746-S Landfill area covers about 16 acres and contains a clay liner with a 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 Number 073-00015. The permitted C-746-T Landfill area covers about 20 acres and contains a clay liner with a cover of compacted soil. The C-746-T Landfill was used to dispose of construction debris (e.g., concrete, wood, and 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 water level measurement or sample; therefore, there are no analytical results for this location.



G:\GIS\ARCVIEWS\PROJECT\C746S\T\C746U_GMW_Network_12.mxd 20150807

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) (LATA Kentucky 2014)* UCRS wells are included in the monitoring program. 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, and exceedances of these values are reported in the quarterly report.

Groundwater sampling was conducted within the first quarter 2018 in accordance with the Groundwater Monitoring Plan (LATA Kentucky 2014) using the Deactivation and Remediation Contractor, procedure CP4-ES-2101, *Groundwater Sampling*. Appropriate sample containers and preservatives were utilized. The laboratory also 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 January 29, 2018, in MWs of the C-746-S&T Landfills (see Table E.1); in MWs of the C-746-U Landfill; and in MWs of the surrounding region (shown on Figure E.3). Water level measurements in 39 vicinity wells define the potentiometric surface for the RGA. Normal regional flow in the RGA is north to northeastward, toward the Ohio River. During January, RGA groundwater flow in the area of the landfill was oriented primarily northeastward. The hydraulic gradient for the RGA in the vicinity of the C-746-S&T Landfills in January was 4.19×10^{-4} ft/ft, while the gradient beneath the C-746-S&T Landfills was 3.18×10^{-4} ft/ft. Calculated groundwater flow rates (average linear velocities) for the RGA at the C-746-S&T Landfills range from 0.54 to 1.22 ft/day (see Table E.3).

1.2.2 Methane Monitoring

Methane monitoring was conducted in accordance with 401 KAR 48:090 § 5 and the approved Explosive Gas Monitoring Program (KEEC 2011), which is Technical Application, Attachment 12, of the Solid Waste Landfill Permit. Landfill operations staff monitored for the occurrence of methane in 1 on-site building location, 4 locations along the landfill boundary, and 27 passive-gas vents located in Cells 1, 2, and 3 of the C-746-S Landfill on March 8, 2018. See Appendix H for a map (Figure H.1) of the monitoring locations. Monitoring identified 0% of the lower explosive limit (LEL) of methane at all locations, which is compliant with the regulatory requirement of < 100% LEL at boundary locations and < 25% LEL at all other locations. The results are documented on the approved C-746-S&T Landfills Methane Log provided in Appendix H.

1.2.3 Surface Water Monitoring

Surface water was monitored, as specified in 401 KAR 48:300 § 2, and the approved *Surface Water Monitoring Plan for C-746-S and C-746-T Landfills Permit Numbers KY-073-00014 and 073-00015, Paducah Gaseous Diffusion Plant, Paducah, Kentucky (PRS 2008)*, which is Technical Application

Attachment 24, of the Solid Waste Landfill Permit. Sampling was performed at the three locations (see Figure 2) monitored for the C-746-S&T Landfills. The landfills have an upstream location, L135; a downstream location, L154; and a location capturing runoff from the landfill surface, L136.

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 Landfill Permit. Parameters that had concentrations that exceeded their respective MCL are listed in Table 1. Those constituents that exceeded their respective MCL were further evaluated against their historical background UTL. Table 2 identifies parameters (without MCLs) with concentrations that exceeded the statistically derived historical background UTL during the first quarter 2018, as well as parameters that exceeded their MCL and also exceeded their historical background UTL. 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 considered to be upgradient (Table 3).

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, the MCL exceedances for trichloroethene in MW372, MW373, MW391, and MW392 (downgradient wells) do not exceed the historical background concentration and are considered to be a Type 1 exceedance—not attributable to the C-746-S&T Landfills.

The MCL exceedances for beta activity in MW370, MW387, and MW388 (downgradient wells) were shown to exceed both the historical background UTL and the current background UTL; therefore, preliminarily they were considered to be Type 2 exceedances because the source(s) of these exceedances is not determined. To evaluate these preliminary Type 2 exceedances further, the parameter was subjected to the Mann-Kendall statistical test for trend using the most recent eight quarters of data. The results are summarized in Table 4. MW387 and MW388 had no increasing Mann-Kendall trends for beta activity and are considered to be Type 1 exceedances (not attributable to the landfill). MW370 had an increasing trend that is discussed in detail later in this section.

This report serves as the notification of parameters that had statistically significant increased concentrations relative to historical background concentrations, as required by Permit Number SW07300014, SW07300015, SW07300045, Condition GSTR0003, Standard Requirement 8, 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, developed using the most recent eight quarters of data from wells identified as upgradient, to identify if the current downgradient concentrations are consistent with current background values. 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, constituents in downgradient wells that exceed the historical UTL, but do not exceed the current UTL, are considered not to have a landfill source; therefore, they are a Type 1 exceedance.

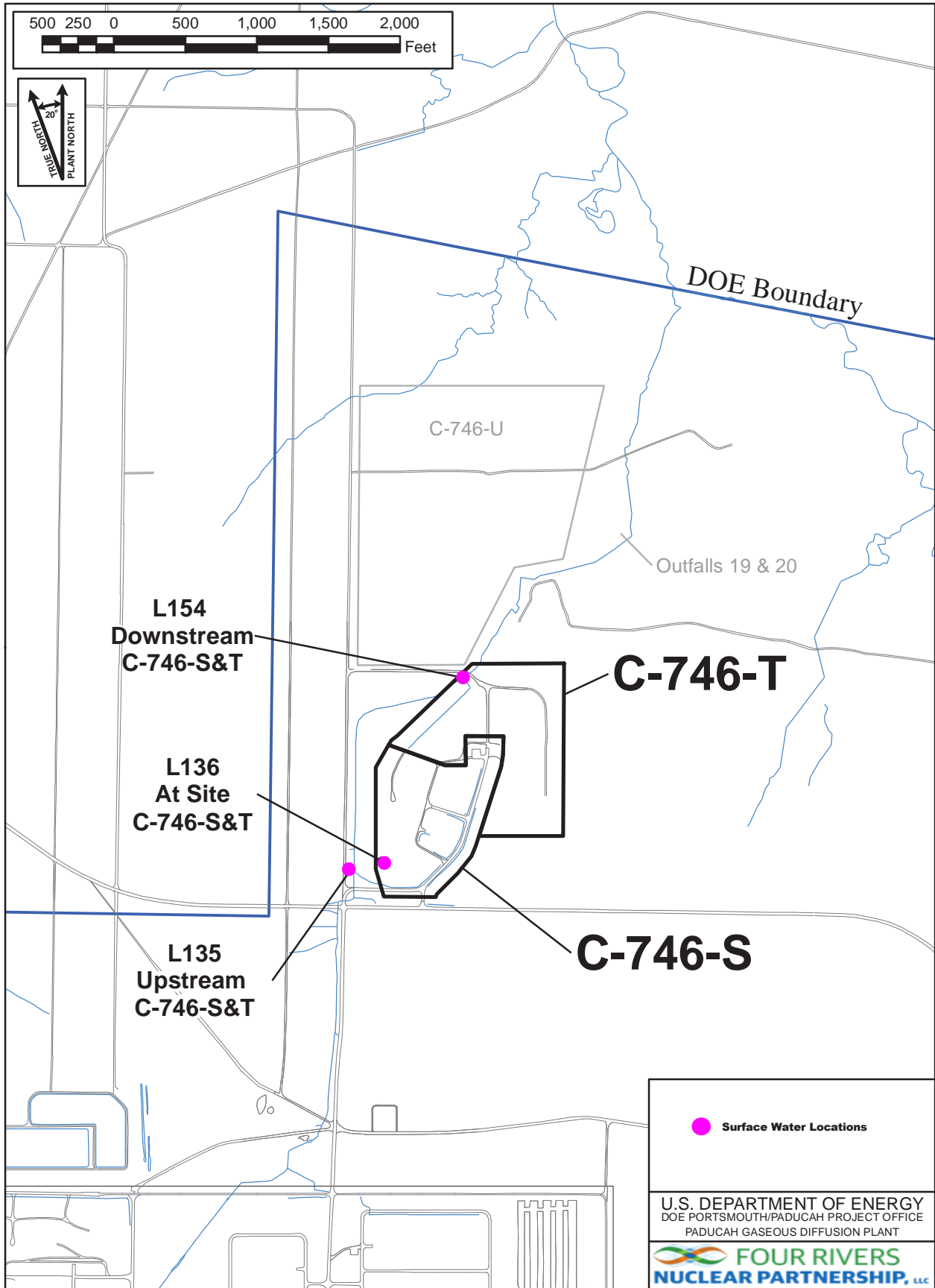


Figure 2. C-746-S&T Landfills Surface Water Monitoring Locations

Table 1. Summary of MCL Exceedances

UCRS	URGA	LRGA
MW390: Beta activity	MW372: Trichloroethene	MW370: Beta activity
	MW384: Beta activity	MW373: Trichloroethene
	MW387: Beta activity	MW385: Beta activity
	MW391: Trichloroethene	MW388: Beta activity
	MW394: Trichloroethene	MW392: Trichloroethene

Table 2. Exceedances of Statistically Derived Historical Background Concentrations

UCRS*	URGA	LRGA
MW386: Oxidation-reduction potential	MW221: Oxidation-reduction potential	MW370: Beta activity, oxidation-reduction potential, radium-226, sulfate, technetium-99
MW390: Beta activity, oxidation-reduction potential, technetium-99	MW222: Aluminum	MW373: Calcium, conductivity, dissolved solids, magnesium, oxidation-reduction potential, sulfate
MW393: Oxidation-reduction potential	MW369: Technetium-99	MW385: Beta activity, sulfate, technetium-99
MW396: Oxidation-reduction potential	MW372: Calcium, dissolved solids, magnesium, radium-226, sulfate	MW388: Beta activity, oxidation-reduction potential, radium-226, sulfate, technetium-99
	MW384: Beta activity, sulfate, technetium-99	MW392: Oxidation-reduction potential
	MW387: Beta activity, magnesium, sulfate, technetium-99	MW397: Oxidation-reduction potential
	MW391: Sulfate	

*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.

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

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

Upgradient wells: MW220, MW394, MW395, MW396, MW397

Table 3. Exceedances of Current Background UTL in Downgradient Wells

URGA	LRGA
MW369: Technetium-99	MW370: Beta activity, radium-226, sulfate, technetium-99
MW372: Calcium, magnesium, sulfate	MW373: Calcium, conductivity, dissolved solids, magnesium, sulfate
MW387: Beta activity, magnesium, sulfate, technetium-99	MW388: Beta activity, radium-226, sulfate, technetium-99
MW391: Sulfate	

The constituents listed in Table 3 that exceed both the historical UTL and the current UTL do not have an identified source and are considered preliminarily to be a Type 2 exceedance, per the approved Groundwater Monitoring Plan. 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. All but three of these preliminary Type 2 exceedances in downgradient wells—beta activity in MW370 and radium-226 and sulfate in MW388—did not have an increasing trend and are considered to be Type 1 exceedances (not attributable to the landfill).

The Mann-Kendall statistical test indicates that there is an increasing trend in beta activity in MW370 over the past eight quarters. In accordance with the Groundwater Monitoring Plan, it is considered a Type 2 exceedance (source unknown). The source of the trend is believed to be unrelated to the C-746-S&T Landfills for the following reasons.

- There is a known upgradient regional source of beta activity associated with the technetium-99 Northwest Plume (see the Groundwater Monitoring Plan);
- Although the deeper (LRGA) MW370 shows an increasing trend, the shallower, collocated (URGA) well, MW369, does not exceed statistically derived historical background concentrations for beta activity (refer to Table 2); and
- The recent beta activity in MW370 is within the range of historical levels (3.66–84.6 pCi/L) of beta activity since 2002.

The Mann-Kendall statistical test indicates that there is an increasing trend of radium-226 in MW388 over the past eight quarters. In accordance with the Groundwater Monitoring Plan, this is considered a Type 2 exceedance (source unknown). The source of the trend is believed to be unrelated to the C-746-S&T Landfills because the shallower, collocated URGA well, MW387, does not exceed the historical UTL for radium-226 (refer to Table 2). Moreover, statistical determinations of elevated activity of radium-226 occur among down-, side- and upgradient monitoring wells at the C-746-S&T Landfills, suggestive that the radium-226 is unrelated to a landfill source.

The Mann-Kendall statistical test indicates that there is an increasing trend of sulfate in MW388 over the past eight quarters. In accordance with the Groundwater Monitoring Plan, this is considered a Type 2 exceedance (source unknown). The source of the trend is believed to be unrelated to the C-746-S&T Landfills because the shallower, collocated URGA well, MW387, does not show the increasing Mann-Kendall trend for sulfate (refer to Table 4).

In accordance with Permit Condition GSTR0003, Variance 2, of the Solid Waste 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 34:060 § 12.

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

Location	Well ID	Parameter	Sample Size	Alpha ¹	p-Value ²	S ³	Var(S) ⁴	Sen's Slope ⁵	Kendall Correlation ⁶	Decision ⁷
C-746-S&T Landfills	MW369	Technetium-99	8	0.05	0.199	8	65.333	3.89	0.286	No Trend
	MW370	Beta Activity	8	0.05	0.031	16	65.333	3.84	0.571	Positive Trend
		Radium-226	8	0.05	0.138	10	65.333	0.06	0.357	No Trend
		Sulfate ⁸	8	0.05	0.309	5	64.333	0.17	0.182	No Trend
		Technetium-99	8	0.05	0.274	6	65.333	1.89	0.214	No Trend
	MW372	Calcium	8	0.05	0.054	-14	65.333	-0.99	-0.500	No Trend
		Magnesium	8	0.05	0.007	-20	65.333	-0.73	-0.714	Negative Trend
		Sulfate	8	0.05	0.016	-18	65.333	-7.58	-0.643	Negative Trend
	MW373	Calcium	8	0.05	0.452	-2	65.333	-0.34	-0.071	No Trend
		Conductivity	8	0.05	0.360	4	65.333	4.45	0.143	No Trend
		Dissolved Solids	8	0.05	0.452	-2	65.333	-1.25	-0.071	No Trend
		Magnesium	8	0.05	0.452	-2	65.333	-0.10	-0.071	No Trend
		Sulfate ⁸	8	0.05	0.040	-15	64.333	-2.79	-0.546	Negative Trend
	MW387	Beta Activity	8	0.05	0.089	12	65.333	11.9	0.429	No Trend
		Magnesium	8	0.05	0.089	12	65.333	0.34	0.429	No Trend
		Sulfate	8	0.05	0.054	14	65.333	1.45	0.500	No Trend
		Technetium-99	8	0.05	0.199	8	65.333	14.1	0.286	No Trend
	MW388	Beta Activity	8	0.05	0.031	-16	65.333	-7.75	-0.571	Negative Trend
		Radium-226	8	0.05	0.016	18	65.333	0.08	0.643	Positive Trend
		Sulfate ⁸	8	0.05	0.040	15	64.333	0.59	0.546	Positive Trend
		Technetium-99	8	0.05	0.054	-14	65.333	-12.4	-0.500	No Trend
	MW391	Sulfate	8	0.05	0.089	-12	65.333	-1.88	-0.429	No Trend

Footnotes:

¹ An alpha of 0.05 represents a 95% confidence interval.

² The p-value represents the risk of acceptance the H_a hypothesis of a trend, in terms of a percentage.

³ 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.

⁴ VAR(S) represents the variance of S in the sample set and takes into account statistical ties.

⁵ The magnitude of trend is predicted by the Sen's Slope. Here, the slope is described as the median of all (x_j-x_k)/(j-k), where x is a data point and j and k are values of time.

⁶ Kendall's correlation is described as the difference of concordant pairs and discordant pairs, also taking sample size and statistical ties into account. When the Kendall's correlation is positive, it indicates an increasing trend and when it is negative, it indicates a decreasing trend.

⁷ The Mann-Kendall decision operates on two hypotheses, the H₀ and H_a. H₀ assumes there is no trend in the data, whereas H_a assumes either a positive or negative trend. Two different tests were run to test for positive or negative trends. This table reports the test with the lowest p-value.

⁸ Due to ties in the data, XLSTAT applied a continuity correction to calculate an approximate p-value.

Note: Statistics generated using XLSTAT.

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

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

UCRS
MW390: Beta activity, technetium-99

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

All MCL and UTL exceedances, except for beta activity in MW370 and radium-226 and sulfate in MW388, reported for this quarter were evaluated and considered to be Type 1 exceedances—not attributable to the C-746-S&T Landfills. The increasing trends for these listed parameters do not appear to be landfill-related. The listed parameters will continue to be evaluated in the context of these observations.

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2. DATA EVALUATION/STATISTICAL SYNOPSIS

The statistical analyses conducted on the first quarter 2018 groundwater data collected from the C-746-S&T Landfills 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, these 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 upgradient) to identify if this exceedance is attributable to upgradient/non-landfill sources. If the downgradient 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 are divided into censored (nondetects) and uncensored (detected) observations. The one-sided tolerance interval statistical test is conducted only on parameters that have at least one uncensored observation. Results of the one-sided tolerance interval statistical test are 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 is conducted. The test well results are compared to both the upper and lower tolerance limit to determine if statistically significant deviations in concentrations exist with respect to upgradient (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 historically in the statistical analyses are listed in Table 6.

Table 6. Monitoring Wells Included in Statistical Analysis*

UCRS	URGA	LRGA
MW386	MW220 (upgradient)	MW370
MW389**	MW221	MW373
MW390	MW222	MW385
MW393	MW223	MW388
MW396***	MW224	MW392
	MW369	MW395 (upgradient)
	MW372	MW397 (upgradient)
	MW384	
	MW387	
	MW391	
	MW394 (upgradient)	

*A map showing the MW locations is shown on Figure 1.

**MW389 had insufficient water to permit a water sample for laboratory analysis.

***In the same direction (relative to the landfill) as RGA wells considered to be upgradient.

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 upgradient in order to determine if the current downgradient 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, 29 parameters, including those with MCLs, required statistical analysis in the UCRS. During the first quarter, beta activity, oxidation-reduction potential, and technetium-99 displayed concentrations that exceeded their respective historical UTLs and are listed in Table 2. Beta activity and technetium-99 exceeded the current background UTL and are included in Table 5.

2.1.2 Upper Regional Gravel Aquifer

In this quarter, 30 parameters, including those with MCLs, required statistical analysis in the URGA. During the first quarter, aluminum, beta activity, calcium, dissolved solids, magnesium, oxidation-reduction potential, radium-226, sulfate, and technetium-99 displayed concentrations that exceeded their respective historical UTLs and are listed in Table 2. Beta activity, calcium, 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, 29 parameters, including those with MCLs, required statistical analysis in the LRGA. During the first quarter, beta activity, calcium, conductivity, dissolved solids, magnesium, oxidation-reduction potential, radium-226, sulfate, and technetium-99 displayed concentrations that exceeded their respective historical UTL and are listed in Table 2. Beta activity, calcium, conductivity, dissolved solids, magnesium, radium-226, sulfate, and technetium-99 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. Validation qualifiers are not requested on the groundwater reporting forms.

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 forms 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.

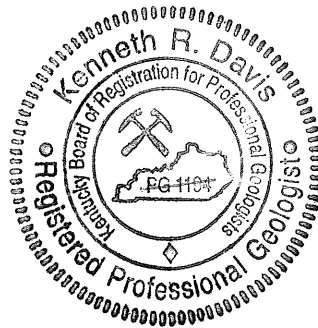
Data verification and validation results for this data set indicated that all data were considered usable.

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3. PROFESSIONAL GEOLOGIST AUTHORIZATION

DOCUMENT IDENTIFICATION: *C-746-S&T Landfills*
First Quarter Calendar Year 2018 (January–March)
Compliance Monitoring Report,
Paducah Gaseous Diffusion Plant,
Paducah, Kentucky (FRNP-RPT-0028/V1)

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



PG 113927
K. R. Davis
5-23-18

Kenneth R. Davis
Kenneth R. Davis

PG113927

May 23, 2018
Date

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4. REFERENCES

- KEEC (Kentucky Energy and Environment Cabinet) 2011. Solid Waste Landfill Permit, Number SW07300014, SW07300015, SW07300045, Division of Waste Management, Solid Waste Branch, Technical Application Attachment 12, “Explosive Gas Monitoring Program,” January 21.
- 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, Number SW07300014, SW07300015, SW07300045, Technical Application Attachment 25, LATA Environmental Services of Kentucky, LLC, Kevil, KY, June.
- PRS (Paducah Remediation Services, LLC) 2008. *Surface Water Monitoring Plan for C-746-S and C-746-T Landfills Permit Numbers KY-073-00014 and 073-00015, Paducah Gaseous Diffusion Plant, Paducah, Kentucky*, Solid Waste Landfill Permit, Number SW07300014, SW07300015, SW07300045, Technical Application Attachment 24, Paducah Remediation Services, 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 1st Qtr. CY 2018

Please check the following as applicable:

Characterization Quarterly Semiannual Annual Assessment

Please check applicable submittal(s): Groundwater Surface Water
 Leachate 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 the 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 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, Deputy Program Manager
Four Rivers Nuclear Partnership, LLC

5/29/18

Date



Jennifer Woodard, Paducah Site Lead
U.S. Department of Energy

5/29/18

Date

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APPENDIX B
FACILITY INFORMATION SHEET

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FACILITY INFORMATION SHEET

Groundwater: January 2018
Surface water: January 2018
Methane: March 2018

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, Robert E. Edwards III, Manager Phone No: (859) 227-5020

Contact Person: James Miller Phone No: (270) 441-5068
Director, Waste, Materials, and Environmental Services Project,
Contact Person Title: Four Rivers Nuclear Partnership, LLC

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

SAMPLING PERSONNEL (IF OTHER THAN LANDFILL OR LABORATORY)

Company: GEO Consultants, LLC

Contact Person: Sam Martin Phone No: (270) 441-6755

Mailing Address: 199 Kentucky Avenue Kevil, Kentucky 42053
Street City/State Zip

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

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

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 WRITTEN COMMENTS

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Division of Waste Management
 Solid Waste Branch
 14 Reilly Road
 Frankfort, KY 40601 (502)564-6716

RESIDENTIAL/INERT-QUARTERLY

Facility: US DOE - Paducah Gaseous Diffusion Plant

Permit Number: 073-00014 & 073-00015 FINDS/UNIT: KY8-890-008-982 / 1

LAB ID: None
 For Official Use Only

GROUNDWATER SAMPLE ANALYSIS (S)

AKGWA NUMBER ¹ , Facility Well/Spring Number	8000-5201	8000-5202	8000-5242	8000-5243								
Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.)	220	221	222	223								
Sample Sequence #	1	1	1	1								
If sample is a Blank, specify Type: (F)ield, (T)rip, (M)ethod, or (E)quipment	NA	NA	NA	NA								
Sample Date and Time (Month/Day/Year hour: minutes)	1/23/2018 10:21	1/23/2018 07:24	1/23/2018 08:53	1/23/2018 08:09								
Duplicate ("Y" or "N") ²	N	N	N	N								
Split ("Y" or "N") ³	N	N	N	N								
Facility Sample ID Number (if applicable)	MW220SG2-18	MW221SG2-18	MW222SG2-18	MW223SG2-18								
Laboratory Sample ID Number (if applicable)	442295003	442295005	442295007	442295009								
Date of Analysis (Month/Day/Year) For <u>Volatile Organics</u> Analysis	1/26/2018	1/26/2018	1/26/2018	1/26/2018								
Gradient with respect to Monitored Unit (UP, DOWN, SIDE, UNKNOWN)	UP	SIDE	SIDE	SIDE								
CAS RN ⁴	CONSTITUENT	T D 5	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL ⁶	F L A G S ⁷	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S
24959-67-9	Bromide	T	mg/L	9056	0.2	J	0.42		0.421		0.399	
16887-00-6	Chloride(s)	T	mg/L	9056	20.5		39.7		31.9		29.6	
16984-48-8	Fluoride	T	mg/L	9056	0.198		0.27		0.354		0.303	
S0595- -	Nitrate & Nitrite	T	mg/L	9056	1.17		0.997		1.08		1.1	
14808-79-8	Sulfate	T	mg/L	9056	16.4		13.7		10.4		13	
NS1894	Barometric Pressure Reading	T	Inches/Hg	Field	30.03		29.92		29.98		29.95	
S0145- -	Specific Conductance	T	µMHO/cm	Field	331		407		317		378	

STANDARD FLAGS:
 * = See Comments
 J = Estimated Value
 B = Analyte found in blank
 A = Average value
 N = Presumptive ID
 D = Concentration from analysis
 of a secondary dilution

¹AKGWA # is 0000-0000 for any type of blank.

²Respond "Y" if the sample was a duplicate of another sample in this report.

³Respond "Y" if the sample was split and analyzed by separate laboratories.

⁴Chemical Abstracts Service Registry Number or unique identifier number assigned by agency.

⁵"T" = Total; "D" = Dissolved

⁶"<" indicates a non-detect; do not use "ND" or "BDL". Value shown is Practical Quantification Limit.

⁷Flags are as designated, do not use any other type. Use "*", " then describe on "Written Comments Page."

RESIDENTIAL/INERT-QUARTERLY

Facility: US DOE - Paducah Gaseous Diffusion Plant

Permit Number: 073-00014 & 073-00015

FINDS/UNIT: KY8-890-008-982 / 1

LAB ID: None

For Official Use Only

GROUNDWATER SAMPLE ANALYSIS - (Cont.)

AKGWA NUMBER ¹ , Facility Well/Spring Number					8000-5201	8000-5202	8000-5242	8000-5243				
Facility's Local Well or Spring Number (e.g., MW-1, MW-2, BLANK-F, etc.)					220	221	222	223				
CAS RN ⁴	CONSTITUENT	T D 5	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S
S0906 - -	Static Water Level Elevation	T	Ft. MSL	Field	321.83		321.89		322.1		322.04	
N238	Dissolved Oxygen	T	mg/L	Field	5.01		3.92		2.58		2.82	
S0266- -	Total Dissolved Solids	T	mg/L	160.1	163		210		187		207	
S0296- -	pH	T	Units	Field	6.12		6.18		6.2		6.19	
NS215	Eh	T	mV	Field	362		401		387		378	
S0907 - -	Temperature	T	°C	Field	15.11		13.33		14.11		13.78	
7429-90-5	Aluminum	T	mg/L	6020	0.0286	J	<0.05		0.707		0.0966	
7440-36-0	Antimony	T	mg/L	6020	<0.003		<0.003		<0.003		<0.003	
7440-38-2	Arsenic	T	mg/L	6020	<0.005		<0.005		<0.005		<0.005	
7440-39-3	Barium	T	mg/L	6020	0.197		0.219		0.249		0.265	
7440-41-7	Beryllium	T	mg/L	6020	<0.0005		<0.0005		<0.0005		<0.0005	
7440-42-8	Boron	T	mg/L	6020	0.00702	J	0.0125	J	0.00767	J	0.00608	J
7440-43-9	Cadmium	T	mg/L	6020	<0.001		<0.001		<0.001		<0.001	
7440-70-2	Calcium	T	mg/L	6020	18.8		22.2		13.5		19.8	
7440-47-3	Chromium	T	mg/L	6020	0.00548	J	0.00906	J	0.00866	J	0.0131	
7440-48-4	Cobalt	T	mg/L	6020	0.000376	J	0.000494	J	0.00418		0.00245	
7440-50-8	Copper	T	mg/L	6020	0.00224		0.000796	J	0.00111		0.00113	
7439-89-6	Iron	T	mg/L	6020	0.0704	J	0.0582	J	1.39		0.27	
7439-92-1	Lead	T	mg/L	6020	<0.002		<0.002		<0.002		<0.002	
7439-95-4	Magnesium	T	mg/L	6020	8.04		9.14		6.51		8.45	
7439-96-5	Manganese	T	mg/L	6020	0.00354	J	0.00162	J	0.027		0.0691	
7439-97-6	Mercury	T	mg/L	7470	<0.0002		<0.0002		<0.0002		<0.0002	

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RESIDENTIAL/INERT-QUARTERLY

Facility: US DOE - Paducah Gaseous Diffusion Plant

Permit Number: 073-00014 & 073-00015

FINDS/UNIT: KY8-890-008-982 / 1

LAB ID: None

For Official Use Only

GROUNDWATER SAMPLE ANALYSIS - (Cont.)

AKGWA NUMBER ¹ , Facility Well/Spring Number					8000-5201	8000-5202	8000-5242	8000-5243				
Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.)					220	221	222	223				
CAS RN ⁴	CONSTITUENT	T D 5	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S
7439-98-7	Molybdenum	T	mg/L	6020	0.000698		0.00391		0.000518		0.00435	
7440-02-0	Nickel	T	mg/L	6020	0.0135		0.0318		0.0299		0.117	
7440-09-7	Potassium	T	mg/L	6020	1.86		5.48		0.6		3.8	
7440-16-6	Rhodium	T	mg/L	6020	<0.005		<0.005		<0.005		<0.005	
7782-49-2	Selenium	T	mg/L	6020	<0.005		<0.005		<0.005		<0.005	
7440-22-4	Silver	T	mg/L	6020	<0.001		<0.001		<0.001		<0.001	
7440-23-5	Sodium	T	mg/L	6020	38.8		48.4		43.5		46.7	
7440-25-7	Tantalum	T	mg/L	6020	<0.005		<0.005		<0.005		<0.005	
7440-28-0	Thallium	T	mg/L	6020	<0.002		<0.002		<0.002		<0.002	
7440-61-1	Uranium	T	mg/L	6020	<0.0002		<0.0002		0.000114	BJ	<0.0002	
7440-62-2	Vanadium	T	mg/L	6020	<0.01		<0.01		0.00484	J	<0.01	
7440-66-6	Zinc	T	mg/L	6020	<0.01		<0.01		0.0044	J	<0.01	
108-05-4	Vinyl acetate	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
67-64-1	Acetone	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
107-02-8	Acrolein	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
107-13-1	Acrylonitrile	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
71-43-2	Benzene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
108-90-7	Chlorobenzene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
1330-20-7	Xylenes	T	mg/L	8260	<0.003		<0.003		<0.003		<0.003	
100-42-5	Styrene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
108-88-3	Toluene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
74-97-5	Chlorobromomethane	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	

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RESIDENTIAL/INERT-QUARTERLY

Facility: US DOE - Paducah Gaseous Diffusion Plant

Permit Number: 073-00014 & 073-00015

FINDS/UNIT: KY8-890-008-982 / 1

LAB ID: None

For Official Use Only

GROUNDWATER SAMPLE ANALYSIS - (Cont.)

AKGWA NUMBER ¹ , Facility Well/Spring Number					8000-5201		8000-5202		8000-5242		8000-5243	
Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.)					220		221		222		223	
CAS RN ⁴	CONSTITUENT	T D 5	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S
75-27-4	Bromodichloromethane	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
75-25-2	Tribromomethane	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
74-83-9	Methyl bromide	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
78-93-3	Methyl ethyl ketone	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
110-57-6	trans-1,4-Dichloro-2-butene	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
75-15-0	Carbon disulfide	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
75-00-3	Chloroethane	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
67-66-3	Chloroform	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
74-87-3	Methyl chloride	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
156-59-2	cis-1,2-Dichloroethene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
74-95-3	Methylene bromide	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
75-34-3	1,1-Dichloroethane	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
107-06-2	1,2-Dichloroethane	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
75-35-4	1,1-Dichloroethylene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
106-93-4	Ethane, 1,2-dibromo	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
79-34-5	Ethane, 1,1,2,2-Tetrachloro	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
71-55-6	Ethane, 1,1,1-Trichloro-	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
79-00-5	Ethane, 1,1,2-Trichloro	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
630-20-6	Ethane, 1,1,1,2-Tetrachloro	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
75-01-4	Vinyl chloride	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
127-18-4	Ethene, Tetrachloro-	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
79-01-6	Ethene, Trichloro-	T	mg/L	8260	<0.001		<0.001		<0.001		0.00084	J

C-6

RESIDENTIAL/CONTAINED-QUARTERLY

Facility: US DOE - Paducah Gaseous Diffusion Plant
 Permit Number: 073-00014 & 073-00015

FINDS/UNIT: KY8-890-008-982 / 1
 LAB ID: None
 For Official Use Only

GROUNDWATER SAMPLE ANALYSIS - (Cont.)

AKGWA NUMBER ¹ , Facility Well/Spring Number					8000-5201	8000-5202	8000-5242	8000-5243				
Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.)					220	221	222	223				
CAS RN ⁴	CONSTITUENT	T D 5	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S
100-41-4	Ethylbenzene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
591-78-6	2-Hexanone	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
74-88-4	Iodomethane	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
124-48-1	Methane, Dibromochloro-	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
56-23-5	Carbon Tetrachloride	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
75-09-2	Dichloromethane	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
108-10-1	Methyl isobutyl ketone	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
96-12-8	Propane, 1,2-Dibromo-3-chloro	T	mg/L	8011	<0.0000199		<0.0000195		<0.0000197		<0.0000196	
78-87-5	Propane, 1,2-Dichloro-	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
10061-02-6	trans-1,3-Dichloro-1-propene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
10061-01-5	cis-1,3-Dichloro-1-propene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
156-60-5	trans-1,2-Dichloroethene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
75-69-4	Trichlorofluoromethane	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
96-18-4	1,2,3-Trichloropropane	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
95-50-1	Benzene, 1,2-Dichloro-	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
106-46-7	Benzene, 1,4-Dichloro-	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
1336-36-3	PCB, Total	T	ug/L	8082		*		*		*		*
12674-11-2	PCB-1016	T	ug/L	8082		*		*		*		*
11104-28-2	PCB-1221	T	ug/L	8082		*		*		*		*
11141-16-5	PCB-1232	T	ug/L	8082		*		*		*		*
53469-21-9	PCB-1242	T	ug/L	8082		*		*		*		*
12672-29-6	PCB-1248	T	ug/L	8082		*		*		*		*

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RESIDENTIAL/CONTAINED-QUARTERLY

Facility: US DOE - Paducah Gaseous Diffusion Plant

Permit Number: 073-00014 & 073-00015

FINDS/UNIT: KY8-890-008-982 / 1

LAB ID: None

For Official Use Only

GROUNDWATER SAMPLE ANALYSIS - (Cont.)

AKGWA NUMBER ¹ , Facility Well/Spring Number					8000-5201	8000-5202	8000-5242	8000-5243				
Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.)					220	221	222	223				
CAS RN ⁴	CONSTITUENT	T D 5	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S
11097-69-1	PCB-1254	T	ug/L	8082		*		*		*		*
11096-82-5	PCB-1260	T	ug/L	8082		*		*		*		*
11100-14-4	PCB-1268	T	ug/L	8082		*		*		*		*
12587-46-1	Gross Alpha	T	pCi/L	9310	-1.05	*	4.25	*	0.0844	*	2.53	*
12587-47-2	Gross Beta	T	pCi/L	9310	12.8	*	15.1	*	3.19	*	2.15	*
10043-66-0	Iodine-131	T	pCi/L			*		*		*		*
13982-63-3	Radium-226	T	pCi/L	AN-1418	-0.246	*	0.447	*	0.287	*	0.482	*
10098-97-2	Strontium-90	T	pCi/L	905.0	1.55	*	-0.439	*	1.26	*	-0.272	*
14133-76-7	Technetium-99	T	pCi/L	Tc-02-RC	27.4	*	-0.215	*	-1.44	*	4.08	*
14269-63-7	Thorium-230	T	pCi/L	Th-01-RC	0.819	*	0.189	*	0.569	*	0.44	*
10028-17-8	Tritium	T	pCi/L	906.0	102	*	-51.6	*	20.8	*	85.9	*
S0130- -	Chemical Oxygen Demand	T	mg/L	410.4	18.9	J	20.9		31.4		29.3	
57-12-5	Cyanide	T	mg/L	9012	<0.2		<0.2		<0.2		<0.2	
20461-54-5	Iodide	T	mg/L	300.0	<0.5	*	<0.5	*	<0.5	*	<0.5	*
S0268- -	Total Organic Carbon	T	mg/L	9060	0.823	J	1.06	J	0.699	J	0.754	J
S0586- -	Total Organic Halides	T	mg/L	9020	0.00486	J	0.00536	J	<0.01		0.00372	J

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Division of Waste Management
 Solid Waste Branch
 14 Reilly Road
 Frankfort, KY 40601 (502)564-6716

RESIDENTIAL/INERT-QUARTERLY

Facility: US DOE - Paducah Gaseous Diffusion Plant

Permit Number: 073-00014 & 073-00015 FINDS/UNIT: KY8-890-008-982 / 1

LAB ID: None
 For Official Use Only

GROUNDWATER SAMPLE ANALYSIS (S)

AKGWA NUMBER ¹ , Facility Well/Spring Number	8000-5244	8004-4820	8004-4818	8004-4808								
Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.)	224	369	370	372								
Sample Sequence #	1	1	1	1								
If sample is a Blank, specify Type: (F)ield, (T)rip, (M)ethod, or (E)quipment	NA	NA	NA	NA								
Sample Date and Time (Month/Day/Year hour: minutes)	1/23/2018 09:38	1/22/2018 11:59	1/22/2018 13:27	1/22/2018 10:10								
Duplicate ("Y" or "N") ²	N	N	N	N								
Split ("Y" or "N") ³	N	N	N	N								
Facility Sample ID Number (if applicable)	MW224SG2-18	MW369UG2-18	MW370UG2-18	MW372UG2-18								
Laboratory Sample ID Number (if applicable)	442295011	442172015	442172017	442179001								
Date of Analysis (Month/Day/Year) For <u>Volatile Organics</u> Analysis	1/26/2018	1/24/2018	1/24/2018	1/24/2018								
Gradient with respect to Monitored Unit (UP, DOWN, SIDE, UNKNOWN)	SIDE	DOWN	DOWN	DOWN								
CAS RN ⁴	CONSTITUENT	T D 5	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL ⁶	F L A G S ⁷	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S
24959-67-9	Bromide	T	mg/L	9056	0.254		0.364	*	0.443	*	0.576	
16887-00-6	Chloride(s)	T	mg/L	9056	18.4		31.6		35.1		43.5	
16984-48-8	Fluoride	T	mg/L	9056	0.375		0.159		0.149		0.147	
S0595- -	Nitrate & Nitrite	T	mg/L	9056	0.827		0.682		0.972		0.178	J
14808-79-8	Sulfate	T	mg/L	9056	8.4		7.63	*	22.4	*	75.2	
NS1894	Barometric Pressure Reading	T	Inches/Hg	Field	29.98		29.67		29.62		29.74	
S0145- -	Specific Conductance	T	µMHO/cm	Field	365		351		449		620	

STANDARD FLAGS:
 * = See Comments
 J = Estimated Value
 B = Analyte found in blank
 A = Average value
 N = Presumptive ID
 D = Concentration from analysis
 of a secondary dilution

¹AKGWA # is 0000-0000 for any type of blank.

²Respond "Y" if the sample was a duplicate of another sample in this report.

³Respond "Y" if the sample was split and analyzed by separate laboratories.

⁴Chemical Abstracts Service Registry Number or unique identifier number assigned by agency.

⁵"T" = Total; "D" = Dissolved

⁶"<" indicates a non-detect; do not use "ND" or "BDL". Value shown is Practical Quantification Limit.

⁷Flags are as designated, do not use any other type. Use "*", " then describe on "Written Comments Page."

RESIDENTIAL/INERT-QUARTERLY

Facility: US DOE - Paducah Gaseous Diffusion Plant
 Permit Number: 073-00014 & 073-00015

FINDS/UNIT: KY8-890-008-982 / 1
 LAB ID: None
 For Official Use Only

GROUNDWATER SAMPLE ANALYSIS - (Cont.)

AKGWA NUMBER ¹ , Facility Well/Spring Number					8000-5244	8004-4820	8004-4818	8004-4808				
Facility's Local Well or Spring Number (e.g., MW-1, MW-2, BLANK-F, etc.)					224	369	370	372				
CAS RN ⁴	CONSTITUENT	T D 5	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S
S0906 - -	Static Water Level Elevation	T	Ft. MSL	Field	322.15		322.53		322.55		322.47	
N238	Dissolved Oxygen	T	mg/L	Field	3.19		1.78		5.15		1.25	
S0266- -	Total Dissolved Solids	T	mg/L	160.1	189		161	*	203	*	330	*
S0296- -	pH	T	Units	Field	6.14		6.21		6.12		6.29	
NS215	Eh	T	mV	Field	367		346		334		275	
S0907 - -	Temperature	T	°C	Field	15.22		16.11		16.33		14.83	
7429-90-5	Aluminum	T	mg/L	6020	0.0244	J	0.178		<0.05		<0.05	
7440-36-0	Antimony	T	mg/L	6020	<0.003		<0.003		<0.003		<0.003	
7440-38-2	Arsenic	T	mg/L	6020	<0.005		<0.005		<0.005		<0.005	
7440-39-3	Barium	T	mg/L	6020	0.192		0.381		0.23		0.058	
7440-41-7	Beryllium	T	mg/L	6020	<0.0005		<0.0005		<0.0005		<0.0005	
7440-42-8	Boron	T	mg/L	6020	0.00722	J	0.0163		0.0359		1.02	
7440-43-9	Cadmium	T	mg/L	6020	<0.001		<0.001		<0.001		<0.001	
7440-70-2	Calcium	T	mg/L	6020	17.2		15		29.9		49.4	
7440-47-3	Chromium	T	mg/L	6020	<0.01		<0.01		<0.01		<0.01	
7440-48-4	Cobalt	T	mg/L	6020	0.00217		0.00558		0.000314	J	0.000814	J
7440-50-8	Copper	T	mg/L	6020	0.000812	J	0.00114		0.000629	J	0.0005	J
7439-89-6	Iron	T	mg/L	6020	0.0626	J	0.155	*	<0.1	*	0.166	
7439-92-1	Lead	T	mg/L	6020	<0.002		<0.002		<0.002		<0.002	
7439-95-4	Magnesium	T	mg/L	6020	7.86		6.82		13.2		18.5	*
7439-96-5	Manganese	T	mg/L	6020	0.0176		0.0215	*	0.00336	*J	0.0115	
7439-97-6	Mercury	T	mg/L	7470	<0.0002		<0.0002		<0.0002		<0.0002	

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RESIDENTIAL/INERT-QUARTERLY

Facility: US DOE - Paducah Gaseous Diffusion Plant

Permit Number: 073-00014 & 073-00015

FINDS/UNIT: KY8-890-008-982 / 1

LAB ID: None

For Official Use Only

GROUNDWATER SAMPLE ANALYSIS - (Cont.)

AKGWA NUMBER ¹ , Facility Well/Spring Number					8000-5244	8004-4820	8004-4818	8004-4808				
Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.)					224	369	370	372				
CAS RN ⁴	CONSTITUENT	T D 5	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S
7439-98-7	Molybdenum	T	mg/L	6020	0.000438	J	<0.0005		<0.0005		0.00041	J
7440-02-0	Nickel	T	mg/L	6020	0.0978		0.00495		0.000752	J	0.0012	J
7440-09-7	Potassium	T	mg/L	6020	0.703		0.504		2.46		2.13	
7440-16-6	Rhodium	T	mg/L	6020	<0.005		<0.005		<0.005		<0.005	
7782-49-2	Selenium	T	mg/L	6020	<0.005		0.00216	J	<0.005		<0.005	
7440-22-4	Silver	T	mg/L	6020	<0.001		<0.001		0.000378	J	<0.001	
7440-23-5	Sodium	T	mg/L	6020	49.9		48.5		47.2		45.5	
7440-25-7	Tantalum	T	mg/L	6020	<0.005		<0.005		<0.005		<0.005	
7440-28-0	Thallium	T	mg/L	6020	<0.002		<0.002		<0.002		<0.002	
7440-61-1	Uranium	T	mg/L	6020	<0.0002		<0.0002		<0.0002		<0.0002	
7440-62-2	Vanadium	T	mg/L	6020	<0.01		0.00426	J	<0.01		<0.01	
7440-66-6	Zinc	T	mg/L	6020	<0.01		0.00335	J	<0.01		<0.01	
108-05-4	Vinyl acetate	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
67-64-1	Acetone	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
107-02-8	Acrolein	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
107-13-1	Acrylonitrile	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
71-43-2	Benzene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
108-90-7	Chlorobenzene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
1330-20-7	Xylenes	T	mg/L	8260	<0.003		<0.003		<0.003		<0.003	
100-42-5	Styrene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
108-88-3	Toluene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
74-97-5	Chlorobromomethane	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	

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RESIDENTIAL/INERT-QUARTERLY

Facility: US DOE - Paducah Gaseous Diffusion Plant

Permit Number: 073-00014 & 073-00015

FINDS/UNIT: KY8-890-008-982 / 1

LAB ID: None

For Official Use Only

GROUNDWATER SAMPLE ANALYSIS - (Cont.)

AKGWA NUMBER ¹ , Facility Well/Spring Number					8000-5244		8004-4820		8004-4818		8004-4808	
Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.)					224		369		370		372	
CAS RN ⁴	CONSTITUENT	T D 5	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S
75-27-4	Bromodichloromethane	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
75-25-2	Tribromomethane	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
74-83-9	Methyl bromide	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
78-93-3	Methyl ethyl ketone	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
110-57-6	trans-1,4-Dichloro-2-butene	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
75-15-0	Carbon disulfide	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
75-00-3	Chloroethane	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
67-66-3	Chloroform	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
74-87-3	Methyl chloride	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
156-59-2	cis-1,2-Dichloroethene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
74-95-3	Methylene bromide	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
75-34-3	1,1-Dichloroethane	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
107-06-2	1,2-Dichloroethane	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
75-35-4	1,1-Dichloroethylene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
106-93-4	Ethane, 1,2-dibromo	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
79-34-5	Ethane, 1,1,2,2-Tetrachloro	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
71-55-6	Ethane, 1,1,1-Trichloro-	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
79-00-5	Ethane, 1,1,2-Trichloro	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
630-20-6	Ethane, 1,1,1,2-Tetrachloro	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
75-01-4	Vinyl chloride	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
127-18-4	Ethene, Tetrachloro-	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
79-01-6	Ethene, Trichloro-	T	mg/L	8260	<0.001		0.00123		0.00056	J	0.00543	

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RESIDENTIAL/CONTAINED-QUARTERLY

Facility: US DOE - Paducah Gaseous Diffusion Plant
 Permit Number: 073-00014 & 073-00015

FINDS/UNIT: KY8-890-008-982 / 1
 LAB ID: None
 For Official Use Only

GROUNDWATER SAMPLE ANALYSIS - (Cont.)

AKGWA NUMBER ¹ , Facility Well/Spring Number					8000-5244	8004-4820	8004-4818	8004-4808				
Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.)					224	369	370	372				
CAS RN ⁴	CONSTITUENT	T D 5	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S
100-41-4	Ethylbenzene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
591-78-6	2-Hexanone	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
74-88-4	Iodomethane	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
124-48-1	Methane, Dibromochloro-	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
56-23-5	Carbon Tetrachloride	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
75-09-2	Dichloromethane	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
108-10-1	Methyl isobutyl ketone	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
96-12-8	Propane, 1,2-Dibromo-3-chloro	T	mg/L	8011	<0.0000197		<0.0000197		<0.0000197		<0.0000197	
78-87-5	Propane, 1,2-Dichloro-	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
10061-02-6	trans-1,3-Dichloro-1-propene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
10061-01-5	cis-1,3-Dichloro-1-propene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
156-60-5	trans-1,2-Dichloroethene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
75-69-4	Trichlorofluoromethane	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
96-18-4	1,2,3-Trichloropropane	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
95-50-1	Benzene, 1,2-Dichloro-	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
106-46-7	Benzene, 1,4-Dichloro-	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
1336-36-3	PCB, Total	T	ug/L	8082		*	<0.0952		<0.0971		<0.0885	
12674-11-2	PCB-1016	T	ug/L	8082		*	<0.0952		<0.0971		<0.0885	
11104-28-2	PCB-1221	T	ug/L	8082		*	<0.0952		<0.0971		<0.0885	
11141-16-5	PCB-1232	T	ug/L	8082		*	<0.0952		<0.0971		<0.0885	
53469-21-9	PCB-1242	T	ug/L	8082		*	<0.0952		<0.0971		<0.0885	
12672-29-6	PCB-1248	T	ug/L	8082		*	<0.0952		<0.0971		<0.0885	

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RESIDENTIAL/CONTAINED-QUARTERLY

Facility: US DOE - Paducah Gaseous Diffusion Plant

Permit Number: 073-00014 & 073-00015

FINDS/UNIT: KY8-890-008-982 / 1

LAB ID: None

For Official Use Only

GROUNDWATER SAMPLE ANALYSIS - (Cont.)

AKGWA NUMBER ¹ , Facility Well/Spring Number					8000-5244	8004-4820	8004-4818	8004-4808				
Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.)					224	369	370	372				
CAS RN ⁴	CONSTITUENT	T D 5	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S
11097-69-1	PCB-1254	T	ug/L	8082		*	<0.0952		<0.0971		<0.0885	
11096-82-5	PCB-1260	T	ug/L	8082		*	<0.0952		<0.0971		<0.0885	
11100-14-4	PCB-1268	T	ug/L	8082		*	<0.0952		<0.0971		<0.0885	
12587-46-1	Gross Alpha	T	pCi/L	9310	3.38	*	0.769	*	1.85	*	1.17	*
12587-47-2	Gross Beta	T	pCi/L	9310	2.99	*	32	*	71.9	*	21.7	*
10043-66-0	Iodine-131	T	pCi/L			*		*		*		*
13982-63-3	Radium-226	T	pCi/L	AN-1418	0.214	*	0.676	*	1.01	*	0.689	*
10098-97-2	Strontium-90	T	pCi/L	905.0	-0.777	*	2.93	*	-0.577	*	-1.15	*
14133-76-7	Technetium-99	T	pCi/L	Tc-02-RC	1.89	*	38.8	*	73.9	*	17.3	*
14269-63-7	Thorium-230	T	pCi/L	Th-01-RC	0.997	*	-0.923	*	1.23	*	0.771	*
10028-17-8	Tritium	T	pCi/L	906.0	113	*	-8.97	*	1.9	*	-30.4	*
S0130- -	Chemical Oxygen Demand	T	mg/L	410.4	10.5	J	12.6	J	16.8	J	29.3	
57-12-5	Cyanide	T	mg/L	9012	<0.2		<0.2		<0.2		<0.2	
20461-54-5	Iodide	T	mg/L	300.0	<0.5	*	<0.5	*	<0.5	*	<0.5	*
S0268- -	Total Organic Carbon	T	mg/L	9060	0.828	J	1.05	J	1.04	J	1.62	J
S0586- -	Total Organic Halides	T	mg/L	9020	<0.01		0.0124		0.00458	J	0.037	

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Division of Waste Management
 Solid Waste Branch
 14 Reilly Road
 Frankfort, KY 40601 (502)564-6716

RESIDENTIAL/INERT-QUARTERLY

Facility: US DOE - Paducah Gaseous Diffusion Plant

Permit Number: 073-00014 & 073-00015 FINDS/UNIT: KY8-890-008-982 / 1

LAB ID: None
 For Official Use Only

GROUNDWATER SAMPLE ANALYSIS (S)

AKGWA NUMBER ¹ , Facility Well/Spring Number	8004-4792	8004-4809	8004-4810	8004-4804								
Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.)	373	384	385	386								
Sample Sequence #	1	1	1	1								
If sample is a Blank, specify Type: (F)ield, (T)rip, (M)ethod, or (E)quipment	NA	NA	NA	NA								
Sample Date and Time (Month/Day/Year hour: minutes)	1/22/2018 08:06	1/24/2018 07:18	1/24/2018 08:47	1/24/2018 08:07								
Duplicate ("Y" or "N") ²	N	N	N	N								
Split ("Y" or "N") ³	N	N	N	N								
Facility Sample ID Number (if applicable)	MW373UG2-18	MW384SG2-18	MW385SG2-18	MW386SG2-18								
Laboratory Sample ID Number (if applicable)	442179011	442318003	442318005	442318007								
Date of Analysis (Month/Day/Year) For <u>Volatile Organics</u> Analysis	1/24/2018	1/26/2018	1/26/2018	1/26/2018								
Gradient with respect to Monitored Unit (UP, DOWN, SIDE, UNKNOWN)	DOWN	SIDE	SIDE	SIDE								
CAS RN ⁴	CONSTITUENT	T D 5	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL ⁶	F L A G S ⁷	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S
24959-67-9	Bromide	T	mg/L	9056	0.601		0.428		0.222		0.148	J
16887-00-6	Chloride(s)	T	mg/L	9056	41.9		39.4		23.1		14.6	
16984-48-8	Fluoride	T	mg/L	9056	0.184		0.267		0.156		0.61	
S0595- -	Nitrate & Nitrite	T	mg/L	9056	1.37		1.01		0.4		<0.2	
14808-79-8	Sulfate	T	mg/L	9056	97.1		21.4		18.6		44.5	
NS1894	Barometric Pressure Reading	T	Inches/Hg	Field	29.76		30.3		30.31		30.31	
S0145- -	Specific Conductance	T	µMHO/cm	Field	730		486		458		601	

STANDARD FLAGS:
 * = See Comments
 J = Estimated Value
 B = Analyte found in blank
 A = Average value
 N = Presumptive ID
 D = Concentration from analysis
 of a secondary dilution

¹AKGWA # is 0000-0000 for any type of blank.
²Respond "Y" if the sample was a duplicate of another sample in this report.
³Respond "Y" if the sample was split and analyzed by separate laboratories.
⁴Chemical Abstracts Service Registry Number or unique identifier number assigned by agency.
⁵"T" = Total; "D" = Dissolved
⁶"<" indicates a non-detect; do not use "ND" or "BDL". Value shown is Practical Quantification Limit.
⁷Flags are as designated, do not use any other type. Use "*", " then describe on "Written Comments Page."

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RESIDENTIAL/INERT-QUARTERLY

Facility: US DOE - Paducah Gaseous Diffusion Plant
 Permit Number: 073-00014 & 073-00015

FINDS/UNIT: KY8-890-008-982 / 1
 LAB ID: None
 For Official Use Only

GROUNDWATER SAMPLE ANALYSIS - (Cont.)

AKGWA NUMBER ¹ , Facility Well/Spring Number					8004-4792	8004-4809	8004-4810	8004-4804				
Facility's Local Well or Spring Number (e.g., MW-1, MW-2, BLANK-F, etc.)					373	384	385	386				
CAS RN ⁴	CONSTITUENT	T D 5	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S
S0906 - -	Static Water Level Elevation	T	Ft. MSL	Field	322.46		322.44		321.44		346.71	
N238	Dissolved Oxygen	T	mg/L	Field	2.33		3.28		1.39		1.72	
S0266- -	Total Dissolved Solids	T	mg/L	160.1	376	*	260		264		347	
S0296- -	pH	T	Units	Field	6.19		6.14		6.51		6.67	
NS215	Eh	T	mV	Field	393		341		234		142	
S0907 - -	Temperature	T	°C	Field	14.67		10.78		13.28		12.06	
7429-90-5	Aluminum	T	mg/L	6020	<0.05		0.0323	J	0.0928		<0.05	
7440-36-0	Antimony	T	mg/L	6020	<0.003		<0.003		<0.003		<0.003	
7440-38-2	Arsenic	T	mg/L	6020	<0.005		0.00242	J	<0.005		0.00264	J
7440-39-3	Barium	T	mg/L	6020	0.0302		0.141	*	0.248	*	0.21	*
7440-41-7	Beryllium	T	mg/L	6020	<0.0005		<0.0005		<0.0005		<0.0005	
7440-42-8	Boron	T	mg/L	6020	1.32		0.0304		0.0152		<0.015	
7440-43-9	Cadmium	T	mg/L	6020	<0.001		<0.001		<0.001		<0.001	
7440-70-2	Calcium	T	mg/L	6020	57.3		27.8		37.4		19.9	
7440-47-3	Chromium	T	mg/L	6020	<0.01		0.00561	J	<0.01		<0.01	
7440-48-4	Cobalt	T	mg/L	6020	<0.001		<0.001		<0.001		0.0075	
7440-50-8	Copper	T	mg/L	6020	0.000486	J	0.001		0.000534	J	0.0116	
7439-89-6	Iron	T	mg/L	6020	0.0752	J	1.04		0.204		1.64	
7439-92-1	Lead	T	mg/L	6020	<0.002		<0.002		<0.002		<0.002	
7439-95-4	Magnesium	T	mg/L	6020	22.8	*	11.4		14.6		8.77	
7439-96-5	Manganese	T	mg/L	6020	0.0116		0.0422		0.00674		0.952	
7439-97-6	Mercury	T	mg/L	7470	<0.0002		<0.0002	*	<0.0002	*	<0.0002	*

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RESIDENTIAL/INERT-QUARTERLY

Facility: US DOE - Paducah Gaseous Diffusion Plant

Permit Number: 073-00014 & 073-00015

FINDS/UNIT: KY8-890-008-982 / 1

LAB ID: None

For Official Use Only

GROUNDWATER SAMPLE ANALYSIS - (Cont.)

AKGWA NUMBER ¹ , Facility Well/Spring Number					8004-4792	8004-4809	8004-4810	8004-4804				
Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.)					373	384	385	386				
CAS RN ⁴	CONSTITUENT	T D 5	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S
7439-98-7	Molybdenum	T	mg/L	6020	<0.0005		0.000291	J	0.0006		0.000616	
7440-02-0	Nickel	T	mg/L	6020	0.000711	J	0.00116	J	0.0015	J	0.00242	
7440-09-7	Potassium	T	mg/L	6020	2.35		1.19		1.82		0.305	
7440-16-6	Rhodium	T	mg/L	6020	<0.005		<0.005		<0.005		<0.005	
7782-49-2	Selenium	T	mg/L	6020	<0.005		<0.005		<0.005		<0.005	
7440-22-4	Silver	T	mg/L	6020	0.000397	J	<0.001		<0.001		0.000308	J
7440-23-5	Sodium	T	mg/L	6020	47.9		48.1		30.5		93.6	
7440-25-7	Tantalum	T	mg/L	6020	<0.005		<0.005		<0.005		<0.005	
7440-28-0	Thallium	T	mg/L	6020	<0.002		<0.002		<0.002		<0.002	
7440-61-1	Uranium	T	mg/L	6020	<0.0002		<0.0002		0.000256	B	<0.0002	
7440-62-2	Vanadium	T	mg/L	6020	<0.01		<0.01		<0.01		<0.01	
7440-66-6	Zinc	T	mg/L	6020	<0.01		<0.01		<0.01		<0.01	
108-05-4	Vinyl acetate	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
67-64-1	Acetone	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
107-02-8	Acrolein	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
107-13-1	Acrylonitrile	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
71-43-2	Benzene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
108-90-7	Chlorobenzene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
1330-20-7	Xylenes	T	mg/L	8260	<0.003		<0.003		<0.003		<0.003	
100-42-5	Styrene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
108-88-3	Toluene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
74-97-5	Chlorobromomethane	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	

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RESIDENTIAL/INERT-QUARTERLY

Facility: US DOE - Paducah Gaseous Diffusion Plant

Permit Number: 073-00014 & 073-00015

FINDS/UNIT: KY8-890-008-982 / 1

LAB ID: None

For Official Use Only

GROUNDWATER SAMPLE ANALYSIS - (Cont.)

AKGWA NUMBER ¹ , Facility Well/Spring Number					8004-4792		8004-4809		8004-4810		8004-4804	
Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.)					373		384		385		386	
CAS RN ⁴	CONSTITUENT	T D 5	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S
75-27-4	Bromodichloromethane	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
75-25-2	Tribromomethane	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
74-83-9	Methyl bromide	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
78-93-3	Methyl ethyl ketone	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
110-57-6	trans-1,4-Dichloro-2-butene	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
75-15-0	Carbon disulfide	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
75-00-3	Chloroethane	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
67-66-3	Chloroform	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
74-87-3	Methyl chloride	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
156-59-2	cis-1,2-Dichloroethene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
74-95-3	Methylene bromide	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
75-34-3	1,1-Dichloroethane	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
107-06-2	1,2-Dichloroethane	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
75-35-4	1,1-Dichloroethylene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
106-93-4	Ethane, 1,2-dibromo	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
79-34-5	Ethane, 1,1,2,2-Tetrachloro	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
71-55-6	Ethane, 1,1,1-Trichloro-	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
79-00-5	Ethane, 1,1,2-Trichloro	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
630-20-6	Ethane, 1,1,1,2-Tetrachloro	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
75-01-4	Vinyl chloride	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
127-18-4	Ethene, Tetrachloro-	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
79-01-6	Ethene, Trichloro-	T	mg/L	8260	0.00626		0.00095	J	0.00048	J	<0.001	

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RESIDENTIAL/CONTAINED-QUARTERLY

Facility: US DOE - Paducah Gaseous Diffusion Plant

Permit Number: 073-00014 & 073-00015

FINDS/UNIT: KY8-890-008-982 / 1

LAB ID: None

For Official Use Only

GROUNDWATER SAMPLE ANALYSIS - (Cont.)

AKGWA NUMBER ¹ , Facility Well/Spring Number					8004-4792	8004-4809	8004-4810	8004-4804				
Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.)					373	384	385	386				
CAS RN ⁴	CONSTITUENT	T D 5	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S
100-41-4	Ethylbenzene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
591-78-6	2-Hexanone	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
74-88-4	Iodomethane	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
124-48-1	Methane, Dibromochloro-	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
56-23-5	Carbon Tetrachloride	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
75-09-2	Dichloromethane	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
108-10-1	Methyl isobutyl ketone	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
96-12-8	Propane, 1,2-Dibromo-3-chloro	T	mg/L	8011	<0.0000194		<0.0000197		<0.0000195		<0.0000199	
78-87-5	Propane, 1,2-Dichloro-	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
10061-02-6	trans-1,3-Dichloro-1-propene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
10061-01-5	cis-1,3-Dichloro-1-propene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
156-60-5	trans-1,2-Dichloroethene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
75-69-4	Trichlorofluoromethane	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
96-18-4	1,2,3-Trichloropropane	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
95-50-1	Benzene, 1,2-Dichloro-	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
106-46-7	Benzene, 1,4-Dichloro-	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
1336-36-3	PCB, Total	T	ug/L	8082	<0.0952			*		*		*
12674-11-2	PCB-1016	T	ug/L	8082	<0.0952			*		*		*
11104-28-2	PCB-1221	T	ug/L	8082	<0.0952			*		*		*
11141-16-5	PCB-1232	T	ug/L	8082	<0.0952			*		*		*
53469-21-9	PCB-1242	T	ug/L	8082	<0.0952			*		*		*
12672-29-6	PCB-1248	T	ug/L	8082	<0.0952			*		*		*

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RESIDENTIAL/CONTAINED-QUARTERLY

Facility: US DOE - Paducah Gaseous Diffusion Plant

Permit Number: 073-00014 & 073-00015

FINDS/UNIT: KY8-890-008-982 / 1

LAB ID: None

For Official Use Only

GROUNDWATER SAMPLE ANALYSIS - (Cont.)

AKGWA NUMBER ¹ , Facility Well/Spring Number					8004-4792	8004-4809	8004-4810	8004-4804				
Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.)					373	384	385	386				
CAS RN ⁴	CONSTITUENT	T D 5	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S
11097-69-1	PCB-1254	T	ug/L	8082	<0.0952			*		*		*
11096-82-5	PCB-1260	T	ug/L	8082	<0.0952			*		*		*
11100-14-4	PCB-1268	T	ug/L	8082	<0.0952			*		*		*
12587-46-1	Gross Alpha	T	pCi/L	9310	8.77	*	0.842	*	1.14	*	0.276	*
12587-47-2	Gross Beta	T	pCi/L	9310	18.8	*	76.5	*	50.6	*	0.187	*
10043-66-0	Iodine-131	T	pCi/L			*		*		*		*
13982-63-3	Radium-226	T	pCi/L	AN-1418	0.322	*	0.603	*	0.151	*	0.167	*
10098-97-2	Strontium-90	T	pCi/L	905.0	1.31	*	-0.843	*	-1.76	*	0.705	*
14133-76-7	Technetium-99	T	pCi/L	Tc-02-RC	17.9	*	139	*	86.8	*	4.14	*
14269-63-7	Thorium-230	T	pCi/L	Th-01-RC	0.253	*	0.698	*	0.743	*	0.174	*
10028-17-8	Tritium	T	pCi/L	906.0	78	*	128	*	-16.7	*	19.1	*
S0130- -	Chemical Oxygen Demand	T	mg/L	410.4	31.4		19.1	J	<20		22.5	
57-12-5	Cyanide	T	mg/L	9012	<0.2		<0.2		<0.2		<0.2	
20461-54-5	Iodide	T	mg/L	300.0	<0.5	*	<0.5		<0.5		0.186	J
S0268- -	Total Organic Carbon	T	mg/L	9060	1.04	J	1.5	J	0.924	J	7.32	
S0586- -	Total Organic Halides	T	mg/L	9020	0.0104		0.0117		0.00738	J	0.121	

C-20

Division of Waste Management
 Solid Waste Branch
 14 Reilly Road
 Frankfort, KY 40601 (502)564-6716

RESIDENTIAL/INERT-QUARTERLY

Facility: US DOE - Paducah Gaseous Diffusion Plant

Permit Number: 073-00014 & 073-00015 FINDS/UNIT: KY8-890-008-982 / 1

LAB ID: None
 For Official Use Only

GROUNDWATER SAMPLE ANALYSIS (S)

AKGWA NUMBER ¹ , Facility Well/Spring Number	8004-4815	8004-4816	8004-4812	8004-4811						
Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.)	387	388	389	390						
Sample Sequence #	1	1	1	1						
If sample is a Blank, specify Type: (F)ield, (T)rip, (M)ethod, or (E)quipment	NA	NA	NA	NA						
Sample Date and Time (Month/Day/Year hour: minutes)	1/23/2018 12:52	1/23/2018 13:32	NA	1/24/2018 07:19						
Duplicate ("Y" or "N") ²	N	N	N	N						
Split ("Y" or "N") ³	N	N	N	N						
Facility Sample ID Number (if applicable)	MW387SG2-18	MW388SG2-18	NA	MW390SG2-18						
Laboratory Sample ID Number (if applicable)	442295013	442295015	NA	442318009						
Date of Analysis (Month/Day/Year) For <u>Volatile Organics</u> Analysis	1/26/2018	1/26/2018	NA	1/26/2018						
Gradient with respect to Monitored Unit (UP, DOWN, SIDE, UNKNOWN)	DOWN	DOWN	DOWN	DOWN						
CAS RN ⁴	CONSTITUENT	T D 5	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL ⁶	F L A G S ⁷	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S
24959-67-9	Bromide	T	mg/L	9056	0.497		0.356		*	0.456
16887-00-6	Chloride(s)	T	mg/L	9056	41.2		30.8		*	40.4
16984-48-8	Fluoride	T	mg/L	9056	0.614		0.205		*	0.335
S0595- -	Nitrate & Nitrite	T	mg/L	9056	0.989		0.878		*	2.21
14808-79-8	Sulfate	T	mg/L	9056	33.3		25.2		*	32.7
NS1894	Barometric Pressure Reading	T	Inches/Hg	Field	30.07		30.07		*	30.3
S0145- -	Specific Conductance	T	µMH0/cm	Field	545		465		*	671

STANDARD FLAGS:
 * = See Comments
 J = Estimated Value
 B = Analyte found in blank
 A = Average value
 N = Presumptive ID
 D = Concentration from analysis
 of a secondary dilution

¹AKGWA # is 0000-0000 for any type of blank.

²Respond "Y" if the sample was a duplicate of another sample in this report.

³Respond "Y" if the sample was split and analyzed by separate laboratories.

⁴Chemical Abstracts Service Registry Number or unique identifier number assigned by agency.

⁵"T" = Total; "D" = Dissolved

⁶"<" indicates a non-detect; do not use "ND" or "BDL". Value shown is Practical Quantification Limit.

⁷Flags are as designated, do not use any other type. Use "*", " then describe on "Written Comments Page."

RESIDENTIAL/INERT-QUARTERLY

Facility: US DOE - Paducah Gaseous Diffusion Plant

Permit Number: 073-00014 & 073-00015

FINDS/UNIT: KY8-890-008-982 / 1

LAB ID: None

For Official Use Only

GROUNDWATER SAMPLE ANALYSIS - (Cont.)

AKGWA NUMBER ¹ , Facility Well/Spring Number					8004-4815	8004-4816	8004-4812	8004-4811				
Facility's Local Well or Spring Number (e.g., MW-1, MW-2, BLANK-F, etc.)					387	388	389	390				
CAS RN ⁴	CONSTITUENT	T D 5	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S
S0906 - -	Static Water Level Elevation	T	Ft. MSL	Field	321.81		321.7		*		321.94	
N238	Dissolved Oxygen	T	mg/L	Field	4.39		5.51		*		4.79	
S0266- -	Total Dissolved Solids	T	mg/L	160.1	286		246		*		371	
S0296- -	pH	T	Units	Field	6.19		6.18		*		6.43	
NS215	Eh	T	mV	Field	349		341		*		353	
S0907 - -	Temperature	T	°C	Field	14.44		14.67		*		10.72	
7429-90-5	Aluminum	T	mg/L	6020	0.0575		0.0501		*		0.248	
7440-36-0	Antimony	T	mg/L	6020	<0.003		<0.003		*		<0.003	
7440-38-2	Arsenic	T	mg/L	6020	0.00471	J	<0.005		*		<0.005	
7440-39-3	Barium	T	mg/L	6020	0.133		0.249		*		0.252	*
7440-41-7	Beryllium	T	mg/L	6020	<0.0005		<0.0005		*		<0.0005	
7440-42-8	Boron	T	mg/L	6020	0.0347		0.0324		*		0.0112	J
7440-43-9	Cadmium	T	mg/L	6020	<0.001		<0.001		*		<0.001	
7440-70-2	Calcium	T	mg/L	6020	35.5		28.6		*		27.7	
7440-47-3	Chromium	T	mg/L	6020	0.0044	J	<0.01		*		<0.01	
7440-48-4	Cobalt	T	mg/L	6020	<0.001		<0.001		*		0.000444	J
7440-50-8	Copper	T	mg/L	6020	0.000492	J	0.000737	J	*		0.00101	
7439-89-6	Iron	T	mg/L	6020	0.351		0.207		*		0.28	
7439-92-1	Lead	T	mg/L	6020	<0.002		<0.002		*		<0.002	
7439-95-4	Magnesium	T	mg/L	6020	15.6		13.1		*		12.1	
7439-96-5	Manganese	T	mg/L	6020	0.0214		0.00138	J	*		0.00202	J
7439-97-6	Mercury	T	mg/L	7470	<0.0002		<0.0002		*		<0.0002	*

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RESIDENTIAL/INERT-QUARTERLY

Facility: US DOE - Paducah Gaseous Diffusion Plant

Permit Number: 073-00014 & 073-00015

FINDS/UNIT: KY8-890-008-982 / 1

LAB ID: None

For Official Use Only

GROUNDWATER SAMPLE ANALYSIS - (Cont.)

AKGWA NUMBER ¹ , Facility Well/Spring Number					8004-4815	8004-4816	8004-4812	8004-4811				
Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.)					387	388	389	390				
CAS RN ⁴	CONSTITUENT	T D 5	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S
7439-98-7	Molybdenum	T	mg/L	6020	<0.0005		0.000288	J	*	0.000384	J	
7440-02-0	Nickel	T	mg/L	6020	0.000824	J	0.00208		*	0.00191	J	
7440-09-7	Potassium	T	mg/L	6020	1.88		2.24		*	0.375		
7440-16-6	Rhodium	T	mg/L	6020	<0.005		<0.005		*	<0.005		
7782-49-2	Selenium	T	mg/L	6020	<0.005		<0.005		*	<0.005		
7440-22-4	Silver	T	mg/L	6020	0.000374	J	0.000387	J	*	0.00038	J	
7440-23-5	Sodium	T	mg/L	6020	56.4		50.1		*	87.6		
7440-25-7	Tantalum	T	mg/L	6020	<0.005		<0.005		*	<0.005		
7440-28-0	Thallium	T	mg/L	6020	<0.002		<0.002		*	<0.002		
7440-61-1	Uranium	T	mg/L	6020	0.000108	BJ	<0.0002		*	0.000193	BJ	
7440-62-2	Vanadium	T	mg/L	6020	<0.01		<0.01		*	0.00339	J	
7440-66-6	Zinc	T	mg/L	6020	<0.01		<0.01		*	0.00414	J	
108-05-4	Vinyl acetate	T	mg/L	8260	<0.005		<0.005		*	<0.005		
67-64-1	Acetone	T	mg/L	8260	<0.005		<0.005		*	<0.005		
107-02-8	Acrolein	T	mg/L	8260	<0.005		<0.005		*	<0.005		
107-13-1	Acrylonitrile	T	mg/L	8260	<0.005		<0.005		*	<0.005		
71-43-2	Benzene	T	mg/L	8260	<0.001		<0.001		*	<0.001		
108-90-7	Chlorobenzene	T	mg/L	8260	<0.001		<0.001		*	<0.001		
1330-20-7	Xylenes	T	mg/L	8260	<0.003		<0.003		*	<0.003		
100-42-5	Styrene	T	mg/L	8260	<0.001		<0.001		*	<0.001		
108-88-3	Toluene	T	mg/L	8260	<0.001		<0.001		*	<0.001		
74-97-5	Chlorobromomethane	T	mg/L	8260	<0.001		<0.001		*	<0.001		

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RESIDENTIAL/INERT-QUARTERLY

Facility: US DOE - Paducah Gaseous Diffusion Plant

Permit Number: 073-00014 & 073-00015

FINDS/UNIT: KY8-890-008-982 / 1

LAB ID: None

For Official Use Only

GROUNDWATER SAMPLE ANALYSIS - (Cont.)

AKGWA NUMBER ¹ , Facility Well/Spring Number					8004-4815		8004-4816		8004-4812		8004-4811	
Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.)					387		388		389		390	
CAS RN ⁴	CONSTITUENT	T D 5	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S
75-27-4	Bromodichloromethane	T	mg/L	8260	<0.001		<0.001			*	<0.001	
75-25-2	Tribromomethane	T	mg/L	8260	<0.001		<0.001			*	<0.001	
74-83-9	Methyl bromide	T	mg/L	8260	<0.001		<0.001			*	<0.001	
78-93-3	Methyl ethyl ketone	T	mg/L	8260	<0.005		<0.005			*	<0.005	
110-57-6	trans-1,4-Dichloro-2-butene	T	mg/L	8260	<0.005		<0.005			*	<0.005	
75-15-0	Carbon disulfide	T	mg/L	8260	<0.005		<0.005			*	<0.005	
75-00-3	Chloroethane	T	mg/L	8260	<0.001		<0.001			*	<0.001	
67-66-3	Chloroform	T	mg/L	8260	<0.001		<0.001			*	<0.001	
74-87-3	Methyl chloride	T	mg/L	8260	<0.001		<0.001			*	<0.001	
156-59-2	cis-1,2-Dichloroethene	T	mg/L	8260	<0.001		<0.001			*	<0.001	
74-95-3	Methylene bromide	T	mg/L	8260	<0.001		<0.001			*	<0.001	
75-34-3	1,1-Dichloroethane	T	mg/L	8260	<0.001		<0.001			*	<0.001	
107-06-2	1,2-Dichloroethane	T	mg/L	8260	<0.001		<0.001			*	<0.001	
75-35-4	1,1-Dichloroethylene	T	mg/L	8260	<0.001		<0.001			*	<0.001	
106-93-4	Ethane, 1,2-dibromo	T	mg/L	8260	<0.001		<0.001			*	<0.001	
79-34-5	Ethane, 1,1,2,2-Tetrachloro	T	mg/L	8260	<0.001		<0.001			*	<0.001	
71-55-6	Ethane, 1,1,1-Trichloro-	T	mg/L	8260	<0.001		<0.001			*	<0.001	
79-00-5	Ethane, 1,1,2-Trichloro	T	mg/L	8260	<0.001		<0.001			*	<0.001	
630-20-6	Ethane, 1,1,1,2-Tetrachloro	T	mg/L	8260	<0.001		<0.001			*	<0.001	
75-01-4	Vinyl chloride	T	mg/L	8260	<0.001		<0.001			*	<0.001	
127-18-4	Ethene, Tetrachloro-	T	mg/L	8260	<0.001		<0.001			*	<0.001	
79-01-6	Ethene, Trichloro-	T	mg/L	8260	0.00117		0.00073	J		*	<0.001	

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RESIDENTIAL/CONTAINED-QUARTERLY

Facility: US DOE - Paducah Gaseous Diffusion Plant

Permit Number: 073-00014 & 073-00015

FINDS/UNIT: KY8-890-008-982 / 1

LAB ID: None

For Official Use Only

GROUNDWATER SAMPLE ANALYSIS - (Cont.)

AKGWA NUMBER ¹ , Facility Well/Spring Number					8004-4815	8004-4816	8004-4812	8004-4811				
Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.)					387	388	389	390				
CAS RN ⁴	CONSTITUENT	T D 5	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S
100-41-4	Ethylbenzene	T	mg/L	8260	<0.001		<0.001		*		<0.001	
591-78-6	2-Hexanone	T	mg/L	8260	<0.005		<0.005		*		<0.005	
74-88-4	Iodomethane	T	mg/L	8260	<0.005		<0.005		*		<0.005	
124-48-1	Methane, Dibromochloro-	T	mg/L	8260	<0.001		<0.001		*		<0.001	
56-23-5	Carbon Tetrachloride	T	mg/L	8260	<0.001		<0.001		*		<0.001	
75-09-2	Dichloromethane	T	mg/L	8260	<0.005		<0.005		*		<0.005	
108-10-1	Methyl isobutyl ketone	T	mg/L	8260	<0.005		<0.005		*		<0.005	
96-12-8	Propane, 1,2-Dibromo-3-chloro	T	mg/L	8011	<0.0000195		<0.0000201		*		<0.0000195	
78-87-5	Propane, 1,2-Dichloro-	T	mg/L	8260	<0.001		<0.001		*		<0.001	
10061-02-6	trans-1,3-Dichloro-1-propene	T	mg/L	8260	<0.001		<0.001		*		<0.001	
10061-01-5	cis-1,3-Dichloro-1-propene	T	mg/L	8260	<0.001		<0.001		*		<0.001	
156-60-5	trans-1,2-Dichloroethene	T	mg/L	8260	<0.001		<0.001		*		<0.001	
75-69-4	Trichlorofluoromethane	T	mg/L	8260	<0.001		<0.001		*		<0.001	
96-18-4	1,2,3-Trichloropropane	T	mg/L	8260	<0.001		<0.001		*		<0.001	
95-50-1	Benzene, 1,2-Dichloro-	T	mg/L	8260	<0.001		<0.001		*		<0.001	
106-46-7	Benzene, 1,4-Dichloro-	T	mg/L	8260	<0.001		<0.001		*		<0.001	
1336-36-3	PCB, Total	T	ug/L	8082		*		*	*			*
12674-11-2	PCB-1016	T	ug/L	8082		*		*	*			*
11104-28-2	PCB-1221	T	ug/L	8082		*		*	*			*
11141-16-5	PCB-1232	T	ug/L	8082		*		*	*			*
53469-21-9	PCB-1242	T	ug/L	8082		*		*	*			*
12672-29-6	PCB-1248	T	ug/L	8082		*		*	*			*

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RESIDENTIAL/CONTAINED-QUARTERLY

Facility: US DOE - Paducah Gaseous Diffusion Plant

Permit Number: 073-00014 & 073-00015

FINDS/UNIT: KY8-890-008-982 / 1

LAB ID: None

For Official Use Only

GROUNDWATER SAMPLE ANALYSIS - (Cont.)

AKGWA NUMBER ¹ , Facility Well/Spring Number					8004-4815	8004-4816	8004-4812	8004-4811				
Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.)					387	388	389	390				
CAS RN ⁴	CONSTITUENT	T D 5	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S
11097-69-1	PCB-1254	T	ug/L	8082		*		*		*		*
11096-82-5	PCB-1260	T	ug/L	8082		*		*		*		*
11100-14-4	PCB-1268	T	ug/L	8082		*		*		*		*
12587-46-1	Gross Alpha	T	pCi/L	9310	2.68	*	2.39	*		*	-2.72	*
12587-47-2	Gross Beta	T	pCi/L	9310	201	*	52.8	*		*	57.7	*
10043-66-0	Iodine-131	T	pCi/L			*		*		*		*
13982-63-3	Radium-226	T	pCi/L	AN-1418	0.063	*	1.07	*		*	0.123	*
10098-97-2	Strontium-90	T	pCi/L	905.0	0.669	*	1.09	*		*	0.103	*
14133-76-7	Technetium-99	T	pCi/L	Tc-02-RC	306	*	96.7	*		*	82.8	*
14269-63-7	Thorium-230	T	pCi/L	Th-01-RC	1.36	*	0.19	*		*	-0.223	*
10028-17-8	Tritium	T	pCi/L	906.0	-2.21	*	49.2	*		*	85.5	*
S0130- -	Chemical Oxygen Demand	T	mg/L	410.4	20.9		18.9	J		*	29.2	
57-12-5	Cyanide	T	mg/L	9012	<0.2		<0.2			*	<0.2	
20461-54-5	Iodide	T	mg/L	300.0	<0.5	*	<0.5	*		*	<0.5	
S0268- -	Total Organic Carbon	T	mg/L	9060	1.3	J	1.28	J		*	2.57	
S0586- -	Total Organic Halides	T	mg/L	9020	0.00622	J	0.0288			*	0.0123	

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Division of Waste Management
Solid Waste Branch
14 Reilly Road
Frankfort, KY 40601 (502)564-6716

RESIDENTIAL/INERT-QUARTERLY

Facility: US DOE - Paducah Gaseous Diffusion Plant

Permit Number: 073-00014 & 073-00015 FINDS/UNIT: KY8-890-008-982 / 1

LAB ID: None
For Official Use Only

GROUNDWATER SAMPLE ANALYSIS (S)

AKGWA NUMBER ¹ , Facility Well/Spring Number	8004-4805	8004-4806	8004-4807	8004-4802								
Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.)	391	392	393	394								
Sample Sequence #	1	1	1	1								
If sample is a Blank, specify Type: (F)ield, (T)rip, (M)ethod, or (E)quipment	NA	NA	NA	NA								
Sample Date and Time (Month/Day/Year hour: minutes)	1/24/2018 09:41	1/24/2018 08:14	1/24/2018 08:56	1/23/2018 12:22								
Duplicate ("Y" or "N") ²	N	N	N	N								
Split ("Y" or "N") ³	N	N	N	N								
Facility Sample ID Number (if applicable)	MW391SG2-18	MW392SG2-18	MW393SG2-18	MW394SG2-18								
Laboratory Sample ID Number (if applicable)	442318011	442318013	442318015	442295017								
Date of Analysis (Month/Day/Year) For <u>Volatile Organics</u> Analysis	1/26/2018	1/26/2018	1/26/2018	1/26/2018								
Gradient with respect to Monitored Unit (UP, DOWN, SIDE, UNKNOWN)	DOWN	DOWN	DOWN	UP								
CAS RN ⁴	CONSTITUENT	T D 5	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL ⁶	F L A G S ⁷	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S
24959-67-9	Bromide	T	mg/L	9056	0.571		0.634		0.167	J	0.658	
16887-00-6	Chloride(s)	T	mg/L	9056	42.9		46.8		13.9		49.3	
16984-48-8	Fluoride	T	mg/L	9056	0.121		0.255		0.135		0.204	
S0595- -	Nitrate & Nitrite	T	mg/L	9056	1.05		0.745		<0.2		1.02	
14808-79-8	Sulfate	T	mg/L	9056	46.1		8.01		12.2		10.4	
NS1894	Barometric Pressure Reading	T	Inches/Hg	Field	30.33		30.31		30.33		30.07	
S0145- -	Specific Conductance	T	µMHO/cm	Field	473		404		407		398	

STANDARD FLAGS:
* = See Comments
J = Estimated Value
B = Analyte found in blank
A = Average value
N = Presumptive ID
D = Concentration from analysis of a secondary dilution

¹AKGWA # is 0000-0000 for any type of blank.

²Respond "Y" if the sample was a duplicate of another sample in this report.

³Respond "Y" if the sample was split and analyzed by separate laboratories.

⁴Chemical Abstracts Service Registry Number or unique identifier number assigned by agency.

⁵"T" = Total; "D" = Dissolved

⁶"<" indicates a non-detect; do not use "ND" or "BDL". Value shown is Practical Quantification Limit.

⁷Flags are as designated, do not use any other type. Use "*", " then describe on "Written Comments Page."

RESIDENTIAL/INERT-QUARTERLY

Facility: US DOE - Paducah Gaseous Diffusion Plant
 Permit Number: 073-00014 & 073-00015

FINDS/UNIT: KY8-890-008-982 / 1
 LAB ID: None
 For Official Use Only

GROUNDWATER SAMPLE ANALYSIS - (Cont.)

AKGWA NUMBER ¹ , Facility Well/Spring Number					8004-4805	8004-4806	8004-4807	8004-4802				
Facility's Local Well or Spring Number (e.g., MW-1, MW-2, BLANK-F, etc.)					391	392	393	394				
CAS RN ⁴	CONSTITUENT	T D 5	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S
S0906 - -	Static Water Level Elevation	T	Ft. MSL	Field	321.86		321.86		338.38		322.33	
N238	Dissolved Oxygen	T	mg/L	Field	3.23		1.7		1.73		3.55	
S0266- -	Total Dissolved Solids	T	mg/L	160.1	261		227		249		187	
S0296- -	pH	T	Units	Field	6.15		6.24		6.25		6.23	
NS215	Eh	T	mV	Field	261		292		266		264	
S0907 - -	Temperature	T	°C	Field	14.22		12.94		14.11		11.56	
7429-90-5	Aluminum	T	mg/L	6020	0.0234	J	0.0211	J	0.0671		0.0544	
7440-36-0	Antimony	T	mg/L	6020	<0.003		<0.003		<0.003		<0.003	
7440-38-2	Arsenic	T	mg/L	6020	<0.005		<0.005		0.00471	J	<0.005	
7440-39-3	Barium	T	mg/L	6020	0.142	*	0.21	*	0.147	*	0.243	
7440-41-7	Beryllium	T	mg/L	6020	<0.0005		<0.0005		<0.0005		<0.0005	
7440-42-8	Boron	T	mg/L	6020	0.165		0.0284		0.0218		0.0195	
7440-43-9	Cadmium	T	mg/L	6020	<0.001		<0.001		<0.001		<0.001	
7440-70-2	Calcium	T	mg/L	6020	32.6		27.7		13.1		26	
7440-47-3	Chromium	T	mg/L	6020	<0.01		<0.01		<0.01		<0.01	
7440-48-4	Cobalt	T	mg/L	6020	<0.001		<0.001		<0.001		<0.001	
7440-50-8	Copper	T	mg/L	6020	0.000436	J	0.00192		0.000582	J	0.000741	J
7439-89-6	Iron	T	mg/L	6020	0.123		0.0974	J	2.84		0.26	
7439-92-1	Lead	T	mg/L	6020	<0.002		<0.002		<0.002		<0.002	
7439-95-4	Magnesium	T	mg/L	6020	14.3		10.7		3.63		11.5	
7439-96-5	Manganese	T	mg/L	6020	0.00322	J	0.0203		0.048		0.0061	
7439-97-6	Mercury	T	mg/L	7470	<0.0002	*	<0.0002	*	<0.0002	*	<0.0002	

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RESIDENTIAL/INERT-QUARTERLY

Facility: US DOE - Paducah Gaseous Diffusion Plant

Permit Number: 073-00014 & 073-00015

FINDS/UNIT: KY8-890-008-982 / 1

LAB ID: None

For Official Use Only

GROUNDWATER SAMPLE ANALYSIS - (Cont.)

AKGWA NUMBER ¹ , Facility Well/Spring Number					8004-4805	8004-4806	8004-4807	8004-4802				
Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.)					391	392	393	394				
CAS RN ⁴	CONSTITUENT	T D 5	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S
7439-98-7	Molybdenum	T	mg/L	6020	<0.0005		0.000284	J	<0.0005		<0.0005	
7440-02-0	Nickel	T	mg/L	6020	0.000782	J	0.00105	J	<0.002		0.00292	
7440-09-7	Potassium	T	mg/L	6020	1.66		1.83		0.447		1.12	
7440-16-6	Rhodium	T	mg/L	6020	<0.005		<0.005		<0.005		<0.005	
7782-49-2	Selenium	T	mg/L	6020	<0.005		<0.005		<0.005		<0.005	
7440-22-4	Silver	T	mg/L	6020	0.000393	J	0.000374	J	<0.001		0.000403	J
7440-23-5	Sodium	T	mg/L	6020	31.1		33.1		71.6		33.5	
7440-25-7	Tantalum	T	mg/L	6020	<0.005		<0.005		<0.005		<0.005	
7440-28-0	Thallium	T	mg/L	6020	<0.002		<0.002		<0.002		<0.002	
7440-61-1	Uranium	T	mg/L	6020	<0.0002		<0.0002		<0.0002		<0.0002	
7440-62-2	Vanadium	T	mg/L	6020	<0.01		<0.01		<0.01		<0.01	
7440-66-6	Zinc	T	mg/L	6020	<0.01		<0.01		<0.01		<0.01	
108-05-4	Vinyl acetate	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
67-64-1	Acetone	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
107-02-8	Acrolein	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
107-13-1	Acrylonitrile	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
71-43-2	Benzene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
108-90-7	Chlorobenzene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
1330-20-7	Xylenes	T	mg/L	8260	<0.003		<0.003		<0.003		<0.003	
100-42-5	Styrene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
108-88-3	Toluene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
74-97-5	Chlorobromomethane	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	

C-29

RESIDENTIAL/INERT-QUARTERLY

Facility: US DOE - Paducah Gaseous Diffusion Plant

Permit Number: 073-00014 & 073-00015

FINDS/UNIT: KY8-890-008-982 / 1

LAB ID: None

For Official Use Only

GROUNDWATER SAMPLE ANALYSIS - (Cont.)

AKGWA NUMBER ¹ , Facility Well/Spring Number					8004-4805		8004-4806		8004-4807		8004-4802	
Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.)					391		392		393		394	
CAS RN ⁴	CONSTITUENT	T D 5	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S
75-27-4	Bromodichloromethane	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
75-25-2	Tribromomethane	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
74-83-9	Methyl bromide	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
78-93-3	Methyl ethyl ketone	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
110-57-6	trans-1,4-Dichloro-2-butene	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
75-15-0	Carbon disulfide	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
75-00-3	Chloroethane	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
67-66-3	Chloroform	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
74-87-3	Methyl chloride	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
156-59-2	cis-1,2-Dichloroethene	T	mg/L	8260	0.00057	J	0.0011		<0.001		<0.001	
74-95-3	Methylene bromide	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
75-34-3	1,1-Dichloroethane	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
107-06-2	1,2-Dichloroethane	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
75-35-4	1,1-Dichloroethylene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
106-93-4	Ethane, 1,2-dibromo	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
79-34-5	Ethane, 1,1,2,2-Tetrachloro	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
71-55-6	Ethane, 1,1,1-Trichloro-	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
79-00-5	Ethane, 1,1,2-Trichloro	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
630-20-6	Ethane, 1,1,1,2-Tetrachloro	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
75-01-4	Vinyl chloride	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
127-18-4	Ethene, Tetrachloro-	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
79-01-6	Ethene, Trichloro-	T	mg/L	8260	0.0119		0.0166		<0.001		0.00647	

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RESIDENTIAL/CONTAINED-QUARTERLY

Facility: US DOE - Paducah Gaseous Diffusion Plant

Permit Number: 073-00014 & 073-00015

FINDS/UNIT: KY8-890-008-982 / 1

LAB ID: None

For Official Use Only

GROUNDWATER SAMPLE ANALYSIS - (Cont.)

AKGWA NUMBER ¹ , Facility Well/Spring Number					8004-4805	8004-4806	8004-4807	8004-4802				
Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.)					391	392	393	394				
CAS RN ⁴	CONSTITUENT	T D 5	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S
100-41-4	Ethylbenzene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
591-78-6	2-Hexanone	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
74-88-4	Iodomethane	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
124-48-1	Methane, Dibromochloro-	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
56-23-5	Carbon Tetrachloride	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
75-09-2	Dichloromethane	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
108-10-1	Methyl isobutyl ketone	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
96-12-8	Propane, 1,2-Dibromo-3-chloro	T	mg/L	8011	<0.0000193		<0.0000195		<0.0000196		<0.0000197	
78-87-5	Propane, 1,2-Dichloro-	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
10061-02-6	trans-1,3-Dichloro-1-propene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
10061-01-5	cis-1,3-Dichloro-1-propene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
156-60-5	trans-1,2-Dichloroethene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
75-69-4	Trichlorofluoromethane	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
96-18-4	1,2,3-Trichloropropane	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
95-50-1	Benzene, 1,2-Dichloro-	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
106-46-7	Benzene, 1,4-Dichloro-	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
1336-36-3	PCB, Total	T	ug/L	8082		*		*		*		*
12674-11-2	PCB-1016	T	ug/L	8082		*		*		*		*
11104-28-2	PCB-1221	T	ug/L	8082		*		*		*		*
11141-16-5	PCB-1232	T	ug/L	8082		*		*		*		*
53469-21-9	PCB-1242	T	ug/L	8082		*		*		*		*
12672-29-6	PCB-1248	T	ug/L	8082		*		*		*		*

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RESIDENTIAL/CONTAINED-QUARTERLY

Facility: US DOE - Paducah Gaseous Diffusion Plant

Permit Number: 073-00014 & 073-00015

FINDS/UNIT: KY8-890-008-982 / 1

LAB ID: None

For Official Use Only

GROUNDWATER SAMPLE ANALYSIS - (Cont.)

AKGWA NUMBER ¹ , Facility Well/Spring Number					8004-4805	8004-4806	8004-4807	8004-4802				
Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.)					391	392	393	394				
CAS RN ⁴	CONSTITUENT	T D 5	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S
11097-69-1	PCB-1254	T	ug/L	8082		*		*		*		*
11096-82-5	PCB-1260	T	ug/L	8082		*		*		*		*
11100-14-4	PCB-1268	T	ug/L	8082		*		*		*		*
12587-46-1	Gross Alpha	T	pCi/L	9310	-0.529	*	-0.285	*	2.31	*	-2.24	*
12587-47-2	Gross Beta	T	pCi/L	9310	10.5	*	2.16	*	2.53	*	-3.27	*
10043-66-0	Iodine-131	T	pCi/L			*		*		*		*
13982-63-3	Radium-226	T	pCi/L	AN-1418	0.0244	*	0.297	*	0.278	*	0.232	*
10098-97-2	Strontium-90	T	pCi/L	905.0	-1.72	*	-1.08	*	-0.986	*	-1.7	*
14133-76-7	Technetium-99	T	pCi/L	Tc-02-RC	10.8	*	4.72	*	3.99	*	6.15	*
14269-63-7	Thorium-230	T	pCi/L	Th-01-RC	0.171	*	0.231	*	0.303	*	-0.346	*
10028-17-8	Tritium	T	pCi/L	906.0	90.6	*	4.89	*	34.5	*	-35.6	*
S0130- -	Chemical Oxygen Demand	T	mg/L	410.4	22.5		24.2		12.3	J	12.6	J
57-12-5	Cyanide	T	mg/L	9012	<0.2		<0.2		<0.2		<0.2	
20461-54-5	Iodide	T	mg/L	300.0	<0.5		<0.5		<0.5		<0.5	*
S0268- -	Total Organic Carbon	T	mg/L	9060	0.991	J	1.1	J	3.01		0.928	J
S0586- -	Total Organic Halides	T	mg/L	9020	0.00876	J	0.0183		0.0183		0.0115	

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Division of Waste Management
 Solid Waste Branch
 14 Reilly Road
 Frankfort, KY 40601 (502)564-6716

RESIDENTIAL/INERT-QUARTERLY

Facility: US DOE - Paducah Gaseous Diffusion Plant

Permit Number: 073-00014 & 073-00015 FINDS/UNIT: KY8-890-008-982 / 1

LAB ID: None
 For Official Use Only

GROUNDWATER SAMPLE ANALYSIS (S)

AKGWA NUMBER ¹ , Facility Well/Spring Number	8004-4801	8004-4803	8004-4817	0000-0000								
Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.)	395	396	397	E. BLANK								
Sample Sequence #	1	1	1	1								
If sample is a Blank, specify Type: (F)ield, (T)rip, (M)ethod, or (E)quipment	NA	NA	NA	E								
Sample Date and Time (Month/Day/Year hour: minutes)	1/23/2018 13:49	1/23/2018 13:04	1/23/2018 12:05	1/24/2018 06:35								
Duplicate ("Y" or "N") ²	N	N	N	N								
Split ("Y" or "N") ³	N	N	N	N								
Facility Sample ID Number (if applicable)	MW395SG2-18	MW396SG2-18	MW397SG2-18	R11SG2-18								
Laboratory Sample ID Number (if applicable)	442295019	442300001	442295001	442318018								
Date of Analysis (Month/Day/Year) For <u>Volatile Organics</u> Analysis	1/26/2018	1/26/2018	1/26/2018	1/26/2018								
Gradient with respect to Monitored Unit (UP, DOWN, SIDE, UNKNOWN)	UP	UP	UP	NA								
CAS RN ⁴	CONSTITUENT	T D 5	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL ⁶	F L A G S ⁷	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S
24959-67-9	Bromide	T	mg/L	9056	0.493		1.1		0.463			*
16887-00-6	Chloride(s)	T	mg/L	9056	40.6		71.3	*B	39.1			*
16984-48-8	Fluoride	T	mg/L	9056	0.158		0.67		0.145			*
S0595- -	Nitrate & Nitrite	T	mg/L	9056	1.42		<0.2		1.5			*
14808-79-8	Sulfate	T	mg/L	9056	10.4		21.5		11.4			*
NS1894	Barometric Pressure Reading	T	Inches/Hg	Field	30.07		30.07		30.07			*
S0145- -	Specific Conductance	T	µMH0/cm	Field	384		750		326			*

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STANDARD FLAGS:
 * = See Comments
 J = Estimated Value
 B = Analyte found in blank
 A = Average value
 N = Presumptive ID
 D = Concentration from analysis of a secondary dilution

¹AKGWA # is 0000-0000 for any type of blank.
²Respond "Y" if the sample was a duplicate of another sample in this report.
³Respond "Y" if the sample was split and analyzed by separate laboratories.
⁴Chemical Abstracts Service Registry Number or unique identifier number assigned by agency.
⁵"T" = Total; "D" = Dissolved
⁶"<" indicates a non-detect; do not use "ND" or "BDL". Value shown is Practical Quantification Limit.
⁷Flags are as designated, do not use any other type. Use "*", " then describe on "Written Comments Page."

RESIDENTIAL/INERT-QUARTERLY

Facility: US DOE - Paducah Gaseous Diffusion Plant
 Permit Number: 073-00014 & 073-00015

FINDS/UNIT: KY8-890-008-982 / 1
 LAB ID: None
 For Official Use Only

GROUNDWATER SAMPLE ANALYSIS - (Cont.)

AKGWA NUMBER ¹ , Facility Well/Spring Number					8004-4801	8004-4803	8004-4817	0000-0000				
Facility's Local Well or Spring Number (e.g., MW-1, MW-2, BLANK-F, etc.)					395	396	397	E. BLANK				
CAS RN ⁴	CONSTITUENT	T D 5	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S
S0906 - -	Static Water Level Elevation	T	Ft. MSL	Field	322.69		368.6		322.05			*
N238	Dissolved Oxygen	T	mg/L	Field	3.39		1.01		5.37			*
S0266- -	Total Dissolved Solids	T	mg/L	160.1	176		433		179			*
S0296- -	pH	T	Units	Field	6.51		6.53		6.06			*
NS215	Eh	T	mV	Field	195		203		361			*
S0907 - -	Temperature	T	°C	Field	14.67		15.11		13.83			*
7429-90-5	Aluminum	T	mg/L	6020	0.0376	J	<0.05		0.103		0.0417	J
7440-36-0	Antimony	T	mg/L	6020	<0.003		<0.003		<0.003		<0.003	
7440-38-2	Arsenic	T	mg/L	6020	<0.005		0.00274	J	<0.005		<0.005	
7440-39-3	Barium	T	mg/L	6020	0.241		0.443		0.137		<0.002	*
7440-41-7	Beryllium	T	mg/L	6020	<0.0005		<0.0005		<0.0005		<0.0005	
7440-42-8	Boron	T	mg/L	6020	0.0206		0.00697	J	0.00938	J	<0.015	
7440-43-9	Cadmium	T	mg/L	6020	<0.001		<0.001		<0.001		<0.001	
7440-70-2	Calcium	T	mg/L	6020	24.5		34.4		19.4		<0.2	
7440-47-3	Chromium	T	mg/L	6020	<0.01		<0.01		<0.01		<0.01	
7440-48-4	Cobalt	T	mg/L	6020	<0.001		0.00288		<0.001		<0.001	
7440-50-8	Copper	T	mg/L	6020	0.000374	J	0.000421	J	0.000963	J	0.0101	
7439-89-6	Iron	T	mg/L	6020	0.0896	J	2.6		0.243		<0.1	
7439-92-1	Lead	T	mg/L	6020	<0.002		<0.002		<0.002		<0.002	
7439-95-4	Magnesium	T	mg/L	6020	10.8		15.5		8.61		<0.03	
7439-96-5	Manganese	T	mg/L	6020	0.00115	J	0.45		0.00705		<0.005	
7439-97-6	Mercury	T	mg/L	7470	<0.0002		<0.0002		<0.0002		<0.0002	*

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RESIDENTIAL/INERT-QUARTERLY

Facility: US DOE - Paducah Gaseous Diffusion Plant

Permit Number: 073-00014 & 073-00015

FINDS/UNIT: KY8-890-008-982 / 1

LAB ID: None

For Official Use Only

GROUNDWATER SAMPLE ANALYSIS - (Cont.)

AKGWA NUMBER ¹ , Facility Well/Spring Number					8004-4801	8004-4803	8004-4817	0000-0000				
Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.)					395	396	397	E. BLANK				
CAS RN ⁴	CONSTITUENT	T D 5	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S
7439-98-7	Molybdenum	T	mg/L	6020	0.000279	J	0.000418	J	<0.0005		<0.0005	
7440-02-0	Nickel	T	mg/L	6020	0.0012	J	0.00126	J	0.000989	J	<0.002	
7440-09-7	Potassium	T	mg/L	6020	1.5		0.83		1.89		<0.3	
7440-16-6	Rhodium	T	mg/L	6020	<0.005		<0.005		<0.005		<0.005	
7782-49-2	Selenium	T	mg/L	6020	<0.005		<0.005		<0.005		<0.005	
7440-22-4	Silver	T	mg/L	6020	<0.001		<0.001		<0.001		<0.001	
7440-23-5	Sodium	T	mg/L	6020	28.2		112		34.1		<0.25	
7440-25-7	Tantalum	T	mg/L	6020	<0.005		<0.005		<0.005		<0.005	
7440-28-0	Thallium	T	mg/L	6020	<0.002		<0.002		<0.002		<0.002	
7440-61-1	Uranium	T	mg/L	6020	<0.0002		<0.0002		<0.0002		<0.0002	
7440-62-2	Vanadium	T	mg/L	6020	<0.01		<0.01		<0.01		<0.01	
7440-66-6	Zinc	T	mg/L	6020	<0.01		<0.01		0.00337	J	<0.01	
108-05-4	Vinyl acetate	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
67-64-1	Acetone	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
107-02-8	Acrolein	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
107-13-1	Acrylonitrile	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
71-43-2	Benzene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
108-90-7	Chlorobenzene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
1330-20-7	Xylenes	T	mg/L	8260	<0.003		<0.003		<0.003		<0.003	
100-42-5	Styrene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
108-88-3	Toluene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
74-97-5	Chlorobromomethane	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	

C-35

RESIDENTIAL/INERT-QUARTERLY

Facility: US DOE - Paducah Gaseous Diffusion Plant

Permit Number: 073-00014 & 073-00015

FINDS/UNIT: KY8-890-008-982 / 1

LAB ID: None

For Official Use Only

GROUNDWATER SAMPLE ANALYSIS - (Cont.)

AKGWA NUMBER ¹ , Facility Well/Spring Number					8004-4801		8004-4803		8004-4817		0000-0000	
Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.)					395		396		397		E. BLANK	
CAS RN ⁴	CONSTITUENT	T D 5	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S
75-27-4	Bromodichloromethane	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
75-25-2	Tribromomethane	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
74-83-9	Methyl bromide	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
78-93-3	Methyl ethyl ketone	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
110-57-6	trans-1,4-Dichloro-2-butene	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
75-15-0	Carbon disulfide	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
75-00-3	Chloroethane	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
67-66-3	Chloroform	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
74-87-3	Methyl chloride	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
156-59-2	cis-1,2-Dichloroethene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
74-95-3	Methylene bromide	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
75-34-3	1,1-Dichloroethane	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
107-06-2	1,2-Dichloroethane	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
75-35-4	1,1-Dichloroethylene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
106-93-4	Ethane, 1,2-dibromo	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
79-34-5	Ethane, 1,1,2,2-Tetrachloro	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
71-55-6	Ethane, 1,1,1-Trichloro-	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
79-00-5	Ethane, 1,1,2-Trichloro	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
630-20-6	Ethane, 1,1,1,2-Tetrachloro	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
75-01-4	Vinyl chloride	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
127-18-4	Ethene, Tetrachloro-	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
79-01-6	Ethene, Trichloro-	T	mg/L	8260	0.00291		<0.001		<0.001		<0.001	

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RESIDENTIAL/CONTAINED-QUARTERLY

Facility: US DOE - Paducah Gaseous Diffusion Plant

Permit Number: 073-00014 & 073-00015

FINDS/UNIT: KY8-890-008-982 / 1

LAB ID: None

For Official Use Only

GROUNDWATER SAMPLE ANALYSIS - (Cont.)

AKGWA NUMBER ¹ , Facility Well/Spring Number					8004-4801	8004-4803	8004-4817	0000-0000				
Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.)					395	396	397	E. BLANK				
CAS RN ⁴	CONSTITUENT	T D 5	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S
100-41-4	Ethylbenzene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
591-78-6	2-Hexanone	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
74-88-4	Iodomethane	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
124-48-1	Methane, Dibromochloro-	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
56-23-5	Carbon Tetrachloride	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
75-09-2	Dichloromethane	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
108-10-1	Methyl isobutyl ketone	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
96-12-8	Propane, 1,2-Dibromo-3-chloro	T	mg/L	8011	<0.0000197		<0.0000197		<0.0000195		<0.0000195	
78-87-5	Propane, 1,2-Dichloro-	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
10061-02-6	trans-1,3-Dichloro-1-propene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
10061-01-5	cis-1,3-Dichloro-1-propene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
156-60-5	trans-1,2-Dichloroethene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
75-69-4	Trichlorofluoromethane	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
96-18-4	1,2,3-Trichloropropane	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
95-50-1	Benzene, 1,2-Dichloro-	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
106-46-7	Benzene, 1,4-Dichloro-	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
1336-36-3	PCB, Total	T	ug/L	8082		*		*		*		*
12674-11-2	PCB-1016	T	ug/L	8082		*		*		*		*
11104-28-2	PCB-1221	T	ug/L	8082		*		*		*		*
11141-16-5	PCB-1232	T	ug/L	8082		*		*		*		*
53469-21-9	PCB-1242	T	ug/L	8082		*		*		*		*
12672-29-6	PCB-1248	T	ug/L	8082		*		*		*		*

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RESIDENTIAL/CONTAINED-QUARTERLY

Facility: US DOE - Paducah Gaseous Diffusion Plant

Permit Number: 073-00014 & 073-00015

FINDS/UNIT: KY8-890-008-982 / 1

LAB ID: None

For Official Use Only

GROUNDWATER SAMPLE ANALYSIS - (Cont.)

AKGWA NUMBER ¹ , Facility Well/Spring Number					8004-4801	8004-4803	8004-4817	0000-0000				
Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.)					395	396	397	E. BLANK				
CAS RN ⁴	CONSTITUENT	T D 5	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S
11097-69-1	PCB-1254	T	ug/L	8082		*		*		*		*
11096-82-5	PCB-1260	T	ug/L	8082		*		*		*		*
11100-14-4	PCB-1268	T	ug/L	8082		*		*		*		*
12587-46-1	Gross Alpha	T	pCi/L	9310	3.08	*	0.0895	*	0.898	*	-1.24	*
12587-47-2	Gross Beta	T	pCi/L	9310	7.59	*	5.34	*	2.66	*	0.992	*
10043-66-0	Iodine-131	T	pCi/L			*		*		*		*
13982-63-3	Radium-226	T	pCi/L	AN-1418	0.592	*	0.682	*	0.3	*	0.394	*
10098-97-2	Strontium-90	T	pCi/L	905.0	0.0326	*	1.43	*	1.1	*	-0.647	*
14133-76-7	Technetium-99	T	pCi/L	Tc-02-RC	15.7	*	5.85	*	13.2	*	7.2	*
14269-63-7	Thorium-230	T	pCi/L	Th-01-RC	0.241	*	0.44	*	-0.213	*	0.494	*
10028-17-8	Tritium	T	pCi/L	906.0	15.2	*	9.84	*	-56.2	*	-72.5	*
S0130- -	Chemical Oxygen Demand	T	mg/L	410.4	18.9	J	37.6		18.9	J		*
57-12-5	Cyanide	T	mg/L	9012	<0.2		<0.2		<0.2			*
20461-54-5	Iodide	T	mg/L	300.0	<0.5	*	0.737	*	<0.5	*	<0.5	
S0268- -	Total Organic Carbon	T	mg/L	9060	0.962	J	6.3		0.829	J		*
S0586- -	Total Organic Halides	T	mg/L	9020	0.00894	J	0.0284		<0.01			*

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Division of Waste Management
 Solid Waste Branch
 14 Reilly Road
 Frankfort, KY 40601 (502)564-6716

RESIDENTIAL/INERT-QUARTERLY

Facility: US DOE - Paducah Gaseous Diffusion Plant

Permit Number: 073-00014 & 073-00015 FINDS/UNIT: KY8-890-008-982 / 1

LAB ID: None
 For Official Use Only

GROUNDWATER SAMPLE ANALYSIS (S)

AKGWA NUMBER ¹ , Facility Well/Spring Number	0000-0000	0000-0000	0000-0000	0000-0000								
Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.)	F. BLANK	T. BLANK 1	T. BLANK 2	T. BLANK 3								
Sample Sequence #	1	1	1	1								
If sample is a Blank, specify Type: (F)ield, (T)rip, (M)ethod, or (E)quipment	F	T	T	T								
Sample Date and Time (Month/Day/Year hour: minutes)	1/24/2018 07:20	1/23/2018 06:45	1/23/2018 11:45	1/24/2018 06:30								
Duplicate ("Y" or "N") ²	N	N	N	N								
Split ("Y" or "N") ³	N	N	N	N								
Facility Sample ID Number (if applicable)	FB1SG2-18	TB1SG2-18	TB2SG2-18	TB3SG2-18								
Laboratory Sample ID Number (if applicable)	442318017	442300003	442300004	442318019								
Date of Analysis (Month/Day/Year) For <u>Volatile Organics</u> Analysis	1/26/2018	1/26/2018	1/26/2018	1/26/2018								
Gradient with respect to Monitored Unit (UP, DOWN, SIDE, UNKNOWN)	NA	NA	NA	NA								
CAS RN ⁴	CONSTITUENT	T D 5	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL ⁶	F L A G S ⁷	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S
24959-67-9	Bromide	T	mg/L	9056		*		*		*		*
16887-00-6	Chloride(s)	T	mg/L	9056		*		*		*		*
16984-48-8	Fluoride	T	mg/L	9056		*		*		*		*
S0595- -	Nitrate & Nitrite	T	mg/L	9056		*		*		*		*
14808-79-8	Sulfate	T	mg/L	9056		*		*		*		*
NS1894	Barometric Pressure Reading	T	Inches/Hg	Field		*		*		*		*
S0145- -	Specific Conductance	T	µMH0/cm	Field		*		*		*		*

STANDARD FLAGS:
 * = See Comments
 J = Estimated Value
 B = Analyte found in blank
 A = Average value
 N = Presumptive ID
 D = Concentration from analysis
 of a secondary dilution

¹AKGWA # is 0000-0000 for any type of blank.

²Respond "Y" if the sample was a duplicate of another sample in this report.

³Respond "Y" if the sample was split and analyzed by separate laboratories.

⁴Chemical Abstracts Service Registry Number or unique identifier number assigned by agency.

⁵"T" = Total; "D" = Dissolved

⁶"<" indicates a non-detect; do not use "ND" or "BDL". Value shown is Practical Quantification Limit.

⁷Flags are as designated, do not use any other type. Use "*", then describe on "Written Comments Page."

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RESIDENTIAL/INERT-QUARTERLY

Facility: US DOE - Paducah Gaseous Diffusion Plant
 Permit Number: 073-00014 & 073-00015

FINDS/UNIT: KY8-890-008-982 / 1
 LAB ID: None
 For Official Use Only

GROUNDWATER SAMPLE ANALYSIS - (Cont.)

AKGWA NUMBER ¹ , Facility Well/Spring Number					0000-0000		0000-0000		0000-0000		0000-0000	
Facility's Local Well or Spring Number (e.g., MW-1, MW-2, BLANK-F, etc.)					F. BLANK		T. BLANK 1		T. BLANK 2		T. BLANK 3	
CAS RN ⁴	CONSTITUENT	T D 5	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S
S0906 - -	Static Water Level Elevation	T	Ft. MSL	Field		*		*		*		*
N238	Dissolved Oxygen	T	mg/L	Field		*		*		*		*
S0266- -	Total Dissolved Solids	T	mg/L	160.1		*		*		*		*
S0296- -	pH	T	Units	Field		*		*		*		*
NS215	Eh	T	mV	Field		*		*		*		*
S0907 - -	Temperature	T	°C	Field		*		*		*		*
7429-90-5	Aluminum	T	mg/L	6020	<0.05			*		*		*
7440-36-0	Antimony	T	mg/L	6020	<0.003			*		*		*
7440-38-2	Arsenic	T	mg/L	6020	<0.005			*		*		*
7440-39-3	Barium	T	mg/L	6020	<0.002	*		*		*		*
7440-41-7	Beryllium	T	mg/L	6020	<0.0005			*		*		*
7440-42-8	Boron	T	mg/L	6020	<0.015			*		*		*
7440-43-9	Cadmium	T	mg/L	6020	<0.001			*		*		*
7440-70-2	Calcium	T	mg/L	6020	<0.2			*		*		*
7440-47-3	Chromium	T	mg/L	6020	<0.01			*		*		*
7440-48-4	Cobalt	T	mg/L	6020	<0.001			*		*		*
7440-50-8	Copper	T	mg/L	6020	<0.001			*		*		*
7439-89-6	Iron	T	mg/L	6020	<0.1			*		*		*
7439-92-1	Lead	T	mg/L	6020	<0.002			*		*		*
7439-95-4	Magnesium	T	mg/L	6020	<0.03			*		*		*
7439-96-5	Manganese	T	mg/L	6020	<0.005			*		*		*
7439-97-6	Mercury	T	mg/L	7470	<0.0002	*		*		*		*

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RESIDENTIAL/INERT-QUARTERLY

Facility: US DOE - Paducah Gaseous Diffusion Plant

Permit Number: 073-00014 & 073-00015

FINDS/UNIT: KY8-890-008-982 / 1

LAB ID: None

For Official Use Only

GROUNDWATER SAMPLE ANALYSIS - (Cont.)

AKGWA NUMBER ¹ , Facility Well/Spring Number					0000-0000	0000-0000	0000-0000	0000-0000				
Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.)					F. BLANK	T. BLANK 1	T. BLANK 2	T. BLANK 3				
CAS RN ⁴	CONSTITUENT	T D 5	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S
7439-98-7	Molybdenum	T	mg/L	6020	<0.0005			*		*		*
7440-02-0	Nickel	T	mg/L	6020	<0.002			*		*		*
7440-09-7	Potassium	T	mg/L	6020	<0.3			*		*		*
7440-16-6	Rhodium	T	mg/L	6020	<0.005			*		*		*
7782-49-2	Selenium	T	mg/L	6020	<0.005			*		*		*
7440-22-4	Silver	T	mg/L	6020	<0.001			*		*		*
7440-23-5	Sodium	T	mg/L	6020	<0.25			*		*		*
7440-25-7	Tantalum	T	mg/L	6020	<0.005			*		*		*
7440-28-0	Thallium	T	mg/L	6020	<0.002			*		*		*
7440-61-1	Uranium	T	mg/L	6020	<0.0002			*		*		*
7440-62-2	Vanadium	T	mg/L	6020	<0.01			*		*		*
7440-66-6	Zinc	T	mg/L	6020	<0.01			*		*		*
108-05-4	Vinyl acetate	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
67-64-1	Acetone	T	mg/L	8260	<0.005		<0.005		<0.005		0.00184	J
107-02-8	Acrolein	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
107-13-1	Acrylonitrile	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
71-43-2	Benzene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
108-90-7	Chlorobenzene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
1330-20-7	Xylenes	T	mg/L	8260	<0.003		<0.003		<0.003		<0.003	
100-42-5	Styrene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
108-88-3	Toluene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
74-97-5	Chlorobromomethane	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	

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RESIDENTIAL/INERT-QUARTERLY

Facility: US DOE - Paducah Gaseous Diffusion Plant

Permit Number: 073-00014 & 073-00015

FINDS/UNIT: KY8-890-008-982 / 1

LAB ID: None

For Official Use Only

GROUNDWATER SAMPLE ANALYSIS - (Cont.)

AKGWA NUMBER ¹ , Facility Well/Spring Number					0000-0000		0000-0000		0000-0000		0000-0000	
Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.)					F. BLANK		T. BLANK 1		T. BLANK 2		T. BLANK 3	
CAS RN ⁴	CONSTITUENT	T D 5	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S
75-27-4	Bromodichloromethane	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
75-25-2	Tribromomethane	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
74-83-9	Methyl bromide	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
78-93-3	Methyl ethyl ketone	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
110-57-6	trans-1,4-Dichloro-2-butene	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
75-15-0	Carbon disulfide	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
75-00-3	Chloroethane	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
67-66-3	Chloroform	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
74-87-3	Methyl chloride	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
156-59-2	cis-1,2-Dichloroethene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
74-95-3	Methylene bromide	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
75-34-3	1,1-Dichloroethane	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
107-06-2	1,2-Dichloroethane	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
75-35-4	1,1-Dichloroethylene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
106-93-4	Ethane, 1,2-dibromo	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
79-34-5	Ethane, 1,1,2,2-Tetrachloro	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
71-55-6	Ethane, 1,1,1-Trichloro-	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
79-00-5	Ethane, 1,1,2-Trichloro	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
630-20-6	Ethane, 1,1,1,2-Tetrachloro	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
75-01-4	Vinyl chloride	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
127-18-4	Ethene, Tetrachloro-	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
79-01-6	Ethene, Trichloro-	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	

C-42

RESIDENTIAL/CONTAINED-QUARTERLY

Facility: US DOE - Paducah Gaseous Diffusion Plant
 Permit Number: 073-00014 & 073-00015

FINDS/UNIT: KY8-890-008-982 / 1
 LAB ID: None
 For Official Use Only

GROUNDWATER SAMPLE ANALYSIS - (Cont.)

AKGWA NUMBER ¹ , Facility Well/Spring Number					0000-0000		0000-0000		0000-0000		0000-0000	
Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.)					F. BLANK		T. BLANK 1		T. BLANK 2		T. BLANK 3	
CAS RN ⁴	CONSTITUENT	T D 5	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S
100-41-4	Ethylbenzene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
591-78-6	2-Hexanone	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
74-88-4	Iodomethane	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
124-48-1	Methane, Dibromochloro-	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
56-23-5	Carbon Tetrachloride	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
75-09-2	Dichloromethane	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
108-10-1	Methyl isobutyl ketone	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
96-12-8	Propane, 1,2-Dibromo-3-chloro	T	mg/L	8011	<0.0000198		<0.0000197		<0.0000201		<0.0000199	
78-87-5	Propane, 1,2-Dichloro-	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
10061-02-6	trans-1,3-Dichloro-1-propene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
10061-01-5	cis-1,3-Dichloro-1-propene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
156-60-5	trans-1,2-Dichloroethene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
75-69-4	Trichlorofluoromethane	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
96-18-4	1,2,3-Trichloropropane	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
95-50-1	Benzene, 1,2-Dichloro-	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
106-46-7	Benzene, 1,4-Dichloro-	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
1336-36-3	PCB, Total	T	ug/L	8082		*		*		*		*
12674-11-2	PCB-1016	T	ug/L	8082		*		*		*		*
11104-28-2	PCB-1221	T	ug/L	8082		*		*		*		*
11141-16-5	PCB-1232	T	ug/L	8082		*		*		*		*
53469-21-9	PCB-1242	T	ug/L	8082		*		*		*		*
12672-29-6	PCB-1248	T	ug/L	8082		*		*		*		*

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RESIDENTIAL/CONTAINED-QUARTERLY

Facility: US DOE - Paducah Gaseous Diffusion Plant

Permit Number: 073-00014 & 073-00015

FINDS/UNIT: KY8-890-008-982 / 1

LAB ID: None

For Official Use Only

GROUNDWATER SAMPLE ANALYSIS - (Cont.)

AKGWA NUMBER ¹ , Facility Well/Spring Number					0000-0000	0000-0000	0000-0000	0000-0000				
Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.)					F. BLANK	T. BLANK 1	T. BLANK 2	T. BLANK 3				
CAS RN ⁴	CONSTITUENT	T D 5	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S
11097-69-1	PCB-1254	T	ug/L	8082		*		*		*		*
11096-82-5	PCB-1260	T	ug/L	8082		*		*		*		*
11100-14-4	PCB-1268	T	ug/L	8082		*		*		*		*
12587-46-1	Gross Alpha	T	pCi/L	9310	-1.56	*		*		*		*
12587-47-2	Gross Beta	T	pCi/L	9310	0.558	*		*		*		*
10043-66-0	Iodine-131	T	pCi/L			*		*		*		*
13982-63-3	Radium-226	T	pCi/L	AN-1418	0	*		*		*		*
10098-97-2	Strontium-90	T	pCi/L	905.0	-1.13	*		*		*		*
14133-76-7	Technetium-99	T	pCi/L	Tc-02-RC	2.74	*		*		*		*
14269-63-7	Thorium-230	T	pCi/L	Th-01-RC	-0.0233	*		*		*		*
10028-17-8	Tritium	T	pCi/L	906.0	2.54	*		*		*		*
S0130- -	Chemical Oxygen Demand	T	mg/L	410.4		*		*		*		*
57-12-5	Cyanide	T	mg/L	9012		*		*		*		*
20461-54-5	Iodide	T	mg/L	300.0	<0.5	*		*		*		*
S0268- -	Total Organic Carbon	T	mg/L	9060		*		*		*		*
S0586- -	Total Organic Halides	T	mg/L	9020		*		*		*		*

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Division of Waste Management
 Solid Waste Branch
 14 Reilly Road
 Frankfort, KY 40601 (502)564-6716

RESIDENTIAL/INERT-QUARTERLY

Facility: US DOE - Paducah Gaseous Diffusion Plant

Permit Number: 073-00014 & 073-00015 FINDS/UNIT: KY8-890-008-982 / 1

LAB ID: None
 For Official Use Only

GROUNDWATER SAMPLE ANALYSIS (S)

AKGWA NUMBER ¹ , Facility Well/Spring Number					0000-0000	8004-4792	8004-4809						
Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.)					T. BLANK 4	373	384						
Sample Sequence #					1	2	2						
If sample is a Blank, specify Type: (F)ield, (T)rip, (M)ethod, or (E)quipment					T	NA	NA						
Sample Date and Time (Month/Day/Year hour:minutes)					1/24/2018 06:30	1/22/2018 08:06	1/24/2018 07:18						
Duplicate ("Y" or "N") ²					N	Y	Y						
Split ("Y" or "N") ³					N	N	N						
Facility Sample ID Number (if applicable)					TB4SG2-18	MW373DUG2-18	MW384DSG2-18						
Laboratory Sample ID Number (if applicable)					442318020	442179013	442318001						
Date of Analysis (Month/Day/Year) For <u>Volatile Organics</u> Analysis					1/26/2018	1/25/2018	1/26/2018						
Gradient with respect to Monitored Unit (UP, DOWN, SIDE, UNKNOWN)					NA	DOWN	SIDE						
CAS RN ⁴	CONSTITUENT	T D S ⁵	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL ⁶	F L A G S ⁷	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	
24959-67-9	Bromide	T	mg/L	9056		*	0.587		0.436				
16887-00-6	Chloride(s)	T	mg/L	9056		*	43.3		39.5				
16984-48-8	Fluoride	T	mg/L	9056		*	0.189		0.269				
S0595- -	Nitrate & Nitrite	T	mg/L	9056		*	1.39		0.955				
14808-79-8	Sulfate	T	mg/L	9056		*	98.7		21.3				
NS1894	Barometric Pressure Reading	T	Inches/Hg	Field		*	29.76		30.3				
S0145- -	Specific Conductance	T	µMH0/cm	Field		*	730		486				

STANDARD FLAGS:
 * = See Comments
 J = Estimated Value
 B = Analyte found in blank
 A = Average value
 N = Presumptive ID
 D = Concentration from analysis
 of a secondary dilution

¹AKGWA # is 0000-0000 for any type of blank.

²Respond "Y" if the sample was a duplicate of another sample in this report.

³Respond "Y" if the sample was split and analyzed by separate laboratories.

⁴Chemical Abstracts Service Registry Number or unique identifier number assigned by agency.

⁵"T" = Total; "D" = Dissolved

⁶"<" indicates a non-detect; do not use "ND" or "BDL". Value shown is Practical Quantification Limit.

⁷Flags are as designated, do not use any other type. Use "*", then describe on "Written Comments Page."

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RESIDENTIAL/INERT-QUARTERLY

Facility: US DOE - Paducah Gaseous Diffusion Plant
 Permit Number: 073-00014 & 073-00015

FINDS/UNIT: KY8-890-008-982 / 1
 LAB ID: None
 For Official Use Only

GROUNDWATER SAMPLE ANALYSIS - (Cont.)

AKGWA NUMBER ¹ , Facility Well/Spring Number					0000-0000	8004-4792	8004-4809					
Facility's Local Well or Spring Number (e.g., MW-1, MW-2, BLANK-F, etc.)					T. BLANK 4	373	384					
CAS RN ⁴	CONSTITUENT	T D 5	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S
S0906 - -	Static Water Level Elevation	T	Ft. MSL	Field		*	322.46		322.44			
N238	Dissolved Oxygen	T	mg/L	Field		*	2.33		3.28			
S0266- -	Total Dissolved Solids	T	mg/L	160.1		*	353	*	269			
S0296- -	pH	T	Units	Field		*	6.19		6.14			
NS215	Eh	T	mV	Field		*	393		341			
S0907 - -	Temperature	T	°C	Field		*	14.67		10.78			
7429-90-5	Aluminum	T	mg/L	6020		*	<0.05		0.0294	J		
7440-36-0	Antimony	T	mg/L	6020		*	<0.003		<0.003			
7440-38-2	Arsenic	T	mg/L	6020		*	<0.005		0.00275	J		
7440-39-3	Barium	T	mg/L	6020		*	0.0322		0.146	*		
7440-41-7	Beryllium	T	mg/L	6020		*	<0.0005		<0.0005			
7440-42-8	Boron	T	mg/L	6020		*	1.4		0.0309			
7440-43-9	Cadmium	T	mg/L	6020		*	<0.001		<0.001			
7440-70-2	Calcium	T	mg/L	6020		*	60.3		27.9			
7440-47-3	Chromium	T	mg/L	6020		*	<0.01		0.0059	J		
7440-48-4	Cobalt	T	mg/L	6020		*	0.000332	J	<0.001			
7440-50-8	Copper	T	mg/L	6020		*	0.000513	J	0.000926	J		
7439-89-6	Iron	T	mg/L	6020		*	0.0864	J	1.03			
7439-92-1	Lead	T	mg/L	6020		*	<0.002		<0.002			
7439-95-4	Magnesium	T	mg/L	6020		*	24.3	*	11.4			
7439-96-5	Manganese	T	mg/L	6020		*	0.0142		0.041			
7439-97-6	Mercury	T	mg/L	7470		*	<0.0002		<0.0002	*		

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RESIDENTIAL/INERT-QUARTERLY

Facility: US DOE - Paducah Gaseous Diffusion Plant

Permit Number: 073-00014 & 073-00015

FINDS/UNIT: KY8-890-008-982 / 1

LAB ID: None

For Official Use Only

GROUNDWATER SAMPLE ANALYSIS - (Cont.)

AKGWA NUMBER ¹ , Facility Well/Spring Number					0000-0000	8004-4792	8004-4809					
Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.)					T. BLANK 4	373	384					
CAS RN ⁴	CONSTITUENT	T D 5	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S
7439-98-7	Molybdenum	T	mg/L	6020		*	<0.0005		0.000272	J		
7440-02-0	Nickel	T	mg/L	6020		*	0.0009	J	0.00113	J		
7440-09-7	Potassium	T	mg/L	6020		*	2.5		1.2			
7440-16-6	Rhodium	T	mg/L	6020		*	<0.005		<0.005			
7782-49-2	Selenium	T	mg/L	6020		*	<0.005		0.00201	J		
7440-22-4	Silver	T	mg/L	6020		*	0.000438	J	<0.001			
7440-23-5	Sodium	T	mg/L	6020		*	49.8		51.3			
7440-25-7	Tantalum	T	mg/L	6020		*	<0.005		<0.005			
7440-28-0	Thallium	T	mg/L	6020		*	<0.002		<0.002			
7440-61-1	Uranium	T	mg/L	6020		*	<0.0002		<0.0002			
7440-62-2	Vanadium	T	mg/L	6020		*	<0.01		<0.01			
7440-66-6	Zinc	T	mg/L	6020		*	<0.01		<0.01			
108-05-4	Vinyl acetate	T	mg/L	8260	<0.005		<0.005		<0.005			
67-64-1	Acetone	T	mg/L	8260	<0.005		<0.005		<0.005			
107-02-8	Acrolein	T	mg/L	8260	<0.005		<0.005		<0.005			
107-13-1	Acrylonitrile	T	mg/L	8260	<0.005		<0.005		<0.005			
71-43-2	Benzene	T	mg/L	8260	<0.001		<0.001		<0.001			
108-90-7	Chlorobenzene	T	mg/L	8260	<0.001		<0.001		<0.001			
1330-20-7	Xylenes	T	mg/L	8260	<0.003		<0.003		<0.003			
100-42-5	Styrene	T	mg/L	8260	<0.001		<0.001		<0.001			
108-88-3	Toluene	T	mg/L	8260	<0.001		<0.001		<0.001			
74-97-5	Chlorobromomethane	T	mg/L	8260	<0.001		<0.001		<0.001			

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RESIDENTIAL/INERT-QUARTERLY

Facility: US DOE - Paducah Gaseous Diffusion Plant

Permit Number: 073-00014 & 073-00015

FINDS/UNIT: KY8-890-008-982 / 1

LAB ID: None

For Official Use Only

GROUNDWATER SAMPLE ANALYSIS - (Cont.)

AKGWA NUMBER ¹ , Facility Well/Spring Number					0000-0000		8004-4792		8004-4809			
Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.)					T. BLANK 4		373		384			
CAS RN ⁴	CONSTITUENT	T D 5	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S
75-27-4	Bromodichloromethane	T	mg/L	8260	<0.001		<0.001		<0.001			
75-25-2	Tribromomethane	T	mg/L	8260	<0.001		<0.001		<0.001			
74-83-9	Methyl bromide	T	mg/L	8260	<0.001		<0.001		<0.001			
78-93-3	Methyl ethyl ketone	T	mg/L	8260	<0.005		<0.005		<0.005			
110-57-6	trans-1,4-Dichloro-2-butene	T	mg/L	8260	<0.005		<0.005		<0.005			
75-15-0	Carbon disulfide	T	mg/L	8260	<0.005		<0.005		<0.005			
75-00-3	Chloroethane	T	mg/L	8260	<0.001		<0.001		<0.001			
67-66-3	Chloroform	T	mg/L	8260	<0.001		<0.001		<0.001			
74-87-3	Methyl chloride	T	mg/L	8260	<0.001		<0.001		<0.001			
156-59-2	cis-1,2-Dichloroethene	T	mg/L	8260	<0.001		<0.001		<0.001			
74-95-3	Methylene bromide	T	mg/L	8260	<0.001		<0.001		<0.001			
75-34-3	1,1-Dichloroethane	T	mg/L	8260	<0.001		<0.001		<0.001			
107-06-2	1,2-Dichloroethane	T	mg/L	8260	<0.001		<0.001		<0.001			
75-35-4	1,1-Dichloroethylene	T	mg/L	8260	<0.001		<0.001		<0.001			
106-93-4	Ethane, 1,2-dibromo	T	mg/L	8260	<0.001		<0.001		<0.001			
79-34-5	Ethane, 1,1,2,2-Tetrachloro	T	mg/L	8260	<0.001		<0.001		<0.001			
71-55-6	Ethane, 1,1,1-Trichloro-	T	mg/L	8260	<0.001		<0.001		<0.001			
79-00-5	Ethane, 1,1,2-Trichloro	T	mg/L	8260	<0.001		<0.001		<0.001			
630-20-6	Ethane, 1,1,1,2-Tetrachloro	T	mg/L	8260	<0.001		<0.001		<0.001			
75-01-4	Vinyl chloride	T	mg/L	8260	<0.001		<0.001		<0.001			
127-18-4	Ethene, Tetrachloro-	T	mg/L	8260	<0.001		<0.001		<0.001			
79-01-6	Ethene, Trichloro-	T	mg/L	8260	<0.001		0.00621		0.00076	J		

C-48

RESIDENTIAL/CONTAINED-QUARTERLY

Facility: US DOE - Paducah Gaseous Diffusion Plant

Permit Number: 073-00014 & 073-00015

FINDS/UNIT: KY8-890-008-982 / 1

LAB ID: None

For Official Use Only

GROUNDWATER SAMPLE ANALYSIS - (Cont.)

AKGWA NUMBER ¹ , Facility Well/Spring Number					0000-0000	8004-4792	8004-4809					
Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.)					T. BLANK 4	373	384					
CAS RN ⁴	CONSTITUENT	T D 5	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S
100-41-4	Ethylbenzene	T	mg/L	8260	<0.001		<0.001		<0.001			
591-78-6	2-Hexanone	T	mg/L	8260	<0.005		<0.005		<0.005			
74-88-4	Iodomethane	T	mg/L	8260	<0.005		<0.005		<0.005			
124-48-1	Methane, Dibromochloro-	T	mg/L	8260	<0.001		<0.001		<0.001			
56-23-5	Carbon Tetrachloride	T	mg/L	8260	<0.001		<0.001		<0.001			
75-09-2	Dichloromethane	T	mg/L	8260	<0.005		<0.005		<0.005			
108-10-1	Methyl isobutyl ketone	T	mg/L	8260	<0.005		<0.005		<0.005			
96-12-8	Propane, 1,2-Dibromo-3-chloro	T	mg/L	8011	<0.0000199		<0.0000199		<0.0000196			
78-87-5	Propane, 1,2-Dichloro-	T	mg/L	8260	<0.001		<0.001		<0.001			
10061-02-6	trans-1,3-Dichloro-1-propene	T	mg/L	8260	<0.001		<0.001		<0.001			
10061-01-5	cis-1,3-Dichloro-1-propene	T	mg/L	8260	<0.001		<0.001		<0.001			
156-60-5	trans-1,2-Dichloroethene	T	mg/L	8260	<0.001		<0.001		<0.001			
75-69-4	Trichlorofluoromethane	T	mg/L	8260	<0.001		<0.001		<0.001			
96-18-4	1,2,3-Trichloropropane	T	mg/L	8260	<0.001		<0.001		<0.001			
95-50-1	Benzene, 1,2-Dichloro-	T	mg/L	8260	<0.001		<0.001		<0.001			
106-46-7	Benzene, 1,4-Dichloro-	T	mg/L	8260	<0.001		<0.001		<0.001			
1336-36-3	PCB, Total	T	ug/L	8082		*	<0.0952			*		
12674-11-2	PCB-1016	T	ug/L	8082		*	<0.0952			*		
11104-28-2	PCB-1221	T	ug/L	8082		*	<0.0952			*		
11141-16-5	PCB-1232	T	ug/L	8082		*	<0.0952			*		
53469-21-9	PCB-1242	T	ug/L	8082		*	<0.0952			*		
12672-29-6	PCB-1248	T	ug/L	8082		*	<0.0952			*		

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RESIDENTIAL/CONTAINED-QUARTERLY

Facility: US DOE - Paducah Gaseous Diffusion Plant

Permit Number: 073-00014 & 073-00015

FINDS/UNIT: KY8-890-008-982 / 1

LAB ID: None

For Official Use Only

GROUNDWATER SAMPLE ANALYSIS - (Cont.)

AKGWA NUMBER ¹ , Facility Well/Spring Number					0000-0000	8004-4792	8004-4809					
Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.)					T. BLANK 4	373	384					
CAS RN ⁴	CONSTITUENT	T D 5	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S
11097-69-1	PCB-1254	T	ug/L	8082		*	<0.0952			*		
11096-82-5	PCB-1260	T	ug/L	8082		*	<0.0952			*		
11100-14-4	PCB-1268	T	ug/L	8082		*	<0.0952			*		
12587-46-1	Gross Alpha	T	pCi/L	9310		*	6.28	*	-0.875	*		
12587-47-2	Gross Beta	T	pCi/L	9310		*	23.5	*	89.7	*		
10043-66-0	Iodine-131	T	pCi/L			*		*		*		
13982-63-3	Radium-226	T	pCi/L	AN-1418		*	0.29	*	0.0278	*		
10098-97-2	Strontium-90	T	pCi/L	905.0		*	-0.365	*	1.05	*		
14133-76-7	Technetium-99	T	pCi/L	Tc-02-RC		*	24.8	*	135	*		
14269-63-7	Thorium-230	T	pCi/L	Th-01-RC		*	-0.289	*	0.169	*		
10028-17-8	Tritium	T	pCi/L	906.0		*	9.52	*	70.2	*		
S0130- -	Chemical Oxygen Demand	T	mg/L	410.4		*	27.2		14	J		
57-12-5	Cyanide	T	mg/L	9012		*	<0.2		<0.2			
20461-54-5	Iodide	T	mg/L	300.0		*	<0.5	*	<0.5			
S0268- -	Total Organic Carbon	T	mg/L	9060		*	1.11	J	1.42	J		
S0586- -	Total Organic Halides	T	mg/L	9020		*	0.0135		0.00844	J		

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RESIDENTIAL/INERT – QUARTERLY

Finds/Unit: KY8-890-008-982 / 1

Facility: US DOE - Paducah Gaseous Diffusion Plant

LAB ID: None

Permit Numbers: 073-00014 and 073-00015

For Official Use Only

GROUNDWATER WRITTEN COMMENTS

Monitoring Point	Facility Sample ID	Constituent	Flag	Description
8000-5201 MW220	MW220SG2-18	PCB, Total		Analysis of constituent not required and not performed.
		PCB-1016		Analysis of constituent not required and not performed.
		PCB-1221		Analysis of constituent not required and not performed.
		PCB-1232		Analysis of constituent not required and not performed.
		PCB-1242		Analysis of constituent not required and not performed.
		PCB-1248		Analysis of constituent not required and not performed.
		PCB-1254		Analysis of constituent not required and not performed.
		PCB-1260		Analysis of constituent not required and not performed.
		PCB-1268		Analysis of constituent not required and not performed.
		Gross alpha	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 3.97. Rad error is 3.97.
		Gross beta		TPU is 7.15. Rad error is 6.84.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.366. Rad error is 0.364.
		Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 2.29. Rad error is 2.28.
		Technetium-99		TPU is 12.4. Rad error is 12.
		Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 1.34. Rad error is 1.32.
Tritium	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 124. Rad error is 122.		
Iodide	W	Post-digestion spike recovery out of control limits.		

RESIDENTIAL/INERT – QUARTERLY

Finds/Unit: KY8-890-008-982 / 1

Facility: US DOE - Paducah Gaseous Diffusion Plant

LAB ID: None

Permit Numbers: 073-00014 and 073-00015

For Official Use Only

GROUNDWATER WRITTEN COMMENTS

Monitoring Point	Facility Sample ID	Constituent	Flag	Description	
8000-5202 MW221	MW221SG2-18	PCB, Total		Analysis of constituent not required and not performed.	
		PCB-1016		Analysis of constituent not required and not performed.	
		PCB-1221		Analysis of constituent not required and not performed.	
		PCB-1232		Analysis of constituent not required and not performed.	
		PCB-1242		Analysis of constituent not required and not performed.	
		PCB-1248		Analysis of constituent not required and not performed.	
		PCB-1254		Analysis of constituent not required and not performed.	
		PCB-1260		Analysis of constituent not required and not performed.	
		PCB-1268		Analysis of constituent not required and not performed.	
		Gross alpha		U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 6.16. Rad error is 6.11.
		Gross beta			TPU is 7.68. Rad error is 7.26.
		Iodine-131			Analysis of constituent not required and not performed.
		Radium-226		U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.746. Rad error is 0.739.
		Strontium-90		U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 1.09. Rad error is 1.09.
		Technetium-99		U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 11.7. Rad error is 11.7.
		Thorium-230		U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.684. Rad error is 0.679.
		Tritium		U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 115. Rad error is 115.
Iodide		W	Post-digestion spike recovery out of control limits.		

RESIDENTIAL/INERT – QUARTERLY

Finds/Unit: KY8-890-008-982 / 1

Facility: US DOE - Paducah Gaseous Diffusion Plant

LAB ID: None

Permit Numbers: 073-00014 and 073-00015

For Official Use Only

GROUNDWATER WRITTEN COMMENTS

Monitoring Point	Facility Sample ID	Constituent	Flag	Description
8000-5242 MW222	MW222SG2-18	PCB, Total		Analysis of constituent not required and not performed.
		PCB-1016		Analysis of constituent not required and not performed.
		PCB-1221		Analysis of constituent not required and not performed.
		PCB-1232		Analysis of constituent not required and not performed.
		PCB-1242		Analysis of constituent not required and not performed.
		PCB-1248		Analysis of constituent not required and not performed.
		PCB-1254		Analysis of constituent not required and not performed.
		PCB-1260		Analysis of constituent not required and not performed.
		PCB-1268		Analysis of constituent not required and not performed.
		Gross alpha	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 6.25. Rad error is 6.25.
		Gross beta	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 5.56. Rad error is 5.53.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.525. Rad error is 0.52.
		Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 1.81. Rad error is 1.8.
		Technetium-99	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 12. Rad error is 12.
		Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.923. Rad error is 0.91.
		Tritium	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 118. Rad error is 118.
Iodide	W	Post-digestion spike recovery out of control limits.		

RESIDENTIAL/INERT – QUARTERLY

Finds/Unit: KY8-890-008-982 / 1

Facility: US DOE - Paducah Gaseous Diffusion Plant

LAB ID: None

Permit Numbers: 073-00014 and 073-00015

For Official Use Only

GROUNDWATER WRITTEN COMMENTS

Monitoring Point	Facility Sample ID	Constituent	Flag	Description
8000-5243 MW223	MW223SG2-18	PCB, Total		Analysis of constituent not required and not performed.
		PCB-1016		Analysis of constituent not required and not performed.
		PCB-1221		Analysis of constituent not required and not performed.
		PCB-1232		Analysis of constituent not required and not performed.
		PCB-1242		Analysis of constituent not required and not performed.
		PCB-1248		Analysis of constituent not required and not performed.
		PCB-1254		Analysis of constituent not required and not performed.
		PCB-1260		Analysis of constituent not required and not performed.
		PCB-1268		Analysis of constituent not required and not performed.
		Gross alpha	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 4.88. Rad error is 4.86.
		Gross beta	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 4.59. Rad error is 4.56.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.69. Rad error is 0.676.
		Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 2.77. Rad error is 2.77.
		Technetium-99	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 11.5. Rad error is 11.5.
		Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.752. Rad error is 0.742.
		Tritium	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 123. Rad error is 122.
		Iodide	W	Post-digestion spike recovery out of control limits.

RESIDENTIAL/INERT – QUARTERLY

Finds/Unit: KY8-890-008-982 / 1

Facility: US DOE - Paducah Gaseous Diffusion Plant

LAB ID: None

Permit Numbers: 073-00014 and 073-00015

For Official Use Only

GROUNDWATER WRITTEN COMMENTS

Monitoring Point	Facility Sample ID	Constituent	Flag	Description
8000-5244 MW224	MW224SG2-18	PCB, Total		Analysis of constituent not required and not performed.
		PCB-1016		Analysis of constituent not required and not performed.
		PCB-1221		Analysis of constituent not required and not performed.
		PCB-1232		Analysis of constituent not required and not performed.
		PCB-1242		Analysis of constituent not required and not performed.
		PCB-1248		Analysis of constituent not required and not performed.
		PCB-1254		Analysis of constituent not required and not performed.
		PCB-1260		Analysis of constituent not required and not performed.
		PCB-1268		Analysis of constituent not required and not performed.
		Gross alpha	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 5.78. Rad error is 5.75.
		Gross beta	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 5.19. Rad error is 5.16.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.531. Rad error is 0.526.
		Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 1.48. Rad error is 1.48.
		Technetium-99	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 11.7. Rad error is 11.7.
		Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.896. Rad error is 0.869.
		Tritium	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 125. Rad error is 123.
8004-4820 MW369	MW369UG2-18	Iodide	W	Post-digestion spike recovery out of control limits.
		Bromide	W	Post-digestion spike recovery out of control limits.
		Sulfate	W	Post-digestion spike recovery out of control limits.
		Total Dissolved Solids	*	Duplicate analysis not within control limits.
		Iron	E	Result estimated due to matrix interferences.
		Manganese	N	Sample spike (MS/MSD) recovery not within control limits
		Gross alpha	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 4.9. Rad error is 4.9.
		Gross beta		TPU is 10.2. Rad error is 8.74.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.72. Rad error is 0.702.
		Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 2.73. Rad error is 2.69.
		Technetium-99		TPU is 12. Rad error is 11.2.
		Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.684. Rad error is 0.683.
		Tritium	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 103. Rad error is 103.
		Iodide	W	Post-digestion spike recovery out of control limits.

RESIDENTIAL/INERT – QUARTERLY

Finds/Unit: KY8-890-008-982 / 1

Facility: US DOE - Paducah Gaseous Diffusion Plant

LAB ID: None

Permit Numbers: 073-00014 and 073-00015

For Official Use Only

GROUNDWATER WRITTEN COMMENTS

Monitoring Point	Facility Sample ID	Constituent	Flag	Description
8004-4818 MW370	MW370UG2-18	Bromide	W	Post-digestion spike recovery out of control limits.
		Sulfate	W	Post-digestion spike recovery out of control limits.
		Total Dissolved Solids	*	Duplicate analysis not within control limits.
		Iron	E	Result estimated due to matrix interferences.
		Manganese	N	Sample spike (MS/MSD) recovery not within control limits
		Gross alpha	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 5.76. Rad error is 5.75.
		Gross beta		TPU is 15.9. Rad error is 10.4.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226		TPU is 0.953. Rad error is 0.916.
		Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 1.59. Rad error is 1.59.
		Technetium-99		TPU is 14.9. Rad error is 12.5.
		Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 1.9. Rad error is 1.87.
		Tritium	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 103. Rad error is 103.
		Iodide	W	Post-digestion spike recovery out of control limits.
8004-4808 MW372	MW372UG2-18	Total Dissolved Solids	*	Duplicate analysis not within control limits.
		Magnesium	E	Result estimated due to matrix interferences.
		Gross alpha	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 6.01. Rad error is 6.01.
		Gross beta		TPU is 8.18. Rad error is 7.37.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226		TPU is 0.787. Rad error is 0.756.
		Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 3.29. Rad error is 3.29.
		Technetium-99		TPU is 10.2. Rad error is 10.
		Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.937. Rad error is 0.918.
		Tritium	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 106. Rad error is 106.
		Iodide	W	Post-digestion spike recovery out of control limits.

RESIDENTIAL/INERT – QUARTERLY

Finds/Unit: KY8-890-008-982 / 1

Facility: US DOE - Paducah Gaseous Diffusion Plant

LAB ID: None

Permit Numbers: 073-00014 and 073-00015

For Official Use Only

GROUNDWATER WRITTEN COMMENTS

Monitoring Point	Facility Sample ID	Constituent	Flag	Description
8004-4792 MW373	MW373UG2-18	Total Dissolved Solids	*	Duplicate analysis not within control limits.
		Magnesium	E	Result estimated due to matrix interferences.
		Gross alpha	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 7.86. Rad error is 7.72.
		Gross beta		TPU is 7.64. Rad error is 6.99.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.368. Rad error is 0.368.
		Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 2.53. Rad error is 2.52.
		Technetium-99	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 19.1. Rad error is 19.
		Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.634. Rad error is 0.628.
		Tritium	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 121. Rad error is 120.
				Iodide
8004-4809 MW384	MW384SG2-18	Barium	N	Sample spike (MS/MSD) recovery not within control limits
		Mercury	N	Sample spike (MS/MSD) recovery not within control limits
		PCB, Total		Analysis of constituent not required and not performed.
		PCB-1016		Analysis of constituent not required and not performed.
		PCB-1221		Analysis of constituent not required and not performed.
		PCB-1232		Analysis of constituent not required and not performed.
		PCB-1242		Analysis of constituent not required and not performed.
		PCB-1248		Analysis of constituent not required and not performed.
		PCB-1254		Analysis of constituent not required and not performed.
		PCB-1260		Analysis of constituent not required and not performed.
		PCB-1268		Analysis of constituent not required and not performed.
		Gross alpha	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 5.5. Rad error is 5.5.
		Gross beta		TPU is 17.6. Rad error is 12.5.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.725. Rad error is 0.724.
		Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 2.47. Rad error is 2.47.
		Technetium-99		TPU is 22.1. Rad error is 15.9.
Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 1.02. Rad error is 1.		
Tritium	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 131. Rad error is 128.		

RESIDENTIAL/INERT – QUARTERLY

Finds/Unit: KY8-890-008-982 / 1

Facility: US DOE - Paducah Gaseous Diffusion Plant

LAB ID: None

Permit Numbers: 073-00014 and 073-00015

For Official Use Only

GROUNDWATER WRITTEN COMMENTS

Monitoring Point	Facility Sample ID	Constituent	Flag	Description
8004-4810 MW385	MW385SG2-18	Barium	N	Sample spike (MS/MSD) recovery not within control limits
		Mercury	N	Sample spike (MS/MSD) recovery not within control limits
		PCB, Total		Analysis of constituent not required and not performed.
		PCB-1016		Analysis of constituent not required and not performed.
		PCB-1221		Analysis of constituent not required and not performed.
		PCB-1232		Analysis of constituent not required and not performed.
		PCB-1242		Analysis of constituent not required and not performed.
		PCB-1248		Analysis of constituent not required and not performed.
		PCB-1254		Analysis of constituent not required and not performed.
		PCB-1260		Analysis of constituent not required and not performed.
		PCB-1268		Analysis of constituent not required and not performed.
		Gross alpha	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 3.05. Rad error is 3.05.
		Gross beta		TPU is 13.1. Rad error is 10.2.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.503. Rad error is 0.503.
		Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 1.54. Rad error is 1.54.
		Technetium-99		TPU is 17. Rad error is 14.1.
Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 1.07. Rad error is 1.05.		
Tritium	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 115. Rad error is 115.		

RESIDENTIAL/INERT – QUARTERLY

Finds/Unit: KY8-890-008-982 / 1

Facility: US DOE - Paducah Gaseous Diffusion Plant

LAB ID: None

Permit Numbers: 073-00014 and 073-00015

For Official Use Only

GROUNDWATER WRITTEN COMMENTS

Monitoring Point	Facility Sample ID	Constituent	Flag	Description
8004-4804 MW386	MW386SG2-18	Barium	N	Sample spike (MS/MSD) recovery not within control limits
		Mercury	N	Sample spike (MS/MSD) recovery not within control limits
		PCB, Total		Analysis of constituent not required and not performed.
		PCB-1016		Analysis of constituent not required and not performed.
		PCB-1221		Analysis of constituent not required and not performed.
		PCB-1232		Analysis of constituent not required and not performed.
		PCB-1242		Analysis of constituent not required and not performed.
		PCB-1248		Analysis of constituent not required and not performed.
		PCB-1254		Analysis of constituent not required and not performed.
		PCB-1260		Analysis of constituent not required and not performed.
		PCB-1268		Analysis of constituent not required and not performed.
		Gross alpha	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 4.12. Rad error is 4.12.
		Gross beta	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 3.8. Rad error is 3.8.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.45. Rad error is 0.45.
		Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 1.67. Rad error is 1.66.
		Technetium-99	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 10.9. Rad error is 10.9.
		Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.81. Rad error is 0.806.
Tritium	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 120. Rad error is 120.		

RESIDENTIAL/INERT – QUARTERLY

Finds/Unit: KY8-890-008-982 / 1

Facility: US DOE - Paducah Gaseous Diffusion Plant

LAB ID: None

Permit Numbers: 073-00014 and 073-00015

For Official Use Only

GROUNDWATER WRITTEN COMMENTS

Monitoring Point	Facility Sample ID	Constituent	Flag	Description
8004-4815 MW387	MW387SG2-18	PCB, Total		Analysis of constituent not required and not performed.
		PCB-1016		Analysis of constituent not required and not performed.
		PCB-1221		Analysis of constituent not required and not performed.
		PCB-1232		Analysis of constituent not required and not performed.
		PCB-1242		Analysis of constituent not required and not performed.
		PCB-1248		Analysis of constituent not required and not performed.
		PCB-1254		Analysis of constituent not required and not performed.
		PCB-1260		Analysis of constituent not required and not performed.
		PCB-1268		Analysis of constituent not required and not performed.
		Gross alpha	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 5.87. Rad error is 5.84.
		Gross beta		TPU is 37. Rad error is 17.6.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.449. Rad error is 0.446.
		Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 1.68. Rad error is 1.68.
		Technetium-99		TPU is 39. Rad error is 19.2.
		Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 1.22. Rad error is 1.19.
		Tritium	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 118. Rad error is 118.
Iodide	W	Post-digestion spike recovery out of control limits.		
8004-4816 MW388	MW388SG2-18	PCB, Total		Analysis of constituent not required and not performed.
		PCB-1016		Analysis of constituent not required and not performed.
		PCB-1221		Analysis of constituent not required and not performed.
		PCB-1232		Analysis of constituent not required and not performed.
		PCB-1242		Analysis of constituent not required and not performed.
		PCB-1248		Analysis of constituent not required and not performed.
		PCB-1254		Analysis of constituent not required and not performed.
		PCB-1260		Analysis of constituent not required and not performed.
		PCB-1268		Analysis of constituent not required and not performed.
		Gross alpha	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 6.79. Rad error is 6.78.
		Gross beta		TPU is 13.9. Rad error is 10.7.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226		TPU is 0.965. Rad error is 0.879.
		Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 1.62. Rad error is 1.62.
		Technetium-99		TPU is 18. Rad error is 14.5.
		Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.686. Rad error is 0.681.
		Tritium	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 119. Rad error is 119.
Iodide	W	Post-digestion spike recovery out of control limits.		

RESIDENTIAL/INERT – QUARTERLY

Finds/Unit: KY8-890-008-982 / 1

Facility: US DOE - Paducah Gaseous Diffusion Plant

LAB ID: None

Permit Numbers: 073-00014 and 073-00015

For Official Use Only

GROUNDWATER WRITTEN COMMENTS

Monitoring Point	Facility Sample ID	Constituent	Flag	Description
8004-4812 MW389		Bromide		During sampling, the well was dry; therefore, no sample was collected.
		Chloride		During sampling, the well was dry; therefore, no sample was collected.
		Fluoride		During sampling, the well was dry; therefore, no sample was collected.
		Nitrate & Nitrite		During sampling, the well was dry; therefore, no sample was collected.
		Sulfate		During sampling, the well was dry; therefore, no sample was collected.
		Barometric Pressure Reading		During sampling, the well was dry; therefore, no sample was collected.
		Specific Conductance		During sampling, the well was dry; therefore, no sample was collected.
		Static Water Level Elevation		During sampling, the well was dry; therefore, no sample was collected.
		Dissolved Oxygen		During sampling, the well was dry; therefore, no sample was collected.
		Total Dissolved Solids		During sampling, the well was dry; therefore, no sample was collected.
		pH		During sampling, the well was dry; therefore, no sample was collected.
		Eh		During sampling, the well was dry; therefore, no sample was collected.
		Temperature		During sampling, the well was dry; therefore, no sample was collected.
		Aluminum		During sampling, the well was dry; therefore, no sample was collected.
		Antimony		During sampling, the well was dry; therefore, no sample was collected.
		Arsenic		During sampling, the well was dry; therefore, no sample was collected.
		Barium		During sampling, the well was dry; therefore, no sample was collected.
		Beryllium		During sampling, the well was dry; therefore, no sample was collected.
		Boron		During sampling, the well was dry; therefore, no sample was collected.
		Cadmium		During sampling, the well was dry; therefore, no sample was collected.
		Calcium		During sampling, the well was dry; therefore, no sample was collected.
		Chromium		During sampling, the well was dry; therefore, no sample was collected.
		Cobalt		During sampling, the well was dry; therefore, no sample was collected.
		Copper		During sampling, the well was dry; therefore, no sample was collected.
		Iron		During sampling, the well was dry; therefore, no sample was collected.
		Lead		During sampling, the well was dry; therefore, no sample was collected.
		Magnesium		During sampling, the well was dry; therefore, no sample was collected.
		Manganese		During sampling, the well was dry; therefore, no sample was collected.
		Mercury		During sampling, the well was dry; therefore, no sample was collected.

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Finds/Unit: KY8-890-008-982 / 1

Facility: US DOE - Paducah Gaseous Diffusion Plant

LAB ID: None

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GROUNDWATER WRITTEN COMMENTS

Monitoring Point	Facility Sample ID	Constituent	Flag	Description
8004-4812 MW389		Molybdenum		During sampling, the well was dry; therefore, no sample was collected.
		Nickel		During sampling, the well was dry; therefore, no sample was collected.
		Potassium		During sampling, the well was dry; therefore, no sample was collected.
		Rhodium		During sampling, the well was dry; therefore, no sample was collected.
		Selenium		During sampling, the well was dry; therefore, no sample was collected.
		Silver		During sampling, the well was dry; therefore, no sample was collected.
		Sodium		During sampling, the well was dry; therefore, no sample was collected.
		Tantalum		During sampling, the well was dry; therefore, no sample was collected.
		Thallium		During sampling, the well was dry; therefore, no sample was collected.
		Uranium		During sampling, the well was dry; therefore, no sample was collected.
		Vanadium		During sampling, the well was dry; therefore, no sample was collected.
		Zinc		During sampling, the well was dry; therefore, no sample was collected.
		Vinyl acetate		During sampling, the well was dry; therefore, no sample was collected.
		Acetone		During sampling, the well was dry; therefore, no sample was collected.
		Acrolein		During sampling, the well was dry; therefore, no sample was collected.
		Acrylonitrile		During sampling, the well was dry; therefore, no sample was collected.
		Benzene		During sampling, the well was dry; therefore, no sample was collected.
		Chlorobenzene		During sampling, the well was dry; therefore, no sample was collected.
		Xylenes		During sampling, the well was dry; therefore, no sample was collected.
		Styrene		During sampling, the well was dry; therefore, no sample was collected.
		Toluene		During sampling, the well was dry; therefore, no sample was collected.
		Chlorobromomethane		During sampling, the well was dry; therefore, no sample was collected.
		Bromodichloromethane		During sampling, the well was dry; therefore, no sample was collected.
		Tribromomethane		During sampling, the well was dry; therefore, no sample was collected.
		Methyl bromide		During sampling, the well was dry; therefore, no sample was collected.
		Methyl Ethyl Ketone		During sampling, the well was dry; therefore, no sample was collected.
		trans-1,4-Dichloro-2-butene		During sampling, the well was dry; therefore, no sample was collected.
		Carbon disulfide		During sampling, the well was dry; therefore, no sample was collected.
		Chloroethane		During sampling, the well was dry; therefore, no sample was collected.

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LAB ID: None

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GROUNDWATER WRITTEN COMMENTS

Monitoring Point	Facility Sample ID	Constituent	Flag	Description
8004-4812	MW389	Chloroform		During sampling, the well was dry; therefore, no sample was collected.
		Methyl chloride		During sampling, the well was dry; therefore, no sample was collected.
		cis-1,2-Dichloroethene		During sampling, the well was dry; therefore, no sample was collected.
		Methylene bromide		During sampling, the well was dry; therefore, no sample was collected.
		1,1-Dichloroethane		During sampling, the well was dry; therefore, no sample was collected.
		1,2-Dichloroethane		During sampling, the well was dry; therefore, no sample was collected.
		1,1-Dichloroethylene		During sampling, the well was dry; therefore, no sample was collected.
		1,2-Dibromoethane		During sampling, the well was dry; therefore, no sample was collected.
		1,1,2,2-Tetrachloroethane		During sampling, the well was dry; therefore, no sample was collected.
		1,1,1-Trichloroethane		During sampling, the well was dry; therefore, no sample was collected.
		1,1,2-Trichloroethane		During sampling, the well was dry; therefore, no sample was collected.
		1,1,1,2-Tetrachloroethane		During sampling, the well was dry; therefore, no sample was collected.
		Vinyl chloride		During sampling, the well was dry; therefore, no sample was collected.
		Tetrachloroethene		During sampling, the well was dry; therefore, no sample was collected.
		Trichloroethene		During sampling, the well was dry; therefore, no sample was collected.
		Ethylbenzene		During sampling, the well was dry; therefore, no sample was collected.
		2-Hexanone		During sampling, the well was dry; therefore, no sample was collected.
		Iodomethane		During sampling, the well was dry; therefore, no sample was collected.
		Dibromochloromethane		During sampling, the well was dry; therefore, no sample was collected.
		Carbon tetrachloride		During sampling, the well was dry; therefore, no sample was collected.
		Dichloromethane		During sampling, the well was dry; therefore, no sample was collected.
		Methyl Isobutyl Ketone		During sampling, the well was dry; therefore, no sample was collected.
		1,2-Dibromo-3-chloropropane		During sampling, the well was dry; therefore, no sample was collected.
		1,2-Dichloropropane		During sampling, the well was dry; therefore, no sample was collected.
		trans-1,3-Dichloropropene		During sampling, the well was dry; therefore, no sample was collected.
		cis-1,3-Dichloropropene		During sampling, the well was dry; therefore, no sample was collected.
		trans-1,2-Dichloroethene		During sampling, the well was dry; therefore, no sample was collected.
		Trichlorofluoromethane		During sampling, the well was dry; therefore, no sample was collected.
		1,2,3-Trichloropropane		During sampling, the well was dry; therefore, no sample was collected.

RESIDENTIAL/INERT – QUARTERLY

Finds/Unit: KY8-890-008-982 / 1

Facility: US DOE - Paducah Gaseous Diffusion Plant

LAB ID: None

Permit Numbers: 073-00014 and 073-00015

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GROUNDWATER WRITTEN COMMENTS

Monitoring Point	Facility Sample ID	Constituent	Flag	Description
8004-4812 MW389		1,2-Dichlorobenzene		During sampling, the well was dry; therefore, no sample was collected.
		1,4-Dichlorobenzene		During sampling, the well was dry; therefore, no sample was collected.
		PCB, Total		During sampling, the well was dry; therefore, no sample was collected.
		PCB-1016		During sampling, the well was dry; therefore, no sample was collected.
		PCB-1221		During sampling, the well was dry; therefore, no sample was collected.
		PCB-1232		During sampling, the well was dry; therefore, no sample was collected.
		PCB-1242		During sampling, the well was dry; therefore, no sample was collected.
		PCB-1248		During sampling, the well was dry; therefore, no sample was collected.
		PCB-1254		During sampling, the well was dry; therefore, no sample was collected.
		PCB-1260		During sampling, the well was dry; therefore, no sample was collected.
		PCB-1268		During sampling, the well was dry; therefore, no sample was collected.
		Gross alpha		During sampling, the well was dry; therefore, no sample was collected.
		Gross beta		During sampling, the well was dry; therefore, no sample was collected.
		Iodine-131		During sampling, the well was dry; therefore, no sample was collected.
		Radium-226		During sampling, the well was dry; therefore, no sample was collected.
		Strontium-90		During sampling, the well was dry; therefore, no sample was collected.
		Technetium-99		During sampling, the well was dry; therefore, no sample was collected.
		Thorium-230		During sampling, the well was dry; therefore, no sample was collected.
		Tritium		During sampling, the well was dry; therefore, no sample was collected.
		Chemical Oxygen Demand		During sampling, the well was dry; therefore, no sample was collected.
		Cyanide		During sampling, the well was dry; therefore, no sample was collected.
		Iodide		During sampling, the well was dry; therefore, no sample was collected.
		Total Organic Carbon		During sampling, the well was dry; therefore, no sample was collected.
		Total Organic Halides		During sampling, the well was dry; therefore, no sample was collected.

RESIDENTIAL/INERT – QUARTERLY

Finds/Unit: KY8-890-008-982 / 1

Facility: US DOE - Paducah Gaseous Diffusion Plant

LAB ID: None

Permit Numbers: 073-00014 and 073-00015

For Official Use Only

GROUNDWATER WRITTEN COMMENTS

Monitoring Point	Facility Sample ID	Constituent	Flag	Description
8004-4811 MW390	MW390SG2-18	Barium	N	Sample spike (MS/MSD) recovery not within control limits
		Mercury	N	Sample spike (MS/MSD) recovery not within control limits
		PCB, Total		Analysis of constituent not required and not performed.
		PCB-1016		Analysis of constituent not required and not performed.
		PCB-1221		Analysis of constituent not required and not performed.
		PCB-1232		Analysis of constituent not required and not performed.
		PCB-1242		Analysis of constituent not required and not performed.
		PCB-1248		Analysis of constituent not required and not performed.
		PCB-1254		Analysis of constituent not required and not performed.
		PCB-1260		Analysis of constituent not required and not performed.
		PCB-1268		Analysis of constituent not required and not performed.
		Gross alpha	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 4.99. Rad error is 4.99.
		Gross beta		TPU is 14.4. Rad error is 10.9.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.392. Rad error is 0.391.
		Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 1.71. Rad error is 1.71.
		Technetium-99		TPU is 16.1. Rad error is 13.2.
Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.607. Rad error is 0.605.		
Tritium	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 119. Rad error is 117.		

RESIDENTIAL/INERT – QUARTERLY

Finds/Unit: KY8-890-008-982 / 1

Facility: US DOE - Paducah Gaseous Diffusion Plant

LAB ID: None

Permit Numbers: 073-00014 and 073-00015

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GROUNDWATER WRITTEN COMMENTS

Monitoring Point	Facility Sample ID	Constituent	Flag	Description
8004-4805 MW391	MW391SG2-18	Barium	N	Sample spike (MS/MSD) recovery not within control limits
		Mercury	N	Sample spike (MS/MSD) recovery not within control limits
		PCB, Total		Analysis of constituent not required and not performed.
		PCB-1016		Analysis of constituent not required and not performed.
		PCB-1221		Analysis of constituent not required and not performed.
		PCB-1232		Analysis of constituent not required and not performed.
		PCB-1242		Analysis of constituent not required and not performed.
		PCB-1248		Analysis of constituent not required and not performed.
		PCB-1254		Analysis of constituent not required and not performed.
		PCB-1260		Analysis of constituent not required and not performed.
		PCB-1268		Analysis of constituent not required and not performed.
		Gross alpha	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 5.24. Rad error is 5.24.
		Gross beta	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 9.16. Rad error is 8.98.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.435. Rad error is 0.434.
		Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 1.49. Rad error is 1.49.
		Technetium-99	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 10.4. Rad error is 10.3.
		Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.803. Rad error is 0.799.
Tritium	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 127. Rad error is 126.		

RESIDENTIAL/INERT – QUARTERLY

Finds/Unit: KY8-890-008-982 / 1

Facility: US DOE - Paducah Gaseous Diffusion Plant

LAB ID: None

Permit Numbers: 073-00014 and 073-00015

For Official Use Only

GROUNDWATER WRITTEN COMMENTS

Monitoring Point	Facility Sample ID	Constituent	Flag	Description
8004-4806 MW392	MW392SG2-18	Barium	N	Sample spike (MS/MSD) recovery not within control limits
		Mercury	N	Sample spike (MS/MSD) recovery not within control limits
		PCB, Total		Analysis of constituent not required and not performed.
		PCB-1016		Analysis of constituent not required and not performed.
		PCB-1221		Analysis of constituent not required and not performed.
		PCB-1232		Analysis of constituent not required and not performed.
		PCB-1242		Analysis of constituent not required and not performed.
		PCB-1248		Analysis of constituent not required and not performed.
		PCB-1254		Analysis of constituent not required and not performed.
		PCB-1260		Analysis of constituent not required and not performed.
		PCB-1268		Analysis of constituent not required and not performed.
		Gross alpha	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 3.48. Rad error is 3.47.
		Gross beta	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 6.41. Rad error is 6.39.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.52. Rad error is 0.516.
		Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 2.29. Rad error is 2.29.
		Technetium-99	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 10.2. Rad error is 10.2.
		Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.74. Rad error is 0.734.
Tritium	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 121. Rad error is 121.		

RESIDENTIAL/INERT – QUARTERLY

Finds/Unit: KY8-890-008-982 / 1

Facility: US DOE - Paducah Gaseous Diffusion Plant

LAB ID: None

Permit Numbers: 073-00014 and 073-00015

For Official Use Only

GROUNDWATER WRITTEN COMMENTS

Monitoring Point	Facility Sample ID	Constituent	Flag	Description
8004-4807 MW393	MW393SG2-18	Barium	N	Sample spike (MS/MSD) recovery not within control limits
		Mercury	N	Sample spike (MS/MSD) recovery not within control limits
		PCB, Total		Analysis of constituent not required and not performed.
		PCB-1016		Analysis of constituent not required and not performed.
		PCB-1221		Analysis of constituent not required and not performed.
		PCB-1232		Analysis of constituent not required and not performed.
		PCB-1242		Analysis of constituent not required and not performed.
		PCB-1248		Analysis of constituent not required and not performed.
		PCB-1254		Analysis of constituent not required and not performed.
		PCB-1260		Analysis of constituent not required and not performed.
		PCB-1268		Analysis of constituent not required and not performed.
		Gross alpha	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 5.59. Rad error is 5.57.
		Gross beta	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 5.38. Rad error is 5.36.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.545. Rad error is 0.541.
		Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 1.17. Rad error is 1.17.
		Technetium-99	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 10.6. Rad error is 10.6.
		Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.871. Rad error is 0.864.
Tritium	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 114. Rad error is 114.		

RESIDENTIAL/INERT – QUARTERLY

Finds/Unit: KY8-890-008-982 / 1

Facility: US DOE - Paducah Gaseous Diffusion Plant

LAB ID: None

Permit Numbers: 073-00014 and 073-00015

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GROUNDWATER WRITTEN COMMENTS

Monitoring Point	Facility Sample ID	Constituent	Flag	Description
8004-4802 MW394	MW394SG2-18	PCB, Total		Analysis of constituent not required and not performed.
		PCB-1016		Analysis of constituent not required and not performed.
		PCB-1221		Analysis of constituent not required and not performed.
		PCB-1232		Analysis of constituent not required and not performed.
		PCB-1242		Analysis of constituent not required and not performed.
		PCB-1248		Analysis of constituent not required and not performed.
		PCB-1254		Analysis of constituent not required and not performed.
		PCB-1260		Analysis of constituent not required and not performed.
		PCB-1268		Analysis of constituent not required and not performed.
		Gross alpha	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 4.02. Rad error is 4.02.
		Gross beta	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 5.94. Rad error is 5.94.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.494. Rad error is 0.485.
		Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 1.92. Rad error is 1.92.
		Technetium-99	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 11.6. Rad error is 11.6.
		Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.681. Rad error is 0.68.
		Tritium	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 117. Rad error is 117.
Iodide	W	Post-digestion spike recovery out of control limits.		

RESIDENTIAL/INERT – QUARTERLY

Finds/Unit: KY8-890-008-982 / 1

Facility: US DOE - Paducah Gaseous Diffusion Plant

LAB ID: None

Permit Numbers: 073-00014 and 073-00015

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GROUNDWATER WRITTEN COMMENTS

Monitoring Point	Facility Sample ID	Constituent	Flag	Description
8004-4801 MW395	MW395SG2-18	PCB, Total		Analysis of constituent not required and not performed.
		PCB-1016		Analysis of constituent not required and not performed.
		PCB-1221		Analysis of constituent not required and not performed.
		PCB-1232		Analysis of constituent not required and not performed.
		PCB-1242		Analysis of constituent not required and not performed.
		PCB-1248		Analysis of constituent not required and not performed.
		PCB-1254		Analysis of constituent not required and not performed.
		PCB-1260		Analysis of constituent not required and not performed.
		PCB-1268		Analysis of constituent not required and not performed.
		Gross alpha	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 5.35. Rad error is 5.32.
		Gross beta	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 7.91. Rad error is 7.81.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.785. Rad error is 0.742.
		Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 1.5. Rad error is 1.5.
		Technetium-99	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 14. Rad error is 13.9.
		Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.618. Rad error is 0.613.
		Tritium	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 119. Rad error is 119.
Iodide	W	Post-digestion spike recovery out of control limits.		

RESIDENTIAL/INERT – QUARTERLY

Finds/Unit: KY8-890-008-982 / 1

Facility: US DOE - Paducah Gaseous Diffusion Plant

LAB ID: None

Permit Numbers: 073-00014 and 073-00015

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GROUNDWATER WRITTEN COMMENTS

Monitoring Point	Facility Sample ID	Constituent	Flag	Description
8004-4803 MW396	MW396SG2-18	Chloride	W	Post-digestion spike recovery out of control limits.
		PCB, Total		Analysis of constituent not required and not performed.
		PCB-1016		Analysis of constituent not required and not performed.
		PCB-1221		Analysis of constituent not required and not performed.
		PCB-1232		Analysis of constituent not required and not performed.
		PCB-1242		Analysis of constituent not required and not performed.
		PCB-1248		Analysis of constituent not required and not performed.
		PCB-1254		Analysis of constituent not required and not performed.
		PCB-1260		Analysis of constituent not required and not performed.
		PCB-1268		Analysis of constituent not required and not performed.
		Gross alpha	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 4.78. Rad error is 4.77.
		Gross beta	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 7.44. Rad error is 7.39.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226		TPU is 0.758. Rad error is 0.69.
		Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 2.51. Rad error is 2.5.
		Technetium-99	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 10.8. Rad error is 10.8.
		Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.733. Rad error is 0.722.
Tritium	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 119. Rad error is 119.		
Iodide	W	Post-digestion spike recovery out of control limits.		

RESIDENTIAL/INERT – QUARTERLY

Finds/Unit: KY8-890-008-982 / 1

Facility: US DOE - Paducah Gaseous Diffusion Plant

LAB ID: None

Permit Numbers: 073-00014 and 073-00015

For Official Use Only

GROUNDWATER WRITTEN COMMENTS

Monitoring Point	Facility Sample ID	Constituent	Flag	Description
8004-4817 MW397	MW397SG2-18	PCB, Total		Analysis of constituent not required and not performed.
		PCB-1016		Analysis of constituent not required and not performed.
		PCB-1221		Analysis of constituent not required and not performed.
		PCB-1232		Analysis of constituent not required and not performed.
		PCB-1242		Analysis of constituent not required and not performed.
		PCB-1248		Analysis of constituent not required and not performed.
		PCB-1254		Analysis of constituent not required and not performed.
		PCB-1260		Analysis of constituent not required and not performed.
		PCB-1268		Analysis of constituent not required and not performed.
		Gross alpha	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 4.71. Rad error is 4.7.
		Gross beta	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 4.45. Rad error is 4.42.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.629. Rad error is 0.627.
		Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 1.57. Rad error is 1.56.
		Technetium-99	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 12.1. Rad error is 12.
		Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.616. Rad error is 0.616.
		Tritium	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 114. Rad error is 114.
		Iodide	W	Post-digestion spike recovery out of control limits.

RESIDENTIAL/INERT – QUARTERLY

Finds/Unit: KY8-890-008-982 / 1

Facility: US DOE - Paducah Gaseous Diffusion Plant

LAB ID: None

Permit Numbers: 073-00014 and 073-00015

For Official Use Only

GROUNDWATER WRITTEN COMMENTS

Monitoring Point	Facility Sample ID	Constituent	Flag	Description	
0000-0000 QC	RI1SG2-18	Bromide		Analysis of constituent not required and not performed.	
		Chloride		Analysis of constituent not required and not performed.	
		Fluoride		Analysis of constituent not required and not performed.	
		Nitrate & Nitrite		Analysis of constituent not required and not performed.	
		Sulfate		Analysis of constituent not required and not performed.	
		Barometric Pressure Reading		Analysis of constituent not required and not performed.	
		Specific Conductance		Analysis of constituent not required and not performed.	
		Static Water Level Elevation		Analysis of constituent not required and not performed.	
		Dissolved Oxygen		Analysis of constituent not required and not performed.	
		Total Dissolved Solids		Analysis of constituent not required and not performed.	
		pH		Analysis of constituent not required and not performed.	
		Eh		Analysis of constituent not required and not performed.	
		Temperature		Analysis of constituent not required and not performed.	
		Barium		N	Sample spike (MS/MSD) recovery not within control limits
		Mercury		N	Sample spike (MS/MSD) recovery not within control limits
		PCB, Total			Analysis of constituent not required and not performed.
		PCB-1016			Analysis of constituent not required and not performed.
		PCB-1221			Analysis of constituent not required and not performed.
		PCB-1232			Analysis of constituent not required and not performed.
		PCB-1242			Analysis of constituent not required and not performed.
		PCB-1248			Analysis of constituent not required and not performed.
		PCB-1254			Analysis of constituent not required and not performed.
		PCB-1260			Analysis of constituent not required and not performed.
		PCB-1268			Analysis of constituent not required and not performed.
		Gross alpha		U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 2.53. Rad error is 2.53.
		Gross beta		U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 6.87. Rad error is 6.86.
		Iodine-131			Analysis of constituent not required and not performed.
		Radium-226		U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.6. Rad error is 0.589.
		Strontium-90		U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 1.5. Rad error is 1.5.
		Technetium-99		U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 10.6. Rad error is 10.5.
		Thorium-230		U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 1. Rad error is 0.991.
		Tritium		U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 110. Rad error is 110.
		Chemical Oxygen Demand			Analysis of constituent not required and not performed.
Cyanide			Analysis of constituent not required and not performed.		
Total Organic Carbon			Analysis of constituent not required and not performed.		
Total Organic Halides			Analysis of constituent not required and not performed.		

RESIDENTIAL/INERT – QUARTERLY

Finds/Unit: KY8-890-008-982 / 1

Facility: US DOE - Paducah Gaseous Diffusion Plant

LAB ID: None

Permit Numbers: 073-00014 and 073-00015

For Official Use Only

GROUNDWATER WRITTEN COMMENTS

Monitoring Point	Facility Sample ID	Constituent	Flag	Description	
0000-0000 QC	FB1SG2-18	Bromide		Analysis of constituent not required and not performed.	
		Chloride		Analysis of constituent not required and not performed.	
		Fluoride		Analysis of constituent not required and not performed.	
		Nitrate & Nitrite		Analysis of constituent not required and not performed.	
		Sulfate		Analysis of constituent not required and not performed.	
		Barometric Pressure Reading		Analysis of constituent not required and not performed.	
		Specific Conductance		Analysis of constituent not required and not performed.	
		Static Water Level Elevation		Analysis of constituent not required and not performed.	
		Dissolved Oxygen		Analysis of constituent not required and not performed.	
		Total Dissolved Solids		Analysis of constituent not required and not performed.	
		pH		Analysis of constituent not required and not performed.	
		Eh		Analysis of constituent not required and not performed.	
		Temperature		Analysis of constituent not required and not performed.	
		Barium		N	Sample spike (MS/MSD) recovery not within control limits
		Mercury		N	Sample spike (MS/MSD) recovery not within control limits
		PCB, Total			Analysis of constituent not required and not performed.
		PCB-1016			Analysis of constituent not required and not performed.
		PCB-1221			Analysis of constituent not required and not performed.
		PCB-1232			Analysis of constituent not required and not performed.
		PCB-1242			Analysis of constituent not required and not performed.
		PCB-1248			Analysis of constituent not required and not performed.
		PCB-1254			Analysis of constituent not required and not performed.
		PCB-1260			Analysis of constituent not required and not performed.
		PCB-1268			Analysis of constituent not required and not performed.
		Gross alpha		U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 2.54. Rad error is 2.54.
		Gross beta		U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 4.51. Rad error is 4.51.
		Iodine-131			Analysis of constituent not required and not performed.
		Radium-226		U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.55. Rad error is 0.549.
		Strontium-90		U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 2.4. Rad error is 2.4.
		Technetium-99		U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 9.43. Rad error is 9.42.
		Thorium-230		U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.801. Rad error is 0.8.
		Tritium		U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 115. Rad error is 115.
		Chemical Oxygen Demand			Analysis of constituent not required and not performed.
Cyanide			Analysis of constituent not required and not performed.		
Total Organic Carbon			Analysis of constituent not required and not performed.		
Total Organic Halides			Analysis of constituent not required and not performed.		

RESIDENTIAL/INERT – QUARTERLY

Finds/Unit: KY8-890-008-982 / 1

Facility: US DOE - Paducah Gaseous Diffusion Plant

LAB ID: None

Permit Numbers: 073-00014 and 073-00015

For Official Use Only

GROUNDWATER WRITTEN COMMENTS

Monitoring Point	Facility Sample ID	Constituent	Flag	Description
0000-0000 QC	TB1SG2-18	Bromide		Analysis of constituent not required and not performed.
		Chloride		Analysis of constituent not required and not performed.
		Fluoride		Analysis of constituent not required and not performed.
		Nitrate & Nitrite		Analysis of constituent not required and not performed.
		Sulfate		Analysis of constituent not required and not performed.
		Barometric Pressure Reading		Analysis of constituent not required and not performed.
		Specific Conductance		Analysis of constituent not required and not performed.
		Static Water Level Elevation		Analysis of constituent not required and not performed.
		Dissolved Oxygen		Analysis of constituent not required and not performed.
		Total Dissolved Solids		Analysis of constituent not required and not performed.
		pH		Analysis of constituent not required and not performed.
		Eh		Analysis of constituent not required and not performed.
		Temperature		Analysis of constituent not required and not performed.
		Aluminum		Analysis of constituent not required and not performed.
		Antimony		Analysis of constituent not required and not performed.
		Arsenic		Analysis of constituent not required and not performed.
		Barium		Analysis of constituent not required and not performed.
		Beryllium		Analysis of constituent not required and not performed.
		Boron		Analysis of constituent not required and not performed.
		Cadmium		Analysis of constituent not required and not performed.
		Calcium		Analysis of constituent not required and not performed.
		Chromium		Analysis of constituent not required and not performed.
		Cobalt		Analysis of constituent not required and not performed.
		Copper		Analysis of constituent not required and not performed.
		Iron		Analysis of constituent not required and not performed.
		Lead		Analysis of constituent not required and not performed.
		Magnesium		Analysis of constituent not required and not performed.
		Manganese		Analysis of constituent not required and not performed.
		Mercury		Analysis of constituent not required and not performed.
		Molybdenum		Analysis of constituent not required and not performed.
		Nickel		Analysis of constituent not required and not performed.
		Potassium		Analysis of constituent not required and not performed.
		Rhodium		Analysis of constituent not required and not performed.
		Selenium		Analysis of constituent not required and not performed.
		Silver		Analysis of constituent not required and not performed.
		Sodium		Analysis of constituent not required and not performed.
		Tantalum		Analysis of constituent not required and not performed.
		Thallium		Analysis of constituent not required and not performed.
		Uranium		Analysis of constituent not required and not performed.

RESIDENTIAL/INERT – QUARTERLY

Finds/Unit: KY8-890-008-982 / 1

Facility: US DOE - Paducah Gaseous Diffusion Plant

LAB ID: None

Permit Numbers: 073-00014 and 073-00015

For Official Use Only

GROUNDWATER WRITTEN COMMENTS

Monitoring Point	Facility Sample ID	Constituent	Flag	Description
0000-0000 QC	TB1SG2-18	Vanadium		Analysis of constituent not required and not performed.
		Zinc		Analysis of constituent not required and not performed.
		PCB, Total		Analysis of constituent not required and not performed.
		PCB-1016		Analysis of constituent not required and not performed.
		PCB-1221		Analysis of constituent not required and not performed.
		PCB-1232		Analysis of constituent not required and not performed.
		PCB-1242		Analysis of constituent not required and not performed.
		PCB-1248		Analysis of constituent not required and not performed.
		PCB-1254		Analysis of constituent not required and not performed.
		PCB-1260		Analysis of constituent not required and not performed.
		PCB-1268		Analysis of constituent not required and not performed.
		Gross alpha		Analysis of constituent not required and not performed.
		Gross beta		Analysis of constituent not required and not performed.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226		Analysis of constituent not required and not performed.
		Strontium-90		Analysis of constituent not required and not performed.
		Technetium-99		Analysis of constituent not required and not performed.
		Thorium-230		Analysis of constituent not required and not performed.
		Tritium		Analysis of constituent not required and not performed.
		Chemical Oxygen Demand		Analysis of constituent not required and not performed.
		Cyanide		Analysis of constituent not required and not performed.
		Iodide		Analysis of constituent not required and not performed.
		Total Organic Carbon		Analysis of constituent not required and not performed.
		Total Organic Halides		Analysis of constituent not required and not performed.

RESIDENTIAL/INERT – QUARTERLY

Finds/Unit: KY8-890-008-982 / 1

Facility: US DOE - Paducah Gaseous Diffusion Plant

LAB ID: None

Permit Numbers: 073-00014 and 073-00015

For Official Use Only

GROUNDWATER WRITTEN COMMENTS

Monitoring Point	Facility Sample ID	Constituent	Flag	Description
0000-0000 QC	TB2SG2-18	Bromide		Analysis of constituent not required and not performed.
		Chloride		Analysis of constituent not required and not performed.
		Fluoride		Analysis of constituent not required and not performed.
		Nitrate & Nitrite		Analysis of constituent not required and not performed.
		Sulfate		Analysis of constituent not required and not performed.
		Barometric Pressure Reading		Analysis of constituent not required and not performed.
		Specific Conductance		Analysis of constituent not required and not performed.
		Static Water Level Elevation		Analysis of constituent not required and not performed.
		Dissolved Oxygen		Analysis of constituent not required and not performed.
		Total Dissolved Solids		Analysis of constituent not required and not performed.
		pH		Analysis of constituent not required and not performed.
		Eh		Analysis of constituent not required and not performed.
		Temperature		Analysis of constituent not required and not performed.
		Aluminum		Analysis of constituent not required and not performed.
		Antimony		Analysis of constituent not required and not performed.
		Arsenic		Analysis of constituent not required and not performed.
		Barium		Analysis of constituent not required and not performed.
		Beryllium		Analysis of constituent not required and not performed.
		Boron		Analysis of constituent not required and not performed.
		Cadmium		Analysis of constituent not required and not performed.
		Calcium		Analysis of constituent not required and not performed.
		Chromium		Analysis of constituent not required and not performed.
		Cobalt		Analysis of constituent not required and not performed.
		Copper		Analysis of constituent not required and not performed.
		Iron		Analysis of constituent not required and not performed.
		Lead		Analysis of constituent not required and not performed.
		Magnesium		Analysis of constituent not required and not performed.
		Manganese		Analysis of constituent not required and not performed.
		Mercury		Analysis of constituent not required and not performed.
		Molybdenum		Analysis of constituent not required and not performed.
		Nickel		Analysis of constituent not required and not performed.
		Potassium		Analysis of constituent not required and not performed.
		Rhodium		Analysis of constituent not required and not performed.
		Selenium		Analysis of constituent not required and not performed.
		Silver		Analysis of constituent not required and not performed.
		Sodium		Analysis of constituent not required and not performed.
		Tantalum		Analysis of constituent not required and not performed.
		Thallium		Analysis of constituent not required and not performed.
		Uranium		Analysis of constituent not required and not performed.

RESIDENTIAL/INERT – QUARTERLY

Finds/Unit: KY8-890-008-982 / 1

Facility: US DOE - Paducah Gaseous Diffusion Plant

LAB ID: None

Permit Numbers: 073-00014 and 073-00015

For Official Use Only

GROUNDWATER WRITTEN COMMENTS

Monitoring Point	Facility Sample ID	Constituent	Flag	Description
0000-0000 QC	TB2SG2-18	Vanadium		Analysis of constituent not required and not performed.
		Zinc		Analysis of constituent not required and not performed.
		PCB, Total		Analysis of constituent not required and not performed.
		PCB-1016		Analysis of constituent not required and not performed.
		PCB-1221		Analysis of constituent not required and not performed.
		PCB-1232		Analysis of constituent not required and not performed.
		PCB-1242		Analysis of constituent not required and not performed.
		PCB-1248		Analysis of constituent not required and not performed.
		PCB-1254		Analysis of constituent not required and not performed.
		PCB-1260		Analysis of constituent not required and not performed.
		PCB-1268		Analysis of constituent not required and not performed.
		Gross alpha		Analysis of constituent not required and not performed.
		Gross beta		Analysis of constituent not required and not performed.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226		Analysis of constituent not required and not performed.
		Strontium-90		Analysis of constituent not required and not performed.
		Technetium-99		Analysis of constituent not required and not performed.
		Thorium-230		Analysis of constituent not required and not performed.
		Tritium		Analysis of constituent not required and not performed.
		Chemical Oxygen Demand		Analysis of constituent not required and not performed.
		Cyanide		Analysis of constituent not required and not performed.
		Iodide		Analysis of constituent not required and not performed.
		Total Organic Carbon		Analysis of constituent not required and not performed.
		Total Organic Halides		Analysis of constituent not required and not performed.

RESIDENTIAL/INERT – QUARTERLY

Finds/Unit: KY8-890-008-982 / 1

Facility: US DOE - Paducah Gaseous Diffusion Plant

LAB ID: None

Permit Numbers: 073-00014 and 073-00015

For Official Use Only

GROUNDWATER WRITTEN COMMENTS

Monitoring Point	Facility Sample ID	Constituent	Flag	Description
0000-0000 QC	TB3SG2-18	Bromide		Analysis of constituent not required and not performed.
		Chloride		Analysis of constituent not required and not performed.
		Fluoride		Analysis of constituent not required and not performed.
		Nitrate & Nitrite		Analysis of constituent not required and not performed.
		Sulfate		Analysis of constituent not required and not performed.
		Barometric Pressure Reading		Analysis of constituent not required and not performed.
		Specific Conductance		Analysis of constituent not required and not performed.
		Static Water Level Elevation		Analysis of constituent not required and not performed.
		Dissolved Oxygen		Analysis of constituent not required and not performed.
		Total Dissolved Solids		Analysis of constituent not required and not performed.
		pH		Analysis of constituent not required and not performed.
		Eh		Analysis of constituent not required and not performed.
		Temperature		Analysis of constituent not required and not performed.
		Aluminum		Analysis of constituent not required and not performed.
		Antimony		Analysis of constituent not required and not performed.
		Arsenic		Analysis of constituent not required and not performed.
		Barium		Analysis of constituent not required and not performed.
		Beryllium		Analysis of constituent not required and not performed.
		Boron		Analysis of constituent not required and not performed.
		Cadmium		Analysis of constituent not required and not performed.
		Calcium		Analysis of constituent not required and not performed.
		Chromium		Analysis of constituent not required and not performed.
		Cobalt		Analysis of constituent not required and not performed.
		Copper		Analysis of constituent not required and not performed.
		Iron		Analysis of constituent not required and not performed.
		Lead		Analysis of constituent not required and not performed.
		Magnesium		Analysis of constituent not required and not performed.
		Manganese		Analysis of constituent not required and not performed.
		Mercury		Analysis of constituent not required and not performed.
		Molybdenum		Analysis of constituent not required and not performed.
		Nickel		Analysis of constituent not required and not performed.
		Potassium		Analysis of constituent not required and not performed.
		Rhodium		Analysis of constituent not required and not performed.
		Selenium		Analysis of constituent not required and not performed.
		Silver		Analysis of constituent not required and not performed.
		Sodium		Analysis of constituent not required and not performed.
		Tantalum		Analysis of constituent not required and not performed.
		Thallium		Analysis of constituent not required and not performed.
		Uranium		Analysis of constituent not required and not performed.

RESIDENTIAL/INERT – QUARTERLY

Finds/Unit: KY8-890-008-982 / 1

Facility: US DOE - Paducah Gaseous Diffusion Plant

LAB ID: None

Permit Numbers: 073-00014 and 073-00015

For Official Use Only

GROUNDWATER WRITTEN COMMENTS

Monitoring Point	Facility Sample ID	Constituent	Flag	Description
0000-0000 QC	TB3SG2-18	Vanadium		Analysis of constituent not required and not performed.
		Zinc		Analysis of constituent not required and not performed.
		PCB, Total		Analysis of constituent not required and not performed.
		PCB-1016		Analysis of constituent not required and not performed.
		PCB-1221		Analysis of constituent not required and not performed.
		PCB-1232		Analysis of constituent not required and not performed.
		PCB-1242		Analysis of constituent not required and not performed.
		PCB-1248		Analysis of constituent not required and not performed.
		PCB-1254		Analysis of constituent not required and not performed.
		PCB-1260		Analysis of constituent not required and not performed.
		PCB-1268		Analysis of constituent not required and not performed.
		Gross alpha		Analysis of constituent not required and not performed.
		Gross beta		Analysis of constituent not required and not performed.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226		Analysis of constituent not required and not performed.
		Strontium-90		Analysis of constituent not required and not performed.
		Technetium-99		Analysis of constituent not required and not performed.
		Thorium-230		Analysis of constituent not required and not performed.
		Tritium		Analysis of constituent not required and not performed.
		Chemical Oxygen Demand		Analysis of constituent not required and not performed.
		Cyanide		Analysis of constituent not required and not performed.
		Iodide		Analysis of constituent not required and not performed.
		Total Organic Carbon		Analysis of constituent not required and not performed.
		Total Organic Halides		Analysis of constituent not required and not performed.

RESIDENTIAL/INERT – QUARTERLY

Finds/Unit: KY8-890-008-982 / 1

Facility: US DOE - Paducah Gaseous Diffusion Plant

LAB ID: None

Permit Numbers: 073-00014 and 073-00015

For Official Use Only

GROUNDWATER WRITTEN COMMENTS

Monitoring Point	Facility Sample ID	Constituent	Flag	Description
0000-0000 QC	TB4SG2-18	Bromide		Analysis of constituent not required and not performed.
		Chloride		Analysis of constituent not required and not performed.
		Fluoride		Analysis of constituent not required and not performed.
		Nitrate & Nitrite		Analysis of constituent not required and not performed.
		Sulfate		Analysis of constituent not required and not performed.
		Barometric Pressure Reading		Analysis of constituent not required and not performed.
		Specific Conductance		Analysis of constituent not required and not performed.
		Static Water Level Elevation		Analysis of constituent not required and not performed.
		Dissolved Oxygen		Analysis of constituent not required and not performed.
		Total Dissolved Solids		Analysis of constituent not required and not performed.
		pH		Analysis of constituent not required and not performed.
		Eh		Analysis of constituent not required and not performed.
		Temperature		Analysis of constituent not required and not performed.
		Aluminum		Analysis of constituent not required and not performed.
		Antimony		Analysis of constituent not required and not performed.
		Arsenic		Analysis of constituent not required and not performed.
		Barium		Analysis of constituent not required and not performed.
		Beryllium		Analysis of constituent not required and not performed.
		Boron		Analysis of constituent not required and not performed.
		Cadmium		Analysis of constituent not required and not performed.
		Calcium		Analysis of constituent not required and not performed.
		Chromium		Analysis of constituent not required and not performed.
		Cobalt		Analysis of constituent not required and not performed.
		Copper		Analysis of constituent not required and not performed.
		Iron		Analysis of constituent not required and not performed.
		Lead		Analysis of constituent not required and not performed.
		Magnesium		Analysis of constituent not required and not performed.
		Manganese		Analysis of constituent not required and not performed.
		Mercury		Analysis of constituent not required and not performed.
		Molybdenum		Analysis of constituent not required and not performed.
		Nickel		Analysis of constituent not required and not performed.
		Potassium		Analysis of constituent not required and not performed.
		Rhodium		Analysis of constituent not required and not performed.
		Selenium		Analysis of constituent not required and not performed.
		Silver		Analysis of constituent not required and not performed.
		Sodium		Analysis of constituent not required and not performed.
		Tantalum		Analysis of constituent not required and not performed.
		Thallium		Analysis of constituent not required and not performed.
		Uranium		Analysis of constituent not required and not performed.

RESIDENTIAL/INERT – QUARTERLY

Finds/Unit: KY8-890-008-982 / 1

Facility: US DOE - Paducah Gaseous Diffusion Plant

LAB ID: None

Permit Numbers: 073-00014 and 073-00015

For Official Use Only

GROUNDWATER WRITTEN COMMENTS

Monitoring Point	Facility Sample ID	Constituent	Flag	Description
0000-0000 QC	TB4SG2-18	Vanadium		Analysis of constituent not required and not performed.
		Zinc		Analysis of constituent not required and not performed.
		PCB, Total		Analysis of constituent not required and not performed.
		PCB-1016		Analysis of constituent not required and not performed.
		PCB-1221		Analysis of constituent not required and not performed.
		PCB-1232		Analysis of constituent not required and not performed.
		PCB-1242		Analysis of constituent not required and not performed.
		PCB-1248		Analysis of constituent not required and not performed.
		PCB-1254		Analysis of constituent not required and not performed.
		PCB-1260		Analysis of constituent not required and not performed.
		PCB-1268		Analysis of constituent not required and not performed.
		Gross alpha		Analysis of constituent not required and not performed.
		Gross beta		Analysis of constituent not required and not performed.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226		Analysis of constituent not required and not performed.
		Strontium-90		Analysis of constituent not required and not performed.
		Technetium-99		Analysis of constituent not required and not performed.
		Thorium-230		Analysis of constituent not required and not performed.
		Tritium		Analysis of constituent not required and not performed.
		Chemical Oxygen Demand		Analysis of constituent not required and not performed.
Cyanide		Analysis of constituent not required and not performed.		
Iodide		Analysis of constituent not required and not performed.		
Total Organic Carbon		Analysis of constituent not required and not performed.		
Total Organic Halides		Analysis of constituent not required and not performed.		
8004-4792 MW373	MW373DUG2-18	Total Dissolved Solids	*	Duplicate analysis not within control limits.
		Magnesium	E	Result estimated due to matrix interferences.
		Gross alpha	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 8.05. Rad error is 7.98.
		Gross beta		TPU is 8.3. Rad error is 7.34.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.404. Rad error is 0.404.
		Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 2.03. Rad error is 2.03.
		Technetium-99	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 19.5. Rad error is 19.3.
		Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.547. Rad error is 0.546.
		Tritium	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 119. Rad error is 119.
Iodide	W	Post-digestion spike recovery out of control limits.		

RESIDENTIAL/INERT – QUARTERLY

Finds/Unit: KY8-890-008-982 / 1

Facility: US DOE - Paducah Gaseous Diffusion Plant

LAB ID: None

Permit Numbers: 073-00014 and 073-00015

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GROUNDWATER WRITTEN COMMENTS

Monitoring Point	Facility Sample ID	Constituent	Flag	Description
8004-4809 MW384	MW384DSG2-18	Barium	N	Sample spike (MS/MSD) recovery not within control limits
		Mercury	N	Sample spike (MS/MSD) recovery not within control limits
		PCB, Total		Analysis of constituent not required and not performed.
		PCB-1016		Analysis of constituent not required and not performed.
		PCB-1221		Analysis of constituent not required and not performed.
		PCB-1232		Analysis of constituent not required and not performed.
		PCB-1242		Analysis of constituent not required and not performed.
		PCB-1248		Analysis of constituent not required and not performed.
		PCB-1254		Analysis of constituent not required and not performed.
		PCB-1260		Analysis of constituent not required and not performed.
		PCB-1268		Analysis of constituent not required and not performed.
		Gross alpha	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 3.72. Rad error is 3.72.
		Gross beta		TPU is 18.9. Rad error is 12.1.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.495. Rad error is 0.495.
		Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 1.7. Rad error is 1.69.
		Technetium-99		TPU is 20.6. Rad error is 14.3.
Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.791. Rad error is 0.786.		
Tritium	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 124. Rad error is 124.		

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APPENDIX D
STATISTICAL ANALYSES AND
QUALIFICATION STATEMENT

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GROUNDWATER STATISTICAL COMMENTS

Introduction

The statistical analyses conducted on the first quarter 2018 groundwater data collected from the C-746-S&T Landfills monitoring wells (MWs) were performed in accordance with Permit GSTR0001, 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 first quarter 2018 data used to conduct the statistical analyses were collected in January 2018. The statistical analyses for this report first used data from the first 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 was run on analytes that had at least one downgradient well that exceeded the historical background, using the last eight quarters. 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.

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. The tolerance interval statistical analysis is conducted separately for each parameter in each well (no pooling of downgradient data).

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**

Station	Type	Groundwater Unit
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 ¹	SG	UCRS
MW387	TW	URGA
MW388	TW	LRGA
MW389 ^{1*}	TW	UCRS
MW390 ¹	TW	UCRS
MW391	TW	URGA
MW392	TW	LRGA
MW393 ¹	TW	UCRS
MW394	BG	URGA
MW395	BG	LRGA
MW396 ¹	BG	UCRS
MW397	BG	LRGA

¹**NOTE:** 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.

BG: upgradient or background wells

TW: downgradient or test wells

SG: sidegradient wells

*Well was dry this quarter and a groundwater sample could not be collected.

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 current 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 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.¹

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, then there is statistically significant evidence that the well concentration exceeds the historical background.

Type of Data Used

Exhibit D.1 presents the upgradient or background wells (identified as “BG”), the downgradient 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, first quarter 2018. 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, 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.

¹ For pH, two-sided TLs (upper and lower) were calculated with an adjusted K factor using the following equations:

$$\begin{aligned} \text{upper TL} &= X + (K \times S) \\ \text{lower TL} &= X - (K \times S) \end{aligned}$$

Exhibit D.2. List of Parameters Tested Using the One-Sided Upper Tolerance Level Test with Historical Background

Parameters
Aluminum
Beta Activity
Boron
Bromide
Calcium
Chemical Oxygen Demand (COD)
Chloride
<i>cis</i> -1,2-Dichloroethene
Cobalt
Conductivity
Copper
Dissolved Oxygen
Dissolved Solids
Iodide
Iron
Magnesium
Manganese
Molybdenum
Nickel
Oxidation-Reduction Potential
pH*
Potassium
Radium-226
Sodium
Sulfate
Technetium-99
Total Organic Carbon (TOC)
Total Organic Halides (TOX)
Trichloroethene
Vanadium
Zinc

*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

Parameters	Observations	Censored Observation	Uncensored Observation	Statistical Analysis?
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
Aluminum	4	2	2	Yes
Antimony	4	4	0	No
Beryllium	4	4	0	No
Beta activity	4	3	1	Yes
Boron	4	1	3	Yes
Bromide	4	0	4	Yes
Bromochloromethane	4	4	0	No
Bromodichloromethane	4	4	0	No
Bromoform	4	4	0	No
Bromomethane	4	4	0	No
Calcium	4	0	4	Yes
Carbon disulfide	4	4	0	No
Chemical Oxygen Demand (COD)	4	0	4	Yes
Chloride	4	0	4	Yes
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
Cobalt	4	1	3	Yes
Conductivity	4	0	4	Yes
Copper	4	0	4	Yes
Cyanide	4	4	0	No
Dibromochloromethane	4	4	0	No
Dibromomethane	4	4	0	No
Dimethylbenzene, Total	4	4	0	No
Dissolved Oxygen	4	0	4	Yes
Dissolved Solids	4	0	4	Yes
Ethylbenzene	4	4	0	No

Exhibit D.3. Summary of Censored and Uncensored Data—UCRS (Continued)

Parameters	Observations	Censored Observation	Uncensored Observation	Statistical Analysis?
Iodide	4	2	2	Yes
Iodomethane	4	4	0	No
Iron	4	0	4	Yes
Magnesium	4	0	4	Yes
Manganese	4	0	4	Yes
Methylene chloride	4	4	0	No
Molybdenum	4	1	3	Yes
Nickel	4	1	3	Yes
Oxidation-Reduction Potential	4	0	4	Yes
pH	4	0	4	Yes
Potassium	4	0	4	Yes
Radium-226	4	3	1	Yes
Rhodium	4	4	0	No
Sodium	4	0	4	Yes
Styrene	4	4	0	No
Sulfate	4	0	4	Yes
Tantalum	4	4	0	No
Technetium-99	4	3	1	Yes
Tetrachloroethene	4	4	0	No
Thallium	4	4	0	No
Thorium-230	4	4	0	No
Toluene	4	4	0	No
Total Organic Carbon (TOC)	4	0	4	Yes
Total Organic Halides (TOX)	4	0	4	Yes
<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
Vanadium	4	3	1	Yes
Vinyl Acetate	4	4	0	No
Zinc	4	3	1	Yes

Bold denotes parameters with at least one uncensored observation.

Exhibit D.4. Summary of Censored and Uncensored Data—URGA

Parameters	Observations	Censored Observation	Uncensored Observation	Statistical Analysis?
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
Aluminum	11	2	9	Yes
Antimony	11	11	0	No
Beryllium	11	11	0	No
Beta activity	11	5	6	Yes
Boron	11	0	11	Yes
Bromide	11	0	11	Yes
Bromochloromethane	11	11	0	No
Bromodichloromethane	11	11	0	No
Bromoform	11	11	0	No
Bromomethane	11	11	0	No
Calcium	11	0	11	Yes
Carbon disulfide	11	11	0	No
Chemical Oxygen Demand (COD)	11	0	11	Yes
Chloride	11	0	11	Yes
Chlorobenzene	11	11	0	No
Chloroethane	11	11	0	No
Chloroform	11	11	0	No
Chloromethane	11	11	0	No
cis-1,2-Dichloroethene	11	10	1	Yes
cis-1,3-Dichloropropene	11	11	0	No
Cobalt	11	4	7	Yes
Conductivity	11	0	11	Yes
Copper	11	0	11	Yes
Cyanide	11	11	0	No
Dibromochloromethane	11	11	0	No
Dibromomethane	11	11	0	No
Dimethylbenzene, Total	11	11	0	No
Dissolved Oxygen	11	0	11	Yes
Dissolved Solids	11	0	11	Yes
Ethylbenzene	11	11	0	No

Exhibit D.4. Summary of Censored and Uncensored Data—URGA (Continued)

Parameters	Observations	Censored Observation	Uncensored Observation	Statistical Analysis?
Iodide	11	11	0	No
Iodomethane	11	11	0	No
Iron	11	0	11	Yes
Magnesium	11	0	11	Yes
Manganese	11	0	11	Yes
Methylene chloride	11	11	0	No
Molybdenum	11	4	7	Yes
Nickel	11	0	11	Yes
Oxidation-Reduction Potential	11	0	11	Yes
pH	11	0	11	Yes
Potassium	11	0	11	Yes
Radium-226	11	10	1	Yes
Rhodium	11	11	0	No
Sodium	11	0	11	Yes
Styrene	11	11	0	No
Sulfate	11	0	11	Yes
Tantalum	11	11	0	No
Technetium-99	11	6	5	Yes
Tetrachloroethene	11	11	0	No
Thallium	11	11	0	No
Thorium-230	11	11	0	No
Toluene	11	11	0	No
Total Organic Carbon (TOC)	11	0	11	Yes
Total Organic Halides (TOX)	11	2	9	Yes
<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
Trichloroethene	11	4	7	Yes
Trichlorofluoromethane	11	11	0	No
Vanadium	11	9	2	Yes
Vinyl Acetate	11	11	0	No
Zinc	11	9	2	Yes

Bold denotes parameters with at least one uncensored observation.

Exhibit D.5. Summary of Censored and Uncensored Data—LRGA

Parameters	Observations	Censored Observation	Uncensored Observation	Statistical Analysis?
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
Aluminum	7	2	5	Yes
Antimony	7	7	0	No
Beryllium	7	7	0	No
Beta activity	7	3	4	Yes
Boron	7	0	7	Yes
Bromide	7	0	7	Yes
Bromochloromethane	7	7	0	No
Bromodichloromethane	7	7	0	No
Bromoform	7	7	0	No
Bromomethane	7	7	0	No
Calcium	7	0	7	Yes
Carbon disulfide	7	7	0	No
Chemical Oxygen Demand (COD)	7	1	6	Yes
Chloride	7	0	7	Yes
Chlorobenzene	7	7	0	No
Chloroethane	7	7	0	No
Chloroform	7	7	0	No
Chloromethane	7	7	0	No
cis-1,2-Dichloroethene	7	6	1	Yes
cis-1,3-Dichloropropene	7	7	0	No
Cobalt	7	5	2	Yes
Conductivity	7	0	7	Yes
Copper	7	0	7	Yes
Cyanide	7	7	0	No
Dibromochloromethane	7	7	0	No
Dibromomethane	7	7	0	No
Dimethylbenzene, Total	7	7	0	No
Dissolved Oxygen	7	0	7	Yes
Dissolved Solids	7	0	7	Yes
Ethylbenzene	7	7	0	No
Iodide	7	7	0	No
Iodomethane	7	7	0	No
Iron	7	1	6	Yes

Exhibit D.5. Summary of Censored and Uncensored Data—LRGA (Continued)

Parameters	Observations	Censored Observation	Uncensored Observation	Statistical Analysis?
Magnesium	7	0	7	Yes
Manganese	7	1	6	Yes
Methylene chloride	7	7	0	No
Molybdenum	7	3	4	Yes
Nickel	7	0	7	Yes
Oxidation-Reduction Potential	7	0	7	Yes
pH	7	0	7	Yes
Potassium	7	0	7	Yes
Radium-226	7	5	2	Yes
Rhodium	7	7	0	No
Sodium	7	0	7	Yes
Styrene	7	7	0	No
Sulfate	7	0	7	Yes
Tantalum	7	7	0	No
Technetium-99	7	4	3	Yes
Tetrachloroethene	7	7	0	No
Thallium	7	7	0	No
Thorium-230	7	7	0	No
Toluene	7	7	0	No
Total Organic Carbon (TOC)	7	0	7	Yes
Total Organic Halides (TOX)	7	1	6	Yes
<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
Trichloroethene	7	1	6	Yes
Trichlorofluoromethane	7	7	0	No
Vanadium	7	7	0	No
Vinyl Acetate	7	7	0	No
Zinc	7	6	1	Yes

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 upper tolerance interval tests that were calculated using historical background and presented in Attachment D1. The statistician qualification statement is presented in Attachment D3. For the UCRS, URGA, and LRGA, the test was applied to 29, 30, and 29 parameters, respectively, including those listed in bold print in Exhibits D.3, D.4, and D.5, which includes those constituents (beta activity and trichloroethene) that exceeded their MCL. A summary of exceedances when compared to statistically derived historical upgradient background by well number is shown in Exhibit D.6.

UCRS

This quarter's results identified exceedances of historical background UTL for beta activity, oxidation-reduction potential, and technetium-99.

URGA

This quarter's results identified exceedances of historical background UTL for aluminum, beta activity, calcium, dissolved solids, magnesium, oxidation-reduction potential, radium-226, sulfate, and technetium-99.

LRGA

This quarter's results identified exceedances of historical background UTL for beta activity, calcium, conductivity, dissolved solids, magnesium, oxidation-reduction potential, radium-226, 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

UCRS	URGA	LRGA
MW386: Oxidation-reduction potential	MW221: Oxidation-reduction potential	MW370: Beta activity, oxidation-reduction potential, radium-226, sulfate, technetium-99
MW390: Beta activity, oxidation-reduction potential, technetium-99	MW222: Aluminum	MW373: Calcium, conductivity, dissolved solids, magnesium, oxidation-reduction potential, sulfate
MW393: Oxidation-reduction potential	MW369: Technetium-99	MW385: Beta activity, sulfate, technetium-99
MW396: Oxidation-reduction potential	MW372: Calcium, dissolved solids, magnesium, radium-226, sulfate	MW388: Beta activity, oxidation-reduction potential, radium-226, sulfate, technetium-99
	MW384: Beta activity, sulfate, technetium-99	MW392: Oxidation-reduction potential
	MW387: Beta activity, magnesium, sulfate, technetium-99	MW397: Oxidation-reduction potential
	MW391: Sulfate	

Exhibit D.7. Test Summaries for Qualified Parameters for Historical Background—UCRS

Parameter	Performed Test	CV Normality Test*	Results of Tolerance Interval Test Conducted
Aluminum	Tolerance Interval	0.57	No exceedance of statistically derived historical background concentration.
Beta Activity ¹	Tolerance Interval	1.17	Current results exceed statistically derived historical background concentration in MW390.
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.
Chemical Oxygen Demand (COD)	Tolerance Interval	0.02	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.
Iodide	Tolerance Interval	0.13	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.

Exhibit D.7. Test Summaries for Qualified Parameters for Historical Background—UCRS (Continued)

Parameter	Performed Test	CV Normality Test*	Results of Tolerance Interval Test Conducted
Manganese	Tolerance Interval	0.46	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	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.
Radium-226	Tolerance Interval	1.78	No exceedance of statistically derived historical background concentration.
Sodium	Tolerance Interval	0.30	No exceedance of statistically derived historical background concentration.
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.
Total Organic Carbon (TOC)	Tolerance Interval	0.47	No exceedance of statistically derived historical background concentration.
Total Organic Halides (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

*If CV > 1.0, used log-transformed data.

¹ Tolerance interval was calculated based on an MCL exceedance.

Exhibit D.8. Test Summaries for Qualified Parameters for Historical Background—URGA

Parameter	Performed Test	CV Normality Test*	Results of Tolerance Interval Test Conducted
Aluminum	Tolerance Interval	0.28	Current results exceed statistically derived historical background concentration in MW222.
Beta Activity ¹	Tolerance Interval	0.97	Current results exceed statistically derived historical background concentration in MW384 and MW387.
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 concentration in MW372.
Chemical Oxygen Demand (COD)	Tolerance Interval	0.00	No exceedance of statistically derived historical background concentration.
Chloride	Tolerance Interval	0.23	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.
Cobalt	Tolerance Interval	2.44	No exceedance of statistically derived historical background concentration.
Conductivity	Tolerance Interval	0.28	No exceedance of statistically derived historical background concentration.
Copper	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.

Exhibit D.8. Test Summaries for Qualified Parameters for Historical Background—URGA (Continued)

Parameter	Performed Test	CV Normality Test*	Results of Tolerance Interval Test Conducted
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	Tolerance Interval	0.48	Current results exceed statistically derived historical background concentration in MW221.
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.
Radium-226	Tolerance Interval	10.59	Current results exceed statistically derived historical background concentration in MW372.
Sodium	Tolerance Interval	0.24	No exceedance of statistically derived historical background concentration.
Sulfate	Tolerance Interval	0.25	Current results exceed statistically derived historical background concentration in MW372, MW384, MW387, and MW391.
Technetium-99	Tolerance Interval	0.99	Current results exceed statistically derived historical background concentration in MW369, MW384, and MW387.
Total Organic Carbon (TOC)	Tolerance Interval	0.49	No exceedance of statistically derived historical background concentration.
Total Organic Halides (TOX)	Tolerance Interval	2.57	No exceedance of statistically derived historical background concentration.
Trichloroethene ¹	Tolerance Interval	0.95	No exceedance of statistically derived historical background concentration.
Vanadium	Tolerance Interval	0.08	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

* If CV > 1.0, used log-transformed data.

¹ Tolerance interval was calculated based on an MCL exceedance.

Exhibit D.9. Test Summaries for Qualified Parameters for Historical Background—LRGA

Parameter	Performed Test	CV Normality Test*	Results of Tolerance Interval Test Conducted
Aluminum	Tolerance Interval	0.86	No exceedance of statistically derived historical background concentration.
Beta Activity ¹	Tolerance Interval	0.36	Current results exceed statistically derived historical background concentration in MW370, MW385, and MW388.
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.
Chemical Oxygen Demand	Tolerance Interval	0.04	No exceedance of statistically derived historical background concentration.
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.
Cobalt	Tolerance Interval	1.51	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.
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.

Exhibit D.9. Test Summaries for Qualified Parameters for Historical Background—LRGA (Continued)

Parameter	Performed Test	CV Normality Test*	Results of Tolerance Interval Test Conducted
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	Tolerance Interval	0.33	Current results exceed statistically derived historical background concentration in MW370, MW373, MW388, MW392, 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.
Radium-226	Tolerance Interval	10.74	Current results exceed statistically derived historical background concentration in MW370 and MW388.
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 MW370, MW385, and MW388.
Total Organic Carbon (TOC)	Tolerance Interval	0.55	No exceedance of statistically derived historical background concentration.
Total Organic Halides (TOX)	Tolerance Interval	0.59	No exceedance of statistically derived historical background concentration.
Trichloroethene ¹	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

*If CV > 1.0, used log-transformed data.

¹ 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 upper 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. The statistician qualification statement is presented in Attachment D3. For the UCRS, URGA, and LRGA, the test was applied to 3, 9, and 9 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

URGA	LRGA
MW369: Technetium-99	MW370: Beta activity, radium-226, sulfate, technetium-99
MW372: Calcium, magnesium, sulfate,	MW373: Calcium, conductivity, dissolved solids, magnesium, sulfate
MW387: Beta activity, magnesium, sulfate, technetium-99	MW388: Beta activity, radium-226, sulfate, technetium-99
MW391: Sulfate	

UCRS

Because gradients in the UCRS are downward (vertical), there are no hydrogeologically downgradient UCRS wells. It should be noted; however, that the beta activity and technetium-99 concentration in one UCRS well (i.e., MW390) was higher than the current TL this quarter.

URGA

This quarter's results identified current background exceedances in downgradient wells for beta activity, calcium, magnesium, sulfate, and technetium-99.

LRGA

This quarter's results identified current background exceedances in downgradient wells for beta activity, calcium, conductivity, dissolved solids, magnesium, radium-226, sulfate, and technetium-99.

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

Parameter	Performed Test	CV Normality Test*	Results of Tolerance Interval Test Conducted
Beta Activity	Tolerance Interval	2.58	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.
Oxidation-Reduction Potential	Tolerance Interval	0.29	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	-2.62	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.

CV: coefficient of variation

*If CV > 1.0, used log-transformed data.

Exhibit D.12. Test Summaries for Qualified Parameters for Current Background—URGA

Parameter	Performed Test	CV Normality Test*	Results of Tolerance Interval Test Conducted
Aluminum	Tolerance Interval	0.65	MW222 exceeded the upper TL, which is evidence of elevated concentration with respect to current background data.
Beta Activity	Tolerance Interval	0.67	MW384 and MW387 exceeded the upper TL, which is evidence of elevated concentration with respect to current background data.
Calcium	Tolerance Interval	0.16	MW372 exceeded the upper TL, which is evidence of elevated concentration with respect to current background data.
Dissolved Solids	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.
Magnesium	Tolerance Interval	0.15	MW372 and MW387 exceeded the upper TL, which is evidence of elevated concentration with respect to current background data.
Oxidation-reduction potential	Tolerance Interval	0.15	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.
Radium-226	Tolerance Interval	0.63	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	0.32	MW372, MW387, and MW391 exceeded the upper TL, which is evidence of elevated concentration with respect to current background data.
Technetium-99	Tolerance Interval	0.59	MW369, MW384, and MW387 exceeded the upper TL, which is evidence of elevated concentration with respect to current background data.

CV: coefficient of variation

*If CV > 1.0, used log-transformed data.

Exhibit D.13. Test Summaries for Qualified Parameters for Current Background—LRGA

Parameter	Performed Test	CV Normality Test*	Results of Tolerance Interval Test Conducted
Beta Activity	Tolerance Interval	0.56	MW370, MW385, and MW388 exceeded the upper TL, which is evidence of elevated concentration with respect to current background data.
Calcium	Tolerance Interval	0.22	MW373 exceeded the upper TL, which is evidence of elevated concentration with respect to current background data.
Conductivity	Tolerance Interval	0.09	MW373 exceeded the upper TL, which is evidence of elevated concentration with respect to current background data.
Dissolved Solids	Tolerance Interval	0.13	MW373 exceeded the upper TL, which is evidence of elevated concentration with respect to current background data.
Magnesium	Tolerance Interval	0.22	MW373 exceeded the upper TL, which is evidence of elevated concentration with respect to current background data.
Oxidation-Reduction Potential	Tolerance Interval	0.23	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.
Radium-226	Tolerance Interval	0.55	MW370 and MW388 exceeded the upper TL, which is evidence of elevated concentration with respect to current background data.
Sulfate	Tolerance Interval	0.06	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	0.57	MW370, MW385, and MW388 exceeded the upper TL, which is evidence of elevated concentration with respect to current background data.

CV: coefficient of variation

* If CV > 1.0, used log-transformed data.

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 First Quarter 2018 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)= 0.900 LL(1)=N/A

Statistics-Transformed Background Data X= -1.259 S= 0.503 CV(2)=-0.400 **K factor**= 3.188** TL(2)= 0.345 LL(2)=N/A

Historical Background Data from Upgradient Wells with Transformed Result

Well Number:	MW396	
Date Collected	Result	LN(Result)
8/13/2002	0.393	-0.934
9/16/2002	0.2	-1.609
10/16/2002	0.2	-1.609
1/13/2003	0.501	-0.691
4/8/2003	0.2	-1.609
7/16/2003	0.2	-1.609
10/14/2003	0.2	-1.609
1/14/2004	0.668	-0.403

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	0.05	N/A	-2.996	N/A
MW390	Downgradient	Yes	0.248	NO	-1.394	N/A
MW393	Downgradient	Yes	0.0671	NO	-2.702	N/A
MW396	Upgradient	No	0.05	N/A	-2.996	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. D1-3

C-746-S/T First Quarter 2018 Statistical Analysis Historical Background Comparison

Beta activity

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= 4.298 S= 5.012 CV(1)= 1.166 K factor**= 3.188 TL(1)= 20.277 LL(1)=N/A

Statistics-Transformed Background Data X= 1.294 S= 0.988 CV(2)=0.764 K factor**= 3.188 TL(2)= 2.632 LL(2)=N/A

Historical Background Data from Upgradient Wells with Transformed Result

Well Number: MW396		
Date Collected	Result	LN(Result)
8/13/2002	2.2	0.788
9/16/2002	0.727	-0.319
10/16/2002	7.28	1.985
1/13/2003	6.97	1.942
4/8/2003	13.9	2.632
7/16/2003	2.08	0.732
10/14/2003	-2.42	#Func!
1/14/2004	3.65	1.295

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	No	0.187	N/A	-1.677	N/A
MW390	Downgradient	Yes	57.7	N/A	4.055	YES
MW393	Downgradient	No	2.53	N/A	0.928	N/A
MW396	Upgradient	No	5.34	N/A	1.675	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. D1-4

C-746-S/T First Quarter 2018 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) = 3.306	LL(1) =N/A
Statistics-Transformed Background Data	X = -1.034	S = 1.066	CV(2) = -1.031	K factor** = 3.188	TL(2) = 2.364	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	0.693
9/16/2002	2	0.693
10/16/2002	0.2	-1.609
1/13/2003	0.2	-1.609
4/8/2003	0.2	-1.609
7/16/2003	0.2	-1.609
10/14/2003	0.2	-1.609
1/14/2004	0.2	-1.609

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	No	0.015	N/A	-4.200	N/A
MW390	Downgradient	Yes	0.0112	N/A	-4.492	NO
MW393	Downgradient	Yes	0.0218	N/A	-3.826	NO
MW396	Upgradient	Yes	0.00697	N/A	-4.966	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. D1-5

C-746-S/T First Quarter 2018 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) = 2.430	LL(1) =N/A
Statistics-Transformed Background Data	X = 0.301	S = 0.252	CV(2) =0.838	K factor** = 3.188	TL(2) = 1.105	LL(2) =N/A

Historical Background Data from Upgradient Wells with Transformed Result

Well Number: MW396

Date Collected	Result	LN(Result)
8/13/2002	1.5	0.405
9/16/2002	1.6	0.470
10/16/2002	1.6	0.470
1/13/2003	1	0.000
4/8/2003	1	0.000
7/16/2003	1	0.000
10/14/2003	1.7	0.531
1/14/2004	1.7	0.531

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	0.148	NO	-1.911	N/A
MW390	Downgradient	Yes	0.456	NO	-0.785	N/A
MW393	Downgradient	Yes	0.167	NO	-1.790	N/A
MW396	Upgradient	Yes	1.1	NO	0.095	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. D1-6

C-746-S/T First Quarter 2018 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)= 68.748 LL(1)=N/A

Statistics-Transformed Background Data X= 3.711 S= 0.241 CV(2)=0.065 K factor**= 3.188 TL(2)= 4.479 LL(2)=N/A

Historical Background Data from Upgradient Wells with Transformed Result

Well Number: MW396

Date Collected	Result	LN(Result)
8/13/2002	38.4	3.648
9/16/2002	42.9	3.759
10/16/2002	40.2	3.694
1/13/2003	46.7	3.844
4/8/2003	49.8	3.908
7/16/2003	43.3	3.768
10/14/2003	49.7	3.906
1/14/2004	23.6	3.161

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	19.9	NO	2.991	N/A
MW390	Downgradient	Yes	27.7	NO	3.321	N/A
MW393	Downgradient	Yes	13.1	NO	2.573	N/A
MW396	Upgradient	Yes	34.4	NO	3.538	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. D1-7

C-746-S/T First Quarter 2018 Statistical Analysis Historical Background Comparison
Chemical Oxygen Demand (COD) 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= 35.375 S= 0.744 CV(1)=0.021 **K factor**= 3.188** TL(1)= 37.747 LL(1)=N/A
Statistics-Transformed Background Data X= 3.566 S= 0.021 CV(2)=0.006 **K factor**= 3.188** TL(2)= 3.632 LL(2)=N/A

Historical Background Data from Upgradient Wells with Transformed Result

Well Number: MW396

Date Collected	Result	LN(Result)
8/13/2002	36	3.584
9/16/2002	35	3.555
10/16/2002	37	3.611
1/13/2003	35	3.555
4/8/2003	35	3.555
7/16/2003	35	3.555
10/14/2003	35	3.555
1/14/2004	35	3.555

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	22.5	NO	3.114	N/A
MW390	Downgradient	Yes	29.2	NO	3.374	N/A
MW393	Downgradient	Yes	12.3	NO	2.510	N/A
MW396	Upgradient	Yes	37.6	NO	3.627	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 First Quarter 2018 Statistical Analysis Historical Background Comparison

Chloride

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= 101.725 S= 5.245 CV(1)=0.052 **K factor**= 3.188** TL(1)= 118.447 LL(1)=N/A

Statistics-Transformed Background Data X= 4.621 S= 0.053 CV(2)=0.011 **K factor**= 3.188** TL(2)= 4.789 LL(2)=N/A

Historical Background Data from Upgradient Wells with Transformed Result

Well Number:	MW396	
Date Collected	Result	LN(Result)
8/13/2002	91.6	4.517
9/16/2002	98.3	4.588
10/16/2002	101.4	4.619
1/13/2003	108.3	4.685
4/8/2003	100.5	4.610
7/16/2003	102.5	4.630
10/14/2003	106.8	4.671
1/14/2004	104.4	4.648

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	14.6	NO	2.681	N/A
MW390	Downgradient	Yes	40.4	NO	3.699	N/A
MW393	Downgradient	Yes	13.9	NO	2.632	N/A
MW396	Upgradient	Yes	71.3	NO	4.267	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

C-746-S/T First Quarter 2018 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)= 0.042 LL(1)=N/A

Statistics-Transformed Background Data X= -5.645 S= 1.339 CV(2)=-0.237 K factor**= 3.188 TL(2)= -1.377 LL(2)=N/A

Historical Background Data from Upgradient Wells with Transformed Result

Well Number:	MW396	
Date Collected	Result	LN(Result)
8/13/2002	0.025	-3.689
9/16/2002	0.025	-3.689
10/16/2002	0.001	-6.908
1/13/2003	0.00324	-5.732
4/8/2003	0.00436	-5.435
7/16/2003	0.00276	-5.893
10/14/2003	0.001	-6.908
1/14/2004	0.001	-6.908

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	0.0075	N/A	-4.893	NO
MW390	Downgradient	Yes	0.000444	N/A	-7.720	NO
MW393	Downgradient	No	0.001	N/A	-6.908	N/A
MW396	Upgradient	Yes	0.00288	N/A	-5.850	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. D1-10

C-746-S/T First Quarter 2018 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)= 1265.579 LL(1)=N/A
Statistics-Transformed Background Data X= 6.822 S= 0.111 CV(2)=0.016 **K factor**= 3.188** TL(2)= 7.175 LL(2)=N/A

Historical Background Data from Upgradient Wells with Transformed Result

Well Number: MW396

Date Collected	Result	LN(Result)
8/13/2002	784	6.664
9/30/2002	871	6.770
10/16/2002	868	6.766
1/13/2003	912	6.816
4/8/2003	942	6.848
7/16/2003	910	6.813
10/14/2003	935	6.841
1/14/2004	1158	7.054

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	601	NO	6.399	N/A
MW390	Downgradient	Yes	671	NO	6.509	N/A
MW393	Downgradient	Yes	407	NO	6.009	N/A
MW396	Upgradient	Yes	750	NO	6.620	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. D1-11

C-746-S/T First Quarter 2018 Statistical Analysis Historical Background Comparison
Copper 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= 0.028 S= 0.014 CV(1)=0.481 **K factor**= 3.188** TL(1)= 0.072 LL(1)=N/A
Statistics-Transformed Background Data X= -3.650 S= 0.414 CV(2)=-0.113 **K factor**= 3.188** TL(2)= -2.331 LL(2)=N/A

Historical Background Data from Upgradient Wells with Transformed Result

Well Number: MW396

Date Collected	Result	LN(Result)
8/13/2002	0.05	-2.996
9/16/2002	0.05	-2.996
10/16/2002	0.026	-3.650
1/13/2003	0.02	-3.912
4/8/2003	0.02	-3.912
7/16/2003	0.02	-3.912
10/14/2003	0.02	-3.912
1/14/2004	0.02	-3.912

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	0.0116	NO	-4.457	N/A
MW390	Downgradient	Yes	0.00101	NO	-6.898	N/A
MW393	Downgradient	Yes	0.000582	NO	-7.449	N/A
MW396	Upgradient	Yes	0.000421	NO	-7.773	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 First Quarter 2018 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) = 6.743	LL(1) =N/A
Statistics-Transformed Background Data	X = -0.043	S = 0.814	CV(2) = -18.867	K factor** = 3.188	TL(2) = 2.553	LL(2) =N/A

Historical Background Data from Upgradient Wells with Transformed Result

Well Number: MW396

Date Collected	Result	LN(Result)
8/13/2002	5.45	1.696
9/16/2002	0.4	-0.916
10/16/2002	0.54	-0.616
1/13/2003	0.72	-0.329
4/8/2003	0.69	-0.371
7/16/2003	1.1	0.095
10/14/2003	0.71	-0.342
1/14/2004	1.55	0.438

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	1.72	N/A	0.542	NO
MW390	Downgradient	Yes	4.79	N/A	1.567	NO
MW393	Downgradient	Yes	1.73	N/A	0.548	NO
MW396	Upgradient	Yes	1.01	N/A	0.010	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. D1-13

C-746-S/T First Quarter 2018 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)= 882.980 LL(1)=N/A

Statistics-Transformed Background Data X= 6.298 S= 0.162 CV(2)=0.026 **K factor**= 3.188** TL(2)= 6.815 LL(2)=N/A

Historical Background Data from Upgradient Wells with Transformed Result

Well Number: MW396		
Date Collected	Result	LN(Result)
8/13/2002	502	6.219
9/16/2002	506	6.227
10/16/2002	543	6.297
1/13/2003	521	6.256
4/8/2003	504	6.223
7/16/2003	532	6.277
10/14/2003	490	6.194
1/14/2004	805	6.691

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	347	NO	5.849	N/A
MW390	Downgradient	Yes	371	NO	5.916	N/A
MW393	Downgradient	Yes	249	NO	5.517	N/A
MW396	Upgradient	Yes	433	NO	6.071	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. D1-14

C-746-S/T First Quarter 2018 Statistical Analysis Historical Background Comparison

Iodide

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 = 2.150	S = 0.283	CV(1) =0.132	K factor** = 3.188	TL(1) = 3.052	LL(1) =N/A
Statistics-Transformed Background Data	X = 0.759	S = 0.123	CV(2) =0.162	K factor** = 3.188	TL(2) = 1.150	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	0.693
9/16/2002	2	0.693
10/16/2002	2	0.693
1/13/2003	2	0.693
4/8/2003	2	0.693
7/16/2003	2.7	0.993
10/14/2003	2.5	0.916
1/14/2004	2	0.693

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	0.186	NO	-1.682	N/A
MW390	Downgradient	No	0.5	N/A	-0.693	N/A
MW393	Downgradient	No	0.5	N/A	-0.693	N/A
MW396	Upgradient	Yes	0.737	NO	-0.305	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. D1-15

C-746-S/T First Quarter 2018 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)= 19.666 LL(1)=N/A
Statistics-Transformed Background Data X= 1.880 S= 0.723 CV(2)=0.384 **K factor**= 3.188** TL(2)= 4.184 LL(2)=N/A

Historical Background Data from Upgradient Wells with Transformed Result

Well Number: MW396

Date Collected	Result	LN(Result)
8/13/2002	1.8	0.588
9/16/2002	9.53	2.254
10/16/2002	7.43	2.006
1/13/2003	9.93	2.296
4/8/2003	10.2	2.322
7/16/2003	9.16	2.215
10/14/2003	11.9	2.477
1/14/2004	2.42	0.884

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	1.64	NO	0.495	N/A
MW390	Downgradient	Yes	0.28	NO	-1.273	N/A
MW393	Downgradient	Yes	2.84	NO	1.044	N/A
MW396	Upgradient	Yes	2.6	NO	0.956	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. D1-16

C-746-S/T First Quarter 2018 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)= 27.438 LL(1)=N/A
Statistics-Transformed Background Data X= 2.804 S= 0.240 CV(2)=0.086 **K factor**= 3.188** TL(2)= 3.569 LL(2)=N/A

Historical Background Data from Upgradient Wells with Transformed Result

Well Number: MW396

Date Collected	Result	LN(Result)
8/13/2002	15.5	2.741
9/16/2002	17.3	2.851
10/16/2002	17.8	2.879
1/13/2003	19.2	2.955
4/8/2003	17.8	2.879
7/16/2003	17.8	2.879
10/14/2003	20.2	3.006
1/14/2004	9.41	2.242

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	8.77	NO	2.171	N/A
MW390	Downgradient	Yes	12.1	NO	2.493	N/A
MW393	Downgradient	Yes	3.63	NO	1.289	N/A
MW396	Upgradient	Yes	15.5	NO	2.741	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. D1-17

C-746-S/T First Quarter 2018 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) = 1.900	LL(1) =N/A
Statistics-Transformed Background Data	X = -0.566	S = 1.192	CV(2) =-2.105	K factor** = 3.188	TL(2) = 3.235	LL(2) =N/A

Historical Background Data from Upgradient Wells with Transformed Result

Well Number: MW396		
Date Collected	Result	LN(Result)
8/13/2002	0.57	-0.562
9/16/2002	0.647	-0.435
10/16/2002	0.88	-0.128
1/13/2003	1.132	0.124
4/8/2003	0.965	-0.036
7/16/2003	0.983	-0.017
10/14/2003	0.984	-0.016
1/14/2004	0.0314	-3.461

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	0.952	NO	-0.049	N/A
MW390	Downgradient	Yes	0.00202	NO	-6.205	N/A
MW393	Downgradient	Yes	0.048	NO	-3.037	N/A
MW396	Upgradient	Yes	0.45	NO	-0.799	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. D1-18

C-746-S/T First Quarter 2018 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)= 0.042 LL(1)=N/A

Statistics-Transformed Background Data X= -5.928 S= 1.420 CV(2)=-0.240 K factor**= 3.188 TL(2)= -1.400 LL(2)=N/A

Historical Background Data from Upgradient Wells with Transformed Result

Well Number:	MW396	
Date Collected	Result	LN(Result)
8/13/2002	0.025	-3.689
9/16/2002	0.025	-3.689
10/16/2002	0.001	-6.908
1/13/2003	0.00128	-6.661
4/8/2003	0.00271	-5.911
7/16/2003	0.00117	-6.751
10/14/2003	0.001	-6.908
1/14/2004	0.001	-6.908

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	0.000616	N/A	-7.392	NO
MW390	Downgradient	Yes	0.000384	N/A	-7.865	NO
MW393	Downgradient	No	0.0005	N/A	-7.601	N/A
MW396	Upgradient	Yes	0.000418	N/A	-7.780	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. D1-19

C-746-S/T First Quarter 2018 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)= 0.083 LL(1)=N/A

Statistics-Transformed Background Data X= -4.706 S= 1.057 CV(2)= -0.225 K factor**= 3.188 TL(2)= -1.338 LL(2)=N/A

Historical Background Data from Upgradient Wells with Transformed Result

Well Number:	MW396	
Date Collected	Result	LN(Result)
8/13/2002	0.05	-2.996
9/16/2002	0.05	-2.996
10/16/2002	0.005	-5.298
1/13/2003	0.005	-5.298
4/8/2003	0.00571	-5.166
7/16/2003	0.005	-5.298
10/14/2003	0.005	-5.298
1/14/2004	0.005	-5.298

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	0.00242	N/A	-6.024	NO
MW390	Downgradient	Yes	0.00191	N/A	-6.261	NO
MW393	Downgradient	No	0.002	N/A	-6.215	N/A
MW396	Upgradient	Yes	0.00126	N/A	-6.677	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. D1-20

C-746-S/T First Quarter 2018 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)= 210.502 LL(1)=N/A
Statistics-Transformed Background Data X= 4.364 S= 0.333 CV(2)=0.076 K factor**= 3.188 TL(2)= 4.736 LL(2)=N/A

Historical Background Data from Upgradient Wells with Transformed Result

Well Number: MW396

Date Collected	Result	LN(Result)
8/13/2002	60	4.094
4/8/2003	71	4.263
7/16/2003	-56	#Func!
10/14/2003	-54	#Func!
1/14/2004	-22	#Func!
4/12/2004	-6	#Func!
7/20/2004	-3	#Func!
10/12/2004	114	4.736

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	142	N/A	4.956	YES
MW390	Downgradient	Yes	353	N/A	5.866	YES
MW393	Downgradient	Yes	266	N/A	5.583	YES
MW396	Upgradient	Yes	203	N/A	5.313	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. D1-21

C-746-S/T First Quarter 2018 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)= 7.766	LL(1)=5.1541
Statistics-Transformed Background Data	X= 1.864	S= 0.054	CV(2)=0.029	K factor**= 3.736	TL(2)= 2.067	LL(2)=1.6621

Historical Background Data from Upgradient Wells with Transformed Result

Well Number: MW396

Date Collected	Result	LN(Result)
8/13/2002	6.17	1.820
9/16/2002	6.4	1.856
10/16/2002	5.9	1.775
1/13/2003	6.4	1.856
4/8/2003	6.65	1.895
7/16/2003	6.4	1.856
10/14/2003	6.71	1.904
1/14/2004	7.05	1.953

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)? Result <LL(1)?	LN(Result)	LN(Result) >TL(2)? LN(Result) <LL(2)?
MW386	Sidegradient	Yes	6.67	NO	1.898	N/A
MW390	Downgradient	Yes	6.43	NO	1.861	N/A
MW393	Downgradient	Yes	6.25	NO	1.833	N/A
MW396	Upgradient	Yes	6.53	NO	1.876	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. D1-22

C-746-S/T First Quarter 2018 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) = 2.682	LL(1) =N/A
Statistics-Transformed Background Data	X = 0.311	S = 0.271	CV(2) =0.870	K factor** = 3.188	TL(2) = 1.175	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	0.693
9/16/2002	2	0.693
10/16/2002	0.978	-0.022
1/13/2003	1.08	0.077
4/8/2003	1.12	0.113
7/16/2003	1.38	0.322
10/14/2003	1.24	0.215
1/14/2004	1.49	0.399

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	0.305	NO	-1.187	N/A
MW390	Downgradient	Yes	0.375	NO	-0.981	N/A
MW393	Downgradient	Yes	0.447	NO	-0.805	N/A
MW396	Upgradient	Yes	0.83	NO	-0.186	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. D1-23

C-746-S/T First Quarter 2018 Statistical Analysis Historical Background Comparison

Radium-226

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= 0.157 S= 0.280 CV(1)= 1.782 K factor**= 3.188 TL(1)= 1.050 LL(1)=N/A

Statistics-Transformed Background Data X= -1.836 S= 1.229 CV(2)= -0.669 K factor**= 3.188 TL(2)= -0.371 LL(2)=N/A

Historical Background Data from Upgradient Wells with Transformed Result

Well Number:	MW396	
Date Collected	Result	LN(Result)
10/16/2002	0.69	-0.371
1/13/2003	-0.00693	#Func!
10/14/2003	-0.0514	#Func!
1/14/2004	0.494	-0.705
4/12/2004	-0.082	#Func!
7/20/2004	0.0879	-2.432
10/12/2004	0.0408	-3.199
1/18/2005	0.0844	-2.472

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	No	0.167	N/A	-1.790	N/A
MW390	Downgradient	No	0.123	N/A	-2.096	N/A
MW393	Downgradient	No	0.278	N/A	-1.280	N/A
MW396	Upgradient	Yes	0.682	N/A	-0.383	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. D1-24

C-746-S/T First Quarter 2018 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)= 208.973 LL(1)=N/A

Statistics-Transformed Background Data X= 4.595 S= 0.492 CV(2)=0.107 **K factor**= 3.188** TL(2)= 6.163 LL(2)=N/A

Historical Background Data from Upgradient Wells with Transformed Result

Well Number: MW396

Date Collected	Result	LN(Result)
8/13/2002	115	4.745
9/16/2002	116	4.754
10/16/2002	117	4.762
1/13/2003	122	4.804
4/8/2003	106	4.663
7/16/2003	117	4.762
10/14/2003	132	4.883
1/14/2004	29.6	3.388

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	93.6	NO	4.539	N/A
MW390	Downgradient	Yes	87.6	NO	4.473	N/A
MW393	Downgradient	Yes	71.6	NO	4.271	N/A
MW396	Upgradient	Yes	112	NO	4.718	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 First Quarter 2018 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)= 50.759 LL(1)=N/A**
Statistics-Transformed Background Data **X= 3.054 S= 0.351 CV(2)=0.115 K factor**= 3.188 TL(2)= 4.173 LL(2)=N/A**

Historical Background Data from Upgradient Wells with Transformed Result

Well Number: MW396

Date Collected	Result	LN(Result)
8/13/2002	41.9	3.735
9/16/2002	26.3	3.270
10/16/2002	20.6	3.025
1/13/2003	16.6	2.809
4/8/2003	23.9	3.174
7/16/2003	18.8	2.934
10/14/2003	12.9	2.557
1/14/2004	18.7	2.929

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	44.5	NO	3.795	N/A
MW390	Downgradient	Yes	32.7	NO	3.487	N/A
MW393	Downgradient	Yes	12.2	NO	2.501	N/A
MW396	Upgradient	Yes	21.5	NO	3.068	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. D1-26

C-746-S/T First Quarter 2018 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)= 28.531 LL(1)=N/A
Statistics-Transformed Background Data X= 1.498 S= 1.321 CV(2)=0.882 K factor**= 3.188 TL(2)= 5.710 LL(2)=N/A

Historical Background Data from Upgradient Wells with Transformed Result

Well Number: MW396

Date Collected	Result	LN(Result)
8/13/2002	16.7	2.815
9/16/2002	6.39	1.855
10/16/2002	4.55	1.515
1/13/2003	16.5	2.803
4/8/2003	3.04	1.112
7/16/2003	0.354	-1.038
10/14/2003	11.9	2.477
1/14/2004	1.56	0.445

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	4.14	N/A	1.421	N/A
MW390	Downgradient	Yes	82.8	YES	4.416	N/A
MW393	Downgradient	No	3.99	N/A	1.384	N/A
MW396	Upgradient	No	5.85	N/A	1.766	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. D1-27

C-746-S/T First Quarter 2018 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) = 24.959	LL(1) =N/A
Statistics-Transformed Background Data	X = 2.210	S = 0.454	CV(2) =0.205	K factor** = 3.188	TL(2) = 3.657	LL(2) =N/A

Historical Background Data from Upgradient Wells with Transformed Result

Well Number: MW396

Date Collected	Result	LN(Result)
8/13/2002	19	2.944
9/16/2002	14.6	2.681
10/16/2002	10.4	2.342
1/13/2003	4.4	1.482
4/8/2003	7	1.946
7/16/2003	7.3	1.988
10/14/2003	9.1	2.208
1/14/2004	8.1	2.092

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	7.32	NO	1.991	N/A
MW390	Downgradient	Yes	2.57	NO	0.944	N/A
MW393	Downgradient	Yes	3.01	NO	1.102	N/A
MW396	Upgradient	Yes	6.3	NO	1.841	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. D1-28

C-746-S/T First Quarter 2018 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)= 313.314 LL(1)=N/A

Statistics-Transformed Background Data X= 4.896 S= 0.390 CV(2)=0.080 **K factor**= 3.188** TL(2)= 6.138 LL(2)=N/A

Historical Background Data from Upgradient Wells with Transformed Result

Well Number: MW396

Date Collected	Result	LN(Result)
8/13/2002	193	5.263
9/16/2002	190	5.247
10/16/2002	221	5.398
1/13/2003	106	4.663
4/8/2003	77.8	4.354
7/16/2003	122	4.804
10/14/2003	86.4	4.459
1/14/2004	145	4.977

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	121	NO	4.796	N/A
MW390	Downgradient	Yes	12.3	NO	2.510	N/A
MW393	Downgradient	Yes	18.3	NO	2.907	N/A
MW396	Upgradient	Yes	28.4	NO	3.346	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. D1-29

C-746-S/T First Quarter 2018 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) = 0.029	LL(1) =N/A
Statistics-Transformed Background Data	X = -3.856	S = 0.103	CV(2) =-0.027	K factor** = 3.188	TL(2) = -3.527	LL(2) =N/A

Historical Background Data from Upgradient Wells with Transformed Result

Well Number: MW396

Date Collected	Result	LN(Result)
8/13/2002	0.025	-3.689
9/16/2002	0.025	-3.689
10/16/2002	0.02	-3.912
1/13/2003	0.02	-3.912
4/8/2003	0.02	-3.912
7/16/2003	0.02	-3.912
10/14/2003	0.02	-3.912
1/14/2004	0.02	-3.912

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	0.01	N/A	-4.605	N/A
MW390	Downgradient	Yes	0.00339	NO	-5.687	N/A
MW393	Downgradient	No	0.01	N/A	-4.605	N/A
MW396	Upgradient	No	0.01	N/A	-4.605	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. D1-30

C-746-S/T First Quarter 2018 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)= 0.156 LL(1)=N/A

Statistics-Transformed Background Data X= -3.342 S= 0.682 CV(2)=-0.204 **K factor**= 3.188** TL(2)= -1.168 LL(2)=N/A

Historical Background Data from Upgradient Wells with Transformed Result

Well Number: MW396

Date Collected	Result	LN(Result)
8/13/2002	0.1	-2.303
9/16/2002	0.1	-2.303
10/16/2002	0.025	-3.689
1/13/2003	0.035	-3.352
4/8/2003	0.035	-3.352
7/16/2003	0.02	-3.912
10/14/2003	0.02	-3.912
1/14/2004	0.02	-3.912

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	0.01	N/A	-4.605	N/A
MW390	Downgradient	Yes	0.00414	NO	-5.487	N/A
MW393	Downgradient	No	0.01	N/A	-4.605	N/A
MW396	Upgradient	No	0.01	N/A	-4.605	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. D1-31

C-746-S/T First Quarter 2018 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)= 0.376 LL(1)=N/A

Statistics-Transformed Background Data X= -1.534 S= 0.212 CV(2)=-0.138 K factor**= 2.523 TL(2)= -0.999 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	0.2	-1.609
1/15/2003	0.2	-1.609
4/10/2003	0.2	-1.609
7/14/2003	0.2	-1.609
10/13/2003	0.427	-0.851
1/13/2004	0.309	-1.174
4/13/2004	0.2	-1.609
7/21/2004	0.202	-1.599

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	Yes	0.0286	NO	-3.554	N/A
MW221	Sidegradient	No	0.05	N/A	-2.996	N/A
MW222	Sidegradient	Yes	0.707	YES	-0.347	N/A
MW223	Sidegradient	Yes	0.0966	NO	-2.337	N/A
MW224	Sidegradient	Yes	0.0244	NO	-3.713	N/A
MW369	Downgradient	Yes	0.178	NO	-1.726	N/A
MW372	Downgradient	No	0.05	N/A	-2.996	N/A
MW384	Sidegradient	Yes	0.0323	NO	-3.433	N/A
MW387	Downgradient	Yes	0.0575	NO	-2.856	N/A
MW391	Downgradient	Yes	0.0234	NO	-3.755	N/A
MW394	Upgradient	Yes	0.0544	NO	-2.911	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	0.2	-1.609
9/16/2002	0.2	-1.609
10/16/2002	0.2	-1.609
1/13/2003	0.2	-1.609
4/10/2003	0.2	-1.609
7/16/2003	0.2	-1.609
10/14/2003	0.2	-1.609
1/13/2004	0.2	-1.609

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

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

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Beta activity

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= 14.273 S= 13.883 CV(1)=0.973 K factor**= 2.523 TL(1)= 49.300 LL(1)=N/A

Statistics-Transformed Background Data X= 2.213 S= 1.033 CV(2)=0.467 K factor**= 2.523 TL(2)= 4.819 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	15.2	2.721
1/15/2003	42.5	3.750
4/10/2003	45.4	3.816
7/14/2003	8.53	2.144
10/13/2003	11.7	2.460
1/13/2004	13.5	2.603
4/13/2004	33.5	3.512
7/21/2004	13.7	2.617

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	Yes	12.8	N/A	2.549	N/A
MW221	Sidegradient	Yes	15.1	N/A	2.715	N/A
MW222	Sidegradient	No	3.19	N/A	1.160	N/A
MW223	Sidegradient	No	2.15	N/A	0.765	N/A
MW224	Sidegradient	No	2.99	N/A	1.095	N/A
MW369	Downgradient	Yes	32	N/A	3.466	N/A
MW372	Downgradient	Yes	21.7	N/A	3.077	N/A
MW384	Sidegradient	Yes	89.7	YES	4.496	N/A
MW387	Downgradient	Yes	201	YES	5.303	N/A
MW391	Downgradient	No	10.5	N/A	2.351	N/A
MW394	Upgradient	No	-3.27	N/A	#Error	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	5.03	1.615
9/16/2002	5.57	1.717
10/16/2002	12.8	2.549
1/13/2003	4.3	1.459
4/10/2003	9.52	2.253
7/16/2003	3.92	1.366
10/14/2003	1.06	0.058
1/13/2004	2.14	0.761

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

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. D1-33

C-746-S/T First Quarter 2018 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)= 1.976 LL(1)=N/A

Statistics-Transformed Background Data X= -1.322 S= 0.786 CV(2)= -0.595 K factor**= 2.523 TL(2)= 0.663 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	0.2	-1.609
1/15/2003	0.2	-1.609
4/10/2003	0.2	-1.609
7/14/2003	0.2	-1.609
10/13/2003	0.2	-1.609
1/13/2004	0.2	-1.609
4/13/2004	0.2	-1.609
7/21/2004	0.2	-1.609

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	Yes	0.00702	N/A	-4.959	NO
MW221	Sidegradient	Yes	0.0125	N/A	-4.382	NO
MW222	Sidegradient	Yes	0.00767	N/A	-4.870	NO
MW223	Sidegradient	Yes	0.00608	N/A	-5.103	NO
MW224	Sidegradient	Yes	0.00722	N/A	-4.931	NO
MW369	Downgradient	Yes	0.0163	N/A	-4.117	NO
MW372	Downgradient	Yes	1.02	N/A	0.020	NO
MW384	Sidegradient	Yes	0.0309	N/A	-3.477	NO
MW387	Downgradient	Yes	0.0347	N/A	-3.361	NO
MW391	Downgradient	Yes	0.165	N/A	-1.802	NO
MW394	Upgradient	Yes	0.0195	N/A	-3.937	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	0.693
9/16/2002	2	0.693
10/16/2002	0.2	-1.609
1/13/2003	0.2	-1.609
4/10/2003	0.2	-1.609
7/16/2003	0.2	-1.609
10/14/2003	0.2	-1.609
1/13/2004	0.2	-1.609

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 First Quarter 2018 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)= 1.000 LL(1)=N/A

Statistics-Transformed Background Data X= 0.000 S= 0.000 CV(2)=#Num! K factor**= 2.523 TL(2)= 0.000 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	0.000
1/15/2003	1	0.000
4/10/2003	1	0.000
7/14/2003	1	0.000
10/13/2003	1	0.000
1/13/2004	1	0.000
4/13/2004	1	0.000
7/21/2004	1	0.000

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	Yes	0.2	NO	-1.609	N/A
MW221	Sidegradient	Yes	0.42	NO	-0.868	N/A
MW222	Sidegradient	Yes	0.421	NO	-0.865	N/A
MW223	Sidegradient	Yes	0.399	NO	-0.919	N/A
MW224	Sidegradient	Yes	0.254	NO	-1.370	N/A
MW369	Downgradient	Yes	0.364	NO	-1.011	N/A
MW372	Downgradient	Yes	0.576	NO	-0.552	N/A
MW384	Sidegradient	Yes	0.436	NO	-0.830	N/A
MW387	Downgradient	Yes	0.497	NO	-0.699	N/A
MW391	Downgradient	Yes	0.571	NO	-0.560	N/A
MW394	Upgradient	Yes	0.658	NO	-0.419	N/A

Well Number: MW394

Date Collected	Result	LN(Result)
8/13/2002	1	0.000
9/16/2002	1	0.000
10/16/2002	1	0.000
1/13/2003	1	0.000
4/10/2003	1	0.000
7/16/2003	1	0.000
10/14/2003	1	0.000
1/13/2004	1	0.000

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. D1-35

C-746-S/T First Quarter 2018 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)= 39.604 LL(1)=N/A

Statistics-Transformed Background Data X= 3.304 S= 0.183 CV(2)=0.055 K factor**= 2.523 TL(2)= 3.765 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	23.6	3.161
1/15/2003	25.9	3.254
4/10/2003	30.4	3.414
7/14/2003	33.9	3.523
10/13/2003	21.3	3.059
1/13/2004	20.3	3.011
4/13/2004	23.8	3.170
7/21/2004	19	2.944

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	Yes	18.8	NO	2.934	N/A
MW221	Sidegradient	Yes	22.2	NO	3.100	N/A
MW222	Sidegradient	Yes	13.5	NO	2.603	N/A
MW223	Sidegradient	Yes	19.8	NO	2.986	N/A
MW224	Sidegradient	Yes	17.2	NO	2.845	N/A
MW369	Downgradient	Yes	15	NO	2.708	N/A
MW372	Downgradient	Yes	49.4	YES	3.900	N/A
MW384	Sidegradient	Yes	27.9	NO	3.329	N/A
MW387	Downgradient	Yes	35.5	NO	3.570	N/A
MW391	Downgradient	Yes	32.6	NO	3.484	N/A
MW394	Upgradient	Yes	26	NO	3.258	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	29.5	3.384
9/16/2002	29.9	3.398
10/16/2002	31.2	3.440
1/13/2003	30.7	3.424
4/10/2003	34.4	3.538
7/16/2003	29.6	3.388
10/14/2003	30.3	3.411
1/13/2004	28.4	3.346

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. D1-36

C-746-S/T First Quarter 2018 Statistical Analysis Historical Background Comparison
Chemical Oxygen Demand (COD) UNITS: mg/L URG A

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= 35.000	S= 0.000	CV(1)=0.000	K factor**= 2.523	TL(1)= 35.000	LL(1)=N/A
Statistics-Transformed Background Data	X= 3.555	S= 0.000	CV(2)=0.000	K factor**= 2.523	TL(2)= 3.555	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	35	3.555
1/15/2003	35	3.555
4/10/2003	35	3.555
7/14/2003	35	3.555
10/13/2003	35	3.555
1/13/2004	35	3.555
4/13/2004	35	3.555
7/21/2004	35	3.555

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	Yes	18.9	NO	2.939	N/A
MW221	Sidegradient	Yes	20.9	NO	3.040	N/A
MW222	Sidegradient	Yes	31.4	NO	3.447	N/A
MW223	Sidegradient	Yes	29.3	NO	3.378	N/A
MW224	Sidegradient	Yes	10.5	NO	2.351	N/A
MW369	Downgradient	Yes	12.6	NO	2.534	N/A
MW372	Downgradient	Yes	29.3	NO	3.378	N/A
MW384	Sidegradient	Yes	19.1	NO	2.950	N/A
MW387	Downgradient	Yes	20.9	NO	3.040	N/A
MW391	Downgradient	Yes	22.5	NO	3.114	N/A
MW394	Upgradient	Yes	12.6	NO	2.534	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	35	3.555
9/16/2002	35	3.555
10/16/2002	35	3.555
1/13/2003	35	3.555
4/10/2003	35	3.555
7/16/2003	35	3.555
10/14/2003	35	3.555
1/13/2004	35	3.555

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 First Quarter 2018 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)= 77.499 LL(1)=N/A

Statistics-Transformed Background Data X= 3.866 S= 0.244 CV(2)=0.063 K factor**= 2.523 TL(2)= 4.482 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	44.6	3.798
1/15/2003	43.2	3.766
4/10/2003	31.5	3.450
7/14/2003	30.8	3.428
10/13/2003	40.9	3.711
1/13/2004	40.8	3.709
4/13/2004	37.5	3.624
7/21/2004	40.8	3.709

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	Yes	20.5	NO	3.020	N/A
MW221	Sidegradient	Yes	39.7	NO	3.681	N/A
MW222	Sidegradient	Yes	31.9	NO	3.463	N/A
MW223	Sidegradient	Yes	29.6	NO	3.388	N/A
MW224	Sidegradient	Yes	18.4	NO	2.912	N/A
MW369	Downgradient	Yes	31.6	NO	3.453	N/A
MW372	Downgradient	Yes	43.5	NO	3.773	N/A
MW384	Sidegradient	Yes	39.5	NO	3.676	N/A
MW387	Downgradient	Yes	41.2	NO	3.718	N/A
MW391	Downgradient	Yes	42.9	NO	3.759	N/A
MW394	Upgradient	Yes	49.3	NO	3.898	N/A

Well Number: MW394

Date Collected	Result	LN(Result)
8/13/2002	60.4	4.101
9/16/2002	60.3	4.099
10/16/2002	58	4.060
1/13/2003	60.7	4.106
4/10/2003	62.9	4.142
7/16/2003	58.1	4.062
10/14/2003	58.2	4.064
1/13/2004	56	4.025

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 First Quarter 2018 Statistical Analysis Historical Background Comparison
cis-1,2-Dichloroethene UNITS: ug/L URG A

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= 5.000	S= 0.000	CV(1)=0.000	K factor**= 2.523	TL(1)= 5.000	LL(1)=N/A
Statistics-Transformed Background Data	X= 1.609	S= 0.000	CV(2)=0.000	K factor**= 2.523	TL(2)= 1.609	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	1.609
1/15/2003	5	1.609
4/10/2003	5	1.609
7/14/2003	5	1.609
10/13/2003	5	1.609
1/13/2004	5	1.609
4/13/2004	5	1.609
7/21/2004	5	1.609

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	No	1	N/A	0.000	N/A
MW221	Sidegradient	No	1	N/A	0.000	N/A
MW222	Sidegradient	No	1	N/A	0.000	N/A
MW223	Sidegradient	No	1	N/A	0.000	N/A
MW224	Sidegradient	No	1	N/A	0.000	N/A
MW369	Downgradient	No	1	N/A	0.000	N/A
MW372	Downgradient	No	1	N/A	0.000	N/A
MW384	Sidegradient	No	1	N/A	0.000	N/A
MW387	Downgradient	No	1	N/A	0.000	N/A
MW391	Downgradient	Yes	0.57	NO	-0.562	N/A
MW394	Upgradient	No	1	N/A	0.000	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	1.609
9/30/2002	5	1.609
10/16/2002	5	1.609
1/13/2003	5	1.609
4/10/2003	5	1.609
7/16/2003	5	1.609
10/14/2003	5	1.609
1/13/2004	5	1.609

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. D1-39

C-746-S/T First Quarter 2018 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)= 0.116 LL(1)=N/A

Statistics-Transformed Background Data X= -5.582 S= 1.573 CV(2)=-0.282 K factor**= 2.523 TL(2)= -1.613 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	0.0041	-5.497
1/15/2003	0.00496	-5.306
4/10/2003	0.00289	-5.846
7/14/2003	0.161	-1.826
10/13/2003	0.0226	-3.790
1/13/2004	0.00464	-5.373
4/13/2004	0.001	-6.908
7/21/2004	0.00264	-5.937

Well Number: MW394

Date Collected	Result	LN(Result)
8/13/2002	0.025	-3.689
9/16/2002	0.025	-3.689
10/16/2002	0.001	-6.908
1/13/2003	0.001	-6.908
4/10/2003	0.001	-6.908
7/16/2003	0.001	-6.908
10/14/2003	0.001	-6.908
1/13/2004	0.001	-6.908

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	Yes	0.000376	N/A	-7.886	NO
MW221	Sidegradient	Yes	0.000494	N/A	-7.613	NO
MW222	Sidegradient	Yes	0.00418	N/A	-5.477	NO
MW223	Sidegradient	Yes	0.00245	N/A	-6.012	NO
MW224	Sidegradient	Yes	0.00217	N/A	-6.133	NO
MW369	Downgradient	Yes	0.00558	N/A	-5.189	NO
MW372	Downgradient	Yes	0.000814	N/A	-7.114	NO
MW384	Sidegradient	No	0.001	N/A	-6.908	N/A
MW387	Downgradient	No	0.001	N/A	-6.908	N/A
MW391	Downgradient	No	0.001	N/A	-6.908	N/A
MW394	Upgradient	No	0.001	N/A	-6.908	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. D1-40

C-746-S/T First Quarter 2018 Statistical Analysis Historical Background Comparison
Conductivity UNITS: umho/cm URG A

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)= 652.432 LL(1)=N/A

Statistics-Transformed Background Data X= 5.716 S= 1.164 CV(2)=0.204 **K factor**= 2.523** TL(2)= 8.652 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	368	5.908
1/15/2003	433.2	6.071
4/10/2003	489	6.192
7/14/2003	430	6.064
10/13/2003	346	5.846
1/13/2004	365	5.900
4/13/2004	416	6.031
7/21/2004	353	5.866

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	Yes	331	NO	5.802	N/A
MW221	Sidegradient	Yes	407	NO	6.009	N/A
MW222	Sidegradient	Yes	317	NO	5.759	N/A
MW223	Sidegradient	Yes	378	NO	5.935	N/A
MW224	Sidegradient	Yes	365	NO	5.900	N/A
MW369	Downgradient	Yes	351	NO	5.861	N/A
MW372	Downgradient	Yes	620	NO	6.430	N/A
MW384	Sidegradient	Yes	486	NO	6.186	N/A
MW387	Downgradient	Yes	545	NO	6.301	N/A
MW391	Downgradient	Yes	473	NO	6.159	N/A
MW394	Upgradient	Yes	398	NO	5.986	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	406	6.006
9/16/2002	418	6.035
10/16/2002	411	6.019
1/13/2003	422	6.045
4/10/2003	420	6.040
7/16/2003	438	6.082
10/14/2003	3.91	1.364
1/13/2004	395	5.979

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. D1-41

C-746-S/T First Quarter 2018 Statistical Analysis Historical Background Comparison
Copper UNITS: mg/L URG A

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) =0.429	K factor** = 2.523	TL(1) = 0.050	LL(1) =N/A
Statistics-Transformed Background Data	X = -3.794	S = 0.312	CV(2) =-0.082	K factor** = 2.523	TL(2) = -3.007	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	0.0211	-3.858
1/15/2003	0.02	-3.912
4/10/2003	0.02	-3.912
7/14/2003	0.02	-3.912
10/13/2003	0.02	-3.912
1/13/2004	0.02	-3.912
4/13/2004	0.02	-3.912
7/21/2004	0.02	-3.912

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	Yes	0.00224	NO	-6.101	N/A
MW221	Sidegradient	Yes	0.000796	NO	-7.136	N/A
MW222	Sidegradient	Yes	0.00111	NO	-6.803	N/A
MW223	Sidegradient	Yes	0.00113	NO	-6.786	N/A
MW224	Sidegradient	Yes	0.000812	NO	-7.116	N/A
MW369	Downgradient	Yes	0.00114	NO	-6.777	N/A
MW372	Downgradient	Yes	0.0005	NO	-7.601	N/A
MW384	Sidegradient	Yes	0.001	NO	-6.908	N/A
MW387	Downgradient	Yes	0.000492	NO	-7.617	N/A
MW391	Downgradient	Yes	0.000436	NO	-7.738	N/A
MW394	Upgradient	Yes	0.000741	NO	-7.208	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. D1-42

C-746-S/T First Quarter 2018 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)= 8.545 LL(1)=N/A

Statistics-Transformed Background Data X= 1.182 S= 0.612 CV(2)=0.518 K factor**= 2.523 TL(2)= 2.727 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	6.79	1.915
1/15/2003	7.25	1.981
4/10/2003	3.6	1.281
7/14/2003	0.94	-0.062
10/13/2003	1.65	0.501
1/13/2004	3.48	1.247
4/13/2004	1.05	0.049
7/21/2004	4.46	1.495

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	Yes	5.01	NO	1.611	N/A
MW221	Sidegradient	Yes	3.92	NO	1.366	N/A
MW222	Sidegradient	Yes	2.58	NO	0.948	N/A
MW223	Sidegradient	Yes	2.82	NO	1.037	N/A
MW224	Sidegradient	Yes	3.19	NO	1.160	N/A
MW369	Downgradient	Yes	1.78	NO	0.577	N/A
MW372	Downgradient	Yes	1.25	NO	0.223	N/A
MW384	Sidegradient	Yes	3.28	NO	1.188	N/A
MW387	Downgradient	Yes	4.39	NO	1.479	N/A
MW391	Downgradient	Yes	3.23	NO	1.172	N/A
MW394	Upgradient	Yes	3.55	NO	1.267	N/A

Well Number: MW394

Date Collected	Result	LN(Result)
8/13/2002	6.09	1.807
9/16/2002	3.85	1.348
10/16/2002	5.11	1.631
1/13/2003	3.83	1.343
4/10/2003	4.15	1.423
7/16/2003	1.83	0.604
10/14/2003	3.33	1.203
1/13/2004	3.14	1.144

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 First Quarter 2018 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)= 302.045 LL(1)=N/A

Statistics-Transformed Background Data X= 5.443 S= 0.118 CV(2)=0.022 **K factor**= 2.523** TL(2)= 5.740 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	208	5.338
1/15/2003	257	5.549
4/10/2003	288	5.663
7/14/2003	262	5.568
10/13/2003	197	5.283
1/13/2004	198	5.288
4/13/2004	245	5.501
7/21/2004	204	5.318

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	Yes	163	NO	5.094	N/A
MW221	Sidegradient	Yes	210	NO	5.347	N/A
MW222	Sidegradient	Yes	187	NO	5.231	N/A
MW223	Sidegradient	Yes	207	NO	5.333	N/A
MW224	Sidegradient	Yes	189	NO	5.242	N/A
MW369	Downgradient	Yes	161	NO	5.081	N/A
MW372	Downgradient	Yes	330	YES	5.799	N/A
MW384	Sidegradient	Yes	269	NO	5.595	N/A
MW387	Downgradient	Yes	286	NO	5.656	N/A
MW391	Downgradient	Yes	261	NO	5.565	N/A
MW394	Upgradient	Yes	187	NO	5.231	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	247	5.509
9/16/2002	259	5.557
10/16/2002	201	5.303
1/13/2003	228	5.429
4/10/2003	249	5.517
7/16/2003	240	5.481
10/14/2003	230	5.438
1/13/2004	210	5.347

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. D1-44

C-746-S/T First Quarter 2018 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)= 3.545 LL(1)=N/A

Statistics-Transformed Background Data X= -0.565 S= 0.951 CV(2)= -1.683 K factor**= 2.523 TL(2)= 1.834 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	0.2	-1.609
1/15/2003	0.2	-1.609
4/10/2003	0.429	-0.846
7/14/2003	4.33	1.466
10/13/2003	1.81	0.593
1/13/2004	0.793	-0.232
4/13/2004	0.13	-2.040
7/21/2004	0.382	-0.962

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	Yes	0.0704	N/A	-2.654	NO
MW221	Sidegradient	Yes	0.0582	N/A	-2.844	NO
MW222	Sidegradient	Yes	1.39	N/A	0.329	NO
MW223	Sidegradient	Yes	0.27	N/A	-1.309	NO
MW224	Sidegradient	Yes	0.0626	N/A	-2.771	NO
MW369	Downgradient	Yes	0.155	N/A	-1.864	NO
MW372	Downgradient	Yes	0.166	N/A	-1.796	NO
MW384	Sidegradient	Yes	1.04	N/A	0.039	NO
MW387	Downgradient	Yes	0.351	N/A	-1.047	NO
MW391	Downgradient	Yes	0.123	N/A	-2.096	NO
MW394	Upgradient	Yes	0.26	N/A	-1.347	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	1.34	0.293
9/16/2002	0.328	-1.115
10/16/2002	1.38	0.322
1/13/2003	1.3	0.262
4/10/2003	0.494	-0.705
7/16/2003	0.62	-0.478
10/14/2003	0.37	-0.994
1/13/2004	0.251	-1.382

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

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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)= 15.092 LL(1)=N/A

Statistics-Transformed Background Data X= 2.368 S= 0.158 CV(2)=0.067 K factor**= 2.523 TL(2)= 2.766 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	9.16	2.215
1/15/2003	10	2.303
4/10/2003	10.8	2.380
7/14/2003	14.7	2.688
10/13/2003	9.03	2.201
1/13/2004	8.49	2.139
4/13/2004	9.7	2.272
7/21/2004	8.06	2.087

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	Yes	8.04	NO	2.084	N/A
MW221	Sidegradient	Yes	9.14	NO	2.213	N/A
MW222	Sidegradient	Yes	6.51	NO	1.873	N/A
MW223	Sidegradient	Yes	8.45	NO	2.134	N/A
MW224	Sidegradient	Yes	7.86	NO	2.062	N/A
MW369	Downgradient	Yes	6.82	NO	1.920	N/A
MW372	Downgradient	Yes	18.5	YES	2.918	N/A
MW384	Sidegradient	Yes	11.4	NO	2.434	N/A
MW387	Downgradient	Yes	15.6	YES	2.747	N/A
MW391	Downgradient	Yes	14.3	NO	2.660	N/A
MW394	Upgradient	Yes	11.5	NO	2.442	N/A

Well Number: MW394

Date Collected	Result	LN(Result)
8/13/2002	11.8	2.468
9/16/2002	12.1	2.493
10/16/2002	11.3	2.425
1/13/2003	10.3	2.332
4/10/2003	11.7	2.460
7/16/2003	12	2.485
10/14/2003	12.2	2.501
1/13/2004	11.4	2.434

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
- 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. D1-46

C-746-S/T First Quarter 2018 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)= 1.848 LL(1)=N/A

Statistics-Transformed Background Data X= -2.455 S= 1.619 CV(2)=-0.659 K factor**= 2.523 TL(2)= 1.630 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	0.0306	-3.487
1/15/2003	0.0291	-3.537
4/10/2003	0.0137	-4.290
7/14/2003	2.54	0.932
10/13/2003	0.378	-0.973
1/13/2004	0.159	-1.839
4/13/2004	0.00707	-4.952
7/21/2004	0.0841	-2.476

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	Yes	0.00354	N/A	-5.644	NO
MW221	Sidegradient	Yes	0.00162	N/A	-6.425	NO
MW222	Sidegradient	Yes	0.027	N/A	-3.612	NO
MW223	Sidegradient	Yes	0.0691	N/A	-2.672	NO
MW224	Sidegradient	Yes	0.0176	N/A	-4.040	NO
MW369	Downgradient	Yes	0.0215	N/A	-3.840	NO
MW372	Downgradient	Yes	0.0115	N/A	-4.465	NO
MW384	Sidegradient	Yes	0.0422	N/A	-3.165	NO
MW387	Downgradient	Yes	0.0214	N/A	-3.844	NO
MW391	Downgradient	Yes	0.00322	N/A	-5.738	NO
MW394	Upgradient	Yes	0.0061	N/A	-5.099	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	0.542	-0.612
9/16/2002	0.155	-1.864
10/16/2002	0.103	-2.273
1/13/2003	0.128	-2.056
4/10/2003	0.005	-5.298
7/16/2003	0.272	-1.302
10/14/2003	0.0795	-2.532
1/13/2004	0.0658	-2.721

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

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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)= 0.026 LL(1)=N/A

Statistics-Transformed Background Data X= -5.747 S= 1.205 CV(2)= -0.210 K factor**= 2.523 TL(2)= -2.708 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	0.00558	-5.189
1/15/2003	0.00983	-4.622
4/10/2003	0.0109	-4.519
7/14/2003	0.00245	-6.012
10/13/2003	0.00566	-5.174
1/13/2004	0.00572	-5.164
4/13/2004	0.001	-6.908
7/21/2004	0.00392	-5.542

Well Number: MW394

Date Collected	Result	LN(Result)
8/13/2002	0.025	-3.689
9/16/2002	0.025	-3.689
10/16/2002	0.001	-6.908
1/13/2003	0.001	-6.908
4/10/2003	0.001	-6.908
7/16/2003	0.001	-6.908
10/14/2003	0.001	-6.908
1/13/2004	0.001	-6.908

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	Yes	0.000698	N/A	-7.267	NO
MW221	Sidegradient	Yes	0.00391	N/A	-5.544	NO
MW222	Sidegradient	Yes	0.000518	N/A	-7.566	NO
MW223	Sidegradient	Yes	0.00435	N/A	-5.438	NO
MW224	Sidegradient	Yes	0.000438	N/A	-7.733	NO
MW369	Downgradient	No	0.0005	N/A	-7.601	N/A
MW372	Downgradient	Yes	0.00041	N/A	-7.799	NO
MW384	Sidegradient	Yes	0.000291	N/A	-8.142	NO
MW387	Downgradient	No	0.0005	N/A	-7.601	N/A
MW391	Downgradient	No	0.0005	N/A	-7.601	N/A
MW394	Upgradient	No	0.0005	N/A	-7.601	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. D1-48

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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)= 0.701 LL(1)=N/A

Statistics-Transformed Background Data X= -3.617 S= 1.837 CV(2)= -0.508 K factor**= 2.523 TL(2)= 1.019 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	0.418	-0.872
1/15/2003	0.738	-0.304
4/10/2003	0.544	-0.609
7/14/2003	0.106	-2.244
10/13/2003	0.0529	-2.939
1/13/2004	0.0209	-3.868
4/13/2004	0.005	-5.298
7/21/2004	0.0192	-3.953

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	Yes	0.0135	N/A	-4.305	NO
MW221	Sidegradient	Yes	0.0318	N/A	-3.448	NO
MW222	Sidegradient	Yes	0.0299	N/A	-3.510	NO
MW223	Sidegradient	Yes	0.117	N/A	-2.146	NO
MW224	Sidegradient	Yes	0.0978	N/A	-2.325	NO
MW369	Downgradient	Yes	0.00495	N/A	-5.308	NO
MW372	Downgradient	Yes	0.0012	N/A	-6.725	NO
MW384	Sidegradient	Yes	0.00116	N/A	-6.759	NO
MW387	Downgradient	Yes	0.000824	N/A	-7.101	NO
MW391	Downgradient	Yes	0.000782	N/A	-7.154	NO
MW394	Upgradient	Yes	0.00292	N/A	-5.836	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	0.05	-2.996
9/16/2002	0.05	-2.996
10/16/2002	0.005	-5.298
1/13/2003	0.005	-5.298
4/10/2003	0.005	-5.298
7/16/2003	0.005	-5.298
10/14/2003	0.005	-5.298
1/13/2004	0.005	-5.298

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

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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)= 397.652 LL(1)=N/A

Statistics-Transformed Background Data X= 4.861 S= 1.252 CV(2)=0.258 **K factor**= 2.523** TL(2)= 8.021 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	205	5.323
1/15/2003	1.95	0.668
4/10/2003	203	5.313
7/14/2003	30	3.401
10/13/2003	107	4.673
1/13/2004	295	5.687
4/13/2004	190	5.247
7/21/2004	319	5.765

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	Yes	362	NO	5.892	N/A
MW221	Sidegradient	Yes	401	YES	5.994	N/A
MW222	Sidegradient	Yes	387	NO	5.958	N/A
MW223	Sidegradient	Yes	378	NO	5.935	N/A
MW224	Sidegradient	Yes	367	NO	5.905	N/A
MW369	Downgradient	Yes	346	NO	5.846	N/A
MW372	Downgradient	Yes	275	NO	5.617	N/A
MW384	Sidegradient	Yes	341	NO	5.832	N/A
MW387	Downgradient	Yes	349	NO	5.855	N/A
MW391	Downgradient	Yes	261	NO	5.565	N/A
MW394	Upgradient	Yes	264	NO	5.576	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	90	4.500
9/16/2002	240	5.481
10/16/2002	185	5.220
1/13/2003	220	5.394
4/10/2003	196	5.278
7/16/2003	172	5.147
10/14/2003	175	5.165
1/13/2004	249	5.517

Conclusion of Statistical Analysis on Historical Data

Wells with Exceedances

The test well(s) listed exceeded the Upper Tolerance Limit, which is evidence of elevated concentration with respect to historical background data.

MW221

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

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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) = 6.957	LL(1) =5.3179
Statistics-Transformed Background Data	X = 1.813	S = 0.047	CV(2) =0.026	K factor** = 2.904	TL(2) = 1.950	LL(2) =1.6765

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	6.04	1.798
1/15/2003	6.31	1.842
4/10/2003	6.5	1.872
7/14/2003	6.3	1.841
10/13/2003	6.34	1.847
1/13/2004	6.33	1.845
4/13/2004	6.3	1.841
7/21/2004	5.9	1.775

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	6.12	NO	1.812	N/A
MW221	Sidegradient	Yes	6.18	NO	1.821	N/A
MW222	Sidegradient	Yes	6.2	NO	1.825	N/A
MW223	Sidegradient	Yes	6.19	NO	1.823	N/A
MW224	Sidegradient	Yes	6.14	NO	1.815	N/A
MW369	Downgradient	Yes	6.21	NO	1.826	N/A
MW372	Downgradient	Yes	6.29	NO	1.839	N/A
MW384	Sidegradient	Yes	6.14	NO	1.815	N/A
MW387	Downgradient	Yes	6.19	NO	1.823	N/A
MW391	Downgradient	Yes	6.15	NO	1.816	N/A
MW394	Upgradient	Yes	6.23	NO	1.829	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. D1-51

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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)= 30.144 LL(1)=N/A

Statistics-Transformed Background Data X= 1.130 S= 1.208 CV(2)= 1.069 K factor**= 2.523 TL(2)= 4.178 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	6.7	1.902
1/15/2003	29.7	3.391
4/10/2003	24.9	3.215
7/14/2003	1.13	0.122
10/13/2003	3.43	1.233
1/13/2004	6.71	1.904
4/13/2004	19.3	2.960
7/21/2004	3.97	1.379

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	Yes	1.86	N/A	0.621	NO
MW221	Sidegradient	Yes	5.48	N/A	1.701	NO
MW222	Sidegradient	Yes	0.6	N/A	-0.511	NO
MW223	Sidegradient	Yes	3.8	N/A	1.335	NO
MW224	Sidegradient	Yes	0.703	N/A	-0.352	NO
MW369	Downgradient	Yes	0.504	N/A	-0.685	NO
MW372	Downgradient	Yes	2.13	N/A	0.756	NO
MW384	Sidegradient	Yes	1.2	N/A	0.182	NO
MW387	Downgradient	Yes	1.88	N/A	0.631	NO
MW391	Downgradient	Yes	1.66	N/A	0.507	NO
MW394	Upgradient	Yes	1.12	N/A	0.113	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	0.693
9/16/2002	2	0.693
10/16/2002	1.03	0.030
1/13/2003	1.1	0.095
4/10/2003	1.24	0.215
7/16/2003	1.14	0.131
10/14/2003	1.05	0.049
1/13/2004	1.07	0.068

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

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Radium-226

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= 0.036 S= 0.382 CV(1)= 10.588 K factor**= 2.523 TL(1)= 1.001 LL(1)=N/A

Statistics-Transformed Background Data X= -1.873 S= 1.110 CV(2)= -0.592 K factor**= 2.523 TL(2)= -0.538 LL(2)=N/A

Historical Background Data from Upgradient Wells with Transformed Result

Well Number: MW220

Date Collected	Result	LN(Result)
10/14/2002	-0.804	#Func!
1/15/2003	0	#Func!
10/13/2003	0.389	-0.944
1/13/2004	-0.12	#Func!
4/13/2004	0.159	-1.839
7/21/2004	0.382	-0.962
10/11/2004	0.211	-1.556
1/20/2005	0.229	-1.474

Well Number: MW394

Date Collected	Result	LN(Result)
10/16/2002	0.584	-0.538
1/13/2003	-0.839	#Func!
10/14/2003	0.0325	-3.427
1/13/2004	-0.00402	#Func!
4/12/2004	-0.000337	#Func!
7/20/2004	0.29	-1.238
10/12/2004	0.0366	-3.308
1/18/2005	0.0319	-3.445

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)
MW220	Upgradient	No	-0.246	N/A	#Error	N/A
MW221	Sidegradient	No	0.447	N/A	-0.805	N/A
MW222	Sidegradient	No	0.287	N/A	-1.248	N/A
MW223	Sidegradient	No	0.482	N/A	-0.730	N/A
MW224	Sidegradient	No	0.214	N/A	-1.542	N/A
MW369	Downgradient	No	0.676	N/A	-0.392	N/A
MW372	Downgradient	Yes	0.689	N/A	-0.373	YES
MW384	Sidegradient	No	0.603	N/A	-0.506	N/A
MW387	Downgradient	No	0.063	N/A	-2.765	N/A
MW391	Downgradient	No	0.0244	N/A	-3.713	N/A
MW394	Upgradient	No	0.232	N/A	-1.461	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. D1-53

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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)**= 58.227 **LL(1)**=N/A

Statistics-Transformed Background Data **X**= 3.570 **S**= 0.222 **CV(2)**=0.062 **K factor****= 2.523 **TL(2)**= 4.129 **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	35.4	3.567
1/15/2003	40.6	3.704
4/10/2003	51	3.932
7/14/2003	58.2	4.064
10/13/2003	38.1	3.640
1/13/2004	37	3.611
4/13/2004	43.2	3.766
7/21/2004	33.8	3.520

Well Number: MW394

Date Collected	Result	LN(Result)
8/13/2002	32.9	3.493
9/16/2002	29.9	3.398
10/16/2002	29	3.367
1/13/2003	27.1	3.300
4/10/2003	24.8	3.211
7/16/2003	35.6	3.572
10/14/2003	33.9	3.523
1/13/2004	31.3	3.444

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	Yes	38.8	NO	3.658	N/A
MW221	Sidegradient	Yes	48.4	NO	3.879	N/A
MW222	Sidegradient	Yes	43.5	NO	3.773	N/A
MW223	Sidegradient	Yes	46.7	NO	3.844	N/A
MW224	Sidegradient	Yes	49.9	NO	3.910	N/A
MW369	Downgradient	Yes	48.5	NO	3.882	N/A
MW372	Downgradient	Yes	45.5	NO	3.818	N/A
MW384	Sidegradient	Yes	51.3	NO	3.938	N/A
MW387	Downgradient	Yes	56.4	NO	4.032	N/A
MW391	Downgradient	Yes	31.1	NO	3.437	N/A
MW394	Upgradient	Yes	33.5	NO	3.512	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. D1-54

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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)=** 17.161 **LL(1)=**N/A

Statistics-Transformed Background Data **X=** 2.322 **S=** 0.239 **CV(2)=**0.103 **K factor**=** 2.523 **TL(2)=** 2.925 **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	10.4	2.342
1/15/2003	9.8	2.282
4/10/2003	15.4	2.734
7/14/2003	14.9	2.701
10/13/2003	13.5	2.603
1/13/2004	10.3	2.332
4/13/2004	14.3	2.660
7/21/2004	10.5	2.351

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	Yes	16.4	NO	2.797	N/A
MW221	Sidegradient	Yes	13.7	NO	2.617	N/A
MW222	Sidegradient	Yes	10.4	NO	2.342	N/A
MW223	Sidegradient	Yes	13	NO	2.565	N/A
MW224	Sidegradient	Yes	8.4	NO	2.128	N/A
MW369	Downgradient	Yes	7.63	NO	2.032	N/A
MW372	Downgradient	Yes	75.2	YES	4.320	N/A
MW384	Sidegradient	Yes	21.4	YES	3.063	N/A
MW387	Downgradient	Yes	33.3	YES	3.506	N/A
MW391	Downgradient	Yes	46.1	YES	3.831	N/A
MW394	Upgradient	Yes	10.4	NO	2.342	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	11.2	2.416
9/16/2002	8.3	2.116
10/16/2002	8	2.079
1/13/2003	8.5	2.140
4/10/2003	7.9	2.067
7/16/2003	8.4	2.128
10/14/2003	8.2	2.104
1/13/2004	8.1	2.092

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
- MW384
- MW387
- MW391

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>. D1-55

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Technetium-99 UNITS: pCi/L URG A

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) = 32.768	LL(1) =N/A
Statistics-Transformed Background Data	X = 2.270	S = 0.849	CV(2) =0.374	K factor** = 2.523	TL(2) = 3.262	LL(2) =N/A

Historical Background Data from Upgradient Wells with Transformed Result

Well Number: MW220

Date Collected	Result	LN(Result)
10/14/2002	19.7	2.981
1/15/2003	26.1	3.262
4/10/2003	3.56	1.270
7/14/2003	0	#Func!
10/13/2003	21	3.045
1/13/2004	6.32	1.844
4/13/2004	3	1.099
7/21/2004	14.6	2.681

Well Number: MW394

Date Collected	Result	LN(Result)
8/13/2002	14	2.639
9/16/2002	5.45	1.696
10/16/2002	2.49	0.912
1/13/2003	18.3	2.907
4/10/2003	-1.45	#Func!
7/16/2003	-1.71	#Func!
10/14/2003	18.3	2.907
1/13/2004	0	#Func!

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.

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	Yes	27.4	NO	3.311	N/A
MW221	Sidegradient	No	-0.215	N/A	#Error	N/A
MW222	Sidegradient	No	-1.44	N/A	#Error	N/A
MW223	Sidegradient	No	4.08	N/A	1.406	N/A
MW224	Sidegradient	No	1.89	N/A	0.637	N/A
MW369	Downgradient	Yes	38.8	YES	3.658	N/A
MW372	Downgradient	Yes	17.3	NO	2.851	N/A
MW384	Sidegradient	Yes	139	YES	4.934	N/A
MW387	Downgradient	Yes	306	YES	5.724	N/A
MW391	Downgradient	No	10.8	N/A	2.380	N/A
MW394	Upgradient	No	6.15	N/A	1.816	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, $S = [\text{Sum}([(background\ result - X)^2]/[\text{count of background results} - 1])]^{0.5}$

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. D1-56

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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)= 3.353 LL(1)=N/A

Statistics-Transformed Background Data X= 0.315 S= 0.402 CV(2)=1.279 K factor**= 2.523 TL(2)= 1.330 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	0.000
1/15/2003	1.1	0.095
4/10/2003	1	0.000
7/14/2003	3.3	1.194
10/13/2003	1.8	0.588
1/13/2004	1	0.000
4/13/2004	2	0.693
7/21/2004	3.1	1.131

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	Yes	0.823	NO	-0.195	N/A
MW221	Sidegradient	Yes	1.06	NO	0.058	N/A
MW222	Sidegradient	Yes	0.699	NO	-0.358	N/A
MW223	Sidegradient	Yes	0.754	NO	-0.282	N/A
MW224	Sidegradient	Yes	0.828	NO	-0.189	N/A
MW369	Downgradient	Yes	1.05	NO	0.049	N/A
MW372	Downgradient	Yes	1.62	NO	0.482	N/A
MW384	Sidegradient	Yes	1.5	NO	0.405	N/A
MW387	Downgradient	Yes	1.3	NO	0.262	N/A
MW391	Downgradient	Yes	0.991	NO	-0.009	N/A
MW394	Upgradient	Yes	0.928	NO	-0.075	N/A

Well Number: MW394

Date Collected	Result	LN(Result)
8/13/2002	1.3	0.262
9/16/2002	1	0.000
10/16/2002	1	0.000
1/13/2003	1.6	0.470
4/10/2003	1	0.000
7/16/2003	1.4	0.336
10/14/2003	1.3	0.262
1/13/2004	1	0.000

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

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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)= 475.063 LL(1)=N/A

Statistics-Transformed Background Data X= 3.103 S= 1.145 CV(2)=0.369 **K factor**= 2.523** TL(2)= 5.992 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	50	3.912
1/15/2003	10	2.303
4/10/2003	10	2.303
7/14/2003	10	2.303
10/13/2003	10	2.303
1/13/2004	10	2.303
4/13/2004	10	2.303
7/21/2004	10	2.303

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	Yes	4.86	N/A	1.581	NO
MW221	Sidegradient	Yes	5.36	N/A	1.679	NO
MW222	Sidegradient	No	10	N/A	2.303	N/A
MW223	Sidegradient	Yes	3.72	N/A	1.314	NO
MW224	Sidegradient	No	10	N/A	2.303	N/A
MW369	Downgradient	Yes	12.4	N/A	2.518	NO
MW372	Downgradient	Yes	37	N/A	3.611	NO
MW384	Sidegradient	Yes	11.7	N/A	2.460	NO
MW387	Downgradient	Yes	6.22	N/A	1.828	NO
MW391	Downgradient	Yes	8.76	N/A	2.170	NO
MW394	Upgradient	Yes	11.5	N/A	2.442	NO

Well Number: MW394

Date Collected	Result	LN(Result)
8/13/2002	50	3.912
9/16/2002	672	6.510
10/16/2002	50	3.912
1/13/2003	36.1	3.586
4/10/2003	10	2.303
7/16/2003	42.7	3.754
10/14/2003	22	3.091
1/13/2004	12.8	2.549

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. D1-58

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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)= 29.946 LL(1)=N/A

Statistics-Transformed Background Data X= 1.395 S= 1.449 CV(2)=1.039 K factor**= 2.523 TL(2)= 5.052 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	0.000
1/15/2003	1	0.000
4/10/2003	1	0.000
7/14/2003	1	0.000
10/13/2003	1	0.000
1/13/2004	1	0.000
4/13/2004	1	0.000
7/21/2004	1	0.000

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	No	1	N/A	0.000	N/A
MW221	Sidegradient	No	1	N/A	0.000	N/A
MW222	Sidegradient	No	1	N/A	0.000	N/A
MW223	Sidegradient	Yes	0.84	N/A	-0.174	N/A
MW224	Sidegradient	No	1	N/A	0.000	N/A
MW369	Downgradient	Yes	1.23	N/A	0.207	N/A
MW372	Downgradient	Yes	5.43	NO	1.692	N/A
MW384	Sidegradient	Yes	0.95	N/A	-0.051	N/A
MW387	Downgradient	Yes	1.17	N/A	0.157	N/A
MW391	Downgradient	Yes	11.9	NO	2.477	N/A
MW394	Upgradient	Yes	6.47	NO	1.867	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	16	2.773
9/30/2002	20	2.996
10/16/2002	17	2.833
1/13/2003	15	2.708
4/10/2003	10	2.303
7/16/2003	19	2.944
10/14/2003	20	2.996
1/13/2004	16	2.773

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. D1-59

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Vanadium

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= 0.021 S= 0.002 CV(1)=0.083 K factor**= 2.523 TL(1)= 0.025 LL(1)=N/A

Statistics-Transformed Background Data X= -3.884 S= 0.076 CV(2)=-0.020 K factor**= 2.523 TL(2)= -3.692 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	0.02	-3.912
1/15/2003	0.02	-3.912
4/10/2003	0.02	-3.912
7/14/2003	0.02	-3.912
10/13/2003	0.02	-3.912
1/13/2004	0.02	-3.912
4/13/2004	0.02	-3.912
7/21/2004	0.02	-3.912

Well Number: MW394

Date Collected	Result	LN(Result)
8/13/2002	0.025	-3.689
9/16/2002	0.025	-3.689
10/16/2002	0.02	-3.912
1/13/2003	0.02	-3.912
4/10/2003	0.02	-3.912
7/16/2003	0.02	-3.912
10/14/2003	0.02	-3.912
1/13/2004	0.02	-3.912

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	No	0.01	N/A	-4.605	N/A
MW221	Sidegradient	No	0.01	N/A	-4.605	N/A
MW222	Sidegradient	Yes	0.00484	NO	-5.331	N/A
MW223	Sidegradient	No	0.01	N/A	-4.605	N/A
MW224	Sidegradient	No	0.01	N/A	-4.605	N/A
MW369	Downgradient	Yes	0.00426	NO	-5.458	N/A
MW372	Downgradient	No	0.01	N/A	-4.605	N/A
MW384	Sidegradient	No	0.01	N/A	-4.605	N/A
MW387	Downgradient	No	0.01	N/A	-4.605	N/A
MW391	Downgradient	No	0.01	N/A	-4.605	N/A
MW394	Upgradient	No	0.01	N/A	-4.605	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. D1-60

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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)= 0.101 LL(1)=N/A

Statistics-Transformed Background Data X= -3.485 S= 0.525 CV(2)=-0.151 K factor**= 2.523 TL(2)= -2.162 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	0.025	-3.689
1/15/2003	0.035	-3.352
4/10/2003	0.035	-3.352
7/14/2003	0.0389	-3.247
10/13/2003	0.026	-3.650
1/13/2004	0.02	-3.912
4/13/2004	0.02	-3.912
7/21/2004	0.02	-3.912

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	No	0.01	N/A	-4.605	N/A
MW221	Sidegradient	No	0.01	N/A	-4.605	N/A
MW222	Sidegradient	Yes	0.0044	NO	-5.426	N/A
MW223	Sidegradient	No	0.01	N/A	-4.605	N/A
MW224	Sidegradient	No	0.01	N/A	-4.605	N/A
MW369	Downgradient	Yes	0.00335	NO	-5.699	N/A
MW372	Downgradient	No	0.01	N/A	-4.605	N/A
MW384	Sidegradient	No	0.01	N/A	-4.605	N/A
MW387	Downgradient	No	0.01	N/A	-4.605	N/A
MW391	Downgradient	No	0.01	N/A	-4.605	N/A
MW394	Upgradient	No	0.01	N/A	-4.605	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	0.1	-2.303
9/16/2002	0.1	-2.303
10/16/2002	0.025	-3.689
1/13/2003	0.035	-3.352
4/10/2003	0.035	-3.352
7/16/2003	0.02	-3.912
10/14/2003	0.02	-3.912
1/13/2004	0.02	-3.912

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. D1-61

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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)= 0.815 LL(1)=N/A

Statistics-Transformed Background Data X= -2.266 S= 2.485 CV(2)=-1.097 K factor**= 2.523 TL(2)= 4.003 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	0.2	-1.609
9/16/2002	0.2	-1.609
10/16/2002	0.0002	-8.517
1/13/2003	0.737	-0.305
4/10/2003	0.2	-1.609
7/16/2003	0.2	-1.609
10/14/2003	0.2	-1.609
1/13/2004	0.2	-1.609

Well Number: MW397

Date Collected	Result	LN(Result)
8/13/2002	0.824	-0.194
9/16/2002	0.2	-1.609
10/17/2002	0.0002	-8.517
1/13/2003	0.363	-1.013
4/8/2003	0.2	-1.609
7/16/2003	0.2	-1.609
10/14/2003	0.2	-1.609
1/13/2004	0.2	-1.609

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW370	Downgradient	No	0.05	N/A	-2.996	N/A
MW373	Downgradient	No	0.05	N/A	-2.996	N/A
MW385	Sidegradient	Yes	0.0928	NO	-2.377	N/A
MW388	Downgradient	Yes	0.0501	NO	-2.994	N/A
MW392	Downgradient	Yes	0.0211	NO	-3.858	N/A
MW395	Upgradient	Yes	0.0376	NO	-3.281	N/A
MW397	Upgradient	Yes	0.103	NO	-2.273	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. D1-62

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Beta activity

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= 7.183 S= 2.612 CV(1)=0.364 K factor**= 2.523 TL(1)= 13.773 LL(1)=N/A

Statistics-Transformed Background Data X= 1.870 S= 0.552 CV(2)=0.295 K factor**= 2.523 TL(2)= 3.261 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	1.09	0.086
9/16/2002	5.79	1.756
10/16/2002	6.82	1.920
1/13/2003	5.01	1.611
4/10/2003	6.1	1.808
7/16/2003	8.51	2.141
10/14/2003	4.99	1.607
1/13/2004	6.58	1.884

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW370	Downgradient	Yes	71.9	YES	4.275	N/A
MW373	Downgradient	Yes	23.5	N/A	3.157	N/A
MW385	Sidegradient	Yes	50.6	YES	3.924	N/A
MW388	Downgradient	Yes	52.8	YES	3.967	N/A
MW392	Downgradient	No	2.16	N/A	0.770	N/A
MW395	Upgradient	No	7.59	N/A	2.027	N/A
MW397	Upgradient	No	2.66	N/A	0.978	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	9.57	2.259
9/16/2002	11	2.398
10/17/2002	9.3	2.230
1/13/2003	8.63	2.155
4/8/2003	10	2.303
7/16/2003	6.89	1.930
10/14/2003	10.1	2.313
1/13/2004	4.55	1.515

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
- 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. D1-63

C-746-S/T First Quarter 2018 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)= 2.681 LL(1)=N/A

Statistics-Transformed Background Data X= -1.034 S= 1.030 CV(2)= -0.996 K factor**= 2.523 TL(2)= 1.564 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	0.693
9/16/2002	2	0.693
10/16/2002	0.2	-1.609
1/13/2003	0.2	-1.609
4/10/2003	0.2	-1.609
7/16/2003	0.2	-1.609
10/14/2003	0.2	-1.609
1/13/2004	0.2	-1.609

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW370	Downgradient	Yes	0.0359	N/A	-3.327	NO
MW373	Downgradient	Yes	1.4	N/A	0.336	NO
MW385	Sidegradient	Yes	0.0152	N/A	-4.186	NO
MW388	Downgradient	Yes	0.0324	N/A	-3.430	NO
MW392	Downgradient	Yes	0.0284	N/A	-3.561	NO
MW395	Upgradient	Yes	0.0206	N/A	-3.882	NO
MW397	Upgradient	Yes	0.00938	N/A	-4.669	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: MW397

Date Collected	Result	LN(Result)
8/13/2002	2	0.693
9/16/2002	2	0.693
10/17/2002	0.2	-1.609
1/13/2003	0.2	-1.609
4/8/2003	0.2	-1.609
7/16/2003	0.2	-1.609
10/14/2003	0.2	-1.609
1/13/2004	0.2	-1.609

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. D1-64

C-746-S/T First Quarter 2018 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)= 1.000 LL(1)=N/A

Statistics-Transformed Background Data X= 0.000 S= 0.000 CV(2)=#Num! K factor**= 2.523 TL(2)= 0.000 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	0.000
9/16/2002	1	0.000
10/16/2002	1	0.000
1/13/2003	1	0.000
4/10/2003	1	0.000
7/16/2003	1	0.000
10/14/2003	1	0.000
1/13/2004	1	0.000

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW370	Downgradient	Yes	0.443	NO	-0.814	N/A
MW373	Downgradient	Yes	0.601	NO	-0.509	N/A
MW385	Sidegradient	Yes	0.222	NO	-1.505	N/A
MW388	Downgradient	Yes	0.356	NO	-1.033	N/A
MW392	Downgradient	Yes	0.634	NO	-0.456	N/A
MW395	Upgradient	Yes	0.493	NO	-0.707	N/A
MW397	Upgradient	Yes	0.463	NO	-0.770	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	0.000
9/16/2002	1	0.000
10/17/2002	1	0.000
1/13/2003	1	0.000
4/8/2003	1	0.000
7/16/2003	1	0.000
10/14/2003	1	0.000
1/13/2004	1	0.000

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 First Quarter 2018 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)= 52.213 LL(1)=N/A

Statistics-Transformed Background Data X= 2.357 S= 2.411 CV(2)=1.023 **K factor**= 2.523** TL(2)= 8.439 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	32.2	3.472
9/16/2002	33	3.497
10/16/2002	0.0295	-3.523
1/13/2003	32.1	3.469
4/10/2003	40.2	3.694
7/16/2003	32.4	3.478
10/14/2003	33.9	3.523
1/13/2004	31.2	3.440

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW370	Downgradient	Yes	29.9	NO	3.398	N/A
MW373	Downgradient	Yes	60.3	YES	4.099	N/A
MW385	Sidegradient	Yes	37.4	NO	3.622	N/A
MW388	Downgradient	Yes	28.6	NO	3.353	N/A
MW392	Downgradient	Yes	27.7	NO	3.321	N/A
MW395	Upgradient	Yes	24.5	NO	3.199	N/A
MW397	Upgradient	Yes	19.4	NO	2.965	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	19.4	2.965
9/16/2002	19	2.944
10/17/2002	0.0179	-4.023
1/13/2003	17.8	2.879
4/8/2003	20.3	3.011
7/16/2003	19.4	2.965
10/14/2003	19.9	2.991
1/13/2004	18.8	2.934

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 First Quarter 2018 Statistical Analysis	Historical Background Comparison
Chemical Oxygen Demand (COD)	LRGA
UNITS: mg/L	

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= 35.313	S= 1.250	CV(1)=0.035	K factor**= 2.523	TL(1)= 38.466	LL(1)=N/A
Statistics-Transformed Background Data	X= 3.564	S= 0.033	CV(2)=0.009	K factor**= 2.523	TL(2)= 3.648	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	35	3.555
9/16/2002	35	3.555
10/16/2002	35	3.555
1/13/2003	35	3.555
4/10/2003	35	3.555
7/16/2003	35	3.555
10/14/2003	35	3.555
1/13/2004	35	3.555

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW370	Downgradient	Yes	16.8	NO	2.821	N/A
MW373	Downgradient	Yes	31.4	NO	3.447	N/A
MW385	Sidegradient	No	20	N/A	2.996	N/A
MW388	Downgradient	Yes	18.9	NO	2.939	N/A
MW392	Downgradient	Yes	24.2	NO	3.186	N/A
MW395	Upgradient	Yes	18.9	NO	2.939	N/A
MW397	Upgradient	Yes	18.9	NO	2.939	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	40	3.689
9/16/2002	35	3.555
10/17/2002	35	3.555
1/13/2003	35	3.555
4/8/2003	35	3.555
7/16/2003	35	3.555
10/14/2003	35	3.555
1/13/2004	35	3.555

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. D1-67

C-746-S/T First Quarter 2018 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)= 81.242 LL(1)=N/A

Statistics-Transformed Background Data X= 3.924 S= 0.229 CV(2)=0.058 K factor**= 2.523 TL(2)= 4.501 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	62.2	4.130
9/16/2002	64.7	4.170
10/16/2002	62.2	4.130
1/13/2003	63.5	4.151
4/10/2003	64.1	4.160
7/16/2003	64	4.159
10/14/2003	63.2	4.146
1/13/2004	60.6	4.104

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW370	Downgradient	Yes	35.1	NO	3.558	N/A
MW373	Downgradient	Yes	43.3	NO	3.768	N/A
MW385	Sidegradient	Yes	23.1	NO	3.140	N/A
MW388	Downgradient	Yes	30.8	NO	3.428	N/A
MW392	Downgradient	Yes	46.8	NO	3.846	N/A
MW395	Upgradient	Yes	40.6	NO	3.704	N/A
MW397	Upgradient	Yes	39.1	NO	3.666	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	38.9	3.661
9/16/2002	39.8	3.684
10/17/2002	39.3	3.671
1/13/2003	40.5	3.701
4/8/2003	42.1	3.740
7/16/2003	42	3.738
10/14/2003	40.8	3.709
1/13/2004	41.6	3.728

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. D1-68

C-746-S/T First Quarter 2018 Statistical Analysis Historical Background Comparison
cis-1,2-Dichloroethene 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= 5.000	S= 0.000	CV(1)=0.000	K factor**= 2.523	TL(1)= 5.000	LL(1)=N/A
Statistics-Transformed Background Data	X= 1.609	S= 0.000	CV(2)=0.000	K factor**= 2.523	TL(2)= 1.609	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	1.609
9/30/2002	5	1.609
10/16/2002	5	1.609
1/13/2003	5	1.609
4/10/2003	5	1.609
7/16/2003	5	1.609
10/14/2003	5	1.609
1/13/2004	5	1.609

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW370	Downgradient	No	1	N/A	0.000	N/A
MW373	Downgradient	No	1	N/A	0.000	N/A
MW385	Sidegradient	No	1	N/A	0.000	N/A
MW388	Downgradient	No	1	N/A	0.000	N/A
MW392	Downgradient	Yes	1.1	NO	0.095	N/A
MW395	Upgradient	No	1	N/A	0.000	N/A
MW397	Upgradient	No	1	N/A	0.000	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	1.609
9/30/2002	5	1.609
10/17/2002	5	1.609
1/13/2003	5	1.609
4/8/2003	5	1.609
7/16/2003	5	1.609
10/14/2003	5	1.609
1/13/2004	5	1.609

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. D1-69

C-746-S/T First Quarter 2018 Statistical Analysis Historical Background Comparison

Cobalt

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)= 1.515 K factor**= 2.523 TL(1)= 0.034 LL(1)=N/A

Statistics-Transformed Background Data X= -6.053 S= 1.416 CV(2)= -0.234 K factor**= 2.523 TL(2)= -2.480 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	0.025	-3.689
9/16/2002	0.025	-3.689
10/16/2002	0.001	-6.908
1/13/2003	0.00148	-6.516
4/10/2003	0.00151	-6.496
7/16/2003	0.001	-6.908
10/14/2003	0.001	-6.908
1/13/2004	0.001	-6.908

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW370	Downgradient	Yes	0.000314	N/A	-8.066	NO
MW373	Downgradient	Yes	0.000332	N/A	-8.010	NO
MW385	Sidegradient	No	0.001	N/A	-6.908	N/A
MW388	Downgradient	No	0.001	N/A	-6.908	N/A
MW392	Downgradient	No	0.001	N/A	-6.908	N/A
MW395	Upgradient	No	0.001	N/A	-6.908	N/A
MW397	Upgradient	No	0.001	N/A	-6.908	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	0.025	-3.689
9/16/2002	0.025	-3.689
10/17/2002	0.001	-6.908
1/13/2003	0.001	-6.908
4/8/2003	0.001	-6.908
7/16/2003	0.001	-6.908
10/14/2003	0.001	-6.908
1/13/2004	0.001	-6.908

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 First Quarter 2018 Statistical Analysis Historical 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 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= 377.875 S= 52.101 CV(1)=0.138 **K factor**= 2.523** TL(1)= 509.326 LL(1)=N/A
Statistics-Transformed Background Data X= 5.926 S= 0.136 CV(2)=0.023 **K factor**= 2.523** TL(2)= 6.270 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	405	6.004
9/16/2002	401	5.994
10/16/2002	392	5.971
1/13/2003	404	6.001
4/10/2003	488	6.190
7/16/2003	450	6.109
10/14/2003	410	6.016
1/13/2004	413	6.023

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW370	Downgradient	Yes	449	NO	6.107	N/A
MW373	Downgradient	Yes	730	YES	6.593	N/A
MW385	Sidegradient	Yes	458	NO	6.127	N/A
MW388	Downgradient	Yes	465	NO	6.142	N/A
MW392	Downgradient	Yes	404	NO	6.001	N/A
MW395	Upgradient	Yes	384	NO	5.951	N/A
MW397	Upgradient	Yes	326	NO	5.787	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	322	5.775
9/16/2002	315	5.753
10/17/2002	317	5.759
1/13/2003	320	5.768
4/8/2003	390	5.966
7/16/2003	354	5.869
10/14/2003	331	5.802
1/13/2004	334	5.811

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. D1-71

C-746-S/T First Quarter 2018 Statistical Analysis Historical Background Comparison
Copper 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 = 0.028	S = 0.013	CV(1) =0.474	K factor** = 2.523	TL(1) = 0.061	LL(1) =N/A
Statistics-Transformed Background Data	X = -3.662	S = 0.406	CV(2) =-0.111	K factor** = 2.523	TL(2) = -2.638	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	0.05	-2.996
9/16/2002	0.05	-2.996
10/16/2002	0.0281	-3.572
1/13/2003	0.02	-3.912
4/10/2003	0.02	-3.912
7/16/2003	0.02	-3.912
10/14/2003	0.02	-3.912
1/13/2004	0.02	-3.912

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW370	Downgradient	Yes	0.000629	NO	-7.371	N/A
MW373	Downgradient	Yes	0.000513	NO	-7.575	N/A
MW385	Sidegradient	Yes	0.000534	NO	-7.535	N/A
MW388	Downgradient	Yes	0.000737	NO	-7.213	N/A
MW392	Downgradient	Yes	0.00192	NO	-6.255	N/A
MW395	Upgradient	Yes	0.000374	NO	-7.891	N/A
MW397	Upgradient	Yes	0.000963	NO	-6.945	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	0.05	-2.996
9/16/2002	0.05	-2.996
10/17/2002	0.02	-3.912
1/13/2003	0.02	-3.912
4/8/2003	0.02	-3.912
7/16/2003	0.02	-3.912
10/14/2003	0.02	-3.912
1/13/2004	0.02	-3.912

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. D1-72

C-746-S/T First Quarter 2018 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) = 10.812	LL(1) =N/A
Statistics-Transformed Background Data	X = 1.414	S = 0.550	CV(2) =0.389	K factor** = 2.523	TL(2) = 2.802	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	7.29	1.987
9/30/2002	4.03	1.394
10/16/2002	3.85	1.348
1/13/2003	2.36	0.859
4/10/2003	1.14	0.131
7/16/2003	1.76	0.565
10/14/2003	4.05	1.399
1/13/2004	4.26	1.449

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW370	Downgradient	Yes	5.15	NO	1.639	N/A
MW373	Downgradient	Yes	2.33	NO	0.846	N/A
MW385	Sidegradient	Yes	1.39	NO	0.329	N/A
MW388	Downgradient	Yes	5.51	NO	1.707	N/A
MW392	Downgradient	Yes	1.7	NO	0.531	N/A
MW395	Upgradient	Yes	3.39	NO	1.221	N/A
MW397	Upgradient	Yes	5.37	NO	1.681	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	11.56	2.448
9/16/2002	5.86	1.768
10/17/2002	5.94	1.782
1/13/2003	4.66	1.539
4/8/2003	3.77	1.327
7/16/2003	3.47	1.244
10/14/2003	5.34	1.675
1/13/2004	5.51	1.707

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. D1-73

C-746-S/T First Quarter 2018 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)= 305.301 LL(1)=N/A

Statistics-Transformed Background Data X= 5.379 S= 0.152 CV(2)=0.028 **K factor**= 2.523** TL(2)= 5.762 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	249	5.517
9/16/2002	272	5.606
10/16/2002	255	5.541
1/13/2003	211	5.352
4/10/2003	289	5.666
7/16/2003	236	5.464
10/14/2003	224	5.412
1/13/2004	235	5.460

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW370	Downgradient	Yes	203	NO	5.313	N/A
MW373	Downgradient	Yes	376	YES	5.930	N/A
MW385	Sidegradient	Yes	264	NO	5.576	N/A
MW388	Downgradient	Yes	246	NO	5.505	N/A
MW392	Downgradient	Yes	227	NO	5.425	N/A
MW395	Upgradient	Yes	176	NO	5.170	N/A
MW397	Upgradient	Yes	179	NO	5.187	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	187	5.231
9/16/2002	197	5.283
10/17/2002	183	5.209
1/13/2003	182	5.204
4/8/2003	217	5.380
7/16/2003	196	5.278
10/14/2003	198	5.288
1/13/2004	177	5.176

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. D1-74

C-746-S/T First Quarter 2018 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)= 1.698 LL(1)=N/A

Statistics-Transformed Background Data X= -2.197 S= 2.634 CV(2)= -1.199 K factor**= 2.523 TL(2)= 4.449 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	0.294	-1.224
9/16/2002	0.2	-1.609
10/16/2002	0.0002	-8.517
1/13/2003	1.33	0.285
4/10/2003	1.31	0.270
7/16/2003	0.2	-1.609
10/14/2003	0.1	-2.303
1/13/2004	0.1	-2.303

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW370	Downgradient	No	0.1	N/A	-2.303	N/A
MW373	Downgradient	Yes	0.0864	N/A	-2.449	NO
MW385	Sidegradient	Yes	0.204	N/A	-1.590	NO
MW388	Downgradient	Yes	0.207	N/A	-1.575	NO
MW392	Downgradient	Yes	0.0974	N/A	-2.329	NO
MW395	Upgradient	Yes	0.0896	N/A	-2.412	NO
MW397	Upgradient	Yes	0.243	N/A	-1.415	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: MW397

Date Collected	Result	LN(Result)
8/13/2002	1.58	0.457
9/16/2002	0.232	-1.461
10/17/2002	0.0002	-8.517
1/13/2003	0.453	-0.792
4/8/2003	0.2	-1.609
7/16/2003	0.2	-1.609
10/14/2003	0.1	-2.303
1/13/2004	0.1	-2.303

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 First Quarter 2018 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)= 20.922 LL(1)=N/A

Statistics-Transformed Background Data X= 1.423 S= 2.408 CV(2)=1.692 K factor**= 2.523 TL(2)= 7.500 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	12.5	2.526
9/16/2002	13	2.565
10/16/2002	0.0127	-4.366
1/13/2003	11.2	2.416
4/10/2003	17.5	2.862
7/16/2003	12.9	2.557
10/14/2003	13.4	2.595
1/13/2004	12.4	2.518

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW370	Downgradient	Yes	13.2	NO	2.580	N/A
MW373	Downgradient	Yes	24.3	YES	3.190	N/A
MW385	Sidegradient	Yes	14.6	NO	2.681	N/A
MW388	Downgradient	Yes	13.1	NO	2.573	N/A
MW392	Downgradient	Yes	10.7	NO	2.370	N/A
MW395	Upgradient	Yes	10.8	NO	2.380	N/A
MW397	Upgradient	Yes	8.61	NO	2.153	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	7.83	2.058
9/16/2002	7.64	2.033
10/17/2002	0.00658	-5.024
1/13/2003	6.69	1.901
4/8/2003	7.28	1.985
7/16/2003	7.82	2.057
10/14/2003	7.94	2.072
1/13/2004	7.51	2.016

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. D1-76

C-746-S/T First Quarter 2018 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)= 0.624 LL(1)=N/A

Statistics-Transformed Background Data X= -3.104 S= 1.529 CV(2)=-0.493 K factor**= 2.523 TL(2)= 0.755 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	0.361	-1.019
9/16/2002	0.028	-3.576
10/16/2002	0.026	-3.650
1/13/2003	0.0713	-2.641
4/10/2003	0.629	-0.464
7/16/2003	0.297	-1.214
10/14/2003	0.0198	-3.922
1/13/2004	0.0126	-4.374

Well Number: MW397

Date Collected	Result	LN(Result)
8/13/2002	0.466	-0.764
9/16/2002	0.077	-2.564
10/17/2002	0.028	-3.576
1/13/2003	0.0164	-4.110
4/8/2003	0.0407	-3.202
7/16/2003	0.0167	-4.092
10/14/2003	0.00555	-5.194
1/13/2004	0.005	-5.298

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW370	Downgradient	No	0.00336	N/A	-5.696	N/A
MW373	Downgradient	Yes	0.0142	N/A	-4.255	NO
MW385	Sidegradient	Yes	0.00674	N/A	-5.000	NO
MW388	Downgradient	Yes	0.00138	N/A	-6.586	NO
MW392	Downgradient	Yes	0.0203	N/A	-3.897	NO
MW395	Upgradient	Yes	0.00115	N/A	-6.768	NO
MW397	Upgradient	Yes	0.00705	N/A	-4.955	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. D1-77

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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)= 0.034 LL(1)=N/A

Statistics-Transformed Background Data X= -5.990 S= 1.443 CV(2)=-0.241 K factor**= 2.523 TL(2)= -2.349 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	0.025	-3.689
9/16/2002	0.025	-3.689
10/16/2002	0.001	-6.908
1/13/2003	0.00609	-5.101
4/10/2003	0.001	-6.908
7/16/2003	0.001	-6.908
10/14/2003	0.001	-6.908
1/13/2004	0.001	-6.908

Well Number: MW397

Date Collected	Result	LN(Result)
8/13/2002	0.025	-3.689
9/16/2002	0.025	-3.689
10/17/2002	0.001	-6.908
1/13/2003	0.001	-6.908
4/8/2003	0.001	-6.908
7/16/2003	0.001	-6.908
10/14/2003	0.001	-6.908
1/13/2004	0.001	-6.908

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW370	Downgradient	No	0.0005	N/A	-7.601	N/A
MW373	Downgradient	No	0.0005	N/A	-7.601	N/A
MW385	Sidegradient	Yes	0.0006	N/A	-7.419	NO
MW388	Downgradient	Yes	0.000288	N/A	-8.153	NO
MW392	Downgradient	Yes	0.000284	N/A	-8.167	NO
MW395	Upgradient	Yes	0.000279	N/A	-8.184	NO
MW397	Upgradient	No	0.0005	N/A	-7.601	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. D1-78

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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)= 0.068 LL(1)=N/A

Statistics-Transformed Background Data X= -4.540 S= 1.020 CV(2)= -0.225 K factor**= 2.523 TL(2)= -1.965 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	0.05	-2.996
9/16/2002	0.05	-2.996
10/16/2002	0.00702	-4.959
1/13/2003	0.029	-3.540
4/10/2003	0.0091	-4.699
7/16/2003	0.00627	-5.072
10/14/2003	0.005	-5.298
1/13/2004	0.005	-5.298

Well Number: MW397

Date Collected	Result	LN(Result)
8/13/2002	0.05	-2.996
9/16/2002	0.05	-2.996
10/17/2002	0.005	-5.298
1/13/2003	0.00502	-5.294
4/8/2003	0.005	-5.298
7/16/2003	0.005	-5.298
10/14/2003	0.005	-5.298
1/13/2004	0.005	-5.298

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW370	Downgradient	Yes	0.000752	N/A	-7.193	NO
MW373	Downgradient	Yes	0.0009	N/A	-7.013	NO
MW385	Sidegradient	Yes	0.0015	N/A	-6.502	NO
MW388	Downgradient	Yes	0.00208	N/A	-6.175	NO
MW392	Downgradient	Yes	0.00105	N/A	-6.859	NO
MW395	Upgradient	Yes	0.0012	N/A	-6.725	NO
MW397	Upgradient	Yes	0.000989	N/A	-6.919	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. D1-79

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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)= 289.395 LL(1)=N/A

Statistics-Transformed Background Data X= 5.003 S= 0.348 CV(2)=0.069 **K factor**= 2.523** TL(2)= 5.880 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	80	4.382
9/16/2002	145	4.977
10/16/2002	125	4.828
1/13/2003	85	4.443
4/10/2003	159	5.069
7/16/2003	98	4.585
10/14/2003	138	4.927
1/13/2004	233	5.451

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW370	Downgradient	Yes	334	YES	5.811	N/A
MW373	Downgradient	Yes	393	YES	5.974	N/A
MW385	Sidegradient	Yes	234	NO	5.455	N/A
MW388	Downgradient	Yes	341	YES	5.832	N/A
MW392	Downgradient	Yes	292	YES	5.677	N/A
MW395	Upgradient	Yes	195	NO	5.273	N/A
MW397	Upgradient	Yes	361	YES	5.889	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	115	4.745
9/30/2002	140	4.942
10/17/2002	185	5.220
1/13/2003	230	5.438
4/8/2003	155	5.043
7/16/2003	188	5.236
10/14/2003	187	5.231
1/13/2004	253	5.533

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
- MW388
- MW392
- 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. D1-80

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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)= 6.767	LL(1)=5.3289
Statistics-Transformed Background Data	X= 1.799	S= 0.042	CV(2)=0.023	K factor**= 2.904	TL(2)= 1.920	LL(2)=1.6782

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	5.8	1.758
9/16/2002	6	1.792
10/16/2002	5.47	1.699
1/13/2003	6	1.792
4/10/2003	6.18	1.821
7/16/2003	6	1.792
10/14/2003	6.31	1.842
1/13/2004	6.24	1.831

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	6.12	NO	1.812	N/A
MW373	Downgradient	Yes	6.19	NO	1.823	N/A
MW385	Sidegradient	Yes	6.51	NO	1.873	N/A
MW388	Downgradient	Yes	6.18	NO	1.821	N/A
MW392	Downgradient	Yes	6.24	NO	1.831	N/A
MW395	Upgradient	Yes	6.51	NO	1.873	N/A
MW397	Upgradient	Yes	6.06	NO	1.802	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	5.84	1.765
9/30/2002	6	1.792
10/17/2002	5.75	1.749
1/13/2003	6	1.792
4/8/2003	6.3	1.841
7/16/2003	6.2	1.825
10/14/2003	6.36	1.850
1/13/2004	6.32	1.844

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. D1-81

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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)= 3.208 LL(1)=N/A

Statistics-Transformed Background Data X= -0.306 S= 2.457 CV(2)=-8.028 K factor**= 2.523 TL(2)= 5.892 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	0.693
9/16/2002	2	0.693
10/16/2002	0.00129	-6.653
1/13/2003	1.51	0.412
4/10/2003	1.67	0.513
7/16/2003	1.73	0.548
10/14/2003	1.7	0.531
1/13/2004	1.58	0.457

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW370	Downgradient	Yes	2.46	NO	0.900	N/A
MW373	Downgradient	Yes	2.5	NO	0.916	N/A
MW385	Sidegradient	Yes	1.82	NO	0.599	N/A
MW388	Downgradient	Yes	2.24	NO	0.806	N/A
MW392	Downgradient	Yes	1.83	NO	0.604	N/A
MW395	Upgradient	Yes	1.5	NO	0.405	N/A
MW397	Upgradient	Yes	1.89	NO	0.637	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	2.03	0.708
9/16/2002	2	0.693
10/17/2002	0.00145	-6.536
1/13/2003	1.69	0.525
4/8/2003	1.73	0.548
7/16/2003	2	0.693
10/14/2003	1.92	0.652
1/13/2004	1.87	0.626

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

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Radium-226

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= 0.039 S= 0.419 CV(1)= 10.740 K factor**= 2.523 TL(1)= 1.096 LL(1)=N/A

Statistics-Transformed Background Data X= -1.695 S= 1.043 CV(2)= -0.615 K factor**= 2.523 TL(2)= -0.414 LL(2)=N/A

Historical Background Data from Upgradient Wells with Transformed Result

Well Number: MW395

Date Collected	Result	LN(Result)
10/16/2002	0.661	-0.414
1/13/2003	-0.839	#Func!
10/14/2003	0.0266	-3.627
1/13/2004	-0.0777	#Func!
4/12/2004	-0.115	#Func!
7/20/2004	0.105	-2.254
10/12/2004	0.408	-0.896
1/18/2005	0.0564	-2.875

Well Number: MW397

Date Collected	Result	LN(Result)
10/17/2002	0.576	-0.552
1/13/2003	-0.841	#Func!
10/14/2003	-0.179	#Func!
1/13/2004	-0.0564	#Func!
4/12/2004	0.174	-1.749
7/21/2004	0.227	-1.483
10/12/2004	0.379	-0.970
1/20/2005	0.119	-2.129

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)
MW370	Downgradient	Yes	1.01	N/A	0.010	YES
MW373	Downgradient	No	0.322	N/A	-1.133	N/A
MW385	Sidegradient	No	0.151	N/A	-1.890	N/A
MW388	Downgradient	Yes	1.07	N/A	0.068	YES
MW392	Downgradient	No	0.297	N/A	-1.214	N/A
MW395	Upgradient	No	0.592	N/A	-0.524	N/A
MW397	Upgradient	No	0.3	N/A	-1.204	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

MW370
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. D1-83

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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)= 64.616 LL(1)=N/A

Statistics-Transformed Background Data X= 2.615 S= 2.411 CV(2)=0.922 K factor**= 2.523 TL(2)= 8.699 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	27	3.296
9/16/2002	27.2	3.303
10/16/2002	0.0253	-3.677
1/13/2003	22.6	3.118
4/10/2003	53.9	3.987
7/16/2003	30	3.401
10/14/2003	29.1	3.371
1/13/2004	26.4	3.273

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW370	Downgradient	Yes	47.2	NO	3.854	N/A
MW373	Downgradient	Yes	49.8	NO	3.908	N/A
MW385	Sidegradient	Yes	30.5	NO	3.418	N/A
MW388	Downgradient	Yes	50.1	NO	3.914	N/A
MW392	Downgradient	Yes	33.1	NO	3.500	N/A
MW395	Upgradient	Yes	28.2	NO	3.339	N/A
MW397	Upgradient	Yes	34.1	NO	3.529	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	35.2	3.561
9/16/2002	34.3	3.535
10/17/2002	0.0336	-3.393
1/13/2003	31.3	3.444
4/8/2003	46.1	3.831
7/16/2003	38.4	3.648
10/14/2003	37.1	3.614
1/13/2004	34.3	3.535

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. D1-84

C-746-S/T First Quarter 2018 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)= 16.173 LL(1)=N/A

Statistics-Transformed Background Data X= 2.356 S= 0.203 CV(2)=0.086 K factor**= 2.523 TL(2)= 2.869 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	10.3	2.332
9/16/2002	9.1	2.208
10/16/2002	8.8	2.175
1/13/2003	9	2.197
4/10/2003	8.3	2.116
7/16/2003	8.2	2.104
10/14/2003	8.3	2.116
1/13/2004	8.2	2.104

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW370	Downgradient	Yes	22.4	YES	3.109	N/A
MW373	Downgradient	Yes	98.7	YES	4.592	N/A
MW385	Sidegradient	Yes	18.6	YES	2.923	N/A
MW388	Downgradient	Yes	25.2	YES	3.227	N/A
MW392	Downgradient	Yes	8.01	NO	2.081	N/A
MW395	Upgradient	Yes	10.4	NO	2.342	N/A
MW397	Upgradient	Yes	11.4	NO	2.434	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	14	2.639
9/16/2002	12.8	2.549
10/17/2002	12.3	2.510
1/13/2003	12.7	2.542
4/8/2003	12.8	2.549
7/16/2003	13.1	2.573
10/14/2003	12.1	2.493
1/13/2004	12.1	2.493

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. D1-85

C-746-S/T First Quarter 2018 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)= 34.414	LL(1)=N/A
Statistics-Transformed Background Data	X= 2.398	S= 0.859	CV(2)=0.358	K factor**= 2.523	TL(2)= 3.246	LL(2)=N/A

Historical Background Data from Upgradient Wells with Transformed Result

Well Number: MW395

Date Collected	Result	LN(Result)
8/13/2002	20.8	3.035
9/16/2002	16.2	2.785
10/16/2002	8.28	2.114
1/13/2003	13	2.565
4/10/2003	-9.37	#Func!
7/16/2003	0.826	-0.191
10/14/2003	14.1	2.646
1/13/2004	0	#Func!

Well Number: MW397

Date Collected	Result	LN(Result)
8/13/2002	6.06	1.802
9/16/2002	17.3	2.851
10/17/2002	25.7	3.246
1/13/2003	20.9	3.040
4/8/2003	20.1	3.001
7/16/2003	9.2	2.219
10/14/2003	10.1	2.313
1/13/2004	8.54	2.145

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.

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW370	Downgradient	Yes	73.9	YES	4.303	N/A
MW373	Downgradient	No	24.8	N/A	3.211	N/A
MW385	Sidegradient	Yes	86.8	YES	4.464	N/A
MW388	Downgradient	Yes	96.7	YES	4.572	N/A
MW392	Downgradient	No	4.72	N/A	1.552	N/A
MW395	Upgradient	No	15.7	N/A	2.754	N/A
MW397	Upgradient	No	13.2	N/A	2.580	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

- MW370
- 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, $S = [\text{Sum}([(background\ result - X)^2]/[\text{count of background results} - 1])]^{0.5}$

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. D1-86

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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)= 3.702 LL(1)=N/A

Statistics-Transformed Background Data X= 0.325 S= 0.452 CV(2)=1.393 K factor**= 2.523 TL(2)= 1.465 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	1.6	0.470
9/16/2002	1.1	0.095
10/16/2002	1	0.000
1/13/2003	2	0.693
4/10/2003	3.4	1.224
7/16/2003	2	0.693
10/14/2003	1	0.000
1/13/2004	1	0.000

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW370	Downgradient	Yes	1.04	NO	0.039	N/A
MW373	Downgradient	Yes	1.11	NO	0.104	N/A
MW385	Sidegradient	Yes	0.924	NO	-0.079	N/A
MW388	Downgradient	Yes	1.28	NO	0.247	N/A
MW392	Downgradient	Yes	1.1	NO	0.095	N/A
MW395	Upgradient	Yes	0.962	NO	-0.039	N/A
MW397	Upgradient	Yes	0.829	NO	-0.188	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	0.000
9/16/2002	1	0.000
10/17/2002	1	0.000
1/13/2003	3.6	1.281
4/8/2003	1.9	0.642
7/16/2003	1.1	0.095
10/14/2003	1	0.000
1/13/2004	1	0.000

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. D1-87

C-746-S/T First Quarter 2018 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)= 21.695 LL(1)=N/A

Statistics-Transformed Background Data X= 1.467 S= 1.213 CV(2)=0.827 K factor**= 2.523 TL(2)= 4.528 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	11	2.398
9/30/2002	14	2.639
10/16/2002	12	2.485
1/13/2003	14	2.639
4/10/2003	14	2.639
7/16/2003	13	2.565
10/14/2003	12	2.485
1/13/2004	11	2.398

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW370	Downgradient	Yes	0.56	N/A	-0.580	N/A
MW373	Downgradient	Yes	6.26	NO	1.834	N/A
MW385	Sidegradient	Yes	0.48	N/A	-0.734	N/A
MW388	Downgradient	Yes	0.73	N/A	-0.315	N/A
MW392	Downgradient	Yes	16.6	NO	2.809	N/A
MW395	Upgradient	Yes	2.91	N/A	1.068	N/A
MW397	Upgradient	No	1	N/A	0.000	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	1.609
9/30/2002	5	1.609
10/17/2002	1	0.000
1/13/2003	1	0.000
4/8/2003	1	0.000
7/16/2003	1	0.000
10/14/2003	1	0.000
1/13/2004	1	0.000

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. D1-89

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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)= 0.129 LL(1)=N/A

Statistics-Transformed Background Data X= -3.342 S= 0.659 CV(2)=-0.197 K factor**= 2.523 TL(2)= -1.679 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	0.1	-2.303
9/16/2002	0.1	-2.303
10/16/2002	0.025	-3.689
1/13/2003	0.035	-3.352
4/10/2003	0.035	-3.352
7/16/2003	0.02	-3.912
10/14/2003	0.02	-3.912
1/13/2004	0.02	-3.912

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW370	Downgradient	No	0.01	N/A	-4.605	N/A
MW373	Downgradient	No	0.01	N/A	-4.605	N/A
MW385	Sidegradient	No	0.01	N/A	-4.605	N/A
MW388	Downgradient	No	0.01	N/A	-4.605	N/A
MW392	Downgradient	No	0.01	N/A	-4.605	N/A
MW395	Upgradient	No	0.01	N/A	-4.605	N/A
MW397	Upgradient	Yes	0.00337	NO	-5.693	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	0.1	-2.303
9/16/2002	0.1	-2.303
10/17/2002	0.025	-3.689
1/13/2003	0.035	-3.352
4/8/2003	0.035	-3.352
7/16/2003	0.02	-3.912
10/14/2003	0.02	-3.912
1/13/2004	0.02	-3.912

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. D1-90

ATTACHMENT D2

**COMPARISON OF CURRENT DATA TO
ONE-SIDED UPPER TOLERANCE INTERVAL TEST
CALCULATED USING
CURRENT BACKGROUND DATA**

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C-746-S/T First Quarter 2018 Statistical Analysis

Current Background Comparison

Beta activity

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**= 0.656 **S**= 1.689 **CV(1)**=2.576 **K factor****= 3.188 **TL(1)**= 6.039 **LL(1)**=N/A

Statistics-Transformed Background Data **X**= -0.472 **S**= 1.900 **CV(2)**= -4.024 **K factor****= 3.188 **TL(2)**= 1.061 **LL(2)**=N/A

Current Background Data from Upgradient Wells with Transformed Result

Well Number: MW396

Date Collected	Result	LN(Result)
1/5/2016	1.53	0.425
4/18/2016	2.89	1.061
7/19/2016	-2.66	#Func!
10/12/2016	2.09	0.737
1/17/2017	0.0175	-4.046
4/20/2017	0.34	-1.079
7/19/2017	1.07	0.068
10/9/2017	-0.033	#Func!

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	57.7	N/A	4.055	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, $S = [\text{Sum}([(background\ result-X)^2]/[\text{count of background results} - 1])]^{0.5}$

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. D2-3

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Current 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 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**= 257.000 **S**= 73.280 **CV(1)**=0.285 **K factor****= 3.188 **TL(1)**= 490.618 **LL(1)**=N/A

Statistics-Transformed Background Data **X**= 5.516 **S**= 0.273 **CV(2)**=0.049 **K factor****= 3.188 **TL(2)**= 6.385 **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)
1/5/2016	223	5.407
4/18/2016	384	5.951
7/19/2016	339	5.826
10/12/2016	221	5.398
1/17/2017	209	5.342
4/20/2017	172	5.147
7/19/2017	291	5.673
10/9/2017	217	5.380

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW386	Sidegradient	Yes	142	NO	4.956	N/A
MW390	Downgradient	Yes	353	NO	5.866	N/A
MW393	Downgradient	Yes	266	NO	5.583	N/A
MW396	Upgradient	Yes	203	NO	5.313	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, $S = \sqrt{[\text{Sum} ((\text{background result}-X)^2)/(\text{count of background results} - 1)]^{0.5}}$

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. D2-4

C-746-S/T First Quarter 2018 Statistical Analysis

Current 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 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**= -2.765 **S**= 7.236 **CV(1)**=-2.617 **K factor****= 3.188 **TL(1)**= 20.305 **LL(1)**=N/A

Statistics-Transformed Background Data **X**= 1.169 **S**= 0.704 **CV(2)**=0.602 **K factor****= 3.188 **TL(2)**= 1.831 **LL(2)**=N/A

Current Background Data from Upgradient Wells with Transformed Result

Well Number: MW396

Date Collected	Result	LN(Result)
1/5/2016	6.24	1.831
4/18/2016	-7.52	#Func!
7/19/2016	3.89	1.358
10/12/2016	-10.9	#Func!
1/17/2017	3.72	1.314
4/20/2017	-7.44	#Func!
7/19/2017	1.19	0.174
10/9/2017	-11.3	#Func!

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.

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW390	Downgradient	Yes	82.8	YES	4.416	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

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, $S = \sqrt{[\text{Sum} ((\text{background result}-X)^2)/(\text{count of background results} - 1)]^{0.5}}$

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. D2-5

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Current 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 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 = 0.051	S = 0.033	CV(1) =0.652	K factor** = 2.523	TL(1) = 0.134	LL(1) =N/A
Statistics-Transformed Background Data	X = -3.111	S = 0.487	CV(2) =-0.156	K factor** = 2.523	TL(2) = -1.883	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)
1/5/2016	0.05	-2.996
4/12/2016	0.05	-2.996
7/19/2016	0.05	-2.996
10/10/2016	0.036	-3.324
1/11/2017	0.0444	-3.115
4/19/2017	0.0372	-3.291
7/19/2017	0.05	-2.996
10/9/2017	0.0203	-3.897

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW222	Sidegradient	Yes	0.707	YES	-0.347	N/A

Well Number: MW394

Date Collected	Result	LN(Result)
1/5/2016	0.0363	-3.316
4/18/2016	0.0168	-4.086
7/19/2016	0.05	-2.996
10/12/2016	0.05	-2.996
1/17/2017	0.05	-2.996
4/20/2017	0.05	-2.996
7/19/2017	0.05	-2.996
10/9/2017	0.167	-1.790

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

MW222

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. D2-6

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Current Background Comparison

Beta activity

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 = 10.655	S = 7.141	CV(1) =0.670	K factor** = 2.523	TL(1) = 28.671	LL(1) =N/A
Statistics-Transformed Background Data	X = 2.248	S = 0.662	CV(2) =0.294	K factor** = 2.523	TL(2) = 3.114	LL(2) =N/A

Current Background Data from Upgradient Wells with Transformed Result

Well Number: MW220

Date Collected	Result	LN(Result)
1/5/2016	18.1	2.896
4/12/2016	14.2	2.653
7/19/2016	6.61	1.889
10/10/2016	21.7	3.077
1/11/2017	13.6	2.610
4/19/2017	20.1	3.001
7/19/2017	22.5	3.114
10/9/2017	13.1	2.573

Well Number: MW394

Date Collected	Result	LN(Result)
1/5/2016	6.13	1.813
4/18/2016	7.54	2.020
7/19/2016	4.04	1.396
10/12/2016	2.51	0.920
1/17/2017	5.57	1.717
4/20/2017	9.09	2.207
7/19/2017	6.29	1.839
10/9/2017	-0.603	#Func!

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.

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW384	Sidegradient	Yes	89.7	YES	4.496	N/A
MW387	Downgradient	Yes	201	YES	5.303	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

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, $S = [\text{Sum}([(background\ result-X)^2]/[\text{count of background results} - 1])]^{0.5}$

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. D2-7

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**= 24.313 **S**= 3.847 **CV(1)**=0.158 **K factor****= 2.523 **TL(1)**= 34.018 **LL(1)**=N/A

Statistics-Transformed Background Data **X**= 3.179 **S**= 0.162 **CV(2)**=0.051 **K factor****= 2.523 **TL(2)**= 3.587 **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)
1/5/2016	19.3	2.960
4/12/2016	25.7	3.246
7/19/2016	19.5	2.970
10/10/2016	20.5	3.020
1/11/2017	19.6	2.976
4/19/2017	20.8	3.035
7/19/2017	22.7	3.122
10/9/2017	19.9	2.991

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW372	Downgradient	Yes	49.4	YES	3.900	N/A

Well Number: MW394

Date Collected	Result	LN(Result)
1/5/2016	27.7	3.321
4/18/2016	29.5	3.384
7/19/2016	28.8	3.360
10/12/2016	28.6	3.353
1/17/2017	26.7	3.285
4/20/2017	27.9	3.329
7/19/2017	26.1	3.262
10/9/2017	25.7	3.246

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, $S = [\text{Sum}([(background\ result-X)^2]/[\text{count of background results} - 1])]^{0.5}$

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. D2-8

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Current 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 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= 220.313 S= 67.292 CV(1)=0.305 **K factor**= 2.523** TL(1)= 390.091 LL(1)=N/A

Statistics-Transformed Background Data X= 5.364 S= 0.240 CV(2)=0.045 **K factor**= 2.523** TL(2)= 5.970 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)
1/5/2016	209	5.342
4/12/2016	273	5.609
7/19/2016	200	5.298
10/10/2016	187	5.231
1/11/2017	201	5.303
4/19/2017	193	5.263
7/19/2017	451	6.111
10/9/2017	147	4.990

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW372	Downgradient	Yes	330	NO	5.799	N/A

Well Number: MW394

Date Collected	Result	LN(Result)
1/5/2016	226	5.421
4/18/2016	199	5.293
7/19/2016	231	5.442
10/12/2016	219	5.389
1/17/2017	213	5.361
4/20/2017	203	5.313
7/19/2017	203	5.313
10/9/2017	170	5.136

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. D2-9

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**= 10.309 **S**= 1.550 **CV(1)**=0.150 **K factor****= 2.523 **TL(1)**= 14.221 **LL(1)**=N/A

Statistics-Transformed Background Data **X**= 2.322 **S**= 0.154 **CV(2)**=0.067 **K factor****= 2.523 **TL(2)**= 2.712 **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)
1/5/2016	8.44	2.133
4/12/2016	10.5	2.351
7/19/2016	7.99	2.078
10/10/2016	8.7	2.163
1/11/2017	8.48	2.138
4/19/2017	9.11	2.209
7/19/2017	9.36	2.236
10/9/2017	8.67	2.160

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW372	Downgradient	Yes	18.5	YES	2.918	N/A
MW387	Downgradient	Yes	15.6	YES	2.747	N/A

Well Number: MW394

Date Collected	Result	LN(Result)
1/5/2016	11.9	2.477
4/18/2016	11.9	2.477
7/19/2016	11.7	2.460
10/12/2016	12.1	2.493
1/17/2017	11.7	2.460
4/20/2017	11.6	2.451
7/19/2017	11.4	2.434
10/9/2017	11.4	2.434

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, $S = [\text{Sum}([(background\ result-X)^2]/[\text{count of background results} - 1])]^{0.5}$

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. D2-10

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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**= 383.875 **S**= 56.604 **CV(1)**=0.147 **K factor****= 2.523 **TL(1)**= 526.686 **LL(1)**=N/A

Statistics-Transformed Background Data **X**= 5.940 **S**= 0.150 **CV(2)**=0.025 **K factor****= 2.523 **TL(2)**= 6.319 **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)
1/5/2016	449	6.107
4/12/2016	438	6.082
7/19/2016	425	6.052
10/10/2016	414	6.026
1/11/2017	417	6.033
4/19/2017	283	5.645
7/19/2017	350	5.858
10/9/2017	436	6.078

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW221	Sidegradient	Yes	401	NO	5.994	N/A

Well Number: MW394

Date Collected	Result	LN(Result)
1/5/2016	351	5.861
4/18/2016	484	6.182
7/19/2016	348	5.852
10/12/2016	369	5.911
1/17/2017	397	5.984
4/20/2017	306	5.724
7/19/2017	338	5.823
10/9/2017	337	5.820

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, $S = [\text{Sum}([(background\ result-X)^2]/[\text{count of background results} - 1])]^{0.5}$

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>. D2-11

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Current Background Comparison

Radium-226

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**= 0.511 **S**= 0.322 **CV(1)**=0.631 **K factor****= 2.523 **TL(1)**= 1.324 **LL(1)**=N/A

Statistics-Transformed Background Data **X**= -0.895 **S**= 0.769 **CV(2)**=-0.860 **K factor****= 2.523 **TL(2)**= 1.045 **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)
1/5/2016	0.745	-0.294
4/12/2016	0.657	-0.420
7/19/2016	0.375	-0.981
10/10/2016	1.15	0.140
1/11/2017	0.308	-1.178
4/19/2017	0.178	-1.726
7/19/2017	0.476	-0.742
10/9/2017	0.212	-1.551

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW372	Downgradient	Yes	0.689	NO	-0.373	N/A

Well Number: MW394

Date Collected	Result	LN(Result)
1/5/2016	1.19	0.174
4/18/2016	0.757	-0.278
7/19/2016	0.405	-0.904
10/12/2016	0.419	-0.870
1/17/2017	0.518	-0.658
4/20/2017	0.0524	-2.949
7/19/2017	0.462	-0.772
10/9/2017	0.271	-1.306

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, $S = [\text{Sum}([(background\ result-X)^2]/[\text{count of background results} - 1])]^{0.5}$

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. D2-12

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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**= 14.771 **S**= 4.793 **CV(1)**=0.324 **K factor****= 2.523 **TL(1)**= 26.864 **LL(1)**=N/A

Statistics-Transformed Background Data **X**= 2.643 **S**= 0.325 **CV(2)**=0.123 **K factor****= 2.523 **TL(2)**= 3.464 **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)
1/5/2016	16.5	2.803
4/12/2016	21.8	3.082
7/19/2016	17.9	2.885
10/10/2016	18.7	2.929
1/11/2017	18.4	2.912
4/19/2017	19.9	2.991
7/19/2017	22.7	3.122
10/9/2017	17.6	2.868

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW372	Downgradient	Yes	75.2	YES	4.320	N/A
MW384	Sidegradient	Yes	21.4	NO	3.063	N/A
MW387	Downgradient	Yes	33.3	YES	3.506	N/A
MW391	Downgradient	Yes	46.1	YES	3.831	N/A

Well Number: MW394

Date Collected	Result	LN(Result)
1/5/2016	10.1	2.313
4/18/2016	9.84	2.286
7/19/2016	10.5	2.351
10/12/2016	10.4	2.342
1/17/2017	10.8	2.380
4/20/2017	10.5	2.351
7/19/2017	10.2	2.322
10/9/2017	10.5	2.351

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
- MW391

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. D2-13

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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**= 13.471 **S**= 7.966 **CV(1)**=0.591 **K factor****= 2.523 **TL(1)**= 33.570 **LL(1)**=N/A

Statistics-Transformed Background Data **X**= 2.382 **S**= 0.751 **CV(2)**=0.315 **K factor****= 2.523 **TL(2)**= 4.277 **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)
1/5/2016	18.4	2.912
4/12/2016	13	2.565
7/19/2016	28.9	3.364
10/10/2016	12.3	2.510
1/11/2017	23.2	3.144
4/19/2017	20.7	3.030
7/19/2017	22.7	3.122
10/9/2017	18.3	2.907

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW369	Downgradient	Yes	38.8	YES	3.658	N/A
MW384	Sidegradient	Yes	139	YES	4.934	N/A
MW387	Downgradient	Yes	306	YES	5.724	N/A

Well Number: MW394

Date Collected	Result	LN(Result)
1/5/2016	4.07	1.404
4/18/2016	15	2.708
7/19/2016	5.87	1.770
10/12/2016	4.39	1.479
1/17/2017	7.79	2.053
4/20/2017	7.82	2.057
7/19/2017	11.1	2.407
10/9/2017	1.99	0.688

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, $S = [\text{Sum}([(background\ result-X)^2]/[\text{count of background results} - 1])]^{0.5}$

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. D2-14

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Current Background Comparison

Beta activity

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 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**= 7.656 **S**= 4.296 **CV(1)**=0.561 **K factor****= 2.523 **TL(1)**= 18.495 **LL(1)**=N/A

Statistics-Transformed Background Data **X**= 2.032 **S**= 0.423 **CV(2)**=0.208 **K factor****= 2.523 **TL(2)**= 2.845 **LL(2)**=N/A

Current Background Data from Upgradient Wells with Transformed Result

Well Number: MW395

Date Collected	Result	LN(Result)
1/5/2016	17.2	2.845
4/18/2016	6.43	1.861
7/19/2016	-1.87	#Func!
10/12/2016	3.62	1.286
1/17/2017	5.31	1.670
4/20/2017	7.61	2.029
7/19/2017	5.16	1.641
10/9/2017	8.17	2.100

Well Number: MW397

Date Collected	Result	LN(Result)
1/5/2016	9.49	2.250
4/14/2016	10.2	2.322
7/19/2016	7.53	2.019
10/11/2016	5.73	1.746
1/11/2017	4.42	1.486
4/20/2017	12.1	2.493
7/19/2017	9.5	2.251
10/9/2017	11.9	2.477

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.

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW370	Downgradient	Yes	71.9	YES	4.275	N/A
MW385	Sidegradient	Yes	50.6	YES	3.924	N/A
MW388	Downgradient	Yes	52.8	YES	3.967	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
- 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, $S = [\text{Sum}([(background\ result-X)^2]/[\text{count of background results} - 1])]^{0.5}$

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. D2-15

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**= 23.713 **S**= 5.150 **CV(1)**=0.217 **K factor****= 2.523 **TL(1)**= 36.707 **LL(1)**=N/A

Statistics-Transformed Background Data **X**= 3.144 **S**= 0.216 **CV(2)**=0.069 **K factor****= 2.523 **TL(2)**= 3.689 **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)
1/5/2016	27.4	3.311
4/18/2016	27.6	3.318
7/19/2016	26.3	3.270
10/12/2016	27.2	3.303
1/17/2017	25.9	3.254
4/20/2017	28.2	3.339
7/19/2017	26.2	3.266
10/9/2017	25.3	3.231

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW373	Downgradient	Yes	60.3	YES	4.099	N/A

Well Number: MW397

Date Collected	Result	LN(Result)
1/5/2016	19.2	2.955
4/14/2016	18.1	2.896
7/19/2016	35.1	3.558
10/11/2016	19.3	2.960
1/11/2017	19.5	2.970
4/20/2017	18.2	2.901
7/19/2017	17.2	2.845
10/9/2017	18.7	2.929

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, $S = [\text{Sum}([(background\ result-X)^2]/[\text{count of background results} - 1])]^{0.5}$

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. D2-16

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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**= 360.875 **S**= 32.672 **CV(1)**=0.091 **K factor****= 2.523 **TL(1)**= 443.306 **LL(1)**=N/A

Statistics-Transformed Background Data **X**= 5.885 **S**= 0.091 **CV(2)**=0.015 **K factor****= 2.523 **TL(2)**= 6.114 **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)
1/5/2016	408	6.011
4/18/2016	399	5.989
7/19/2016	394	5.976
10/12/2016	377	5.932
1/17/2017	386	5.956
4/20/2017	392	5.971
7/19/2017	392	5.971
10/9/2017	378	5.935

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW373	Downgradient	Yes	730	YES	6.593	N/A

Well Number: MW397

Date Collected	Result	LN(Result)
1/5/2016	353	5.866
4/14/2016	323	5.778
7/19/2016	333	5.808
10/11/2016	334	5.811
1/11/2017	337	5.820
4/20/2017	320	5.768
7/19/2017	315	5.753
10/9/2017	333	5.808

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, $S = [\text{Sum}([(background\ result-X)^2]/[\text{count of background results} - 1])]^{0.5}$

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. D2-17

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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**= 192.875 **S**= 25.487 **CV(1)**=0.132 **K factor****= 2.523 **TL(1)**= 257.179 **LL(1)**=N/A

Statistics-Transformed Background Data **X**= 5.254 **S**= 0.133 **CV(2)**=0.025 **K factor****= 2.523 **TL(2)**= 5.590 **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)
1/5/2016	229	5.434
4/18/2016	224	5.412
7/19/2016	219	5.389
10/12/2016	214	5.366
1/17/2017	223	5.407
4/20/2017	204	5.318
7/19/2017	210	5.347
10/9/2017	163	5.094

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW373	Downgradient	Yes	376	YES	5.930	N/A

Well Number: MW397

Date Collected	Result	LN(Result)
1/5/2016	204	5.318
4/14/2016	167	5.118
7/19/2016	169	5.130
10/11/2016	166	5.112
1/11/2017	187	5.231
4/20/2017	180	5.193
7/19/2017	171	5.142
10/9/2017	156	5.050

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, $S = [\text{Sum}([(background\ result-X)^2]/[\text{count of background results} - 1])]^{0.5}$

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

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**= 10.201 **S**= 2.194 **CV(1)**=0.215 **K factor****= 2.523 **TL(1)**= 15.736 **LL(1)**=N/A

Statistics-Transformed Background Data **X**= 2.301 **S**= 0.213 **CV(2)**=0.093 **K factor****= 2.523 **TL(2)**= 2.839 **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)
1/5/2016	11.8	2.468
4/18/2016	11.5	2.442
7/19/2016	11.1	2.407
10/12/2016	12	2.485
1/17/2017	11.4	2.434
4/20/2017	11.6	2.451
7/19/2017	10.9	2.389
10/9/2017	11.4	2.434

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW373	Downgradient	Yes	24.3	YES	3.190	N/A

Well Number: MW397

Date Collected	Result	LN(Result)
1/5/2016	8.18	2.102
4/14/2016	7.72	2.044
7/19/2016	15.2	2.721
10/11/2016	8.26	2.111
1/11/2017	8.54	2.145
4/20/2017	7.83	2.058
7/19/2017	7.37	1.997
10/9/2017	8.41	2.129

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, $S = [\text{Sum}([(background\ result-X)^2]/[\text{count of background results} - 1])]^{0.5}$

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. D2-19

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Current 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 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**= 376.563 **S**= 86.870 **CV(1)**=0.231 **K factor****= 2.523 **TL(1)**= 595.735 **LL(1)**=N/A

Statistics-Transformed Background Data **X**= 5.904 **S**= 0.247 **CV(2)**=0.042 **K factor****= 2.523 **TL(2)**= 6.526 **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)
1/5/2016	380	5.940
4/18/2016	325	5.784
7/19/2016	428	6.059
10/12/2016	357	5.878
1/17/2017	299	5.700
4/20/2017	190	5.247
7/19/2017	392	5.971
10/9/2017	385	5.953

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW370	Downgradient	Yes	334	NO	5.811	N/A
MW373	Downgradient	Yes	393	NO	5.974	N/A
MW388	Downgradient	Yes	341	NO	5.832	N/A
MW392	Downgradient	Yes	292	NO	5.677	N/A
MW397	Upgradient	Yes	361	NO	5.889	N/A

Well Number: MW397

Date Collected	Result	LN(Result)
1/5/2016	473	6.159
4/14/2016	586	6.373
7/19/2016	420	6.040
10/11/2016	378	5.935
1/11/2017	416	6.031
4/20/2017	282	5.642
7/19/2017	352	5.864
10/9/2017	362	5.892

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, $S = [\text{Sum} ((\text{background result}-X)^2)/[\text{count of background results} - 1]]^{0.5}$

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. D2-20

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Current Background Comparison

Radium-226

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 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**= 0.418 **S**= 0.231 **CV(1)**=0.553 **K factor****= 2.523 **TL(1)**= 1.001 **LL(1)**=N/A

Statistics-Transformed Background Data **X**= -0.930 **S**= 0.578 **CV(2)**=-0.622 **K factor****= 2.523 **TL(2)**= -0.290 **LL(2)**=N/A

Current Background Data from Upgradient Wells with Transformed Result

Well Number: MW395

Date Collected	Result	LN(Result)
1/5/2016	0.707	-0.347
4/18/2016	0.13	-2.040
7/19/2016	0.654	-0.425
10/12/2016	0.669	-0.402
1/17/2017	0.347	-1.058
4/20/2017	0.198	-1.619
7/19/2017	0.437	-0.828
10/9/2017	0.345	-1.064

Well Number: MW397

Date Collected	Result	LN(Result)
1/5/2016	0.748	-0.290
4/14/2016	-0.0439	#Func!
7/19/2016	0.464	-0.768
10/11/2016	0.575	-0.553
1/11/2017	0.374	-0.983
4/20/2017	0.41	-0.892
7/19/2017	0.555	-0.589
10/9/2017	0.123	-2.096

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.

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW370	Downgradient	Yes	1.01	YES	0.010	N/A
MW388	Downgradient	Yes	1.07	YES	0.068	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
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, $S = [\text{Sum}([(background\ result-X)^2]/[\text{count of background results} - 1])]^{0.5}$

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. D2-21

C-746-S/T First Quarter 2018 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**= 10.346 **S**= 0.660 **CV(1)**=0.064 **K factor****= 2.523 **TL(1)**= 12.012 **LL(1)**=N/A

Statistics-Transformed Background Data **X**= 2.335 **S**= 0.063 **CV(2)**=0.027 **K factor****= 2.523 **TL(2)**= 2.493 **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)
1/5/2016	9.84	2.286
4/18/2016	9.73	2.275
7/19/2016	9.9	2.293
10/12/2016	9.86	2.288
1/17/2017	10.1	2.313
4/20/2017	10.4	2.342
7/19/2017	10	2.303
10/9/2017	10.1	2.313

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW370	Downgradient	Yes	22.4	YES	3.109	N/A
MW373	Downgradient	Yes	98.7	YES	4.592	N/A
MW385	Sidegradient	Yes	18.6	YES	2.923	N/A
MW388	Downgradient	Yes	25.2	YES	3.227	N/A

Well Number: MW397

Date Collected	Result	LN(Result)
1/5/2016	11.2	2.416
4/14/2016	9.61	2.263
7/19/2016	11	2.398
10/11/2016	11.3	2.425
1/11/2017	11.6	2.451
4/20/2017	9.7	2.272
7/19/2017	10.1	2.313
10/9/2017	11.1	2.407

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. D2-22

C-746-S/T First Quarter 2018 Statistical Analysis

Current 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 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**= 11.813 **S**= 6.732 **CV(1)**=0.570 **K factor****= 2.523 **TL(1)**= 28.797 **LL(1)**=N/A

Statistics-Transformed Background Data **X**= 2.301 **S**= 0.645 **CV(2)**=0.280 **K factor****= 2.523 **TL(2)**= 3.927 **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)
1/5/2016	5.69	1.739
4/18/2016	8.36	2.123
7/19/2016	13.2	2.580
10/12/2016	2.15	0.765
1/17/2017	11.4	2.434
4/20/2017	9.95	2.298
7/19/2017	19.2	2.955
10/9/2017	3.67	1.300

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW370	Downgradient	Yes	73.9	YES	4.303	N/A
MW385	Sidegradient	Yes	86.8	YES	4.464	N/A
MW388	Downgradient	Yes	96.7	YES	4.572	N/A

Well Number: MW397

Date Collected	Result	LN(Result)
1/5/2016	17.4	2.856
4/14/2016	7.44	2.007
7/19/2016	14.9	2.701
10/11/2016	9.1	2.208
1/11/2017	8.85	2.180
4/20/2017	14.9	2.701
7/19/2017	29.8	3.395
10/9/2017	13	2.565

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
- 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, $S = [\text{Sum}([(background\ result-X)^2]/[\text{count of background results} - 1])]^{0.5}$

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. D2-23

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ATTACHMENT D3
STATISTICIAN QUALIFICATION STATEMENT

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19 April 2018

Ms. Kelly Layne
Four Rivers Nuclear Partnership, LLC
5501 Hobbs Road
Kevil, KY 42053

Subject: First Quarter 2018 Statistical Analysis for the C-746-S&T and C-746-U Landfills

Dear Ms. Layne:

This statement is submitted in response to your request that it be included with the completed statistical analysis I performed on the groundwater data for the C-746-S&T and C-746-U Landfills at the Paducah Gaseous Diffusion Plant.

As an environmental microbiologist, with a Ph.D. in Engineering Science, I have over 10 years of experience reviewing and analyzing geochemical results associated with environmental sampling and investigation activities. For this project, statistical analysis was performed on historical background and current background data using a coded database provided by FRNP, LLC. Additionally, Mann-Kendall trend tests were conducted using XL Stat, a publicly available and widely used commercial product. In the production of the Mann-Kendall Results, XL Stat provides values for alpha, p-value, the Mann-Kendall Statistic (S), variance of S, Sen's slope, and Kendall's correction. For the generation of the Historical Background Comparison Report, Current Background Comparison Report, and the Mann-Kendall statistical analyses, my work was observed and reviewed by a Senior Hydrogeologist with Geosyntec Consultants.

Statistical analyses conducted on the first quarter 2018 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,



Andrea Rocha, Ph.D.
Senior Staff Scientist

19 April 2018

Ms. Kelly Layne
Four Rivers Nuclear Partnership, LLC
5501 Hobbs Road
Kevil, KY 42053

Subject: First Quarter 2018 Statistical Analysis for the C-746-S&T and C-746-U Landfills

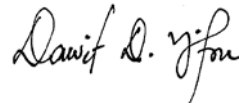
Dear Ms. Layne:

This statement is submitted in response to your request that it be included with the completed statistical analysis that I checked and on the groundwater data for the C-746-S&T and C-746-U Landfills at the Paducah Gaseous Diffusion Plant.

As an environmental scientist, with a Ph.D. in hydrogeology, I have over 11 years of experience reviewing and analyzing environmental chemistry data associated with environmental sampling, investigation, and remediation activities. For the generation of the Historical Background Comparison Report, Current Background Comparison Report, and the Mann-Kendall statistical analyses, I have experience with the method and other parametric and nonparametric statistical methods to a level of expertise that allows me to provide peer and senior review of the analysis.

For this project, the statistical analyses conducted on the first quarter 2018 monitoring well data collected from the C-746-S&T and C-746-U Landfills were 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,



Dawit Yifru, Ph.D., P.G.
Senior Hydrogeologist

APPENDIX E
GROUNDWATER FLOW RATE AND DIRECTION

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GROUNDWATER FLOW RATE AND DIRECTION

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 first quarter 2018 and to determine the groundwater flow rate and direction.

Water levels during this reporting period were measured on January 29, 2018. 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 had insufficient water for both measurement of the water level and for sampling.

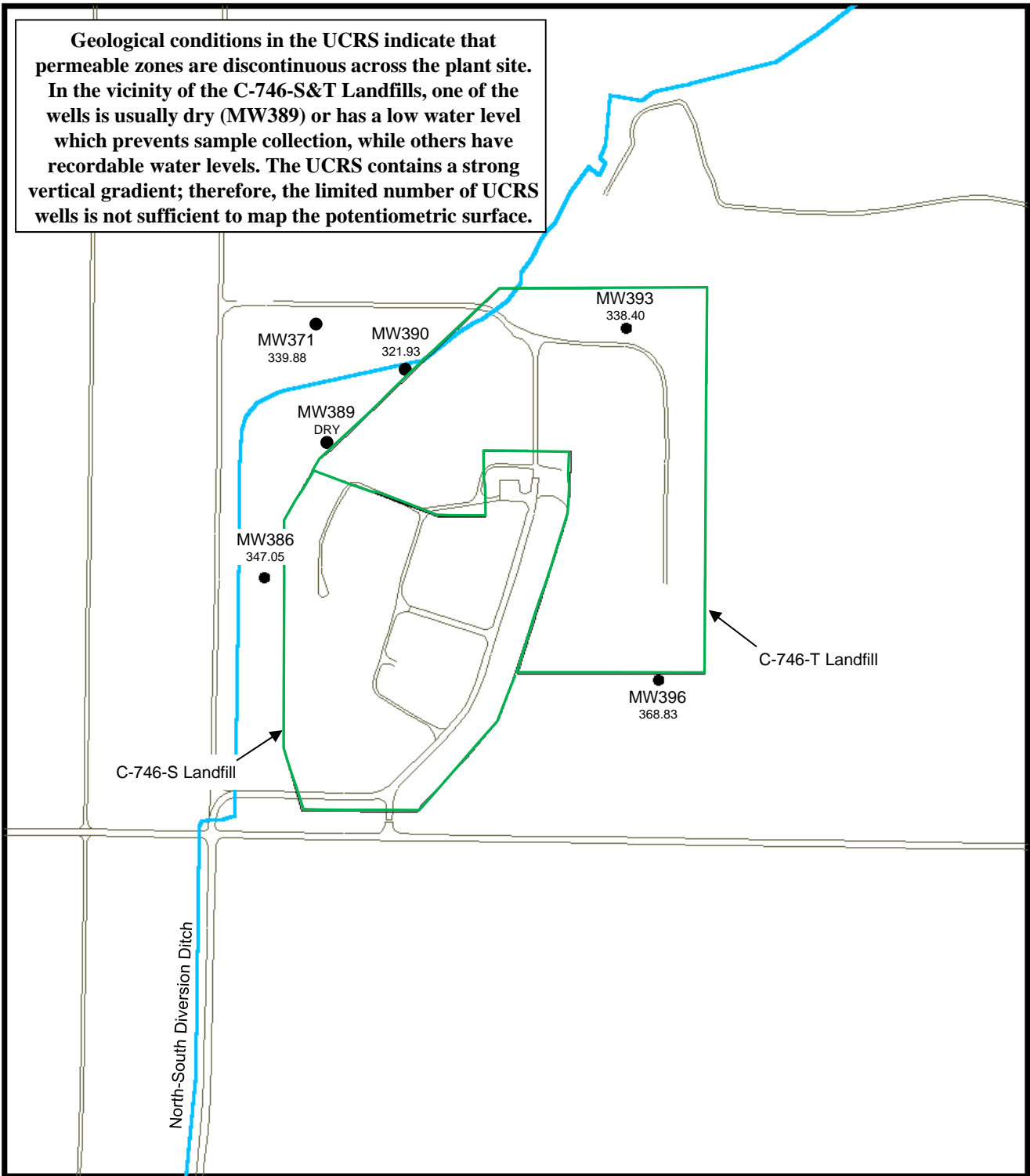
The UCRS has a strong vertical hydraulic gradient; therefore, the limited number of available UCRS wells, screened over different elevations, is not sufficient for mapping the potentiometric surface. Figure E.1 shows the location of UCRS MWs. The Upper Regional Gravel Aquifer (URGA) and Lower Regional 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.¹ Based on the site potentiometric map (Figure E.2), the hydraulic gradient beneath the landfill, as measured along the defined groundwater flow directions, is 3.18×10^{-4} feet (ft)/ft. Additional water level measurements in January (Figure E.3) document the vicinity groundwater hydraulic gradient for the RGA to be 4.19×10^{-4} ft/ft. 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 January 2018, the groundwater flow direction in the immediate area of the landfill was oriented primarily northeastward.

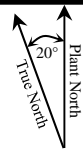
¹ Additional water level measurements, in wells at the C-746-U Landfill and in wells of the surrounding region (MW98, MW100, MW125, MW139, MW165A, MW173, MW193, MW197, and MW200), were used to contour the RGA potentiometric surface.

Geological conditions in the UCRS indicate that permeable zones are discontinuous across the plant site. In the vicinity of the C-746-S&T Landfills, one of the wells is usually dry (MW389) or has a low water level which prevents sample collection, while others have recordable water levels. The UCRS contains a strong vertical gradient; therefore, the limited number of UCRS wells is not sufficient to map the potentiometric surface.



500 0 500 Feet

Contour Interval = N/A



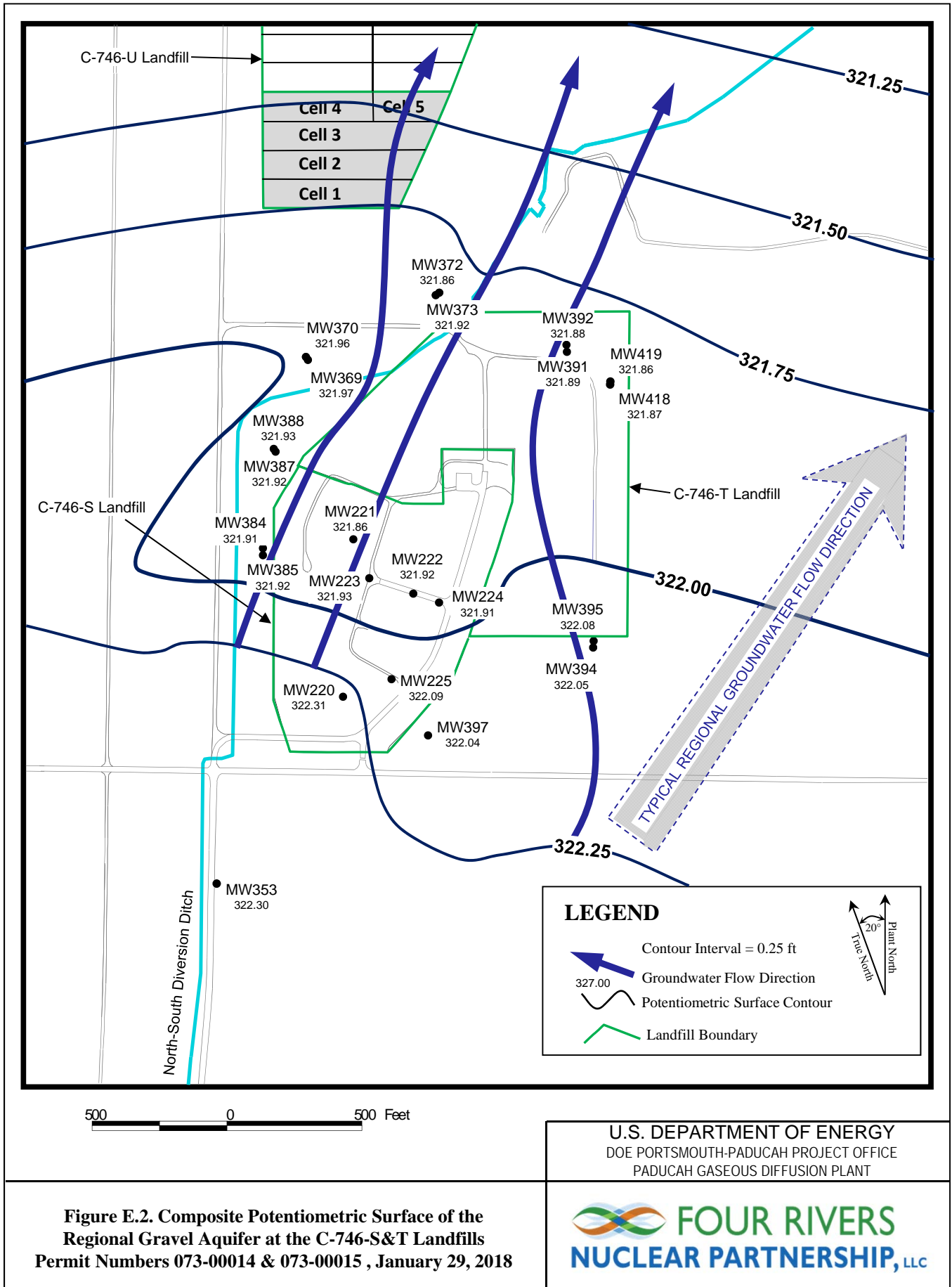
U.S. DEPARTMENT OF ENERGY
DOE PORTSMOUTH-PADUCAH PROJECT OFFICE
PADUCAH GASEOUS DIFFUSION PLANT

Figure E.1. Potentiometric Surface of the Upper Continental Recharge System at the C-746 S&T Landfills
Permit Numbers 073-00014 & 073-00015
January 29, 2018



Table E.1. C-746-S&T Landfills First Quarter 2018 (January) Water Levels

C-746-S&T Landfills (January 2018) 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)
1/29/2018	10:33	MW220	URGA	382.27	30.39	0.00	59.96	322.31	59.96	322.31
1/29/2018	10:43	MW221	URGA	391.51	30.39	0.00	69.65	321.86	69.65	321.86
1/29/2018	10:39	MW222	URGA	395.39	30.39	0.00	73.47	321.92	73.47	321.92
1/29/2018	10:41	MW223	URGA	394.49	30.39	0.00	72.56	321.93	72.56	321.93
1/29/2018	10:37	MW224	URGA	395.82	30.39	0.00	73.91	321.91	73.91	321.91
1/29/2018	10:35	MW225	URGA	385.88	30.39	0.00	63.79	322.09	63.79	322.09
1/29/2018	10:50	MW353	LRGA	375.12	30.39	0.00	52.82	322.30	52.82	322.30
1/29/2018	10:29	MW384	URGA	365.42	30.39	0.00	43.51	321.91	43.51	321.91
1/29/2018	10:30	MW385	LRGA	365.86	30.39	0.00	43.94	321.92	43.94	321.92
1/29/2018	10:31	MW386	UCRS	365.47	30.39	0.00	18.42	347.05	18.42	347.05
1/29/2018	10:26	MW387	URGA	363.65	30.39	0.00	41.73	321.92	41.73	321.92
1/29/2018	10:27	MW388	LRGA	363.64	30.39	0.00	41.71	321.93	41.71	321.93
1/29/2018	--	MW389	UCRS	364.26	NA	--	NA	--	DRY	--
1/29/2018	10:24	MW390	UCRS	360.60	30.39	0.00	38.67	321.93	38.67	321.93
1/29/2018	10:11	MW391	URGA	366.83	30.39	0.00	44.94	321.89	44.94	321.89
1/29/2018	10:12	MW392	LRGA	366.07	30.39	0.00	44.19	321.88	44.19	321.88
1/29/2018	10:13	MW393	UCRS	366.81	30.39	0.00	28.41	338.40	28.41	338.40
1/29/2018	10:18	MW394	URGA	378.64	30.39	0.00	56.59	322.05	56.59	322.05
1/29/2018	10:19	MW395	LRGA	379.34	30.39	0.00	57.26	322.08	57.26	322.08
1/29/2018	10:20	MW396	UCRS	378.84	30.39	0.00	10.01	368.83	10.01	368.83
1/29/2018	10:22	MW397	LRGA	387.12	30.39	0.00	65.08	322.04	65.08	322.04
1/29/2018	10:15	MW418	URGA	367.37	30.39	0.00	45.50	321.87	45.50	321.87
1/29/2018	10:16	MW419	LRGA	367.22	30.39	0.00	45.36	321.86	45.36	321.86
Initial Barometric Pressure			30.39							
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										
NA = not available										
*Assumes a barometric efficiency of 1.0										



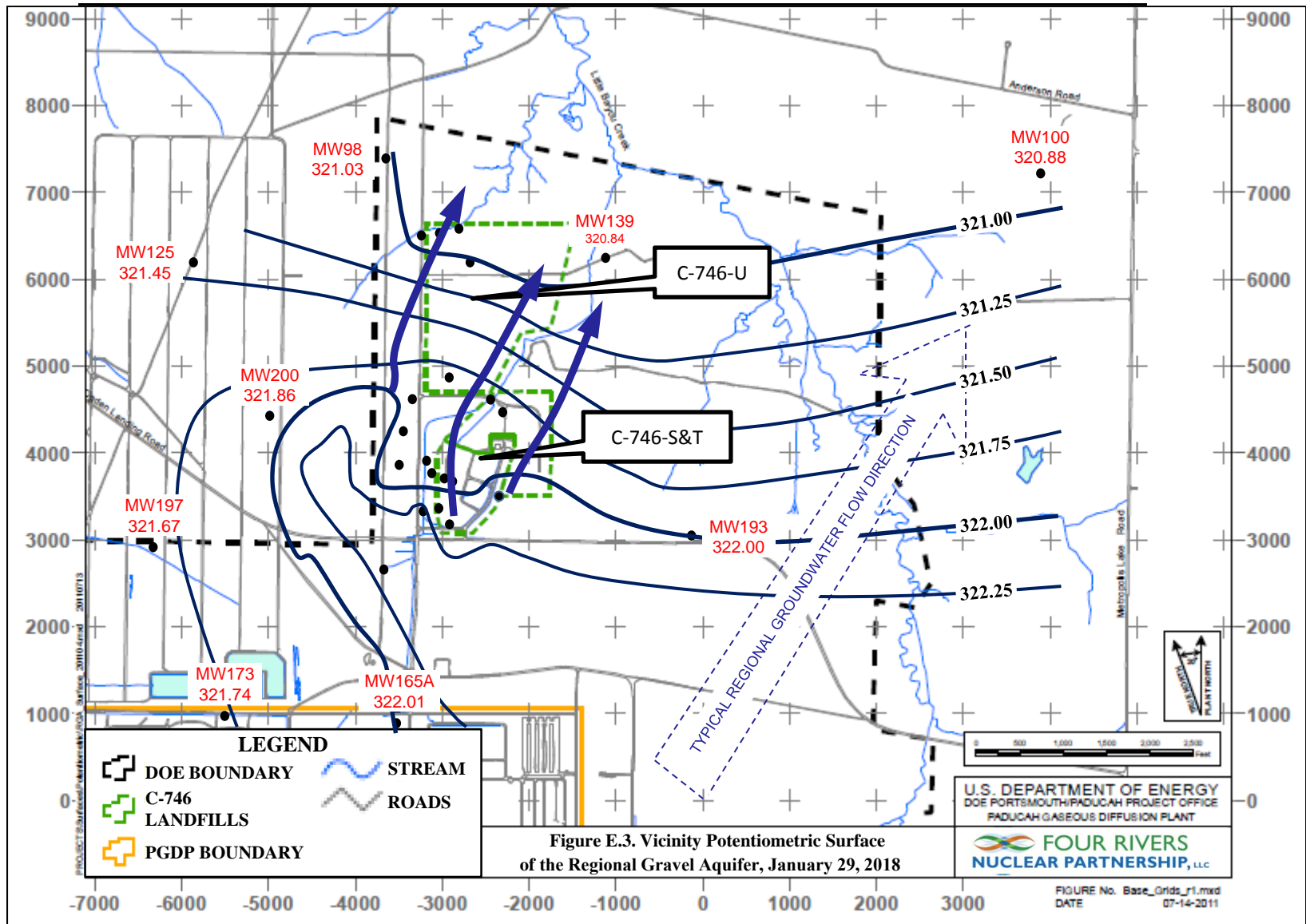


Table E.2. C-746-S&T Landfills Hydraulic Gradients

	ft/ft
Beneath Landfill Mound	3.18×10^{-4}
Vicinity	4.19×10^{-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	0.231	8.15×10^{-5}	0.924	3.26×10^{-4}
425	0.150	0.135	4.78×10^{-5}	0.541	1.91×10^{-4}
<u>Vicinity</u>					
725	0.256	0.304	1.07×10^{-4}	1.22	4.29×10^{-4}
425	0.150	0.178	6.29×10^{-5}	0.712	2.51×10^{-4}

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 the 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 first quarter 2018 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>
Upper Continental Recharge System	Technetium-99	MW390
Upper Regional Gravel Aquifer	Technetium-99	MW369, MW384, MW387
Lower Regional Gravel Aquifer	Technetium-99	MW370, MW385, MW388

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.

2/26/2018

**Four Rivers Nuclear Partnership, LLC
 PROJECT ENVIRONMENTAL MEASUREMENTS SYSTEM
 C-746-S&T LANDFILLS
 SOLID WASTE PERMIT NUMBER SW07300014 and SW07300015
 MAXIMUM CONTAMINANT LEVEL (MCL) EXCEEDANCE REPORT
 Quarterly Groundwater Sampling**

AKGWA	Station	Analysis	Method	Results	Units	MCL
8004-4818	MW370	Beta activity	9310	71.9	pCi/L	50
8004-4808	MW372	Trichloroethene	8260B	5.43	ug/L	5
8004-4792	MW373	Trichloroethene	8260B	6.26	ug/L	5
		Trichloroethene	8260B	6.21	ug/L	5
8004-4809	MW384	Beta activity	9310	89.7	pCi/L	50
		Beta activity	9310	76.5	pCi/L	50
8004-4810	MW385	Beta activity	9310	50.6	pCi/L	50
8004-4815	MW387	Beta activity	9310	201	pCi/L	50
8004-4816	MW388	Beta activity	9310	52.8	pCi/L	50
8004-4811	MW390	Beta activity	9310	57.7	pCi/L	50
8004-4805	MW391	Trichloroethene	8260B	11.9	ug/L	5
8004-4806	MW392	Trichloroethene	8260B	16.6	ug/L	5
8004-4802	MW394	Trichloroethene	8260B	6.47	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
ACETONE																							
Quarter 3, 2003							*					*											
Quarter 4, 2003											*							*					
Quarter 1, 2005								*															
ALPHA ACTIVITY																							
Quarter 4, 2002			■	■									■										
Quarter 4, 2008											■												
Quarter 4, 2010											■												
ALUMINUM																							
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 4, 2008							*				*												
Quarter 1, 2009			*				*				*												
Quarter 1, 2010			*				*				*												
Quarter 2, 2010			*								*												
Quarter 3, 2010			*								*		*			*		*					
Quarter 1, 2011							*				*												
Quarter 2, 2011			*								*												
Quarter 2, 2012			*																				
Quarter 3, 2012							*																
Quarter 1, 2013							*				*												
Quarter 3, 2013			*								*												
Quarter 1, 2014							*																
Quarter 2, 2014											*												
Quarter 4, 2014			*																				
Quarter 1, 2016							*																
Quarter 2, 2016													*										
Quarter 1, 2017							*																
Quarter 4, 2017																							*
Quarter 1, 2018							*																
BARIUM																							
Quarter 3, 2003							■	■															
Quarter 4, 2003							■	■															
BETA ACTIVITY																							
Quarter 4, 2002													■										
Quarter 1, 2003													■				■						
Quarter 2, 2003			■	■													■		■				
Quarter 3, 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	
BETA ACTIVITY																								
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			■								■		■	■			■		■	■				
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			■								■		■	■			■	■	■	■				
BROMIDE																								
Quarter 1, 2003			*																					
Quarter 4, 2003			*																					
Quarter 1, 2004			*																					

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	
BROMIDE																								
Quarter 2, 2004			*																					
Quarter 3, 2004			*																					
Quarter 4, 2004			*																					
Quarter 1, 2005			*																					
Quarter 3, 2006			*																					
CALCIUM																								
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												*										*	*	
Quarter 2, 2014												*										*	*	
Quarter 3, 2014												*										*	*	
Quarter 4, 2014												*										*	*	
Quarter 1, 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	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
CALCIUM																							
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												*										*	
CARBON DISULFIDE																							
Quarter 4, 2010											*												
Quarter 1, 2011												*										*	
Quarter 2, 2017													*										
CHEMICAL OXYGEN DEMAND																							
Quarter 1, 2003				*																			
Quarter 2, 2003				*																			
Quarter 3, 2003				*			*			*													
Quarter 4, 2003				*																			
Quarter 1, 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 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						*																	

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	
CHLORIDE																								
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 2, 2011			*																					
Quarter 3, 2011			*																					
Quarter 4, 2011			*																					
Quarter 3, 2012			*																					
Quarter 3, 2013			*																					
Quarter 4, 2013			*																					
Quarter 4, 2014			*																					
CHROMIUM																								
Quarter 4, 2002									■															
Quarter 1, 2003									■														■	
Quarter 2, 2003							■		■															
Quarter 3, 2009							■																	
COBALT																								
Quarter 3, 2003								*																
CONDUCTIVITY																								
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											*		*							*				

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
CONDUCTIVITY																							
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												*							*				
DISSOLVED OXYGEN																							
Quarter 3, 2006			*							*													
DISSOLVED SOLIDS																							
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										*	*								*				

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
DISSOLVED SOLIDS																							
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												*	*						*				
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												*							*				
IODIDE																							
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	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
IRON																							
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												*											
MAGNESIUM																							
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												*	*							*			

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
MAGNESIUM																							
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												*	*								*		
MANGANESE																							
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	*																						
OXIDATION-REDUCTION POTENTIAL																							
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			*	*		*	*	*	*			*					*	*		*			
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	*	*	*	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	

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	
OXIDATION-REDUCTION POTENTIAL																								
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	*		*	*	*	*											*	*	*	*	*	*	*	
PCB-1016																								
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											*													
Quarter 1, 2009											*													
Quarter 2, 2009											*													
Quarter 3, 2009											*													
Quarter 4, 2009											*													
Quarter 1, 2010											*													
Quarter 2, 2010											*													
Quarter 3, 2010											*													
Quarter 4, 2010											*													
PCB-1232																								
Quarter 1, 2011											*													
PCB-1248																								
Quarter 2, 2008											*													
PCB-1260																								
Quarter 2, 2006																		*						
pH																								
Quarter 4, 2002																		*						
Quarter 2, 2003																		*						
Quarter 3, 2003																		*						
Quarter 4, 2003							*											*						
Quarter 1, 2004							*											*						
Quarter 2, 2004																		*						
Quarter 3, 2004																		*						

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
pH																							
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																		*	*				
POTASSIUM																							
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																			*				
RADIUM-226																							
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		*																	*			*	*
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												*					*	*	*	*			
RADIUM-228																							
Quarter 2, 2005							■				■												
Quarter 3, 2005			■																				
Quarter 4, 2005								■	■														
Quarter 1, 2006					■																		
SELENIUM																							
Quarter 4, 2002			■		■																		
Quarter 1, 2003					■																	■	
Quarter 2, 2003			■																				
Quarter 3, 2003			■		■																		
Quarter 4, 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
SODIUM																							
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												*								*			
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									*	*	*	*											
STRONTIUM-90																							
Quarter 2, 2003										■													
Quarter 1, 2004										■													

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
SULFATE																							
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	*								*		*	*	*	*	*		*	*	*	*			
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							*		*		*	*	*	*	*	*	*	*	*	*			

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	
TECHNETIUM-99																								
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			*								*	*	*	*			*	*	*	*				
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			*				*				*	*	*	*			*	*	*	*				

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
THORIUM-230																							
Quarter 1, 2012	*								*						*								
Quarter 4, 2014	*		*																				
Quarter 3, 2015	*								*	*			*		*								
Quarter 1, 2017			*							*							*						
THORIUM-234																							
Quarter 2, 2003						*			*						*								
Quarter 4, 2007									*														
TOLUENE																							
Quarter 2, 2014										*	*		*										
TOTAL ORGANIC CARBON																							
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																			*				
TOTAL ORGANIC HALIDES																							
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
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
TOTAL ORGANIC HALIDES																							
Quarter 4, 2010	*																						
Quarter 1, 2011	*																						
Quarter 3, 2013																					*		
TRICHLOROETHENE																							
Quarter 4, 2002																							
Quarter 1, 2003																							
Quarter 2, 2003																							
Quarter 3, 2003																							
Quarter 4, 2003																							
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Quarter 4, 2016																							
Quarter 1, 2017																							
Quarter 2, 2017																							
Quarter 3, 2017																							
Quarter 4, 2017																							
Quarter 1, 2018																							

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
TURBIDITY																							
Quarter 4, 2002																					*		
Quarter 1, 2003						*						*	*										
URANIUM																							
Quarter 4, 2002																		*	*				
Quarter 1, 2003																			*				
Quarter 4, 2003						*																	
Quarter 1, 2004						*	*	*						*		*							
Quarter 4, 2004																*							
Quarter 4, 2006																		*			*		
ZINC																							
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

Date:	3/08/2018	Time:	0900am	Monitor:	Robert Kirby													
Weather Conditions: Mostly cloudy at 35 degrees with winds out of the NW at 7 mph																		
Monitoring Equipment: RAE Systems, Multi-RAE, Serial# 4495																		
Monitoring Location					Reading (% LEL)													
Ogden Landing Road Entrance	Checked at ground level				0													
North Landfill Gate	Checked at ground level				0													
West Side of Landfill: North 37° 07.652' West 88° 48.029'	Checked at ground level				0													
East Side of Landfill: North 37° 07.628' West 88° 47.798'	Checked at ground level				0													
Cell 1 Gas Vent (17)	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
Cell 2 Gas Vent (3)	1 0	2 0	3 0															0
Cell 3 Gas Vent (7)	1 0	2 0	3 0	4 0	5 0	6 0	7 0											0
Landfill Office	Checked at floor level				0													
Suspect or Problem Areas	No areas noted				N/A													
Remarks: ALL VENTS CHECKED 1" FROM THE MOUTH OF VENT																		
Performed by:																		
				<i>Tommy Smith</i> Signature	3/08/18 Date													

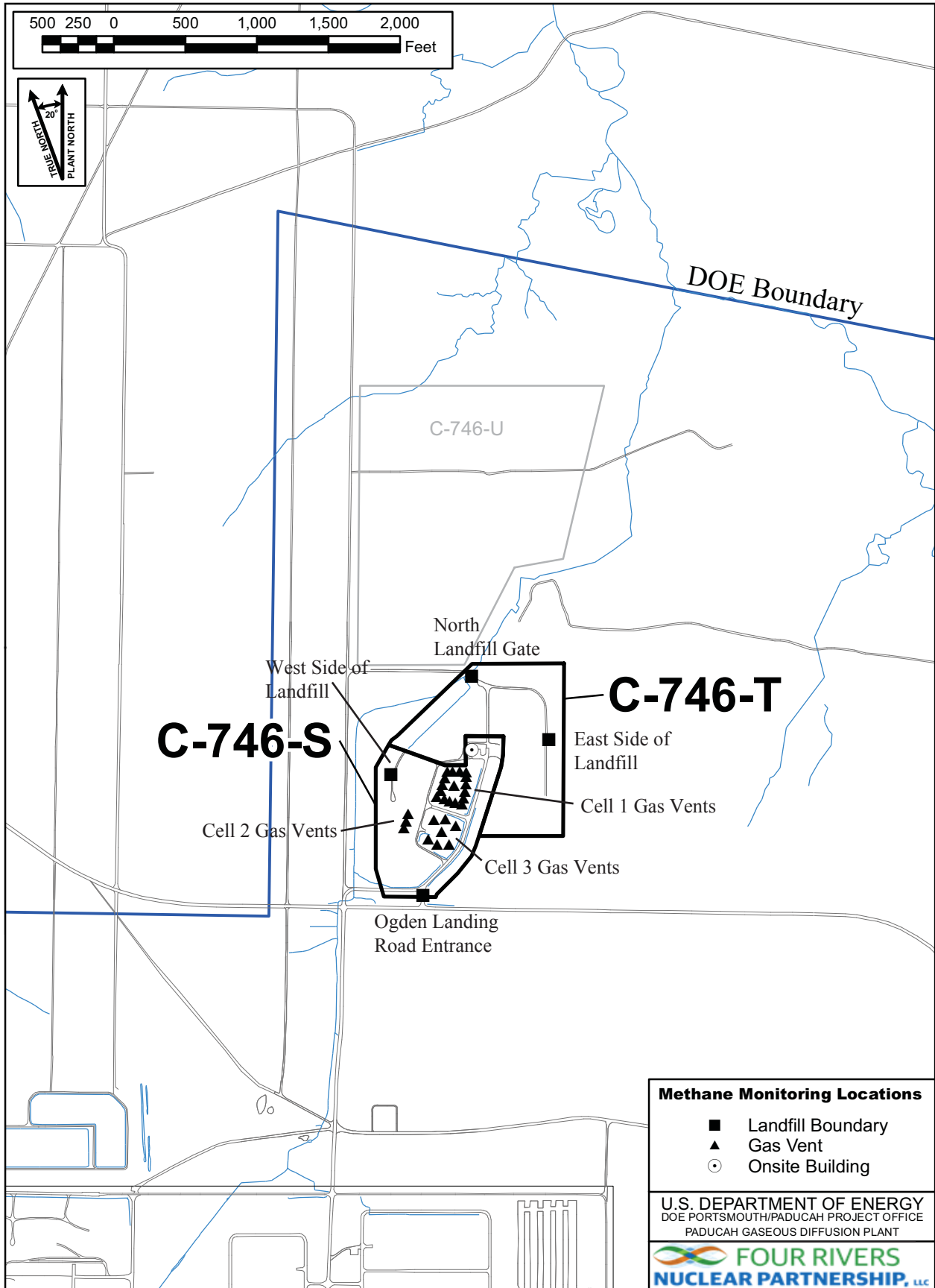


Figure H.1. C-746-S&T Methane Monitoring Locations

APPENDIX I

SURFACE WATER ANALYSES AND WRITTEN COMMENTS

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Division of Waste Management
 Solid Waste Branch
 14 Reilly Road
 Frankfort, KY 40601 (502)564-6716

RESIDENTIAL/INERT-QUARTERLY
 Facility: US DOE - Paducah Gaseous Diffusion Plant
 Permit Number: 073-00014 & 073-00015 FINDS/UNIT: KY8-890-008-982 / 1

LAB ID: None
 For Official Use Only

SURFACE WATER SAMPLE ANALYSIS (S)

Monitoring Point (KPDES Discharge Number, or "UPSTREAM", or "DOWNSTREAM")				L135 UPSTREAM	L154 DOWNSTREAM	L136 AT SITE							
Sample Sequence #				1	1	1							
If sample is a Blank, specify Type: (F)ield, (T)rip, (M)ethod, or (E)quipment				NA	NA	NA							
Sample Date and Time (Month/Day/Year hour:minutes)				1/8/2018 09:34	1/8/2018 09:23	1/22/2018 08:05							
Duplicate ("Y" or "N") ¹				N	N	N							
Split ('Y' or "N") ²				N	N	N							
Facility Sample ID Number (if applicable)				L135SS2-18	L154US2-18	L136SS2-18							
Laboratory Sample ID Number (if applicable)				441179001	441166002	442157001							
Date of Analysis (Month/Day/Year)				1/18/2018	1/18/2018	2/1/2018							
CAS RN ³		CONSTITUENT	T D 4	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL ⁵	F L A G S ⁷	DETECTED VALUE OR PQL ⁵	F L A G S ⁷	DETECTED VALUE OR PQL ⁵	F L A G S ⁷	DETECTED VALUE OR PQL ⁵	F L A G S ⁷
A200-00-0	0	Flow	T	MGD	Field	0.01		0.81		0.06			
16887-00-6	2	Chloride(s)	T	MG/L	300.0	11.6		11.4		1.24			
14808-79-8	0	Sulfate	T	MG/L	300.0	10.8		10.2		10.5			
7439-89-6	0	Iron	T	MG/L	200.8	0.275		0.526		0.465			
7440-23-5	0	Sodium	T	MG/L	200.8	1.85		1.33		1.17			
S0268- -	0	Organic Carbon ⁶	T	MG/L	9060	21.2		25.3		11.6			
S0097- -	0	BOD ⁵	T	MG/L	not applicable		*		*		*		
S0130- -	0	Chemical Oxygen Demand	T	MG/L	410.4	47.7		71.5		37.6			

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¹Respond "Y" if the sample was a duplicate of another sample in this report

²Respond "Y" if the sample was split and analyzed by separate laboratories.

³Chemical Abstracts Service Registry Number or unique identifier number assigned by agency.

⁴"T" = Total; "D" = Dissolved

⁵"<" indicates a non-detect; do not use "ND" or "BDL". Value then shown is Practical Quantification Limit

⁶Facility has either/or option on Organic Carbon and (BOD) Biochemical Oxygen Demand - both are not required

⁷Flags are as designated, do not use any other type. Use "*", " then describe on "Written Comments" page.

STANDARD FLAGS:

* = See Comments

J = Estimated Value

B = Analyte found in blank

A = Average value

N = Presumptive ID

D = Concentration from analysis of
a secondary dilution factor

SURFACE WATER - QUARTERLY

Facility: **US DOE - Paducah Gaseous Diffusion Plant**

Permit Number: **073-00014 & 073-00015**

FINDS/UNIT: KY8-890-008-982 / 1

LAB ID: None

For Official Use Only

SURFACE WATER SAMPLE ANALYSIS - (Cont.)

Monitoring Point (KPDES Discharge Number, or "UPSTREAM" or "DOWNSTREAM")				L135 UPSTREAM		L154 DOWNSTREAM		L136 AT SITE					
CAS RN ³		CONSTITUENT	T D 4	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL ⁵	F L A G S ⁷	DETECTED VALUE OR PQL ⁵	F L A G S ⁷	DETECTED VALUE OR PQL ⁵	F L A G S ⁷	DETECTED VALUE OR PQL ⁵	F L A G S ⁷
S0145- -	1	Specific Conductance	T	μHMS/CM	Field	203		165		282			
S0270- -	0	Total Suspended Solids	T	MG/L	160.2	6.2		9.4		4.9			
S0266- -	0	Total Dissolved Solids	T	MG/L	160.1	176	*	179	*	196			
S0269- -	0	Total Solids	T	MG/L	SM-2540 B 17	204		193		218			
S0296- -	0	pH	T	Units	Field	7.55		7.38		7.78			
7440-61-1		Uranium	T	MG/L	200.8	0.00499		0.00126		0.00243			
12587-46-1		Gross Alpha (α)	T	pCi/L	9310	9.68	*	0.834	*	7.23	*		
12587-47-2		Gross Beta (β)	T	pCi/L	9310	40.7	*	9.38	*	5.44	*		

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RESIDENTIAL/INERT – QUARTERLY

Facility: US DOE - Paducah Gaseous Diffusion Plant

Permit Numbers: 073-00014 & 073-00015

Finds/Unit: KY8-890-008-982 / 1

LAB ID: None

For Official Use Only

SURFACE WATER WRITTEN COMMENTS

Monitoring Point	Facility Sample ID	Constituent	Flag	Description
L135	L135SS2-18	Biochemical Oxygen Demand (BOD)		Analysis of constituent not required and not performed.
		Dissolved Solids	*	Duplicate analysis not within control limits.
		Alpha activity		TPU is 3.05. Rad error is 2.61.
		Beta activity		TPU is 7.58. Rad error is 3.69.
L154	L154US2-18	Biochemical Oxygen Demand (BOD)		Analysis of constituent not required and not performed.
		Dissolved Solids	*	Duplicate analysis not within control limits.
		Alpha activity	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 1.31. Rad error is 1.3.
		Beta activity		TPU is 3.2. Rad error is 2.8.
L136	L136SS2-18	Biochemical Oxygen Demand (BOD)		Analysis of constituent not required and not performed.
		Alpha activity	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 6.05. Rad error is 5.93.
		Beta activity	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 5.64. Rad error is 5.54.

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