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Dear Ms. Green and Mr. Hendricks:

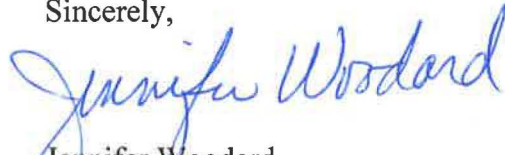
**C-746-S&T LANDFILLS THIRD QUARTER CALENDAR YEAR 2017
(JULY-SEPTEMBER) COMPLIANCE MONITORING REPORT, PADUCAH
GASEOUS DIFFUSION PLANT, PADUCAH, KENTUCKY, FPDP-RPT-0088/V3,
PERMIT NUMBER SW07300014, SW07300015, SW07300045**

Enclosed is the subject report for third quarter calendar year 2017, provided in accordance with Solid Waste Landfill Permit Number SW07300014, SW07300015, SW07300045. The report includes groundwater and surface water analytical data, validation summary, groundwater flow rate and direction determination, figures depicting well locations, and methane monitoring results.

The statistical analyses on the third quarter 2017 monitoring well data collected from the C-746-S&T Landfills were performed in accordance with Condition GSTR0003, Standard Requirement 3, using the U.S. Environmental Protection Agency guidance document, *Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Final Guidance* (1989). This report also serves as the statistical increase notification for the third quarter calendar year 2017, in accordance with Condition GSTR0003, Standard Requirement 8, of the Solid Waste Landfill Permit Number SW07300014, SW07300015, SW07300045.

If you have any questions or require additional information, please contact David Dollins at (270) 441-6819.

Sincerely,


Jennifer Woodard
Paducah Site Lead
Portsmouth/Paducah Project Office

Enclosure:

C-746-S&T Landfills 3rd Qtr CY 2017 (July–September) Compliance Monitoring Report

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**C-746-S&T Landfills
Third Quarter Calendar Year 2017
(July–September)
Compliance Monitoring Report,
Paducah Gaseous Diffusion Plant,
Paducah, Kentucky**



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11-29-17
Date

**C-746-S&T Landfills
Third Quarter Calendar Year 2017
(July–September)
Compliance Monitoring Report,
Paducah Gaseous Diffusion Plant,
Paducah, Kentucky**

Date Issued—November 2017

U.S. DEPARTMENT OF ENERGY
Office of Environmental Management

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

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ACRONYMS

<i>CFR</i>	<i>Code of Federal Regulations</i>
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
PGDP	Paducah Gaseous Diffusion Plant
RGA	Regional Gravel Aquifer
UCRS	Upper Continental Recharge System
URGA	Upper Regional Gravel Aquifer
UTL	upper tolerance limit

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1. INTRODUCTION

This report, *C-746-S&T Landfills Third Quarter Calendar Year 2017 (July–September) 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 § 4. Surface water results are provided in Appendix I.

1.1 BACKGROUND

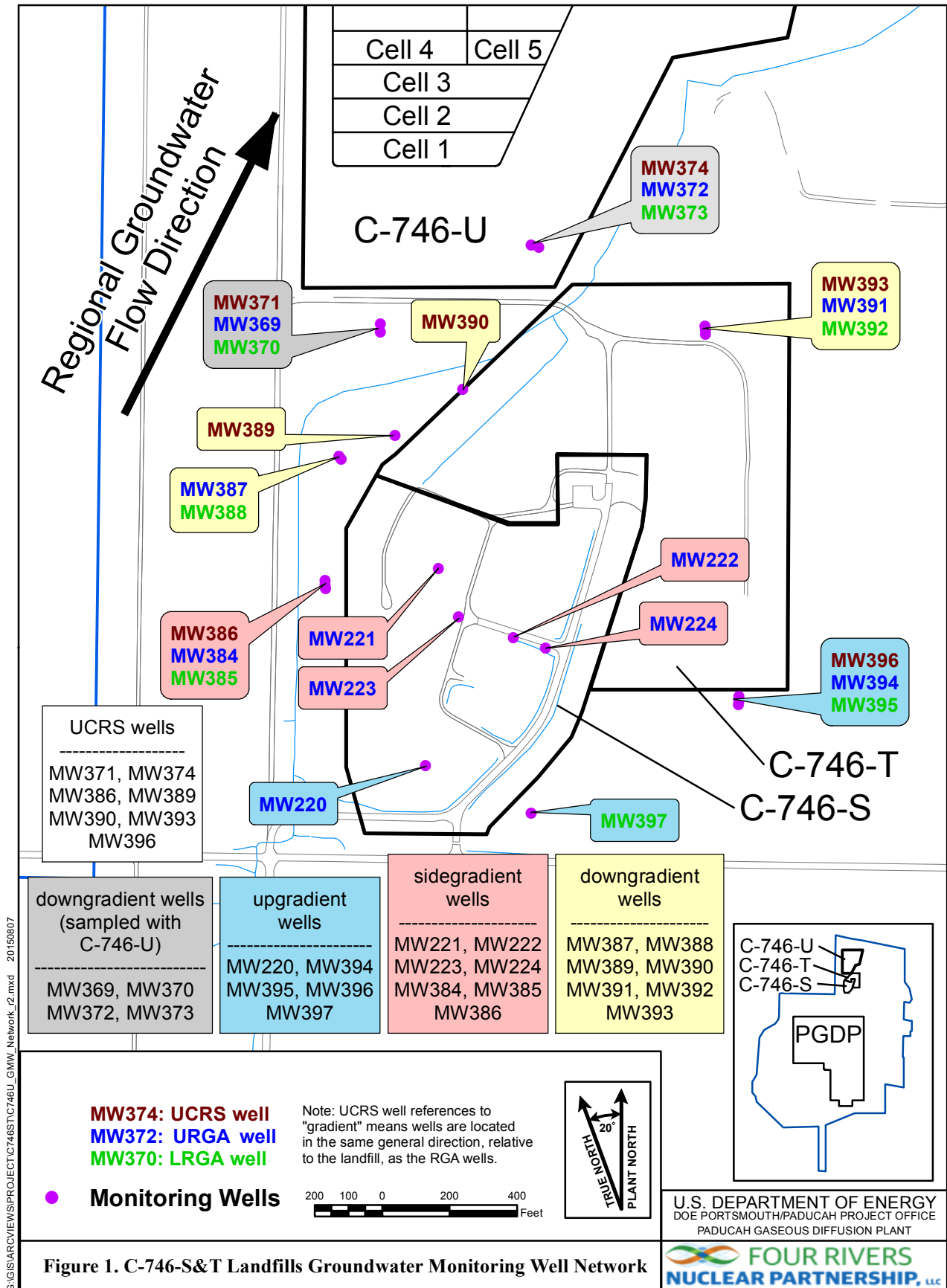
The C-746-S&T Landfills are closed, solid waste landfills located north of the Paducah Gaseous Diffusion Plant (PGDP) and south of the C-746-U Landfill. Construction and operation of the C-746-S Residential Landfill were permitted in April 1981 under Solid Waste Landfill Permit Number 073-00014. The 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 PGDP. 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 PGDP. 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.



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

Consistent with the approved 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 third quarter 2017 in accordance with the Groundwater Monitoring Plan (LATA Kentucky 2014) using Fluor Federal Services, Inc., 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 July 26, 2017, 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 July, RGA groundwater flow in the area of the landfill was oriented north to northeastward. The hydraulic gradient for the RGA in the vicinity of the C-746-S&T Landfills in July was 3.66×10^{-4} ft/ft, while the gradient beneath the C-746-S&T Landfills was 3.25×10^{-4} ft/ft. Calculated groundwater flow rates (average linear velocities) for the RGA at the C-746-S&T Landfills range from 0.552 to 0.942 ft/day (see Table E.3).

1.2.2 Methane Monitoring

Methane monitoring was conducted in accordance with 401 KAR 48:090 § 4 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 gas-passive vents located in Cells 1, 2, and 3 of the C-746-S Landfill on September 9, 2017. 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 KY-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 two of 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. Location L136 could not be sampled due to insufficient flow during the reporting period.

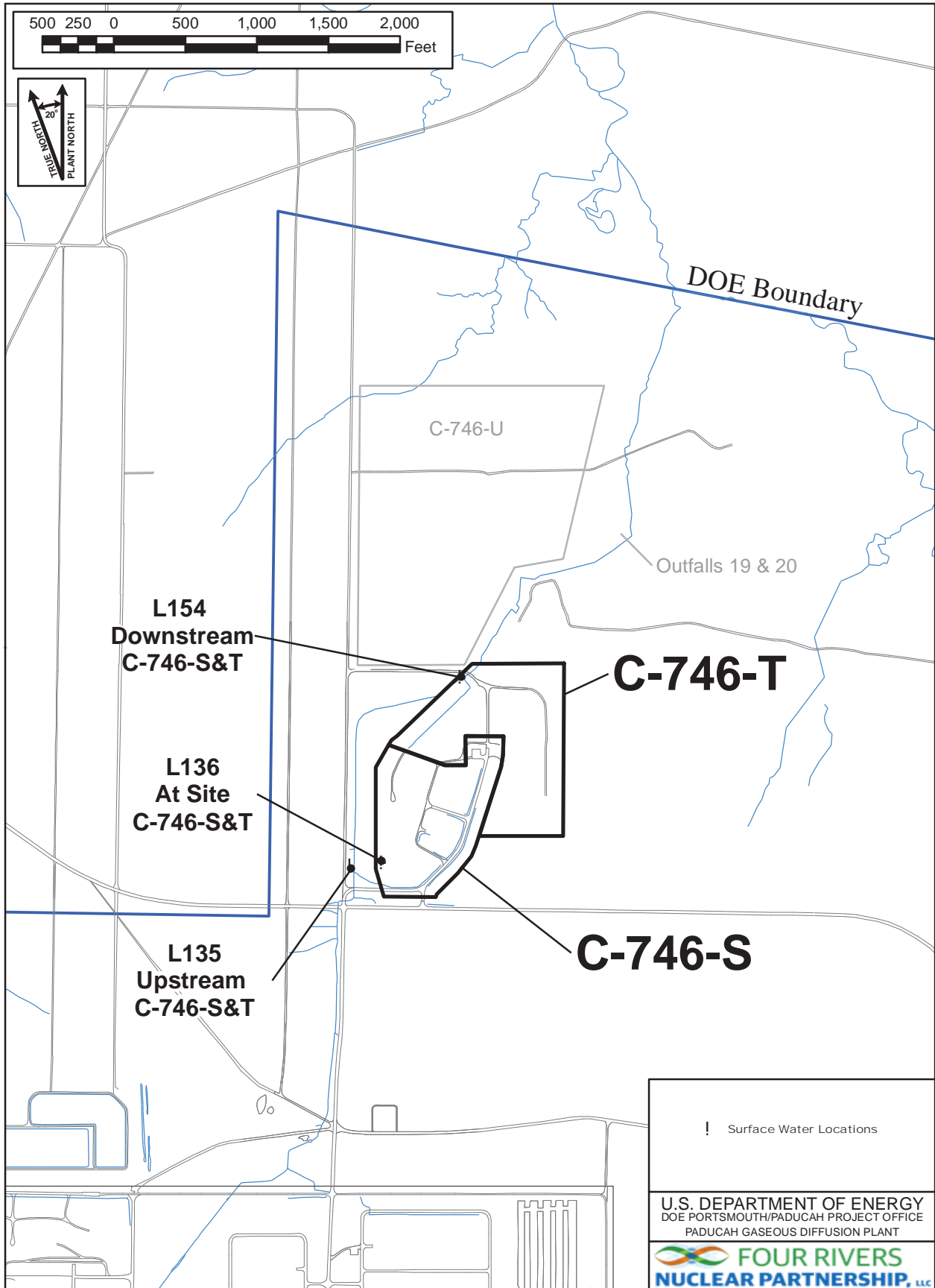


Figure 2. C-746-S&T Landfills Surface Water Monitoring Locations

The parameters identified in the Solid Waste Landfill Permit were analyzed for report only format, pursuant to Permit Condition GMNP0003, Standard Requirement 1. Surface water results are provided in Appendix I.

1.3 KEY RESULTS

Groundwater data were evaluated in accordance 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*, (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 third quarter 2017, 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).

Table 1. Summary of MCL Exceedances

UCRS	URGA	LRGA
None	MW372: Trichloroethene	MW370: Beta activity
	MW384: Beta activity	MW373: Trichloroethene
	MW387: Beta activity	MW385: Beta activity
	MW391: Trichloroethene	MW388: Beta activity
		MW392: Trichloroethene

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.

Table 2. Exceedances of Statistically Derived Historical Background Concentrations

UCRS*	URGA	LRGA
MW386: Chemical oxygen demand, oxidation-reduction potential	MW220: Chemical oxygen demand, dissolved solids, sulfate	MW370: Beta activity, oxidation-reduction potential, sulfate, technetium-99
MW390: Oxidation-reduction potential, technetium-99	MW223: Sulfate	MW373: Calcium, conductivity, dissolved solids, oxidation-reduction potential, sulfate
MW393: Oxidation-reduction potential	MW224: Radium-226	MW385: Beta activity, oxidation-reduction potential, sulfate, technetium-99
MW396: Oxidation-reduction potential, radium-226	MW369: Radium-226, technetium-99	MW388: Beta activity, oxidation-reduction potential, radium-226, sulfate, technetium-99
	MW372: Calcium, dissolved solids, magnesium, sulfate	MW392: Oxidation-reduction potential
	MW384: Beta activity, radium-226, sulfate, technetium-99	MW395: Oxidation-reduction potential
	MW387: Beta activity, sulfate, technetium-99	MW397: Oxidation-reduction potential
	MW391: Dissolved solids, magnesium, 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, sulfate, technetium-99
MW372: Calcium, dissolved solids, magnesium, sulfate	MW373: Calcium, conductivity, dissolved solids, sulfate
MW387: Beta activity, technetium-99	MW388: Beta activity, sulfate, technetium-99
MW391: Dissolved solids, magnesium, sulfate	

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, 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.

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 two of these preliminary Type 2 exceedances in

Table 4. C-746-S and 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 and T Landfills Downgradient Wells	MW369	Technetium-99	8	0.05	0.274	-6.000	65.33	-2.24	-0.214	No Trend
	MW370	Beta Activity	8	0.05	0.031	16.00	65.33	6.93	0.571	Positive Trend
		Sulfate	8	0.05	0.017	17.00	64.33	0.37	0.618	Positive Trend
		Technetium-99	8	0.05	0.054	14.00	65.33	9.01	0.500	No Trend
	MW372	Calcium	8	0.05	0.003	-22.00	65.33	-2.42	-0.786	Negative Trend
		Dissolved Solids	8	0.05	0.007	-20.00	65.33	-16.38	-0.714	Negative Trend
		Magnesium	8	0.05	0.000	-26.00	65.33	-0.99	-0.929	Negative Trend
		Sulfate	8	0.05	0.002	-23.00	64.33	-8.73	-0.837	Negative Trend
	MW373	Calcium	8	0.05	0.054	-14.00	65.33	-1.73	-0.500	No Trend
		Conductivity	8	0.05	0.138	-10.00	65.33	-17.00	-0.357	No Trend
		Dissolved Solids	8	0.05	0.138	-10.00	65.33	-14.61	-0.357	No Trend
		Sulfate	8	0.05	0.003	-22.00	65.33	-4.75	-0.786	Negative Trend
	MW387	Beta Activity	8	0.05	0.360	4.000	65.33	5.00	0.143	No Trend
		Technetium-99	8	0.05	0.274	6.000	65.33	5.00	0.214	No Trend
	MW388	Beta Activity	8	0.05	0.452	-2.000	65.33	-1.15	-0.071	No Trend
		Sulfate	8	0.05	0.066	12.00	63.33	0.39	0.445	No Trend
		Technetium-99	8	0.05	0.199	8.000	65.33	7.45	0.286	No Trend
	MW391	Dissolved Solids	8	0.05	0.085	11.00	64.33	6.17	0.400	No Trend
Sulfate		8	0.05	0.054	14.00	65.33	5.98	0.500	No Trend	
Magnesium		8	0.05	0.138	10.00	65.33	0.46	0.357	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 hypothesis, 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 ran to test for positive or negative trends. This table reports the test with the lowest p-value.

Note: Statistics generated using XLSTAT.

downgradient wells—beta activity and sulfate in MW370—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 of sulfate in MW370 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, MW369, does not exceed the historical UTL for sulfate. In addition, the source of sulfate in this well may be associated with non-landfill, alternative sources that simultaneously could increase sulfate, dissolved solids, specific conductivity, calcium, or magnesium—all of which have similar concentration fluctuations over the past eight quarters.

The Mann-Kendall statistical test also indicates that there is an increasing trend in beta activity in MW370 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 for the following reasons.

- There is a known upgradient regional source of beta activity associated with the technetium-99 Northwest Plume (refer to Figure 10 in the Groundwater Monitoring Plan); and
- Although the deeper (LRGA) MW370 shows increasing trends, the shallower, collocated (URGA) well, MW369, does not exceed statistically derived historical background concentrations for beta activity.

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.

The statistical evaluation of current UCRS wells against the current UCRS background UTL identified UCRS well MW390 with a technetium-99 value that exceeds 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: Technetium-99

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

All MCL and UTL exceedances, except for beta activity and sulfate in MW370, 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 beta activity and sulfate in MW370 do not appear to be landfill-related. Beta activity and sulfate in MW370 will continue to be evaluated in the context of this observation.

2. DATA EVALUATION/STATISTICAL SYNOPSIS

The statistical analyses conducted on the third quarter 2017 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 respective Kentucky solid waste facility MCL 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.

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

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

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, 26 parameters, including those with MCLs, required statistical analysis in the UCRS. During the third quarter, chemical oxygen demand, oxidation-reduction potential, radium-226, and technetium-99 displayed concentrations that exceeded their respective historical UTLs and are listed in Table 2. Technetium-99 exceeded the current background UTL and is included in Table 5.

2.1.2 Upper Regional Gravel Aquifer

In this quarter, 31 parameters, including those with MCLs, required statistical analysis in the URGA. During the third quarter, beta activity, calcium, chemical oxygen demand, dissolved solids, magnesium, radium-226, sulfate, and technetium-99 displayed concentrations that exceeded their respective historical UTLs and are listed in Table 2. Beta activity, calcium, dissolved solids, magnesium, sulfate, and technetium-99 exceeded the current background UTL in downgradient wells and are included in Table 3.

2.1.3 Lower Regional Gravel Aquifer

In this quarter, 29 parameters, including those with MCLs, required statistical analysis in the LRGA. During the third quarter, beta activity, calcium, conductivity, dissolved solids, 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, 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
Third Quarter Calendar Year 2017 (July–September)
Compliance Monitoring Report,
Paducah Gaseous Diffusion Plant,
Paducah, Kentucky (FPDP-RPT-0088/V3)*

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



*PG113927
Kenneth Davis 11-28-17*

Kenneth R. Davis
Kenneth R. Davis

PG113927

November 28, 2017
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 KY-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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APPENDIX B
FACILITY INFORMATION SHEET

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FACILITY INFORMATION SHEET

Groundwater: July 2017
Surface Water: July 2017
Methane: September 2017

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: 5501 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: Curt B. Walker Phone No: (270) 441-5226

Contact Person Title: Director, Environmental Services Project, 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)	7/19/2017 09:58	7/19/2017 10:44	7/19/2017 13:41	7/19/2017 12:58								
Duplicate ("Y" or "N") ²	N	N	N	N								
Split ("Y" or "N") ³	N	N	N	N								
Facility Sample ID Number (if applicable)	MW220SG4-17	MW221SG4-17	MW222SG4-17	MW223SG4-17								
Laboratory Sample ID Number (if applicable)	428391001	428391003	428391005	428391007								
Date of Analysis (Month/Day/Year) For <u>Volatile Organics</u> Analysis	7/25/2017	7/25/2017	7/25/2017	7/25/2017								
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	0.201		0.428		0.432		0.408	
16887-00-6	Chloride(s)	T	mg/L	9056	19.4		30.8		30.5		29	
16984-48-8	Fluoride	T	mg/L	9056	0.195		0.2		0.254		0.222	
S0595- -	Nitrate & Nitrite	T	mg/L	9056	1.06		1.04		0.872		1.01	
14808-79-8	Sulfate	T	mg/L	9056	22.7		15.3		13.4		19.8	
NS1894	Barometric Pressure Reading	T	Inches/Hg	Field	30.14		30.14		30.12		30.13	
S0145- -	Specific Conductance	T	µMHO/cm	Field	387		398		376		411	

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."

CS

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	327.43		327.36		327.41		327.41	
N238	Dissolved Oxygen	T	mg/L	Field	4.58		3.96		3		3.02	
S0266- -	Total Dissolved Solids	T	mg/L	160.1	451		230		217		223	
S0296- -	pH	T	Units	Field	6.16		6.17		6.22		6.15	
NS215	Eh	T	mV	Field	350		345		325		348	
S0907 - -	Temperature	T	°C	Field	18.06		19.17		20.33		21.22	
7429-90-5	Aluminum	T	mg/L	6020	<0.05		<0.05		0.0234	J	<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	0.202		0.201		0.273		0.233	
7440-41-7	Beryllium	T	mg/L	6020	<0.0005		<0.0005		<0.0005		<0.0005	
7440-42-8	Boron	T	mg/L	6020	0.00703	J	0.0108	J	0.00854	J	0.00663	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	22.7		21.6		19.1		21.9	
7440-47-3	Chromium	T	mg/L	6020	0.00661	J	0.00528	J	<0.01		0.0395	
7440-48-4	Cobalt	T	mg/L	6020	<0.001		0.000633	J	0.000814	J	0.000373	J
7440-50-8	Copper	T	mg/L	6020	0.00124		0.00077	J	0.000404	J	0.000498	J
7439-89-6	Iron	T	mg/L	6020	<0.1		<0.1		<0.1		<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	9.36		9.39		8.56		9.3	
7439-96-5	Manganese	T	mg/L	6020	<0.005		0.00174	J	0.0224		0.00302	J
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	0.0014		0.00551		0.000202	J	0.00809	
7440-02-0	Nickel	T	mg/L	6020	0.0266		0.0739		0.282		0.144	
7440-09-7	Potassium	T	mg/L	6020	1.84		1.18		0.495		2.66	
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	0.000412	J	0.00041	J	0.000386	J	0.000443	J
7440-23-5	Sodium	T	mg/L	6020	42		43.8		41.9		45.1	
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	0.00337	J	<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					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	0.00068	J	<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	0.00264		0.00034	J	<0.001		<0.001	

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	<0.0000197		<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					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	3.84	*	-0.95	*	2.74	*	-0.00808	*
12587-47-2	Gross Beta	T	pCi/L	9310	22.5	*	11.1	*	12.7	*	5.02	*
10043-66-0	Iodine-131	T	pCi/L			*		*		*		*
13982-63-3	Radium-226	T	pCi/L	AN-1418	0.476	*	0.132	*	0.0719	*	0.2	*
10098-97-2	Strontium-90	T	pCi/L	905.0	-1.05	*	-1.69	*	-1.66	*	-0.401	*
14133-76-7	Technetium-99	T	pCi/L	Tc-02-RC	22.7	*	25.7	*	2.36	*	10.2	*
14269-63-7	Thorium-230	T	pCi/L	Th-01-RC	0.402	*	0.399	*	0.57	*	0.342	*
10028-17-8	Tritium	T	pCi/L	906.0	-6.78	*	-48.4	*	-36.6	*	10.4	*
S0130- -	Chemical Oxygen Demand	T	mg/L	410.4	46.8		<20		14.9	J	10.4	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	0.996	J	0.895	J	0.982	J	0.961	J
S0586- -	Total Organic Halides	T	mg/L	9020	0.006	J	0.00506	J	<0.01		0.00864	J

C-8

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)	7/19/2017 11:55	7/20/2017 07:06	7/20/2017 08:32	7/20/2017 10:23								
Duplicate ("Y" or "N") ²	N	N	N	N								
Split ("Y" or "N") ³	N	N	N	N								
Facility Sample ID Number (if applicable)	MW224SG4-17	MW369UG4-17	MW370UG4-17	MW372UG4-17								
Laboratory Sample ID Number (if applicable)	428391011	428537007	428537009	428537013								
Date of Analysis (Month/Day/Year) For <u>Volatile Organics</u> Analysis	7/25/2017	7/26/2017	7/26/2017	7/26/2017								
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	0.459		0.397		0.407		0.605	
16887-00-6	Chloride(s)	T	mg/L	9056	35.6		33.7		34.2		45.8	
16984-48-8	Fluoride	T	mg/L	9056	0.244		0.161		0.137		0.152	
S0595- -	Nitrate & Nitrite	T	mg/L	9056	1.05		0.448		1.17		0.192	
14808-79-8	Sulfate	T	mg/L	9056	14.6		6.26		20.4		65.8	
NS1894	Barometric Pressure Reading	T	Inches/Hg	Field	30.14		30.08		30.1		30.12	
S0145- -	Specific Conductance	T	µMHO/cm	Field	443		367		427		585	

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					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	327.37		326.86		326.82		326.82	
N238	Dissolved Oxygen	T	mg/L	Field	3.74		1.81		4.26		0.99	
S0266- -	Total Dissolved Solids	T	mg/L	160.1	226		206		236		334	
S0296- -	pH	T	Units	Field	6.23		6.2		6.19		6.24	
NS215	Eh	T	mV	Field	339		376		343		300	
S0907 - -	Temperature	T	°C	Field	19.33		19.72		18.89		22.5	
7429-90-5	Aluminum	T	mg/L	6020	<0.05		0.228	*	0.137	*	0.0335	*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		0.00297	BJ	0.00317	BJ	0.00277	BJ
7440-39-3	Barium	T	mg/L	6020	0.199		0.417		0.238		0.0502	
7440-41-7	Beryllium	T	mg/L	6020	<0.0005		<0.0005		<0.0005		<0.0005	
7440-42-8	Boron	T	mg/L	6020	0.017		0.0117	J	0.0286		0.89	
7440-43-9	Cadmium	T	mg/L	6020	<0.001		<0.001		<0.001		<0.001	
7440-70-2	Calcium	T	mg/L	6020	22		16.9	B	28	B	46.3	B
7440-47-3	Chromium	T	mg/L	6020	<0.01		<0.01		0.00736	J	<0.01	
7440-48-4	Cobalt	T	mg/L	6020	0.000931	J	0.00938		0.00344		0.00119	
7440-50-8	Copper	T	mg/L	6020	0.000406	J	0.00191		0.00162		0.000714	J
7439-89-6	Iron	T	mg/L	6020	0.044	J	1.22		0.873		0.676	
7439-92-1	Lead	T	mg/L	6020	<0.002		<0.002		<0.002		<0.002	
7439-95-4	Magnesium	T	mg/L	6020	9.42		6.81	B	11.6	B	17.2	B
7439-96-5	Manganese	T	mg/L	6020	0.0112		0.0894		0.268		0.0157	
7439-97-6	Mercury	T	mg/L	7470	<0.0002		<0.0002		0.000067	J	<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	0.000774		0.000203	J	0.000547		0.000547	
7440-02-0	Nickel	T	mg/L	6020	0.0428		0.00989		0.00202		0.00114	J
7440-09-7	Potassium	T	mg/L	6020	0.769		0.474		2.31		1.98	
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	0.00042	J	0.000379	J	0.000526	J	<0.001	
7440-23-5	Sodium	T	mg/L	6020	50.7		54		40.6		42.8	
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		0.00704	BJ	0.00521	BJ	<0.01	
7440-66-6	Zinc	T	mg/L	6020	<0.01		0.0049	J	0.0116		0.00542	J
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		0.00119		0.00078	J	0.00569	

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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	<0.0000198		<0.0000196		<0.0000199		<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		*	0.0914	J*	<0.0962	*	<0.0962	*
12674-11-2	PCB-1016	T	ug/L	8082		*	<0.106	*	<0.0962	*	<0.0962	*
11104-28-2	PCB-1221	T	ug/L	8082		*	<0.106		<0.0962		<0.0962	
11141-16-5	PCB-1232	T	ug/L	8082		*	<0.106		<0.0962		<0.0962	
53469-21-9	PCB-1242	T	ug/L	8082		*	0.0914	J	<0.0962		<0.0962	
12672-29-6	PCB-1248	T	ug/L	8082		*	<0.106		<0.0962		<0.0962	

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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		*	<0.106		<0.0962		<0.0962	
11096-82-5	PCB-1260	T	ug/L	8082		*	<0.106	*	<0.0962	*	<0.0962	*
11100-14-4	PCB-1268	T	ug/L	8082		*	<0.106		<0.0962		<0.0962	
12587-46-1	Gross Alpha	T	pCi/L	9310	2.77	*	2.75	*	4.25	*	1.08	*
12587-47-2	Gross Beta	T	pCi/L	9310	4.52	*	26.1	*	84.6	*	21.3	*
10043-66-0	Iodine-131	T	pCi/L			*		*		*		*
13982-63-3	Radium-226	T	pCi/L	AN-1418	0.837	*	0.727	*	0.63	*	0.293	*
10098-97-2	Strontium-90	T	pCi/L	905.0	-0.86	*	-1.14	*	1.13	*	-0.452	*
14133-76-7	Technetium-99	T	pCi/L	Tc-02-RC	20.3	*	34.2	*	120	*	30.2	*
14269-63-7	Thorium-230	T	pCi/L	Th-01-RC	0.504	*	0.459	*	0.122	*	1.21	*
10028-17-8	Tritium	T	pCi/L	906.0	35.5	*	-70.5	*	-58.5	*	-3.84	*
S0130- -	Chemical Oxygen Demand	T	mg/L	410.4	<20		12.7	J	10.4	J	12.7	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		0.176	J
S0268- -	Total Organic Carbon	T	mg/L	9060	1.06	J	1.56	J	1.35	J	1.51	J
S0586- -	Total Organic Halides	T	mg/L	9020	0.0366		0.021		<0.01		0.0154	

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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)	7/20/2017 12:24	7/18/2017 09:35	7/18/2017 10:14	7/18/2017 10:50								
Duplicate ("Y" or "N") ²	N	N	N	N								
Split ("Y" or "N") ³	N	N	N	N								
Facility Sample ID Number (if applicable)	MW373UG4-17	MW384SG4-17	MW385SG4-17	MW386SG4-17								
Laboratory Sample ID Number (if applicable)	428537015	428258003	428258005	428258007								
Date of Analysis (Month/Day/Year) For <u>Volatile Organics</u> Analysis	7/26/2017	7/20/2017	7/20/2017	7/20/2017								
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	0.566		0.328		0.265		0.147	J
16887-00-6	Chloride(s)	T	mg/L	9056	47.1		36.3		31.3		14.9	
16984-48-8	Fluoride	T	mg/L	9056	0.148		0.249		0.119		0.605	
S0595- -	Nitrate & Nitrite	T	mg/L	9056	1.17		1.11		0.857		0.0654	J
14808-79-8	Sulfate	T	mg/L	9056	100		21.9		21.4		46.1	
NS1894	Barometric Pressure Reading	T	Inches/Hg	Field	30.1		30.07		30.07		30.07	
S0145- -	Specific Conductance	T	µMHO/cm	Field	660		466		410		584	

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	326.82		327.03		326.99		344.72	
N238	Dissolved Oxygen	T	mg/L	Field	3.28		2.54		3.83		2.01	
S0266- -	Total Dissolved Solids	T	mg/L	160.1	377		227		217		343	
S0296- -	pH	T	Units	Field	6.24		6.25		6.24		6.79	
NS215	Eh	T	mV	Field	309		343		328		324	
S0907 - -	Temperature	T	°C	Field	22.67		18.39		18.61		18.89	
7429-90-5	Aluminum	T	mg/L	6020	0.193	*	<0.05		0.0261	J	<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	0.00382	BJ	<0.005		<0.005		0.00203	J
7440-39-3	Barium	T	mg/L	6020	0.0343		0.111		0.209		0.152	
7440-41-7	Beryllium	T	mg/L	6020	<0.0005		<0.0005		<0.0005		<0.0005	
7440-42-8	Boron	T	mg/L	6020	1.15		0.0125	J	0.0154		0.00563	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	56.9	B	26.4		26.2		21.5	
7440-47-3	Chromium	T	mg/L	6020	<0.01		0.00354	J	<0.01		<0.01	
7440-48-4	Cobalt	T	mg/L	6020	0.00664		<0.001		<0.001		<0.001	
7440-50-8	Copper	T	mg/L	6020	0.00213		0.000578	J	0.000841	J	0.000699	J
7439-89-6	Iron	T	mg/L	6020	2.03		0.0709	J	<0.1		0.0612	J
7439-92-1	Lead	T	mg/L	6020	0.000614	J	<0.002		<0.002		<0.002	
7439-95-4	Magnesium	T	mg/L	6020	19.9	B	10.1		9.33		8.96	
7439-96-5	Manganese	T	mg/L	6020	0.256		0.0335		0.00141	J	0.0133	
7439-97-6	Mercury	T	mg/L	7470	0.000067	J	<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	0.000295	J	0.000369	BJ	0.000539	B	0.000692	B
7440-02-0	Nickel	T	mg/L	6020	0.00232		0.00136	J	0.000993	J	0.000657	J
7440-09-7	Potassium	T	mg/L	6020	2.2		1.03		1.66		0.301	
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		0.00266	J	<0.005		<0.005	
7440-22-4	Silver	T	mg/L	6020	0.000747	J	<0.001		<0.001		<0.001	
7440-23-5	Sodium	T	mg/L	6020	45.3		50.3		43.7		97.7	
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		<0.0002		<0.0002	
7440-62-2	Vanadium	T	mg/L	6020	0.00437	BJ	<0.01		<0.01		<0.01	
7440-66-6	Zinc	T	mg/L	6020	0.00693	J	<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-17

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	0.00652		0.00067	J	0.00072	J	0.00039	J

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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	<0.0000196		<0.0000196		<0.0000198		<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	<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	5.29	*	0.886	*	0.0104	*	2.07	*
12587-47-2	Gross Beta	T	pCi/L	9310	16.7	*	90.6	*	116	*	2.92	*
10043-66-0	Iodine-131	T	pCi/L			*		*		*		*
13982-63-3	Radium-226	T	pCi/L	AN-1418	0.257	*	0.658	*	0.216	*	0.129	*
10098-97-2	Strontium-90	T	pCi/L	905.0	0.135	*	-0.747	*	-0.251	*	1.49	*
14133-76-7	Technetium-99	T	pCi/L	Tc-02-RC	9.12	*	178	*	198	*	2.87	*
14269-63-7	Thorium-230	T	pCi/L	Th-01-RC	0.765	*	0.229	*	0.0611	*	-0.0383	*
10028-17-8	Tritium	T	pCi/L	906.0	49.6	*	39.1	*	-22.6	*		*
S0130- -	Chemical Oxygen Demand	T	mg/L	410.4	14.9	J	21.1		<20		65.3	
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	1.53	J	1.35	J	1.1	J	4.47	
S0586- -	Total Organic Halides	T	mg/L	9020	0.0146		0.0214		0.0043	J	0.121	

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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	8004-4815	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)	7/18/2017 08:18	7/18/2017 08:57	NA	7/18/2017 07:36						
Duplicate ("Y" or "N") ²	N	N	N	N						
Split ("Y" or "N") ³	N	N	N	N						
Facility Sample ID Number (if applicable)	MW387SG4-17	MW388SG4-17	NA	MW390SG4-17						
Laboratory Sample ID Number (if applicable)	428258009	428258011	NA	428258013						
Date of Analysis (Month/Day/Year) For <u>Volatile Organics</u> Analysis	7/20/2017	7/20/2017	NA	7/21/2017						
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	0.378		0.295		*	0.571
16887-00-6	Chloride(s)	T	mg/L	9056	38.2		33.1		*	62.2
16984-48-8	Fluoride	T	mg/L	9056	0.463		0.25		*	0.281
S0595- -	Nitrate & Nitrite	T	mg/L	9056	1.28		1.17		*	3.11
14808-79-8	Sulfate	T	mg/L	9056	23.8		23.5		*	40.3
NS1894	Barometric Pressure Reading	T	Inches/Hg	Field	30.06		30.06		*	30.05
S0145- -	Specific Conductance	T	µMH0/cm	Field	482		403		*	695

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					8004-4815	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	327.12		327.08		*		327.04	
N238	Dissolved Oxygen	T	mg/L	Field	4.35		5.04		*		6.37	
S0266- -	Total Dissolved Solids	T	mg/L	160.1	247		207		*		367	
S0296- -	pH	T	Units	Field	6.26		6.14		*		6.45	
NS215	Eh	T	mV	Field	357		352		*		393	
S0907 - -	Temperature	T	°C	Field	18.94		18.61		*		18.83	
7429-90-5	Aluminum	T	mg/L	6020	0.0207	J	0.0368	J	*		0.161	
7440-36-0	Antimony	T	mg/L	6020	<0.003		<0.003		*		<0.003	
7440-38-2	Arsenic	T	mg/L	6020	0.00228	J	<0.005		*		<0.005	
7440-39-3	Barium	T	mg/L	6020	0.125		0.162		*		0.242	
7440-41-7	Beryllium	T	mg/L	6020	<0.0005		<0.0005		*		<0.0005	
7440-42-8	Boron	T	mg/L	6020	0.0287		0.0173		*		0.00969	J
7440-43-9	Cadmium	T	mg/L	6020	<0.001		<0.001		*		<0.001	
7440-70-2	Calcium	T	mg/L	6020	28.9		22.5		*		30.5	
7440-47-3	Chromium	T	mg/L	6020	<0.01		<0.01		*		<0.01	
7440-48-4	Cobalt	T	mg/L	6020	<0.001		<0.001		*		0.000358	J
7440-50-8	Copper	T	mg/L	6020	0.000357	J	0.000403	J	*		0.000725	J
7439-89-6	Iron	T	mg/L	6020	0.0349	J	0.0914	J	*		0.166	
7439-92-1	Lead	T	mg/L	6020	<0.002		<0.002		*		<0.002	
7439-95-4	Magnesium	T	mg/L	6020	11.9		9.53		*		12.8	
7439-96-5	Manganese	T	mg/L	6020	0.00131	J	0.00139	J	*		0.0019	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	0.000267	BJ	0.000233	BJ	*	0.000756	B	
7440-02-0	Nickel	T	mg/L	6020	<0.002		0.001	J	*	0.00155	J	
7440-09-7	Potassium	T	mg/L	6020	1.49		1.64		*	0.366		
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	<0.001		<0.001		*	<0.001		
7440-23-5	Sodium	T	mg/L	6020	48.5		46		*	95		
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	<0.0002		<0.0002		*	<0.0002		
7440-62-2	Vanadium	T	mg/L	6020	<0.01		<0.01		*	<0.01		
7440-66-6	Zinc	T	mg/L	6020	<0.01		<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					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	0.0017		0.00104			*	0.00056	J

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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	<0.0000196		<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		*		*	*			*
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	0.718	*	-0.794	*		*	3.36	*
12587-47-2	Gross Beta	T	pCi/L	9310	130	*	103	*		*	45.7	*
10043-66-0	Iodine-131	T	pCi/L			*		*		*		*
13982-63-3	Radium-226	T	pCi/L	AN-1418	0.337	*	0.732	*		*	0.252	*
10098-97-2	Strontium-90	T	pCi/L	905.0	-0.167	*	2.34	*		*	-1.9	*
14133-76-7	Technetium-99	T	pCi/L	Tc-02-RC	207	*	198	*		*	86.7	*
14269-63-7	Thorium-230	T	pCi/L	Th-01-RC	0.437	*	0.182	*		*	0.0595	*
10028-17-8	Tritium	T	pCi/L	906.0	-15.5	*	-2.28	*		*	20.3	*
S0130- -	Chemical Oxygen Demand	T	mg/L	410.4	21.1		11.8	J		*	<20	
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	1.06	J	1.14	J		*	2.46	
S0586- -	Total Organic Halides	T	mg/L	9020	0.0171		0.00404	J		*	0.0165	

C-26

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)	7/18/2017 12:33	7/18/2017 13:12	7/18/2017 11:55	7/19/2017 08:26								
Duplicate ("Y" or "N") ²	N	N	N	N								
Split ("Y" or "N") ³	N	N	N	N								
Facility Sample ID Number (if applicable)	MW391SG4-17	MW392SG4-17	MW393SG4-17	MW394SG4-17								
Laboratory Sample ID Number (if applicable)	428258015	428258001	428258017	428391013								
Date of Analysis (Month/Day/Year) For <u>Volatile Organics</u> Analysis	7/21/2017	7/20/2017	7/21/2017	7/25/2017								
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		
24959-67-9	Bromide	T	mg/L	9056	0.48		0.602		0.164	J	0.592	
16887-00-6	Chloride(s)	T	mg/L	9056	37.8		47.8		13.3		47.9	
16984-48-8	Fluoride	T	mg/L	9056	0.136		0.197		0.155		0.15	
S0595- -	Nitrate & Nitrite	T	mg/L	9056	0.714		0.243		0.167		1.56	
14808-79-8	Sulfate	T	mg/L	9056	98.9		6.72		17.6		10.2	
NS1894	Barometric Pressure Reading	T	Inches/Hg	Field	30.08		30.07		30.08		30.12	
S0145- -	Specific Conductance	T	µMHO/cm	Field	557		419		427		395	

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					8004-4805	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	327		326.98		340.27		327.08	
N238	Dissolved Oxygen	T	mg/L	Field	3.09		3.58		1.3		5.58	
S0266- -	Total Dissolved Solids	T	mg/L	160.1	327		206		246		203	
S0296- -	pH	T	Units	Field	6.12		6.3		6.28		6.18	
NS215	Eh	T	mV	Field	310		304		307		338	
S0907 - -	Temperature	T	°C	Field	21.72		20.94		21.06		18.83	
7429-90-5	Aluminum	T	mg/L	6020	0.0202	J	0.0404	J	0.0597		<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		0.00402	J	<0.005	
7440-39-3	Barium	T	mg/L	6020	0.103		0.197		0.123		0.256	
7440-41-7	Beryllium	T	mg/L	6020	<0.0005		<0.0005		<0.0005		<0.0005	
7440-42-8	Boron	T	mg/L	6020	0.357		0.03		0.0212		0.0223	
7440-43-9	Cadmium	T	mg/L	6020	<0.001		<0.001		<0.001		<0.001	
7440-70-2	Calcium	T	mg/L	6020	39.6		28.6		13.6		26.1	
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	0.000479	J	0.000961	J	0.000643	J	0.000624	J
7439-89-6	Iron	T	mg/L	6020	0.0578	J	0.271		1.16		<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	16.8		9.87		3.8		11.4	
7439-96-5	Manganese	T	mg/L	6020	0.00161	J	0.136		0.0255		0.00234	J
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	0.000209	BJ	0.000469	BJ	0.000392	BJ	0.000292	J
7440-02-0	Nickel	T	mg/L	6020	0.000787	J	0.0012	J	<0.002		0.0129	
7440-09-7	Potassium	T	mg/L	6020	1.78		1.82		0.461		1.33	
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		0.000412	J
7440-23-5	Sodium	T	mg/L	6020	47		41.5		82.8		28.7	
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		<0.0002		<0.0002	
7440-62-2	Vanadium	T	mg/L	6020	<0.01		<0.01		0.00674	BJ	<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					8004-4805		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	0.0004	J	0.00102		<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	0.00777		0.0156		0.00104		0.00481	

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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	<0.0000195		<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					8004-4805	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	-0.0583	*	4.73	*	0.0655	*	-1.04	*
12587-47-2	Gross Beta	T	pCi/L	9310	3.34	*	0.686	*	-0.584	*	6.29	*
10043-66-0	Iodine-131	T	pCi/L			*		*		*		*
13982-63-3	Radium-226	T	pCi/L	AN-1418	0.194	*	0.181	*	0.261	*	0.462	*
10098-97-2	Strontium-90	T	pCi/L	905.0	-1.33	*	0.839	*	-1.34	*	-3.32	*
14133-76-7	Technetium-99	T	pCi/L	Tc-02-RC	5.74	*	8.72	*	0.46	*	11.1	*
14269-63-7	Thorium-230	T	pCi/L	Th-01-RC	0.322	*	0.144	*	-0.044	*	0.112	*
10028-17-8	Tritium	T	pCi/L	906.0	-10	*	-7.83	*	7.15	*	-178	*
S0130- -	Chemical Oxygen Demand	T	mg/L	410.4	18.7	J	16.4	J	<20		<20	
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	1.12	J	1.33	J	2.6		0.806	J
S0586- -	Total Organic Halides	T	mg/L	9020	0.0098	J	0.0344		0.016		0.00844	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	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)	7/19/2017 07:11	7/19/2017 07:48	7/19/2017 09:10	7/19/2017 06:15								
Duplicate ("Y" or "N") ²	N	N	N	N								
Split ("Y" or "N") ³	N	N	N	N								
Facility Sample ID Number (if applicable)	MW395SG4-17	MW396SG4-17	MW397SG4-17	R11SG4-17								
Laboratory Sample ID Number (if applicable)	428391015	428391017	428391019	428391022								
Date of Analysis (Month/Day/Year) For <u>Volatile Organics</u> Analysis	7/25/2017	7/25/2017	7/24/2017	7/25/2017								
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	0.58		1.09		0.413			*
16887-00-6	Chloride(s)	T	mg/L	9056	48.1		72.5		34			*
16984-48-8	Fluoride	T	mg/L	9056	0.129		0.608		0.153			*
S0595- -	Nitrate & Nitrite	T	mg/L	9056	1.53		0.132		1.29			*
14808-79-8	Sulfate	T	mg/L	9056	10		24.4		10.1			*
NS1894	Barometric Pressure Reading	T	Inches/Hg	Field	30.11		30.11		30.12			*
S0145- -	Specific Conductance	T	µMHO/cm	Field	392		762		315			*

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					8004-4801	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	327.47		368.58		327.01			*
N238	Dissolved Oxygen	T	mg/L	Field	5.47		1.07		5.86			*
S0266- -	Total Dissolved Solids	T	mg/L	160.1	210		420		171			*
S0296- -	pH	T	Units	Field	6.13		6.49		6.08			*
NS215	Eh	T	mV	Field	392		291		352			*
S0907 - -	Temperature	T	°C	Field	17.89		19		18.44			*
7429-90-5	Aluminum	T	mg/L	6020	<0.05		<0.05		0.0612		<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		0.00216	J
7440-39-3	Barium	T	mg/L	6020	0.245		0.341		0.135		<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	0.0222		0.00607	J	0.00689	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	26.2		34.5		17.2		<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		<0.001		<0.001		<0.001	
7440-50-8	Copper	T	mg/L	6020	0.000311	J	0.000742	J	0.000512	J	<0.001	
7439-89-6	Iron	T	mg/L	6020	<0.1		0.0929	J	0.119		<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	10.9		14.9		7.37		<0.03	
7439-96-5	Manganese	T	mg/L	6020	<0.005		0.0615		0.00275	J	<0.005	
7439-97-6	Mercury	T	mg/L	7470	<0.0002		<0.0002		<0.000222		<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	<0.0005		0.00041	J	<0.0005		<0.0005	
7440-02-0	Nickel	T	mg/L	6020	0.000603	J	<0.002		<0.002		<0.002	
7440-09-7	Potassium	T	mg/L	6020	1.52		0.822		1.52		<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	0.000395	J	<0.001		0.00039	J	0.00041	J
7440-23-5	Sodium	T	mg/L	6020	28.2		100		29.1		<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		0.00725	J
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		0.00282	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					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		0.00279	J
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	0.00435		0.00057	J	0.00044	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					8004-4801	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	<0.0000199		<0.0000197		<0.0000198		<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					8004-4801	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	2.05	*	0.797	*	0.381	*	1.28	*
12587-47-2	Gross Beta	T	pCi/L	9310	5.16	*	1.07	*	9.5	*	-0.722	*
10043-66-0	Iodine-131	T	pCi/L			*		*		*		*
13982-63-3	Radium-226	T	pCi/L	AN-1418	0.437	*	0.752	*	0.555	*	0.42	*
10098-97-2	Strontium-90	T	pCi/L	905.0	0.526	*	-0.859	*	1.64	*	0.205	*
14133-76-7	Technetium-99	T	pCi/L	Tc-02-RC	19.2	*	1.19	*	29.8	*	2.77	*
14269-63-7	Thorium-230	T	pCi/L	Th-01-RC	0.184	*	0.428	*	0.612	*	-0.083	*
10028-17-8	Tritium	T	pCi/L	906.0	-55.8	*	-39.5	*	-67.2	*	73.1	*
S0130- -	Chemical Oxygen Demand	T	mg/L	410.4	12.7	J	21.8		<20			*
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		0.242	J	<0.5		<0.5	
S0268- -	Total Organic Carbon	T	mg/L	9060	0.951	J	5.03		0.72	J		*
S0586- -	Total Organic Halides	T	mg/L	9020	0.00766	J	0.0697		0.00338	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	0000-0000	0000-0000	0000-0000	8000-5244								
Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.)	F. BLANK	T. BLANK 1	T. BLANK 2	224								
Sample Sequence #	1	1	1	2								
If sample is a Blank, specify Type: (F)ield, (T)rip, (M)ethod, or (E)quipment	F	T	T	NA								
Sample Date and Time (Month/Day/Year hour: minutes)	7/19/2017 12:00	7/18/2017 07:05	7/19/2017 06:10	7/19/2017 11:55								
Duplicate ("Y" or "N") ²	N	N	N	Y								
Split ("Y" or "N") ³	N	N	N	N								
Facility Sample ID Number (if applicable)	FB1SG4-17	TB1SG4-17	TB2SG4-17	MW224DSG4-17								
Laboratory Sample ID Number (if applicable)	428391021	428258019	428391023	428391009								
Date of Analysis (Month/Day/Year) For <u>Volatile Organics</u> Analysis	7/25/2017	7/21/2017	7/24/2017	7/25/2017								
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		*		*		*	0.459	
16887-00-6	Chloride(s)	T	mg/L	9056		*		*		*	35.7	
16984-48-8	Fluoride	T	mg/L	9056		*		*		*	0.255	
S0595- -	Nitrate & Nitrite	T	mg/L	9056		*		*		*	1.03	
14808-79-8	Sulfate	T	mg/L	9056		*		*		*	14.6	
NS1894	Barometric Pressure Reading	T	Inches/Hg	Field		*		*		*	30.14	
S0145- -	Specific Conductance	T	µMH0/cm	Field		*		*		*	443	

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					0000-0000	0000-0000	0000-0000	8000-5244				
Facility's Local Well or Spring Number (e.g., MW-1, MW-2, BLANK-F, etc.)					F. BLANK	T. BLANK 1	T. BLANK 2	224				
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		*		*		*	327.37	
N238	Dissolved Oxygen	T	mg/L	Field		*		*		*	3.74	
S0266- -	Total Dissolved Solids	T	mg/L	160.1		*		*		*	233	
S0296- -	pH	T	Units	Field		*		*		*	6.23	
NS215	Eh	T	mV	Field		*		*		*	339	
S0907 - -	Temperature	T	°C	Field		*		*		*	19.33	
7429-90-5	Aluminum	T	mg/L	6020	<0.05			*		*	<0.05	
7440-36-0	Antimony	T	mg/L	6020	0.00672			*		*	<0.003	
7440-38-2	Arsenic	T	mg/L	6020	<0.005			*		*	0.00211	J
7440-39-3	Barium	T	mg/L	6020	<0.002			*		*	0.208	
7440-41-7	Beryllium	T	mg/L	6020	<0.0005			*		*	<0.0005	
7440-42-8	Boron	T	mg/L	6020	<0.015			*		*	0.018	
7440-43-9	Cadmium	T	mg/L	6020	<0.001			*		*	<0.001	
7440-70-2	Calcium	T	mg/L	6020	<0.2			*		*	25.3	
7440-47-3	Chromium	T	mg/L	6020	<0.01			*		*	<0.01	
7440-48-4	Cobalt	T	mg/L	6020	<0.001			*		*	0.00103	
7440-50-8	Copper	T	mg/L	6020	0.00037	J		*		*	0.000571	J
7439-89-6	Iron	T	mg/L	6020	<0.1			*		*	0.0534	J
7439-92-1	Lead	T	mg/L	6020	<0.002			*		*	<0.002	
7439-95-4	Magnesium	T	mg/L	6020	<0.03			*		*	11.7	
7439-96-5	Manganese	T	mg/L	6020	<0.005			*		*	0.0129	
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	0000-0000	0000-0000	8000-5244		
Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.)					F. BLANK	T. BLANK 1	T. BLANK 2	224		
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
7439-98-7	Molybdenum	T	mg/L	6020	<0.0005		*	*	0.000727	
7440-02-0	Nickel	T	mg/L	6020	<0.002		*	*	0.0494	
7440-09-7	Potassium	T	mg/L	6020	<0.3		*	*	0.912	
7440-16-6	Rhodium	T	mg/L	6020	<0.005		*	*	<0.005	
7782-49-2	Selenium	T	mg/L	6020	<0.005		*	*	<0.005	
7440-22-4	Silver	T	mg/L	6020	0.000413	J	*	*	0.000519	J
7440-23-5	Sodium	T	mg/L	6020	<0.25		*	*	57.1	
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		*	*	0.00858	J
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	<0.005	
67-64-1	Acetone	T	mg/L	8260	0.00253	J	<0.005	0.00287	<0.005	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		0.00039	J	<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		8000-5244	
Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.)					F. BLANK		T. BLANK 1		T. BLANK 2		224	
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	0.00321	J	<0.005		0.00321	J	<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	

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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		8000-5244	
Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.)					F. BLANK		T. BLANK 1		T. BLANK 2		224	
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		<0.0000198		<0.0000195		<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					0000-0000	0000-0000	0000-0000	8000-5244				
Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.)					F. BLANK	T. BLANK 1	T. BLANK 2	224				
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	-0.557	*		*		*	2.33	*
12587-47-2	Gross Beta	T	pCi/L	9310	-0.455	*		*		*	4.79	*
10043-66-0	Iodine-131	T	pCi/L			*		*		*		*
13982-63-3	Radium-226	T	pCi/L	AN-1418	0.285	*		*		*	0.0501	*
10098-97-2	Strontium-90	T	pCi/L	905.0	-0.971	*		*		*	1.43	*
14133-76-7	Technetium-99	T	pCi/L	Tc-02-RC	-2.78	*		*		*	9.36	*
14269-63-7	Thorium-230	T	pCi/L	Th-01-RC	0.498	*		*		*	0.331	*
10028-17-8	Tritium	T	pCi/L	906.0	21	*		*		*	31.8	*
S0130- -	Chemical Oxygen Demand	T	mg/L	410.4		*		*		*	<20	
57-12-5	Cyanide	T	mg/L	9012		*		*		*	<0.2	
20461-54-5	Iodide	T	mg/L	300.0	<0.5			*		*	<0.5	
S0268- -	Total Organic Carbon	T	mg/L	9060		*		*		*	1.05	J
S0586- -	Total Organic Halides	T	mg/L	9020		*		*		*	0.00818	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		8004-4804											
Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.)		386											
Sample Sequence #		1											
If sample is a Blank, specify Type: (F)ield, (T)rip, (M)ethod, or (E)quipment		NA											
Sample Date and Time (Month/Day/Year hour: minutes)		7/24/2017 13:32											
Duplicate ("Y" or "N") ²		N											
Split ("Y" or "N") ³		N											
Facility Sample ID Number (if applicable)		MW386SG4-17R											
Laboratory Sample ID Number (if applicable)		428755001											
Date of Analysis (Month/Day/Year) For <u>Volatile Organics</u> Analysis		NA											
Gradient with respect to Monitored Unit (UP, DOWN, SIDE, UNKNOWN)		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		*							
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	29.94								
S0145- -	Specific Conductance	T	µMHO/cm	Field	589								

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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."

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

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					8004-4804								
Facility's Local Well or Spring Number (e.g., MW-1, MW-2, BLANK-F, etc.)					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	344.58								
N238	Dissolved Oxygen	T	mg/L	Field	2.3								
S0266- -	Total Dissolved Solids	T	mg/L	160.1		*							
S0296- -	pH	T	Units	Field	6.75								
NS215	Eh	T	mV	Field	295								
S0907 - -	Temperature	T	°C	Field	20.94								
7429-90-5	Aluminum	T	mg/L	6020		*							
7440-36-0	Antimony	T	mg/L	6020		*							
7440-38-2	Arsenic	T	mg/L	6020		*							
7440-39-3	Barium	T	mg/L	6020		*							
7440-41-7	Beryllium	T	mg/L	6020		*							
7440-42-8	Boron	T	mg/L	6020		*							
7440-43-9	Cadmium	T	mg/L	6020		*							
7440-70-2	Calcium	T	mg/L	6020		*							
7440-47-3	Chromium	T	mg/L	6020		*							
7440-48-4	Cobalt	T	mg/L	6020		*							
7440-50-8	Copper	T	mg/L	6020		*							
7439-89-6	Iron	T	mg/L	6020		*							
7439-92-1	Lead	T	mg/L	6020		*							
7439-95-4	Magnesium	T	mg/L	6020		*							
7439-96-5	Manganese	T	mg/L	6020		*							
7439-97-6	Mercury	T	mg/L	7470		*							

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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					8004-4804								
Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.)					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		*							
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		*							
12587-47-2	Gross Beta	T	pCi/L	9310		*							
10043-66-0	Iodine-131	T	pCi/L			*							
13982-63-3	Radium-226	T	pCi/L	AN-1418		*							
10098-97-2	Strontium-90	T	pCi/L	905.0		*							
14133-76-7	Technetium-99	T	pCi/L	Tc-02-RC		*							
14269-63-7	Thorium-230	T	pCi/L	Th-01-RC		*							
10028-17-8	Tritium	T	pCi/L	906.0	68.8	*							
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		*							
S0268- -	Total Organic Carbon	T	mg/L	9060		*							
S0586- -	Total Organic Halides	T	mg/L	9020		*							

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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	MW220SG4-17	Tantalum	N	Sample spike (MS/MSD) recovery not within control limits
		Chlorobenzene	Y2	MS/MSD RPD outside acceptance criteria
		Xylenes	Y2	MS/MSD RPD outside acceptance criteria
		Styrene	Y2	MS/MSD RPD outside acceptance criteria
		Methyl bromide	L	LCS or LCSD recovery outside of control limits
		Methyl chloride	L	LCS or LCSD recovery outside of control limits
		Tetrachloroethene	Y2	MS/MSD RPD outside acceptance criteria
		Ethylbenzene	Y2	MS/MSD RPD outside acceptance criteria
		1,2-Dichlorobenzene	Y2	MS/MSD RPD outside acceptance criteria
		1,4-Dichlorobenzene	Y2	MS/MSD RPD outside acceptance criteria
		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 3.35. Rad error is 3.29.
		Gross beta		TPU is 5.84. Rad error is 4.51.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226		TPU is 0.432. Rad error is 0.432.
		Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 3.78. Rad error is 3.77.
		Technetium-99		TPU is 8.18. Rad error is 7.78.
		Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.411. Rad error is 0.402.
		Tritium	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 153. Rad error is 153.

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	MW221SG4-17		
		Tantalum	N	Sample spike (MS/MSD) recovery not within control limits
		Chlorobenzene	Y2	MS/MSD RPD outside acceptance criteria
		Xylenes	Y2	MS/MSD RPD outside acceptance criteria
		Styrene	Y2	MS/MSD RPD outside acceptance criteria
		Methyl bromide	L	LCS or LCSD recovery outside of control limits
		Methyl chloride	L	LCS or LCSD recovery outside of control limits
		Tetrachloroethene	Y2	MS/MSD RPD outside acceptance criteria
		Ethylbenzene	Y2	MS/MSD RPD outside acceptance criteria
		1,2-Dichlorobenzene	Y2	MS/MSD RPD outside acceptance criteria
		1,4-Dichlorobenzene	Y2	MS/MSD RPD outside acceptance criteria
		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 1.74. Rad error is 1.74.
		Gross beta		TPU is 3.3. Rad error is 2.74.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.21. Rad error is 0.21.
		Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 3.74. Rad error is 3.74.
		Technetium-99		TPU is 8.94. Rad error is 8.47.
		Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.558. Rad error is 0.549.
		Tritium	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 152. Rad error is 152.

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	MW222SG4-17		
		Tantalum	N	Sample spike (MS/MSD) recovery not within control limits
		Chlorobenzene	Y2	MS/MSD RPD outside acceptance criteria
		Xylenes	Y2	MS/MSD RPD outside acceptance criteria
		Styrene	Y2	MS/MSD RPD outside acceptance criteria
		Methyl bromide	L	LCS or LCSD recovery outside of control limits
		Methyl chloride	L	LCS or LCSD recovery outside of control limits
		Tetrachloroethene	Y2	MS/MSD RPD outside acceptance criteria
		Ethylbenzene	Y2	MS/MSD RPD outside acceptance criteria
		1,2-Dichlorobenzene	Y2	MS/MSD RPD outside acceptance criteria
		1,4-Dichlorobenzene	Y2	MS/MSD RPD outside acceptance criteria
		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 2.92. Rad error is 2.88.
		Gross beta		TPU is 3.52. Rad error is 2.83.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.246. Rad error is 0.246.
		Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 2.54. Rad error is 2.54.
		Technetium-99	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 7.36. Rad error is 7.35.
		Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.504. Rad error is 0.492.
		Tritium	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 148. Rad error is 148.

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 MW223SG4-17	Tantalum	N	Sample spike (MS/MSD) recovery not within control limits
		Chlorobenzene	Y2	MS/MSD RPD outside acceptance criteria
		Xylenes	Y2	MS/MSD RPD outside acceptance criteria
		Styrene	Y2	MS/MSD RPD outside acceptance criteria
		Methyl bromide	L	LCS or LCSD recovery outside of control limits
		Methyl chloride	L	LCS or LCSD recovery outside of control limits
		Tetrachloroethene	Y2	MS/MSD RPD outside acceptance criteria
		Ethylbenzene	Y2	MS/MSD RPD outside acceptance criteria
		1,2-Dichlorobenzene	Y2	MS/MSD RPD outside acceptance criteria
		1,4-Dichlorobenzene	Y2	MS/MSD RPD outside acceptance criteria
		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 2.31. Rad error is 2.31.
		Gross beta		TPU is 2.32. Rad error is 2.17.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.324. Rad error is 0.324.
		Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 3.87. Rad error is 3.87.
		Technetium-99	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 7.93. Rad error is 7.85.
		Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.447. Rad error is 0.439.
		Tritium	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 159. Rad error is 159.

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	MW224SG4-17	Tantalum	N	Sample spike (MS/MSD) recovery not within control limits
		Chlorobenzene	Y2	MS/MSD RPD outside acceptance criteria
		Xylenes	Y2	MS/MSD RPD outside acceptance criteria
		Styrene	Y2	MS/MSD RPD outside acceptance criteria
		Methyl bromide	L	LCS or LCSD recovery outside of control limits
		Methyl chloride	L	LCS or LCSD recovery outside of control limits
		Tetrachloroethene	Y2	MS/MSD RPD outside acceptance criteria
		Ethylbenzene	Y2	MS/MSD RPD outside acceptance criteria
		1,2-Dichlorobenzene	Y2	MS/MSD RPD outside acceptance criteria
		1,4-Dichlorobenzene	Y2	MS/MSD RPD outside acceptance criteria
		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 3.01. Rad error is 2.98.
		Gross beta		TPU is 2.02. Rad error is 1.87.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226		TPU is 0.495. Rad error is 0.494.
		Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 3.73. Rad error is 3.73.
		Technetium-99		TPU is 11. Rad error is 10.8.
		Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.454. Rad error is 0.442.
		Tritium	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 162. Rad error is 161.

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
8004-4820 MW369	MW369UG4-17	Aluminum	N	Sample spike (MS/MSD) recovery not within control limits
		Tantalum	N	Sample spike (MS/MSD) recovery not within control limits
		PCB, Total	Y2	MS/MSD RPD outside acceptance criteria
		PCB-1016	Y2	MS/MSD RPD outside acceptance criteria
		PCB-1260	Y2	MS/MSD RPD outside acceptance criteria
		Gross alpha	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 3. Rad error is 2.96.
		Gross beta		TPU is 6.39. Rad error is 4.74.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226		TPU is 0.569. Rad error is 0.568.
		Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 1.56. Rad error is 1.56.
		Technetium-99		TPU is 14.3. Rad error is 13.8.
		Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.818. Rad error is 0.808.
		Tritium	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 120. Rad error is 120.
8004-4818 MW370	MW370UG4-17	Aluminum	N	Sample spike (MS/MSD) recovery not within control limits
		Tantalum	N	Sample spike (MS/MSD) recovery not within control limits
		PCB, Total	Y2	MS/MSD RPD outside acceptance criteria
		PCB-1016	Y2	MS/MSD RPD outside acceptance criteria
		PCB-1260	Y2	MS/MSD RPD outside acceptance criteria
		Gross alpha	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 3.52. Rad error is 3.45.
		Gross beta		TPU is 15.6. Rad error is 7.39.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226		TPU is 0.473. Rad error is 0.473.
		Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 1.93. Rad error is 1.92.
		Technetium-99		TPU is 20.6. Rad error is 15.7.
		Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.778. Rad error is 0.775.
		Tritium	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 122. Rad error is 122.

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
8004-4808 MW372	MW372UG4-17	Aluminum	N	Sample spike (MS/MSD) recovery not within control limits
		Tantalum	N	Sample spike (MS/MSD) recovery not within control limits
		PCB, Total	Y2	MS/MSD RPD outside acceptance criteria
		PCB-1016	Y2	MS/MSD RPD outside acceptance criteria
		PCB-1260	Y2	MS/MSD RPD outside acceptance criteria
		Gross alpha	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 2.37. Rad error is 2.36.
		Gross beta		TPU is 4.39. Rad error is 2.72.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.371. Rad error is 0.371.
		Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 1.69. Rad error is 1.69.
		Technetium-99		TPU is 13.6. Rad error is 13.2.
		Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 1.05. Rad error is 1.02.
		Tritium	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 128. Rad error is 128.
8004-4792 MW373	MW373UG4-17	Aluminum	N	Sample spike (MS/MSD) recovery not within control limits
		Tantalum	N	Sample spike (MS/MSD) recovery not within control limits
		PCB, Total	Y2	MS/MSD RPD outside acceptance criteria
		PCB-1016	Y2	MS/MSD RPD outside acceptance criteria
		PCB-1260	Y2	MS/MSD RPD outside acceptance criteria
		Gross alpha		TPU is 3.11. Rad error is 2.99.
		Gross beta		TPU is 3.7. Rad error is 2.51.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.335. Rad error is 0.334.
		Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 1.9. Rad error is 1.9.
		Technetium-99	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 13.4. Rad error is 13.4.
		Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.865. Rad error is 0.847.
		Tritium	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 134. Rad error is 133.

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	MW384SG4-17	Tantalum	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 2.68. Rad error is 2.67.
		Gross beta		TPU is 16.1. Rad error is 6.29.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226		TPU is 0.526. Rad error is 0.525.
		Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 1.82. Rad error is 1.82.
		Technetium-99		TPU is 25.2. Rad error is 15.6.
		Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.284. Rad error is 0.279.
Tritium	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 82. Rad error is 81.7.		
8004-4810 MW385	MW385SG4-17	Tantalum	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 2.41. Rad error is 2.41.
		Gross beta		TPU is 20.1. Rad error is 7.21.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.324. Rad error is 0.324.
		Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 1.4. Rad error is 1.4.
		Technetium-99		TPU is 26.5. Rad error is 14.8.
		Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.272. Rad error is 0.269.
Tritium	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 78.1. Rad error is 78.1.		

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	MW386SG4-17	Tantalum	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 2.8. Rad error is 2.78.
		Gross beta		TPU is 1.56. Rad error is 1.48.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.256. Rad error is 0.256.
		Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 2.33. Rad error is 2.32.
		Technetium-99	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 10.1. Rad error is 10.1.
		Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.222. Rad error is 0.221.
Tritium		A resample was collected - sample bottle broken in transit to the lab.		
8004-4815 MW387	MW387SG4-17	Tantalum	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 2.76. Rad error is 2.75.
		Gross beta		TPU is 22.2. Rad error is 7.3.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.343. Rad error is 0.343.
		Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 1.28. Rad error is 1.28.
		Technetium-99		TPU is 27.4. Rad error is 14.9.
		Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.384. Rad error is 0.375.
Tritium	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 77.4. Rad error is 77.4.		

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
8004-4816 MW388	MW388SG4-17	Tantalum	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		TPU is 18. Rad error is 6.78.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226		TPU is 0.505. Rad error is 0.504.
		Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 1.66. Rad error is 1.62.
		Technetium-99		TPU is 26.6. Rad error is 14.8.
		Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.284. Rad error is 0.279.
		Tritium	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 77.9. Rad error is 77.9.

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		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.

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	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.

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	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

For Official Use Only

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	MW390SG4-17		
		Tantalum	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 3.27. Rad error is 3.19.
		Gross beta		TPU is 8.75. Rad error is 4.09.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.289. Rad error is 0.288.
		Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 1.45. Rad error is 1.45.
		Technetium-99		TPU is 16.3. Rad error is 13.1.
		Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.244. Rad error is 0.242.
		Tritium	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 79.9. Rad error is 79.8.

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
8004-4805 MW391	MW391SG4-17	Tantalum	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 2.33. Rad error is 2.33.
		Gross beta	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 2.5. Rad error is 2.44.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.288. Rad error is 0.288.
		Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 1.16. Rad error is 1.16.
		Technetium-99	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 10. Rad error is 10.
		Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.346. Rad error is 0.339.
		Tritium	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 80.2. Rad error is 80.2.

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	MW392SG4-17	Tantalum	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 3.5. Rad error is 3.41.
		Gross beta	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 1.94. Rad error is 1.91.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.288. Rad error is 0.288.
		Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 1.65. Rad error is 1.64.
		Technetium-99	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 10.5. Rad error is 10.5.
		Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.256. Rad error is 0.252.
		Tritium	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 79.2. Rad error is 79.2.

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	MW393SG4-17	Tantalum	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 2.42. Rad error is 2.42.
		Gross beta	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 2.12. Rad error is 2.12.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.367. Rad error is 0.367.
		Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 1.41. Rad error is 1.41.
		Technetium-99	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 10.4. Rad error is 10.4.
		Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.268. Rad error is 0.267.
		Tritium	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 78.5. Rad error is 78.5.

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
8004-4802	MW394	MW394SG4-17		
		Tantalum	N	Sample spike (MS/MSD) recovery not within control limits
		Chlorobenzene	Y2	MS/MSD RPD outside acceptance criteria
		Xylenes	Y2	MS/MSD RPD outside acceptance criteria
		Styrene	Y2	MS/MSD RPD outside acceptance criteria
		Methyl bromide	L	LCS or LCSD recovery outside of control limits
		Methyl chloride	L	LCS or LCSD recovery outside of control limits
		Tetrachloroethene	Y2	MS/MSD RPD outside acceptance criteria
		Ethylbenzene	Y2	MS/MSD RPD outside acceptance criteria
		1,2-Dichlorobenzene	Y2	MS/MSD RPD outside acceptance criteria
		1,4-Dichlorobenzene	Y2	MS/MSD RPD outside acceptance criteria
		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 1.96. Rad error is 1.96.
		Gross beta		TPU is 2.39. Rad error is 2.14.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.432. Rad error is 0.431.
		Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 3.52. Rad error is 3.52.
		Technetium-99	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 8.61. Rad error is 8.52.
		Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.361. Rad error is 0.357.
		Tritium	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 149. Rad error is 149.

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
8004-4801 MW395	MW395SG4-17	Tantalum	N	Sample spike (MS/MSD) recovery not within control limits
		Chlorobenzene	Y2	MS/MSD RPD outside acceptance criteria
		Xylenes	Y2	MS/MSD RPD outside acceptance criteria
		Styrene	Y2	MS/MSD RPD outside acceptance criteria
		Methyl bromide	L	LCS or LCSD recovery outside of control limits
		Methyl chloride	L	LCS or LCSD recovery outside of control limits
		Tetrachloroethene	Y2	MS/MSD RPD outside acceptance criteria
		Ethylbenzene	Y2	MS/MSD RPD outside acceptance criteria
		1,2-Dichlorobenzene	Y2	MS/MSD RPD outside acceptance criteria
		1,4-Dichlorobenzene	Y2	MS/MSD RPD outside acceptance criteria
		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 2.78. Rad error is 2.76.
		Gross beta		TPU is 2.26. Rad error is 2.08.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226		TPU is 0.392. Rad error is 0.391.
		Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 4.01. Rad error is 4.01.
		Technetium-99		TPU is 8.83. Rad error is 8.57.
		Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.46. Rad error is 0.456.
		Tritium	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 153. Rad error is 153.

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
8004-4803 MW396	MW396SG4-17	Tantalum	N	Sample spike (MS/MSD) recovery not within control limits
		Chlorobenzene	Y2	MS/MSD RPD outside acceptance criteria
		Xylenes	Y2	MS/MSD RPD outside acceptance criteria
		Styrene	Y2	MS/MSD RPD outside acceptance criteria
		Methyl bromide	L	LCS or LCSD recovery outside of control limits
		Methyl chloride	L	LCS or LCSD recovery outside of control limits
		Tetrachloroethene	Y2	MS/MSD RPD outside acceptance criteria
		Ethylbenzene	Y2	MS/MSD RPD outside acceptance criteria
		1,2-Dichlorobenzene	Y2	MS/MSD RPD outside acceptance criteria
		1,4-Dichlorobenzene	Y2	MS/MSD RPD outside acceptance criteria
		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 2.34. Rad error is 2.34.
		Gross beta	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 1.32. Rad error is 1.31.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226		TPU is 0.49. Rad error is 0.489.
		Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 3.85. Rad error is 3.85.
		Technetium-99	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 7.66. Rad error is 7.66.
		Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.453. Rad error is 0.444.
		Tritium	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 157. Rad error is 157.

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	MW397SG4-17	Tantalum	N	Sample spike (MS/MSD) recovery not within control limits
		Chlorobenzene	Y2	MS/MSD RPD outside acceptance criteria
		Xylenes	Y2	MS/MSD RPD outside acceptance criteria
		Styrene	Y2	MS/MSD RPD outside acceptance criteria
		Tetrachloroethene	Y2	MS/MSD RPD outside acceptance criteria
		Ethylbenzene	Y2	MS/MSD RPD outside acceptance criteria
		1,2-Dichlorobenzene	Y2	MS/MSD RPD outside acceptance criteria
		1,4-Dichlorobenzene	Y2	MS/MSD RPD outside acceptance criteria
		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		TPU is 3.46. Rad error is 3.09.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226		TPU is 0.401. Rad error is 0.401.
		Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 4.16. Rad error is 4.15.
		Technetium-99		TPU is 13.6. Rad error is 13.1.
Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.524. Rad error is 0.51.		
Tritium	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 154. Rad error is 154.		

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	RI1SG4-17	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.
		Tantalum	N	Sample spike (MS/MSD) recovery not within control limits
		Chlorobenzene	Y2	MS/MSD RPD outside acceptance criteria
		Xylenes	Y2	MS/MSD RPD outside acceptance criteria
		Styrene	Y2	MS/MSD RPD outside acceptance criteria
		Methyl bromide	L	LCS or LCSD recovery outside of control limits
		Methyl chloride	L	LCS or LCSD recovery outside of control limits
		Tetrachloroethene	Y2	MS/MSD RPD outside acceptance criteria
		Ethylbenzene	Y2	MS/MSD RPD outside acceptance criteria
		1,2-Dichlorobenzene	Y2	MS/MSD RPD outside acceptance criteria
		1,4-Dichlorobenzene	Y2	MS/MSD RPD outside acceptance criteria
		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 2.3. Rad error is 2.29.
Gross beta	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 2.04. Rad error is 2.04.		
Iodine-131		Analysis of constituent not required and not performed.		
Radium-226		TPU is 0.381. Rad error is 0.381.		
Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 3.87. Rad error is 3.87.		
Technetium-99	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 7.16. Rad error is 7.16.		

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	RI1SG4-17	Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.303. Rad error is 0.302.
		Tritium	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 159. Rad error is 158.
		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	FB1SG4-17	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.
		Tantalum	N	Sample spike (MS/MSD) recovery not within control limits
		Chlorobenzene	Y2	MS/MSD RPD outside acceptance criteria
		Xylenes	Y2	MS/MSD RPD outside acceptance criteria
		Styrene	Y2	MS/MSD RPD outside acceptance criteria
		Methyl bromide	L	LCS or LCSD recovery outside of control limits
		Methyl chloride	L	LCS or LCSD recovery outside of control limits
		Tetrachloroethene	Y2	MS/MSD RPD outside acceptance criteria
		Ethylbenzene	Y2	MS/MSD RPD outside acceptance criteria
		1,2-Dichlorobenzene	Y2	MS/MSD RPD outside acceptance criteria
		1,4-Dichlorobenzene	Y2	MS/MSD RPD outside acceptance criteria
		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 1.45. Rad error is 1.45.
Gross beta	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 1.33. Rad error is 1.33.		
Iodine-131		Analysis of constituent not required and not performed.		
Radium-226	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.347. Rad error is 0.347.		
Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 3.76. Rad error is 3.76.		

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	FB1SG4-17	Technetium-99	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 6.7. Rad error is 6.7.
		Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.483. Rad error is 0.472.
		Tritium	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 159. Rad error is 159.
		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	TB1SG4-17	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	TB1SG4-17	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	TB2SG4-17	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	TB2SG4-17	Vanadium		Analysis of constituent not required and not performed.
		Zinc		Analysis of constituent not required and not performed.
		Chlorobenzene	Y2	MS/MSD RPD outside acceptance criteria
		Xylenes	Y2	MS/MSD RPD outside acceptance criteria
		Styrene	Y2	MS/MSD RPD outside acceptance criteria
		Tetrachloroethene	Y2	MS/MSD RPD outside acceptance criteria
		Ethylbenzene	Y2	MS/MSD RPD outside acceptance criteria
		1,2-Dichlorobenzene	Y2	MS/MSD RPD outside acceptance criteria
		1,4-Dichlorobenzene	Y2	MS/MSD RPD outside acceptance criteria
		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
8000-5244	MW224	MW224DSG4-17		
		Tantalum	N	Sample spike (MS/MSD) recovery not within control limits
		Chlorobenzene	Y2	MS/MSD RPD outside acceptance criteria
		Xylenes	Y2	MS/MSD RPD outside acceptance criteria
		Styrene	Y2	MS/MSD RPD outside acceptance criteria
		Methyl bromide	L	LCS or LCSD recovery outside of control limits
		Methyl chloride	L	LCS or LCSD recovery outside of control limits
		Tetrachloroethene	Y2	MS/MSD RPD outside acceptance criteria
		Ethylbenzene	Y2	MS/MSD RPD outside acceptance criteria
		1,2-Dichlorobenzene	Y2	MS/MSD RPD outside acceptance criteria
		1,4-Dichlorobenzene	Y2	MS/MSD RPD outside acceptance criteria
		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 2.84. Rad error is 2.82.
		Gross beta		TPU is 2.62. Rad error is 2.5.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.25. Rad error is 0.25.
		Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 4.32. Rad error is 4.32.
		Technetium-99	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 8.08. Rad error is 8.02.
		Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.519. Rad error is 0.511.
		Tritium	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 161. Rad error is 161.

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	MW386SG4-17R		
		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.
		Total Dissolved Solids		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.
		Vanadium		Analysis of constituent not required and not performed.
		Zinc		Analysis of constituent not required and not performed.
		Vinyl acetate		Analysis of constituent not required and not performed.
		Acetone		Analysis of constituent not required and not performed.
		Acrolein		Analysis of constituent not required and not performed.
		Acrylonitrile		Analysis of constituent not required and not performed.
		Benzene		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
8004-4804	MW386 MW386SG4-17R	Chlorobenzene		Analysis of constituent not required and not performed.
		Xylenes		Analysis of constituent not required and not performed.
		Styrene		Analysis of constituent not required and not performed.
		Toluene		Analysis of constituent not required and not performed.
		Chlorobromomethane		Analysis of constituent not required and not performed.
		Bromodichloromethane		Analysis of constituent not required and not performed.
		Tribromomethane		Analysis of constituent not required and not performed.
		Methyl bromide		Analysis of constituent not required and not performed.
		Methyl Ethyl Ketone		Analysis of constituent not required and not performed.
		trans-1,4-Dichloro-2-butene		Analysis of constituent not required and not performed.
		Carbon disulfide		Analysis of constituent not required and not performed.
		Chloroethane		Analysis of constituent not required and not performed.
		Chloroform		Analysis of constituent not required and not performed.
		Methyl chloride		Analysis of constituent not required and not performed.
		cis-1,2-Dichloroethene		Analysis of constituent not required and not performed.
		Methylene bromide		Analysis of constituent not required and not performed.
		1,1-Dichloroethane		Analysis of constituent not required and not performed.
		1,2-Dichloroethane		Analysis of constituent not required and not performed.
		1,1-Dichloroethylene		Analysis of constituent not required and not performed.
		1,2-Dibromoethane		Analysis of constituent not required and not performed.
		1,1,2,2-Tetrachloroethane		Analysis of constituent not required and not performed.
		1,1,1-Trichloroethane		Analysis of constituent not required and not performed.
		1,1,2-Trichloroethane		Analysis of constituent not required and not performed.
		1,1,1,2-Tetrachloroethane		Analysis of constituent not required and not performed.
		Vinyl chloride		Analysis of constituent not required and not performed.
		Tetrachloroethene		Analysis of constituent not required and not performed.
		Trichloroethene		Analysis of constituent not required and not performed.
		Ethylbenzene		Analysis of constituent not required and not performed.
		2-Hexanone		Analysis of constituent not required and not performed.
		Iodomethane		Analysis of constituent not required and not performed.
		Dibromochloromethane		Analysis of constituent not required and not performed.
		Carbon tetrachloride		Analysis of constituent not required and not performed.
		Dichloromethane		Analysis of constituent not required and not performed.
		Methyl Isobutyl Ketone		Analysis of constituent not required and not performed.
		1,2-Dibromo-3-chloropropane		Analysis of constituent not required and not performed.
		1,2-Dichloropropane		Analysis of constituent not required and not performed.
		trans-1,3-Dichloropropene		Analysis of constituent not required and not performed.
		cis-1,3-Dichloropropene		Analysis of constituent not required and not performed.
		trans-1,2-Dichloroethene		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
8004-4804	MW386	MW386SG4-17R		
		Trichlorofluoromethane		Analysis of constituent not required and not performed.
		1,2,3-Trichloropropane		Analysis of constituent not required and not performed.
		1,2-Dichlorobenzene		Analysis of constituent not required and not performed.
		1,4-Dichlorobenzene		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	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 137. Rad error is 136.
		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.

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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 third quarter 2017 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 third quarter 2017 data used to conduct the statistical analyses were collected in July 2017. 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.

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.

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

$$\text{upper TL} = X + (K \times S)$$

$$\text{lower TL} = X - (K \times S)$$

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, third quarter 2017. 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.

**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.

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
Boron	4	0	4	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	2	2	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
cis-1,2-Dichloroethene	4	4	0	No
cis-1,3-Dichloropropene	4	4	0	No
Cobalt	4	3	1	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
Iodide	4	3	1	Yes

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

Parameters	Observations	Censored Observation	Uncensored Observation	Statistical Analysis?
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	3	1	Yes
Nickel	4	2	2	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
trans-1,2-Dichloroethene	4	4	0	No
trans-1,3-Dichloropropene	4	4	0	No
trans-1,4-Dichloro-2-Butene	4	4	0	No
Trichlorofluoromethane	4	4	0	No
Uranium	4	4	0	No
Vanadium	4	4	0	No
Vinyl Acetate	4	4	0	No
Zinc	4	4	0	No

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	6	5	Yes
Antimony	11	11	0	No
Beryllium	11	11	0	No
Beta Activity	11	1	10	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	3	8	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	9	2	Yes
cis-1,3-Dichloropropene	11	11	0	No
Cobalt	11	5	6	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	10	1	Yes
Iodomethane	11	11	0	No
Iron	11	5	6	Yes
Magnesium	11	0	11	Yes
Manganese	11	1	10	Yes
Methylene chloride	11	11	0	No
Molybdenum	11	3	8	Yes
Nickel	11	1	10	Yes
Oxidation-Reduction Potential	11	0	11	Yes
pH	11	0	11	Yes
Potassium	11	0	11	Yes
Radium-226	11	7	4	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	4	7	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	1	10	Yes
trans-1,2-Dichloroethene	11	11	0	No
trans-1,3-Dichloropropene	11	11	0	No
trans-1,4-Dichloro-2-Butene	11	11	0	No
Trichloroethene	11	3	8	Yes
Trichlorofluoromethane	11	11	0	No
Uranium	11	11	0	No
Vanadium	11	10	1	Yes
Vinyl Acetate	11	11	0	No
Zinc	11	8	3	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	1	6	Yes
Antimony	7	7	0	No
Beryllium	7	7	0	No
Beta Activity	7	1	6	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	2	5	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	2	5	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	5	2	Yes
Nickel	7	1	6	Yes
Oxidation-Reduction Potential	7	0	7	Yes
pH	7	0	7	Yes
Potassium	7	0	7	Yes
Radium-226	7	3	4	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	2	5	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
trans-1,2-Dichloroethene	7	7	0	No
trans-1,3-Dichloropropene	7	7	0	No
trans-1,4-Dichloro-2-Butene	7	7	0	No
Trichloroethene	7	0	7	Yes
Trichlorofluoromethane	7	7	0	No
Uranium	7	7	0	No
Vanadium	7	7	0	No
Vinyl Acetate	7	7	0	No
Zinc	7	5	2	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 26, 31, 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 chemical oxygen demand, oxidation-reduction potential, radium-226, and technetium-99.

URGA

This quarter's results identified exceedances of historical background UTL for beta activity, calcium, chemical oxygen demand, dissolved solids, magnesium, radium-226, sulfate, and technetium-99.

LRGA

This quarter's results identified exceedances of historical background UTL for beta activity, calcium, conductivity, dissolved solids, 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: Chemical oxygen demand, oxidation-reduction potential	MW220: Chemical oxygen demand, dissolved solids, sulfate	MW370: Beta activity, oxidation-reduction potential, sulfate, technetium-99
MW390: Oxidation-reduction potential, technetium-99	MW223: Sulfate	MW373: Calcium, conductivity, dissolved solids, oxidation-reduction potential, sulfate
MW393: Oxidation-reduction potential	MW224: Radium-226	MW385: Beta activity, oxidation-reduction potential, sulfate, technetium-99
MW396: Oxidation-reduction potential, radium-226	MW369: Radium-226, technetium-99	MW388: Beta activity, oxidation-reduction potential, radium-226, sulfate, technetium-99
	MW372: Calcium, dissolved solids, magnesium, sulfate	MW392: Oxidation-reduction potential
	MW384: Beta activity, radium-226, sulfate, technetium-99	MW395: Oxidation-reduction potential
	MW387: Beta activity, sulfate, technetium-99	MW397: Oxidation-reduction potential
	MW391: Dissolved solids, magnesium, 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.
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	Current results exceed statistically derived historical background concentration in MW386.
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.
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.

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
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	Current results exceed statistically derived historical background concentration in MW396.
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.

CV: coefficient of variation

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

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	No exceedance of statistically derived historical background concentration.
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	Current results exceed statistically derived historical background concentration in MW220.
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 MW220, MW372, and MW391.
Iodide	Tolerance Interval	0.00	No exceedance of statistically derived historical background concentration.
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 MW391.

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
Manganese	Tolerance Interval	2.16	No exceedance of statistically derived historical background concentration.
Molybdenum	Tolerance Interval	1.26	No exceedance of statistically derived historical background concentration.
Nickel	Tolerance Interval	1.79	No exceedance of statistically derived historical background concentration.
Oxidation-Reduction Potential	Tolerance Interval	0.48	No exceedance of statistically derived historical background concentration.
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 MW224, MW369, and MW384.
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 MW220, MW223, 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	No exceedance of statistically derived historical background concentration.
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, MW385, MW388, MW392, MW395, and MW397.
pH	Tolerance Interval	0.04	No exceedance of statistically derived historical background concentration.
Potassium	Tolerance Interval	0.40	No exceedance of statistically derived historical background concentration.
Radium-226	Tolerance Interval	10.74	Current results exceed statistically derived historical background concentration in 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.
Trichloroethene ¹	Tolerance Interval	0.78	No exceedance of statistically derived historical background concentration.
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.
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, URGAs, 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, URGAs, and LRGA, the test was applied to 4, 8, and 8 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, sulfate, technetium-99
MW372: Calcium, dissolved solids, magnesium, sulfate	MW373: Calcium, conductivity, dissolved solids, sulfate
MW387: Beta activity, technetium-99	MW388: Beta activity, sulfate, technetium-99
MW391: Dissolved solids, magnesium, sulfate	

UCRS

Because gradients in the UCRS are downward (vertical), there are no hydrogeologically downgradient UCRS wells. It should be noted; however, that the technetium-99 concentration in 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, dissolved solids, magnesium, sulfate, and technetium-99.

LRGA

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

Statistical Summary

Summaries of the statistical tests conducted on data obtained from wells in the UCRS, the URGAs, 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
Chemical Oxygen Demand	Tolerance Interval	0.64	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.
Oxidation-Reduction Potential	Tolerance Interval	0.33	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	0.49	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	-2.77	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
Beta Activity	Tolerance Interval	0.55	MW384 and MW387 exceeded the upper TL, which is evidence of elevated concentration with respect to current background data.
Calcium	Tolerance Interval	0.17	MW372 exceeded the upper TL, which is evidence of elevated concentration with respect to current background data.
Chemical Oxygen Demand	Tolerance Interval	1.03	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.
Dissolved Solids	Tolerance Interval	0.10	MW220, MW372, and MW391 exceeded the upper TL, which is evidence of elevated concentration with respect to current background data.
Magnesium	Tolerance Interval	0.16	MW372 and MW391 exceeded the upper TL, which is evidence of elevated concentration with respect to current background data.
Radium-226	Tolerance Interval	0.54	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	0.30	MW372 and MW391 exceeded the upper TL, which is evidence of elevated concentration with respect to current background data.
Technetium-99	Tolerance Interval	0.66	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	0.73	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	0.12	MW373 exceeded the upper TL, which is evidence of elevated concentration with respect to current background data.
Oxidation-Reduction Potential	Tolerance Interval	0.26	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	0.61	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	0.07	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	0.37	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 Third Quarter 2017 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	0.161	NO	-1.826	N/A
MW393	Downgradient	Yes	0.0597	NO	-2.818	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 Third Quarter 2017 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	Yes	0.00563	N/A	-5.180	NO
MW390	Downgradient	Yes	0.00969	N/A	-4.637	NO
MW393	Downgradient	Yes	0.0212	N/A	-3.854	NO
MW396	Upgradient	Yes	0.00607	N/A	-5.104	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. D1-4

C-746-S/T Third Quarter 2017 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	0.147	NO	-1.917	N/A
MW390	Downgradient	Yes	0.571	NO	-0.560	N/A
MW393	Downgradient	Yes	0.164	NO	-1.808	N/A
MW396	Upgradient	Yes	1.09	NO	0.086	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. D1-5

C-746-S/T Third Quarter 2017 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	21.5	NO	3.068	N/A
MW390	Downgradient	Yes	30.5	NO	3.418	N/A
MW393	Downgradient	Yes	13.6	NO	2.610	N/A
MW396	Upgradient	Yes	34.5	NO	3.541	N/A

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for a well did not exceed the MCL value, that well was not included in the statistical evaluation.

Conclusion of Statistical Analysis on Historical Data

None of the test wells exceeded the Upper Tolerance Limit, which is evidence that concentrations in these wells are not different from historical background concentrations to a statistically-significant level.

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum ((background result-X)^2)/[count of background results - 1]]^0.5

TL Upper Tolerance Limit, TL = X + (K * S), LL Lower Tolerance Limit, LL = X - (K * S)

X Mean, X = (sum of background results)/(count of background results)

** Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009. D1-6

C-746-S/T Third Quarter 2017 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	65.3	YES	4.179	N/A
MW390	Downgradient	No	20	N/A	2.996	N/A
MW393	Downgradient	No	20	N/A	2.996	N/A
MW396	Upgradient	Yes	21.8	NO	3.082	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
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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

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

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. D1-7

C-746-S/T Third Quarter 2017 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

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	14.9	NO	2.701	N/A
MW390	Downgradient	Yes	62.2	NO	4.130	N/A
MW393	Downgradient	Yes	13.3	NO	2.588	N/A
MW396	Upgradient	Yes	72.5	NO	4.284	N/A

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for a well did not exceed the MCL value, that well was not included in the statistical evaluation.

Conclusion of Statistical Analysis on Historical Data

None of the test wells exceeded the Upper Tolerance Limit, which is evidence that concentrations in these wells are not different from historical background concentrations to a statistically-significant level.

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum ((background result-X)^2)/[count of background results - 1]]^0.5

TL Upper Tolerance Limit, TL = X + (K * S), LL Lower Tolerance Limit, LL = X - (K * S)

X Mean, X = (sum of background results)/(count of background results)

** Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009. D1-8

C-746-S/T Third Quarter 2017 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	No	0.001	N/A	-6.908	N/A
MW390	Downgradient	Yes	0.000358	N/A	-7.935	NO
MW393	Downgradient	No	0.001	N/A	-6.908	N/A
MW396	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. D1-9

C-746-S/T Third Quarter 2017 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	584	NO	6.370	N/A
MW390	Downgradient	Yes	695	NO	6.544	N/A
MW393	Downgradient	Yes	427	NO	6.057	N/A
MW396	Upgradient	Yes	762	NO	6.636	N/A

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for a well did not exceed the MCL value, that well was not included in the statistical evaluation.

Conclusion of Statistical Analysis on Historical Data

None of the test wells exceeded the Upper Tolerance Limit, which is evidence that concentrations in these wells are not different from historical background concentrations to a statistically-significant level.

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum ((background result-X)^2)/[count of background results - 1]]^0.5

TL Upper Tolerance Limit, TL = X + (K * S), LL Lower Tolerance Limit, LL = X - (K * S)

X Mean, X = (sum of background results)/(count of background results)

** Read from Table 5, Appendix B of *Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance*, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from *NIST/SEMATECH e-Handbook of Statistical Methods*, <http://www.itl.nist.gov/div898/handbook/>, 2009. D1-10

C-746-S/T Third Quarter 2017 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	0.000699	NO	-7.266	N/A
MW390	Downgradient	Yes	0.000725	NO	-7.229	N/A
MW393	Downgradient	Yes	0.000643	NO	-7.349	N/A
MW396	Upgradient	Yes	0.000742	NO	-7.206	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. D1-11

C-746-S/T Third Quarter 2017 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	2.01	N/A	0.698	NO
MW390	Downgradient	Yes	6.37	N/A	1.852	NO
MW393	Downgradient	Yes	1.3	N/A	0.262	NO
MW396	Upgradient	Yes	1.07	N/A	0.068	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
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None of the test wells exceeded the Upper Tolerance Limit, which is evidence that concentrations in these wells are not different from historical background concentrations to a statistically-significant level.

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, $CV = S/X$ If CV is less than or equal to 1 assume normal distribution.

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

TL Upper Tolerance Limit, $TL = X + (K * S)$, LL Lower Tolerance Limit, $LL = X - (K * S)$

X Mean, $X = (\text{sum of background results})/(\text{count of background results})$

** Read from Table 5, Appendix B of *Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance*, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009. D1-12

C-746-S/T Third Quarter 2017 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	343	NO	5.838	N/A
MW390	Downgradient	Yes	367	NO	5.905	N/A
MW393	Downgradient	Yes	246	NO	5.505	N/A
MW396	Upgradient	Yes	420	NO	6.040	N/A

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for a well did not exceed the MCL value, that well was not included in the statistical evaluation.

Conclusion of Statistical Analysis on Historical Data

None of the test wells exceeded the Upper Tolerance Limit, which is evidence that concentrations in these wells are not different from historical background concentrations to a statistically-significant level.

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, $CV = S/X$ If CV is less than or equal to 1 assume normal distribution.

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

TL Upper Tolerance Limit, $TL = X + (K * S)$, LL Lower Tolerance Limit, $LL = X - (K * S)$

X Mean, $X = (\text{sum of background results})/(\text{count of background results})$

** Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009. D1-13

C-746-S/T Third Quarter 2017 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	No	0.5	N/A	-0.693	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	0.242	NO	-1.419	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 Third Quarter 2017 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	0.0612	NO	-2.794	N/A
MW390	Downgradient	Yes	0.166	NO	-1.796	N/A
MW393	Downgradient	Yes	1.16	NO	0.148	N/A
MW396	Upgradient	Yes	0.0929	NO	-2.376	N/A

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for a well did not exceed the MCL value, that well was not included in the statistical evaluation.

Conclusion of Statistical Analysis on Historical Data

None of the test wells exceeded the Upper Tolerance Limit, which is evidence that concentrations in these wells are not different from historical background concentrations to a statistically-significant level.

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum ((background result-X)^2)/[count of background results - 1]]^0.5

TL Upper Tolerance Limit, TL = X + (K * S), LL Lower Tolerance Limit, LL = X - (K * S)

X Mean, X = (sum of background results)/(count of background results)

** Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009. D1-15

C-746-S/T Third Quarter 2017 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	8.96	NO	2.193	N/A
MW390	Downgradient	Yes	12.8	NO	2.549	N/A
MW393	Downgradient	Yes	3.8	NO	1.335	N/A
MW396	Upgradient	Yes	14.9	NO	2.701	N/A

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for a well did not exceed the MCL value, that well was not included in the statistical evaluation.

Conclusion of Statistical Analysis on Historical Data

None of the test wells exceeded the Upper Tolerance Limit, which is evidence that concentrations in these wells are not different from historical background concentrations to a statistically-significant level.

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum ((background result-X)^2)/[count of background results - 1]]^0.5

TL Upper Tolerance Limit, TL = X + (K * S), LL Lower Tolerance Limit, LL = X - (K * S)

X Mean, X = (sum of background results)/(count of background results)

** Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009. D1-16

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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	0.0133	NO	-4.320	N/A
MW390	Downgradient	Yes	0.0019	NO	-6.266	N/A
MW393	Downgradient	Yes	0.0255	NO	-3.669	N/A
MW396	Upgradient	Yes	0.0615	NO	-2.789	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

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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	No	0.000692	N/A	-7.276	N/A
MW390	Downgradient	No	0.000756	N/A	-7.187	N/A
MW393	Downgradient	No	0.000392	N/A	-7.844	N/A
MW396	Upgradient	Yes	0.00041	N/A	-7.799	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. D1-18

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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	0.000657	N/A	-7.328	NO
MW390	Downgradient	Yes	0.00155	N/A	-6.470	NO
MW393	Downgradient	No	0.002	N/A	-6.215	N/A
MW396	Upgradient	No	0.002	N/A	-6.215	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. D1-19

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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	324	N/A	5.781	YES
MW390	Downgradient	Yes	393	N/A	5.974	YES
MW393	Downgradient	Yes	307	N/A	5.727	YES
MW396	Upgradient	Yes	291	N/A	5.673	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, $S = [\text{Sum}([(background\ result-X)^2]/[\text{count of background results} - 1])]^{0.5}$

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

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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	6.79	NO	1.915	N/A
MW390	Downgradient	Yes	6.45	NO	1.864	N/A
MW393	Downgradient	Yes	6.28	NO	1.837	N/A
MW396	Upgradient	Yes	6.49	NO	1.870	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. D1-21

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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	0.301	NO	-1.201	N/A
MW390	Downgradient	Yes	0.366	NO	-1.005	N/A
MW393	Downgradient	Yes	0.461	NO	-0.774	N/A
MW396	Upgradient	Yes	0.822	NO	-0.196	N/A

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for a well did not exceed the MCL value, that well was not included in the statistical evaluation.

Conclusion of Statistical Analysis on Historical Data

None of the test wells exceeded the Upper Tolerance Limit, which is evidence that concentrations in these wells are not different from historical background concentrations to a statistically-significant level.

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum ((background result-X)^2)/[count of background results - 1]]^0.5

TL Upper Tolerance Limit, TL = X + (K * S), LL Lower Tolerance Limit, LL = X - (K * S)

X Mean, X = (sum of background results)/(count of background results)

** Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009. D1-22

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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	0.129	N/A	-2.048	N/A
MW390	Downgradient	No	0.252	N/A	-1.378	N/A
MW393	Downgradient	No	0.261	N/A	-1.343	N/A
MW396	Upgradient	Yes	0.752	N/A	-0.285	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

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. D1-23

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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	97.7	NO	4.582	N/A
MW390	Downgradient	Yes	95	NO	4.554	N/A
MW393	Downgradient	Yes	82.8	NO	4.416	N/A
MW396	Upgradient	Yes	100	NO	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. D1-24

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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	46.1	NO	3.831	N/A
MW390	Downgradient	Yes	40.3	NO	3.696	N/A
MW393	Downgradient	Yes	17.6	NO	2.868	N/A
MW396	Upgradient	Yes	24.4	NO	3.195	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

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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	4.47	NO	1.497	N/A
MW390	Downgradient	Yes	2.46	NO	0.900	N/A
MW393	Downgradient	Yes	2.6	NO	0.956	N/A
MW396	Upgradient	Yes	5.03	NO	1.615	N/A

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for a well did not exceed the MCL value, that well was not included in the statistical evaluation.

Conclusion of Statistical Analysis on Historical Data

None of the test wells exceeded the Upper Tolerance Limit, which is evidence that concentrations in these wells are not different from historical background concentrations to a statistically-significant level.

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum ((background result-X)^2)/[count of background results - 1]]^0.5

TL Upper Tolerance Limit, TL = X + (K * S), LL Lower Tolerance Limit, LL = X - (K * S)

X Mean, X = (sum of background results)/(count of background results)

** Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009. D1-27

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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	16.5	NO	2.803	N/A
MW393	Downgradient	Yes	16	NO	2.773	N/A
MW396	Upgradient	Yes	69.7	NO	4.244	N/A

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for a well did not exceed the MCL value, that well was not included in the statistical evaluation.

Conclusion of Statistical Analysis on Historical Data

None of the test wells exceeded the Upper Tolerance Limit, which is evidence that concentrations in these wells are not different from historical background concentrations to a statistically-significant level.

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum ((background result-X)^2)/[count of background results - 1]]^0.5

TL Upper Tolerance Limit, TL = X + (K * S), LL Lower Tolerance Limit, LL = X - (K * S)

X Mean, X = (sum of background results)/(count of background results)

** Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009. D1-28

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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	No	0.05	N/A	-2.996	N/A
MW221	Sidegradient	No	0.05	N/A	-2.996	N/A
MW222	Sidegradient	Yes	0.0234	NO	-3.755	N/A
MW223	Sidegradient	No	0.05	N/A	-2.996	N/A
MW224	Sidegradient	No	0.05	N/A	-2.996	N/A
MW369	Downgradient	Yes	0.228	NO	-1.478	N/A
MW372	Downgradient	Yes	0.0335	NO	-3.396	N/A
MW384	Sidegradient	No	0.05	N/A	-2.996	N/A
MW387	Downgradient	Yes	0.0207	NO	-3.878	N/A
MW391	Downgradient	Yes	0.0202	NO	-3.902	N/A
MW394	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.

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

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. D1-29

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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	22.5	N/A	3.114	N/A
MW221	Sidegradient	Yes	11.1	N/A	2.407	N/A
MW222	Sidegradient	Yes	12.7	N/A	2.542	N/A
MW223	Sidegradient	Yes	5.02	N/A	1.613	N/A
MW224	Sidegradient	Yes	4.79	N/A	1.567	N/A
MW369	Downgradient	Yes	26.1	N/A	3.262	N/A
MW372	Downgradient	Yes	21.3	N/A	3.059	N/A
MW384	Sidegradient	Yes	90.6	YES	4.506	N/A
MW387	Downgradient	Yes	130	YES	4.868	N/A
MW391	Downgradient	No	3.34	N/A	1.206	N/A
MW394	Upgradient	Yes	6.29	N/A	1.839	N/A

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

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

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. D1-30

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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

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

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	Yes	0.00703	N/A	-4.958	NO
MW221	Sidegradient	Yes	0.0108	N/A	-4.528	NO
MW222	Sidegradient	Yes	0.00854	N/A	-4.763	NO
MW223	Sidegradient	Yes	0.00663	N/A	-5.016	NO
MW224	Sidegradient	Yes	0.018	N/A	-4.017	NO
MW369	Downgradient	Yes	0.0117	N/A	-4.448	NO
MW372	Downgradient	Yes	0.89	N/A	-0.117	NO
MW384	Sidegradient	Yes	0.0125	N/A	-4.382	NO
MW387	Downgradient	Yes	0.0287	N/A	-3.551	NO
MW391	Downgradient	Yes	0.357	N/A	-1.030	NO
MW394	Upgradient	Yes	0.0223	N/A	-3.803	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. D1-31

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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	0.201	NO	-1.604	N/A
MW221	Sidegradient	Yes	0.428	NO	-0.849	N/A
MW222	Sidegradient	Yes	0.432	NO	-0.839	N/A
MW223	Sidegradient	Yes	0.408	NO	-0.896	N/A
MW224	Sidegradient	Yes	0.459	NO	-0.779	N/A
MW369	Downgradient	Yes	0.397	NO	-0.924	N/A
MW372	Downgradient	Yes	0.605	NO	-0.503	N/A
MW384	Sidegradient	Yes	0.328	NO	-1.115	N/A
MW387	Downgradient	Yes	0.378	NO	-0.973	N/A
MW391	Downgradient	Yes	0.48	NO	-0.734	N/A
MW394	Upgradient	Yes	0.592	NO	-0.524	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>. D1-32

C-746-S/T Third Quarter 2017 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	22.7	NO	3.122	N/A
MW221	Sidegradient	Yes	21.6	NO	3.073	N/A
MW222	Sidegradient	Yes	19.1	NO	2.950	N/A
MW223	Sidegradient	Yes	21.9	NO	3.086	N/A
MW224	Sidegradient	Yes	25.3	NO	3.231	N/A
MW369	Downgradient	Yes	16.9	NO	2.827	N/A
MW372	Downgradient	Yes	46.3	YES	3.835	N/A
MW384	Sidegradient	Yes	26.4	NO	3.273	N/A
MW387	Downgradient	Yes	28.9	NO	3.364	N/A
MW391	Downgradient	Yes	39.6	NO	3.679	N/A
MW394	Upgradient	Yes	26.1	NO	3.262	N/A

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

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>. D1-33

C-746-S/T Third Quarter 2017 Statistical Analysis Historical Background Comparison
Chemical Oxygen Demand (COD) 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= 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

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

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)
MW220	Upgradient	Yes	46.8	YES	3.846	N/A
MW221	Sidegradient	No	20	N/A	2.996	N/A
MW222	Sidegradient	Yes	14.9	NO	2.701	N/A
MW223	Sidegradient	Yes	10.4	NO	2.342	N/A
MW224	Sidegradient	No	20	N/A	2.996	N/A
MW369	Downgradient	Yes	12.7	NO	2.542	N/A
MW372	Downgradient	Yes	12.7	NO	2.542	N/A
MW384	Sidegradient	Yes	21.1	NO	3.049	N/A
MW387	Downgradient	Yes	21.1	NO	3.049	N/A
MW391	Downgradient	Yes	18.7	NO	2.929	N/A
MW394	Upgradient	No	20	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

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

Wells with Exceedances

MW220

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.* D1-34

C-746-S/T Third Quarter 2017 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	19.4	NO	2.965	N/A
MW221	Sidegradient	Yes	30.8	NO	3.428	N/A
MW222	Sidegradient	Yes	30.5	NO	3.418	N/A
MW223	Sidegradient	Yes	29	NO	3.367	N/A
MW224	Sidegradient	Yes	35.7	NO	3.575	N/A
MW369	Downgradient	Yes	33.7	NO	3.517	N/A
MW372	Downgradient	Yes	45.8	NO	3.824	N/A
MW384	Sidegradient	Yes	36.3	NO	3.592	N/A
MW387	Downgradient	Yes	38.2	NO	3.643	N/A
MW391	Downgradient	Yes	37.8	NO	3.632	N/A
MW394	Upgradient	Yes	47.9	NO	3.869	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	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

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 Third Quarter 2017 Statistical Analysis Historical Background Comparison
cis-1,2-Dichloroethene 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= 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	Yes	0.68	NO	-0.386	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	0.4	NO	-0.916	N/A
MW394	Upgradient	No	1	N/A	0.000	N/A

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

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. D1-36

C-746-S/T Third Quarter 2017 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	No	0.001	N/A	-6.908	N/A
MW221	Sidegradient	Yes	0.000633	N/A	-7.365	NO
MW222	Sidegradient	Yes	0.000814	N/A	-7.114	NO
MW223	Sidegradient	Yes	0.000373	N/A	-7.894	NO
MW224	Sidegradient	Yes	0.00103	N/A	-6.878	NO
MW369	Downgradient	Yes	0.00938	N/A	-4.669	NO
MW372	Downgradient	Yes	0.00119	N/A	-6.734	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>. D1-37

C-746-S/T Third Quarter 2017 Statistical Analysis Historical Background Comparison
Conductivity UNITS: umho/cm URGA

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is evidence of an exceedance of the statistically-derived historical background concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

Statistics-Background Data X= 382.132 S= 107.134 CV(1)=0.280 **K factor**= 2.523** TL(1)= 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	387	NO	5.958	N/A
MW221	Sidegradient	Yes	398	NO	5.986	N/A
MW222	Sidegradient	Yes	376	NO	5.930	N/A
MW223	Sidegradient	Yes	411	NO	6.019	N/A
MW224	Sidegradient	Yes	443	NO	6.094	N/A
MW369	Downgradient	Yes	367	NO	5.905	N/A
MW372	Downgradient	Yes	585	NO	6.372	N/A
MW384	Sidegradient	Yes	466	NO	6.144	N/A
MW387	Downgradient	Yes	482	NO	6.178	N/A
MW391	Downgradient	Yes	557	NO	6.323	N/A
MW394	Upgradient	Yes	395	NO	5.979	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>. D1-38

C-746-S/T Third Quarter 2017 Statistical Analysis Historical Background Comparison

Copper

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= 0.024 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

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	0.02	-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	Yes	0.00124	NO	-6.693	N/A
MW221	Sidegradient	Yes	0.00077	NO	-7.169	N/A
MW222	Sidegradient	Yes	0.000404	NO	-7.814	N/A
MW223	Sidegradient	Yes	0.000498	NO	-7.605	N/A
MW224	Sidegradient	Yes	0.000571	NO	-7.468	N/A
MW369	Downgradient	Yes	0.00191	NO	-6.261	N/A
MW372	Downgradient	Yes	0.000714	NO	-7.245	N/A
MW384	Sidegradient	Yes	0.000578	NO	-7.456	N/A
MW387	Downgradient	Yes	0.000357	NO	-7.938	N/A
MW391	Downgradient	Yes	0.000479	NO	-7.644	N/A
MW394	Upgradient	Yes	0.000624	NO	-7.379	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. D1-39

C-746-S/T Third Quarter 2017 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	4.58	NO	1.522	N/A
MW221	Sidegradient	Yes	3.96	NO	1.376	N/A
MW222	Sidegradient	Yes	3	NO	1.099	N/A
MW223	Sidegradient	Yes	3.02	NO	1.105	N/A
MW224	Sidegradient	Yes	3.74	NO	1.319	N/A
MW369	Downgradient	Yes	1.81	NO	0.593	N/A
MW372	Downgradient	Yes	0.99	NO	-0.010	N/A
MW384	Sidegradient	Yes	2.54	NO	0.932	N/A
MW387	Downgradient	Yes	4.35	NO	1.470	N/A
MW391	Downgradient	Yes	3.09	NO	1.128	N/A
MW394	Upgradient	Yes	5.58	NO	1.719	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	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

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. D1-40

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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	451	YES	6.111	N/A
MW221	Sidegradient	Yes	230	NO	5.438	N/A
MW222	Sidegradient	Yes	217	NO	5.380	N/A
MW223	Sidegradient	Yes	223	NO	5.407	N/A
MW224	Sidegradient	Yes	233	NO	5.451	N/A
MW369	Downgradient	Yes	206	NO	5.328	N/A
MW372	Downgradient	Yes	334	YES	5.811	N/A
MW384	Sidegradient	Yes	227	NO	5.425	N/A
MW387	Downgradient	Yes	247	NO	5.509	N/A
MW391	Downgradient	Yes	327	YES	5.790	N/A
MW394	Upgradient	Yes	203	NO	5.313	N/A

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

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

MW220
MW372
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 = [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

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Iodide

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= 2.000 S= 0.000 CV(1)=0.000 K factor**= 2.523 TL(1)= 2.000 LL(1)=N/A

Statistics-Transformed Background Data X= 0.693 S= 0.000 CV(2)=0.000 K factor**= 2.523 TL(2)= 0.693 LL(2)=N/A

Historical Background Data from Upgradient Wells with Transformed Result

Because CV(1) is less than or equal to 1, assume normal distribution and continue with statistical analysis utilizing TL(1).

Well Number: MW220

Date Collected	Result	LN(Result)
10/14/2002	2	0.693
1/15/2003	2	0.693
4/10/2003	2	0.693
7/14/2003	2	0.693
10/13/2003	2	0.693
1/13/2004	2	0.693
4/13/2004	2	0.693
7/21/2004	2	0.693

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	No	0.5	N/A	-0.693	N/A
MW221	Sidegradient	No	0.5	N/A	-0.693	N/A
MW222	Sidegradient	No	0.5	N/A	-0.693	N/A
MW223	Sidegradient	No	0.5	N/A	-0.693	N/A
MW224	Sidegradient	No	0.5	N/A	-0.693	N/A
MW369	Downgradient	No	0.5	N/A	-0.693	N/A
MW372	Downgradient	Yes	0.176	NO	-1.737	N/A
MW384	Sidegradient	No	0.5	N/A	-0.693	N/A
MW387	Downgradient	No	0.5	N/A	-0.693	N/A
MW391	Downgradient	No	0.5	N/A	-0.693	N/A
MW394	Upgradient	No	0.5	N/A	-0.693	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: MW394

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
4/10/2003	2	0.693
7/16/2003	2	0.693
10/14/2003	2	0.693
1/13/2004	2	0.693

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

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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	No	0.1	N/A	-2.303	N/A
MW221	Sidegradient	No	0.1	N/A	-2.303	N/A
MW222	Sidegradient	No	0.1	N/A	-2.303	N/A
MW223	Sidegradient	No	0.1	N/A	-2.303	N/A
MW224	Sidegradient	Yes	0.0534	N/A	-2.930	NO
MW369	Downgradient	Yes	1.22	N/A	0.199	NO
MW372	Downgradient	Yes	0.676	N/A	-0.392	NO
MW384	Sidegradient	Yes	0.0709	N/A	-2.646	NO
MW387	Downgradient	Yes	0.0349	N/A	-3.355	NO
MW391	Downgradient	Yes	0.0578	N/A	-2.851	NO
MW394	Upgradient	No	0.1	N/A	-2.303	N/A

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for a well did not exceed the MCL value, that well was not included in the statistical evaluation.

Well Number: MW394

Date Collected	Result	LN(Result)
8/13/2002	1.34	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. D1-43

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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	9.36	NO	2.236	N/A
MW221	Sidegradient	Yes	9.39	NO	2.240	N/A
MW222	Sidegradient	Yes	8.56	NO	2.147	N/A
MW223	Sidegradient	Yes	9.3	NO	2.230	N/A
MW224	Sidegradient	Yes	11.7	NO	2.460	N/A
MW369	Downgradient	Yes	6.81	NO	1.918	N/A
MW372	Downgradient	Yes	17.2	YES	2.845	N/A
MW384	Sidegradient	Yes	10.1	NO	2.313	N/A
MW387	Downgradient	Yes	11.9	NO	2.477	N/A
MW391	Downgradient	Yes	16.8	YES	2.821	N/A
MW394	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: 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

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
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 = [Sum ((background result-X)^2)/[count of background results -1]]^0.5

TL Upper Tolerance Limit, TL = X + (K * S), LL Lower Tolerance Limit, LL = X - (K * S)

X Mean, X = (sum of background results)/(count of background results)

** Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009. D1-44

C-746-S/T Third Quarter 2017 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

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

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

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)
MW220	Upgradient	No	0.005	N/A	-5.298	N/A
MW221	Sidegradient	Yes	0.00174	N/A	-6.354	NO
MW222	Sidegradient	Yes	0.0224	N/A	-3.799	NO
MW223	Sidegradient	Yes	0.00302	N/A	-5.802	NO
MW224	Sidegradient	Yes	0.0129	N/A	-4.351	NO
MW369	Downgradient	Yes	0.0894	N/A	-2.415	NO
MW372	Downgradient	Yes	0.0157	N/A	-4.154	NO
MW384	Sidegradient	Yes	0.0335	N/A	-3.396	NO
MW387	Downgradient	Yes	0.00131	N/A	-6.638	NO
MW391	Downgradient	Yes	0.00161	N/A	-6.432	NO
MW394	Upgradient	Yes	0.00234	N/A	-6.058	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. D1-45

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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

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	Yes	0.0014	N/A	-6.571	NO
MW221	Sidegradient	Yes	0.00551	N/A	-5.201	NO
MW222	Sidegradient	Yes	0.000202	N/A	-8.507	NO
MW223	Sidegradient	Yes	0.00809	N/A	-4.817	NO
MW224	Sidegradient	Yes	0.000774	N/A	-7.164	NO
MW369	Downgradient	Yes	0.000203	N/A	-8.502	NO
MW372	Downgradient	Yes	0.000547	N/A	-7.511	NO
MW384	Sidegradient	No	0.000369	N/A	-7.905	N/A
MW387	Downgradient	No	0.000267	N/A	-8.228	N/A
MW391	Downgradient	No	0.000209	N/A	-8.473	N/A
MW394	Upgradient	Yes	0.000292	N/A	-8.139	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	0.025	-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

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>. D1-46

C-746-S/T Third Quarter 2017 Statistical Analysis Historical Background Comparison

Nickel

UNITS: mg/L

URGA

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is evidence of an exceedance of the statistically-derived historical background concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

Statistics-Background Data X= 0.127 S= 0.228 CV(1)= 1.790 K factor**= 2.523 TL(1)= 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	0.0266	N/A	-3.627	NO
MW221	Sidegradient	Yes	0.0739	N/A	-2.605	NO
MW222	Sidegradient	Yes	0.282	N/A	-1.266	NO
MW223	Sidegradient	Yes	0.144	N/A	-1.938	NO
MW224	Sidegradient	Yes	0.0494	N/A	-3.008	NO
MW369	Downgradient	Yes	0.00989	N/A	-4.616	NO
MW372	Downgradient	Yes	0.00114	N/A	-6.777	NO
MW384	Sidegradient	Yes	0.00136	N/A	-6.600	NO
MW387	Downgradient	No	0.002	N/A	-6.215	N/A
MW391	Downgradient	Yes	0.000787	N/A	-7.147	NO
MW394	Upgradient	Yes	0.0129	N/A	-4.351	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. D1-47

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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	350	NO	5.858	N/A
MW221	Sidegradient	Yes	345	NO	5.844	N/A
MW222	Sidegradient	Yes	325	NO	5.784	N/A
MW223	Sidegradient	Yes	348	NO	5.852	N/A
MW224	Sidegradient	Yes	339	NO	5.826	N/A
MW369	Downgradient	Yes	376	NO	5.930	N/A
MW372	Downgradient	Yes	300	NO	5.704	N/A
MW384	Sidegradient	Yes	343	NO	5.838	N/A
MW387	Downgradient	Yes	357	NO	5.878	N/A
MW391	Downgradient	Yes	310	NO	5.737	N/A
MW394	Upgradient	Yes	338	NO	5.823	N/A

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

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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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	6.16	NO	1.818	N/A
MW221	Sidegradient	Yes	6.17	NO	1.820	N/A
MW222	Sidegradient	Yes	6.22	NO	1.828	N/A
MW223	Sidegradient	Yes	6.15	NO	1.816	N/A
MW224	Sidegradient	Yes	6.23	NO	1.829	N/A
MW369	Downgradient	Yes	6.2	NO	1.825	N/A
MW372	Downgradient	Yes	6.24	NO	1.831	N/A
MW384	Sidegradient	Yes	6.25	NO	1.833	N/A
MW387	Downgradient	Yes	6.26	NO	1.834	N/A
MW391	Downgradient	Yes	6.12	NO	1.812	N/A
MW394	Upgradient	Yes	6.18	NO	1.821	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. D1-49

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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	1.84	N/A	0.610	NO
MW221	Sidegradient	Yes	1.18	N/A	0.166	NO
MW222	Sidegradient	Yes	0.495	N/A	-0.703	NO
MW223	Sidegradient	Yes	2.66	N/A	0.978	NO
MW224	Sidegradient	Yes	0.912	N/A	-0.092	NO
MW369	Downgradient	Yes	0.474	N/A	-0.747	NO
MW372	Downgradient	Yes	1.98	N/A	0.683	NO
MW384	Sidegradient	Yes	1.03	N/A	0.030	NO
MW387	Downgradient	Yes	1.49	N/A	0.399	NO
MW391	Downgradient	Yes	1.78	N/A	0.577	NO
MW394	Upgradient	Yes	1.33	N/A	0.285	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. D1-50

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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	Yes	0.476	N/A	-0.742	NO
MW221	Sidegradient	No	0.132	N/A	-2.025	N/A
MW222	Sidegradient	No	0.0719	N/A	-2.632	N/A
MW223	Sidegradient	No	0.2	N/A	-1.609	N/A
MW224	Sidegradient	Yes	0.837	N/A	-0.178	YES
MW369	Downgradient	Yes	0.727	N/A	-0.319	YES
MW372	Downgradient	No	0.293	N/A	-1.228	N/A
MW384	Sidegradient	Yes	0.658	N/A	-0.419	YES
MW387	Downgradient	No	0.337	N/A	-1.088	N/A
MW391	Downgradient	No	0.194	N/A	-1.640	N/A
MW394	Upgradient	No	0.462	N/A	-0.772	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

- MW224
- MW369
- MW384

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum ((background result-X)^2)/[count of background results - 1]]^0.5

TL Upper Tolerance Limit, TL = X + (K * S), LL Lower Tolerance Limit, LL = X - (K * S)

X Mean, X = (sum of background results)/(count of background results)

** Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009. D1-51

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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

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	Yes	42	NO	3.738	N/A
MW221	Sidegradient	Yes	43.8	NO	3.780	N/A
MW222	Sidegradient	Yes	41.9	NO	3.735	N/A
MW223	Sidegradient	Yes	45.1	NO	3.809	N/A
MW224	Sidegradient	Yes	57.1	NO	4.045	N/A
MW369	Downgradient	Yes	54	NO	3.989	N/A
MW372	Downgradient	Yes	42.8	NO	3.757	N/A
MW384	Sidegradient	Yes	50.3	NO	3.918	N/A
MW387	Downgradient	Yes	48.5	NO	3.882	N/A
MW391	Downgradient	Yes	47	NO	3.850	N/A
MW394	Upgradient	Yes	28.7	NO	3.357	N/A

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

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>. D1-52

C-746-S/T Third Quarter 2017 Statistical Analysis Historical Background Comparison

Sulfate

UNITS: mg/L

URGA

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is evidence of an exceedance of the statistically-derived historical background concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

Statistics-Background Data X= 10.481 S= 2.648 CV(1)=0.253 K factor**= 2.523 TL(1)= 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	22.7	YES	3.122	N/A
MW221	Sidegradient	Yes	15.3	NO	2.728	N/A
MW222	Sidegradient	Yes	13.4	NO	2.595	N/A
MW223	Sidegradient	Yes	19.8	YES	2.986	N/A
MW224	Sidegradient	Yes	14.6	NO	2.681	N/A
MW369	Downgradient	Yes	6.26	NO	1.834	N/A
MW372	Downgradient	Yes	65.8	YES	4.187	N/A
MW384	Sidegradient	Yes	21.9	YES	3.086	N/A
MW387	Downgradient	Yes	23.8	YES	3.170	N/A
MW391	Downgradient	Yes	98.9	YES	4.594	N/A
MW394	Upgradient	Yes	10.2	NO	2.322	N/A

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

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

- MW220
- MW223
- 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 = [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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Technetium-99

UNITS: pCi/L

URGA

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is evidence of an exceedance of the statistically-derived historical background concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

Statistics-Background Data X= 9.354 S= 9.280 CV(1)=0.992 K factor**= 2.523 TL(1)= 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	22.7	NO	3.122	N/A
MW221	Sidegradient	Yes	25.7	NO	3.246	N/A
MW222	Sidegradient	No	2.36	N/A	0.859	N/A
MW223	Sidegradient	No	10.2	N/A	2.322	N/A
MW224	Sidegradient	Yes	20.3	NO	3.011	N/A
MW369	Downgradient	Yes	34.2	YES	3.532	N/A
MW372	Downgradient	Yes	30.2	NO	3.408	N/A
MW384	Sidegradient	Yes	178	YES	5.182	N/A
MW387	Downgradient	Yes	207	YES	5.333	N/A
MW391	Downgradient	No	5.74	N/A	1.747	N/A
MW394	Upgradient	No	11.1	N/A	2.407	N/A

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for a well did not exceed the MCL value, that well was not included in the statistical evaluation.

Conclusion of Statistical Analysis on Historical Data

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

Wells with Exceedances

- MW369
- MW384
- MW387

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum ((background result-X)^2)/[count of background results - 1]]^0.5

TL Upper Tolerance Limit, TL = X + (K * S), LL Lower Tolerance Limit, LL = X - (K * S)

X Mean, X = (sum of background results)/(count of background results)

** Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009. D1-54

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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	0.996	NO	-0.004	N/A
MW221	Sidegradient	Yes	0.895	NO	-0.111	N/A
MW222	Sidegradient	Yes	0.982	NO	-0.018	N/A
MW223	Sidegradient	Yes	0.961	NO	-0.040	N/A
MW224	Sidegradient	Yes	1.06	NO	0.058	N/A
MW369	Downgradient	Yes	1.56	NO	0.445	N/A
MW372	Downgradient	Yes	1.51	NO	0.412	N/A
MW384	Sidegradient	Yes	1.35	NO	0.300	N/A
MW387	Downgradient	Yes	1.06	NO	0.058	N/A
MW391	Downgradient	Yes	1.12	NO	0.113	N/A
MW394	Upgradient	Yes	0.806	NO	-0.216	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>. D1-55

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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	6	N/A	1.792	NO
MW221	Sidegradient	Yes	5.06	N/A	1.621	NO
MW222	Sidegradient	No	10	N/A	2.303	N/A
MW223	Sidegradient	Yes	8.64	N/A	2.156	NO
MW224	Sidegradient	Yes	36.6	N/A	3.600	NO
MW369	Downgradient	Yes	21	N/A	3.045	NO
MW372	Downgradient	Yes	15.4	N/A	2.734	NO
MW384	Sidegradient	Yes	21.4	N/A	3.063	NO
MW387	Downgradient	Yes	17.1	N/A	2.839	NO
MW391	Downgradient	Yes	9.8	N/A	2.282	NO
MW394	Upgradient	Yes	8.44	N/A	2.133	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>. D1-56

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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	Yes	2.64	N/A	0.971	N/A
MW221	Sidegradient	Yes	0.34	N/A	-1.079	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	Yes	1.19	N/A	0.174	N/A
MW372	Downgradient	Yes	5.69	NO	1.739	N/A
MW384	Sidegradient	Yes	0.67	N/A	-0.400	N/A
MW387	Downgradient	Yes	1.7	N/A	0.531	N/A
MW391	Downgradient	Yes	7.77	NO	2.050	N/A
MW394	Upgradient	Yes	4.81	N/A	1.571	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. D1-57

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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

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	No	0.01	N/A	-4.605	N/A
MW223	Sidegradient	No	0.01	N/A	-4.605	N/A
MW224	Sidegradient	Yes	0.00858	NO	-4.758	N/A
MW369	Downgradient	No	0.00704	N/A	-4.956	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

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

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

C-746-S/T Third Quarter 2017 Statistical Analysis Historical Background Comparison

Zinc

UNITS: mg/L

URGA

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is evidence of an exceedance of the statistically-derived historical background concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

Statistics-Background Data X= 0.036 S= 0.026 CV(1)=0.722 K factor**= 2.523 TL(1)= 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	Yes	0.00337	NO	-5.693	N/A
MW221	Sidegradient	No	0.01	N/A	-4.605	N/A
MW222	Sidegradient	No	0.01	N/A	-4.605	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	0.0049	NO	-5.319	N/A
MW372	Downgradient	Yes	0.00542	NO	-5.218	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

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

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>. D1-59

C-746-S/T Third Quarter 2017 Statistical Analysis Historical Background Comparison

Aluminum

UNITS: mg/L

LRGA

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is evidence of an exceedance of the statistically-derived historical background concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

Statistics-Background Data X= 0.258 S= 0.221 CV(1)=0.856 K factor**= 2.523 TL(1)= 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

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW370	Downgradient	Yes	0.137	NO	-1.988	N/A
MW373	Downgradient	Yes	0.193	NO	-1.645	N/A
MW385	Sidegradient	Yes	0.0261	NO	-3.646	N/A
MW388	Downgradient	Yes	0.0368	NO	-3.302	N/A
MW392	Downgradient	Yes	0.0404	NO	-3.209	N/A
MW395	Upgradient	No	0.05	N/A	-2.996	N/A
MW397	Upgradient	Yes	0.0612	NO	-2.794	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	0.824	-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

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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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	84.6	YES	4.438	N/A
MW373	Downgradient	Yes	16.7	N/A	2.815	N/A
MW385	Sidegradient	Yes	116	YES	4.754	N/A
MW388	Downgradient	Yes	103	YES	4.635	N/A
MW392	Downgradient	No	0.686	N/A	-0.377	N/A
MW395	Upgradient	Yes	5.16	N/A	1.641	N/A
MW397	Upgradient	Yes	9.5	N/A	2.251	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. D1-61

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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

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

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW370	Downgradient	Yes	0.0286	N/A	-3.554	NO
MW373	Downgradient	Yes	1.15	N/A	0.140	NO
MW385	Sidegradient	Yes	0.0154	N/A	-4.173	NO
MW388	Downgradient	Yes	0.0173	N/A	-4.057	NO
MW392	Downgradient	Yes	0.03	N/A	-3.507	NO
MW395	Upgradient	Yes	0.0222	N/A	-3.808	NO
MW397	Upgradient	Yes	0.00689	N/A	-4.978	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. D1-62

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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	0.407	NO	-0.899	N/A
MW373	Downgradient	Yes	0.566	NO	-0.569	N/A
MW385	Sidegradient	Yes	0.265	NO	-1.328	N/A
MW388	Downgradient	Yes	0.295	NO	-1.221	N/A
MW392	Downgradient	Yes	0.602	NO	-0.507	N/A
MW395	Upgradient	Yes	0.58	NO	-0.545	N/A
MW397	Upgradient	Yes	0.413	NO	-0.884	N/A

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

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. D1-63

C-746-S/T Third Quarter 2017 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	28	NO	3.332	N/A
MW373	Downgradient	Yes	56.9	YES	4.041	N/A
MW385	Sidegradient	Yes	26.2	NO	3.266	N/A
MW388	Downgradient	Yes	22.5	NO	3.114	N/A
MW392	Downgradient	Yes	28.6	NO	3.353	N/A
MW395	Upgradient	Yes	26.2	NO	3.266	N/A
MW397	Upgradient	Yes	17.2	NO	2.845	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. D1-64

C-746-S/T Third Quarter 2017 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	10.4	NO	2.342	N/A
MW373	Downgradient	Yes	14.9	NO	2.701	N/A
MW385	Sidegradient	No	20	N/A	2.996	N/A
MW388	Downgradient	Yes	11.8	NO	2.468	N/A
MW392	Downgradient	Yes	16.4	NO	2.797	N/A
MW395	Upgradient	Yes	12.7	NO	2.542	N/A
MW397	Upgradient	No	20	N/A	2.996	N/A

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

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
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None of the test wells exceeded the Upper Tolerance Limit, which is evidence that concentrations in these wells are not different from historical background concentrations to a statistically-significant level.

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, $CV = S/X$ If CV is less than or equal to 1 assume normal distribution.

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

TL Upper Tolerance Limit, $TL = X + (K * S)$, LL Lower Tolerance Limit, $LL = X - (K * S)$

X Mean, $X = (\text{sum of background results})/(\text{count of background results})$

** Read from Table 5, Appendix B of *Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance*, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009. D1-65

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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	34.2	NO	3.532	N/A
MW373	Downgradient	Yes	47.1	NO	3.852	N/A
MW385	Sidegradient	Yes	31.3	NO	3.444	N/A
MW388	Downgradient	Yes	33.1	NO	3.500	N/A
MW392	Downgradient	Yes	47.8	NO	3.867	N/A
MW395	Upgradient	Yes	48.1	NO	3.873	N/A
MW397	Upgradient	Yes	34	NO	3.526	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. D1-66

C-746-S/T Third Quarter 2017 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	1.02	NO	0.020	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. D1-67

C-746-S/T Third Quarter 2017 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	0.00344	N/A	-5.672	NO
MW373	Downgradient	Yes	0.00664	N/A	-5.015	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. D1-68

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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	427	NO	6.057	N/A
MW373	Downgradient	Yes	660	YES	6.492	N/A
MW385	Sidegradient	Yes	410	NO	6.016	N/A
MW388	Downgradient	Yes	403	NO	5.999	N/A
MW392	Downgradient	Yes	419	NO	6.038	N/A
MW395	Upgradient	Yes	392	NO	5.971	N/A
MW397	Upgradient	Yes	315	NO	5.753	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. D1-69

C-746-S/T Third Quarter 2017 Statistical Analysis Historical Background Comparison
Copper UNITS: mg/L LRGAs

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	0.00162	NO	-6.425	N/A
MW373	Downgradient	Yes	0.00213	NO	-6.152	N/A
MW385	Sidegradient	Yes	0.000841	NO	-7.081	N/A
MW388	Downgradient	Yes	0.000403	NO	-7.817	N/A
MW392	Downgradient	Yes	0.000961	NO	-6.948	N/A
MW395	Upgradient	Yes	0.000311	NO	-8.076	N/A
MW397	Upgradient	Yes	0.000512	NO	-7.577	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. D1-70

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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	4.26	NO	1.449	N/A
MW373	Downgradient	Yes	3.28	NO	1.188	N/A
MW385	Sidegradient	Yes	3.83	NO	1.343	N/A
MW388	Downgradient	Yes	5.04	NO	1.617	N/A
MW392	Downgradient	Yes	3.58	NO	1.275	N/A
MW395	Upgradient	Yes	5.47	NO	1.699	N/A
MW397	Upgradient	Yes	5.86	NO	1.768	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 = [Sum ((background result-X)^2)/[count of background results - 1]]^0.5

TL Upper Tolerance Limit, TL = X + (K * S), LL Lower Tolerance Limit, LL = X - (K * S)

X Mean, X = (sum of background results)/(count of background results)

** Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009. D1-71

C-746-S/T Third Quarter 2017 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	236	NO	5.464	N/A
MW373	Downgradient	Yes	377	YES	5.932	N/A
MW385	Sidegradient	Yes	217	NO	5.380	N/A
MW388	Downgradient	Yes	207	NO	5.333	N/A
MW392	Downgradient	Yes	206	NO	5.328	N/A
MW395	Upgradient	Yes	210	NO	5.347	N/A
MW397	Upgradient	Yes	171	NO	5.142	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. D1-72

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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	Yes	0.873	N/A	-0.136	NO
MW373	Downgradient	Yes	2.03	N/A	0.708	NO
MW385	Sidegradient	No	0.1	N/A	-2.303	N/A
MW388	Downgradient	Yes	0.0914	N/A	-2.393	NO
MW392	Downgradient	Yes	0.271	N/A	-1.306	NO
MW395	Upgradient	No	0.1	N/A	-2.303	N/A
MW397	Upgradient	Yes	0.119	N/A	-2.129	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. D1-73

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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	11.6	NO	2.451	N/A
MW373	Downgradient	Yes	19.9	NO	2.991	N/A
MW385	Sidegradient	Yes	9.33	NO	2.233	N/A
MW388	Downgradient	Yes	9.53	NO	2.254	N/A
MW392	Downgradient	Yes	9.87	NO	2.289	N/A
MW395	Upgradient	Yes	10.9	NO	2.389	N/A
MW397	Upgradient	Yes	7.37	NO	1.997	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

None of the test wells exceeded the Upper Tolerance Limit, which is evidence that concentrations in these wells are not different from historical background concentrations to a statistically-significant level.

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum ((background result-X)^2)/[count of background results - 1]]^0.5

TL Upper Tolerance Limit, TL = X + (K * S), LL Lower Tolerance Limit, LL = X - (K * S)

X Mean, X = (sum of background results)/(count of background results)

** Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009. D1-74

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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

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW370	Downgradient	Yes	0.268	N/A	-1.317	NO
MW373	Downgradient	Yes	0.256	N/A	-1.363	NO
MW385	Sidegradient	Yes	0.00141	N/A	-6.564	NO
MW388	Downgradient	Yes	0.00139	N/A	-6.578	NO
MW392	Downgradient	Yes	0.136	N/A	-1.995	NO
MW395	Upgradient	No	0.005	N/A	-5.298	N/A
MW397	Upgradient	Yes	0.00275	N/A	-5.896	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	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

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. D1-75

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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

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW370	Downgradient	Yes	0.000547	N/A	-7.511	NO
MW373	Downgradient	Yes	0.000295	N/A	-8.129	NO
MW385	Sidegradient	No	0.000539	N/A	-7.526	N/A
MW388	Downgradient	No	0.000233	N/A	-8.364	N/A
MW392	Downgradient	No	0.000469	N/A	-7.665	N/A
MW395	Upgradient	No	0.0005	N/A	-7.601	N/A
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.

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. D1-76

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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	0.00202	N/A	-6.205	NO
MW373	Downgradient	Yes	0.00232	N/A	-6.066	NO
MW385	Sidegradient	Yes	0.000993	N/A	-6.915	NO
MW388	Downgradient	Yes	0.001	N/A	-6.908	NO
MW392	Downgradient	Yes	0.0012	N/A	-6.725	NO
MW395	Upgradient	Yes	0.000603	N/A	-7.414	NO
MW397	Upgradient	No	0.002	N/A	-6.215	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. D1-77

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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	343	YES	5.838	N/A
MW373	Downgradient	Yes	309	YES	5.733	N/A
MW385	Sidegradient	Yes	328	YES	5.793	N/A
MW388	Downgradient	Yes	352	YES	5.864	N/A
MW392	Downgradient	Yes	304	YES	5.717	N/A
MW395	Upgradient	Yes	392	YES	5.971	N/A
MW397	Upgradient	Yes	352	YES	5.864	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
- MW385
- MW388
- MW392
- MW395
- MW397

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum ((background result-X)^2)/[count of background results - 1]]^0.5

TL Upper Tolerance Limit, TL = X + (K * S), LL Lower Tolerance Limit, LL = X - (K * S)

X Mean, X = (sum of background results)/(count of background results)

** Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/2009>. D1-78

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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

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

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

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)?
MW370	Downgradient	Yes	6.19	NO	1.823	N/A
MW373	Downgradient	Yes	6.24	NO	1.831	N/A
MW385	Sidegradient	Yes	6.24	NO	1.831	N/A
MW388	Downgradient	Yes	6.14	NO	1.815	N/A
MW392	Downgradient	Yes	6.3	NO	1.841	N/A
MW395	Upgradient	Yes	6.13	NO	1.813	N/A
MW397	Upgradient	Yes	6.08	NO	1.805	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. D1-79

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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	2.31	NO	0.837	N/A
MW373	Downgradient	Yes	2.2	NO	0.788	N/A
MW385	Sidegradient	Yes	1.66	NO	0.507	N/A
MW388	Downgradient	Yes	1.64	NO	0.495	N/A
MW392	Downgradient	Yes	1.82	NO	0.599	N/A
MW395	Upgradient	Yes	1.52	NO	0.419	N/A
MW397	Upgradient	Yes	1.52	NO	0.419	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. D1-80

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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	0.63	N/A	-0.462	NO
MW373	Downgradient	No	0.257	N/A	-1.359	N/A
MW385	Sidegradient	No	0.216	N/A	-1.532	N/A
MW388	Downgradient	Yes	0.732	N/A	-0.312	YES
MW392	Downgradient	No	0.181	N/A	-1.709	N/A
MW395	Upgradient	Yes	0.437	N/A	-0.828	NO
MW397	Upgradient	Yes	0.555	N/A	-0.589	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

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

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. D1-81

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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	40.6	NO	3.704	N/A
MW373	Downgradient	Yes	45.3	NO	3.813	N/A
MW385	Sidegradient	Yes	43.7	NO	3.777	N/A
MW388	Downgradient	Yes	46	NO	3.829	N/A
MW392	Downgradient	Yes	41.5	NO	3.726	N/A
MW395	Upgradient	Yes	28.2	NO	3.339	N/A
MW397	Upgradient	Yes	29.1	NO	3.371	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. D1-82

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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	20.4	YES	3.016	N/A
MW373	Downgradient	Yes	100	YES	4.605	N/A
MW385	Sidegradient	Yes	21.4	YES	3.063	N/A
MW388	Downgradient	Yes	23.5	YES	3.157	N/A
MW392	Downgradient	Yes	6.72	NO	1.905	N/A
MW395	Upgradient	Yes	10	NO	2.303	N/A
MW397	Upgradient	Yes	10.1	NO	2.313	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. D1-83

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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	120	YES	4.787	N/A
MW373	Downgradient	No	9.12	N/A	2.210	N/A
MW385	Sidegradient	Yes	198	YES	5.288	N/A
MW388	Downgradient	Yes	198	YES	5.288	N/A
MW392	Downgradient	No	8.72	N/A	2.166	N/A
MW395	Upgradient	Yes	19.2	NO	2.955	N/A
MW397	Upgradient	Yes	29.8	NO	3.395	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 = [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

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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	1.35	NO	0.300	N/A
MW373	Downgradient	Yes	1.53	NO	0.425	N/A
MW385	Sidegradient	Yes	1.1	NO	0.095	N/A
MW388	Downgradient	Yes	1.14	NO	0.131	N/A
MW392	Downgradient	Yes	1.33	NO	0.285	N/A
MW395	Upgradient	Yes	0.951	NO	-0.050	N/A
MW397	Upgradient	Yes	0.72	NO	-0.329	N/A

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

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. D1-85

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Total Organic Halides (TOX)

UNITS: ug/L

LRGA

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is evidence of an exceedance of the statistically-derived historical background concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

Statistics-Background Data X= 31.513 S= 18.609 CV(1)=0.591 K factor**= 2.523 TL(1)= 78.462 LL(1)=N/A

Statistics-Transformed Background Data X= 3.240 S= 0.707 CV(2)=0.218 K factor**= 2.523 TL(2)= 5.024 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	50	3.912
9/16/2002	50	3.912
10/16/2002	50	3.912
1/13/2003	18.3	2.907
4/10/2003	51.2	3.936
7/16/2003	42.6	3.752
10/14/2003	12.3	2.510
1/13/2004	10	2.303

Well Number: MW397

Date Collected	Result	LN(Result)
8/13/2002	50	3.912
9/16/2002	50	3.912
10/17/2002	50	3.912
1/13/2003	12	2.485
4/8/2003	19.9	2.991
7/16/2003	17.9	2.885
10/14/2003	10	2.303
1/13/2004	10	2.303

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW370	Downgradient	No	10	N/A	2.303	N/A
MW373	Downgradient	Yes	14.6	NO	2.681	N/A
MW385	Sidegradient	Yes	4.3	NO	1.459	N/A
MW388	Downgradient	Yes	4.04	NO	1.396	N/A
MW392	Downgradient	Yes	34.4	NO	3.538	N/A
MW395	Upgradient	Yes	7.66	NO	2.036	N/A
MW397	Upgradient	Yes	3.38	NO	1.218	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. D1-86

C-746-S/T Third Quarter 2017 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	0.78	N/A	-0.248	N/A
MW373	Downgradient	Yes	6.52	NO	1.875	N/A
MW385	Sidegradient	Yes	0.72	N/A	-0.329	N/A
MW388	Downgradient	Yes	1.04	N/A	0.039	N/A
MW392	Downgradient	Yes	15.6	NO	2.747	N/A
MW395	Upgradient	Yes	4.35	N/A	1.470	N/A
MW397	Upgradient	Yes	0.44	N/A	-0.821	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. D1-87

C-746-S/T Third Quarter 2017 Statistical Analysis Historical Background Comparison

Zinc

UNITS: mg/L

LRGA

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is evidence of an exceedance of the statistically-derived historical background concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the TL or is less than the LL, that is statistically significant evidence of elevated or lowered concentration in that well.

Statistics-Background Data X= 0.044 S= 0.034 CV(1)=0.760 K factor**= 2.523 TL(1)= 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	Yes	0.0116	NO	-4.457	N/A
MW373	Downgradient	Yes	0.00693	NO	-4.972	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	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: 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. D1-88

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 Third Quarter 2017 Statistical Analysis	Current 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 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= 26.563	S= 17.038	CV(1)=0.641	K factor**= 3.188	TL(1)= 80.879	LL(1)=N/A
Statistics-Transformed Background Data	X= 3.130	S= 0.565	CV(2)=0.180	K factor**= 3.188	TL(2)= 4.931	LL(2)=N/A

Current Background Data from Upgradient Wells with Transformed Result
--

Because CV(1) is less than or equal to 1, assume normal distribution and continue with statistical analysis utilizing TL(1).

Well Number: MW396

Date Collected	Result	LN(Result)
7/16/2015	20	2.996
10/22/2015	12.9	2.557
1/5/2016	11.4	2.434
4/18/2016	28.3	3.343
7/19/2016	63.4	4.149
10/12/2016	22.8	3.127
1/17/2017	16.9	2.827
4/20/2017	36.8	3.605

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW386	Sidegradient	Yes	65.3	NO	4.179	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, $S = [\text{Sum}([(background\ result-X)^2]/[\text{count of background results} - 1])]^{0.5}$

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.

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=** 254.625 **S=** 84.280 **CV(1)=**0.331 **K factor**=** 3.188 **TL(1)=** 523.310 **LL(1)=**N/A

Statistics-Transformed Background Data **X=** 5.492 **S=** 0.328 **CV(2)=**0.060 **K factor**=** 3.188 **TL(2)=** 6.538 **LL(2)=**N/A

Current Background Data from Upgradient Wells with Transformed Result

Because CV(1) is less than or equal to 1, assume normal distribution and continue with statistical analysis utilizing TL(1).

Well Number: MW396

Date Collected	Result	LN(Result)
7/16/2015	330	5.799
10/22/2015	159	5.069
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

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW386	Sidegradient	Yes	324	NO	5.781	N/A
MW390	Downgradient	Yes	393	NO	5.974	N/A
MW393	Downgradient	Yes	307	NO	5.727	N/A
MW396	Upgradient	Yes	291	NO	5.673	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, $S = [\text{Sum}([(background\ result-X)^2]/[\text{count of background results} - 1])]^{0.5}$

TL Upper Tolerance Limit, $TL = X + (K * S)$, LL Lower Tolerance Limit, $LL = X - (K * S)$

X Mean, $X = (\text{sum of background results})/(\text{count of background results})$

** Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009.

C-746-S/T Third Quarter 2017 Statistical Analysis Current 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 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= 0.615 S= 0.300 CV(1)=0.488 **K factor**= 3.188** TL(1)= 1.571 LL(1)=N/A

Statistics-Transformed Background Data X= -0.621 S= 0.590 CV(2)=-0.951 **K factor**= 3.188** TL(2)= 1.261 LL(2)=N/A

Current Background Data from Upgradient Wells with Transformed Result

Because CV(1) is less than or equal to 1, assume normal distribution and continue with statistical analysis utilizing TL(1).

Well Number: MW396

Date Collected	Result	LN(Result)
7/16/2015	0.785	-0.242
10/22/2015	0.988	-0.012
1/5/2016	0.907	-0.098
4/18/2016	0.239	-1.431
7/19/2016	0.376	-0.978
10/12/2016	0.601	-0.509
1/17/2017	0.79	-0.236
4/20/2017	0.232	-1.461

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW396	Upgradient	Yes	0.752	NO	-0.285	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, $S = [\text{Sum}([(background\ result-X)^2]/[\text{count of background results} - 1])]^{0.5}$

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. D2-5

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**= -2.390 **S**= 6.611 **CV(1)**= -2.766 **K factor****= 3.188 **TL(1)**= 18.687 **LL(1)**=N/A

Statistics-Transformed Background Data **X**= 0.684 **S**= 1.650 **CV(2)**=2.412 **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)
7/16/2015	0.171	-1.766
10/22/2015	-7.28	#Func!
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!

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	86.7	YES	4.462	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, $S = [\text{Sum}([(background\ result-X)^2]/[\text{count of background results} - 1])]^{0.5}$

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.

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= 10.817 S= 5.985 CV(1)=0.553 **K factor**= 2.523** TL(1)= 25.917 LL(1)=N/A

Statistics-Transformed Background Data X= 2.219 S= 0.616 CV(2)=0.278 **K factor**= 2.523** TL(2)= 3.773 LL(2)=N/A

Current Background Data from Upgradient Wells with Transformed Result

Because CV(1) is less than or equal to 1, assume normal distribution and continue with statistical analysis utilizing TL(1).

Well Number: MW220

Date Collected	Result	LN(Result)
7/15/2015	9.31	2.231
10/15/2015	17	2.833
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

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW384	Sidegradient	Yes	90.6	YES	4.506	N/A
MW387	Downgradient	Yes	130	YES	4.868	N/A

Well Number: MW394

Date Collected	Result	LN(Result)
7/17/2015	5.97	1.787
10/22/2015	11.6	2.451
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

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 = [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.

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= 24.288 S= 4.064 CV(1)=0.167 **K factor**= 2.523** TL(1)= 34.541 LL(1)=N/A

Statistics-Transformed Background Data X= 3.176 S= 0.172 CV(2)=0.054 **K factor**= 2.523** TL(2)= 3.611 LL(2)=N/A

Current Background Data from Upgradient Wells with Transformed Result

Because CV(1) is less than or equal to 1, assume normal distribution and continue with statistical analysis utilizing TL(1).

Well Number: MW220

Date Collected	Result	LN(Result)
7/15/2015	21.8	3.082
10/15/2015	18.5	2.918
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

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW372	Downgradient	Yes	46.3	YES	3.835	N/A

Well Number: MW394

Date Collected	Result	LN(Result)
7/17/2015	26.8	3.288
10/22/2015	26.9	3.292
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

Conclusion of Statistical Analysis on Current Data

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

Wells with Exceedances

MW372

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum ((background result-X)^2)/[count of background results -1]]^0.5

TL Upper Tolerance Limit, TL = X + (K * S), LL Lower Tolerance Limit, LL = X - (K * S)

X Mean, X = (sum of background results)/(count of background results)

** Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/2009>. D2-8

C-746-S/T Third Quarter 2017 Statistical Analysis	Current Background Comparison
Chemical Oxygen Demand (COD)	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= 25.434	S= 26.144	CV(1)=1.028	K factor**= 2.523	TL(1)= 91.396	LL(1)=N/A
Statistics-Transformed Background Data	X= 3.011	S= 0.582	CV(2)=0.193	K factor**= 2.523	TL(2)= 4.478	LL(2)=N/A

Current Background Data from Upgradient Wells with Transformed Result
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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)
7/15/2015	120	4.787
10/15/2015	20	2.996
1/5/2016	20	2.996
4/12/2016	15.8	2.760
7/19/2016	33.1	3.500
10/10/2016	13.9	2.632
1/11/2017	12.7	2.542
4/19/2017	24	3.178

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	Yes	46.8	N/A	3.846	NO

Well Number: MW394

Date Collected	Result	LN(Result)
7/17/2015	20	2.996
10/22/2015	12.9	2.557
1/5/2016	20	2.996
4/18/2016	20	2.996
7/19/2016	34.9	3.552
10/12/2016	13.6	2.610
1/17/2017	9.95	2.298
4/20/2017	16.1	2.779

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.

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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= 214.063 S= 21.000 CV(1)=0.098 **K factor**= 2.523** TL(1)= 267.045 LL(1)=N/A

Statistics-Transformed Background Data X= 5.362 S= 0.093 CV(2)=0.017 **K factor**= 2.523** TL(2)= 5.597 LL(2)=N/A

Current Background Data from Upgradient Wells with Transformed Result

Because CV(1) is less than or equal to 1, assume normal distribution and continue with statistical analysis utilizing TL(1).

Well Number: MW220

Date Collected	Result	LN(Result)
7/15/2015	224	5.412
10/15/2015	236	5.464
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

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	Yes	451	YES	6.111	N/A
MW372	Downgradient	Yes	334	YES	5.811	N/A
MW391	Downgradient	Yes	327	YES	5.790	N/A

Well Number: MW394

Date Collected	Result	LN(Result)
7/17/2015	201	5.303
10/22/2015	210	5.347
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

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

- MW220
- MW372
- 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 = [Sum ((background result-X)^2)/[count of background results -1]]^0.5

TL Upper Tolerance Limit, TL = X + (K * S), LL Lower Tolerance Limit, LL = X - (K * S)

X Mean, X = (sum of background results)/(count of background results)

** Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009. D2-10

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= 10.321	S= 1.696	CV(1)=0.164	K factor**= 2.523	TL(1)= 14.600	LL(1)=N/A
Statistics-Transformed Background Data	X= 2.321	S= 0.170	CV(2)=0.073	K factor**= 2.523	TL(2)= 2.749	LL(2)=N/A

Current Background Data from Upgradient Wells with Transformed Result

Well Number: MW220

Date Collected	Result	LN(Result)
7/15/2015	9.16	2.215
10/15/2015	7.86	2.062
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

Well Number: MW394

Date Collected	Result	LN(Result)
7/17/2015	11.9	2.477
10/22/2015	12.1	2.493
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

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)
MW372	Downgradient	Yes	17.2	YES	2.845	N/A
MW391	Downgradient	Yes	16.8	YES	2.821	N/A

Conclusion of Statistical Analysis on Current Data

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

Wells with Exceedances

MW372
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, $S = \sqrt{[\text{Sum } ((\text{background result}-X)^2)/[\text{count of background results } -1]]}^{0.5}$

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. D2-11

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**= 0.591 **S**= 0.320 **CV(1)**=0.542 **K factor****= 2.523 **TL(1)**= 1.399 **LL(1)**=N/A

Statistics-Transformed Background Data **X**= -0.729 **S**= 0.773 **CV(2)**=-1.061 **K factor****= 2.523 **TL(2)**= 1.222 **LL(2)**=N/A

Current Background Data from Upgradient Wells with Transformed Result

Because CV(1) is less than or equal to 1, assume normal distribution and continue with statistical analysis utilizing TL(1).

Well Number: MW220

Date Collected	Result	LN(Result)
7/15/2015	0.709	-0.344
10/15/2015	0.636	-0.453
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

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW224	Sidegradient	Yes	0.837	NO	-0.178	N/A
MW369	Downgradient	Yes	0.727	NO	-0.319	N/A
MW384	Sidegradient	Yes	0.658	NO	-0.419	N/A

Well Number: MW394

Date Collected	Result	LN(Result)
7/17/2015	0.928	-0.075
10/22/2015	0.43	-0.844
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

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. D2-12

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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 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= 14.359 S= 4.338 CV(1)=0.302 K factor**= 2.523 TL(1)= 25.302 LL(1)=N/A

Statistics-Transformed Background Data X= 2.622 S= 0.301 CV(2)=0.115 K factor**= 2.523 TL(2)= 3.381 LL(2)=N/A

Current Background Data from Upgradient Wells with Transformed Result

Because CV(1) is less than or equal to 1, assume normal distribution and continue with statistical analysis utilizing TL(1).

Well Number: MW220

Date Collected	Result	LN(Result)
7/15/2015	18.6	2.923
10/15/2015	14.7	2.688
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

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	Yes	22.7	NO	3.122	N/A
MW223	Sidegradient	Yes	19.8	NO	2.986	N/A
MW372	Downgradient	Yes	65.8	YES	4.187	N/A
MW384	Sidegradient	Yes	21.9	NO	3.086	N/A
MW387	Downgradient	Yes	23.8	NO	3.170	N/A
MW391	Downgradient	Yes	98.9	YES	4.594	N/A

Well Number: MW394

Date Collected	Result	LN(Result)
7/17/2015	10.4	2.342
10/22/2015	10.7	2.370
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

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
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 = [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>. D2-13

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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= 11.981 S= 7.938 CV(1)=0.663 **K factor**= 2.523** TL(1)= 32.008 LL(1)=N/A

Statistics-Transformed Background Data X= 2.186 S= 0.931 CV(2)=0.426 **K factor**= 2.523** TL(2)= 4.534 LL(2)=N/A

Current Background Data from Upgradient Wells with Transformed Result

Because CV(1) is less than or equal to 1, assume normal distribution and continue with statistical analysis utilizing TL(1).

Well Number: MW220

Date Collected	Result	LN(Result)
7/15/2015	14.8	2.695
10/15/2015	11.6	2.451
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

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW369	Downgradient	Yes	34.2	YES	3.532	N/A
MW384	Sidegradient	Yes	178	YES	5.182	N/A
MW387	Downgradient	Yes	207	YES	5.333	N/A

Well Number: MW394

Date Collected	Result	LN(Result)
7/17/2015	3.11	1.135
10/22/2015	0.742	-0.298
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

Conclusion of Statistical Analysis on Current Data

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

Wells with Exceedances

- MW369
- MW384
- MW387

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum ((background result-X)^2)/[count of background results -1]]^0.5

TL Upper Tolerance Limit, TL = X + (K * S), LL Lower Tolerance Limit, LL = X - (K * S)

X Mean, X = (sum of background results)/(count of background results)

** Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009.

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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 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= 7.390 S= 5.383 CV(1)=0.728 **K factor**= 2.523** TL(1)= 20.970 LL(1)=N/A

Statistics-Transformed Background Data X= 2.039 S= 0.507 CV(2)=0.249 **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)
7/17/2015	3.79	1.332
10/22/2015	10.7	2.370
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

Well Number: MW397

Date Collected	Result	LN(Result)
7/15/2015	17	2.833
10/22/2015	-1.02	#Func!
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

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	84.6	YES	4.438	N/A
MW385	Sidegradient	Yes	116	YES	4.754	N/A
MW388	Downgradient	Yes	103	YES	4.635	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 = [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. D2-15

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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= 23.900 S= 5.139 CV(1)=0.215 **K factor**= 2.523** TL(1)= 36.866 LL(1)=N/A

Statistics-Transformed Background Data X= 3.152 S= 0.214 CV(2)=0.068 **K factor**= 2.523** TL(2)= 3.693 LL(2)=N/A

Current Background Data from Upgradient Wells with Transformed Result

Because CV(1) is less than or equal to 1, assume normal distribution and continue with statistical analysis utilizing TL(1).

Well Number: MW395

Date Collected	Result	LN(Result)
7/17/2015	26.5	3.277
10/22/2015	27	3.296
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

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW373	Downgradient	Yes	56.9	YES	4.041	N/A

Well Number: MW397

Date Collected	Result	LN(Result)
7/15/2015	17.7	2.874
10/22/2015	19.2	2.955
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

Conclusion of Statistical Analysis on Current Data

Wells with Exceedances

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

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. D2-16

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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= 360.938 S= 31.620 CV(1)=0.088 **K factor**= 2.523** TL(1)= 440.714 LL(1)=N/A

Statistics-Transformed Background Data X= 5.885 S= 0.088 CV(2)=0.015 **K factor**= 2.523** TL(2)= 6.107 LL(2)=N/A

Current Background Data from Upgradient Wells with Transformed Result

Because CV(1) is less than or equal to 1, assume normal distribution and continue with statistical analysis utilizing TL(1).

Well Number: MW395

Date Collected	Result	LN(Result)
7/17/2015	390	5.966
10/22/2015	372	5.919
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

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW373	Downgradient	Yes	660	YES	6.492	N/A

Well Number: MW397

Date Collected	Result	LN(Result)
7/15/2015	334	5.811
10/22/2015	323	5.778
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

Conclusion of Statistical Analysis on Current Data

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

Wells with Exceedances

MW373

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum ((background result-X)^2)/[count of background results -1]]^0.5

TL Upper Tolerance Limit, TL = X + (K * S), LL Lower Tolerance Limit, LL = X - (K * S)

X Mean, X = (sum of background results)/(count of background results)

** Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009. D2-17

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**= 195.813 **S**= 22.766 **CV(1)**=0.116 **K factor****= 2.523 **TL(1)**= 253.251 **LL(1)**=N/A

Statistics-Transformed Background Data **X**= 5.271 **S**= 0.118 **CV(2)**=0.022 **K factor****= 2.523 **TL(2)**= 5.569 **LL(2)**=N/A

Current Background Data from Upgradient Wells with Transformed Result

Because CV(1) is less than or equal to 1, assume normal distribution and continue with statistical analysis utilizing TL(1).

Well Number: MW395

Date Collected	Result	LN(Result)
7/17/2015	203	5.313
10/22/2015	194	5.268
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

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW373	Downgradient	Yes	377	YES	5.932	N/A

Well Number: MW397

Date Collected	Result	LN(Result)
7/15/2015	190	5.247
10/22/2015	160	5.075
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

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

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. D2-18

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**= 401.688 **S**= 104.854 **CV(1)**=0.261 **K factor****= 2.523 **TL(1)**= 666.234 **LL(1)**=N/A

Statistics-Transformed Background Data **X**= 5.961 **S**= 0.282 **CV(2)**=0.047 **K factor****= 2.523 **TL(2)**= 6.673 **LL(2)**=N/A

Current Background Data from Upgradient Wells with Transformed Result

Because CV(1) is less than or equal to 1, assume normal distribution and continue with statistical analysis utilizing TL(1).

Well Number: MW395

Date Collected	Result	LN(Result)
7/17/2015	468	6.148
10/22/2015	378	5.935
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

Well Number: MW397

Date Collected	Result	LN(Result)
7/15/2015	599	6.395
10/22/2015	448	6.105
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

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW370	Downgradient	Yes	343	NO	5.838	N/A
MW373	Downgradient	Yes	309	NO	5.733	N/A
MW385	Sidegradient	Yes	328	NO	5.793	N/A
MW388	Downgradient	Yes	352	NO	5.864	N/A
MW392	Downgradient	Yes	304	NO	5.717	N/A
MW395	Upgradient	Yes	392	NO	5.971	N/A
MW397	Upgradient	Yes	352	NO	5.864	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, $S = [\text{Sum} ((\text{background result}-X)^2)/[\text{count of background results} - 1]]^{0.5}$

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. D2-19

C-746-S/T Third Quarter 2017 Statistical Analysis 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= 0.520 S= 0.316 CV(1)=0.609 **K factor**= 2.523** TL(1)= 1.317 LL(1)=N/A

Statistics-Transformed Background Data X= -0.725 S= 0.583 CV(2)=-0.804 **K factor**= 2.523** TL(2)= 0.182 LL(2)=N/A

Current Background Data from Upgradient Wells with Transformed Result

Well Number: MW395

Date Collected	Result	LN(Result)
7/17/2015	1.2	0.182
10/22/2015	1.01	0.010
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

Well Number: MW397

Date Collected	Result	LN(Result)
7/15/2015	0.516	-0.662
10/22/2015	0.356	-1.033
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

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)
MW388	Downgradient	Yes	0.732	NO	-0.312	N/A

Conclusion of Statistical Analysis on Current Data

None of the test wells exceeded the Upper Tolerance Limit, which is evidence that concentrations in these wells are not different from current background concentrations to a statistically-significant level.

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, CV = S/X If CV is less than or equal to 1 assume normal distribution.

S Standard Deviation, S = [Sum ((background result-X)^2)/[count of background results -1]]^0.5

TL Upper Tolerance Limit, TL = X + (K * S), LL Lower Tolerance Limit, LL = X - (K * S)

X Mean, X = (sum of background results)/(count of background results)

** Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009. D2-20

C-746-S/T Third Quarter 2017 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**= 10.465 **S**= 0.745 **CV(1)**=0.071 **K factor****= 2.523 **TL(1)**= 12.345 **LL(1)**=N/A

Statistics-Transformed Background Data **X**= 2.346 **S**= 0.070 **CV(2)**=0.030 **K factor****= 2.523 **TL(2)**= 2.523 **LL(2)**=N/A

Current Background Data from Upgradient Wells with Transformed Result

Because CV(1) is less than or equal to 1, assume normal distribution and continue with statistical analysis utilizing TL(1).

Well Number: MW395

Date Collected	Result	LN(Result)
7/17/2015	10.2	2.322
10/22/2015	10	2.303
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

Well Number: MW397

Date Collected	Result	LN(Result)
7/15/2015	11.4	2.434
10/22/2015	11.6	2.451
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

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW370	Downgradient	Yes	20.4	YES	3.016	N/A
MW373	Downgradient	Yes	100	YES	4.605	N/A
MW385	Sidegradient	Yes	21.4	YES	3.063	N/A
MW388	Downgradient	Yes	23.5	YES	3.157	N/A

Conclusion of Statistical Analysis on Current Data

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

Wells with Exceedances

- MW370
- MW373
- MW385
- MW388

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the landfill.

CV Coefficient-of-Variation, $CV = S/X$ If CV is less than or equal to 1 assume normal distribution.

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

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. D2-21

C-746-S/T Third Quarter 2017 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= 10.654	S= 3.937	CV(1)=0.370	K factor**= 2.523	TL(1)= 20.586	LL(1)=N/A
Statistics-Transformed Background Data	X= 2.274	S= 0.501	CV(2)=0.220	K factor**= 2.523	TL(2)= 3.537	LL(2)=N/A

Current Background Data from Upgradient Wells with Transformed Result

Well Number: MW395

Date Collected	Result	LN(Result)
7/17/2015	14.7	2.688
10/22/2015	9.39	2.240
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

Well Number: MW397

Date Collected	Result	LN(Result)
7/15/2015	13.2	2.580
10/22/2015	9.83	2.285
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

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)
MW370	Downgradient	Yes	120	YES	4.787	N/A
MW385	Sidegradient	Yes	198	YES	5.288	N/A
MW388	Downgradient	Yes	198	YES	5.288	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. D2-22

ATTACHMENT D3
STATISTICIAN QUALIFICATION STATEMENT

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November 20, 2017

Ms. Kelly Layne
Four Rivers Nuclear Partnership, LLC
5511 Hobbs Road
Kevil, KY 42053

Dear Ms. Layne:

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

As a Chemist, with a Bachelor of Science degree in chemistry and a minor in biology, I have over 20 years of experience in reviewing and assessing laboratory analytical results associated with environmental sampling and investigation activities. For the generation of these statistical analyses, my work was observed and reviewed by a senior chemist and geologist with Four Rivers Nuclear Partnership, LLC.

For this project, the statistical analyses conducted on the third quarter 2017 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,



Jennifer R. Blewett

28 November 2017

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

Subject: Mann-Kendall Statistical Analysis

Dear Ms. Layne:

This statement is submitted in response to your request that it be included with the completed Mann-Kendall 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 the generation of the Mann-Kendall statistical analyses, my work was observed and reviewed by a Senior Principal with Geosyntec Consultants.

For this project, the Mann-Kendall statistical analyses conducted on the Third Quarter 2017 monitoring well data collected from C-746-S&T and C-746-U Landfills were performed using the XLSTAT statistical software program. This work was conducted 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

29 November 2017

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

Subject: Mann-Kendall Statistical Analysis

Dear Ms. Layne:

This statement is submitted in response to your request that it be included with the completed Mann-Kendall 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 Life Sciences, I have over 35 years of experience reviewing and analyzing environmental chemistry data associated with environmental sampling, investigation, and remediation activities. For the generation of 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 Mann-Kendall statistical analyses conducted on the Third Quarter 2017 monitoring well data collected from C-746-S&T and C-746-U Landfills were performed using the XLSTAT statistical software program. This work was conducted 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,



Duane Graves, Ph.D., BCES
Senior Principal

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APPENDIX E
GROUNDWATER FLOW RATE AND DIRECTION

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GROUNDWATER FLOW RATE AND DIRECTION

When monitoring wells (MWs) are sampled, 401 KAR 48:300, Section 11, requires determination of groundwater flow rate and direction of flow in the uppermost aquifer. The uppermost aquifer below the C-746-S&T Landfills is the Regional Gravel Aquifer (RGA). Water level measurements currently are recorded in several wells at the landfill on a quarterly basis. These measurements were used to plot the potentiometric surface of the RGA for the third quarter 2017 and to determine the groundwater flow rate and direction.

Water levels during this reporting period were measured on July 26, 2017. 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.

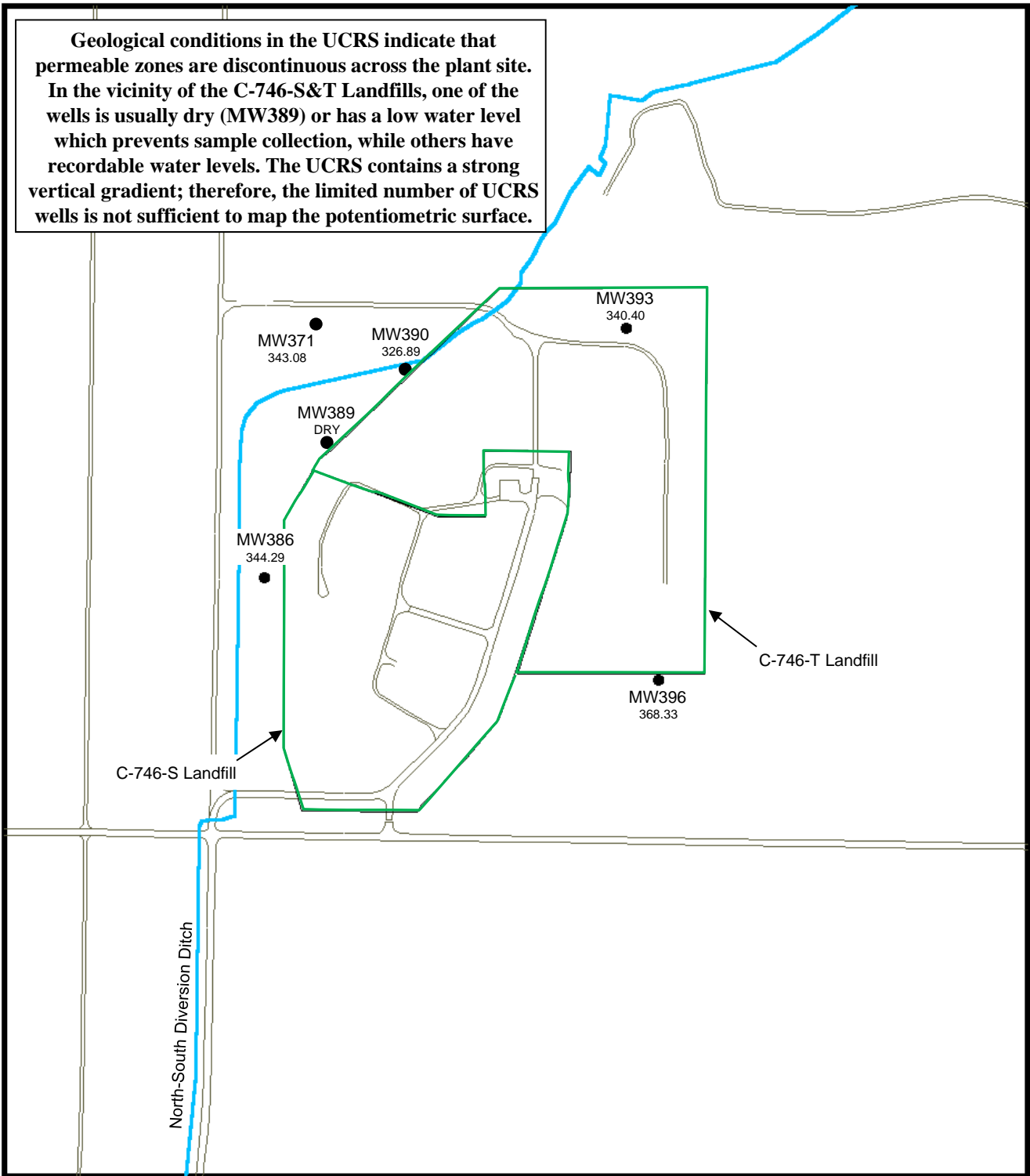
The UCRS has a strong vertical hydraulic gradient; therefore, the limited number of available UCRS wells, screened over different elevations, is not sufficient for mapping the potentiometric surface. Figure E.1 shows the location of UCRS MWs. The Upper Regional Gravel Aquifer (URGA) and Lower Regional 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 3.25×10^{-4} ft/ft. Additional water level measurements in July (Figure E.3) document the vicinity groundwater hydraulic gradient for the RGA to be 3.66×10^{-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 July 2017, the groundwater flow direction in the immediate area of the landfill was oriented north to northeastward.

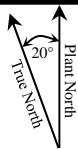
¹ Additional water level measurements, in wells at the C-746-U Landfill and in wells of the surrounding region (MW98, MW100, MW125, MW139, MW165A, MW173, MW193, MW197, and MW200), were used to contour the RGA potentiometric surface.

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

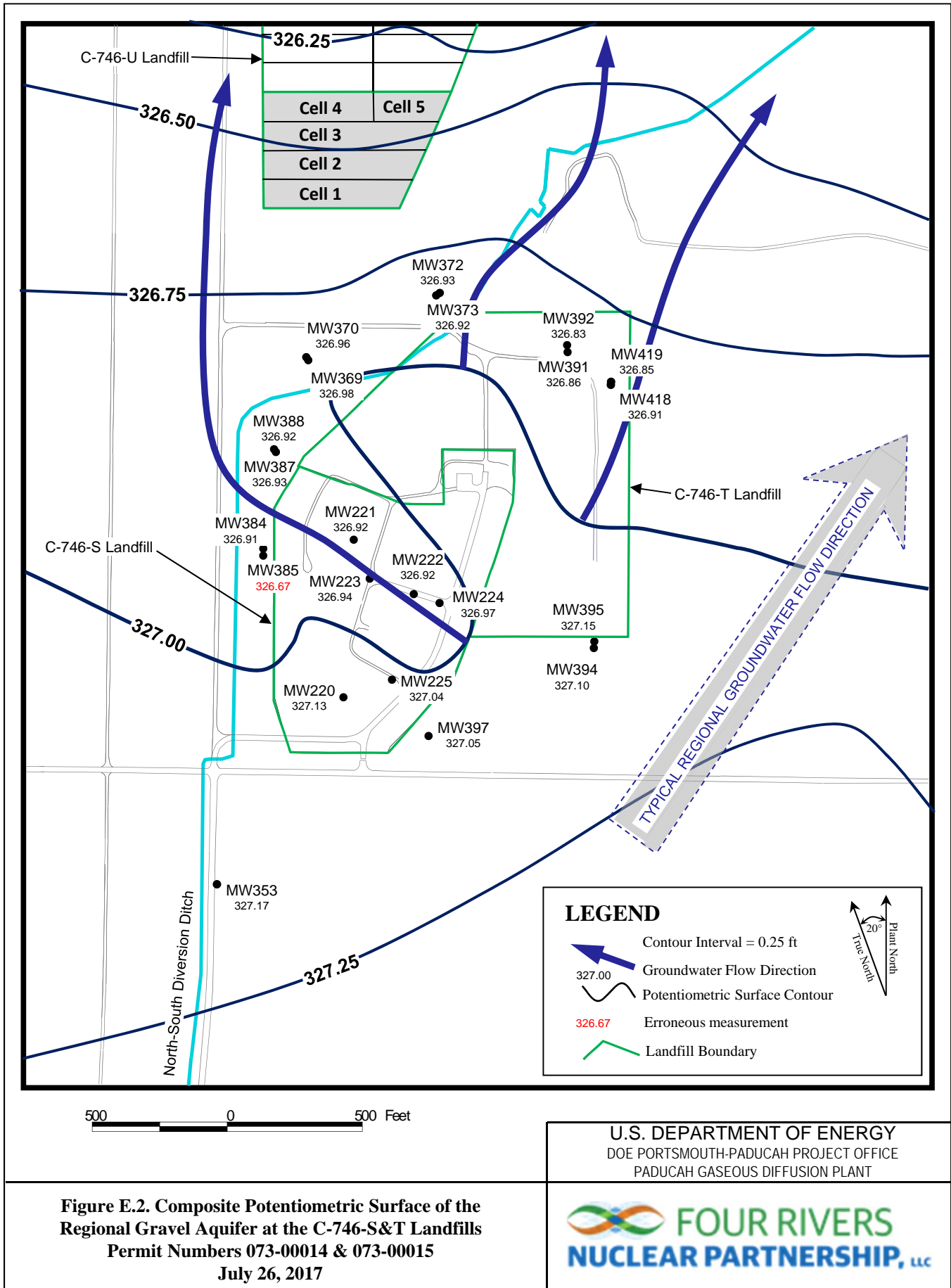
Figure E.1. Potentiometric Surface of the Upper Continental Recharge System at the C-746 S&T Landfills Permit Numbers 073-00014 & 073-00015 July 26, 2017



Table E.1. C-746-S&T Landfills Third Quarter 2017 (July) Water Levels

C-746-S&T Landfills (July 2017) Water Levels										
Date	Time	Well	Formation	Datum Elev (ft amsl)	BP (in Hg)	Delta BP (ft H2O)	Raw Data		*Corrected Data	
							DTW (ft)	Elev (ft amsl)	DTW (ft)	Elev (ft amsl)
7/26/2017	9:28	MW220	URGA	381.44	30.07	0.00	54.31	327.13	54.31	327.13
7/26/2017	9:40	MW221	URGA	390.83	30.07	0.00	63.91	326.92	63.91	326.92
7/26/2017	9:37	MW222	URGA	394.87	30.07	0.00	67.95	326.92	67.95	326.92
7/26/2017	9:38	MW223	URGA	394.03	30.07	0.00	67.09	326.94	67.09	326.94
7/26/2017	9:35	MW224	URGA	395.41	30.07	0.00	68.44	326.97	68.44	326.97
7/26/2017	9:33	MW225	URGA	385.55	30.07	0.00	58.51	327.04	58.51	327.04
7/26/2017	9:44	MW353	LRGA	374.86	30.07	0.00	47.69	327.17	47.69	327.17
7/26/2017	9:22	MW384	URGA	365.06	30.07	0.00	38.15	326.91	38.15	326.91
7/26/2017	9:20	MW385	LRGA	365.54	30.07	0.00	38.87	326.67	38.87	326.67
7/26/2017	9:21	MW386	UCRS	365.21	30.07	0.00	20.92	344.29	20.92	344.29
7/26/2017	9:23	MW387	URGA	363.27	30.07	0.00	36.34	326.93	36.34	326.93
7/26/2017	9:24	MW388	LRGA	363.25	30.07	0.00	36.33	326.92	36.33	326.92
7/26/2017	NA	MW389	UCRS	363.82	30.07	--	NA	--	DRY	--
7/26/2017	9:26	MW390	UCRS	360.36	30.07	0.00	33.47	326.89	33.47	326.89
7/26/2017	9:06	MW391	URGA	366.54	30.07	0.00	39.68	326.86	39.68	326.86
7/26/2017	9:09	MW392	LRGA	365.67	30.07	0.00	38.84	326.83	38.84	326.83
7/26/2017	9:07	MW393	UCRS	366.59	30.07	0.00	26.19	340.40	26.19	340.40
7/26/2017	9:15	MW394	URGA	378.32	30.07	0.00	51.22	327.10	51.22	327.10
7/26/2017	9:13	MW395	LRGA	379.01	30.07	0.00	51.86	327.15	51.86	327.15
7/26/2017	9:14	MW396	UCRS	378.64	30.07	0.00	10.31	368.33	10.31	368.33
7/26/2017	9:17	MW397	LRGA	386.90	30.07	0.00	59.85	327.05	59.85	327.05
7/26/2017	9:11	MW418	URGA	366.78	30.07	0.00	39.87	326.91	39.87	326.91
7/26/2017	9:10	MW419	LRGA	366.68	30.07	0.00	39.83	326.85	39.83	326.85

Initial Barometric Pressure 30.07
Elev = elevation
amsl = above mean sea level
BP = barometric pressure
DTW = depth to water in feet below datum
URGA = Upper Regional Gravel Aquifer
LRGA = Lower Regional Gravel Aquifer
UCRS = Upper Continental Recharge System
*Assumes a barometric efficiency of 1.0



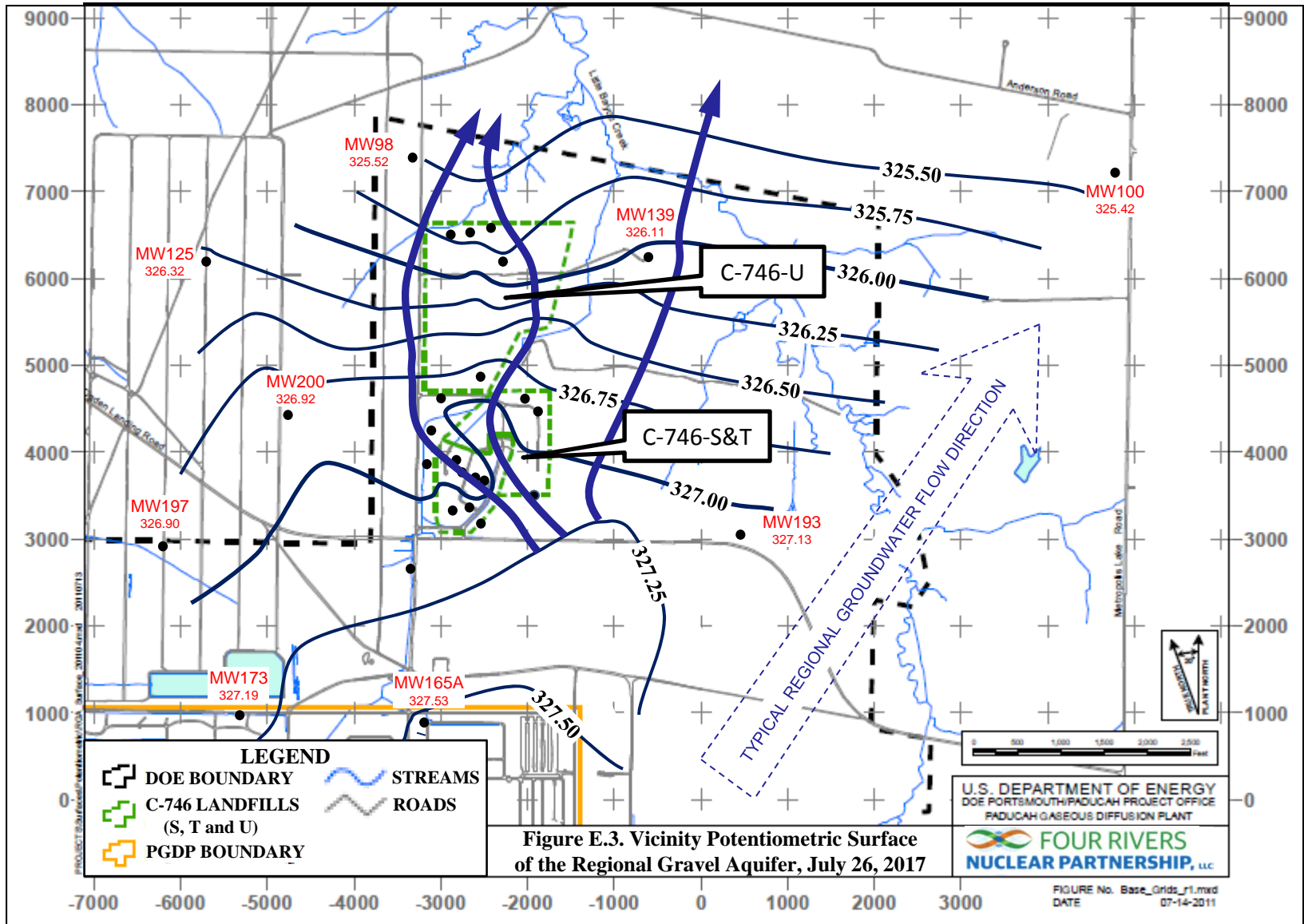


Table E.2. C-746-S&T Landfills Hydraulic Gradients

	ft/ft
Beneath Landfill Mound	3.25×10^{-4}
Vicinity	3.66×10^{-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	0.236	8.32×10^{-5}	0.942	3.33×10^{-4}
425	0.150	0.138	4.87×10^{-5}	0.552	1.95×10^{-4}
<u>Vicinity</u>					
725	0.256	0.266	9.38×10^{-5}	1.06	3.75×10^{-4}
425	0.150	0.156	5.49×10^{-5}	0.623	2.20×10^{-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 third quarter 2017 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.

8/28/2017

**Fluor Federal Services
PROJECT ENVIRONMENTAL MEASUREMENTS SYSTEM
C-746-S and -T LANDFILLS
PERMIT NUMBERS 073-00014 and 073-00015
MAXIMUM CONTAMINANT LEVEL (MCL) EXCEEDANCE REPORT
Quarterly Groundwater Sampling**

AKGWA	Station	Analysis	Method	Results	Units	MCL
8004-4818	MW370	Beta activity	9310	84.6	pCi/L	50
8004-4808	MW372	Trichloroethene	8260B	5.69	ug/L	5
8004-4792	MW373	Trichloroethene	8260B	6.52	ug/L	5
8004-4809	MW384	Beta activity	9310	90.6	pCi/L	50
8004-4810	MW385	Beta activity	9310	116	pCi/L	50
8004-4815	MW387	Beta activity	9310	130	pCi/L	50
8004-4816	MW388	Beta activity	9310	103	pCi/L	50
8004-4805	MW391	Trichloroethene	8260B	7.77	ug/L	5
8004-4806	MW392	Trichloroethene	8260B	15.6	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 and 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							*						*										
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Quarter 3, 2005			*				*			*									*				
Quarter 4, 2005			*				*				*												
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Quarter 2, 2006			*				*																
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Quarter 1, 2007							*										*						
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Quarter 4, 2007							*																
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Quarter 2, 2008											*												
Quarter 4, 2008							*																
Quarter 1, 2009			*				*				*												
Quarter 1, 2010			*				*				*												
Quarter 2, 2010			*				*				*												
Quarter 3, 2010			*				*				*		*		*		*						
Quarter 1, 2011							*				*												
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Quarter 4, 2014			*																				
Quarter 1, 2016							*																
Quarter 2, 2016													*										
Quarter 1, 2017							*																
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 and 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										■		■	■				■		■	■				
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Quarter 4, 2016										■	■	■	■				■		■	■				
Quarter 1, 2017										■		■	■				■		■	■				
Quarter 2, 2017										■		■	■				■	■	■	■				
Quarter 3, 2017										■		■	■				■	■	■	■				
BROMIDE																								
Quarter 1, 2003			*																					
Quarter 4, 2003			*																					
Quarter 1, 2004			*																					

Chart of MCL and Historical UTL Exceedances for the C-746-S and 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																							
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Quarter 1, 2004			*									*		*						*			
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Quarter 4, 2004			*									*								*			
Quarter 1, 2005												*								*			
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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 and 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												*		*									
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CARBON DISULFIDE																							
Quarter 4, 2010												*											
Quarter 1, 2011												*										*	
Quarter 2, 2017														*									
CHEMICAL OXYGEN DEMAND																							
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Quarter 2, 2015																	*						
Quarter 3, 2015															*								
Quarter 3, 2016			*								*												
Quarter 4, 2016																	*						
Quarter 2, 2017								*															
Quarter 3, 2017	*														*								

Chart of MCL and Historical UTL Exceedances for the C-746-S and 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			*																				
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Quarter 2, 2005			*																				
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Quarter 1, 2006																		*					
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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			*																				
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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 and 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												*							*				
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 and 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												*		*	*				*				
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 and 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 and 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												*		*								*	
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 and 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	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
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 and 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				*			*	*	*										*				
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 and 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 and 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								*		*	*	*	*	*	*		*	*	*	*	*	*	

Chart of MCL and Historical UTL Exceedances for the C-746-S and 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			*							*	*	*	*				*	*	*	*			

Chart of MCL and Historical UTL Exceedances for the C-746-S and 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 and 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																								
Quarter 1, 2004																								
Quarter 2, 2004																								
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Quarter 4, 2016																								
Quarter 1, 2017																								
Quarter 2, 2017																								
Quarter 3, 2017																								

Chart of MCL and Historical UTL Exceedances for the C-746-S and T Landfills (Continued)

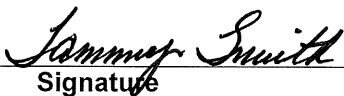
Groundwater Flow System	UCRS					URGA										LRGA							
	S	D	D	D	U	S	S	S	S	S	D	D	D	D	U	U	S	D	D	D	D	U	U
Monitoring Well	386	389	390	393	396	221	222	223	224	384	369	372	387	391	220	394	385	370	373	388	392	395	397
TURBIDITY																							
Quarter 4, 2002																						*	
Quarter 1, 2003						*						*		*									
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																							
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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C-746-S & T LANDFILL METHANE MONITORING REPORT

Date:	9/11/2017	Time:	13:05	Monitor:	Tammy Smith													
Weather Conditions: Partly Cloudy with 74 degrees, winds out of the NE at 13 mph																		
Monitoring Equipment: RAE System, Multi-RAE, Serial# 4497-5																		
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 THE VENT																		
Performed by:																		
				9/11/2017														
Signature				Date														

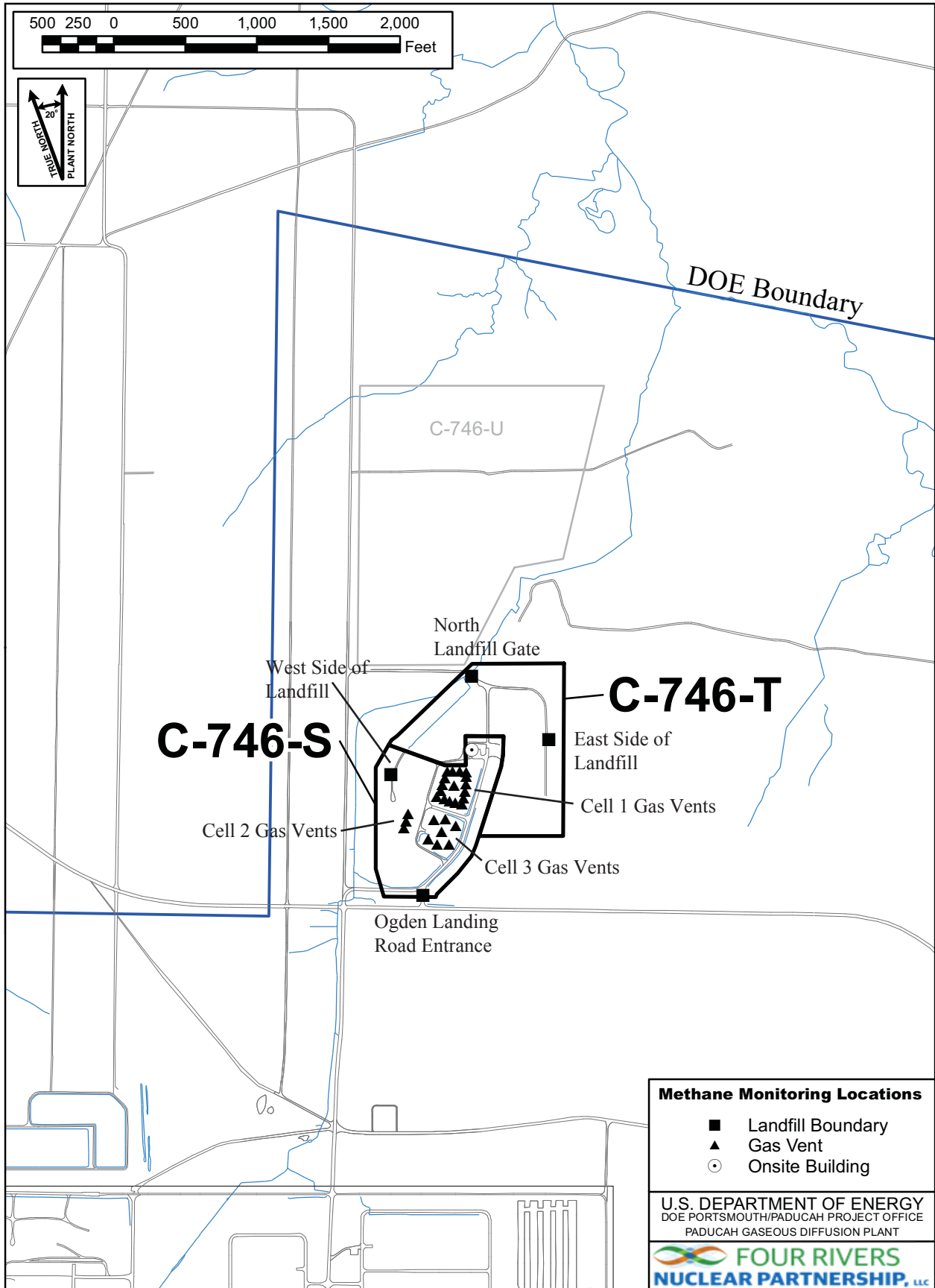


Figure H.1. C-746-S&T Methane Monitoring Locations

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)				7/5/2017 14:14	7/5/2017 13:56	NA							
Duplicate ("Y" or "N") ¹				N	N	N							
Split ('Y' or "N") ²				N	N	N							
Facility Sample ID Number (if applicable)				L135SS4-17	L154US4-17	NA							
Laboratory Sample ID Number (if applicable)				427267001	427264002	NA							
Date of Analysis (Month/Day/Year)				7/14/2017	7/14/2017	NA							
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	0.17		0.17		*			
16887-00-6	2	Chloride(s)	T	MG/L	300.0	4.34		1.73		*			
14808-79-8	0	Sulfate	T	MG/L	300.0	7.02		1.75		*			
7439-89-6	0	Iron	T	MG/L	200.8	0.591		0.899		*			
7440-23-5	0	Sodium	T	MG/L	200.8	3.72		1.02		*			
S0268- -	0	Organic Carbon ⁶	T	MG/L	9060	18		17.2		*			
S0097- -	0	BOD ⁶	T	MG/L	not applicable		*		*	*			
S0130- -	0	Chemical Oxygen Demand	T	MG/L	410.4	78.3		108		*			

3-1

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	189		58			*		
S0270- -	0	Total Suspended Solids	T	mg/L	160.2	40.8	*	35.6	*		*		
S0266- -	0	Total Dissolved Solids	T	mg/L	160.1	157	*	143	*		*		
S0269- -	0	Total Solids	T	mg/L	SM-2540 B 17	196		138			*		
S0296- -	0	pH	T	Units	Field	7.49		7.27			*		
7440-61-1		Uranium	T	mg/L	200.8	0.00388		0.000414			*		
12587-46-1		Gross Alpha (α)	T	pCi/L	9310	11.8	*	6.27	*		*		
12587-47-2		Gross Beta (β)	T	pCi/L	9310	39.6	*	6.61	*		*		

I-4

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	L135SS4-17	Biochemical Oxygen Demand (BOD)		Analysis of constituent not required and not performed.
		Suspended Solids	*	Duplicate analysis not within control limits.
		Dissolved Solids	*	Duplicate analysis not within control limits.
		Alpha activity		TPU is 7.85. Rad error is 7.59.
		Beta activity		TPU is 11.4. Rad error is 9.34.
L154	L154US4-17	Biochemical Oxygen Demand (BOD)		Analysis of constituent not required and not performed.
		Suspended Solids	*	Duplicate analysis not within control limits.
		Dissolved Solids	*	Duplicate analysis not within control limits.
		Alpha activity	*	TPU is 5.97. Rad error is 5.88.
		Beta activity	*	TPU is 5.64. Rad error is 5.53.
L136		Flow Rate		Insufficient flow to collect a sample.
		Chloride		Insufficient flow to collect a sample.
		Sulfate		Insufficient flow to collect a sample.
		Iron		Insufficient flow to collect a sample.
		Sodium		Insufficient flow to collect a sample.
		Total Organic Carbon (TOC)		Insufficient flow to collect a sample.
		Biochemical Oxygen Demand (BOD)		Insufficient flow to collect a sample.
		Chemical Oxygen Demand (COD)		Insufficient flow to collect a sample.
		Conductivity		Insufficient flow to collect a sample.
		Suspended Solids		Insufficient flow to collect a sample.
		Dissolved Solids		Insufficient flow to collect a sample.
		Total Solids		Insufficient flow to collect a sample.
		pH		Insufficient flow to collect a sample.
		Uranium		Insufficient flow to collect a sample.
		Alpha activity		Insufficient flow to collect a sample.
Beta activity		Insufficient flow to collect a sample.		

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