



Department of Energy

Portsmouth/Paducah Project Office
1017 Majestic Drive, Suite 200
Lexington, Kentucky 40513
(859) 219-4000

FEB 27 2017

Ms. Robin Green
Division of Waste Management
Kentucky Department for Environmental Protection
300 Sower Boulevard, 2nd Floor
Frankfort, Kentucky 40601

PPPO-02-4037377-17A

Mr. Todd Hendricks
Division of Waste Management
Kentucky Department for Environmental Protection
300 Sower Boulevard, 2nd Floor
Frankfort, Kentucky 40601

Mr. Allan Shingleton
Division of Waste Management
Kentucky Department for Environmental Protection
625 Hospital Drive
Madisonville, Kentucky 42431

Dear Ms. Green, Mr. Hendricks, and Mr. Shingleton:

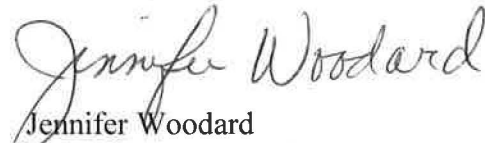
C-746-S&T LANDFILLS FOURTH QUARTER CALENDAR YEAR 2016 (OCTOBER–DECEMBER) COMPLIANCE MONITORING REPORT, PADUCAH GASEOUS DIFFUSION PLANT, PADUCAH, KENTUCKY, FPDP-RPT-0026/V4, PERMIT NUMBER SW07300014, SW07300015, SW07300045

Enclosed is the subject report for Fourth Quarter Calendar Year (CY) 2016. This report is required in accordance with Condition ACTV0006, Special Condition Number 3, of the C-746-S&T Solid Waste Landfill Permit Number (No.) 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 Fourth Quarter CY 2016 monitoring well data collected from the C-746-S&T Landfills were performed in accordance with Condition GSTR0001, 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 Fourth Quarter CY 2016, in accordance with Condition GSTR0003, Standard Requirement 8, of the C-746-S&T Solid Waste Landfill Permit No. 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 Fourth Quarter CY 2016 Compliance Monitoring Report

e-copy w/enclosure:

april.webb@ky.gov, KDEP/Frankfort

brian.begley@ky.gov, KDEP/Frankfort

christopher.jung@ky.gov, KDEP/Frankfort

dave.dollins@lex.doe.gov, PPPO/PAD

edward.winner@ky.gov, KDEP/Frankfort

ffscorrespondence@ffspaducah.com, FFS/Kevil

gaye.brewer@ky.gov, KDEP/PAD

jennifer.blewett@ffspaducah.com, FFS/Kevil

jennifer.watson@ffspaducah.com, FFS/Kevil

jennifer.woodard@lex.doe.gov, PPPO/PAD

joseph.towarnicky@ffspaducah.com, FFS/Kevil

karen.walker@ffspaducah.com, FFS/Kevil

kelly.layne@ffspaducah.com, FFS/Kevil

ken.davis@ffspaducah.com, FFS/Kevil

kim.knerr@lex.doe.gov, PPPO/PAD

leo.williamson@ky.gov, KDEP/Frankfort

lisa.crabtree@ffspaducah.com, FFS/Kevil

mike.guffey@ky.gov, KDEP/Frankfort

myrna.redfield@ffspaducah.com, FFS/Kevil

stephaniec.brock@ky.gov, KYRHB/Frankfort

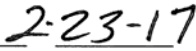
tracey.duncan@lex.doe.gov, PPPO/PAD

**C-746-S&T Landfills
Fourth Quarter Calendar Year 2016
(October–December)
Compliance Monitoring Report,
Paducah Gaseous Diffusion Plant,
Paducah, Kentucky**



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FPDP Classification Support


Date

**C-746-S&T Landfills
Fourth Quarter Calendar Year 2016
(October-December)
Compliance Monitoring Report,
Paducah Gaseous Diffusion Plant,
Paducah, Kentucky**

Date Issued—February 2017

U.S. DEPARTMENT OF ENERGY
Office of Environmental Management

Prepared by
FLUOR FEDERAL SERVICES, INC.,
Paducah Deactivation Project
managing the
Deactivation Project at the
Paducah Gaseous Diffusion Plant
under Task Order DE-DT0007774

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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 Fourth Quarter Calendar Year 2016 (October–December) 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

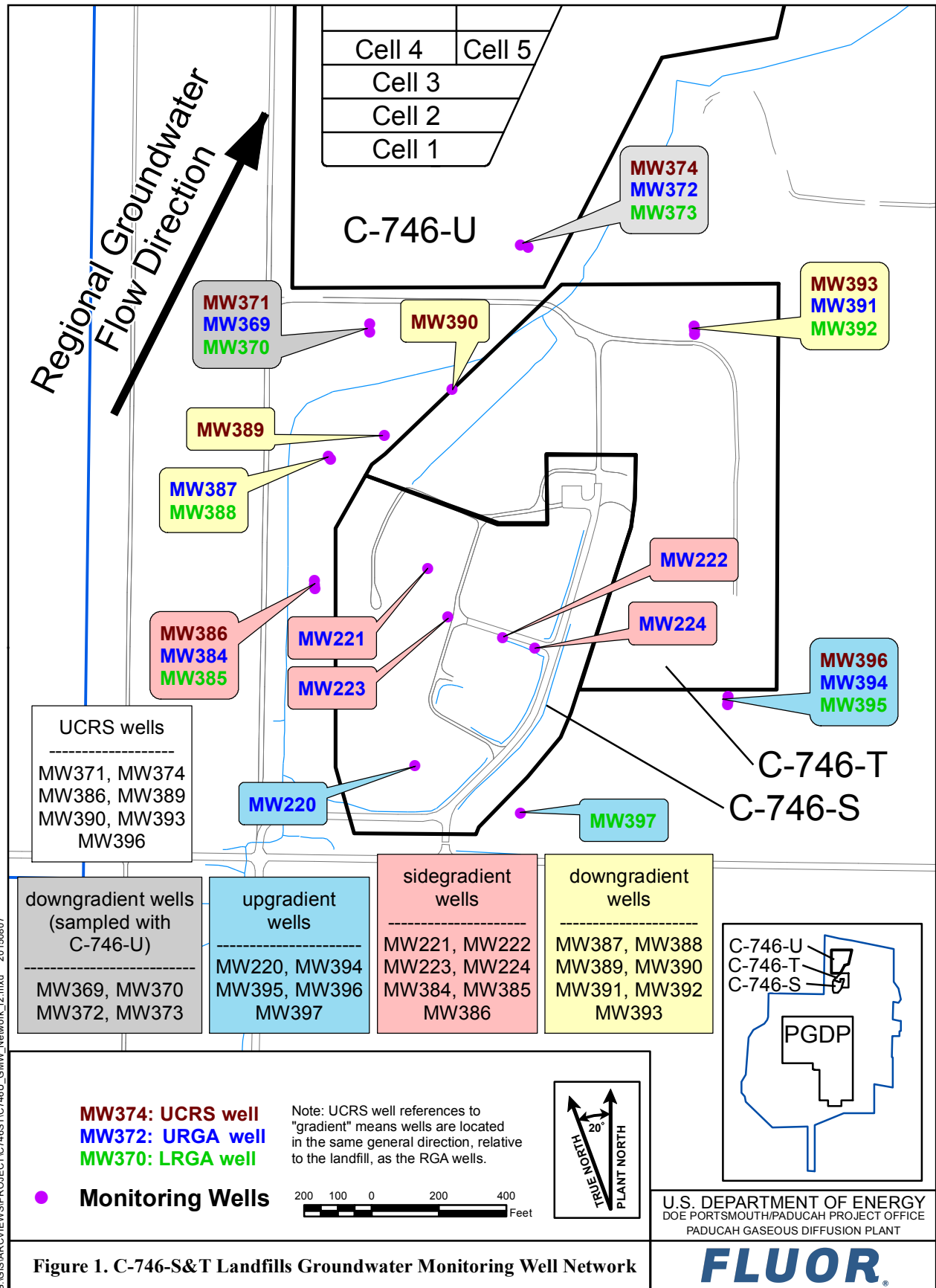
The C-746-S&T Landfills are closed, solid waste landfills located north of the Paducah Gaseous Diffusion Plant (PGDP) and south of the C-746-U Landfill. Construction and operation of the C-746-S Residential Landfill were permitted in April 1981 under Solid Waste Landfill Permit Number 073-00014. The 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 samples; therefore, there are no analytical results for this location.



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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 the UCRS water quality. Similarly, other gradient references for UCRS wells are identified using the RGA wells located in the same direction (relative to the landfill) as nearby UCRS 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 fourth quarter 2016 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 October 25 and 26, 2016, 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. The hydraulic gradient for the RGA in the vicinity of the C-746-S&T Landfills in October was 4.89×10^{-4} ft/ft, while the gradient beneath the C-746-S&T Landfills was 4.76×10^{-4} ft/ft. Calculated groundwater flow rates (average linear velocities) for the RGA at the C-746-S&T Landfills range from 0.809 to 1.38 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 December 5, 2016. 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) that are 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.

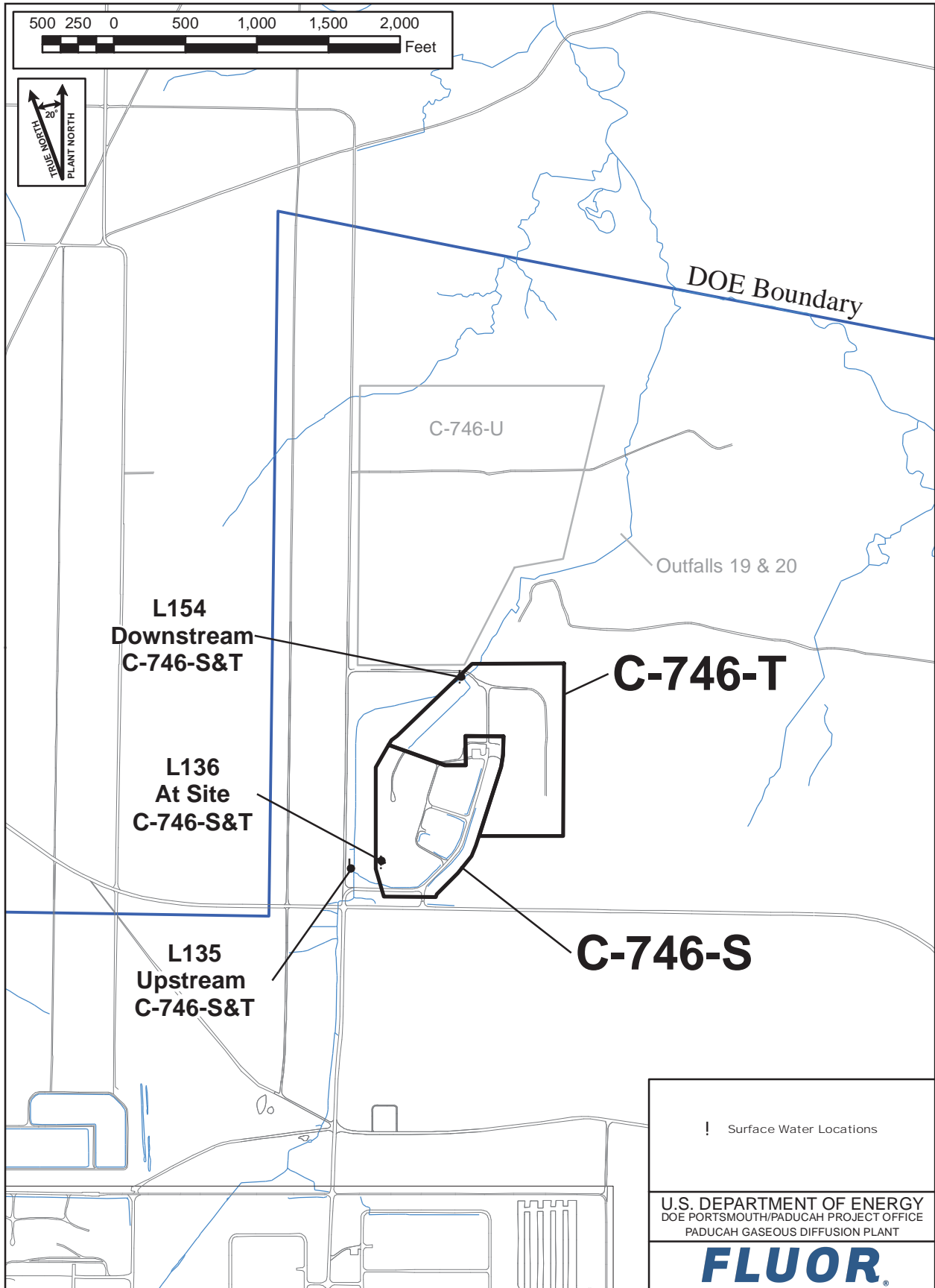


Figure 2. C-746-S&T Landfills Surface Water Monitoring Locations

Location L136 could not be sampled due to insufficient flow during the reporting period. 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 fourth quarter 2016, 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	MW369: Beta activity	MW373: Trichloroethene
	MW372: Trichloroethene	MW385: Beta activity
	MW384: Beta activity	MW388: Beta activity
	MW387: Beta activity	MW392: Trichloroethene
	MW391: Trichloroethene	
	MW394: 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, and MW391 (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 trichloroethene in MW392 and beta activity in MW369, 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. MW392, MW369, MW387, and MW388 had no increasing Mann-Kendall trend for TCE or beta activity, and are considered to be Type 1 exceedances (not attributable to the landfill).

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: Oxidation-reduction potential, radium-226	MW220: Oxidation-reduction potential, radium-226, sulfate	MW370: Oxidation-reduction potential, sulfate
MW390: Oxidation-reduction potential, radium-226, technetium-99	MW221: Radium-226	MW373: Calcium, conductivity, dissolved solids, magnesium, oxidation-reduction potential, sulfate
MW393: Oxidation-reduction potential	MW222: Oxidation-reduction potential	MW385: Beta activity, ^a chemical oxygen demand, oxidation-reduction potential, sulfate, technetium-99
MW396: Oxidation-reduction potential	MW223: Oxidation-reduction potential	MW388: Beta activity, ^a oxidation-reduction potential, radium-226, sulfate, technetium-99
	MW224: Radium-226	MW392: Oxidation-reduction potential, trichloroethene
	MW369: Beta activity, ^a technetium-99	MW395: Oxidation-reduction potential, radium-226
	MW372: Calcium, dissolved solids, magnesium, sulfate	MW397: Oxidation-reduction potential
	MW384: Beta activity, ^a oxidation-reduction potential, sulfate, technetium-99	
	MW387: Beta activity, ^a oxidation-reduction potential, radium-226, sulfate, technetium-99	
	MW391: Magnesium, sulfate	

*Gradients in the UCRS are downward. UCRS gradient designations refer to locations of wells in the same direction, relative to the landfill as the 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,^b MW397

^a Beta activity has an MCL; the exceedances of the MCL were subjected to a comparison against the statistically derived historical background.

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

Table 3. Exceedances of Current Background UTL in Downgradient Wells

URGA	LRGA
MW369: Beta activity, technetium-99	MW370: Sulfate
MW372: Calcium, dissolved solids, magnesium, sulfate	MW373: Calcium, conductivity, dissolved solids, magnesium, sulfate
MW387: Beta activity, sulfate, technetium-99	MW388: Beta activity, sulfate, technetium-99
MW391: Magnesium, sulfate	MW392: Trichloroethene

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	Beta Activity	8	0.05	0.452	2.000	0.000	0.450	0.071	No Trend
		Technetium-99	8	0.05	0.548	0.000	0.000	-0.050	0.000	No Trend
	MW370	Sulfate	8	0.05	0.500	1.000	64.33	0.050	0.036	No Trend
	MW372	Calcium	8	0.05	0.089	-12.00	0.000	-1.450	-0.429	No Trend
		Dissolved Solids	8	0.05	0.360	-4.000	0.000	-3.500	-0.143	No Trend
		Magnesium	8	0.05	0.054	-14.00	0.000	-0.855	-0.500	No Trend
		Sulfate	8	0.05	0.023	-17.00	64.33	-7.267	-0.618	Negative Trend
	MW373	Calcium	8	0.05	0.016	-18.00	0.000	-1.550	-0.643	Negative Trend
		Conductivity	8	0.05	0.016	-18.00	0.000	-31.00	-0.643	Negative Trend
		Dissolved Solids	8	0.05	0.360	-4.000	0.000	-1.967	-0.143	No Trend
		Magnesium	8	0.05	0.007	-20.00	0.000	-0.850	-0.714	Negative Trend
		Sulfate	8	0.05	0.007	-20.00	0.000	-0.714	-10.37	Negative Trend
	MW387	Beta Activity	8	0.05	0.138	-10.00	0.000	-7.000	-0.357	No Trend
		Sulfate	8	0.05	0.452	-2.000	0.000	-0.475	-0.071	No Trend
		Technetium-99	8	0.05	0.452	-2.000	0.000	-5.458	-0.071	No Trend
	MW388	Beta Activity	8	0.05	0.199	8.000	0.000	4.155	0.286	No Trend
		Sulfate	8	0.05	0.227	-7.000	64.33	-0.212	-0.255	No Trend
		Technetium-99	8	0.05	0.031	16.00	0.000	11.40	0.571	Positive Trend
	MW391	Magnesium	8	0.05	0.031	16.00	0.000	0.742	0.571	Positive Trend
		Sulfate	8	0.05	0.016	18.00	0.000	6.432	0.643	Positive Trend
MW392	Trichloroethene	8	0.05	0.089	12.00	0.000	0.377	0.429	No Trend	

Footnotes:

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

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

³The 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.

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

⁵The 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.

⁶Kendall'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.

⁷The 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 Version 2015

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.

Those constituents listed in Table 3 exceed both the historical UTL and the current UTL and preliminarily are considered to be a Type 2 exceedance per the approved Groundwater Monitoring Plan. To evaluate these preliminary Type 2 exceedances further, the parameters were subjected to the Mann-Kendall statistical test for trend using the most recent eight quarters of data. The results are summarized in Table 4. All but three of these preliminary Type 2 exceedances in downgradient wells—technetium-99 in MW388, magnesium in MW391, and sulfate in MW391—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 technetium-99 in MW388 over the past eight quarters. In accordance with the Groundwater Monitoring Plan, this is considered a Type 2 exceedance (source unknown). The source of the trend is believed to be unrelated to the C-746-S&T Landfills for the following reasons:

- There is a known upgradient regional source of technetium-99 associated with the technetium-99 Northwest Plume;
- Although the deeper (LRGA) MW388 shows an increasing trend, the shallower, collocated (URGA) well, MW387, does not show the increasing Mann-Kendall trend for technetium-99 (refer to Table 4); and
- The recent technetium-99 in MW388 is within the range of historical levels (0.493–228 pCi/L) of technetium-99 since 2002.

The Mann-Kendall statistical test indicates that there is an increasing trend of magnesium and sulfate in MW391 over the past eight quarters. In accordance with the Groundwater Monitoring Plan, these are considered Type 2 exceedances (source unknown). The source of the trends is believed to be unrelated to the C-746-S&T Landfills because the adjacent URGA well, MW372, does not show the increasing Mann-Kendall trends (refer to Table 4). In addition, the source of magnesium and sulfate in this well may be associated with non-landfill alternative sources that simultaneously could increase sulfate, dissolved solids, specific conductivity, calcium, and magnesium—all of which have similar concentration fluctuations over the past eight quarters.

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. 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).

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

UCRS
MW390: Technetium-99

All MCL and UTL exceedances, except for the listed parameters—technetium-99 in MW388; magnesium and sulfate in MW391, reported for this quarter were evaluated and considered to be Type 1 exceedances—not attributable to the C-746-S&T Landfills. The increasing trends for these listed parameters do not appear to be landfill-related, given the data collected to date. The listed parameters will continue to be evaluated in the context of these observations.

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2. DATA EVALUATION/STATISTICAL SYNOPSIS

The statistical analyses conducted on the fourth quarter 2016 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.

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 was conducted. The test well results were 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, 29 parameters, including those with MCLs, required statistical analysis in the UCRS. During the fourth quarter, 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, 33 parameters, including those with MCLs, required statistical analysis in the URGA. During the fourth quarter, beta activity, calcium, dissolved solids, magnesium, oxidation-reduction potential, radium-226, sulfate, and technetium-99 displayed concentrations that exceeded their respective historical UTLs and are listed in Table 2. Beta activity, calcium, 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, 30 parameters, including those with MCLs, required statistical analysis in the LRGA. During the fourth quarter, beta activity, calcium, chemical oxygen demand, conductivity, dissolved solids, magnesium, oxidation-reduction potential, radium-226, sulfate, technetium-99, and trichloroethene displayed concentrations that exceeded their respective historical UTL and are listed in Table 2. Beta activity, calcium, conductivity, dissolved solids, magnesium, sulfate, technetium-99, and trichloroethene 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. A result has been considered a nondetect, if it has a “U” validation code.

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 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
Fourth Quarter Calendar Year 2016 (October–December)
Compliance Monitoring Report,
Paducah Gaseous Diffusion Plant,
Paducah, Kentucky (FPDP-RPT-0026/V4)*

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



PG 113927
K.R. Davis
2/23/17

Kenneth R. Davis
Kenneth R. Davis

PG113927

February 23, 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, 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*, Paducah Remediation Services, LLC, Kevil, KY, June.

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APPENDIX A

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

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

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

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

Permit No: SW07300014, Finds/Unit No: _____ Quarter & Year 4th Qtr. CY 2016
SW07300015,
SW07300045


Please check the following as applicable:

 Characterization X Quarterly Semiannual Annual Assessment

Please check applicable submittal(s): X Groundwater X Surface Water
 Leachate X Methane Monitoring

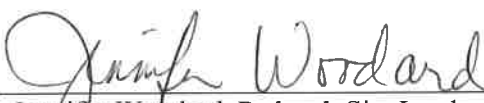
This form is to be utilized by those sites required by regulation (Kentucky Waste Management Regulations-401 KAR 48:300 and 45:160) or by statute (Kentucky Revised Statues Chapter 224) to conduct groundwater and surface water monitoring under the jurisdiction of the Division of Waste Management. **You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

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



Bobby D. Smith, Program Manager
Fluor Federal Services, Inc.

2/27/2017
Date



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

2/27/2017
Date

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APPENDIX B
FACILITY INFORMATION SHEET

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FACILITY INFORMATION SHEET

Groundwater: October 2016
Surface Water: November 2016
Methane: December 2016

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: Myrna E. Redfield Phone No: (270) 441-5113

Contact Person Title: Director, Environmental Management, Fluor Federal Services, Inc.

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)	10/10/2016 13:50	10/12/2016 13:08	10/13/2016 08:25	10/13/2016 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)	MW220SG1-17	MW221SG1-17	MW222SG1-17	MW223SG1-17								
Laboratory Sample ID Number (if applicable)	407701003	408036001	408199001	408199003								
Date of Analysis (Month/Day/Year) For <u>Volatile Organics</u> Analysis	10/12/2016	10/18/2016	10/19/2016	10/19/2016								
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	0.22		0.426		0.435		0.429	
16887-00-6	Chloride(s)	T	mg/L	9056	21.9		31.5		31.5		29.8	
16984-48-8	Fluoride	T	mg/L	9056	0.169		0.168		0.234		0.215	
S0595- -	Nitrate & Nitrite	T	mg/L	9056	1.16		1.01		0.999		1.06	
14808-79-8	Sulfate	T	mg/L	9056	18.7		14.1		12		14.7	
NS1894	Barometric Pressure Reading	T	Inches/Hg	Field	30.3		30.12		30.27		30.25	
S0145- -	Specific Conductance	T	µMHO/cm	Field	348		381		371		420	

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

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

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

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

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

⁵"T" = Total; "D" = Dissolved

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

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

RESIDENTIAL/INERT-QUARTERLY

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

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

GROUNDWATER SAMPLE ANALYSIS - (Cont.)

AKGWA NUMBER ¹ , Facility Well/Spring Number					8000-5201	8000-5202	8000-5242	8000-5243				
Facility's Local Well or Spring Number (e.g., MW-1, MW-2, BLANK-F, etc.)					220	221	222	223				
CAS RN ⁴	CONSTITUENT	T D 5	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S
S0906 - -	Static Water Level Elevation	T	Ft. MSL	Field	325.87		325.75		325.61		325.73	
N238	Dissolved Oxygen	T	mg/L	Field	4.96		4.28		3.35		4.18	
S0266- -	Total Dissolved Solids	T	mg/L	160.1	187		213		130	*	140	*
S0296- -	pH	T	Units	Field	6.14		6.22		6.4		6.31	
NS215	Eh	T	mV	Field	414		378		424		429	
S0907 - -	Temperature	T	°C	Field	18.5		18.78		15.72		15.28	
7429-90-5	Aluminum	T	mg/L	6020	0.036	J	<0.05		0.0376	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	0.205		0.227		0.282		0.231	
7440-41-7	Beryllium	T	mg/L	6020	<0.0005		<0.0005		<0.0005		<0.0005	
7440-42-8	Boron	T	mg/L	6020	0.00859	J	0.015		0.00899	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	20.5		21.2		18.2		21	
7440-47-3	Chromium	T	mg/L	6020	0.00408	J	<0.01		<0.01		0.0234	
7440-48-4	Cobalt	T	mg/L	6020	0.000263	J	0.000119	J	0.000563	J	0.000464	J
7440-50-8	Copper	T	mg/L	6020	0.000966	J	0.000658	J	0.00048	J	0.00108	
7439-89-6	Iron	T	mg/L	6020	0.0847	J	0.044	J	<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	8.7		9.57		8.37		9.07	
7439-96-5	Manganese	T	mg/L	6020	0.00203	J	<0.005		0.00326	J	0.00249	J
7439-97-6	Mercury	T	mg/L	7470	<0.0002		<0.0002		<0.0002		<0.0002	

C4

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	0.000626		0.00127		0.000326	J	0.00613	
7440-02-0	Nickel	T	mg/L	6020	0.0256		0.00712		0.0482		0.174	
7440-09-7	Potassium	T	mg/L	6020	2.73		1.22		0.609		1.72	
7440-16-6	Rhodium	T	mg/L	6020	<0.005		<0.005		<0.005		<0.005	
7782-49-2	Selenium	T	mg/L	6020	<0.005		<0.005		<0.005		<0.005	
7440-22-4	Silver	T	mg/L	6020	<0.001		<0.001		<0.001		<0.001	
7440-23-5	Sodium	T	mg/L	6020	39.6		48.4		46.8		45.9	
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		0.00465	J	0.0047	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		<0.005	
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-5

RESIDENTIAL/INERT-QUARTERLY

Facility: US DOE - Paducah Gaseous Diffusion Plant

Permit Number: 073-00014 & 073-00015

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

LAB ID: None

For Official Use Only

GROUNDWATER SAMPLE ANALYSIS - (Cont.)

AKGWA NUMBER ¹ , Facility Well/Spring Number					8000-5201		8000-5202		8000-5242		8000-5243	
Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.)					220		221		222		223	
CAS RN ⁴	CONSTITUENT	T D 5	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S
75-27-4	Bromodichloromethane	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
75-25-2	Tribromomethane	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
74-83-9	Methyl bromide	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
78-93-3	Methyl ethyl ketone	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
110-57-6	trans-1,4-Dichloro-2-butene	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
75-15-0	Carbon disulfide	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
75-00-3	Chloroethane	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
67-66-3	Chloroform	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
74-87-3	Methyl chloride	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
156-59-2	cis-1,2-Dichloroethene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
74-95-3	Methylene bromide	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
75-34-3	1,1-Dichloroethane	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
107-06-2	1,2-Dichloroethane	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
75-35-4	1,1-Dichloroethylene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
106-93-4	Ethane, 1,2-dibromo	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
79-34-5	Ethane, 1,1,2,2-Tetrachloro	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
71-55-6	Ethane, 1,1,1-Trichloro-	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
79-00-5	Ethane, 1,1,2-Trichloro	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
630-20-6	Ethane, 1,1,1,2-Tetrachloro	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
75-01-4	Vinyl chloride	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
127-18-4	Ethene, Tetrachloro-	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
79-01-6	Ethene, Trichloro-	T	mg/L	8260	0.00063	J	0.00051	J	<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					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	<0.00002		<0.0000201		<0.0000197		<0.0000198	
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	<0.0962		<0.0952		<0.0962		<0.098	
12674-11-2	PCB-1016	T	ug/L	8082	<0.0962		<0.0952		<0.0962		<0.098	
11104-28-2	PCB-1221	T	ug/L	8082	<0.0962		<0.0952		<0.0962		<0.098	
11141-16-5	PCB-1232	T	ug/L	8082	<0.0962		<0.0952		<0.0962		<0.098	
53469-21-9	PCB-1242	T	ug/L	8082	<0.0962		<0.0952		<0.0962		<0.098	
12672-29-6	PCB-1248	T	ug/L	8082	<0.0962		<0.0952		<0.0962		<0.098	

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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	<0.0962		<0.0952		<0.0962		<0.098	
11096-82-5	PCB-1260	T	ug/L	8082	<0.0962		<0.0952		<0.0962		<0.098	
11100-14-4	PCB-1268	T	ug/L	8082	<0.0962		<0.0952		<0.0962		<0.098	
12587-46-1	Gross Alpha	T	pCi/L	9310	-0.286	*	-1.05	*	1.7	*	0.844	*
12587-47-2	Gross Beta	T	pCi/L	9310	21.7	*	10.8	*	2.44	*	5.15	*
10043-66-0	Iodine-131	T	pCi/L			*		*		*		*
13982-63-3	Radium-226	T	pCi/L	AN-1418	1.15	*	0.603	*	0.306	*	0.31	*
10098-97-2	Strontium-90	T	pCi/L	905.0	-4.92	*	-0.35	*	-0.998	*	-1.1	*
14133-76-7	Technetium-99	T	pCi/L	Tc-02-RC	12.3	*	18	*	0.0157	*	3.25	*
14269-63-7	Thorium-230	T	pCi/L	Th-01-RC	-0.173	*	0.037	*	0.119	*	0.391	*
10028-17-8	Tritium	T	pCi/L	906.0	19.4	*	-174	*	-22.5	*	54.8	*
S0130- -	Chemical Oxygen Demand	T	mg/L	410.4	13.9	BJ	26.5	B	22.1	B	27.4	B
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	0.892	J	0.98	J	0.908	J	<2	
S0586- -	Total Organic Halides	T	mg/L	9020	0.00714	J	0.0101		<0.01		<0.01	

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

RESIDENTIAL/INERT-QUARTERLY

Facility: US DOE - Paducah Gaseous Diffusion Plant

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

LAB ID: None
 For Official Use Only

GROUNDWATER SAMPLE ANALYSIS (S)

AKGWA NUMBER ¹ , Facility Well/Spring Number	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)	10/11/2016 11:57	10/19/2016 08:55	10/19/2016 07:25	10/19/2016 09:42								
Duplicate ("Y" or "N") ²	N	N	N	N								
Split ("Y" or "N") ³	N	N	N	N								
Facility Sample ID Number (if applicable)	MW224SG1-17	MW369UG1-17	MW370UG1-17	MW372UG1-17								
Laboratory Sample ID Number (if applicable)	407843003	408780003	408780001	408717003								
Date of Analysis (Month/Day/Year) For <u>Volatile Organics</u> Analysis	10/13/2016	10/24/2016	10/24/2016	10/21/2016								
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	0.429		0.355		0.436		0.606	
16887-00-6	Chloride(s)	T	mg/L	9056	31.5		32.6		36.4		47.6	
16984-48-8	Fluoride	T	mg/L	9056	0.227		0.204		0.186		0.136	
S0595- -	Nitrate & Nitrite	T	mg/L	9056	0.645		0.466	*	1.11	*	0.0619	J
14808-79-8	Sulfate	T	mg/L	9056	13.6		5.97		19.7		76.5	
NS1894	Barometric Pressure Reading	T	Inches/Hg	Field	30.23		30.02		30		30.02	
S0145- -	Specific Conductance	T	µMHO/cm	Field	425		379		435		611	

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

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

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

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

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

⁵"T" = Total; "D" = Dissolved

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

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

RESIDENTIAL/INERT-QUARTERLY

Facility: US DOE - Paducah Gaseous Diffusion Plant

Permit Number: 073-00014 & 073-00015

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

LAB ID: None

For Official Use Only

GROUNDWATER SAMPLE ANALYSIS - (Cont.)

AKGWA NUMBER ¹ , Facility Well/Spring Number					8000-5244	8004-4820	8004-4818	8004-4808				
Facility's Local Well or Spring Number (e.g., MW-1, MW-2, BLANK-F, etc.)					224	369	370	372				
CAS RN ⁴	CONSTITUENT	T D 5	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S
S0906 - -	Static Water Level Elevation	T	Ft. MSL	Field	325.76		325.01		324.97		325	
N238	Dissolved Oxygen	T	mg/L	Field	3.91		3.01		4.01		1.78	
S0266- -	Total Dissolved Solids	T	mg/L	160.1	291		239		227		376	
S0296- -	pH	T	Units	Field	6.26		6.4		6.29		6.34	
NS215	Eh	T	mV	Field	395		365		402		242	
S0907 - -	Temperature	T	°C	Field	18.72		19.94		18.72		18.44	
7429-90-5	Aluminum	T	mg/L	6020	0.0176	J	0.0492	J	<0.05		0.119	
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		0.00179	J	0.00289	J
7440-39-3	Barium	T	mg/L	6020	0.22		0.387		0.222		0.0445	
7440-41-7	Beryllium	T	mg/L	6020	<0.0005		<0.0005		<0.0005		<0.0005	
7440-42-8	Boron	T	mg/L	6020	0.0197		0.0138	J	0.0304		0.901	
7440-43-9	Cadmium	T	mg/L	6020	<0.001		<0.001		<0.001		<0.001	
7440-70-2	Calcium	T	mg/L	6020	22.1		16.4		27.3		49.1	
7440-47-3	Chromium	T	mg/L	6020	<0.01		<0.01		<0.01		<0.01	
7440-48-4	Cobalt	T	mg/L	6020	0.00037	J	0.00601		0.000538	J	0.000377	J
7440-50-8	Copper	T	mg/L	6020	0.000369	J	0.00233		0.000723	J	<0.001	
7439-89-6	Iron	T	mg/L	6020	0.0855	BJ	0.185		0.097	J	0.983	
7439-92-1	Lead	T	mg/L	6020	<0.002		<0.002		<0.002		<0.002	
7439-95-4	Magnesium	T	mg/L	6020	9.86		7.1		11.7		19.6	
7439-96-5	Manganese	T	mg/L	6020	0.0048	J	0.0194		0.00648		0.0216	
7439-97-6	Mercury	T	mg/L	7470	<0.0002		<0.0002		<0.0002		<0.0002	

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RESIDENTIAL/INERT-QUARTERLY

Facility: US DOE - Paducah Gaseous Diffusion Plant

Permit Number: 073-00014 & 073-00015

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

LAB ID: None

For Official Use Only

GROUNDWATER SAMPLE ANALYSIS - (Cont.)

AKGWA NUMBER ¹ , Facility Well/Spring Number					8000-5244	8004-4820	8004-4818	8004-4808				
Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.)					224	369	370	372				
CAS RN ⁴	CONSTITUENT	T D 5	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S
7439-98-7	Molybdenum	T	mg/L	6020	0.000474	J	<0.0005		<0.0005		0.000422	J
7440-02-0	Nickel	T	mg/L	6020	0.00341		0.00654		0.000813	J	0.000724	J
7440-09-7	Potassium	T	mg/L	6020	0.815		0.489		2.44		2.14	
7440-16-6	Rhodium	T	mg/L	6020	<0.005		<0.005		<0.005		<0.005	
7782-49-2	Selenium	T	mg/L	6020	<0.005		<0.005		<0.005		<0.005	
7440-22-4	Silver	T	mg/L	6020	<0.001		<0.001		<0.001		<0.001	
7440-23-5	Sodium	T	mg/L	6020	56.5		52.2		40.1		49.7	
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		<0.01		<0.01	
7440-66-6	Zinc	T	mg/L	6020	<0.01		<0.01		<0.01		0.00412	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		0.00069	J
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		0.00095	J	0.00124		<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		0.00456		0.00478		0.00706	

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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		<0.0000197		<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	<0.0943		<0.098		0.0752	J	0.0366	J
12674-11-2	PCB-1016	T	ug/L	8082	<0.0943		<0.098		<0.098		<0.0971	
11104-28-2	PCB-1221	T	ug/L	8082	<0.0943		<0.098		<0.098		<0.0971	
11141-16-5	PCB-1232	T	ug/L	8082	<0.0943		<0.098		<0.098		<0.0971	
53469-21-9	PCB-1242	T	ug/L	8082	<0.0943		<0.098		0.0752	J	0.0366	J
12672-29-6	PCB-1248	T	ug/L	8082	<0.0943		<0.098		<0.098		<0.0971	

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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	<0.0943		<0.098		<0.098		<0.0971	
11096-82-5	PCB-1260	T	ug/L	8082	<0.0943		<0.098		<0.098		<0.0971	
11100-14-4	PCB-1268	T	ug/L	8082	<0.0943		<0.098		<0.098		<0.0971	
12587-46-1	Gross Alpha	T	pCi/L	9310	-0.212	*	0.37	*	0.356	*	2.28	*
12587-47-2	Gross Beta	T	pCi/L	9310	5.36	*	57	*	19.1	*	9.61	*
10043-66-0	Iodine-131	T	pCi/L			*		*		*		*
13982-63-3	Radium-226	T	pCi/L	AN-1418	0.653	*	0.334	*	0.198	*	0.685	*
10098-97-2	Strontium-90	T	pCi/L	905.0	-0.741	*	7.2	*	-0.131	*	0.162	*
14133-76-7	Technetium-99	T	pCi/L	Tc-02-RC	5.9	*	83.3	*	31.7	*	10.3	*
14269-63-7	Thorium-230	T	pCi/L	Th-01-RC	0.421	*	0.0272	*	3.05	*	0.286	*
10028-17-8	Tritium	T	pCi/L	906.0	57.8	*	106	*	61.9	*	95.9	*
S0130- -	Chemical Oxygen Demand	T	mg/L	410.4	18.5	BJ	23		21.2		15.8	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	1.07	J	0.958	J	1.36	J	2.57	
S0586- -	Total Organic Halides	T	mg/L	9020	0.00444	J	0.00734	J	0.0256		0.00712	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	8004-4792	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)	10/19/2016 12:18	10/10/2016 12:56	10/11/2016 10:17	10/11/2016 09:06								
Duplicate ("Y" or "N") ²	N	N	N	N								
Split ("Y" or "N") ³	N	N	N	N								
Facility Sample ID Number (if applicable)	MW373UG1-17	MW384SG1-17	MW385SG1-17	MW386SG1-17								
Laboratory Sample ID Number (if applicable)	408717005	407701005	407843005	407843009								
Date of Analysis (Month/Day/Year) For <u>Volatile Organics</u> Analysis	10/21/2016	10/12/2016	10/13/2016	10/13/2016								
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	0.586		0.474		0.221		0.169	J
16887-00-6	Chloride(s)	T	mg/L	9056	44.4		45.4		27		16.1	
16984-48-8	Fluoride	T	mg/L	9056	0.162		0.244		0.171		0.535	
S0595- -	Nitrate & Nitrite	T	mg/L	9056	0.54		1.31		0.578		<0.1	
14808-79-8	Sulfate	T	mg/L	9056	148		20.5		19.9		44.1	
NS1894	Barometric Pressure Reading	T	Inches/Hg	Field	30.01		30.3		30.25		30.24	
S0145- -	Specific Conductance	T	µMHO/cm	Field	798		484		464		615	

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

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

RESIDENTIAL/INERT-QUARTERLY

Facility: US DOE - Paducah Gaseous Diffusion Plant

Permit Number: 073-00014 & 073-00015

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

LAB ID: None

For Official Use Only

GROUNDWATER SAMPLE ANALYSIS - (Cont.)

AKGWA NUMBER ¹ , Facility Well/Spring Number					8004-4792	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	324.99		325.19		325.16		344.29	
N238	Dissolved Oxygen	T	mg/L	Field	1.81		4.85		1.03		1.28	
S0266- -	Total Dissolved Solids	T	mg/L	160.1	497		267		257		351	
S0296- -	pH	T	Units	Field	6.31		6.35		6.6		6.72	
NS215	Eh	T	mV	Field	322		401		295		206	
S0907 - -	Temperature	T	°C	Field	19.83		19.06		17.56		17.5	
7429-90-5	Aluminum	T	mg/L	6020	<0.05		<0.05		<0.05		<0.05	
7440-36-0	Antimony	T	mg/L	6020	<0.003		<0.003		<0.003		<0.003	
7440-38-2	Arsenic	T	mg/L	6020	0.0017	J	0.00195	J	<0.005		0.00255	J
7440-39-3	Barium	T	mg/L	6020	0.0312		0.126		0.253		0.231	
7440-41-7	Beryllium	T	mg/L	6020	<0.0005		<0.0005		<0.0005		<0.0005	
7440-42-8	Boron	T	mg/L	6020	1.44		0.0124	J	0.0139	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	67.5		28		39.6		22.7	
7440-47-3	Chromium	T	mg/L	6020	<0.01		0.00336	J	<0.01		<0.01	
7440-48-4	Cobalt	T	mg/L	6020	0.00183		<0.001		<0.001		0.0136	
7440-50-8	Copper	T	mg/L	6020	<0.001		0.000511	J	0.000431	J	0.000844	J
7439-89-6	Iron	T	mg/L	6020	0.0835	J	0.0512	J	0.0758	BJ	1.68	B
7439-92-1	Lead	T	mg/L	6020	<0.002		<0.002		<0.002		<0.002	
7439-95-4	Magnesium	T	mg/L	6020	25.3		11.1		15		9.8	
7439-96-5	Manganese	T	mg/L	6020	0.0749		0.00277	J	0.00618		1.63	
7439-97-6	Mercury	T	mg/L	7470	<0.0002		<0.0002		<0.0002		<0.0002	

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RESIDENTIAL/INERT-QUARTERLY

Facility: US DOE - Paducah Gaseous Diffusion Plant

Permit Number: 073-00014 & 073-00015

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

LAB ID: None

For Official Use Only

GROUNDWATER SAMPLE ANALYSIS - (Cont.)

AKGWA NUMBER ¹ , Facility Well/Spring Number					8004-4792	8004-4809	8004-4810	8004-4804				
Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.)					373	384	385	386				
CAS RN ⁴	CONSTITUENT	T D 5	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S
7439-98-7	Molybdenum	T	mg/L	6020	<0.0005		<0.0005		0.00084		0.000816	
7440-02-0	Nickel	T	mg/L	6020	0.00385		0.000604	J	0.00124	J	0.00289	
7440-09-7	Potassium	T	mg/L	6020	2.69		1.15		1.99		0.302	
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		0.00263	J	<0.005		<0.005	
7440-22-4	Silver	T	mg/L	6020	<0.001		<0.001		<0.001		<0.001	
7440-23-5	Sodium	T	mg/L	6020	55.9		53.4		35		104	
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		0.000156	J	<0.0002	
7440-62-2	Vanadium	T	mg/L	6020	<0.01		<0.01		<0.01		<0.01	
7440-66-6	Zinc	T	mg/L	6020	<0.01		<0.01		<0.01		0.00388	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					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	0.00763		0.00054	J	0.00035	J	<0.001	

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RESIDENTIAL/CONTAINED-QUARTERLY

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

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

GROUNDWATER SAMPLE ANALYSIS - (Cont.)

AKGWA NUMBER ¹ , Facility Well/Spring Number					8004-4792	8004-4809	8004-4810	8004-4804				
Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.)					373	384	385	386				
CAS RN ⁴	CONSTITUENT	T D 5	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S
100-41-4	Ethylbenzene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
591-78-6	2-Hexanone	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
74-88-4	Iodomethane	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
124-48-1	Methane, Dibromochloro-	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
56-23-5	Carbon Tetrachloride	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
75-09-2	Dichloromethane	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
108-10-1	Methyl isobutyl ketone	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
96-12-8	Propane, 1,2-Dibromo-3-chloro	T	mg/L	8011	<0.00002		<0.0000201		<0.0000198		<0.0000199	
78-87-5	Propane, 1,2-Dichloro-	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
10061-02-6	trans-1,3-Dichloro-1-propene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
10061-01-5	cis-1,3-Dichloro-1-propene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
156-60-5	trans-1,2-Dichloroethene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
75-69-4	Trichlorofluoromethane	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
96-18-4	1,2,3-Trichloropropane	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
95-50-1	Benzene, 1,2-Dichloro-	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
106-46-7	Benzene, 1,4-Dichloro-	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
1336-36-3	PCB, Total	T	ug/L	8082	<0.0952		<0.099		<0.098		<0.0943	
12674-11-2	PCB-1016	T	ug/L	8082	<0.0952		<0.099		<0.098		<0.0943	
11104-28-2	PCB-1221	T	ug/L	8082	<0.0952		<0.099		<0.098		<0.0943	
11141-16-5	PCB-1232	T	ug/L	8082	<0.0952		<0.099		<0.098		<0.0943	
53469-21-9	PCB-1242	T	ug/L	8082	<0.0952		<0.099		<0.098		<0.0943	
12672-29-6	PCB-1248	T	ug/L	8082	<0.0952		<0.099		<0.098		<0.0943	

61-0

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		<0.099		<0.098		<0.0943	
11096-82-5	PCB-1260	T	ug/L	8082	<0.0952		<0.099		<0.098		<0.0943	
11100-14-4	PCB-1268	T	ug/L	8082	<0.0952		<0.099		<0.098		<0.0943	
12587-46-1	Gross Alpha	T	pCi/L	9310	2.56	*	-1.51	*	2.55	*	0.651	*
12587-47-2	Gross Beta	T	pCi/L	9310	17.8	*	101	*	78.1	*	0.524	*
10043-66-0	Iodine-131	T	pCi/L			*		*		*		*
13982-63-3	Radium-226	T	pCi/L	AN-1418	0.557	*	0.498	*	0.246	*	0.0419	*
10098-97-2	Strontium-90	T	pCi/L	905.0	-0.172	*	1.23	*	-1	*	-1.97	*
14133-76-7	Technetium-99	T	pCi/L	Tc-02-RC	19.9	*	167	*	147	*	-1.69	*
14269-63-7	Thorium-230	T	pCi/L	Th-01-RC	-0.342	*	0.494	*	0.401	*	0.205	*
10028-17-8	Tritium	T	pCi/L	906.0	-109	*	126	*	53.5	*	68.7	*
S0130- -	Chemical Oxygen Demand	T	mg/L	410.4	14	J	12.1	BJ	154	B	38.1	B
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	1.38	J	1.17	J	1.19	J	6.58	
S0586- -	Total Organic Halides	T	mg/L	9020	0.00966	J	0.0114		0.00468	J	0.148	

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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)	10/11/2016 07:35	10/11/2016 08:24	NA	10/10/2016 11:53						
Duplicate ("Y" or "N") ²	N	N	N	N						
Split ("Y" or "N") ³	N	N	N	N						
Facility Sample ID Number (if applicable)	MW387SG1-17	MW388SG1-17	NA	MW390SG1-17						
Laboratory Sample ID Number (if applicable)	407843001	407843011	NA	407701001						
Date of Analysis (Month/Day/Year) For <u>Volatile Organics</u> Analysis	10/13/2016	10/13/2016	NA	10/12/2016						
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	0.352		0.373		*	0.653
16887-00-6	Chloride(s)	T	mg/L	9056	35.7		32.8		*	69.9
16984-48-8	Fluoride	T	mg/L	9056	0.462		0.221		*	0.274
S0595- -	Nitrate & Nitrite	T	mg/L	9056	1.08		1.07		*	3.23
14808-79-8	Sulfate	T	mg/L	9056	28.3		23.9		*	42.2
NS1894	Barometric Pressure Reading	T	Inches/Hg	Field	30.22		30.23		*	30.33
S0145- -	Specific Conductance	T	µMH0/cm	Field	500		432		*	710

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	325.32		325.23		*		325.19	
N238	Dissolved Oxygen	T	mg/L	Field	4.65		5.07		*		6	
S0266- -	Total Dissolved Solids	T	mg/L	160.1	271		243		*		391	
S0296- -	pH	T	Units	Field	6.4		6.15		*		6.54	
NS215	Eh	T	mV	Field	450		455		*		431	
S0907 - -	Temperature	T	°C	Field	16		16.83		*		18.67	
7429-90-5	Aluminum	T	mg/L	6020	0.0209	J	<0.05		*		0.107	
7440-36-0	Antimony	T	mg/L	6020	<0.003		<0.003		*		<0.003	
7440-38-2	Arsenic	T	mg/L	6020	0.00236	J	<0.005		*		0.00172	J
7440-39-3	Barium	T	mg/L	6020	0.118		0.211		*		0.257	
7440-41-7	Beryllium	T	mg/L	6020	<0.0005		<0.0005		*		<0.0005	
7440-42-8	Boron	T	mg/L	6020	0.0411		0.0255		*		0.00872	J
7440-43-9	Cadmium	T	mg/L	6020	<0.001		<0.001		*		<0.001	
7440-70-2	Calcium	T	mg/L	6020	32.8		26.5		*		32.9	
7440-47-3	Chromium	T	mg/L	6020	0.00355	J	<0.01		*		<0.01	
7440-48-4	Cobalt	T	mg/L	6020	<0.001		<0.001		*		0.000281	J
7440-50-8	Copper	T	mg/L	6020	0.00101		0.000572	J	*		0.000857	J
7439-89-6	Iron	T	mg/L	6020	0.131	B	0.0737	BJ	*		0.108	
7439-92-1	Lead	T	mg/L	6020	<0.002		<0.002		*		<0.002	
7439-95-4	Magnesium	T	mg/L	6020	14		11.7		*		14	
7439-96-5	Manganese	T	mg/L	6020	0.00226	J	<0.005		*		0.00152	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	8004-48112	8004-4811				
Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.)					387	388	389	390				
CAS RN ⁴	CONSTITUENT	T D 5	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S
7439-98-7	Molybdenum	T	mg/L	6020	<0.0005		<0.0005		*	0.000596		
7440-02-0	Nickel	T	mg/L	6020	0.000745	J	0.000904	J	*	0.00177	J	
7440-09-7	Potassium	T	mg/L	6020	1.78		2.17		*	0.369		
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	53.2		49.2		*	98		
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		*	0.000654	J	
7440-61-1	Uranium	T	mg/L	6020	<0.0002		<0.0002		*	0.000137	J	
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	0.00079	J	0.00083	J		*	<0.001	

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RESIDENTIAL/CONTAINED-QUARTERLY

Facility: US DOE - Paducah Gaseous Diffusion Plant

Permit Number: 073-00014 & 073-00015

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

LAB ID: None

For Official Use Only

GROUNDWATER SAMPLE ANALYSIS - (Cont.)

AKGWA NUMBER ¹ , Facility Well/Spring Number					8004-4815	8004-4816	8004-4812	8004-4811				
Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.)					387	388	389	390				
CAS RN ⁴	CONSTITUENT	T D 5	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S
100-41-4	Ethylbenzene	T	mg/L	8260	<0.001		<0.001			*	<0.001	
591-78-6	2-Hexanone	T	mg/L	8260	<0.005		<0.005			*	<0.005	
74-88-4	Iodomethane	T	mg/L	8260	<0.005		<0.005			*	<0.005	
124-48-1	Methane, Dibromochloro-	T	mg/L	8260	<0.001		<0.001			*	<0.001	
56-23-5	Carbon Tetrachloride	T	mg/L	8260	<0.001		<0.001			*	<0.001	
75-09-2	Dichloromethane	T	mg/L	8260	<0.005		<0.005			*	<0.005	
108-10-1	Methyl isobutyl ketone	T	mg/L	8260	<0.005		<0.005			*	<0.005	
96-12-8	Propane, 1,2-Dibromo-3-chloro	T	mg/L	8011	<0.0000193		<0.0000197			*	<0.0000196	
78-87-5	Propane, 1,2-Dichloro-	T	mg/L	8260	<0.001		<0.001			*	<0.001	
10061-02-6	trans-1,3-Dichloro-1-propene	T	mg/L	8260	<0.001		<0.001			*	<0.001	
10061-01-5	cis-1,3-Dichloro-1-propene	T	mg/L	8260	<0.001		<0.001			*	<0.001	
156-60-5	trans-1,2-Dichloroethene	T	mg/L	8260	<0.001		<0.001			*	<0.001	
75-69-4	Trichlorofluoromethane	T	mg/L	8260	<0.001		<0.001			*	<0.001	
96-18-4	1,2,3-Trichloropropane	T	mg/L	8260	<0.001		<0.001			*	<0.001	
95-50-1	Benzene, 1,2-Dichloro-	T	mg/L	8260	<0.001		<0.001			*	<0.001	
106-46-7	Benzene, 1,4-Dichloro-	T	mg/L	8260	<0.001		<0.001			*	<0.001	
1336-36-3	PCB, Total	T	ug/L	8082	<0.1		<0.0943			*	<0.1	
12674-11-2	PCB-1016	T	ug/L	8082	<0.1		<0.0943			*	<0.1	
11104-28-2	PCB-1221	T	ug/L	8082	<0.1		<0.0943			*	<0.1	
11141-16-5	PCB-1232	T	ug/L	8082	<0.1		<0.0943			*	<0.1	
53469-21-9	PCB-1242	T	ug/L	8082	<0.1		<0.0943			*	<0.1	
12672-29-6	PCB-1248	T	ug/L	8082	<0.1		<0.0943			*	<0.1	

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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	<0.1		<0.0943			*	<0.1	
11096-82-5	PCB-1260	T	ug/L	8082	<0.1		<0.0943			*	<0.1	
11100-14-4	PCB-1268	T	ug/L	8082	<0.1		<0.0943			*	<0.1	
12587-46-1	Gross Alpha	T	pCi/L	9310	0.967	*	6.15	*		*	0.909	*
12587-47-2	Gross Beta	T	pCi/L	9310	115	*	95.8	*		*	42.8	*
10043-66-0	Iodine-131	T	pCi/L			*		*		*		*
13982-63-3	Radium-226	T	pCi/L	AN-1418	0.826	*	0.783	*		*	1.02	*
10098-97-2	Strontium-90	T	pCi/L	905.0	-1.56	*	1.87	*		*	-1.29	*
14133-76-7	Technetium-99	T	pCi/L	Tc-02-RC	215	*	162	*		*	56.7	*
14269-63-7	Thorium-230	T	pCi/L	Th-01-RC	-0.027	*	0.402	*		*	0.318	*
10028-17-8	Tritium	T	pCi/L	906.0	159	*	124	*		*	55.8	*
S0130- -	Chemical Oxygen Demand	T	mg/L	410.4	22.1	B	18.5	BJ		*	22.8	B
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	1.2	J	1.17	J		*	2.4	
S0586- -	Total Organic Halides	T	mg/L	9020	0.00656	J	0.00638	J		*	0.0231	

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)	10/12/2016 08:57	10/12/2016 07:27	10/12/2016 08:14	10/12/2016 12:16								
Duplicate ("Y" or "N") ²	N	N	N	N								
Split ("Y" or "N") ³	N	N	N	N								
Facility Sample ID Number (if applicable)	MW391SG1-17	MW392SG1-17	MW393SG1-17	MW394SG1-17								
Laboratory Sample ID Number (if applicable)	408036003	408036005	408036007	408036009								
Date of Analysis (Month/Day/Year) For <u>Volatile Organics</u> Analysis	10/18/2016	10/18/2016	10/18/2016	10/18/2016								
Gradient with respect to Monitored Unit (UP, DOWN, SIDE, UNKNOWN)	DOWN	DOWN	DOWN	UP								
CAS RN ⁴	CONSTITUENT	T D 5	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL ⁶	F L A G S ⁷	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S
24959-67-9	Bromide	T	mg/L	9056	0.557		0.593		0.186	J	0.688	
16887-00-6	Chloride(s)	T	mg/L	9056	43.9		49.4		13.4		49.4	
16984-48-8	Fluoride	T	mg/L	9056	0.133		0.187		0.144		0.124	
S0595- -	Nitrate & Nitrite	T	mg/L	9056	0.949		0.474		<0.1		1.21	
14808-79-8	Sulfate	T	mg/L	9056	54.6		6.43		14.5		10.4	
NS1894	Barometric Pressure Reading	T	Inches/Hg	Field	30.15		30.14		30.15		30.12	
S0145- -	Specific Conductance	T	µMHO/cm	Field	481		413		403		406	

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	325.31		325.3		340.54		325.69	
N238	Dissolved Oxygen	T	mg/L	Field	3.5		1.47		2.18		4.28	
S0266- -	Total Dissolved Solids	T	mg/L	160.1	271		199		233		219	
S0296- -	pH	T	Units	Field	6.23		6.48		6.25		6.23	
NS215	Eh	T	mV	Field	319		442		218		369	
S0907 - -	Temperature	T	°C	Field	16.94		16.22		16.67		19.67	
7429-90-5	Aluminum	T	mg/L	6020	<0.05		0.0188	J	0.0206	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		0.00435	J	<0.005	
7440-39-3	Barium	T	mg/L	6020	0.23		0.208		0.125		0.279	
7440-41-7	Beryllium	T	mg/L	6020	<0.0005		<0.0005		<0.0005		<0.0005	
7440-42-8	Boron	T	mg/L	6020	0.146		0.0296		0.0219		0.0256	
7440-43-9	Cadmium	T	mg/L	6020	<0.001		<0.001		<0.001		<0.001	
7440-70-2	Calcium	T	mg/L	6020	36.5		29.7		13		28.6	
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		0.00013	J	<0.001		<0.001	
7440-50-8	Copper	T	mg/L	6020	<0.001		<0.001		<0.001		0.000548	J
7439-89-6	Iron	T	mg/L	6020	0.0882	J	0.218		2.3		0.083	J
7439-92-1	Lead	T	mg/L	6020	<0.002		<0.002		<0.002		<0.002	
7439-95-4	Magnesium	T	mg/L	6020	15.8		10.9		3.88		12.1	
7439-96-5	Manganese	T	mg/L	6020	0.00102	J	0.0455		0.0459		0.00324	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	<0.0005		<0.0005		<0.0005		<0.0005	
7440-02-0	Nickel	T	mg/L	6020	0.000709	J	0.002		<0.002		0.00463	
7440-09-7	Potassium	T	mg/L	6020	1.8		1.86		0.435		1.35	
7440-16-6	Rhodium	T	mg/L	6020	<0.005		<0.005		<0.005		<0.005	
7782-49-2	Selenium	T	mg/L	6020	<0.005		<0.005		<0.005		<0.005	
7440-22-4	Silver	T	mg/L	6020	<0.001		<0.001		<0.001		<0.001	
7440-23-5	Sodium	T	mg/L	6020	36.9		40.4		79.8		34.9	
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		0.00711	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	0.00051	J	0.00071	J	<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	0.0114		0.0258		<0.001		0.00706	

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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	<0.0000199		<0.0000199		<0.0000199		<0.0000198	
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	<0.0962		<0.0971		<0.0962		<0.0962	
12674-11-2	PCB-1016	T	ug/L	8082	<0.0962		<0.0971		<0.0962		<0.0962	
11104-28-2	PCB-1221	T	ug/L	8082	<0.0962		<0.0971		<0.0962		<0.0962	
11141-16-5	PCB-1232	T	ug/L	8082	<0.0962		<0.0971		<0.0962		<0.0962	
53469-21-9	PCB-1242	T	ug/L	8082	<0.0962		<0.0971		<0.0962		<0.0962	
12672-29-6	PCB-1248	T	ug/L	8082	<0.0962		<0.0971		<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					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	<0.0962		<0.0971		<0.0962		<0.0962	
11096-82-5	PCB-1260	T	ug/L	8082	<0.0962		<0.0971		<0.0962		<0.0962	
11100-14-4	PCB-1268	T	ug/L	8082	<0.0962		<0.0971		<0.0962		<0.0962	
12587-46-1	Gross Alpha	T	pCi/L	9310	2.04	*	0.475	*	2.13	*	-1.82	*
12587-47-2	Gross Beta	T	pCi/L	9310	6.44	*	-0.658	*	1.8	*	2.51	*
10043-66-0	Iodine-131	T	pCi/L			*		*		*		*
13982-63-3	Radium-226	T	pCi/L	AN-1418	0.353	*	0.315	*	0.591	*	0.419	*
10098-97-2	Strontium-90	T	pCi/L	905.0	-0.985	*	-0.313	*	-0.817	*	-0.151	*
14133-76-7	Technetium-99	T	pCi/L	Tc-02-RC	8.63	*	1.55	*	0.082	*	4.39	*
14269-63-7	Thorium-230	T	pCi/L	Th-01-RC	0.184	*	0.44	*	0.555	*	0.195	*
10028-17-8	Tritium	T	pCi/L	906.0	26.1	*	-111	*	-38.5	*	-51.8	*
S0130- -	Chemical Oxygen Demand	T	mg/L	410.4	15.4	BJ	22.8	B	21	B	13.6	BJ
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	1.02	J	1.19	J	2.75		0.885	J
S0586- -	Total Organic Halides	T	mg/L	9020	0.0128		0.073		0.0201		<0.01	

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

RESIDENTIAL/INERT-QUARTERLY

Facility: US DOE - Paducah Gaseous Diffusion Plant

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

LAB ID: None
 For Official Use Only

GROUNDWATER SAMPLE ANALYSIS (S)

AKGWA NUMBER ¹ , Facility Well/Spring Number	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)	10/12/2016 09:44	10/12/2016 10:26	10/11/2016 11:05	10/11/2016 07:00								
Duplicate ("Y" or "N") ²	N	N	N	N								
Split ("Y" or "N") ³	N	N	N	N								
Facility Sample ID Number (if applicable)	MW395SG1-17	MW396SG1-17	MW397SG1-17	R11SG1-17								
Laboratory Sample ID Number (if applicable)	408036011	408036013	407843013	407843016								
Date of Analysis (Month/Day/Year) For <u>Volatile Organics</u> Analysis	10/18/2016	10/18/2016	10/13/2016	10/13/2016								
Gradient with respect to Monitored Unit (UP, DOWN, SIDE, UNKNOWN)	UP	UP	UP	NA								
CAS RN ⁴	CONSTITUENT	T D S ⁵	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL ⁶	F L A G S ⁷	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S
24959-67-9	Bromide	T	mg/L	9056	0.572		1.23		0.489			*
16887-00-6	Chloride(s)	T	mg/L	9056	47.1		70.4		39.7			*
16984-48-8	Fluoride	T	mg/L	9056	0.0987	J	0.467		0.145			*
S0595- -	Nitrate & Nitrite	T	mg/L	9056	1.64		<0.1		1.54			*
14808-79-8	Sulfate	T	mg/L	9056	9.86		23.3		11.3			*
NS1894	Barometric Pressure Reading	T	Inches/Hg	Field	30.15		30.15		30.24			*
S0145- -	Specific Conductance	T	µMH0/cm	Field	377		760		334			*

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."

C-33

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	326.12		368.26		325.54			*
N238	Dissolved Oxygen	T	mg/L	Field	4.9		2.38		5.5			*
S0266- -	Total Dissolved Solids	T	mg/L	160.1	214		396		166			*
S0296- -	pH	T	Units	Field	6.14		6.5		6.25			*
NS215	Eh	T	mV	Field	357		221		378			*
S0907 - -	Temperature	T	°C	Field	16.94		17.89		19.11			*
7429-90-5	Aluminum	T	mg/L	6020	<0.05		0.0228	J	0.0378	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		0.00218	J	<0.005		<0.005	
7440-39-3	Barium	T	mg/L	6020	0.271		0.435		0.134		<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	0.0255		0.00841	J	0.00871	J	0.172	
7440-43-9	Cadmium	T	mg/L	6020	<0.001		<0.001		<0.001		<0.001	
7440-70-2	Calcium	T	mg/L	6020	27.2		39.2		19.3		<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		0.00381		<0.001		<0.001	
7440-50-8	Copper	T	mg/L	6020	0.000508	J	0.000726	J	0.000544	J	0.00317	
7439-89-6	Iron	T	mg/L	6020	0.0517	J	1.29		0.095	BJ	<0.1	
7439-92-1	Lead	T	mg/L	6020	<0.002		<0.002		<0.002		0.000561	J
7439-95-4	Magnesium	T	mg/L	6020	12		17.4		8.26		<0.03	
7439-96-5	Manganese	T	mg/L	6020	<0.005		0.588		0.00172	J	<0.005	
7439-97-6	Mercury	T	mg/L	7470	<0.0002		<0.0002		<0.0002		<0.0002	

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RESIDENTIAL/INERT-QUARTERLY

Facility: US DOE - Paducah Gaseous Diffusion Plant

Permit Number: 073-00014 & 073-00015

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

LAB ID: None

For Official Use Only

GROUNDWATER SAMPLE ANALYSIS - (Cont.)

AKGWA NUMBER ¹ , Facility Well/Spring Number					8004-4801	8004-4803	8004-4817	0000-0000				
Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.)					395	396	397	E. BLANK				
CAS RN ⁴	CONSTITUENT	T D 5	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S
7439-98-7	Molybdenum	T	mg/L	6020	<0.0005		0.000478	J	<0.0005		<0.0005	
7440-02-0	Nickel	T	mg/L	6020	0.00078	J	0.0015	J	0.000624	J	<0.002	
7440-09-7	Potassium	T	mg/L	6020	1.61		0.894		1.81		<0.3	
7440-16-6	Rhodium	T	mg/L	6020	<0.005		<0.005		<0.005		<0.005	
7782-49-2	Selenium	T	mg/L	6020	<0.005		<0.005		<0.005		<0.005	
7440-22-4	Silver	T	mg/L	6020	<0.001		<0.001		<0.001		<0.001	
7440-23-5	Sodium	T	mg/L	6020	30.5		115		33.2		<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		0.000102	J	<0.0002		<0.0002	
7440-62-2	Vanadium	T	mg/L	6020	<0.01		<0.01		<0.01		0.00532	J
7440-66-6	Zinc	T	mg/L	6020	<0.01		0.00389	J	<0.01		<0.01	
108-05-4	Vinyl acetate	T	mg/L	8260	<0.005	*	<0.005	*	<0.005	*	<0.005	*
67-64-1	Acetone	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
107-02-8	Acrolein	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
107-13-1	Acrylonitrile	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
71-43-2	Benzene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
108-90-7	Chlorobenzene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
1330-20-7	Xylenes	T	mg/L	8260	<0.003		<0.003		<0.003		<0.003	
100-42-5	Styrene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
108-88-3	Toluene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
74-97-5	Chlorobromomethane	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	

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RESIDENTIAL/INERT-QUARTERLY

Facility: US DOE - Paducah Gaseous Diffusion Plant

Permit Number: 073-00014 & 073-00015

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

LAB ID: None

For Official Use Only

GROUNDWATER SAMPLE ANALYSIS - (Cont.)

AKGWA NUMBER ¹ , Facility Well/Spring Number					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		0.00141	
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		0.0231	
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	0.00399		<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.)

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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		<0.0000199		<0.0000198		<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	<0.0971		<0.0971		<0.0943		<0.0935	
12674-11-2	PCB-1016	T	ug/L	8082	<0.0971		<0.0971		<0.0943		<0.0935	
11104-28-2	PCB-1221	T	ug/L	8082	<0.0971		<0.0971		<0.0943		<0.0935	
11141-16-5	PCB-1232	T	ug/L	8082	<0.0971		<0.0971		<0.0943		<0.0935	
53469-21-9	PCB-1242	T	ug/L	8082	<0.0971		<0.0971		<0.0943		<0.0935	
12672-29-6	PCB-1248	T	ug/L	8082	<0.0971		<0.0971		<0.0943		<0.0935	

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	<0.0971		<0.0971		<0.0943		<0.0935	
11096-82-5	PCB-1260	T	ug/L	8082	<0.0971		<0.0971		<0.0943		<0.0935	
11100-14-4	PCB-1268	T	ug/L	8082	<0.0971		<0.0971		<0.0943		<0.0935	
12587-46-1	Gross Alpha	T	pCi/L	9310	-0.135	*	2.93	*	-1.77	*	-1.82	*
12587-47-2	Gross Beta	T	pCi/L	9310	3.62	*	2.09	*	5.73	*	1.44	*
10043-66-0	Iodine-131	T	pCi/L			*		*		*		*
13982-63-3	Radium-226	T	pCi/L	AN-1418	0.669	*	0.601	*	0.575	*	0.301	*
10098-97-2	Strontium-90	T	pCi/L	905.0	-0.488	*	-0.903	*	-1.72	*	-2.47	*
14133-76-7	Technetium-99	T	pCi/L	Tc-02-RC	2.15	*	-10.9	*	9.1	*	-1.69	*
14269-63-7	Thorium-230	T	pCi/L	Th-01-RC	-0.154	*	-0.189	*	0.139	*	0.282	*
10028-17-8	Tritium	T	pCi/L	906.0	-37.4	*	-25.9	*	-93.7	*	55.7	*
S0130- -	Chemical Oxygen Demand	T	mg/L	410.4	11.7	BJ	22.8	B	16.7	BJ		*
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		0.628		<0.5		<0.5	
S0268- -	Total Organic Carbon	T	mg/L	9060	0.98	J	5.83		0.838	J		*
S0586- -	Total Organic Halides	T	mg/L	9020	0.00666	J	<0.01		0.00564	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	0000-0000								
Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.)	F. BLANK	T. BLANK 1	T. BLANK 2	T. BLANK 3								
Sample Sequence #	1	1	1	1								
If sample is a Blank, specify Type: (F)ield, (T)rip, (M)ethod, or (E)quipment	F	T	T	T								
Sample Date and Time (Month/Day/Year hour: minutes)	10/11/2016 09:10	10/10/2016 11:30	10/11/2016 06:55	10/12/2016 07:00								
Duplicate ("Y" or "N") ²	N	N	N	N								
Split ("Y" or "N") ³	N	N	N	N								
Facility Sample ID Number (if applicable)	FB1SG1-17	TB1SG1-17	TB2SG1-17	TB3SG1-17								
Laboratory Sample ID Number (if applicable)	407843015	407701007	407843017	408036015								
Date of Analysis (Month/Day/Year) For <u>Volatile Organics</u> Analysis	10/13/2016	10/12/2016	10/14/2016	10/19/2016								
Gradient with respect to Monitored Unit (UP, DOWN, SIDE, UNKNOWN)	NA	NA	NA	NA								
CAS RN ⁴	CONSTITUENT	T D 5	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL ⁶	F L A G S ⁷	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S
24959-67-9	Bromide	T	mg/L	9056		*		*		*		*
16887-00-6	Chloride(s)	T	mg/L	9056		*		*		*		*
16984-48-8	Fluoride	T	mg/L	9056		*		*		*		*
S0595- -	Nitrate & Nitrite	T	mg/L	9056		*		*		*		*
14808-79-8	Sulfate	T	mg/L	9056		*		*		*		*
NS1894	Barometric Pressure Reading	T	Inches/Hg	Field		*		*		*		*
S0145- -	Specific Conductance	T	µMH0/cm	Field		*		*		*		*

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STANDARD FLAGS:

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

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

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

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

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

⁵"T" = Total; "D" = Dissolved

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

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

RESIDENTIAL/INERT-QUARTERLY

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

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

GROUNDWATER SAMPLE ANALYSIS - (Cont.)

AKGWA NUMBER ¹ , Facility Well/Spring Number					0000-0000		0000-0000		0000-0000		0000-0000	
Facility's Local Well or Spring Number (e.g., MW-1, MW-2, BLANK-F, etc.)					F. BLANK		T. BLANK 1		T. BLANK 2		T. BLANK 3	
CAS RN ⁴	CONSTITUENT	T D 5	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S
S0906 - -	Static Water Level Elevation	T	Ft. MSL	Field		*		*		*		*
N238	Dissolved Oxygen	T	mg/L	Field		*		*		*		*
S0266- -	Total Dissolved Solids	T	mg/L	160.1		*		*		*		*
S0296- -	pH	T	Units	Field		*		*		*		*
NS215	Eh	T	mV	Field		*		*		*		*
S0907 - -	Temperature	T	°C	Field		*		*		*		*
7429-90-5	Aluminum	T	mg/L	6020	<0.05			*		*		*
7440-36-0	Antimony	T	mg/L	6020	<0.003			*		*		*
7440-38-2	Arsenic	T	mg/L	6020	<0.005			*		*		*
7440-39-3	Barium	T	mg/L	6020	<0.002			*		*		*
7440-41-7	Beryllium	T	mg/L	6020	<0.0005			*		*		*
7440-42-8	Boron	T	mg/L	6020	0.161			*		*		*
7440-43-9	Cadmium	T	mg/L	6020	<0.001			*		*		*
7440-70-2	Calcium	T	mg/L	6020	<0.2			*		*		*
7440-47-3	Chromium	T	mg/L	6020	<0.01			*		*		*
7440-48-4	Cobalt	T	mg/L	6020	<0.001			*		*		*
7440-50-8	Copper	T	mg/L	6020	0.00219			*		*		*
7439-89-6	Iron	T	mg/L	6020	<0.1			*		*		*
7439-92-1	Lead	T	mg/L	6020	<0.002			*		*		*
7439-95-4	Magnesium	T	mg/L	6020	<0.03			*		*		*
7439-96-5	Manganese	T	mg/L	6020	<0.005			*		*		*
7439-97-6	Mercury	T	mg/L	7470	<0.0002			*		*		*

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RESIDENTIAL/INERT-QUARTERLY

Facility: US DOE - Paducah Gaseous Diffusion Plant

Permit Number: 073-00014 & 073-00015

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

LAB ID: None

For Official Use Only

GROUNDWATER SAMPLE ANALYSIS - (Cont.)

AKGWA NUMBER ¹ , Facility Well/Spring Number					0000-0000	0000-0000	0000-0000	0000-0000				
Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.)					F. BLANK	T. BLANK 1	T. BLANK 2	T. BLANK 3				
CAS RN ⁴	CONSTITUENT	T D 5	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S
7439-98-7	Molybdenum	T	mg/L	6020	<0.0005			*		*		*
7440-02-0	Nickel	T	mg/L	6020	<0.002			*		*		*
7440-09-7	Potassium	T	mg/L	6020	<0.3			*		*		*
7440-16-6	Rhodium	T	mg/L	6020	<0.005			*		*		*
7782-49-2	Selenium	T	mg/L	6020	<0.005			*		*		*
7440-22-4	Silver	T	mg/L	6020	<0.001			*		*		*
7440-23-5	Sodium	T	mg/L	6020	<0.25			*		*		*
7440-25-7	Tantalum	T	mg/L	6020	<0.005			*		*		*
7440-28-0	Thallium	T	mg/L	6020	<0.002			*		*		*
7440-61-1	Uranium	T	mg/L	6020	<0.0002			*		*		*
7440-62-2	Vanadium	T	mg/L	6020	0.00682	J		*		*		*
7440-66-6	Zinc	T	mg/L	6020	<0.01			*		*		*
108-05-4	Vinyl acetate	T	mg/L	8260	<0.005	*	<0.005		<0.005	*	<0.005	*
67-64-1	Acetone	T	mg/L	8260	0.00176	J	<0.005		0.00185	J	0.00227	J
107-02-8	Acrolein	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
107-13-1	Acrylonitrile	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
71-43-2	Benzene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
108-90-7	Chlorobenzene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
1330-20-7	Xylenes	T	mg/L	8260	<0.003		<0.003		<0.003		<0.003	
100-42-5	Styrene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
108-88-3	Toluene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
74-97-5	Chlorobromomethane	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	

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RESIDENTIAL/INERT-QUARTERLY

Facility: US DOE - Paducah Gaseous Diffusion Plant

Permit Number: 073-00014 & 073-00015

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

LAB ID: None

For Official Use Only

GROUNDWATER SAMPLE ANALYSIS - (Cont.)

AKGWA NUMBER ¹ , Facility Well/Spring Number					0000-0000		0000-0000		0000-0000		0000-0000	
Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.)					F. BLANK		T. BLANK 1		T. BLANK 2		T. BLANK 3	
CAS RN ⁴	CONSTITUENT	T D 5	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S
75-27-4	Bromodichloromethane	T	mg/L	8260	0.00137		0.00057	J	0.00142		0.00157	
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	0.0169		0.0251		0.023		0.0271	
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.)

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AKGWA NUMBER ¹ , Facility Well/Spring Number					0000-0000	0000-0000	0000-0000	0000-0000				
Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.)					F. BLANK	T. BLANK 1	T. BLANK 2	T. BLANK 3				
CAS RN ⁴	CONSTITUENT	T D 5	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S
100-41-4	Ethylbenzene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
591-78-6	2-Hexanone	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
74-88-4	Iodomethane	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
124-48-1	Methane, Dibromochloro-	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
56-23-5	Carbon Tetrachloride	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
75-09-2	Dichloromethane	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
108-10-1	Methyl isobutyl ketone	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
96-12-8	Propane, 1,2-Dibromo-3-chloro	T	mg/L	8011	<0.0000196		<0.0000198		<0.0000197		<0.0000201	
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	<0.0943			*		*		*
12674-11-2	PCB-1016	T	ug/L	8082	<0.0943			*		*		*
11104-28-2	PCB-1221	T	ug/L	8082	<0.0943			*		*		*
11141-16-5	PCB-1232	T	ug/L	8082	<0.0943			*		*		*
53469-21-9	PCB-1242	T	ug/L	8082	<0.0943			*		*		*
12672-29-6	PCB-1248	T	ug/L	8082	<0.0943			*		*		*

RESIDENTIAL/CONTAINED-QUARTERLY

Facility: US DOE - Paducah Gaseous Diffusion Plant

Permit Number: 073-00014 & 073-00015

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

LAB ID: None

For Official Use Only

GROUNDWATER SAMPLE ANALYSIS - (Cont.)

AKGWA NUMBER ¹ , Facility Well/Spring Number					0000-0000	0000-0000	0000-0000	0000-0000				
Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.)					F. BLANK	T. BLANK 1	T. BLANK 2	T. BLANK 3				
CAS RN ⁴	CONSTITUENT	T D 5	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S
11097-69-1	PCB-1254	T	ug/L	8082	<0.0943			*		*		*
11096-82-5	PCB-1260	T	ug/L	8082	<0.0943			*		*		*
11100-14-4	PCB-1268	T	ug/L	8082	<0.0943			*		*		*
12587-46-1	Gross Alpha	T	pCi/L	9310	-1.08	*		*		*		*
12587-47-2	Gross Beta	T	pCi/L	9310	1.11	*		*		*		*
10043-66-0	Iodine-131	T	pCi/L			*		*		*		*
13982-63-3	Radium-226	T	pCi/L	AN-1418	0.365	*		*		*		*
10098-97-2	Strontium-90	T	pCi/L	905.0	-0.371	*		*		*		*
14133-76-7	Technetium-99	T	pCi/L	Tc-02-RC	-0.816	*		*		*		*
14269-63-7	Thorium-230	T	pCi/L	Th-01-RC	0.526	*		*		*		*
10028-17-8	Tritium	T	pCi/L	906.0	117	*		*		*		*
S0130- -	Chemical Oxygen Demand	T	mg/L	410.4		*		*		*		*
57-12-5	Cyanide	T	mg/L	9012		*		*		*		*
20461-54-5	Iodide	T	mg/L	300.0	<0.5			*		*		*
S0268- -	Total Organic Carbon	T	mg/L	9060		*		*		*		*
S0586- -	Total Organic Halides	T	mg/L	9020		*		*		*		*

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

RESIDENTIAL/INERT-QUARTERLY

Facility: US DOE - Paducah Gaseous Diffusion Plant

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

LAB ID: None
 For Official Use Only

GROUNDWATER SAMPLE ANALYSIS (S)

AKGWA NUMBER ¹ , Facility Well/Spring Number		0000-0000	8004-4804									
Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.)		T. BLANK 4	386									
Sample Sequence #		1	2									
If sample is a Blank, specify Type: (F)ield, (T)rip, (M)ethod, or (E)quipment		T	NA									
Sample Date and Time (Month/Day/Year hour:minutes)		10/13/2016 07:10	10/11/2016 09:06									
Duplicate ("Y" or "N") ²		N	Y									
Split ("Y" or "N") ³		N	N									
Facility Sample ID Number (if applicable)		TB4SG1-17	MW386DSG1-17									
Laboratory Sample ID Number (if applicable)		408199005	407843007									
Date of Analysis (Month/Day/Year) For <u>Volatile Organics</u> Analysis		10/19/2016	10/13/2016									
Gradient with respect to Monitored Unit (UP, DOWN, SIDE, UNKNOWN)		NA	SIDE									
CAS RN ⁴	CONSTITUENT	T D S ⁵	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL ⁶	F L A G S ⁷	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S	DETECTED VALUE OR PQL ⁶	F L A G S
24959-67-9	Bromide	T	mg/L	9056		*	0.191	J				
16887-00-6	Chloride(s)	T	mg/L	9056		*	16					
16984-48-8	Fluoride	T	mg/L	9056		*	0.513					
S0595- -	Nitrate & Nitrite	T	mg/L	9056		*	<0.1					
14808-79-8	Sulfate	T	mg/L	9056		*	43.7					
NS1894	Barometric Pressure Reading	T	Inches/Hg	Field		*	30.24					
S0145- -	Specific Conductance	T	µMH0/cm	Field		*	615					

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

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

RESIDENTIAL/INERT-QUARTERLY

Facility: US DOE - Paducah Gaseous Diffusion Plant

Permit Number: 073-00014 & 073-00015

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

LAB ID: None

For Official Use Only

GROUNDWATER SAMPLE ANALYSIS - (Cont.)

AKGWA NUMBER ¹ , Facility Well/Spring Number					0000-0000	8004-4804						
Facility's Local Well or Spring Number (e.g., MW-1, MW-2, BLANK-F, etc.)					T. BLANK 4	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		*	344.29					
N238	Dissolved Oxygen	T	mg/L	Field		*	1.28					
S0266- -	Total Dissolved Solids	T	mg/L	160.1		*	376					
S0296- -	pH	T	Units	Field		*	6.72					
NS215	Eh	T	mV	Field		*	206					
S0907 - -	Temperature	T	°C	Field		*	17.5					
7429-90-5	Aluminum	T	mg/L	6020		*	<0.05					
7440-36-0	Antimony	T	mg/L	6020		*	<0.003					
7440-38-2	Arsenic	T	mg/L	6020		*	0.00308	J				
7440-39-3	Barium	T	mg/L	6020		*	0.234					
7440-41-7	Beryllium	T	mg/L	6020		*	<0.0005					
7440-42-8	Boron	T	mg/L	6020		*	<0.015					
7440-43-9	Cadmium	T	mg/L	6020		*	<0.001					
7440-70-2	Calcium	T	mg/L	6020		*	23					
7440-47-3	Chromium	T	mg/L	6020		*	<0.01					
7440-48-4	Cobalt	T	mg/L	6020		*	0.0139					
7440-50-8	Copper	T	mg/L	6020		*	0.000885	J				
7439-89-6	Iron	T	mg/L	6020		*	1.71	B				
7439-92-1	Lead	T	mg/L	6020		*	<0.002					
7439-95-4	Magnesium	T	mg/L	6020		*	9.85					
7439-96-5	Manganese	T	mg/L	6020		*	1.69					
7439-97-6	Mercury	T	mg/L	7470		*	<0.0002					

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RESIDENTIAL/INERT-QUARTERLY

Facility: US DOE - Paducah Gaseous Diffusion Plant

Permit Number: 073-00014 & 073-00015

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

LAB ID: None

For Official Use Only

GROUNDWATER SAMPLE ANALYSIS - (Cont.)

AKGWA NUMBER ¹ , Facility Well/Spring Number					0000-0000	8004-4804						
Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.)					T. BLANK 4	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		*	0.000797					
7440-02-0	Nickel	T	mg/L	6020		*	0.011					
7440-09-7	Potassium	T	mg/L	6020		*	0.308					
7440-16-6	Rhodium	T	mg/L	6020		*	<0.005					
7782-49-2	Selenium	T	mg/L	6020		*	<0.005					
7440-22-4	Silver	T	mg/L	6020		*	<0.001					
7440-23-5	Sodium	T	mg/L	6020		*	105					
7440-25-7	Tantalum	T	mg/L	6020		*	<0.005					
7440-28-0	Thallium	T	mg/L	6020		*	<0.002					
7440-61-1	Uranium	T	mg/L	6020		*	0.000067	J				
7440-62-2	Vanadium	T	mg/L	6020		*	0.00469	J				
7440-66-6	Zinc	T	mg/L	6020		*	0.00381	J				
108-05-4	Vinyl acetate	T	mg/L	8260	<0.005	*	<0.005	*				
67-64-1	Acetone	T	mg/L	8260	0.00199	J	<0.005					
107-02-8	Acrolein	T	mg/L	8260	<0.005		<0.005					
107-13-1	Acrylonitrile	T	mg/L	8260	<0.005		<0.005					
71-43-2	Benzene	T	mg/L	8260	<0.001		<0.001					
108-90-7	Chlorobenzene	T	mg/L	8260	<0.001		<0.001					
1330-20-7	Xylenes	T	mg/L	8260	<0.003		<0.003					
100-42-5	Styrene	T	mg/L	8260	<0.001		<0.001					
108-88-3	Toluene	T	mg/L	8260	<0.001		<0.001					
74-97-5	Chlorobromomethane	T	mg/L	8260	<0.001		<0.001					

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RESIDENTIAL/INERT-QUARTERLY

Facility: US DOE - Paducah Gaseous Diffusion Plant

Permit Number: 073-00014 & 073-00015

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

LAB ID: None

For Official Use Only

GROUNDWATER SAMPLE ANALYSIS - (Cont.)

AKGWA NUMBER ¹ , Facility Well/Spring Number					0000-0000		8004-4804					
Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.)					T. BLANK 4		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	0.00174		<0.001					
75-25-2	Tribromomethane	T	mg/L	8260	<0.001		<0.001					
74-83-9	Methyl bromide	T	mg/L	8260	<0.001		<0.001					
78-93-3	Methyl ethyl ketone	T	mg/L	8260	<0.005		<0.005					
110-57-6	trans-1,4-Dichloro-2-butene	T	mg/L	8260	<0.005		<0.005					
75-15-0	Carbon disulfide	T	mg/L	8260	<0.005		<0.005					
75-00-3	Chloroethane	T	mg/L	8260	<0.001		<0.001					
67-66-3	Chloroform	T	mg/L	8260	0.0282		<0.001					
74-87-3	Methyl chloride	T	mg/L	8260	<0.001		<0.001					
156-59-2	cis-1,2-Dichloroethene	T	mg/L	8260	<0.001		<0.001					
74-95-3	Methylene bromide	T	mg/L	8260	<0.001		<0.001					
75-34-3	1,1-Dichloroethane	T	mg/L	8260	<0.001		<0.001					
107-06-2	1,2-Dichloroethane	T	mg/L	8260	<0.001		<0.001					
75-35-4	1,1-Dichloroethylene	T	mg/L	8260	<0.001		<0.001					
106-93-4	Ethane, 1,2-dibromo	T	mg/L	8260	<0.001		<0.001					
79-34-5	Ethane, 1,1,2,2-Tetrachloro	T	mg/L	8260	<0.001		<0.001					
71-55-6	Ethane, 1,1,1-Trichloro-	T	mg/L	8260	<0.001		<0.001					
79-00-5	Ethane, 1,1,2-Trichloro	T	mg/L	8260	<0.001		<0.001					
630-20-6	Ethane, 1,1,1,2-Tetrachloro	T	mg/L	8260	<0.001		<0.001					
75-01-4	Vinyl chloride	T	mg/L	8260	<0.001		<0.001					
127-18-4	Ethene, Tetrachloro-	T	mg/L	8260	<0.001		<0.001					
79-01-6	Ethene, Trichloro-	T	mg/L	8260	<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.)

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AKGWA NUMBER ¹ , Facility Well/Spring Number					0000-0000	8004-4804						
Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.)					T. BLANK 4	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					
591-78-6	2-Hexanone	T	mg/L	8260	<0.005		<0.005					
74-88-4	Iodomethane	T	mg/L	8260	<0.005		<0.005					
124-48-1	Methane, Dibromochloro-	T	mg/L	8260	<0.001		<0.001					
56-23-5	Carbon Tetrachloride	T	mg/L	8260	<0.001		<0.001					
75-09-2	Dichloromethane	T	mg/L	8260	<0.005		<0.005					
108-10-1	Methyl isobutyl ketone	T	mg/L	8260	<0.005		<0.005					
96-12-8	Propane, 1,2-Dibromo-3-chloro	T	mg/L	8011	<0.0000202		<0.0000202					
78-87-5	Propane, 1,2-Dichloro-	T	mg/L	8260	<0.001		<0.001					
10061-02-6	trans-1,3-Dichloro-1-propene	T	mg/L	8260	<0.001		<0.001					
10061-01-5	cis-1,3-Dichloro-1-propene	T	mg/L	8260	<0.001		<0.001					
156-60-5	trans-1,2-Dichloroethene	T	mg/L	8260	<0.001		<0.001					
75-69-4	Trichlorofluoromethane	T	mg/L	8260	<0.001		<0.001					
96-18-4	1,2,3-Trichloropropane	T	mg/L	8260	<0.001		<0.001					
95-50-1	Benzene, 1,2-Dichloro-	T	mg/L	8260	<0.001		<0.001					
106-46-7	Benzene, 1,4-Dichloro-	T	mg/L	8260	<0.001		<0.001					
1336-36-3	PCB, Total	T	ug/L	8082		*	<0.099					
12674-11-2	PCB-1016	T	ug/L	8082		*	<0.099					
11104-28-2	PCB-1221	T	ug/L	8082		*	<0.099					
11141-16-5	PCB-1232	T	ug/L	8082		*	<0.099					
53469-21-9	PCB-1242	T	ug/L	8082		*	<0.099					
12672-29-6	PCB-1248	T	ug/L	8082		*	<0.099					

RESIDENTIAL/CONTAINED-QUARTERLY

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

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

GROUNDWATER SAMPLE ANALYSIS - (Cont.)

AKGWA NUMBER ¹ , Facility Well/Spring Number					0000-0000		8004-4804					
Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.)					T. BLANK 4		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		*	<0.099					
11096-82-5	PCB-1260	T	ug/L	8082		*	<0.099					
11100-14-4	PCB-1268	T	ug/L	8082		*	<0.099					
12587-46-1	Gross Alpha	T	pCi/L	9310		*	0.416	*				
12587-47-2	Gross Beta	T	pCi/L	9310		*	1.69	*				
10043-66-0	Iodine-131	T	pCi/L			*		*				
13982-63-3	Radium-226	T	pCi/L	AN-1418		*	0.756	*				
10098-97-2	Strontium-90	T	pCi/L	905.0		*	-1.14	*				
14133-76-7	Technetium-99	T	pCi/L	Tc-02-RC		*	-1.08	*				
14269-63-7	Thorium-230	T	pCi/L	Th-01-RC		*	0.512	*				
10028-17-8	Tritium	T	pCi/L	906.0		*	-8.23	*				
S0130- -	Chemical Oxygen Demand	T	mg/L	410.4		*	32.8	B				
57-12-5	Cyanide	T	mg/L	9012		*	<0.2					
20461-54-5	Iodide	T	mg/L	300.0		*	<0.5					
S0268- -	Total Organic Carbon	T	mg/L	9060		*	6.53					
S0586- -	Total Organic Halides	T	mg/L	9020		*	0.148					

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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	MW220SG1-17	Tantalum	N	Sample spike (MS/MSD) recovery not within control limits
			Gross alpha	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 2.64. Rad error is 2.64.
			Gross beta		TPU is 4.97. Rad error is 3.49.
			Iodine-131		Analysis of constituent not required and not performed.
			Radium-226		TPU is 0.647. Rad error is 0.645.
			Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 3.26. Rad error is 3.26.
			Technetium-99	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 11.9. Rad error is 11.8.
			Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.28. Rad error is 0.28.
8000-5202	MW221	MW221SG1-17	Tritium	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 132. Rad error is 132.
			Vinyl acetate	Y1	MS/MSD recovery outside acceptance criteria
			Gross alpha	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 2.22. Rad error is 2.22.
			Gross beta		TPU is 3.08. Rad error is 2.53.
			Iodine-131		Analysis of constituent not required and not performed.
			Radium-226		TPU is 0.494. Rad error is 0.493.
			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 11.6. Rad error is 11.4.
8000-5242	MW222	MW222SG1-17	Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.323. Rad error is 0.321.
			Tritium	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 145. Rad error is 145.
			Total Dissolved Solids	*	Duplicate analysis not within control limits.
			Vinyl acetate	Y1	MS/MSD recovery outside acceptance criteria
			Gross alpha	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 2.41. Rad error is 2.39.
			Gross beta	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 2.19. Rad error is 2.15.
			Iodine-131		Analysis of constituent not required and not performed.
			Radium-226	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.426. Rad error is 0.426.
Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 1.6. Rad error is 1.6.			
Technetium-99	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 11. Rad error is 11.			
Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.4. Rad error is 0.396.			
Tritium	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 153. Rad error is 153.			

RESIDENTIAL/INERT – QUARTERLY

Facility: US DOE - Paducah Gaseous Diffusion Plant

Permit Numbers: 073-00014 and 073-00015

Finds/Unit: KY8-890-008-982 / 1LAB ID: None

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GROUNDWATER WRITTEN COMMENTS

Monitoring Point	Facility Sample ID	Constituent	Flag	Description
8000-5243 MW223	MW223SG1-17	Total Dissolved Solids	*	Duplicate analysis not within control limits.
		Vinyl acetate	Y1	MS/MSD recovery outside acceptance criteria
		Gross alpha	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 2.5. Rad error is 2.5.
		Gross beta		TPU is 3.11. Rad error is 2.99.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.377. Rad error is 0.377.
		Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 2.31. Rad error is 2.31.
		Technetium-99	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 11.4. Rad error is 11.3.
		Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.663. Rad error is 0.654.
		Tritium	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 162. Rad error is 162.
8000-5244 MW224	MW224SG1-17	Vinyl acetate	LY1	LCS or LCSD recovery outside of control limits AND MS/MSD recovery outside acceptance criteria
		Gross alpha	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 2.35. Rad error is 2.35.
		Gross beta		TPU is 2.41. Rad error is 2.24.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226		TPU is 0.511. Rad error is 0.511.
		Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 1.93. Rad error is 1.93.
		Technetium-99	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 8.55. Rad error is 8.53.
		Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.55. Rad error is 0.541.
8004-4820 MW369	MW369UG1-17	Nitrate & Nitrite	H	Analysis performed outside holding time requirement
		1,2-Dichloroethane	Y1	MS/MSD recovery outside acceptance criteria
		Gross alpha	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 1.28. Rad error is 1.28.
		Gross beta		TPU is 9.75. Rad error is 2.39.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.575. Rad error is 0.575.
		Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 4.77. Rad error is 4.63.
		Technetium-99		TPU is 14.7. Rad error is 11.4.
		Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 1.81. Rad error is 1.8.
		Tritium	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 144. Rad error is 142.

RESIDENTIAL/INERT – QUARTERLY

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

Facility: US DOE - Paducah Gaseous Diffusion Plant

LAB ID: None

Permit Numbers: 073-00014 and 073-00015

For Official Use Only

GROUNDWATER WRITTEN COMMENTS

Monitoring Point	Facility Sample ID	Constituent	Flag	Description
8004-4818 MW370	MW370UG1-17	Nitrate & Nitrite	H	Analysis performed outside holding time requirement
		1,2-Dichloroethane	Y1	MS/MSD recovery outside acceptance criteria
		Gross alpha	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.907. Rad error is 0.905.
		Gross beta		TPU is 3.47. Rad error is 1.58.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.703. Rad error is 0.702.
		Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 2.45. Rad error is 2.45.
		Technetium-99		TPU is 11.3. Rad error is 10.8.
		Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 3.75. Rad error is 3.64.
		Tritium	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 139. Rad error is 138.
8004-4808 MW372	MW372UG1-17	Tantalum	N	Sample spike (MS/MSD) recovery not within control limits
		Gross alpha		TPU is 1.38. Rad error is 1.33.
		Gross beta		TPU is 2.14. Rad error is 1.43.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.835. Rad error is 0.835.
		Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 2.65. Rad error is 2.65.
		Technetium-99	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 9.82. Rad error is 9.75.
		Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 1.07. Rad error is 1.06.
8004-4792 MW373	MW373UG1-17	Tantalum	N	Sample spike (MS/MSD) recovery not within control limits
		Gross alpha	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 2.43. Rad error is 2.39.
		Gross beta		TPU is 3.94. Rad error is 2.61.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.696. Rad error is 0.695.
		Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 2.89. Rad error is 2.89.
		Technetium-99		TPU is 10.7. Rad error is 10.5.
		Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 2.03. Rad error is 2.03.
Tritium	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 120. Rad error is 120.		

RESIDENTIAL/INERT – QUARTERLY

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

Facility: US DOE - Paducah Gaseous Diffusion Plant

LAB ID: None

Permit Numbers: 073-00014 and 073-00015

For Official Use Only

GROUNDWATER WRITTEN COMMENTS

Monitoring Point	Facility Sample ID	Constituent	Flag	Description
8004-4809 MW384	MW384SG1-17	Tantalum	N	Sample spike (MS/MSD) recovery not within control limits
		Gross alpha	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 1.83. Rad error is 1.83.
		Gross beta		TPU is 17.9. Rad error is 7.54.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.509. Rad error is 0.509.
		Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 3.46. Rad error is 3.45.
		Technetium-99		TPU is 24.1. Rad error is 15.4.
		Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.517. Rad error is 0.506.
		Tritium	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 138. Rad error is 136.
8004-4810 MW385	MW385SG1-17	Vinyl acetate	LY1	LCS or LCSD recovery outside of control limits AND MS/MSD recovery outside acceptance criteria
		Gross alpha	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 2.93. Rad error is 2.89.
		Gross beta		TPU is 14.1. Rad error is 6.24.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.365. Rad error is 0.365.
		Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 1.99. Rad error is 1.99.
		Technetium-99		TPU is 20.1. Rad error is 11.8.
		Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.462. Rad error is 0.453.
		Tritium	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 135. Rad error is 134.
8004-4804 MW386	MW386SG1-17	Vinyl acetate	LY1	LCS or LCSD recovery outside of control limits AND MS/MSD recovery outside acceptance criteria
		Gross alpha	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 2.56. Rad error is 2.56.
		Gross beta	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 2.25. Rad error is 2.24.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.27. Rad error is 0.27.
		Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 2.4. Rad error is 2.4.
		Technetium-99	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 8.18. Rad error is 8.18.
		Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.371. Rad error is 0.366.
		Tritium	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 138. Rad error is 137.

RESIDENTIAL/INERT – QUARTERLY

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

Facility: US DOE - Paducah Gaseous Diffusion Plant

LAB ID: None

Permit Numbers: 073-00014 and 073-00015

For Official Use Only

GROUNDWATER WRITTEN COMMENTS

Monitoring Point	Facility Sample ID	Constituent	Flag	Description
8004-4815 MW387	MW387SG1-17	Vinyl acetate	LY1	LCS or LCSD recovery outside of control limits AND MS/MSD recovery outside acceptance criteria
		Gross alpha	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 3.29. Rad error is 3.23.
		Gross beta		TPU is 20. Rad error is 7.04.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226		TPU is 0.554. Rad error is 0.553.
		Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 1.95. Rad error is 1.95.
		Technetium-99		TPU is 27.2. Rad error is 13.1.
		Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.303. Rad error is 0.301.
		Tritium	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 141. Rad error is 138.
8004-4816 MW388	MW388SG1-17	Vinyl acetate	LY1	LCS or LCSD recovery outside of control limits AND MS/MSD recovery outside acceptance criteria
		Gross alpha		TPU is 4.29. Rad error is 3.97.
		Gross beta		TPU is 16.8. Rad error is 6.28.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226		TPU is 0.536. Rad error is 0.536.
		Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 3.23. Rad error is 3.22.
		Technetium-99		TPU is 22. Rad error is 12.6.
		Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.501. Rad error is 0.492.
		Tritium	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 140. Rad error is 138.

RESIDENTIAL/INERT – QUARTERLY

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

Facility: US DOE - Paducah Gaseous Diffusion Plant

LAB ID: None

Permit Numbers: 073-00014 and 073-00015

For Official Use Only

GROUNDWATER WRITTEN COMMENTS

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

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	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

For Official Use Only

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	MW390SG1-17	Tantalum	N	Sample spike (MS/MSD) recovery not within control limits
		Gross alpha	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 2.45. Rad error is 2.44.
		Gross beta		TPU is 8.85. Rad error is 5.47.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226		TPU is 0.617. Rad error is 0.615.
		Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 2.53. Rad error is 2.53.
		Technetium-99		TPU is 14.6. Rad error is 13.1.
		Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.444. Rad error is 0.437.
8004-4805 MW391	MW391SG1-17	Tritium	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 133. Rad error is 133.
		Vinyl acetate	Y1	MS/MSD recovery outside acceptance criteria
		Gross alpha	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 2.87. Rad error is 2.84.
		Gross beta		TPU is 3.28. Rad error is 3.08.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.404. Rad error is 0.403.
		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 11.4. Rad error is 11.3.
8004-4806 MW392	MW392SG1-17	Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.379. Rad error is 0.374.
		Tritium	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 148. Rad error is 148.
		Vinyl acetate	Y1	MS/MSD recovery outside acceptance criteria
		Gross alpha	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 2.51. Rad error is 2.51.
		Gross beta	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 1.68. Rad error is 1.68.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.506. Rad error is 0.506.
		Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 2.25. Rad error is 2.25.
		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 0.488. Rad error is 0.478.
		Tritium	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 147. Rad error is 147.

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
8004-4807 MW393	MW393SG1-17	Vinyl acetate	Y1	MS/MSD recovery outside acceptance criteria
		Gross alpha	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 2.81. Rad error is 2.79.
		Gross beta	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 2.01. Rad error is 1.99.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.52. Rad error is 0.519.
		Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 2.4. Rad error is 2.4.
		Technetium-99	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 10.7. Rad error is 10.7.
		Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.5. Rad error is 0.488.
8004-4802 MW394	MW394SG1-17	Vinyl acetate	Y1	MS/MSD recovery outside acceptance criteria
		Gross alpha	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 2.13. Rad error is 2.13.
		Gross beta	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 2.28. Rad error is 2.24.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.449. Rad error is 0.449.
		Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 2.46. Rad error is 2.46.
		Technetium-99	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 11. Rad error is 11.
		Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.402. Rad error is 0.397.
8004-4801 MW395	MW395SG1-17	Vinyl acetate	Y1	MS/MSD recovery outside acceptance criteria
		Gross alpha	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 2.38. Rad error is 2.38.
		Gross beta		TPU is 2.23. Rad error is 2.14.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226		TPU is 0.542. Rad error is 0.541.
		Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 2.35. Rad error is 2.35.
		Technetium-99	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 10.9. Rad error is 10.8.
		Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.347. Rad error is 0.346.
	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
8004-4803 MW396	MW396SG1-17	Vinyl acetate	Y1	MS/MSD recovery outside acceptance criteria
		Gross alpha	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 3.07. Rad error is 3.03.
		Gross beta	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 1.62. Rad error is 1.58.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.521. Rad error is 0.521.
		Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 2.03. Rad error is 2.03.
		Technetium-99	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 10.4. Rad error is 10.4.
		Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.292. Rad error is 0.291.
8004-4817 MW397	MW397SG1-17	Vinyl acetate	LY1	LCS or LCSD recovery outside of control limits AND MS/MSD recovery outside acceptance criteria
		Gross alpha	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 2.28. Rad error is 2.28.
		Gross beta		TPU is 2.37. 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 0.548. Rad error is 0.548.
		Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 3.2. Rad error is 3.2.
		Technetium-99	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 8.64. Rad error is 8.58.
		Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.342. Rad error is 0.338.
		Tritium	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 126. Rad error is 126.

RESIDENTIAL/INERT – QUARTERLY

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

Facility: US DOE - Paducah Gaseous Diffusion Plant

LAB ID: None

Permit Numbers: 073-00014 and 073-00015

For Official Use Only

GROUNDWATER WRITTEN COMMENTS

Monitoring Point	Facility Sample ID	Constituent	Flag	Description
0000-0000 QC	RI1SG1-17	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.
		Vinyl acetate	LY1	LCS or LCSD recovery outside of control limits AND MS/MSD recovery outside acceptance criteria
		Gross alpha	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 1.74. Rad error is 1.74.
		Gross beta	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 1.94. Rad error is 1.92.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.42. Rad error is 0.42.
		Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 1.58. Rad error is 1.58.
		Technetium-99	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 8.13. Rad error is 8.13.
		Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.435. Rad error is 0.428.
		Tritium	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 132. Rad error is 132.
		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

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GROUNDWATER WRITTEN COMMENTS

Monitoring Point	Facility Sample ID	Constituent	Flag	Description
0000-0000 QC	FB1SG1-17	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.
		Vinyl acetate	LY1	LCS or LCSD recovery outside of control limits AND MS/MSD recovery outside acceptance criteria
		Gross alpha	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 2.01. Rad error is 2.01.
		Gross beta	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 2.03. Rad error is 2.02.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.481. Rad error is 0.481.
		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 8.43. Rad error is 8.43.
		Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.495. Rad error is 0.483.
		Tritium	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 132. Rad error is 130.
		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

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GROUNDWATER WRITTEN COMMENTS

Monitoring Point	Facility Sample ID	Constituent	Flag	Description
0000-0000 QC	TB1SG1-17	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

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GROUNDWATER WRITTEN COMMENTS

Monitoring Point	Facility Sample ID	Constituent	Flag	Description
0000-0000 QC	TB1SG1-17	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

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GROUNDWATER WRITTEN COMMENTS

Monitoring Point	Facility Sample ID	Constituent	Flag	Description
0000-0000 QC	TB2SG1-17	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	TB2SG1-17	Vanadium		Analysis of constituent not required and not performed.
		Zinc		Analysis of constituent not required and not performed.
		Vinyl acetate	LY1	LCS or LCSD recovery outside of control limits AND MS/MSD recovery 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
0000-0000 QC	TB3SG1-17	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	TB3SG1-17	Vanadium		Analysis of constituent not required and not performed.
		Zinc		Analysis of constituent not required and not performed.
		Vinyl acetate	Y1	MS/MSD recovery 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
0000-0000 QC	TB3SG1-17	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	TB3SG1-17	Vanadium		Analysis of constituent not required and not performed.
		Zinc		Analysis of constituent not required and not performed.
		Vinyl acetate	Y1	MS/MSD recovery 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.		
8004-4804 MW386	MW386DSG1-17	Vinyl acetate	LY1	LCS or LCSD recovery outside of control limits AND MS/MSD recovery outside acceptance criteria
		Gross alpha	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 2.57. Rad error is 2.56.
		Gross beta	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 2.36. Rad error is 2.35.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226		TPU is 0.612. Rad error is 0.611.
		Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 3.69. Rad error is 3.69.
		Technetium-99	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 8.23. Rad error is 8.23.
		Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.568. Rad error is 0.556.
Tritium	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 132. Rad error is 132.		

APPENDIX D
STATISTICAL ANALYSES AND
QUALIFICATION STATEMENT

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GROUNDWATER STATISTICAL COMMENTS

Introduction

The statistical analyses conducted on the fourth quarter 2016 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 fourth quarter 2016 data used to conduct the statistical analyses were collected in October 2016. 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:

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

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, fourth quarter 2016. The observations are representative of the current quarter data. 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.

**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
PCB, Total
PCB-1242
pH*
Potassium
Radium-226
Sodium
Sulfate
Technetium-99
Thallium
Toluene
Total Organic Carbon (TOC)
Total Organic Halides (TOX)
Trichloroethene
Uranium
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	1	3	Yes
Antimony	4	4	0	No
Beryllium	4	4	0	No
Boron	4	1	3	Yes
Bromide	4	0	4	Yes
Bromochloromethane	4	4	0	No
Bromodichloromethane	4	4	0	No
Bromoform	4	4	0	No
Bromomethane	4	4	0	No
Calcium	4	0	4	Yes
Carbon disulfide	4	4	0	No
Chemical Oxygen Demand (COD)	4	4	0	No
Chloride	4	0	4	Yes
Chlorobenzene	4	4	0	No
Chloroethane	4	4	0	No
Chloroform	4	4	0	No
Chloromethane	4	4	0	No
<i>cis</i> -1,2-Dichloroethene	4	4	0	No
<i>cis</i> -1,3-Dichloropropene	4	4	0	No
Cobalt	4	1	3	Yes
Conductivity	4	0	4	Yes
Copper	4	1	3	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	1	3	Yes
Oxidation-Reduction Potential	4	0	4	Yes
PCB, Total	4	4	0	No
PCB-1016	4	4	0	No
PCB-1221	4	4	0	No
PCB-1232	4	4	0	No
PCB-1242	4	4	0	No
PCB-1248	4	4	0	No
PCB-1254	4	4	0	No
PCB-1260	4	4	0	No
pH	4	0	4	Yes
Potassium	4	0	4	Yes
Radium-226	4	2	2	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	3	1	Yes
Thorium-230	4	4	0	No
Toluene	4	4	0	No
Total Organic Carbon (TOC)	4	0	4	Yes
Total Organic Halides (TOX)	4	1	3	Yes
<i>trans</i> -1,2-Dichloroethene	4	4	0	No
<i>trans</i> -1,3-Dichloropropene	4	4	0	No
<i>trans</i> -1,4-Dichloro-2-Butene	4	4	0	No
Trichlorofluoromethane	4	4	0	No
Uranium	4	1	3	Yes
Vanadium	4	3	1	Yes
Vinyl Acetate	4	4	0	No
Zinc	4	2	2	Yes

Bold denotes parameters with at least one uncensored observation.

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

Parameters	Observations	Censored Observation	Uncensored Observation	Statistical Analysis?
1,1,1,2-Tetrachloroethane	11	11	0	No
1,1,2,2-Tetrachloroethane	11	11	0	No
1,1,2-Trichloroethane	11	11	0	No
1,1-Dichloroethane	11	11	0	No
1,2,3-Trichloropropane	11	11	0	No
1,2-Dibromo-3-chloropropane	11	11	0	No
1,2-Dibromoethane	11	11	0	No
1,2-Dichlorobenzene	11	11	0	No
1,2-Dichloropropane	11	11	0	No
2-Butanone	11	11	0	No
2-Hexanone	11	11	0	No
4-Methyl-2-pentanone	11	11	0	No
Acetone	11	11	0	No
Acrolein	11	11	0	No
Acrylonitrile	11	11	0	No
Aluminum	11	5	6	Yes
Antimony	11	11	0	No
Aroclor-1268	2	2	0	No
Beryllium	11	11	0	No
Beta activity	11	2	9	Yes
Boron	11	1	10	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	9	2	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	4	7	Yes
Conductivity	11	0	11	Yes
Copper	11	2	9	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

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

Parameters	Observations	Censored Observation	Uncensored Observation	Statistical Analysis?
Ethylbenzene	11	11	0	No
Iodide	11	11	0	No
Iodomethane	11	11	0	No
Iron	11	4	7	Yes
Magnesium	11	0	11	Yes
Manganese	11	1	10	Yes
Methylene chloride	11	11	0	No
Molybdenum	11	9	2	Yes
Nickel	11	0	11	Yes
Oxidation-Reduction Potential	11	0	11	Yes
PCB, Total	11	10	1	Yes
PCB-1016	11	11	0	No
PCB-1221	11	11	0	No
PCB-1232	11	11	0	No
PCB-1242	11	10	1	Yes
PCB-1248	11	11	0	No
PCB-1254	11	11	0	No
PCB-1260	11	11	0	No
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	8	3	Yes
Tetrachloroethene	11	11	0	No
Thallium	11	11	0	No
Thorium-230	11	11	0	No
Toluene	11	10	1	Yes
Total Organic Carbon (TOC)	11	1	10	Yes
Total Organic Halides (TOX)	11	3	8	Yes
<i>trans</i> -1,2-Dichloroethene	11	11	0	No
<i>trans</i> -1,3-Dichloropropene	11	11	0	No
<i>trans</i> -1,4-Dichloro-2-Butene	11	11	0	No
Trichloroethene	11	3	8	Yes
Trichlorofluoromethane	11	11	0	No
Uranium	11	11	0	No
Vanadium	11	9	2	Yes
Vinyl Acetate	11	11	0	No
Zinc	11	10	1	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	5	2	Yes
Antimony	7	7	0	No
Aroclor-1268	2	2	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	4	3	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	5	2	Yes
cis-1,3-Dichloropropene	7	7	0	No
Cobalt	7	4	3	Yes
Conductivity	7	0	7	Yes
Copper	7	2	5	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

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

Parameters	Observations	Censored Observation	Uncensored Observation	Statistical Analysis?
Iron	7	3	4	Yes
Magnesium	7	0	7	Yes
Manganese	7	2	5	Yes
Methylene chloride	7	7	0	No
Molybdenum	7	7	0	No
Nickel	7	0	7	Yes
Oxidation-Reduction Potential	7	0	7	Yes
PCB, Total	7	6	1	Yes
PCB-1016	7	7	0	No
PCB-1221	7	7	0	No
PCB-1232	7	7	0	No
PCB-1242	7	6	1	Yes
PCB-1248	7	7	0	No
PCB-1254	7	7	0	No
PCB-1260	7	7	0	No
pH	7	0	7	Yes
Potassium	7	0	7	Yes
Radium-226	7	5	2	Yes
Rhodium	7	7	0	No
Sodium	7	0	7	Yes
Styrene	7	7	0	No
Sulfate	7	0	7	Yes
Tantalum	7	7	0	No
Technetium-99	7	3	4	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	0	7	Yes
<i>trans</i> -1,2-Dichloroethene	7	7	0	No
<i>trans</i> -1,3-Dichloropropene	7	7	0	No
<i>trans</i> -1,4-Dichloro-2-Butene	7	7	0	No
Trichloroethene	7	1	6	Yes
Trichlorofluoromethane	7	7	0	No
Uranium	7	6	1	Yes
Vanadium	7	7	0	No
Vinyl Acetate	7	7	0	No
Zinc	7	7	0	No

Bold denotes parameters with at least one uncensored observation.

Discussion of Results from Historical Background Comparison

For the UCRS, URGA, and LRGA, the concentrations of this quarter were compared to the results of the one-sided upper tolerance interval tests that were calculated using historical background and presented in Attachment D1. The statistician qualification statement is presented in Attachment D3. For the UCRS, URGA, and LRGA, the test was applied to 29, 33, and 30 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 oxidation-reduction potential, radium-226, and technetium-99.

URGA

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

LRGA

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

Statistical Summary

Summaries of the results of the statistical tests conducted on data obtained from wells in the UCRS, the URGA, and in the LRGA are presented in Exhibit D.7, Exhibit D.8, and Exhibit D.9, respectively.

Exhibit D.6. Summary of Exceedances of Statistically Derived Historical Background Concentrations

UCRS	URGA	LRGA
MW386: Oxidation-reduction potential, radium-226	MW220: Oxidation-reduction potential, radium-226, sulfate	MW370: Oxidation-reduction potential, sulfate
MW390: Oxidation-reduction potential, radium-226, technetium-99	MW221: Radium-226	MW373: Calcium, conductivity, dissolved solids, magnesium, oxidation-reduction potential, sulfate
MW393: Oxidation-reduction potential	MW222: Oxidation-reduction potential	MW385: Beta activity, chemical oxygen demand, oxidation-reduction potential, sulfate, technetium-99
MW396: Oxidation-reduction potential	MW223: Oxidation-reduction potential	MW388: Beta activity, oxidation-reduction potential, radium-226, sulfate, technetium-99
	MW224: Radium-226	MW392: Oxidation-reduction potential, trichloroethene
	MW369: Beta activity, technetium-99	MW395: Oxidation-reduction potential, radium-226
	MW372: Calcium, dissolved solids, magnesium, sulfate	MW397: Oxidation-reduction potential
	MW384: Beta activity, oxidation-reduction potential, sulfate, technetium-99	
	MW387: Beta activity, oxidation-reduction potential, radium-226, sulfate, technetium-99	
	MW391: 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.
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 MW386 and MW390.
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.
Thallium	Tolerance Interval	1.61	No exceedance of statistically derived historical background concentration.
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.
Uranium	Tolerance Interval	0.31	No exceedance of statistically derived historical background concentration.
Vanadium	Tolerance Interval	0.11	No exceedance of statistically derived historical background concentration.
Zinc	Tolerance Interval	0.79	No exceedance of statistically derived historical background concentration.

CV: coefficient of variation

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

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 MW369, MW384, and MW387.
Boron	Tolerance Interval	1.45	No exceedance of statistically derived historical background concentration.
Bromide	Tolerance Interval	0.00	No exceedance of statistically derived historical background concentration.
Calcium	Tolerance Interval	0.17	Current results exceed statistically derived historical background concentration in MW372.
Chemical Oxygen Demand (COD)	Tolerance Interval	0.00	No exceedance of statistically derived historical background concentration.
Chloride	Tolerance Interval	0.23	No exceedance of statistically derived historical background concentration.
<i>cis</i> -1,2-Dichloroethene	Tolerance Interval	0.00	No exceedance of statistically derived historical background concentration.
Cobalt	Tolerance Interval	2.44	No exceedance of statistically derived historical background concentration.
Conductivity	Tolerance Interval	0.28	No exceedance of statistically derived historical background concentration.
Copper	Tolerance Interval	0.43	No exceedance of statistically derived historical background concentration.
Dissolved Oxygen	Tolerance Interval	0.50	No exceedance of statistically derived historical background concentration.
Dissolved Solids	Tolerance Interval	0.12	Current results exceed statistically derived historical background concentration in MW372.
Iron	Tolerance Interval	1.17	No exceedance of statistically derived historical background concentration.
Magnesium	Tolerance Interval	0.16	Current results exceed statistically derived historical background concentration in MW372 and MW391.
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.

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
Nickel	Tolerance Interval	1.79	No exceedance of statistically derived historical background concentration.
Oxidation-Reduction Potential	Tolerance Interval	0.48	Current results exceed statistically derived historical background concentration in MW220, MW222, MW223, MW384, and MW387.
PCB, Total	Tolerance Interval	0.72	No exceedance of statistically derived historical background concentration.
PCB-1242	Tolerance Interval	1.16	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 MW220, MW221, MW224, and MW387.
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, MW372, MW384, MW387, and MW391.
Technetium-99	Tolerance Interval	0.99	Current results exceed statistically derived historical background concentration in MW369, MW384, and MW387.
Toluene	Tolerance Interval	0.00	No exceedance of statistically derived historical background concentration.
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 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	Current results exceed statistically derived historical background concentration in MW385.
Chloride	Tolerance Interval	0.22	No exceedance of statistically derived historical background concentration.
<i>cis</i> -1,2-Dichloroethene	Tolerance Interval	0.00	No exceedance of statistically derived historical background concentration.
Cobalt	Tolerance Interval	1.51	No exceedance of statistically derived historical background concentration.
Conductivity	Tolerance Interval	0.14	Current results exceed statistically derived historical background concentration in MW373.
Copper	Tolerance Interval	0.47	No exceedance of statistically derived historical background concentration.
Dissolved Oxygen	Tolerance Interval	0.52	No exceedance of statistically derived historical background concentration.
Dissolved Solids	Tolerance Interval	0.16	Current results exceed statistically derived historical background concentration in MW373.
Iron	Tolerance Interval	1.29	No exceedance of statistically derived historical background concentration.
Magnesium	Tolerance Interval	0.51	Current results exceed statistically derived historical background concentration in MW373.
Manganese	Tolerance Interval	1.49	No exceedance of statistically derived historical background concentration.

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

Parameter	Performed Test	CV Normality Test*	Results of Tolerance Interval Test Conducted
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.
PCB, Total	Tolerance Interval	0.03	No exceedance of statistically derived historical background concentration.
PCB-1242	Tolerance Interval	0.13	No exceedance of statistically derived historical background concentration.
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 and MW395.
Sodium	Tolerance Interval	0.47	No exceedance of statistically derived historical background concentration.
Sulfate	Tolerance Interval	0.20	Current results exceed statistically derived historical background concentration in MW370, MW373, MW385, and MW388.
Technetium-99	Tolerance Interval	0.80	Current results exceed statistically derived historical background concentration in MW385 and MW388.
Total Organic Carbon (TOC)	Tolerance Interval	0.55	No exceedance of statistically derived historical background concentration.
Total Organic Halides (TOX)	Tolerance Interval	0.59	No exceedance of statistically derived historical background concentration.
Trichloroethene ¹	Tolerance Interval	0.78	Current results exceed statistically derived historical background concentration in MW392.
Uranium	Tolerance Interval	0.00	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 the UCRS, URGA, and LRGA, the concentrations from downgradient wells were compared to the one-sided TL calculated using the most recent eight quarters of data and are presented in Attachment D2. The statistician qualification statement is presented in Attachment D3. For the UCRS, URGA, and LRGA, the test was applied to 3, 8, and 11 parameters, respectively, because these parameter concentrations exceeded the historical background TL. A summary of instances where downgradient well concentrations exceeded the TL calculated using current background data is shown in Exhibit D.10, presented by well number.

Exhibit D.10. Summary of Exceedances (Downgradient Wells) of the TL Calculated Using Current Background Concentrations

URGA	LRGA
MW369: Beta activity, technetium-99	MW370: Sulfate
MW372: Calcium, dissolved solids, magnesium, sulfate	MW373: Calcium, conductivity, dissolved solids, magnesium, sulfate
MW387: Beta activity, sulfate, technetium-99	MW388: Beta activity, sulfate, technetium-99
MW391: Magnesium, sulfate	MW392: Trichloroethene

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 concentrations in one UCRS well (i.e., MW390) were 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, magnesium, sulfate, technetium-99, and trichloroethene.

Statistical Summary

Summaries of the statistical tests conducted on data obtained from wells in the UCRS, the URGA, and in 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
Oxidation-Reduction Potential	Tolerance Interval	0.42	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	0.39	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	4.00	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	0.52	MW369, MW384, and MW387 exceeded the upper TL, which is evidence of elevated concentration with respect to current background data.
Calcium	Tolerance Interval	0.16	MW372 exceeded the upper TL, which is evidence of elevated concentration with respect to current background data.
Dissolved Solids	Tolerance Interval	0.16	MW372 exceeded the upper TL, which is evidence of elevated concentration with respect to current background data.
Magnesium	Tolerance Interval	0.17	MW372 and MW391 exceeded the upper TL, which is evidence of elevated concentration with respect to current background data.
Oxidation-Reduction Potential	Tolerance Interval	0.25	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	0.37	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	0.28	MW372, MW387, and MW391 exceeded the upper TL, which is evidence of elevated concentration with respect to current background data.
Technetium-99	Tolerance Interval	0.66	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	0.75	MW385 and MW388 exceeded the upper TL, which is evidence of elevated concentration with respect to current background data.
Calcium	Tolerance Interval	0.21	MW373 exceeded the upper TL, which is evidence of elevated concentration with respect to current background data.
Chemical Oxygen Demand (COD)	Tolerance Interval	0.61	MW385 exceeded the upper TL, which is evidence of elevated concentration with respect to current background data.
Conductivity	Tolerance Interval	0.08	MW373 exceeded the upper TL, which is evidence of elevated concentration with respect to current background data.
Dissolved Solids	Tolerance Interval	0.15	MW373 exceeded the upper TL, which is evidence of elevated concentration with respect to current background data.
Magnesium	Tolerance Interval	0.22	MW373 exceeded the upper TL, which is evidence of elevated concentration with respect to current background data.
Oxidation-Reduction Potential	Tolerance Interval	0.22	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	0.52	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	0.08	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	0.36	MW385 and MW388 exceeded the upper TL, which is evidence of elevated concentration with respect to current background data.
Trichloroethene	Tolerance Interval	0.73	MW392 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 Fourth Quarter 2016 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	0.107	NO	-2.235	N/A
MW393	Downgradient	Yes	0.0206	NO	-3.882	N/A
MW396	Upgradient	Yes	0.0228	NO	-3.781	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. D1-3

C-746-S/T Fourth Quarter 2016 Statistical Analysis Historical Background Comparison

Boron

UNITS: mg/L

UCRS

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

Statistics-Background Data	X = 0.650	S = 0.833	CV(1) = 1.282	K factor** = 3.188	TL(1) = 3.306	LL(1) =N/A
Statistics-Transformed Background Data	X = -1.034	S = 1.066	CV(2) = -1.031	K factor** = 3.188	TL(2) = 2.364	LL(2) =N/A

Historical Background Data from Upgradient Wells with Transformed Result

Well Number: MW396

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

Dry/Partially Dry Wells

Well No.	Gradient
MW389	Downgradient

Because CV(1) is greater than 1, the natural logarithm of background and test well results were calculated utilizing TL(2) for comparison.

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW386	Sidegradient	No	0.015	N/A	-4.200	N/A
MW390	Downgradient	Yes	0.00872	N/A	-4.742	NO
MW393	Downgradient	Yes	0.0219	N/A	-3.821	NO
MW396	Upgradient	Yes	0.00841	N/A	-4.778	NO

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

Conclusion of Statistical Analysis on Historical Data

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

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

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

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

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

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

** Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009. D1-4

C-746-S/T Fourth Quarter 2016 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	0.191	NO	-1.655	N/A
MW390	Downgradient	Yes	0.653	NO	-0.426	N/A
MW393	Downgradient	Yes	0.186	NO	-1.682	N/A
MW396	Upgradient	Yes	1.23	NO	0.207	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. D1-5

C-746-S/T Fourth Quarter 2016 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	23	NO	3.135	N/A
MW390	Downgradient	Yes	32.9	NO	3.493	N/A
MW393	Downgradient	Yes	13	NO	2.565	N/A
MW396	Upgradient	Yes	39.2	NO	3.669	N/A

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

Conclusion of Statistical Analysis on Historical Data

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

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

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

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

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

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

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

C-746-S/T Fourth Quarter 2016 Statistical Analysis Historical Background Comparison

Chloride

UNITS: mg/L

UCRS

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

Statistics-Background Data X= 101.725 S= 5.245 CV(1)=0.052 **K factor**= 3.188** TL(1)= 118.447 LL(1)=N/A

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

Historical Background Data from Upgradient Wells with Transformed Result

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

Dry/Partially Dry Wells

Well No.	Gradient
MW389	Downgradient

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

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW386	Sidegradient	Yes	16.1	NO	2.779	N/A
MW390	Downgradient	Yes	69.9	NO	4.247	N/A
MW393	Downgradient	Yes	13.4	NO	2.595	N/A
MW396	Upgradient	Yes	70.4	NO	4.254	N/A

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

Conclusion of Statistical Analysis on Historical Data

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

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

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

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

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

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

** Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009. D1-7

C-746-S/T Fourth Quarter 2016 Statistical Analysis Historical Background Comparison

Cobalt

UNITS: mg/L

UCRS

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

Statistics-Background Data X= 0.008 S= 0.011 CV(1)=1.340 K factor**= 3.188 TL(1)= 0.042 LL(1)=N/A

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

Historical Background Data from Upgradient Wells with Transformed Result

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

Dry/Partially Dry Wells

Well No.	Gradient
MW389	Downgradient

Because CV(1) is greater than 1, the natural logarithm of background and test well results were calculated utilizing TL(2) for comparison.

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW386	Sidegradient	Yes	0.0139	N/A	-4.276	NO
MW390	Downgradient	Yes	0.000281	N/A	-8.177	NO
MW393	Downgradient	No	0.001	N/A	-6.908	N/A
MW396	Upgradient	Yes	0.00381	N/A	-5.570	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. D1-8

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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	615	NO	6.422	N/A
MW390	Downgradient	Yes	710	NO	6.565	N/A
MW393	Downgradient	Yes	403	NO	5.999	N/A
MW396	Upgradient	Yes	760	NO	6.633	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, $S = [\text{Sum} ((\text{background result}-X)^2)/[\text{count of background results} - 1]]^{0.5}$

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. D1-9

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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	0.000885	NO	-7.030	N/A
MW390	Downgradient	Yes	0.000857	NO	-7.062	N/A
MW393	Downgradient	No	0.001	N/A	-6.908	N/A
MW396	Upgradient	Yes	0.000726	NO	-7.228	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

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Dissolved Oxygen

UNITS: mg/L

UCRS

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

Statistics-Background Data X= 1.395 S= 1.677 CV(1)=1.202 K factor**= 3.188 TL(1)= 6.743 LL(1)=N/A

Statistics-Transformed Background Data X= -0.043 S= 0.814 CV(2)=-18.867 K factor**= 3.188 TL(2)= 2.553 LL(2)=N/A

Historical Background Data from Upgradient Wells with Transformed Result

Well Number: MW396		
Date Collected	Result	LN(Result)
8/13/2002	5.45	1.696
9/16/2002	0.4	-0.916
10/16/2002	0.54	-0.616
1/13/2003	0.72	-0.329
4/8/2003	0.69	-0.371
7/16/2003	1.1	0.095
10/14/2003	0.71	-0.342
1/14/2004	1.55	0.438

Dry/Partially Dry Wells

Well No.	Gradient
MW389	Downgradient

Because CV(1) is greater than 1, the natural logarithm of background and test well results were calculated utilizing TL(2) for comparison.

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW386	Sidegradient	Yes	1.28	N/A	0.247	NO
MW390	Downgradient	Yes	6	N/A	1.792	NO
MW393	Downgradient	Yes	2.18	N/A	0.779	NO
MW396	Upgradient	Yes	2.38	N/A	0.867	NO

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

Conclusion of Statistical Analysis on Historical Data

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

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

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

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

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

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

** Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009. D1-11

C-746-S/T Fourth Quarter 2016 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	376	NO	5.930	N/A
MW390	Downgradient	Yes	391	NO	5.969	N/A
MW393	Downgradient	Yes	233	NO	5.451	N/A
MW396	Upgradient	Yes	396	NO	5.981	N/A

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

Conclusion of Statistical Analysis on Historical Data

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

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

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

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

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

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

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

C-746-S/T Fourth Quarter 2016 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	0.628	NO	-0.465	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 Fourth Quarter 2016 Statistical Analysis Historical Background Comparison

Iron

UNITS: mg/L

UCRS

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

Statistics-Background Data	X = 7.796	S = 3.723	CV(1) =0.478	K factor** = 3.188	TL(1) = 19.666	LL(1) =N/A
Statistics-Transformed Background Data	X = 1.880	S = 0.723	CV(2) =0.384	K factor** = 3.188	TL(2) = 4.184	LL(2) =N/A

Historical Background Data from Upgradient Wells with Transformed Result

Well Number: MW396

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

Dry/Partially Dry Wells

Well No.	Gradient
MW389	Downgradient

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

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW386	Sidegradient	Yes	1.71	NO	0.536	N/A
MW390	Downgradient	Yes	0.108	NO	-2.226	N/A
MW393	Downgradient	Yes	2.3	NO	0.833	N/A
MW396	Upgradient	Yes	1.29	NO	0.255	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 Fourth Quarter 2016 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	9.85	NO	2.287	N/A
MW390	Downgradient	Yes	14	NO	2.639	N/A
MW393	Downgradient	Yes	3.88	NO	1.356	N/A
MW396	Upgradient	Yes	17.4	NO	2.856	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 Fourth Quarter 2016 Statistical Analysis Historical Background Comparison

Manganese

UNITS: mg/L

UCRS

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

Statistics-Background Data X= 0.774 S= 0.353 CV(1)=0.456 K factor**= 3.188 TL(1)= 1.900 LL(1)=N/A

Statistics-Transformed Background Data X= -0.566 S= 1.192 CV(2)=-2.105 K factor**= 3.188 TL(2)= 3.235 LL(2)=N/A

Historical Background Data from Upgradient Wells with Transformed Result

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

Dry/Partially Dry Wells

Well No.	Gradient
MW389	Downgradient

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

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW386	Sidegradient	Yes	1.69	NO	0.525	N/A
MW390	Downgradient	Yes	0.00152	NO	-6.489	N/A
MW393	Downgradient	Yes	0.0459	NO	-3.081	N/A
MW396	Upgradient	Yes	0.588	NO	-0.531	N/A

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

Conclusion of Statistical Analysis on Historical Data

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

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

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

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

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

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

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

C-746-S/T Fourth Quarter 2016 Statistical Analysis Historical Background Comparison

Molybdenum

UNITS: mg/L

UCRS

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

Statistics-Background Data X= 0.007 S= 0.011 CV(1)= 1.507 K factor**= 3.188 TL(1)= 0.042 LL(1)=N/A

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

Historical Background Data from Upgradient Wells with Transformed Result

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

Dry/Partially Dry Wells

Well No.	Gradient
MW389	Downgradient

Because CV(1) is greater than 1, the natural logarithm of background and test well results were calculated utilizing TL(2) for comparison.

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW386	Sidegradient	No	0.000816	N/A	-7.111	N/A
MW390	Downgradient	No	0.000596	N/A	-7.425	N/A
MW393	Downgradient	No	0.0005	N/A	-7.601	N/A
MW396	Upgradient	Yes	0.000478	N/A	-7.646	NO

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

Conclusion of Statistical Analysis on Historical Data

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

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

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

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

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

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

** Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009. D1-17

C-746-S/T Fourth Quarter 2016 Statistical Analysis Historical Background Comparison

Nickel

UNITS: mg/L

UCRS

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

Statistics-Background Data X= 0.016 S= 0.021 CV(1)= 1.272 K factor**= 3.188 TL(1)= 0.083 LL(1)=N/A

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

Historical Background Data from Upgradient Wells with Transformed Result

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

Dry/Partially Dry Wells

Well No.	Gradient
MW389	Downgradient

Because CV(1) is greater than 1, the natural logarithm of background and test well results were calculated utilizing TL(2) for comparison.

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW386	Sidegradient	Yes	0.011	N/A	-4.510	NO
MW390	Downgradient	Yes	0.00177	N/A	-6.337	NO
MW393	Downgradient	No	0.002	N/A	-6.215	N/A
MW396	Upgradient	Yes	0.0015	N/A	-6.502	NO

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

Conclusion of Statistical Analysis on Historical Data

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

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

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

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

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

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

** Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009. D1-18

C-746-S/T Fourth Quarter 2016 Statistical Analysis Historical Background Comparison

Oxidation-Reduction Potential

UNITS: mV

UCRS

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

Statistics-Background Data X= 13.000 S= 61.952 CV(1)=4.766 K factor**= 3.188 TL(1)= 210.502 LL(1)=N/A

Statistics-Transformed Background Data X= 4.364 S= 0.333 CV(2)=0.076 K factor**= 3.188 TL(2)= 4.736 LL(2)=N/A

Historical Background Data from Upgradient Wells with Transformed Result

Well Number: MW396		
Date Collected	Result	LN(Result)
8/13/2002	60	4.094
4/8/2003	71	4.263
7/16/2003	-56	#Func!
10/14/2003	-54	#Func!
1/14/2004	-22	#Func!
4/12/2004	-6	#Func!
7/20/2004	-3	#Func!
10/12/2004	114	4.736

Dry/Partially Dry Wells

Well No.	Gradient
MW389	Downgradient

Because CV(1) is greater than 1, the natural logarithm of background and test well results were calculated utilizing TL(2) for comparison.

#Because the natural log was not possible for all background values, the TL was considered equal to the maximum background value.

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW386	Sidegradient	Yes	206	N/A	5.328	YES
MW390	Downgradient	Yes	431	N/A	6.066	YES
MW393	Downgradient	Yes	218	N/A	5.384	YES
MW396	Upgradient	Yes	221	N/A	5.398	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. D1-19

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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	6.72	NO	1.905	N/A
MW390	Downgradient	Yes	6.54	NO	1.878	N/A
MW393	Downgradient	Yes	6.25	NO	1.833	N/A
MW396	Upgradient	Yes	6.5	NO	1.872	N/A

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

Conclusion of Statistical Analysis on Historical Data

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

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

- CV Coefficient-of-Variation, $CV = S/X$ If CV is less than or equal to 1 assume normal distribution.
- S Standard Deviation, $S = [\text{Sum}([(background\ result-X)^2]/[\text{count of background results} - 1])]^{0.5}$
- TL Upper Tolerance Limit, $TL = X + (K * S)$, LL Lower Tolerance Limit, $LL = X - (K * S)$
- X Mean, $X = (\text{sum of background results})/(\text{count of background results})$

** Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009. D1-20

C-746-S/T Fourth Quarter 2016 Statistical Analysis Historical Background Comparison

Potassium

UNITS: mg/L

UCRS

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

Statistics-Background Data	X = 1.411	S = 0.399	CV(1) =0.282	K factor** = 3.188	TL(1) = 2.682	LL(1) =N/A
Statistics-Transformed Background Data	X = 0.311	S = 0.271	CV(2) =0.870	K factor** = 3.188	TL(2) = 1.175	LL(2) =N/A

Historical Background Data from Upgradient Wells with Transformed Result

Well Number:	MW396	
Date Collected	Result	LN(Result)
8/13/2002	2	0.693
9/16/2002	2	0.693
10/16/2002	0.978	-0.022
1/13/2003	1.08	0.077
4/8/2003	1.12	0.113
7/16/2003	1.38	0.322
10/14/2003	1.24	0.215
1/14/2004	1.49	0.399

Dry/Partially Dry Wells

Well No.	Gradient
MW389	Downgradient

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

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW386	Sidegradient	Yes	0.308	NO	-1.178	N/A
MW390	Downgradient	Yes	0.369	NO	-0.997	N/A
MW393	Downgradient	Yes	0.435	NO	-0.832	N/A
MW396	Upgradient	Yes	0.894	NO	-0.112	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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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	Yes	0.756	N/A	-0.280	YES
MW390	Downgradient	Yes	1.02	N/A	0.020	YES
MW393	Downgradient	No	0.591	N/A	-0.526	N/A
MW396	Upgradient	No	0.601	N/A	-0.509	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

MW386
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. D1-22

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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	105	NO	4.654	N/A
MW390	Downgradient	Yes	98	NO	4.585	N/A
MW393	Downgradient	Yes	79.8	NO	4.380	N/A
MW396	Upgradient	Yes	115	NO	4.745	N/A

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

Conclusion of Statistical Analysis on Historical Data

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

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

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

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

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

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

** Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009. D1-23

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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	44.1	NO	3.786	N/A
MW390	Downgradient	Yes	42.2	NO	3.742	N/A
MW393	Downgradient	Yes	14.5	NO	2.674	N/A
MW396	Upgradient	Yes	23.3	NO	3.148	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

C-746-S/T Fourth Quarter 2016 Statistical Analysis Historical Background Comparison

Technetium-99

UNITS: pCi/L

UCRS

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

Statistics-Background Data X= 7.624 S= 6.558 CV(1)=0.860 K factor**= 3.188 TL(1)= 28.531 LL(1)=N/A

Statistics-Transformed Background Data X= 1.498 S= 1.321 CV(2)=0.882 K factor**= 3.188 TL(2)= 5.710 LL(2)=N/A

Historical Background Data from Upgradient Wells with Transformed Result

Well Number: MW396		
Date Collected	Result	LN(Result)
8/13/2002	16.7	2.815
9/16/2002	6.39	1.855
10/16/2002	4.55	1.515
1/13/2003	16.5	2.803
4/8/2003	3.04	1.112
7/16/2003	0.354	-1.038
10/14/2003	11.9	2.477
1/14/2004	1.56	0.445

Dry/Partially Dry Wells

Well No.	Gradient
MW389	Downgradient

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

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW386	Sidegradient	No	-1.08	N/A	#Error	N/A
MW390	Downgradient	Yes	56.7	YES	4.038	N/A
MW393	Downgradient	No	0.082	N/A	-2.501	N/A
MW396	Upgradient	No	-10.9	N/A	#Error	N/A

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

Conclusion of Statistical Analysis on Historical Data

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

Wells with Exceedances

MW390

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

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

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

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. D1-25

C-746-S/T Fourth Quarter 2016 Statistical Analysis Historical Background Comparison

Thallium

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= 0.056 S= 0.089 CV(1)= 1.608 K factor**= 3.188 TL(1)= 0.340 LL(1)=N/A

Statistics-Transformed Background Data X= -4.259 S= 1.780 CV(2)= -0.418 K factor**= 3.188 TL(2)= 1.415 LL(2)=N/A

Historical Background Data from Upgradient Wells with Transformed Result

Well Number: MW396		
Date Collected	Result	LN(Result)
8/13/2002	0.2	-1.609
9/16/2002	0.2	-1.609
10/16/2002	0.01	-4.605
1/13/2003	0.01	-4.605
4/8/2003	0.01	-4.605
7/16/2003	0.01	-4.605
10/14/2003	0.002	-6.215
1/14/2004	0.002	-6.215

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	0.002	N/A	-6.215	N/A
MW390	Downgradient	Yes	0.000654	N/A	-7.332	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. D1-26

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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	6.58	NO	1.884	N/A
MW390	Downgradient	Yes	2.4	NO	0.875	N/A
MW393	Downgradient	Yes	2.75	NO	1.012	N/A
MW396	Upgradient	Yes	5.83	NO	1.763	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. D1-27

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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	148	NO	4.997	N/A
MW390	Downgradient	Yes	23.1	NO	3.140	N/A
MW393	Downgradient	Yes	20.1	NO	3.001	N/A
MW396	Upgradient	No	10	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.

Conclusion of Statistical Analysis on Historical Data

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

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

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

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

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

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

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

C-746-S/T Fourth Quarter 2016 Statistical Analysis Historical Background Comparison

Uranium

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= 0.001 S= 0.000 CV(1)=0.314 K factor**= 3.188 TL(1)= 0.002 LL(1)=N/A

Statistics-Transformed Background Data X= -6.821 S= 0.245 CV(2)=-0.036 K factor**= 3.188 TL(2)= -6.040 LL(2)=N/A

Historical Background Data from Upgradient Wells with Transformed Result

Well Number: MW396		
Date Collected	Result	LN(Result)
8/13/2002	0.002	-6.215
9/16/2002	0.001	-6.908
10/16/2002	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
1/14/2004	0.001	-6.908

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	0.000067	NO	-9.611	N/A
MW390	Downgradient	Yes	0.000137	NO	-8.896	N/A
MW393	Downgradient	No	0.0002	N/A	-8.517	N/A
MW396	Upgradient	Yes	0.000102	NO	-9.191	N/A

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

Conclusion of Statistical Analysis on Historical Data

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

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

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

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

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

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

** Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009. D1-29

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Vanadium

UNITS: mg/L

UCRS

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

Statistics-Background Data X= 0.021 S= 0.002 CV(1)=0.109 K factor**= 3.188 TL(1)= 0.029 LL(1)=N/A

Statistics-Transformed Background Data X= -3.856 S= 0.103 CV(2)=-0.027 K factor**= 3.188 TL(2)= -3.527 LL(2)=N/A

Historical Background Data from Upgradient Wells with Transformed Result

Well Number:	MW396	
Date Collected	Result	LN(Result)
8/13/2002	0.025	-3.689
9/16/2002	0.025	-3.689
10/16/2002	0.02	-3.912
1/13/2003	0.02	-3.912
4/8/2003	0.02	-3.912
7/16/2003	0.02	-3.912
10/14/2003	0.02	-3.912
1/14/2004	0.02	-3.912

Dry/Partially Dry Wells

Well No.	Gradient
MW389	Downgradient

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

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW386	Sidegradient	Yes	0.00469	NO	-5.362	N/A
MW390	Downgradient	No	0.01	N/A	-4.605	N/A
MW393	Downgradient	No	0.00711	N/A	-4.946	N/A
MW396	Upgradient	No	0.01	N/A	-4.605	N/A

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

Conclusion of Statistical Analysis on Historical Data

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

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

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

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

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

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

** Read from Table 5, Appendix B of *Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance*, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009. D1-30

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Zinc

UNITS: mg/L

UCRS

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

Statistics-Background Data X= 0.044 S= 0.035 CV(1)=0.786 K factor**= 3.188 TL(1)=0.156 LL(1)=N/A

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

Historical Background Data from Upgradient Wells with Transformed Result

Well Number:	MW396	
Date Collected	Result	LN(Result)
8/13/2002	0.1	-2.303
9/16/2002	0.1	-2.303
10/16/2002	0.025	-3.689
1/13/2003	0.035	-3.352
4/8/2003	0.035	-3.352
7/16/2003	0.02	-3.912
10/14/2003	0.02	-3.912
1/14/2004	0.02	-3.912

Dry/Partially Dry Wells

Well No.	Gradient
MW389	Downgradient

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

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW386	Sidegradient	Yes	0.00388	NO	-5.552	N/A
MW390	Downgradient	No	0.01	N/A	-4.605	N/A
MW393	Downgradient	No	0.01	N/A	-4.605	N/A
MW396	Upgradient	Yes	0.00389	NO	-5.549	N/A

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

Conclusion of Statistical Analysis on Historical Data

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

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

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

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

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

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

** Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009. D1-31

C-746-S/T Fourth Quarter 2016 Statistical Analysis Historical Background Comparison

Aluminum

UNITS: mg/L

URGA

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

Statistics-Background Data **X**= 0.221 **S**= 0.061 **CV(1)**=0.277 **K factor****= 2.523 **TL(1)**= 0.376 **LL(1)**=N/A

Statistics-Transformed Background Data **X**= -1.534 **S**= 0.212 **CV(2)**=-0.138 **K factor****= 2.523 **TL(2)**= -0.999 **LL(2)**=N/A

Historical Background Data from Upgradient Wells with Transformed Result

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

Well Number: MW220

Date Collected	Result	LN(Result)
10/14/2002	0.2	-1.609
1/15/2003	0.2	-1.609
4/10/2003	0.2	-1.609
7/14/2003	0.2	-1.609
10/13/2003	0.427	-0.851
1/13/2004	0.309	-1.174
4/13/2004	0.2	-1.609
7/21/2004	0.202	-1.599

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	Yes	0.036	NO	-3.324	N/A
MW221	Sidegradient	No	0.05	N/A	-2.996	N/A
MW222	Sidegradient	Yes	0.0376	NO	-3.281	N/A
MW223	Sidegradient	No	0.05	N/A	-2.996	N/A
MW224	Sidegradient	Yes	0.0176	NO	-4.040	N/A
MW369	Downgradient	Yes	0.0492	NO	-3.012	N/A
MW372	Downgradient	Yes	0.119	NO	-2.129	N/A
MW384	Sidegradient	No	0.05	N/A	-2.996	N/A
MW387	Downgradient	Yes	0.0209	NO	-3.868	N/A
MW391	Downgradient	No	0.05	N/A	-2.996	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, $S = \sqrt{[\text{Sum} ((\text{background result}-X)^2)/(\text{count of background results} - 1)]^0.5}$

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. D1-32

C-746-S/T Fourth Quarter 2016 Statistical Analysis Historical Background Comparison

Beta activity

UNITS: pCi/L

URGA

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is 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	21.7	N/A	3.077	N/A
MW221	Sidegradient	Yes	10.8	N/A	2.380	N/A
MW222	Sidegradient	No	2.44	N/A	0.892	N/A
MW223	Sidegradient	Yes	5.15	N/A	1.639	N/A
MW224	Sidegradient	Yes	5.36	N/A	1.679	N/A
MW369	Downgradient	Yes	57	YES	4.043	N/A
MW372	Downgradient	Yes	9.61	N/A	2.263	N/A
MW384	Sidegradient	Yes	101	YES	4.615	N/A
MW387	Downgradient	Yes	115	YES	4.745	N/A
MW391	Downgradient	Yes	6.44	N/A	1.863	N/A
MW394	Upgradient	No	2.51	N/A	0.920	N/A

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

Well Number: MW394

Date Collected	Result	LN(Result)
8/13/2002	5.03	1.615
9/16/2002	5.57	1.717
10/16/2002	12.8	2.549
1/13/2003	4.3	1.459
4/10/2003	9.52	2.253
7/16/2003	3.92	1.366
10/14/2003	1.06	0.058
1/13/2004	2.14	0.761

Conclusion of Statistical Analysis on Historical Data

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

Wells with Exceedances

- 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. D1-33

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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

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	Yes	0.00859	N/A	-4.757	NO
MW221	Sidegradient	Yes	0.015	N/A	-4.200	NO
MW222	Sidegradient	Yes	0.00899	N/A	-4.712	NO
MW223	Sidegradient	No	0.015	N/A	-4.200	N/A
MW224	Sidegradient	Yes	0.0197	N/A	-3.927	NO
MW369	Downgradient	Yes	0.0138	N/A	-4.283	NO
MW372	Downgradient	Yes	0.901	N/A	-0.104	NO
MW384	Sidegradient	Yes	0.0124	N/A	-4.390	NO
MW387	Downgradient	Yes	0.0411	N/A	-3.192	NO
MW391	Downgradient	Yes	0.146	N/A	-1.924	NO
MW394	Upgradient	Yes	0.0256	N/A	-3.665	NO

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

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. D1-34

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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	0.22	NO	-1.514	N/A
MW221	Sidegradient	Yes	0.426	NO	-0.853	N/A
MW222	Sidegradient	Yes	0.435	NO	-0.832	N/A
MW223	Sidegradient	Yes	0.429	NO	-0.846	N/A
MW224	Sidegradient	Yes	0.429	NO	-0.846	N/A
MW369	Downgradient	Yes	0.355	NO	-1.036	N/A
MW372	Downgradient	Yes	0.606	NO	-0.501	N/A
MW384	Sidegradient	Yes	0.474	NO	-0.747	N/A
MW387	Downgradient	Yes	0.352	NO	-1.044	N/A
MW391	Downgradient	Yes	0.557	NO	-0.585	N/A
MW394	Upgradient	Yes	0.688	NO	-0.374	N/A

Well Number: MW394

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

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

Conclusion of Statistical Analysis on Historical Data

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

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

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

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

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

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

** Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009. D1-35

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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	20.5	NO	3.020	N/A
MW221	Sidegradient	Yes	21.2	NO	3.054	N/A
MW222	Sidegradient	Yes	18.2	NO	2.901	N/A
MW223	Sidegradient	Yes	21	NO	3.045	N/A
MW224	Sidegradient	Yes	22.1	NO	3.096	N/A
MW369	Downgradient	Yes	16.4	NO	2.797	N/A
MW372	Downgradient	Yes	49.1	YES	3.894	N/A
MW384	Sidegradient	Yes	28	NO	3.332	N/A
MW387	Downgradient	Yes	32.8	NO	3.490	N/A
MW391	Downgradient	Yes	36.5	NO	3.597	N/A
MW394	Upgradient	Yes	28.6	NO	3.353	N/A

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

Well Number: MW394

Date Collected	Result	LN(Result)
8/13/2002	29.5	3.384
9/16/2002	29.9	3.398
10/16/2002	31.2	3.440
1/13/2003	30.7	3.424
4/10/2003	34.4	3.538
7/16/2003	29.6	3.388
10/14/2003	30.3	3.411
1/13/2004	28.4	3.346

Conclusion of Statistical Analysis on Historical Data

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

Wells with Exceedances

MW372

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

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

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

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

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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

Well Number: MW394

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

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	No	13.9	N/A	2.632	N/A
MW221	Sidegradient	No	26.5	N/A	3.277	N/A
MW222	Sidegradient	No	22.1	N/A	3.096	N/A
MW223	Sidegradient	No	27.4	N/A	3.311	N/A
MW224	Sidegradient	No	18.5	N/A	2.918	N/A
MW369	Downgradient	Yes	23	NO	3.135	N/A
MW372	Downgradient	Yes	15.8	NO	2.760	N/A
MW384	Sidegradient	No	12.1	N/A	2.493	N/A
MW387	Downgradient	No	22.1	N/A	3.096	N/A
MW391	Downgradient	No	15.4	N/A	2.734	N/A
MW394	Upgradient	No	13.6	N/A	2.610	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

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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	21.9	NO	3.086	N/A
MW221	Sidegradient	Yes	31.5	NO	3.450	N/A
MW222	Sidegradient	Yes	31.5	NO	3.450	N/A
MW223	Sidegradient	Yes	29.8	NO	3.395	N/A
MW224	Sidegradient	Yes	31.5	NO	3.450	N/A
MW369	Downgradient	Yes	32.6	NO	3.484	N/A
MW372	Downgradient	Yes	47.6	NO	3.863	N/A
MW384	Sidegradient	Yes	45.4	NO	3.816	N/A
MW387	Downgradient	Yes	35.7	NO	3.575	N/A
MW391	Downgradient	Yes	43.9	NO	3.782	N/A
MW394	Upgradient	Yes	49.4	NO	3.900	N/A

Well Number: MW394

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

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

Conclusion of Statistical Analysis on Historical Data

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

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

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

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

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

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

** Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/2009>. D1-38

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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	No	1	N/A	0.000	N/A
MW221	Sidegradient	No	1	N/A	0.000	N/A
MW222	Sidegradient	No	1	N/A	0.000	N/A
MW223	Sidegradient	No	1	N/A	0.000	N/A
MW224	Sidegradient	No	1	N/A	0.000	N/A
MW369	Downgradient	Yes	0.95	NO	-0.051	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	0.51	NO	-0.673	N/A
MW394	Upgradient	No	1	N/A	0.000	N/A

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

Well Number: MW394

Date Collected	Result	LN(Result)
8/13/2002	5	1.609
9/30/2002	5	1.609
10/16/2002	5	1.609
1/13/2003	5	1.609
4/10/2003	5	1.609
7/16/2003	5	1.609
10/14/2003	5	1.609
1/13/2004	5	1.609

Conclusion of Statistical Analysis on Historical Data

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

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

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

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

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

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

** Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009. D1-39

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Cobalt

UNITS: mg/L

URGA

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

Statistics-Background Data X= 0.016 S= 0.040 CV(1)=2.440 K factor**= 2.523 TL(1)= 0.116 LL(1)=N/A

Statistics-Transformed Background Data X= -5.582 S= 1.573 CV(2)=-0.282 K factor**= 2.523 TL(2)= -1.613 LL(2)=N/A

Historical Background Data from Upgradient Wells with Transformed Result

Because CV(1) is greater than 1, the natural logarithm of background and test well results were calculated utilizing TL(2) for comparison.

Well Number: MW220

Date Collected	Result	LN(Result)
10/14/2002	0.0041	-5.497
1/15/2003	0.00496	-5.306
4/10/2003	0.00289	-5.846
7/14/2003	0.161	-1.826
10/13/2003	0.0226	-3.790
1/13/2004	0.00464	-5.373
4/13/2004	0.001	-6.908
7/21/2004	0.00264	-5.937

Well Number: MW394

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

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	Yes	0.000263	N/A	-8.243	NO
MW221	Sidegradient	Yes	0.000119	N/A	-9.036	NO
MW222	Sidegradient	Yes	0.000563	N/A	-7.482	NO
MW223	Sidegradient	Yes	0.000464	N/A	-7.676	NO
MW224	Sidegradient	Yes	0.00037	N/A	-7.902	NO
MW369	Downgradient	Yes	0.00601	N/A	-5.114	NO
MW372	Downgradient	Yes	0.000377	N/A	-7.883	NO
MW384	Sidegradient	No	0.001	N/A	-6.908	N/A
MW387	Downgradient	No	0.001	N/A	-6.908	N/A
MW391	Downgradient	No	0.001	N/A	-6.908	N/A
MW394	Upgradient	No	0.001	N/A	-6.908	N/A

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

Conclusion of Statistical Analysis on Historical Data

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

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

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

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

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

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

** Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/2009>. D1-40

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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	348	NO	5.852	N/A
MW221	Sidegradient	Yes	381	NO	5.943	N/A
MW222	Sidegradient	Yes	371	NO	5.916	N/A
MW223	Sidegradient	Yes	420	NO	6.040	N/A
MW224	Sidegradient	Yes	425	NO	6.052	N/A
MW369	Downgradient	Yes	379	NO	5.938	N/A
MW372	Downgradient	Yes	611	NO	6.415	N/A
MW384	Sidegradient	Yes	484	NO	6.182	N/A
MW387	Downgradient	Yes	500	NO	6.215	N/A
MW391	Downgradient	Yes	481	NO	6.176	N/A
MW394	Upgradient	Yes	406	NO	6.006	N/A

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

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>. D1-41

C-746-S/T Fourth Quarter 2016 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	0.000966	NO	-6.942	N/A
MW221	Sidegradient	Yes	0.000658	NO	-7.326	N/A
MW222	Sidegradient	Yes	0.00048	NO	-7.642	N/A
MW223	Sidegradient	Yes	0.00108	NO	-6.831	N/A
MW224	Sidegradient	Yes	0.000369	NO	-7.905	N/A
MW369	Downgradient	Yes	0.00233	NO	-6.062	N/A
MW372	Downgradient	No	0.001	N/A	-6.908	N/A
MW384	Sidegradient	Yes	0.000511	NO	-7.579	N/A
MW387	Downgradient	Yes	0.00101	NO	-6.898	N/A
MW391	Downgradient	No	0.001	N/A	-6.908	N/A
MW394	Upgradient	Yes	0.000548	NO	-7.509	N/A

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

Conclusion of Statistical Analysis on Historical Data

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

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

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

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

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

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

** Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009. D1-42

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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	4.96	NO	1.601	N/A
MW221	Sidegradient	Yes	4.28	NO	1.454	N/A
MW222	Sidegradient	Yes	3.35	NO	1.209	N/A
MW223	Sidegradient	Yes	4.18	NO	1.430	N/A
MW224	Sidegradient	Yes	3.91	NO	1.364	N/A
MW369	Downgradient	Yes	3.01	NO	1.102	N/A
MW372	Downgradient	Yes	1.78	NO	0.577	N/A
MW384	Sidegradient	Yes	4.85	NO	1.579	N/A
MW387	Downgradient	Yes	4.65	NO	1.537	N/A
MW391	Downgradient	Yes	3.5	NO	1.253	N/A
MW394	Upgradient	Yes	4.28	NO	1.454	N/A

Well Number: MW394

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

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

Conclusion of Statistical Analysis on Historical Data

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

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

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

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

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

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

** Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009. D1-43

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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	187	NO	5.231	N/A
MW221	Sidegradient	Yes	213	NO	5.361	N/A
MW222	Sidegradient	Yes	130	NO	4.868	N/A
MW223	Sidegradient	Yes	140	NO	4.942	N/A
MW224	Sidegradient	Yes	291	NO	5.673	N/A
MW369	Downgradient	Yes	239	NO	5.476	N/A
MW372	Downgradient	Yes	376	YES	5.930	N/A
MW384	Sidegradient	Yes	267	NO	5.587	N/A
MW387	Downgradient	Yes	271	NO	5.602	N/A
MW391	Downgradient	Yes	271	NO	5.602	N/A
MW394	Upgradient	Yes	219	NO	5.389	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

MW372

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

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

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

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

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

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

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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	Yes	0.0847	N/A	-2.469	NO
MW221	Sidegradient	Yes	0.044	N/A	-3.124	NO
MW222	Sidegradient	No	0.1	N/A	-2.303	N/A
MW223	Sidegradient	No	0.1	N/A	-2.303	N/A
MW224	Sidegradient	No	0.0855	N/A	-2.459	N/A
MW369	Downgradient	Yes	0.185	N/A	-1.687	NO
MW372	Downgradient	Yes	0.983	N/A	-0.017	NO
MW384	Sidegradient	Yes	0.0512	N/A	-2.972	NO
MW387	Downgradient	No	0.131	N/A	-2.033	N/A
MW391	Downgradient	Yes	0.0882	N/A	-2.428	NO
MW394	Upgradient	Yes	0.083	N/A	-2.489	NO

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

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

C-746-S/T Fourth Quarter 2016 Statistical Analysis Historical Background Comparison

Magnesium

UNITS: mg/L

URGA

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

Statistics-Background Data X= 10.796 S= 1.703 CV(1)=0.158 K factor**= 2.523 TL(1)= 15.092 LL(1)=N/A

Statistics-Transformed Background Data X= 2.368 S= 0.158 CV(2)=0.067 K factor**= 2.523 TL(2)= 2.766 LL(2)=N/A

Historical Background Data from Upgradient Wells with Transformed Result

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

Well Number: MW220

Date Collected	Result	LN(Result)
10/14/2002	9.16	2.215
1/15/2003	10	2.303
4/10/2003	10.8	2.380
7/14/2003	14.7	2.688
10/13/2003	9.03	2.201
1/13/2004	8.49	2.139
4/13/2004	9.7	2.272
7/21/2004	8.06	2.087

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	Yes	8.7	NO	2.163	N/A
MW221	Sidegradient	Yes	9.57	NO	2.259	N/A
MW222	Sidegradient	Yes	8.37	NO	2.125	N/A
MW223	Sidegradient	Yes	9.07	NO	2.205	N/A
MW224	Sidegradient	Yes	9.86	NO	2.288	N/A
MW369	Downgradient	Yes	7.1	NO	1.960	N/A
MW372	Downgradient	Yes	19.6	YES	2.976	N/A
MW384	Sidegradient	Yes	11.1	NO	2.407	N/A
MW387	Downgradient	Yes	14	NO	2.639	N/A
MW391	Downgradient	Yes	15.8	YES	2.760	N/A
MW394	Upgradient	Yes	12.1	NO	2.493	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>. D1-46

C-746-S/T Fourth Quarter 2016 Statistical Analysis Historical Background Comparison

Manganese

UNITS: mg/L

URGA

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

Statistics-Background Data **X**= 0.287 **S**= 0.619 **CV(1)**=2.156 **K factor****= 2.523 **TL(1)**= 1.848 **LL(1)**=N/A

Statistics-Transformed Background Data **X**= -2.455 **S**= 1.619 **CV(2)**=-0.659 **K factor****= 2.523 **TL(2)**= 1.630 **LL(2)**=N/A

Historical Background Data from Upgradient Wells with Transformed Result

Because CV(1) is greater than 1, the natural logarithm of background and test well results were calculated utilizing TL(2) for comparison.

Well Number: MW220

Date Collected	Result	LN(Result)
10/14/2002	0.0306	-3.487
1/15/2003	0.0291	-3.537
4/10/2003	0.0137	-4.290
7/14/2003	2.54	0.932
10/13/2003	0.378	-0.973
1/13/2004	0.159	-1.839
4/13/2004	0.00707	-4.952
7/21/2004	0.0841	-2.476

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	Yes	0.00203	N/A	-6.200	NO
MW221	Sidegradient	No	0.005	N/A	-5.298	N/A
MW222	Sidegradient	Yes	0.00326	N/A	-5.726	NO
MW223	Sidegradient	Yes	0.00249	N/A	-5.995	NO
MW224	Sidegradient	Yes	0.0048	N/A	-5.339	NO
MW369	Downgradient	Yes	0.0194	N/A	-3.942	NO
MW372	Downgradient	Yes	0.0216	N/A	-3.835	NO
MW384	Sidegradient	Yes	0.00277	N/A	-5.889	NO
MW387	Downgradient	Yes	0.00226	N/A	-6.092	NO
MW391	Downgradient	Yes	0.00102	N/A	-6.888	NO
MW394	Upgradient	Yes	0.00324	N/A	-5.732	NO

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

Well Number: MW394

Date Collected	Result	LN(Result)
8/13/2002	0.542	-0.612
9/16/2002	0.155	-1.864
10/16/2002	0.103	-2.273
1/13/2003	0.128	-2.056
4/10/2003	0.005	-5.298
7/16/2003	0.272	-1.302
10/14/2003	0.0795	-2.532
1/13/2004	0.0658	-2.721

Conclusion of Statistical Analysis on Historical Data

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

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

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

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

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. D1-47

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Molybdenum

UNITS: mg/L

URGA

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

Statistics-Background Data X= 0.006 S= 0.008 CV(1)= 1.261 K factor**= 2.523 TL(1)= 0.026 LL(1)=N/A

Statistics-Transformed Background Data X= -5.747 S= 1.205 CV(2)= -0.210 K factor**= 2.523 TL(2)= -2.708 LL(2)=N/A

Historical Background Data from Upgradient Wells with Transformed Result

Because CV(1) is greater than 1, the natural logarithm of background and test well results were calculated utilizing TL(2) for comparison.

Well Number: MW220

Date Collected	Result	LN(Result)
10/14/2002	0.00558	-5.189
1/15/2003	0.00983	-4.622
4/10/2003	0.0109	-4.519
7/14/2003	0.00245	-6.012
10/13/2003	0.00566	-5.174
1/13/2004	0.00572	-5.164
4/13/2004	0.001	-6.908
7/21/2004	0.00392	-5.542

Well Number: MW394

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

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	No	0.000626	N/A	-7.376	N/A
MW221	Sidegradient	Yes	0.00127	N/A	-6.669	NO
MW222	Sidegradient	No	0.000326	N/A	-8.029	N/A
MW223	Sidegradient	Yes	0.00613	N/A	-5.095	NO
MW224	Sidegradient	No	0.000474	N/A	-7.654	N/A
MW369	Downgradient	No	0.0005	N/A	-7.601	N/A
MW372	Downgradient	No	0.000422	N/A	-7.771	N/A
MW384	Sidegradient	No	0.0005	N/A	-7.601	N/A
MW387	Downgradient	No	0.0005	N/A	-7.601	N/A
MW391	Downgradient	No	0.0005	N/A	-7.601	N/A
MW394	Upgradient	No	0.0005	N/A	-7.601	N/A

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

Conclusion of Statistical Analysis on Historical Data

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

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

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

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

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

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

** Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/2009>. D1-48

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Nickel

UNITS: mg/L

URGA

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

Statistics-Background Data X= 0.127 S= 0.228 CV(1)= 1.790 K factor**= 2.523 TL(1)= 0.701 LL(1)=N/A

Statistics-Transformed Background Data X= -3.617 S= 1.837 CV(2)= -0.508 K factor**= 2.523 TL(2)= 1.019 LL(2)=N/A

Historical Background Data from Upgradient Wells with Transformed Result

Because CV(1) is greater than 1, the natural logarithm of background and test well results were calculated utilizing TL(2) for comparison.

Well Number: MW220

Date Collected	Result	LN(Result)
10/14/2002	0.418	-0.872
1/15/2003	0.738	-0.304
4/10/2003	0.544	-0.609
7/14/2003	0.106	-2.244
10/13/2003	0.0529	-2.939
1/13/2004	0.0209	-3.868
4/13/2004	0.005	-5.298
7/21/2004	0.0192	-3.953

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	Yes	0.0256	N/A	-3.665	NO
MW221	Sidegradient	Yes	0.00712	N/A	-4.945	NO
MW222	Sidegradient	Yes	0.0482	N/A	-3.032	NO
MW223	Sidegradient	Yes	0.174	N/A	-1.749	NO
MW224	Sidegradient	Yes	0.00341	N/A	-5.681	NO
MW369	Downgradient	Yes	0.00654	N/A	-5.030	NO
MW372	Downgradient	Yes	0.000724	N/A	-7.231	NO
MW384	Sidegradient	Yes	0.000604	N/A	-7.412	NO
MW387	Downgradient	Yes	0.000745	N/A	-7.202	NO
MW391	Downgradient	Yes	0.000709	N/A	-7.252	NO
MW394	Upgradient	Yes	0.00463	N/A	-5.375	NO

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

Well Number: MW394

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

Conclusion of Statistical Analysis on Historical Data

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

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

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

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

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

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

** Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009. D1-49

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Oxidation-Reduction Potential

UNITS: mV

URGA

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

Statistics-Background Data X= 179.872 S= 86.318 CV(1)=0.480 **K factor**= 2.523** TL(1)= 397.652 LL(1)=N/A

Statistics-Transformed Background Data X= 4.861 S= 1.252 CV(2)=0.258 **K factor**= 2.523** TL(2)= 8.021 LL(2)=N/A

Historical Background Data from Upgradient Wells with Transformed Result

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

Well Number: MW220

Date Collected	Result	LN(Result)
10/14/2002	205	5.323
1/15/2003	1.95	0.668
4/10/2003	203	5.313
7/14/2003	30	3.401
10/13/2003	107	4.673
1/13/2004	295	5.687
4/13/2004	190	5.247
7/21/2004	319	5.765

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	Yes	414	YES	6.026	N/A
MW221	Sidegradient	Yes	378	NO	5.935	N/A
MW222	Sidegradient	Yes	424	YES	6.050	N/A
MW223	Sidegradient	Yes	429	YES	6.061	N/A
MW224	Sidegradient	Yes	395	NO	5.979	N/A
MW369	Downgradient	Yes	365	NO	5.900	N/A
MW372	Downgradient	Yes	242	NO	5.489	N/A
MW384	Sidegradient	Yes	401	YES	5.994	N/A
MW387	Downgradient	Yes	450	YES	6.109	N/A
MW391	Downgradient	Yes	319	NO	5.765	N/A
MW394	Upgradient	Yes	369	NO	5.911	N/A

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

Well Number: MW394

Date Collected	Result	LN(Result)
8/13/2002	90	4.500
9/16/2002	240	5.481
10/16/2002	185	5.220
1/13/2003	220	5.394
4/10/2003	196	5.278
7/16/2003	172	5.147
10/14/2003	175	5.165
1/13/2004	249	5.517

Conclusion of Statistical Analysis on Historical Data

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
- MW222
- MW223
- MW384
- MW387

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

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

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

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

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

** Read from Table 5, Appendix B of *Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance*, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009. D1-50

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PCB, Total

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**= 0.212 **S**= 0.152 **CV(1)**=0.715 **K factor****= 2.523 **TL(1)**= 0.594 **LL(1)**=N/A

Statistics-Transformed Background Data **X**= -1.655 **S**= 0.376 **CV(2)**=-0.227 **K factor****= 2.523 **TL(2)**= -0.706 **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)
7/14/2003	0.78	-0.248
10/13/2003	0.17	-1.772
7/21/2004	0.18	-1.715
7/14/2005	0.18	-1.715
7/17/2006	0.18	-1.715
7/18/2007	0.17	-1.772
10/24/2007	0.17	-1.772
1/24/2008	0.17	-1.772

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	No	0.0962	N/A	-2.341	N/A
MW221	Sidegradient	No	0.0952	N/A	-2.352	N/A
MW222	Sidegradient	No	0.0962	N/A	-2.341	N/A
MW223	Sidegradient	No	0.098	N/A	-2.323	N/A
MW224	Sidegradient	No	0.0943	N/A	-2.361	N/A
MW369	Downgradient	No	0.098	N/A	-2.323	N/A
MW372	Downgradient	Yes	0.0366	NO	-3.308	N/A
MW384	Sidegradient	No	0.099	N/A	-2.313	N/A
MW387	Downgradient	No	0.1	N/A	-2.303	N/A
MW391	Downgradient	No	0.0962	N/A	-2.341	N/A
MW394	Upgradient	No	0.0962	N/A	-2.341	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	0.17	-1.772
9/16/2002	0.17	-1.772
7/16/2003	0.17	-1.772
10/14/2003	0.17	-1.772
7/20/2004	0.18	-1.715
7/11/2005	0.18	-1.715
7/17/2006	0.18	-1.715
7/17/2007	0.17	-1.772

Conclusion of Statistical Analysis on Historical Data

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

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

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

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

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

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

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

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PCB-1242

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= 0.146 S= 0.170 CV(1)= 1.164 K factor**= 2.523 TL(1)= 0.573 LL(1)=N/A

Statistics-Transformed Background Data X= -2.149 S= 0.517 CV(2)= -0.241 K factor**= 2.523 TL(2)= -0.844 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)
7/14/2003	0.78	-0.248
10/13/2003	0.09	-2.408
7/21/2004	0.1	-2.303
7/14/2005	0.1	-2.303
7/17/2006	0.1	-2.303
7/18/2007	0.1	-2.303
10/24/2007	0.1	-2.303
1/24/2008	0.1	-2.303

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	No	0.0962	N/A	-2.341	N/A
MW221	Sidegradient	No	0.0952	N/A	-2.352	N/A
MW222	Sidegradient	No	0.0962	N/A	-2.341	N/A
MW223	Sidegradient	No	0.098	N/A	-2.323	N/A
MW224	Sidegradient	No	0.0943	N/A	-2.361	N/A
MW369	Downgradient	No	0.098	N/A	-2.323	N/A
MW372	Downgradient	Yes	0.0366	N/A	-3.308	NO
MW384	Sidegradient	No	0.099	N/A	-2.313	N/A
MW387	Downgradient	No	0.1	N/A	-2.303	N/A
MW391	Downgradient	No	0.0962	N/A	-2.341	N/A
MW394	Upgradient	No	0.0962	N/A	-2.341	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	0.11	-2.207
9/16/2002	0.13	-2.040
7/16/2003	0.13	-2.040
10/14/2003	0.09	-2.408
7/20/2004	0.1	-2.303
7/11/2005	0.1	-2.303
7/17/2006	0.1	-2.303
7/17/2007	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. D1-52

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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	6.14	NO	1.815	N/A
MW221	Sidegradient	Yes	6.22	NO	1.828	N/A
MW222	Sidegradient	Yes	6.4	NO	1.856	N/A
MW223	Sidegradient	Yes	6.31	NO	1.842	N/A
MW224	Sidegradient	Yes	6.26	NO	1.834	N/A
MW369	Downgradient	Yes	6.4	NO	1.856	N/A
MW372	Downgradient	Yes	6.34	NO	1.847	N/A
MW384	Sidegradient	Yes	6.35	NO	1.848	N/A
MW387	Downgradient	Yes	6.4	NO	1.856	N/A
MW391	Downgradient	Yes	6.23	NO	1.829	N/A
MW394	Upgradient	Yes	6.23	NO	1.829	N/A

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

Conclusion of Statistical Analysis on Historical Data

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

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

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

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

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

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

** Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/2009>. D1-53

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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	2.73	N/A	1.004	NO
MW221	Sidegradient	Yes	1.22	N/A	0.199	NO
MW222	Sidegradient	Yes	0.609	N/A	-0.496	NO
MW223	Sidegradient	Yes	1.72	N/A	0.542	NO
MW224	Sidegradient	Yes	0.815	N/A	-0.205	NO
MW369	Downgradient	Yes	0.489	N/A	-0.715	NO
MW372	Downgradient	Yes	2.14	N/A	0.761	NO
MW384	Sidegradient	Yes	1.15	N/A	0.140	NO
MW387	Downgradient	Yes	1.78	N/A	0.577	NO
MW391	Downgradient	Yes	1.8	N/A	0.588	NO
MW394	Upgradient	Yes	1.35	N/A	0.300	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. D1-54

C-746-S/T Fourth Quarter 2016 Statistical Analysis Historical Background Comparison

Radium-226

UNITS: pCi/L

URGA

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is 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	1.15	N/A	0.140	YES
MW221	Sidegradient	Yes	0.603	N/A	-0.506	YES
MW222	Sidegradient	No	0.306	N/A	-1.184	N/A
MW223	Sidegradient	No	0.31	N/A	-1.171	N/A
MW224	Sidegradient	Yes	0.653	N/A	-0.426	YES
MW369	Downgradient	No	0.334	N/A	-1.097	N/A
MW372	Downgradient	No	0.685	N/A	-0.378	N/A
MW384	Sidegradient	No	0.498	N/A	-0.697	N/A
MW387	Downgradient	Yes	0.826	N/A	-0.191	YES
MW391	Downgradient	No	0.353	N/A	-1.041	N/A
MW394	Upgradient	No	0.419	N/A	-0.870	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

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
- MW221
- MW224
- 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>. D1-55

C-746-S/T Fourth Quarter 2016 Statistical Analysis Historical Background Comparison

Sodium

UNITS: mg/L

URGA

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

Statistics-Background Data X= 36.363 S= 8.666 CV(1)=0.238 K factor**= 2.523 TL(1)= 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	39.6	NO	3.679	N/A
MW221	Sidegradient	Yes	48.4	NO	3.879	N/A
MW222	Sidegradient	Yes	46.8	NO	3.846	N/A
MW223	Sidegradient	Yes	45.9	NO	3.826	N/A
MW224	Sidegradient	Yes	56.5	NO	4.034	N/A
MW369	Downgradient	Yes	52.2	NO	3.955	N/A
MW372	Downgradient	Yes	49.7	NO	3.906	N/A
MW384	Sidegradient	Yes	53.4	NO	3.978	N/A
MW387	Downgradient	Yes	53.2	NO	3.974	N/A
MW391	Downgradient	Yes	36.9	NO	3.608	N/A
MW394	Upgradient	Yes	34.9	NO	3.552	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	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

Conclusion of Statistical Analysis on Historical Data

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

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

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

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

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

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

** Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/2009>. D1-56

C-746-S/T Fourth Quarter 2016 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	18.7	YES	2.929	N/A
MW221	Sidegradient	Yes	14.1	NO	2.646	N/A
MW222	Sidegradient	Yes	12	NO	2.485	N/A
MW223	Sidegradient	Yes	14.7	NO	2.688	N/A
MW224	Sidegradient	Yes	13.6	NO	2.610	N/A
MW369	Downgradient	Yes	5.97	NO	1.787	N/A
MW372	Downgradient	Yes	76.5	YES	4.337	N/A
MW384	Sidegradient	Yes	20.5	YES	3.020	N/A
MW387	Downgradient	Yes	28.3	YES	3.343	N/A
MW391	Downgradient	Yes	54.6	YES	4.000	N/A
MW394	Upgradient	Yes	10.4	NO	2.342	N/A

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

Well Number: MW394

Date Collected	Result	LN(Result)
8/13/2002	11.2	2.416
9/16/2002	8.3	2.116
10/16/2002	8	2.079
1/13/2003	8.5	2.140
4/10/2003	7.9	2.067
7/16/2003	8.4	2.128
10/14/2003	8.2	2.104
1/13/2004	8.1	2.092

Conclusion of Statistical Analysis on Historical Data

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

Wells with Exceedances

- MW220
- 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. D1-57

C-746-S/T Fourth Quarter 2016 Statistical Analysis Historical Background Comparison

Technetium-99

UNITS: pCi/L

URGA

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

Statistics-Background Data X= 9.354 S= 9.280 CV(1)=0.992 K factor**= 2.523 TL(1)= 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	No	12.3	N/A	2.510	N/A
MW221	Sidegradient	No	18	N/A	2.890	N/A
MW222	Sidegradient	No	0.0157	N/A	-4.154	N/A
MW223	Sidegradient	No	3.25	N/A	1.179	N/A
MW224	Sidegradient	No	5.9	N/A	1.775	N/A
MW369	Downgradient	Yes	83.3	YES	4.422	N/A
MW372	Downgradient	No	10.3	N/A	2.332	N/A
MW384	Sidegradient	Yes	167	YES	5.118	N/A
MW387	Downgradient	Yes	215	YES	5.371	N/A
MW391	Downgradient	No	8.63	N/A	2.155	N/A
MW394	Upgradient	No	4.39	N/A	1.479	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. D1-58

C-746-S/T Fourth Quarter 2016 Statistical Analysis Historical Background Comparison

Toluene

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	No	1	N/A	0.000	N/A
MW221	Sidegradient	No	1	N/A	0.000	N/A
MW222	Sidegradient	No	1	N/A	0.000	N/A
MW223	Sidegradient	No	1	N/A	0.000	N/A
MW224	Sidegradient	No	1	N/A	0.000	N/A
MW369	Downgradient	No	1	N/A	0.000	N/A
MW372	Downgradient	Yes	0.69	NO	-0.371	N/A
MW384	Sidegradient	No	1	N/A	0.000	N/A
MW387	Downgradient	No	1	N/A	0.000	N/A
MW391	Downgradient	No	1	N/A	0.000	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 = [Sum ((background result-X)^2)/[count of background results - 1]]^0.5

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

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

** Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009. D1-59

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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	0.892	NO	-0.114	N/A
MW221	Sidegradient	Yes	0.98	NO	-0.020	N/A
MW222	Sidegradient	Yes	0.908	NO	-0.097	N/A
MW223	Sidegradient	No	2	N/A	0.693	N/A
MW224	Sidegradient	Yes	1.07	NO	0.068	N/A
MW369	Downgradient	Yes	0.958	NO	-0.043	N/A
MW372	Downgradient	Yes	2.57	NO	0.944	N/A
MW384	Sidegradient	Yes	1.17	NO	0.157	N/A
MW387	Downgradient	Yes	1.2	NO	0.182	N/A
MW391	Downgradient	Yes	1.02	NO	0.020	N/A
MW394	Upgradient	Yes	0.885	NO	-0.122	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. D1-60

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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

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

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	Yes	7.14	N/A	1.966	NO
MW221	Sidegradient	Yes	10.1	N/A	2.313	NO
MW222	Sidegradient	No	10	N/A	2.303	N/A
MW223	Sidegradient	No	10	N/A	2.303	N/A
MW224	Sidegradient	Yes	4.44	N/A	1.491	NO
MW369	Downgradient	Yes	7.34	N/A	1.993	NO
MW372	Downgradient	Yes	7.12	N/A	1.963	NO
MW384	Sidegradient	Yes	11.4	N/A	2.434	NO
MW387	Downgradient	Yes	6.56	N/A	1.881	NO
MW391	Downgradient	Yes	12.8	N/A	2.549	NO
MW394	Upgradient	No	10	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.

Conclusion of Statistical Analysis on Historical Data

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

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

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

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

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

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

** Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/2009>. D1-61

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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	0.63	N/A	-0.462	N/A
MW221	Sidegradient	Yes	0.51	N/A	-0.673	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	4.56	N/A	1.517	N/A
MW372	Downgradient	Yes	7.06	NO	1.954	N/A
MW384	Sidegradient	Yes	0.54	N/A	-0.616	N/A
MW387	Downgradient	Yes	0.79	N/A	-0.236	N/A
MW391	Downgradient	Yes	11.4	NO	2.434	N/A
MW394	Upgradient	Yes	7.06	NO	1.954	N/A

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

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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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	Yes	0.00465	NO	-5.371	N/A
MW223	Sidegradient	Yes	0.0047	NO	-5.360	N/A
MW224	Sidegradient	No	0.01	N/A	-4.605	N/A
MW369	Downgradient	No	0.01	N/A	-4.605	N/A
MW372	Downgradient	No	0.01	N/A	-4.605	N/A
MW384	Sidegradient	No	0.01	N/A	-4.605	N/A
MW387	Downgradient	No	0.01	N/A	-4.605	N/A
MW391	Downgradient	No	0.01	N/A	-4.605	N/A
MW394	Upgradient	No	0.01	N/A	-4.605	N/A

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

Well Number: MW394

Date Collected	Result	LN(Result)
8/13/2002	0.025	-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

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

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Zinc

UNITS: mg/L

URGA

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

Statistics-Background Data X= 0.036 S= 0.026 CV(1)=0.722 K factor**= 2.523 TL(1)= 0.101 LL(1)=N/A

Statistics-Transformed Background Data X= -3.485 S= 0.525 CV(2)=-0.151 K factor**= 2.523 TL(2)= -2.162 LL(2)=N/A

Historical Background Data from Upgradient Wells with Transformed Result

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

Well Number: MW220

Date Collected	Result	LN(Result)
10/14/2002	0.025	-3.689
1/15/2003	0.035	-3.352
4/10/2003	0.035	-3.352
7/14/2003	0.0389	-3.247
10/13/2003	0.026	-3.650
1/13/2004	0.02	-3.912
4/13/2004	0.02	-3.912
7/21/2004	0.02	-3.912

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	No	0.01	N/A	-4.605	N/A
MW221	Sidegradient	No	0.01	N/A	-4.605	N/A
MW222	Sidegradient	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	No	0.01	N/A	-4.605	N/A
MW372	Downgradient	Yes	0.00412	NO	-5.492	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. D1-64

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Aluminum

UNITS: mg/L

LRGA

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

Statistics-Background Data X= 0.258 S= 0.221 CV(1)=0.856 K factor**= 2.523 TL(1)= 0.815 LL(1)=N/A

Statistics-Transformed Background Data X= -2.266 S= 2.485 CV(2)=-1.097 K factor**= 2.523 TL(2)= 4.003 LL(2)=N/A

Historical Background Data from Upgradient Wells with Transformed Result

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

Well Number: MW395

Date Collected	Result	LN(Result)
8/13/2002	0.2	-1.609
9/16/2002	0.2	-1.609
10/16/2002	0.0002	-8.517
1/13/2003	0.737	-0.305
4/10/2003	0.2	-1.609
7/16/2003	0.2	-1.609
10/14/2003	0.2	-1.609
1/13/2004	0.2	-1.609

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW370	Downgradient	No	0.05	N/A	-2.996	N/A
MW373	Downgradient	No	0.05	N/A	-2.996	N/A
MW385	Sidegradient	No	0.05	N/A	-2.996	N/A
MW388	Downgradient	No	0.05	N/A	-2.996	N/A
MW392	Downgradient	Yes	0.0188	NO	-3.974	N/A
MW395	Upgradient	No	0.05	N/A	-2.996	N/A
MW397	Upgradient	Yes	0.0378	NO	-3.275	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. D1-65

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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	19.1	N/A	2.950	N/A
MW373	Downgradient	Yes	17.8	N/A	2.879	N/A
MW385	Sidegradient	Yes	78.1	YES	4.358	N/A
MW388	Downgradient	Yes	95.8	YES	4.562	N/A
MW392	Downgradient	No	-0.658	N/A	#Error	N/A
MW395	Upgradient	Yes	3.62	N/A	1.286	N/A
MW397	Upgradient	Yes	5.73	N/A	1.746	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

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. D1-66

C-746-S/T Fourth Quarter 2016 Statistical Analysis Historical Background Comparison

Boron

UNITS: mg/L

LRGA

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

Statistics-Background Data X= 0.650 S= 0.805 CV(1)= 1.238 K factor**= 2.523 TL(1)= 2.681 LL(1)=N/A

Statistics-Transformed Background Data X= -1.034 S= 1.030 CV(2)= -0.996 K factor**= 2.523 TL(2)= 1.564 LL(2)=N/A

Historical Background Data from Upgradient Wells with Transformed Result

Because CV(1) is greater than 1, the natural logarithm of background and test well results were calculated utilizing TL(2) for comparison.

Well Number: MW395

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

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	0.0304	N/A	-3.493	NO
MW373	Downgradient	Yes	1.44	N/A	0.365	NO
MW385	Sidegradient	Yes	0.0139	N/A	-4.276	NO
MW388	Downgradient	Yes	0.0255	N/A	-3.669	NO
MW392	Downgradient	Yes	0.0296	N/A	-3.520	NO
MW395	Upgradient	Yes	0.0255	N/A	-3.669	NO
MW397	Upgradient	Yes	0.00871	N/A	-4.743	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. D1-67

C-746-S/T Fourth Quarter 2016 Statistical Analysis Historical Background Comparison

Bromide

UNITS: mg/L

LRGA

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

Statistics-Background Data X= 1.000 S= 0.000 CV(1)=0.000 K factor**= 2.523 TL(1)= 1.000 LL(1)=N/A

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

Historical Background Data from Upgradient Wells with Transformed Result

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

Well Number: MW395

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

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW370	Downgradient	Yes	0.436	NO	-0.830	N/A
MW373	Downgradient	Yes	0.586	NO	-0.534	N/A
MW385	Sidegradient	Yes	0.221	NO	-1.510	N/A
MW388	Downgradient	Yes	0.373	NO	-0.986	N/A
MW392	Downgradient	Yes	0.593	NO	-0.523	N/A
MW395	Upgradient	Yes	0.572	NO	-0.559	N/A
MW397	Upgradient	Yes	0.489	NO	-0.715	N/A

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

Well Number: MW397

Date Collected	Result	LN(Result)
8/13/2002	1	0.000
9/16/2002	1	0.000
10/17/2002	1	0.000
1/13/2003	1	0.000
4/8/2003	1	0.000
7/16/2003	1	0.000
10/14/2003	1	0.000
1/13/2004	1	0.000

Conclusion of Statistical Analysis on Historical Data

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

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

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

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

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

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

** Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009. D1-68

C-746-S/T Fourth Quarter 2016 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	27.3	NO	3.307	N/A
MW373	Downgradient	Yes	67.5	YES	4.212	N/A
MW385	Sidegradient	Yes	39.6	NO	3.679	N/A
MW388	Downgradient	Yes	26.5	NO	3.277	N/A
MW392	Downgradient	Yes	29.7	NO	3.391	N/A
MW395	Upgradient	Yes	27.2	NO	3.303	N/A
MW397	Upgradient	Yes	19.3	NO	2.960	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. D1-69

C-746-S/T Fourth Quarter 2016 Statistical Analysis Historical Background Comparison
Chemical Oxygen Demand (COD) UNITS: mg/L LRG

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

Statistics-Background Data	X = 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

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

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

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	21.2	NO	3.054	N/A
MW373	Downgradient	Yes	14	NO	2.639	N/A
MW385	Sidegradient	Yes	154	YES	5.037	N/A
MW388	Downgradient	No	18.5	N/A	2.918	N/A
MW392	Downgradient	No	22.8	N/A	3.127	N/A
MW395	Upgradient	No	11.7	N/A	2.460	N/A
MW397	Upgradient	No	16.7	N/A	2.815	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

MW385

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

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

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

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

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

** Read from Table 5, Appendix B of *Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance*, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from *NIST/SEMATECH e-Handbook of Statistical Methods*, <http://www.itl.nist.gov/div898/handbook/>, 2009. D1-70

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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	36.4	NO	3.595	N/A
MW373	Downgradient	Yes	44.4	NO	3.793	N/A
MW385	Sidegradient	Yes	27	NO	3.296	N/A
MW388	Downgradient	Yes	32.8	NO	3.490	N/A
MW392	Downgradient	Yes	49.4	NO	3.900	N/A
MW395	Upgradient	Yes	47.1	NO	3.852	N/A
MW397	Upgradient	Yes	39.7	NO	3.681	N/A

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

Well Number: MW397

Date Collected	Result	LN(Result)
8/13/2002	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. D1-71

C-746-S/T Fourth Quarter 2016 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	Yes	1.24	NO	0.215	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	0.71	NO	-0.342	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. D1-72

C-746-S/T Fourth Quarter 2016 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	0.000538	N/A	-7.528	NO
MW373	Downgradient	Yes	0.00183	N/A	-6.303	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	Yes	0.00013	N/A	-8.948	NO
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. D1-73

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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	435	NO	6.075	N/A
MW373	Downgradient	Yes	798	YES	6.682	N/A
MW385	Sidegradient	Yes	464	NO	6.140	N/A
MW388	Downgradient	Yes	432	NO	6.068	N/A
MW392	Downgradient	Yes	413	NO	6.023	N/A
MW395	Upgradient	Yes	377	NO	5.932	N/A
MW397	Upgradient	Yes	334	NO	5.811	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. D1-74

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Copper

UNITS: mg/L

LRGA

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

Statistics-Background Data **X**= 0.028 **S**= 0.013 **CV(1)**=0.474 **K factor****= 2.523 **TL(1)**= 0.061 **LL(1)**=N/A

Statistics-Transformed Background Data **X**= -3.662 **S**= 0.406 **CV(2)**=-0.111 **K factor****= 2.523 **TL(2)**= -2.638 **LL(2)**=N/A

Historical Background Data from Upgradient Wells with Transformed Result

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

Well Number: MW395

Date Collected	Result	LN(Result)
8/13/2002	0.05	-2.996
9/16/2002	0.05	-2.996
10/16/2002	0.0281	-3.572
1/13/2003	0.02	-3.912
4/10/2003	0.02	-3.912
7/16/2003	0.02	-3.912
10/14/2003	0.02	-3.912
1/13/2004	0.02	-3.912

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW370	Downgradient	Yes	0.000723	NO	-7.232	N/A
MW373	Downgradient	No	0.001	N/A	-6.908	N/A
MW385	Sidegradient	Yes	0.000431	NO	-7.749	N/A
MW388	Downgradient	Yes	0.000572	NO	-7.466	N/A
MW392	Downgradient	No	0.001	N/A	-6.908	N/A
MW395	Upgradient	Yes	0.000508	NO	-7.585	N/A
MW397	Upgradient	Yes	0.000544	NO	-7.517	N/A

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

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. D1-75

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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	4.01	NO	1.389	N/A
MW373	Downgradient	Yes	1.81	NO	0.593	N/A
MW385	Sidegradient	Yes	1.03	NO	0.030	N/A
MW388	Downgradient	Yes	5.07	NO	1.623	N/A
MW392	Downgradient	Yes	1.47	NO	0.385	N/A
MW395	Upgradient	Yes	4.9	NO	1.589	N/A
MW397	Upgradient	Yes	5.5	NO	1.705	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. D1-76

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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	227	NO	5.425	N/A
MW373	Downgradient	Yes	497	YES	6.209	N/A
MW385	Sidegradient	Yes	257	NO	5.549	N/A
MW388	Downgradient	Yes	243	NO	5.493	N/A
MW392	Downgradient	Yes	199	NO	5.293	N/A
MW395	Upgradient	Yes	214	NO	5.366	N/A
MW397	Upgradient	Yes	166	NO	5.112	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. D1-77

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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	0.097	N/A	-2.333	NO
MW373	Downgradient	Yes	0.0835	N/A	-2.483	NO
MW385	Sidegradient	No	0.0758	N/A	-2.580	N/A
MW388	Downgradient	No	0.0737	N/A	-2.608	N/A
MW392	Downgradient	Yes	0.218	N/A	-1.523	NO
MW395	Upgradient	Yes	0.0517	N/A	-2.962	NO
MW397	Upgradient	No	0.095	N/A	-2.354	N/A

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

Well Number: MW397

Date Collected	Result	LN(Result)
8/13/2002	1.58	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. D1-78

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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	11.7	NO	2.460	N/A
MW373	Downgradient	Yes	25.3	YES	3.231	N/A
MW385	Sidegradient	Yes	15	NO	2.708	N/A
MW388	Downgradient	Yes	11.7	NO	2.460	N/A
MW392	Downgradient	Yes	10.9	NO	2.389	N/A
MW395	Upgradient	Yes	12	NO	2.485	N/A
MW397	Upgradient	Yes	8.26	NO	2.111	N/A

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

Well Number: MW397

Date Collected	Result	LN(Result)
8/13/2002	7.83	2.058
9/16/2002	7.64	2.033
10/17/2002	0.00658	-5.024
1/13/2003	6.69	1.901
4/8/2003	7.28	1.985
7/16/2003	7.82	2.057
10/14/2003	7.94	2.072
1/13/2004	7.51	2.016

Conclusion of Statistical Analysis on Historical Data

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

Wells with Exceedances

MW373

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

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

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

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

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

** Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009. D1-79

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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	0.00648	N/A	-5.039	NO
MW373	Downgradient	Yes	0.0749	N/A	-2.592	NO
MW385	Sidegradient	Yes	0.00618	N/A	-5.086	NO
MW388	Downgradient	No	0.005	N/A	-5.298	N/A
MW392	Downgradient	Yes	0.0455	N/A	-3.090	NO
MW395	Upgradient	No	0.005	N/A	-5.298	N/A
MW397	Upgradient	Yes	0.00172	N/A	-6.365	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 = [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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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	0.000813	N/A	-7.115	NO
MW373	Downgradient	Yes	0.00385	N/A	-5.560	NO
MW385	Sidegradient	Yes	0.00124	N/A	-6.693	NO
MW388	Downgradient	Yes	0.000904	N/A	-7.009	NO
MW392	Downgradient	Yes	0.002	N/A	-6.215	NO
MW395	Upgradient	Yes	0.00078	N/A	-7.156	NO
MW397	Upgradient	Yes	0.000624	N/A	-7.379	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. D1-81

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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	402	YES	5.996	N/A
MW373	Downgradient	Yes	322	YES	5.775	N/A
MW385	Sidegradient	Yes	295	YES	5.687	N/A
MW388	Downgradient	Yes	455	YES	6.120	N/A
MW392	Downgradient	Yes	442	YES	6.091	N/A
MW395	Upgradient	Yes	357	YES	5.878	N/A
MW397	Upgradient	Yes	378	YES	5.935	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, $S = [\text{Sum}([(background\ result - X)^2]/[\text{count of background results} - 1])]^{0.5}$

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. D1-82

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PCB, Total

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= 0.174 S= 0.005 CV(1)=0.029 K factor**= 2.523 TL(1)= 0.186 LL(1)=N/A

Statistics-Transformed Background Data X= -1.751 S= 0.029 CV(2)=-0.016 K factor**= 2.523 TL(2)= -1.678 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	0.17	-1.772
9/16/2002	0.17	-1.772
7/16/2003	0.17	-1.772
10/14/2003	0.17	-1.772
7/20/2004	0.18	-1.715
7/11/2005	0.18	-1.715
7/17/2006	0.18	-1.715
7/17/2007	0.17	-1.772

Well Number: MW397

Date Collected	Result	LN(Result)
8/13/2002	0.17	-1.772
9/16/2002	0.17	-1.772
7/16/2003	0.17	-1.772
10/14/2003	0.17	-1.772
7/21/2004	0.18	-1.715
7/11/2005	0.18	-1.715
7/18/2006	0.18	-1.715
7/18/2007	0.17	-1.772

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW370	Downgradient	Yes	0.0752	NO	-2.588	N/A
MW373	Downgradient	No	0.0952	N/A	-2.352	N/A
MW385	Sidegradient	No	0.098	N/A	-2.323	N/A
MW388	Downgradient	No	0.0943	N/A	-2.361	N/A
MW392	Downgradient	No	0.0971	N/A	-2.332	N/A
MW395	Upgradient	No	0.0971	N/A	-2.332	N/A
MW397	Upgradient	No	0.0943	N/A	-2.361	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. D1-83

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PCB-1242

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**= 0.108 **S**= 0.014 **CV(1)**=0.134 **K factor****= 2.523 **TL(1)**= 0.144 **LL(1)**=N/A

Statistics-Transformed Background Data **X**= -2.238 **S**= 0.129 **CV(2)**=-0.058 **K factor****= 2.523 **TL(2)**= -1.913 **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	0.11	-2.207
9/16/2002	0.13	-2.040
7/16/2003	0.13	-2.040
10/14/2003	0.09	-2.408
7/20/2004	0.1	-2.303
7/11/2005	0.1	-2.303
7/17/2006	0.1	-2.303
7/17/2007	0.1	-2.303

Well Number: MW397

Date Collected	Result	LN(Result)
8/13/2002	0.11	-2.207
9/16/2002	0.13	-2.040
7/16/2003	0.13	-2.040
10/14/2003	0.09	-2.408
7/21/2004	0.1	-2.303
7/11/2005	0.1	-2.303
7/18/2006	0.1	-2.303
7/18/2007	0.1	-2.303

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW370	Downgradient	Yes	0.0752	NO	-2.588	N/A
MW373	Downgradient	No	0.0952	N/A	-2.352	N/A
MW385	Sidegradient	No	0.098	N/A	-2.323	N/A
MW388	Downgradient	No	0.0943	N/A	-2.361	N/A
MW392	Downgradient	No	0.0971	N/A	-2.332	N/A
MW395	Upgradient	No	0.0971	N/A	-2.332	N/A
MW397	Upgradient	No	0.0943	N/A	-2.361	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. D1-84

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pH

UNITS: Std Unit

LRGA

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

Statistics-Background Data	X = 6.048	S = 0.248	CV(1) =0.041	K factor** = 2.904	TL(1) = 6.767	LL(1) =5.3289
Statistics-Transformed Background Data	X = 1.799	S = 0.042	CV(2) =0.023	K factor** = 2.904	TL(2) = 1.920	LL(2) =1.6782

Historical Background Data from Upgradient Wells with Transformed Result

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

Well Number: MW395

Date Collected	Result	LN(Result)
8/13/2002	5.8	1.758
9/16/2002	6	1.792
10/16/2002	5.47	1.699
1/13/2003	6	1.792
4/10/2003	6.18	1.821
7/16/2003	6	1.792
10/14/2003	6.31	1.842
1/13/2004	6.24	1.831

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)? Result <LL(1)?	LN(Result)	LN(Result) >TL(2)? LN(Result) <LL(2)?
MW370	Downgradient	Yes	6.29	NO	1.839	N/A
MW373	Downgradient	Yes	6.31	NO	1.842	N/A
MW385	Sidegradient	Yes	6.6	NO	1.887	N/A
MW388	Downgradient	Yes	6.15	NO	1.816	N/A
MW392	Downgradient	Yes	6.48	NO	1.869	N/A
MW395	Upgradient	Yes	6.14	NO	1.815	N/A
MW397	Upgradient	Yes	6.25	NO	1.833	N/A

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

Well Number: MW397

Date Collected	Result	LN(Result)
8/13/2002	5.84	1.765
9/30/2002	6	1.792
10/17/2002	5.75	1.749
1/13/2003	6	1.792
4/8/2003	6.3	1.841
7/16/2003	6.2	1.825
10/14/2003	6.36	1.850
1/13/2004	6.32	1.844

Conclusion of Statistical Analysis on Historical Data

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

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

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

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

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

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

** Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009. D1-85

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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	2.44	NO	0.892	N/A
MW373	Downgradient	Yes	2.69	NO	0.990	N/A
MW385	Sidegradient	Yes	1.99	NO	0.688	N/A
MW388	Downgradient	Yes	2.17	NO	0.775	N/A
MW392	Downgradient	Yes	1.86	NO	0.621	N/A
MW395	Upgradient	Yes	1.61	NO	0.476	N/A
MW397	Upgradient	Yes	1.81	NO	0.593	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. D1-86

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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	No	0.198	N/A	-1.619	N/A
MW373	Downgradient	No	0.557	N/A	-0.585	N/A
MW385	Sidegradient	No	0.246	N/A	-1.402	N/A
MW388	Downgradient	Yes	0.783	N/A	-0.245	YES
MW392	Downgradient	No	0.315	N/A	-1.155	N/A
MW395	Upgradient	Yes	0.669	N/A	-0.402	YES
MW397	Upgradient	No	0.575	N/A	-0.553	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

MW388
MW395

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

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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	40.1	NO	3.691	N/A
MW373	Downgradient	Yes	55.9	NO	4.024	N/A
MW385	Sidegradient	Yes	35	NO	3.555	N/A
MW388	Downgradient	Yes	49.2	NO	3.896	N/A
MW392	Downgradient	Yes	40.4	NO	3.699	N/A
MW395	Upgradient	Yes	30.5	NO	3.418	N/A
MW397	Upgradient	Yes	33.2	NO	3.503	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. D1-88

C-746-S/T Fourth Quarter 2016 Statistical Analysis Historical Background Comparison

Sulfate

UNITS: mg/L

LRGA

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

Statistics-Background Data X= 10.756 S= 2.147 CV(1)=0.200 K factor**= 2.523 TL(1)= 16.173 LL(1)=N/A

Statistics-Transformed Background Data X= 2.356 S= 0.203 CV(2)=0.086 K factor**= 2.523 TL(2)= 2.869 LL(2)=N/A

Historical Background Data from Upgradient Wells with Transformed Result

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

Well Number: MW395

Date Collected	Result	LN(Result)
8/13/2002	10.3	2.332
9/16/2002	9.1	2.208
10/16/2002	8.8	2.175
1/13/2003	9	2.197
4/10/2003	8.3	2.116
7/16/2003	8.2	2.104
10/14/2003	8.3	2.116
1/13/2004	8.2	2.104

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW370	Downgradient	Yes	19.7	YES	2.981	N/A
MW373	Downgradient	Yes	148	YES	4.997	N/A
MW385	Sidegradient	Yes	19.9	YES	2.991	N/A
MW388	Downgradient	Yes	23.9	YES	3.174	N/A
MW392	Downgradient	Yes	6.43	NO	1.861	N/A
MW395	Upgradient	Yes	9.86	NO	2.288	N/A
MW397	Upgradient	Yes	11.3	NO	2.425	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. D1-89

C-746-S/T Fourth Quarter 2016 Statistical Analysis Historical Background Comparison

Technetium-99

UNITS: pCi/L

LRGA

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

Statistics-Background Data X= 11.359 S= 9.138 CV(1)=0.805 K factor**= 2.523 TL(1)= 34.414 LL(1)=N/A

Statistics-Transformed Background Data X= 2.398 S= 0.859 CV(2)=0.358 K factor**= 2.523 TL(2)= 3.246 LL(2)=N/A

Historical Background Data from Upgradient Wells with Transformed Result

Well Number: MW395

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

Well Number: MW397

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

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

#Because the natural log was not possible for all background values, the TL was considered equal to the maximum background value.

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW370	Downgradient	Yes	31.7	NO	3.456	N/A
MW373	Downgradient	Yes	19.9	NO	2.991	N/A
MW385	Sidegradient	Yes	147	YES	4.990	N/A
MW388	Downgradient	Yes	162	YES	5.088	N/A
MW392	Downgradient	No	1.55	N/A	0.438	N/A
MW395	Upgradient	No	2.15	N/A	0.765	N/A
MW397	Upgradient	No	9.1	N/A	2.208	N/A

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

Conclusion of Statistical Analysis on Historical Data

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

Wells with Exceedances

MW385
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. D1-90

C-746-S/T Fourth Quarter 2016 Statistical Analysis Historical Background Comparison

Total Organic Carbon (TOC)

UNITS: mg/L

LRGA

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

Statistics-Background Data X= 1.544 S= 0.856 CV(1)=0.554 K factor**= 2.523 TL(1)= 3.702 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	1.36	NO	0.307	N/A
MW373	Downgradient	Yes	1.38	NO	0.322	N/A
MW385	Sidegradient	Yes	1.19	NO	0.174	N/A
MW388	Downgradient	Yes	1.17	NO	0.157	N/A
MW392	Downgradient	Yes	1.19	NO	0.174	N/A
MW395	Upgradient	Yes	0.98	NO	-0.020	N/A
MW397	Upgradient	Yes	0.838	NO	-0.177	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. D1-91

C-746-S/T Fourth Quarter 2016 Statistical Analysis Historical Background Comparison

Total Organic Halides (TOX)

UNITS: ug/L

LRGA

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

Statistics-Background Data X= 31.513 S= 18.609 CV(1)=0.591 K factor**= 2.523 TL(1)= 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

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW370	Downgradient	Yes	25.6	NO	3.243	N/A
MW373	Downgradient	Yes	9.66	NO	2.268	N/A
MW385	Sidegradient	Yes	4.68	NO	1.543	N/A
MW388	Downgradient	Yes	6.38	NO	1.853	N/A
MW392	Downgradient	Yes	73	NO	4.290	N/A
MW395	Upgradient	Yes	6.66	NO	1.896	N/A
MW397	Upgradient	Yes	5.64	NO	1.730	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	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

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. D1-92

C-746-S/T Fourth Quarter 2016 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	4.78	N/A	1.564	N/A
MW373	Downgradient	Yes	7.63	NO	2.032	N/A
MW385	Sidegradient	Yes	0.35	N/A	-1.050	N/A
MW388	Downgradient	Yes	0.83	N/A	-0.186	N/A
MW392	Downgradient	Yes	25.8	YES	3.250	N/A
MW395	Upgradient	Yes	3.99	N/A	1.384	N/A
MW397	Upgradient	No	1	N/A	0.000	N/A

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

Well Number: MW397

Date Collected	Result	LN(Result)
8/13/2002	5	1.609
9/30/2002	5	1.609
10/17/2002	1	0.000
1/13/2003	1	0.000
4/8/2003	1	0.000
7/16/2003	1	0.000
10/14/2003	1	0.000
1/13/2004	1	0.000

Conclusion of Statistical Analysis on Historical Data

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

MW392

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the 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. D1-93

C-746-S/T Fourth Quarter 2016 Statistical Analysis Historical Background Comparison

Uranium

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= 0.001 S= 0.000 CV(1)=0.000 K factor**= 2.523 TL(1)= 0.001 LL(1)=N/A

Statistics-Transformed Background Data X= -6.908 S= 0.000 CV(2)=0.000 K factor**= 2.523 TL(2)= -6.908 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	0.001	-6.908
9/16/2002	0.001	-6.908
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

Well Number: MW397

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

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW370	Downgradient	No	0.0002	N/A	-8.517	N/A
MW373	Downgradient	No	0.0002	N/A	-8.517	N/A
MW385	Sidegradient	Yes	0.000156	NO	-8.766	N/A
MW388	Downgradient	No	0.0002	N/A	-8.517	N/A
MW392	Downgradient	No	0.0002	N/A	-8.517	N/A
MW395	Upgradient	No	0.0002	N/A	-8.517	N/A
MW397	Upgradient	No	0.0002	N/A	-8.517	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. D1-94

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 Fourth Quarter 2016 Statistical Analysis	Current Background Comparison
Oxidation-Reduction Potential	UNITS: mV
	UCRS

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

Statistics-Background Data	X= 279.750	S= 117.897	CV(1)=0.421	K factor**= 3.188	TL(1)= 655.605	LL(1)=N/A
Statistics-Transformed Background Data	X= 5.552	S= 0.440	CV(2)=0.079	K factor**= 3.188	TL(2)= 6.955	LL(2)=N/A

Current Background Data from Upgradient Wells with Transformed Result
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Because CV(1) is less than or equal to 1, assume normal distribution and continue with statistical analysis utilizing TL(1).

Well Number: MW396

Date Collected	Result	LN(Result)
10/27/2014	141	4.949
1/8/2015	193	5.263
4/22/2015	469	6.151
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

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW386	Sidegradient	Yes	206	NO	5.328	N/A
MW390	Downgradient	Yes	431	NO	6.066	N/A
MW393	Downgradient	Yes	218	NO	5.384	N/A
MW396	Upgradient	Yes	221	NO	5.398	N/A

Conclusion of Statistical Analysis on Current Data

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

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

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

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

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

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

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

C-746-S/T Fourth Quarter 2016 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 = 0.662	S = 0.258	CV(1) =0.389	K factor** = 3.188	TL(1) = 1.483	LL(1) =N/A
Statistics-Transformed Background Data	X = -0.499	S = 0.483	CV(2) =-0.967	K factor** = 3.188	TL(2) = 1.040	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)
10/27/2014	0.633	-0.457
1/8/2015	0.585	-0.536
4/22/2015	0.786	-0.241
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

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW386	Sidegradient	Yes	0.756	NO	-0.280	N/A
MW390	Downgradient	Yes	1.02	NO	0.020	N/A

Conclusion of Statistical Analysis on Current Data

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

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

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

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

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

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

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

C-746-S/T Fourth Quarter 2016 Statistical Analysis Current Background Comparison

Beta activity

UNITS: pCi/L

URGA

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

Statistics-Background Data X= 10.118 S= 5.302 CV(1)=0.524 **K factor**= 2.523** TL(1)= 23.495 LL(1)=N/A

Statistics-Transformed Background Data X= 2.188 S= 0.522 CV(2)=0.239 **K factor**= 2.523** TL(2)= 3.505 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)
10/21/2014	9.99	2.302
1/5/2015	21.8	3.082
4/14/2015	11.4	2.434
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

Well Number: MW394

Date Collected	Result	LN(Result)
10/27/2014	3.99	1.384
1/8/2015	5.07	1.623
4/22/2015	9.13	2.212
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

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW369	Downgradient	Yes	57	YES	4.043	N/A
MW384	Sidegradient	Yes	101	YES	4.615	N/A
MW387	Downgradient	Yes	115	YES	4.745	N/A

Conclusion of Statistical Analysis on Current Data

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

Wells with Exceedances

- MW369
- MW384
- MW387

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

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

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

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

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

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

C-746-S/T Fourth Quarter 2016 Statistical Analysis Current Background Comparison

Calcium

UNITS: mg/L

URGA

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

Statistics-Background Data X= 24.131 S= 3.953 CV(1)=0.164 **K factor**= 2.523** TL(1)= 34.104 LL(1)=N/A

Statistics-Transformed Background Data X= 3.170 S= 0.170 CV(2)=0.054 **K factor**= 2.523** TL(2)= 3.599 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)
10/21/2014	18.4	2.912
1/5/2015	20	2.996
4/14/2015	23	3.135
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

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW372	Downgradient	Yes	49.1	YES	3.894	N/A

Well Number: MW394

Date Collected	Result	LN(Result)
10/27/2014	26.5	3.277
1/8/2015	27.2	3.303
4/22/2015	26.5	3.277
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

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.

C-746-S/T Fourth Quarter 2016 Statistical Analysis 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= 202.438 S= 32.560 CV(1)=0.161 K factor**= 2.523 TL(1)= 284.585 LL(1)=N/A**

Statistics-Transformed Background Data **X= 5.298 S= 0.165 CV(2)=0.031 K factor**= 2.523 TL(2)= 5.713 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)
10/21/2014	159	5.069
1/5/2015	140	4.942
4/14/2015	197	5.283
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

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW372	Downgradient	Yes	376	YES	5.930	N/A

Well Number: MW394

Date Collected	Result	LN(Result)
10/27/2014	187	5.231
1/8/2015	166	5.112
4/22/2015	181	5.198
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

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

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.

C-746-S/T Fourth Quarter 2016 Statistical Analysis Current Background Comparison

Magnesium

UNITS: mg/L

URGA

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is 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= 10.157 S= 1.717 CV(1)=0.169 **K factor**= 2.523** TL(1)= 14.488 LL(1)=N/A

Statistics-Transformed Background Data X= 2.304 S= 0.177 CV(2)=0.077 **K factor**= 2.523** TL(2)= 2.751 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)
10/21/2014	7.41	2.003
1/5/2015	8.05	2.086
4/14/2015	10.2	2.322
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

Well Number: MW394

Date Collected	Result	LN(Result)
10/27/2014	11	2.398
1/8/2015	11.3	2.425
4/22/2015	11.1	2.407
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

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW372	Downgradient	Yes	19.6	YES	2.976	N/A
MW391	Downgradient	Yes	15.8	YES	2.760	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, $S = [\text{Sum}([(background\ result-X)^2]/[\text{count of background results} - 1])]^{0.5}$

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>. D2-9

C-746-S/T Fourth Quarter 2016 Statistical Analysis	Current Background Comparison
Oxidation-Reduction Potential	UNITS: mV
	URGA

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

Statistics-Background Data X= 493.938 S= 123.388 CV(1)=0.250 **K factor**= 2.523** TL(1)= 805.245 LL(1)=N/A

Statistics-Transformed Background Data X= 6.176 S= 0.233 CV(2)=0.038 **K factor**= 2.523** TL(2)= 6.764 LL(2)=N/A

Current Background Data from Upgradient Wells with Transformed Result
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Because CV(1) is less than or equal to 1, assume normal distribution and continue with statistical analysis utilizing TL(1).

Well Number: MW220

Date Collected	Result	LN(Result)
10/21/2014	401	5.994
1/5/2015	733	6.597
4/14/2015	488	6.190
9/3/2015	672	6.510
10/15/2015	728	6.590
1/5/2016	449	6.107
4/12/2016	438	6.082
7/19/2016	425	6.052

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	Yes	414	NO	6.026	N/A
MW222	Sidegradient	Yes	424	NO	6.050	N/A
MW223	Sidegradient	Yes	429	NO	6.061	N/A
MW384	Sidegradient	Yes	401	NO	5.994	N/A
MW387	Downgradient	Yes	450	NO	6.109	N/A

Well Number: MW394

Date Collected	Result	LN(Result)
10/27/2014	453	6.116
1/8/2015	453	6.116
4/22/2015	461	6.133
7/17/2015	608	6.410
10/22/2015	411	6.019
1/5/2016	351	5.861
4/18/2016	484	6.182
7/19/2016	348	5.852

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>. D2-10

C-746-S/T Fourth Quarter 2016 Statistical Analysis Current Background Comparison

Radium-226

UNITS: pCi/L

URGA

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

Statistics-Background Data	X = 0.636	S = 0.233	CV(1) =0.367	K factor** = 2.523	TL(1) = 1.225	LL(1) =N/A
Statistics-Transformed Background Data	X = -0.514	S = 0.364	CV(2) =-0.708	K factor** = 2.523	TL(2) = 0.404	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)
10/21/2014	0.858	-0.153
1/5/2015	0.484	-0.726
4/14/2015	0.409	-0.894
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

Well Number: MW394

Date Collected	Result	LN(Result)
10/27/2014	0.706	-0.348
1/8/2015	0.332	-1.103
4/22/2015	0.557	-0.585
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

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	Yes	1.15	NO	0.140	N/A
MW221	Sidegradient	Yes	0.603	NO	-0.506	N/A
MW224	Sidegradient	Yes	0.653	NO	-0.426	N/A
MW387	Downgradient	Yes	0.826	NO	-0.191	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 = (sum of background results)/(count of background results)

** Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009. D2-11

C-746-S/T Fourth Quarter 2016 Statistical Analysis Current Background Comparison

Sulfate

UNITS: mg/L

URGA

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

Statistics-Background Data **X= 13.646 S= 3.833 CV(1)=0.281 K factor**= 2.523 TL(1)= 23.317 LL(1)=N/A**

Statistics-Transformed Background Data **X= 2.579 S= 0.268 CV(2)=0.104 K factor**= 2.523 TL(2)= 3.254 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)
10/21/2014	13.5	2.603
1/5/2015	14	2.639
4/14/2015	17.9	2.885
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

Well Number: MW394

Date Collected	Result	LN(Result)
10/27/2014	11.1	2.407
1/8/2015	10.5	2.351
4/22/2015	10.3	2.332
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

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	Yes	18.7	NO	2.929	N/A
MW372	Downgradient	Yes	76.5	YES	4.337	N/A
MW384	Sidegradient	Yes	20.5	NO	3.020	N/A
MW387	Downgradient	Yes	28.3	YES	3.343	N/A
MW391	Downgradient	Yes	54.6	YES	4.000	N/A

Conclusion of Statistical Analysis on Current Data

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

Wells with Exceedances

MW372
MW387
MW391

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

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

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

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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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= 15.068 S= 10.013 CV(1)=0.664 K factor**= 2.523 TL(1)= 40.330 LL(1)=N/A

Statistics-Transformed Background Data X= 2.398 S= 0.986 CV(2)=0.411 K factor**= 2.523 TL(2)= 4.886 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)
10/21/2014	35	3.555
1/5/2015	32.5	3.481
4/14/2015	12.2	2.501
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

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW369	Downgradient	Yes	83.3	YES	4.422	N/A
MW384	Sidegradient	Yes	167	YES	5.118	N/A
MW387	Downgradient	Yes	215	YES	5.371	N/A

Well Number: MW394

Date Collected	Result	LN(Result)
10/27/2014	17.2	2.845
1/8/2015	17.2	2.845
4/22/2015	11.5	2.442
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

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= 8.602 S= 6.485 CV(1)=0.754 **K factor**= 2.523** TL(1)= 24.963 LL(1)=N/A

Statistics-Transformed Background Data X= 2.101 S= 0.770 CV(2)=0.366 **K factor**= 2.523** TL(2)= 2.950 LL(2)=N/A

Current Background Data from Upgradient Wells with Transformed Result

Well Number: MW395

Date Collected	Result	LN(Result)
10/27/2014	19.1	2.950
1/6/2015	5.98	1.788
4/22/2015	1.03	0.030
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!

Well Number: MW397

Date Collected	Result	LN(Result)
10/21/2014	10.4	2.342
1/7/2015	16.3	2.791
4/22/2015	5.37	1.681
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

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)
MW385	Sidegradient	Yes	78.1	YES	4.358	N/A
MW388	Downgradient	Yes	95.8	YES	4.562	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

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. D2-14

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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= 23.750 S= 5.023 CV(1)=0.212 K factor**= 2.523 TL(1)= 36.424 LL(1)=N/A**

Statistics-Transformed Background Data **X= 3.147 S= 0.210 CV(2)=0.067 K factor**= 2.523 TL(2)= 3.676 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)
10/27/2014	26.6	3.281
1/6/2015	25.8	3.250
4/22/2015	26.4	3.273
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

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW373	Downgradient	Yes	67.5	YES	4.212	N/A

Well Number: MW397

Date Collected	Result	LN(Result)
10/21/2014	19.8	2.986
1/7/2015	18.6	2.923
4/22/2015	18.7	2.929
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

Conclusion of Statistical Analysis on Current Data

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

Wells with Exceedances

MW373

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

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

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

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

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

** Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009. D2-15

C-746-S/T Fourth Quarter 2016 Statistical Analysis Current Background Comparison
Chemical Oxygen Demand (COD) 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= 25.275 S= 15.356 CV(1)=0.608 **K factor**= 2.523** TL(1)= 64.019 LL(1)=N/A
Statistics-Transformed Background Data X= 3.120 S= 0.439 CV(2)=0.141 **K factor**= 2.523** TL(2)= 4.227 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)
10/27/2014	20	2.996
1/6/2015	20	2.996
4/22/2015	20	2.996
7/17/2015	20	2.996
10/22/2015	20	2.996
1/5/2016	20	2.996
4/18/2016	30.8	3.428
7/19/2016	74.1	4.305

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW385	Sidegradient	Yes	154	YES	5.037	N/A

Well Number: MW397

Date Collected	Result	LN(Result)
10/21/2014	20	2.996
1/7/2015	20	2.996
4/22/2015	20	2.996
7/15/2015	20	2.996
10/22/2015	10.4	2.342
1/5/2016	20	2.996
4/14/2016	20	2.996
7/19/2016	49.1	3.894

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.

MW385

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

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

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

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

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

** Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009. 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= 359.125 S= 29.960 CV(1)=0.083 **K factor**= 2.523** TL(1)= 434.713 LL(1)=N/A

Statistics-Transformed Background Data X= 5.880 S= 0.083 CV(2)=0.014 **K factor**= 2.523** TL(2)= 6.090 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)
10/27/2014	387	5.958
1/6/2015	376	5.930
4/22/2015	338	5.823
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

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW373	Downgradient	Yes	798	YES	6.682	N/A

Well Number: MW397

Date Collected	Result	LN(Result)
10/21/2014	337	5.820
1/7/2015	354	5.869
4/22/2015	325	5.784
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

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. D2-17

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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= 183.125 S= 27.058 CV(1)=0.148 **K factor**= 2.523** TL(1)= 251.391 LL(1)=N/A

Statistics-Transformed Background Data X= 5.200 S= 0.147 CV(2)=0.028 **K factor**= 2.523** TL(2)= 5.571 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)
10/27/2014	181	5.198
1/6/2015	147	4.990
4/22/2015	179	5.187
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

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW373	Downgradient	Yes	497	YES	6.209	N/A

Well Number: MW397

Date Collected	Result	LN(Result)
10/21/2014	161	5.081
1/7/2015	159	5.069
4/22/2015	144	4.970
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

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. D2-18

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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 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= 10.134 S= 2.231 CV(1)=0.220 **K factor**= 2.523** TL(1)= 15.763 LL(1)=N/A

Statistics-Transformed Background Data X= 2.294 S= 0.216 CV(2)=0.094 **K factor**= 2.523** TL(2)= 2.840 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)
10/27/2014	11.3	2.425
1/6/2015	9.96	2.299
4/22/2015	11.3	2.425
7/17/2015	11.8	2.468
10/22/2015	12.3	2.510
1/5/2016	11.8	2.468
4/18/2016	11.5	2.442
7/19/2016	11.1	2.407

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW373	Downgradient	Yes	25.3	YES	3.231	N/A

Well Number: MW397

Date Collected	Result	LN(Result)
10/21/2014	8.07	2.088
1/7/2015	7.64	2.033
4/22/2015	8.09	2.091
7/15/2015	7.55	2.022
10/22/2015	8.64	2.156
1/5/2016	8.18	2.102
4/14/2016	7.72	2.044
7/19/2016	15.2	2.721

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. D2-19

C-746-S/T Fourth Quarter 2016 Statistical Analysis	Current Background Comparison
Oxidation-Reduction Potential	UNITS: mV
	LRGA

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

Statistics-Background Data X= 462.375 S= 103.822 CV(1)=0.225 **K factor**= 2.523** TL(1)= 724.317 LL(1)=N/A

Statistics-Transformed Background Data X= 6.113 S= 0.222 CV(2)=0.036 **K factor**= 2.523** TL(2)= 6.674 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)
10/27/2014	307	5.727
1/6/2015	586	6.373
4/22/2015	474	6.161
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

Well Number: MW397

Date Collected	Result	LN(Result)
10/21/2014	380	5.940
1/7/2015	675	6.515
4/22/2015	471	6.155
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

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW370	Downgradient	Yes	402	NO	5.996	N/A
MW373	Downgradient	Yes	322	NO	5.775	N/A
MW385	Sidegradient	Yes	295	NO	5.687	N/A
MW388	Downgradient	Yes	455	NO	6.120	N/A
MW392	Downgradient	Yes	442	NO	6.091	N/A
MW395	Upgradient	Yes	357	NO	5.878	N/A
MW397	Upgradient	Yes	378	NO	5.935	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.

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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 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= 0.586 S= 0.307 CV(1)=0.524 K factor**= 2.523 TL(1)= 1.360 LL(1)=N/A

Statistics-Transformed Background Data X= -0.570 S= 0.521 CV(2)=-0.913 K factor**= 2.523 TL(2)= 0.182 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)
10/27/2014	0.537	-0.622
1/6/2015	0.566	-0.569
4/22/2015	0.892	-0.114
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

#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	0.783	NO	-0.245	N/A
MW395	Upgradient	Yes	0.669	NO	-0.402	N/A

Well Number: MW397

Date Collected	Result	LN(Result)
10/21/2014	0.492	-0.709
1/7/2015	0.45	-0.799
4/22/2015	0.69	-0.371
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

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 Fourth Quarter 2016 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= 10.655 S= 0.865 CV(1)=0.081 **K factor**= 2.523** TL(1)= 12.839 LL(1)=N/A

Statistics-Transformed Background Data X= 2.363 S= 0.080 CV(2)=0.034 **K factor**= 2.523** TL(2)= 2.564 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)
10/27/2014	10.6	2.361
1/6/2015	10.1	2.313
4/22/2015	10.1	2.313
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

Well Number: MW397

Date Collected	Result	LN(Result)
10/21/2014	12.6	2.534
1/7/2015	11.7	2.460
4/22/2015	10.9	2.389
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

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW370	Downgradient	Yes	19.7	YES	2.981	N/A
MW373	Downgradient	Yes	148	YES	4.997	N/A
MW385	Sidegradient	Yes	19.9	YES	2.991	N/A
MW388	Downgradient	Yes	23.9	YES	3.174	N/A

Conclusion of Statistical Analysis on Current Data

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

Wells with Exceedances

- MW370
- MW373
- MW385
- MW388

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

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

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

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

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

** Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-factor for pH was computed using a formula from NIST/SEMATECH e-Handbook of Statistical Methods, <http://www.itl.nist.gov/div898/handbook/>, 2009. D2-22

C-746-S/T Fourth Quarter 2016 Statistical Analysis Current Background Comparison

Technetium-99

UNITS: pCi/L

LRGA

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

Statistics-Background Data X= 11.335 S= 4.073 CV(1)=0.359 **K factor**= 2.523** TL(1)= 21.612 LL(1)=N/A

Statistics-Transformed Background Data X= 2.358 S= 0.404 CV(2)=0.171 **K factor**= 2.523** TL(2)= 3.376 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)
10/27/2014	14.4	2.667
1/6/2015	17	2.833
4/22/2015	7.25	1.981
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

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW385	Sidegradient	Yes	147	YES	4.990	N/A
MW388	Downgradient	Yes	162	YES	5.088	N/A

Well Number: MW397

Date Collected	Result	LN(Result)
10/21/2014	14.7	2.688
1/7/2015	4.58	1.522
4/22/2015	9.32	2.232
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

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

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. D2-23

C-746-S/T Fourth Quarter 2016 Statistical Analysis Current 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 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= 2.407 S= 1.746 CV(1)=0.725 K factor**= 2.523 TL(1)= 6.812 LL(1)=N/A**

Statistics-Transformed Background Data **X= 0.491 S= 1.019 CV(2)=2.075 K factor**= 2.523 TL(2)= 3.062 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)
10/27/2014	4.12	1.416
1/6/2015	3.99	1.384
4/22/2015	3.46	1.241
7/17/2015	3.8	1.335
10/22/2015	3.92	1.366
1/5/2016	4.61	1.528
4/18/2016	4.23	1.442
7/19/2016	4.39	1.479

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW392	Downgradient	Yes	25.8	YES	3.250	N/A

Well Number: MW397

Date Collected	Result	LN(Result)
10/21/2014	0.33	-1.109
1/7/2015	1	0.000
4/22/2015	0.36	-1.022
7/15/2015	1	0.000
10/22/2015	1	0.000
1/5/2016	0.3	-1.204
4/14/2016	1	0.000
7/19/2016	1	0.000

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

MW392

NOTE: For UCRS wells, background ("upgradient") wells are those located in the same direction as RGA wells located upgradient from the 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. D2-24

ATTACHMENT D3

STATISTICIAN QUALIFICATION STATEMENT

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January 24, 2017

Ms. Kelly Layne
Fluor Federal Services, Inc.
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 Fluor Federal Services, Inc.

For this project, the statistical analyses conducted on the fourth quarter 2016 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

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APPENDIX E
GROUNDWATER FLOW RATE AND DIRECTION

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GROUNDWATER FLOW RATE AND DIRECTION

Whenever monitoring wells (MWs) are sampled, 401 KAR 48:300, Section 11, requires determination of groundwater flow rate and direction of flow in the uppermost aquifer. The uppermost aquifer below the C-746-S&T Landfills is the Regional Gravel Aquifer (RGA). Water level measurements currently are recorded in several wells at the landfill on a quarterly basis. These measurements were used to plot the potentiometric surface of the RGA for the fourth quarter 2016 and to determine the groundwater flow rate and direction.

Water levels during this reporting period were measured on October 25 and 26, 2016. 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.

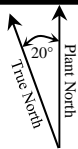
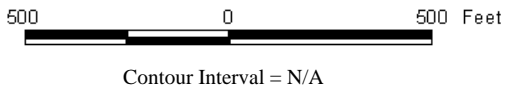
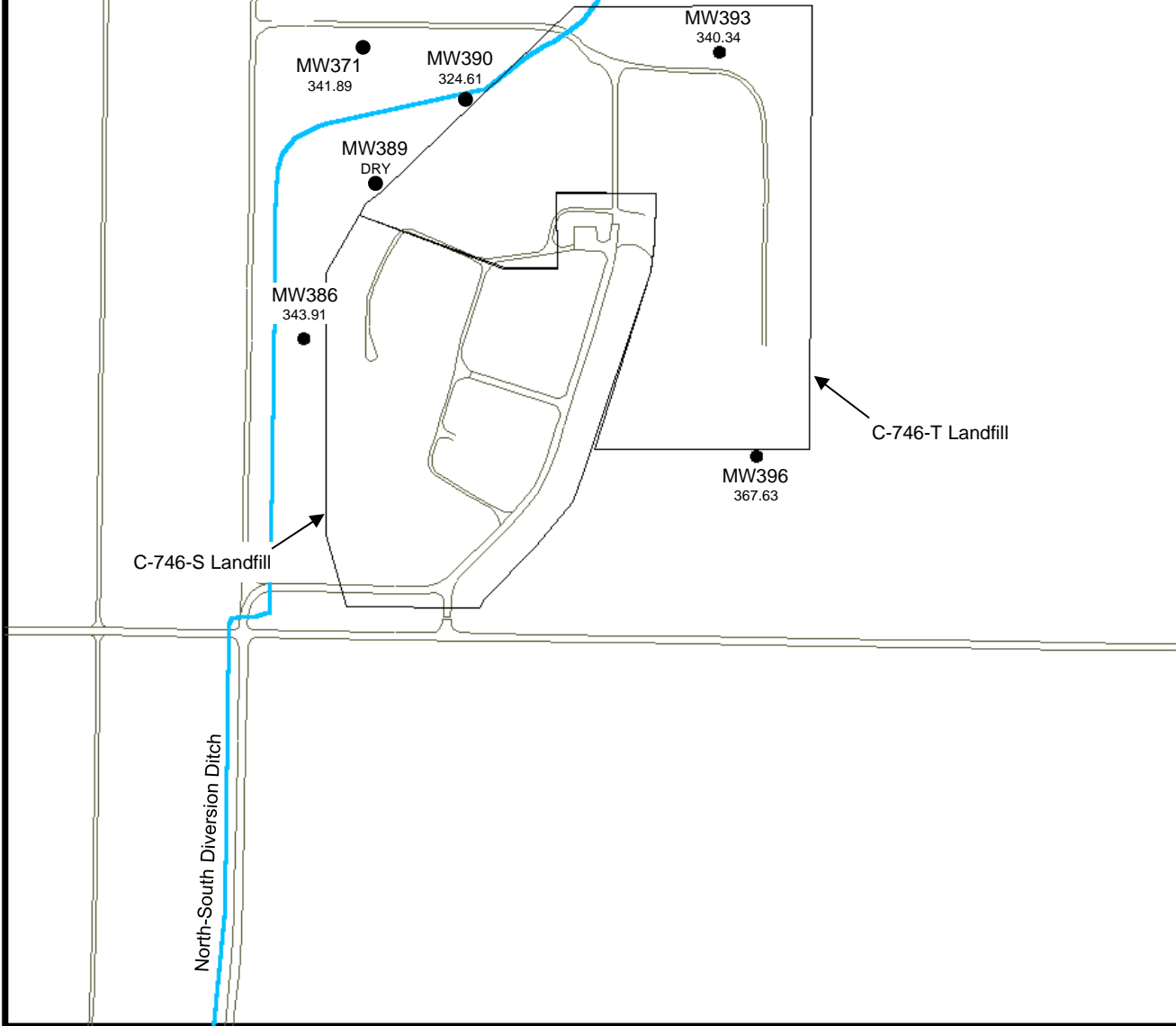
The UCRS has a strong vertical hydraulic gradient; therefore, the limited number of available UCRS wells, screened over different elevations, is not sufficient for mapping the potentiometric surface. Figure E.1 shows the location of UCRS MWs. The Upper Regional Gravel Aquifer (URGA) and Lower Regional 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 is 4.76×10^{-4} ft/ft. Additional water level measurements in October (Figure E.3) document the vicinity groundwater hydraulic gradient for the RGA to be 4.89×10^{-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 October 2016, 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.



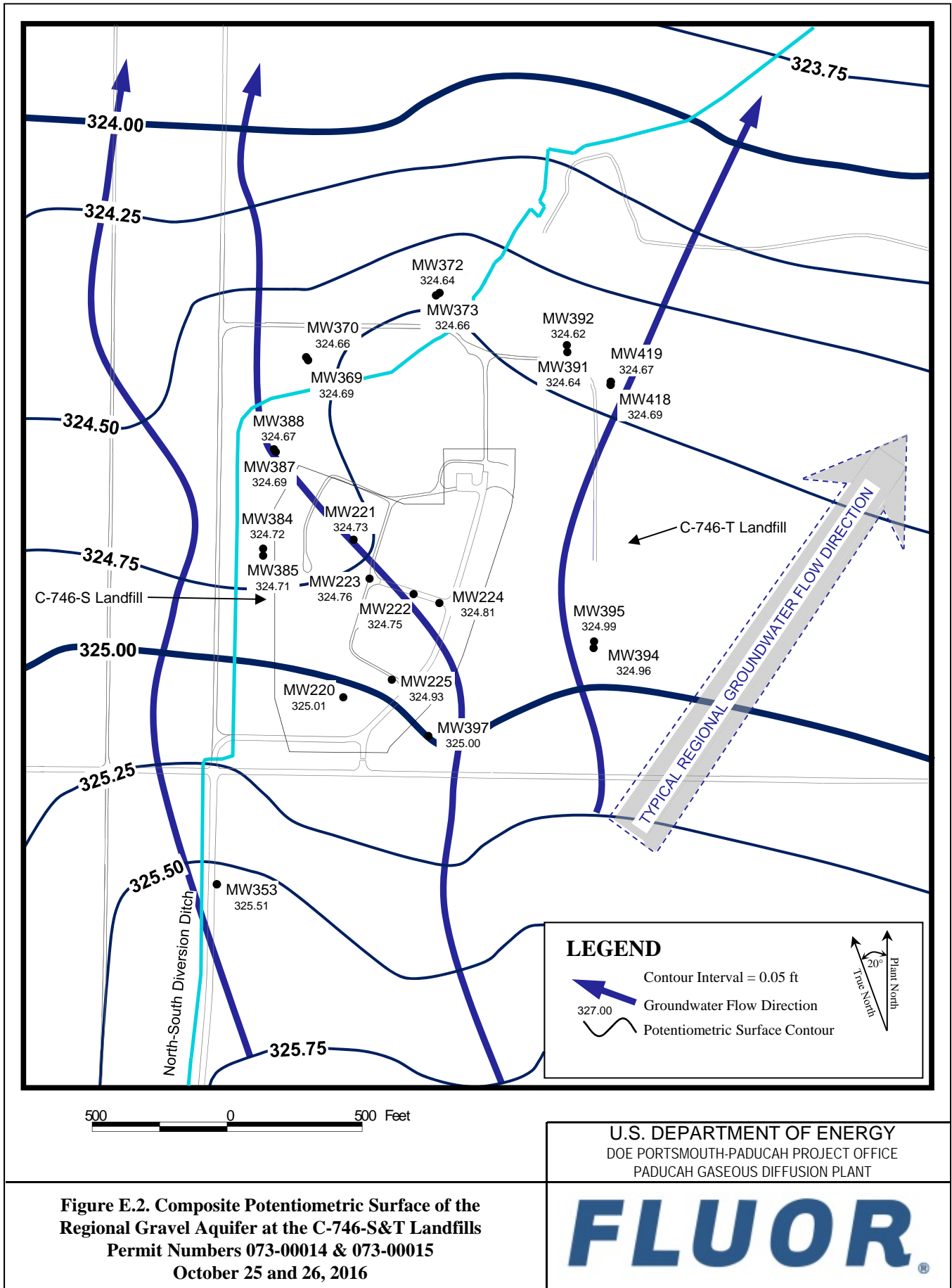
U.S. DEPARTMENT OF ENERGY
DOE PORTSMOUTH-PADUCAH PROJECT OFFICE
PADUCAH GASEOUS DIFFUSION PLANT

Figure E.1. Potentiometric Surface of the Upper Continental Recharge System at the C-746 S&T Landfills Permit Numbers 073-00014 & 073-00015 October 25, 2016



Table E.1. C-746-S&T Landfills Fourth Quarter 2016 (October) Water Levels

C-746-S&T Landfills (October 2016) Water Levels										
Date	Time	Well	Formation	Datum Elev (ft amsl)	BP (in Hg)	Delta BP (ft H ₂ O)	Raw Data		*Corrected Data	
							DTW (ft)	Elev (ft amsl)	DTW (ft)	Elev (ft amsl)
10/25/2016	9:00	MW220	URGA	381.44	30.32	0.00	56.43	325.01	56.43	325.01
10/25/2016	9:06	MW221	URGA	390.83	30.32	0.00	66.10	324.73	66.10	324.73
10/25/2016	9:09	MW222	URGA	394.87	30.32	0.00	70.12	324.75	70.12	324.75
10/25/2016	9:07	MW223	URGA	394.03	30.32	0.00	69.27	324.76	69.27	324.76
10/25/2016	9:10	MW224	URGA	395.41	30.32	0.00	70.60	324.81	70.60	324.81
10/25/2016	9:02	MW225	URGA	385.55	30.32	0.00	60.62	324.93	60.62	324.93
10/25/2016	7:53	MW353	LRGA	374.86	30.32	0.00	49.35	325.51	49.35	325.51
10/25/2016	8:58	MW384	URGA	365.06	30.32	0.00	40.34	324.72	40.34	324.72
10/25/2016	8:56	MW385	LRGA	365.54	30.32	0.00	40.83	324.71	40.83	324.71
10/25/2016	8:57	MW386	UCRS	365.21	30.32	0.00	21.30	343.91	21.30	343.91
10/25/2016	8:54	MW387	URGA	363.27	30.32	0.00	38.58	324.69	38.58	324.69
10/25/2016	8:53	MW388	LRGA	363.25	30.32	0.00	38.58	324.67	38.58	324.67
10/25/2016	8:50	MW389	UCRS	363.82	30.32	--	DRY	--	DRY	--
10/25/2016	8:48	MW390	UCRS	360.36	30.32	0.00	35.75	324.61	35.75	324.61
10/25/2016	8:32	MW391	URGA	366.54	30.32	0.00	41.90	324.64	41.90	324.64
10/25/2016	8:34	MW392	LRGA	365.67	30.32	0.00	41.05	324.62	41.05	324.62
10/25/2016	8:33	MW393	UCRS	366.59	30.32	0.00	26.25	340.34	26.25	340.34
10/25/2016	8:43	MW394	URGA	378.32	30.32	0.00	53.36	324.96	53.36	324.96
10/25/2016	8:41	MW395	LRGA	379.01	30.32	0.00	54.02	324.99	54.02	324.99
10/25/2016	8:42	MW396	UCRS	378.64	30.32	0.00	11.01	367.63	11.01	367.63
10/25/2016	8:45	MW397	LRGA	386.90	30.32	0.00	61.90	325.00	61.90	325.00
10/25/2016	8:36	MW418	URGA	366.78	30.32	0.00	42.09	324.69	42.09	324.69
10/26/2016	14:28	MW419	LRGA	366.68	30.09	0.26	41.75	324.93	42.01	324.67
Initial Barometric Pressure			30.32							
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										



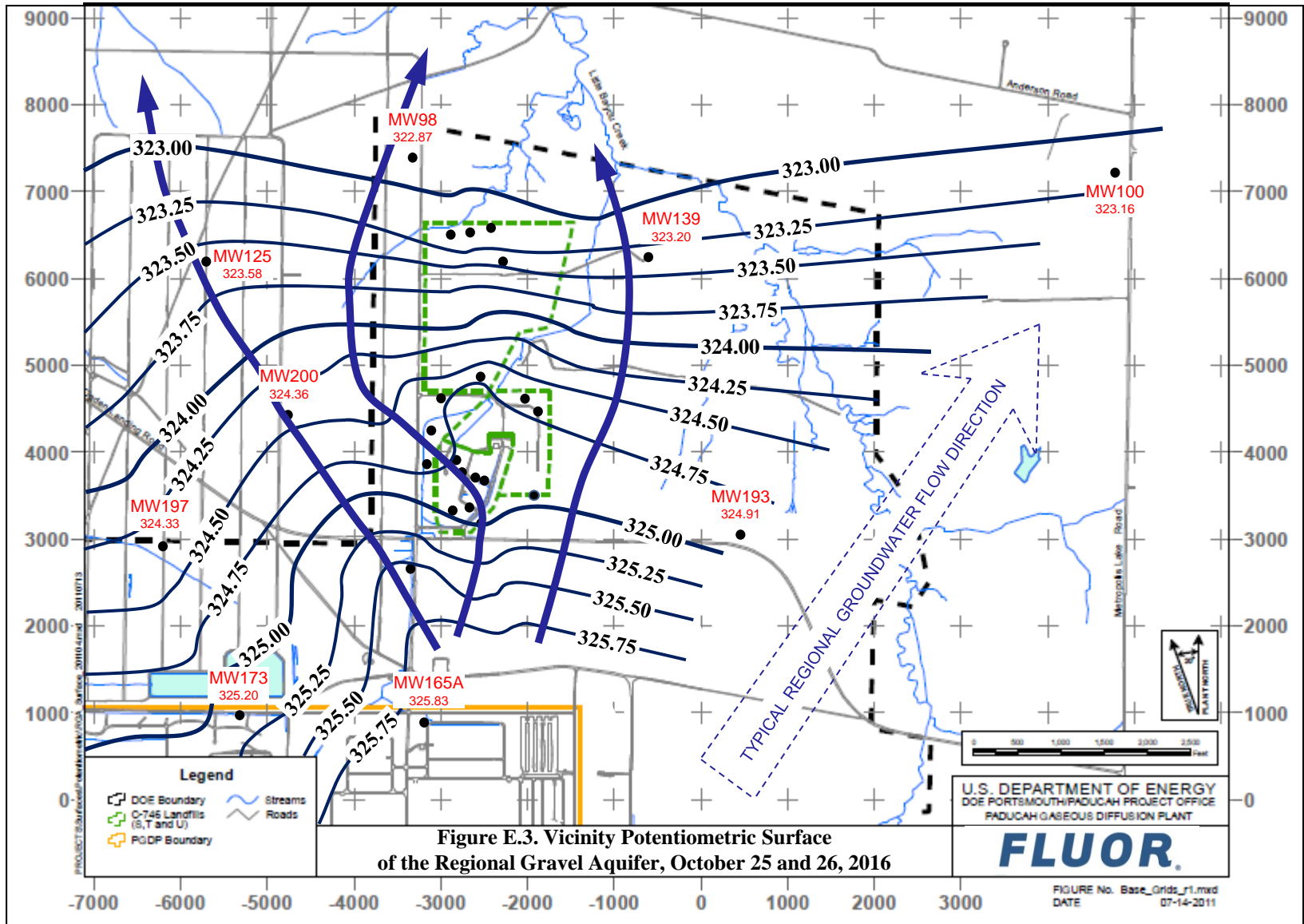


Table E.2. C-746-S&T Landfills Hydraulic Gradients

	ft/ft
Beneath Landfill Mound	4.76×10^{-4}
Vicinity	4.89×10^{-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	0.345	1.22×10^{-4}	1.38	4.87×10^{-4}
425	0.150	0.202	7.13×10^{-5}	0.809	2.85×10^{-4}
<u>Vicinity</u>					
725	0.256	0.354	1.25×10^{-4}	1.42	5.00×10^{-4}
425	0.150	0.208	7.33×10^{-5}	0.831	2.93×10^{-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 fourth quarter 2016 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	MW385, MW388

NOTE: Although technetium-99 is not cited in 40 CFR § 302.4, Appendix A, this radionuclide is being reported along with the parameters of this regulation.

2/23/2017

**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
8004-4820	MW369	Beta activity	9310	57	pCi/L	50
8004-4808	MW372	Trichloroethene	8260B	7.06	ug/L	5
8004-4792	MW373	Trichloroethene	8260B	7.63	ug/L	5
8004-4809	MW384	Beta activity	9310	101	pCi/L	50
8004-4810	MW385	Beta activity	9310	78.1	pCi/L	50
8004-4815	MW387	Beta activity	9310	115	pCi/L	50
8004-4816	MW388	Beta activity	9310	95.8	pCi/L	50
8004-4805	MW391	Trichloroethene	8260B	11.4	ug/L	5
8004-4806	MW392	Trichloroethene	8260B	25.8	ug/L	5
8004-4802	MW394	Trichloroethene	8260B	7.06	ug/L	5

NOTE 1: These levels 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 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							*								*								
Quarter 4, 2004			*																				
Quarter 1, 2005			*																				
Quarter 2, 2005			*				*																
Quarter 3, 2005			*				*			*											*		
Quarter 4, 2005			*				*			*													
Quarter 1, 2006							*						*										
Quarter 2, 2006			*				*																
Quarter 3, 2006							*																
Quarter 4, 2006			*				*																
Quarter 1, 2007							*										*						
Quarter 2, 2007							*										*						
Quarter 3, 2007							*																
Quarter 4, 2007							*																
Quarter 1, 2008							*							*									
Quarter 2, 2008											*												
Quarter 4, 2008							*																
Quarter 1, 2009			*				*				*												
Quarter 1, 2010			*				*				*												
Quarter 2, 2010			*								*												
Quarter 3, 2010			*								*			*			*		*				
Quarter 1, 2011							*				*												
Quarter 2, 2011			*				*				*												
Quarter 2, 2012			*																				
Quarter 3, 2012							*																
Quarter 1, 2013							*				*												
Quarter 3, 2013			*																				
Quarter 1, 2014							*																
Quarter 2, 2014											*												
Quarter 4, 2014			*																				
Quarter 1, 2016							*																
Quarter 2, 2016														*									
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										■			■	■			■		■	■				
Quarter 1, 2016			■							■			■	■			■		■	■				
Quarter 2, 2016										■			■	■			■		■	■				
Quarter 3, 2016										■			■	■			■	■	■	■				
Quarter 4, 2016										■	■		■				■		■	■				
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																								
Quarter 1, 2003			*																					
Quarter 2, 2003			*									*												
Quarter 3, 2003			*																					
Quarter 4, 2003			*									*								*				
Quarter 1, 2004			*									*		*						*				
Quarter 2, 2004			*									*								*				
Quarter 3, 2004			*									*								*				
Quarter 4, 2004			*									*								*				
Quarter 1, 2005												*								*				
Quarter 2, 2005												*								*				
Quarter 3, 2005												*								*				
Quarter 4, 2005												*								*				
Quarter 1, 2006												*								*				
Quarter 2, 2006												*								*				
Quarter 3, 2006												*								*				
Quarter 4, 2006												*								*				
Quarter 1, 2007												*								*				
Quarter 2, 2007												*								*				
Quarter 3, 2007												*								*				
Quarter 4, 2007												*								*				
Quarter 1, 2008												*								*				
Quarter 2, 2008												*								*				
Quarter 3, 2008												*								*				
Quarter 4, 2008												*								*				
Quarter 1, 2009												*								*				
Quarter 2, 2009												*								*				
Quarter 3, 2009												*								*				
Quarter 4, 2009												*								*				
Quarter 1, 2010												*								*				
Quarter 2, 2010												*								*				
Quarter 3, 2010												*								*				
Quarter 4, 2010												*								*				
Quarter 1, 2011												*								*				
Quarter 2, 2011												*	*							*				
Quarter 3, 2011												*								*				
Quarter 4, 2011												*								*				
Quarter 1, 2012												*								*				
Quarter 2, 2012												*								*				
Quarter 3, 2012												*								*				
Quarter 4, 2012												*								*				
Quarter 1, 2013												*								*				
Quarter 2, 2013												*								*				
Quarter 3, 2013												*								*				
Quarter 4, 2013												*								*				
Quarter 1, 2014												*							*	*				
Quarter 2, 2014												*							*	*				
Quarter 3, 2014												*						*	*	*				
Quarter 4, 2014												*							*	*				
Quarter 1, 2015												*	*						*	*				

Chart of MCL and Historical UTL Exceedances for the C-746-S 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												*		*						*				
Quarter 3, 2016												*								*				
Quarter 4, 2016												*								*				
CARBON DISULFIDE																								
Quarter 4, 2010												*												
Quarter 1, 2011												*										*		
CHEMICAL OXYGEN DEMAND																								
Quarter 1, 2003				*																				
Quarter 2, 2003				*																				
Quarter 3, 2003				*			*			*														
Quarter 4, 2003				*																				
Quarter 1, 2004	*			*																				
Quarter 4, 2004	*																							
Quarter 1, 2005	*																							
Quarter 2, 2005	*																							
Quarter 3, 2005	*									*		*										*		
Quarter 4, 2005	*									*														
Quarter 1, 2006	*																							
Quarter 2, 2006	*																							
Quarter 3, 2006	*																							
Quarter 4, 2006																		*						
Quarter 1, 2007	*									*														
Quarter 2, 2007	*																							
Quarter 3, 2007	*																							
Quarter 4, 2007	*																							
Quarter 1, 2008	*																							
Quarter 2, 2008	*																							
Quarter 3, 2008	*																							
Quarter 4, 2008	*																							
Quarter 1, 2009	*																							
Quarter 2, 2009	*																					*		
Quarter 3, 2009	*																							
Quarter 4, 2009	*																							
Quarter 1, 2010	*																							
Quarter 2, 2010	*																							
Quarter 3, 2010	*																							
Quarter 4, 2010	*																							
Quarter 3, 2011	*																							
Quarter 4, 2011	*																							
Quarter 1, 2012	*																							
Quarter 1, 2013	*																							
Quarter 3, 2013	*																							
Quarter 3, 2014	*									*			*					*						
Quarter 4, 2014							*																	
Quarter 2, 2015																	*							
Quarter 3, 2015															*									
Quarter 3, 2016			*								*													
Quarter 4, 2016																	*							
CHLORIDE																								
Quarter 1, 2003			*																					
Quarter 2, 2003			*																					
Quarter 3, 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	
CHLORIDE																								
Quarter 2, 2004			*																					
Quarter 3, 2004			*																					
Quarter 4, 2004			*																					
Quarter 1, 2005			*																					
Quarter 2, 2005			*																					
Quarter 3, 2005			*																					
Quarter 4, 2005			*																					
Quarter 1, 2006																		*						
Quarter 2, 2006			*																					
Quarter 3, 2006			*																					
Quarter 4, 2006			*																					
Quarter 1, 2007			*																					
Quarter 2, 2007			*																					
Quarter 3, 2007			*																					
Quarter 4, 2007			*																					
Quarter 1, 2008			*																					
Quarter 2, 2008			*																					
Quarter 3, 2008			*																					
Quarter 4, 2008			*																					
Quarter 1, 2009			*																					
Quarter 2, 2009			*																					
Quarter 3, 2009			*																					
Quarter 4, 2009			*																					
Quarter 1, 2010			*																					
Quarter 2, 2010			*																					
Quarter 3, 2010			*																					
Quarter 4, 2010			*																					
Quarter 2, 2011			*																					
Quarter 3, 2011			*																					
Quarter 4, 2011			*																					
Quarter 3, 2012			*																					
Quarter 3, 2013			*																					
Quarter 4, 2013			*																					
Quarter 4, 2014			*																					
CHROMIUM																								
Quarter 4, 2002									■															
Quarter 1, 2003									■														■	
Quarter 2, 2003								■	■															
Quarter 3, 2009						■																		
COBALT																								
Quarter 3, 2003								*																
CONDUCTIVITY																								
Quarter 4, 2002										*										*				
Quarter 1, 2003			*							*										*				
Quarter 2, 2003			*							*										*				
Quarter 3, 2003			*					*		*										*				
Quarter 4, 2003			*							*										*				
Quarter 1, 2004										*										*				
Quarter 2, 2004										*										*				
Quarter 3, 2004										*										*				
Quarter 4, 2004			*							*										*				
Quarter 1, 2005										*		*								*				
Quarter 2, 2005												*								*				
Quarter 3, 2005												*								*				
Quarter 4, 2005										*		*								*				
Quarter 1, 2006												*								*				

Chart of MCL and Historical UTL Exceedances for the C-746-S 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												*							*					
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												*							*					
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												*		*					*				
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	
Gradient	386	389	390	393	396	221	222	223	224	384	369	372	387	391	220	394	385	370	373	388	392	395	397	
Monitoring Well																								
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	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
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	*	*				*		*				*		*						*		*	
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	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										*	*	*											*
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									*	*	*	*	*	*	*		*	*	*	*	*		

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			*							*	*	*	*				*		*	*			

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	*								*	*			*		*								
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																								
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Quarter 1, 2016																								
Quarter 2, 2016																								
Quarter 3, 2016																								
Quarter 4, 2016																								

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:	12/05/16	Time:	13:45	Monitor:	Tammy Smith														
Weather Conditions: Mostly cloudy at 43* with winds out of the NE																			
Monitoring Equipment: RAE System, Multi Rae 4494-5																			
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				18 12-5-16														
Remarks: ALL VENTS CHECKED 1" FROM THE MOUTH OF THE VENT																			
Performed by:																			
				<i>Tammy Smith</i>	12/05/2016														
				Signature	Date														

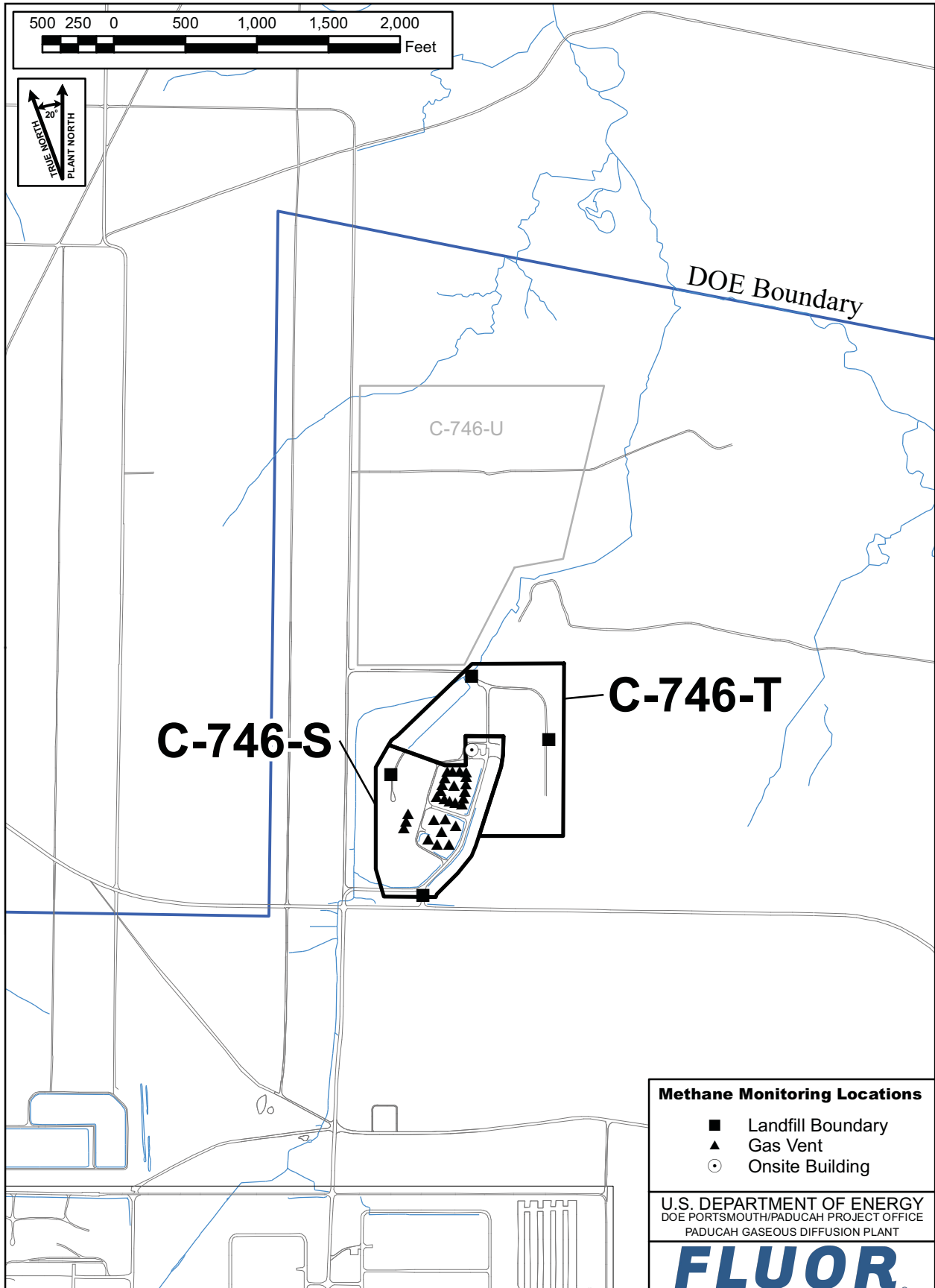


Figure H.1. C-746-S&T Methane Monitoring Locations

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	F. 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	F						
Sample Date and Time (Month/Day/Year hour:minutes)				11/28/2016 15:40	11/28/2016 13:53	NA	11/28/2016 15:42						
Duplicate ("Y" or "N") ¹				N	N	N	N						
Split ('Y' or "N") ²				N	N	N	N						
Facility Sample ID Number (if applicable)				L135SS1-17	L154US1-17	NA	FB1SS1-17						
Laboratory Sample ID Number (if applicable)				411495002	411422003	NA	411495003						
Date of Analysis (Month/Day/Year)				12/22/2016	12/19/2016	NA	12/21/2016						
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	0.25		0.04		*			*
16887-00-6	2	Chloride(s)	T	mg/L	300.0	5.72		3		*		<1	
14808-79-8	0	Sulfate	T	mg/L	300.0	20.4		3.48		*		<2	
7439-89-6	0	Iron	T	mg/L	200.8	0.488	B	0.294		*		<0.1	
7440-23-5	0	Sodium	T	mg/L	200.8	5.47	B	1.06		*		<0.25	
S0268- -	0	Organic Carbon ⁶	T	mg/L	9060	12.4		16.8		*			*
S0097- -	0	BOD ⁶	T	mg/L	not applicable		*		*	*			*
S0130- -	0	Chemical Oxygen Demand	T	mg/L	410.4	53.6		69.7		*			*

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

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

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

⁴"T" = Total; "D" = Dissolved

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

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

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

STANDARD FLAGS:

* = See Comments

J = Estimated Value

B = Analyte found in blank

A = Average value

N = Presumptive ID

D = Concentration from analysis of
 a secondary dilution factor

SURFACE WATER - QUARTERLY

Facility: US DOE - Paducah Gaseous Diffusion Plant

Permit Number: 073-00014 & 073-00015

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

LAB ID: None

For Official Use Only

SURFACE WATER SAMPLE ANALYSIS - (Cont.)

Monitoring Point (KPDES Discharge Number, or "UPSTREAM" or "DOWNSTREAM")				L135 UPSTREAM		L154 DOWNSTREAM		L136 AT SITE		F. BLANK			
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	µhmo/cm	Field	195		59		*		*	
S0270- -	0	Total Suspended Solids	T	mg/L	160.2	22.7		5.2	*	*		*	
S0266- -	0	Total Dissolved Solids	T	mg/L	160.1	201		77.1	*	*		*	
S0269- -	0	Total Solids	T	mg/L	SM-2540B	173		91	*	*		*	
S0296- -	0	pH	T	Units	Field	7.06		7.49		*		*	
7440-61-1		Uranium	T	mg/L	200.8	0.00363		0.000222		*		<0.0002	
12587-46-1		Gross Alpha (α)	T	pCi/L	9310	3.25	*	1.11	*	*		-2.03	*
12587-47-2		Gross Beta (β)	T	pCi/L	9310	29.4	*	21.3	*	*		0.291	*

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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											
Sample Sequence #		2											
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)		11/28/2016 15:40											
Duplicate ("Y" or "N") ¹		Y											
Split ('Y' or "N") ²		N											
Facility Sample ID Number (if applicable)		L135DSS1-17											
Laboratory Sample ID Number (if applicable)		411495001											
Date of Analysis (Month/Day/Year)		12/21/2016											
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	0.25							
16887-00-6	2	Chloride(s)	T	MG/L	300.0	5.71							
14808-79-8	0	Sulfate	T	MG/L	300.0	20.6							
7439-89-6	0	Iron	T	MG/L	200.8	0.448	B						
7440-23-5	0	Sodium	T	MG/L	200.8	5.32	B						
S0268- -	0	Organic Carbon ⁶	T	MG/L	9060	11.8							
S0097- -	0	BOD ⁶	T	MG/L	not applicable		*						
S0130- -	0	Chemical Oxygen Demand	T	MG/L	410.4	47.1							

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

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

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

⁴"T" = Total; "D" = Dissolved

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

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

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

STANDARD FLAGS:

* = See Comments

J = Estimated Value

B = Analyte found in blank

A = Average value

N = Presumptive ID

D = Concentration from analysis of
a secondary dilution factor

SURFACE WATER - QUARTERLY

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

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

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

LAB ID: None

For Official Use Only

SURFACE WATER SAMPLE ANALYSIS - (Cont.)

Monitoring Point (KPDES Discharge Number, or "UPSTREAM" or "DOWNSTREAM")				L135 UPSTREAM									
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	µmho/cm	Field	195							
S0270- -	0	Total Suspended Solids	T	mg/L	160.2	21.6							
S0266- -	0	Total Dissolved Solids	T	mg/L	160.1	187							
S0269- -	0	Total Solids	T	mg/L	SM-2540B	185							
S0296- -	0	pH	T	Units	Field	7.06							
7440-61-1		Uranium	T	mg/L	200.8	0.00376							
12587-46-1		Gross Alpha (α)	T	pCi/L	900.0	0.604	*						
12587-47-2		Gross Beta (β)	T	pCi/L	900.0	19.8	*						

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RESIDENTIAL/INERT – QUARTERLY

Facility: US DOE - Paducah Gaseous Diffusion Plant

Permit Numbers: 073-00014 & 073-00015

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

LAB ID: None

For Official Use Only

SURFACE WATER WRITTEN COMMENTS

Monitoring Point	Facility Sample ID	Constituent	Flag	Description
L135	L135SS1-17	Biochemical Oxygen Demand (BOD)		Analysis of constituent not required and not performed.
		Alpha activity	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 6.55. Rad error is 6.53.
		Beta activity		TPU is 9.85. Rad error is 8.57.
L154	L154US1-17	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.
		Total Solids	*	Duplicate analysis not within control limits.
		Alpha activity	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 4.65. Rad error is 4.64.
		Beta activity		TPU is 8.83. Rad error is 8.06.
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)		Analysis of constituent not required and not performed.
		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.

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
QC	FB1SS1-17	Flow Rate		Analysis of constituent not required and not performed.
		Total Organic Carbon (TOC)		Analysis of constituent not required and not performed.
		Biochemical Oxygen Demand (BOD)		Analysis of constituent not required and not performed.
		Chemical Oxygen Demand (COD)		Analysis of constituent not required and not performed.
		Conductivity		Analysis of constituent not required and not performed.
		Suspended Solids		Analysis of constituent not required and not performed.
		Dissolved Solids		Analysis of constituent not required and not performed.
		Total Solids		Analysis of constituent not required and not performed.
		pH		Analysis of constituent not required and not performed.
		Alpha activity		U Indicates analyte/nuclide was analyzed for, but not detected. TPU is 4.84. Rad error is 4.83.
		Beta activity		U Indicates analyte/nuclide was analyzed for, but not detected. TPU is 6.1. Rad error is 6.1.
L135	L135DSS1-17	Biochemical Oxygen Demand (BOD)		Analysis of constituent not required and not performed.
		Alpha activity	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 4.47. Rad error is 4.46.
		Beta activity		TPU is 8.44. Rad error is 7.81.