FRNP-RPT-0028/V4

C-746-S&T Landfills
Fourth Quarter Calendar Year 2018
(October–December)
Compliance Monitoring Report,
Paducah Gaseous Diffusion Plant,
Paducah, Kentucky

FOUR RIVERS
NUCLEAR PARTNERSHIP, LLC

This document is approved for public release per review by:

David Hayden — 2-18-19

FRNP Classification Support — Date

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C-746-S&T Landfills
Fourth Quarter Calendar Year 2018
(October–December)
Compliance Monitoring Report,
Paducah Gaseous Diffusion Plant,
Paducah, Kentucky

Date Issued—February 2019

U.S. DEPARTMENT OF ENERGY
Office of Environmental Management

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

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ACRONYMS

CFR	*Code of Federal Regulations*
CY	calendar year
KAR	*Kentucky Administrative Regulations*
KDWM	Kentucky Division of Waste Management
KRS	*Kentucky Revised Statutes*
LEL	lower explosive limit
LRGA	Lower Regional Gravel Aquifer
LTL	lower tolerance limit
MCL	maximum contaminant level
MW	monitoring well
RGA	Regional Gravel Aquifer
UCRS	Upper Continental Recharge System
URGA	Upper Regional Gravel Aquifer
UTL	upper tolerance limit

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1. INTRODUCTION

This report, *C-746-S&T Landfills Fourth Quarter Calendar Year 2018 (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), or both UTL and lower tolerance limit (LTL) for pH, as established at a 95% confidence]. Appendix G provides a chart of exceedances of the MCL and historical UTL that have occurred since the fourth quarter calendar year (CY) 2002. Methane monitoring results are documented on the approved C-746-S&T Landfills Methane Monitoring Report form provided in Appendix H. The form includes pertinent remarks/observations as required by 401 *KAR* 48:090 § 5. Surface water results are provided in Appendix I.

1.1 BACKGROUND

The C-746-S&T Landfills are closed, solid waste landfills located north of the Paducah Site and south of the C-746-U Landfill. Construction and operation of the C-746-S Residential Landfill were permitted in April 1981 under Solid Waste Landfill Permit Number 073-00014. The permitted C-746-S Landfill area covers about 16 acres and contains a clay liner with a final cover of compacted soil. The C-746-S Landfill was a sanitary landfill for the Paducah Gaseous Diffusion Plant operations. The C-746-S Landfill is closed and has been inactive since July 1995.

Construction and operation of the C-746-T Inert Landfill were permitted in February 1985 under Solid Waste Landfill Permit Number 073-00015. The permitted C-746-T Landfill area covers about 20 acres and contains a clay liner with a final cover of compacted soil. The C-746-T Landfill was used to dispose of construction debris (e.g., concrete, wood, and rock) and steam plant fly ash from the Paducah Gaseous Diffusion Plant operations. The C-746-T Landfill is closed and has been inactive since June 1992.

1.2 MONITORING PERIOD ACTIVITIES

1.2.1 Groundwater Monitoring

Three zones are monitored at the site: the Upper Continental Recharge System (UCRS), the Upper Regional Gravel Aquifer (URGA), and the Lower Regional Gravel Aquifer (LRGA). There are 23 monitoring wells (MWs) under permit for the C-746-S&T Landfills: 5 UCRS wells, 11 URGA wells, and 7 LRGA wells. A map of the MW locations is presented in Figure 1. All MWs listed on the permit were sampled this quarter except MW389 (screened in the UCRS), which had an insufficient amount of water to obtain a water level measurement or sample; therefore, there are no analytical results for this location.

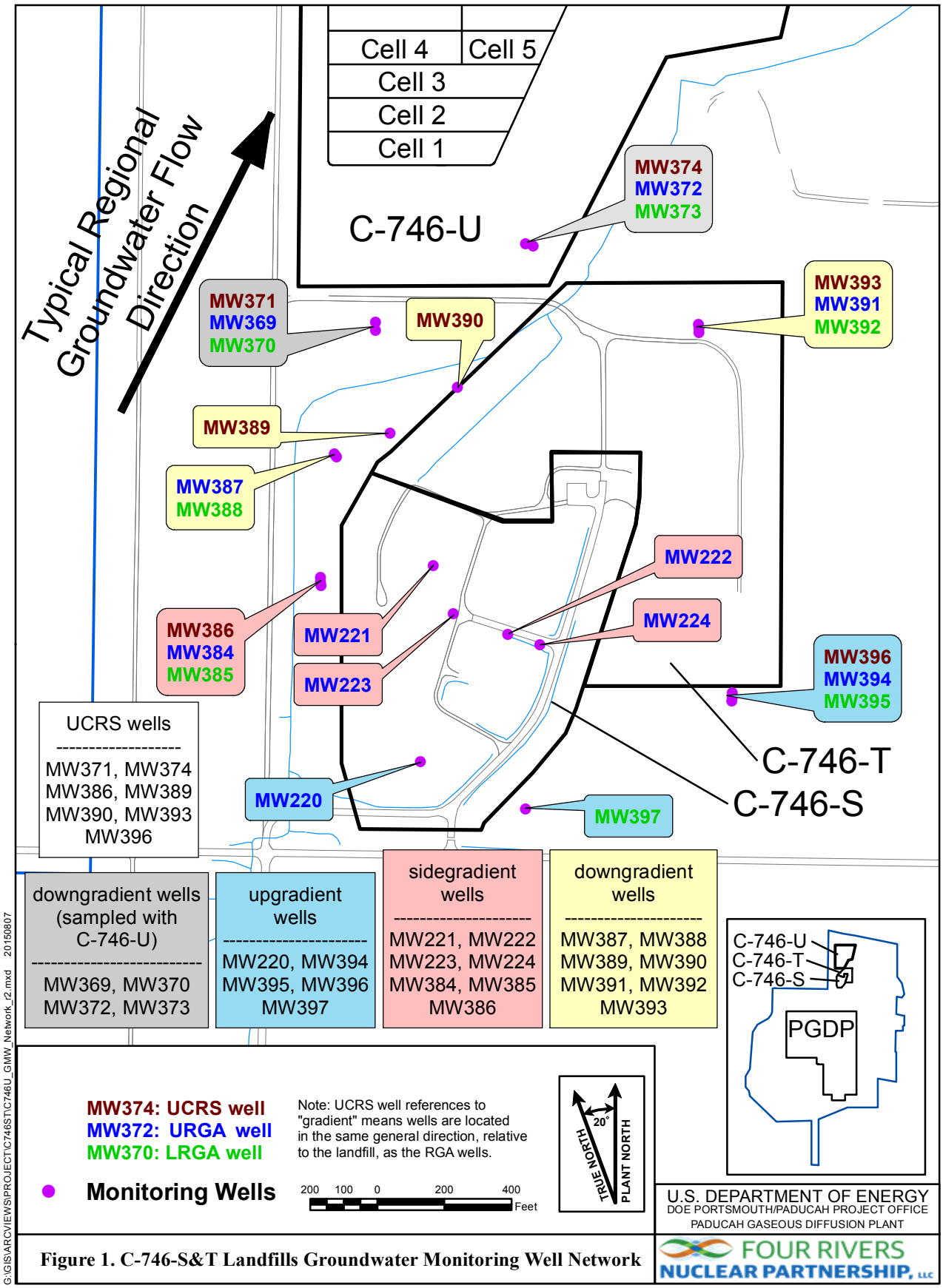

Figure 1. C-746-S&T Landfills Groundwater Monitoring Well Network

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

Groundwater sampling was conducted within the fourth quarter 2018 in accordance with the Groundwater Monitoring Plan (LATA Kentucky 2014) using the Deactivation and Remediation Contractor, procedure CP4-ES-2101, *Groundwater Sampling*. Appropriate sample containers and preservatives were utilized. The laboratory also used U.S. Environmental Protection Agency-approved methods, as applicable. The parameters specified in Permit Condition GSTR0003, Special Condition 3, were analyzed for all locations sampled.

The groundwater flow rate and direction determination are provided in Appendix E. Depth-to-water was measured on October 24, 2018, in MWs of the C-746-S&T Landfills (see Table E.1); in MWs of the C-746-U Landfill; and in MWs of the surrounding region (shown on Figure E.3). Water level measurements in 39 vicinity wells define the potentiometric surface for the RGA. Typical regional flow in the RGA is northeastward, toward the Ohio River. During October, RGA groundwater flow in the area of the landfill was oriented primarily north to northeastward. The hydraulic gradient for the RGA in the vicinity of the C-746-S&T Landfills in October was 5.58×10^{-4} ft/ft, while the gradient beneath the C-746-S&T Landfills was 5.01×10^{-4} ft/ft. Calculated groundwater flow rates (average linear velocities) for the RGA at the C-746-S&T Landfills range from 0.851 to 1.45 ft/day (see Table E.3).

1.2.2 Methane Monitoring

Methane monitoring was conducted in accordance with 401 *KAR* 48:090 § 5 and the Solid Waste Landfill Permit. Landfill operations staff monitored for the occurrence of methane in one on-site building location, four locations along the landfill boundary, and 27 passive-gas vents located in Cells 1, 2, and 3 of the C-746-S Landfill on November 14, 2018. See Appendix H for a map (Figure H.1) of the monitoring locations. Monitoring identified 0% of the lower explosive limit (LEL) of methane at all locations, which is compliant with the regulatory requirement of < 100% LEL at boundary locations and < 25% LEL at all other locations. The results are documented on the C-746-S&T Landfills Methane Log provided in Appendix H.

1.2.3 Surface Water Monitoring

Surface water was monitored, as specified in 401 *KAR* 48:300 § 2, and the approved *Surface Water Monitoring Plan for C-746-S and C-746-T Landfills Permit Numbers KY-073-00014 and 073-00015, Paducah Gaseous Diffusion Plant, Paducah, Kentucky* (PRS 2008), which is Technical Application Attachment 24 of the Solid Waste Landfill Permit. Sampling was performed at the three locations

(see Figure 2) monitored for the C-746-S&T Landfills. The landfills have an upstream location, L135; a downstream location, L154; and a location capturing runoff from the landfill surface, L136. Surface water results are provided in Appendix I.

1.3 KEY RESULTS

Groundwater data were evaluated in accordance with the approved Groundwater Monitoring Plan (LATA Kentucky 2014) which is Technical Application, Attachment 25, of the Solid Waste 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 (that do not have MCLs) with concentrations that exceeded the statistically derived historical background UTL[1] during the fourth quarter 2018, as well as parameters that exceeded their MCL and also exceeded their historical background UTL. Those constituents (present in downgradient wells) that exceed their historical background UTL were evaluated against their current UTL-derived background using the most recent eight quarters of data from wells considered to be upgradient (Table 3).

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

The constituents that exceeded their MCL were subjected to a comparison against the UTL concentrations calculated using historical concentrations from wells identified as background. In accordance with the approved Groundwater Monitoring Plan, the MCL exceedances for trichloroethene in MW372, MW373, MW391, and MW392 (downgradient wells) do not exceed the historical background concentration and are considered to be a Type 1 exceedance—not attributable to the C-746-S&T Landfills.

The MCL exceedances for beta activity in MW370, MW372, 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. 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. All of these wells had no increasing Mann-Kendall trend for beta activity and are considered to be a Type 1 exceedance—not attributable to the C-746-S&T Landfills.

This report serves as the notification of parameters that had statistically significant increased concentrations relative to historical background concentrations, as required by Permit Number SW07300014, SW07300015, SW07300045, Condition GSTR0003, Standard Requirement 5, and 401 *KAR* 48:300 § 7.

The constituents listed in Table 2 that had exceedances of the statistically derived historical background UTL underwent additional statistical evaluation. The current-quarter concentrations were compared to the current background UTL, 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.

[1] The UTL comparison for pH uses a two-sided test, both UTL and LTL. For the purposes of this report, the reference to "UTL exceedances" also includes the LTL for pH.

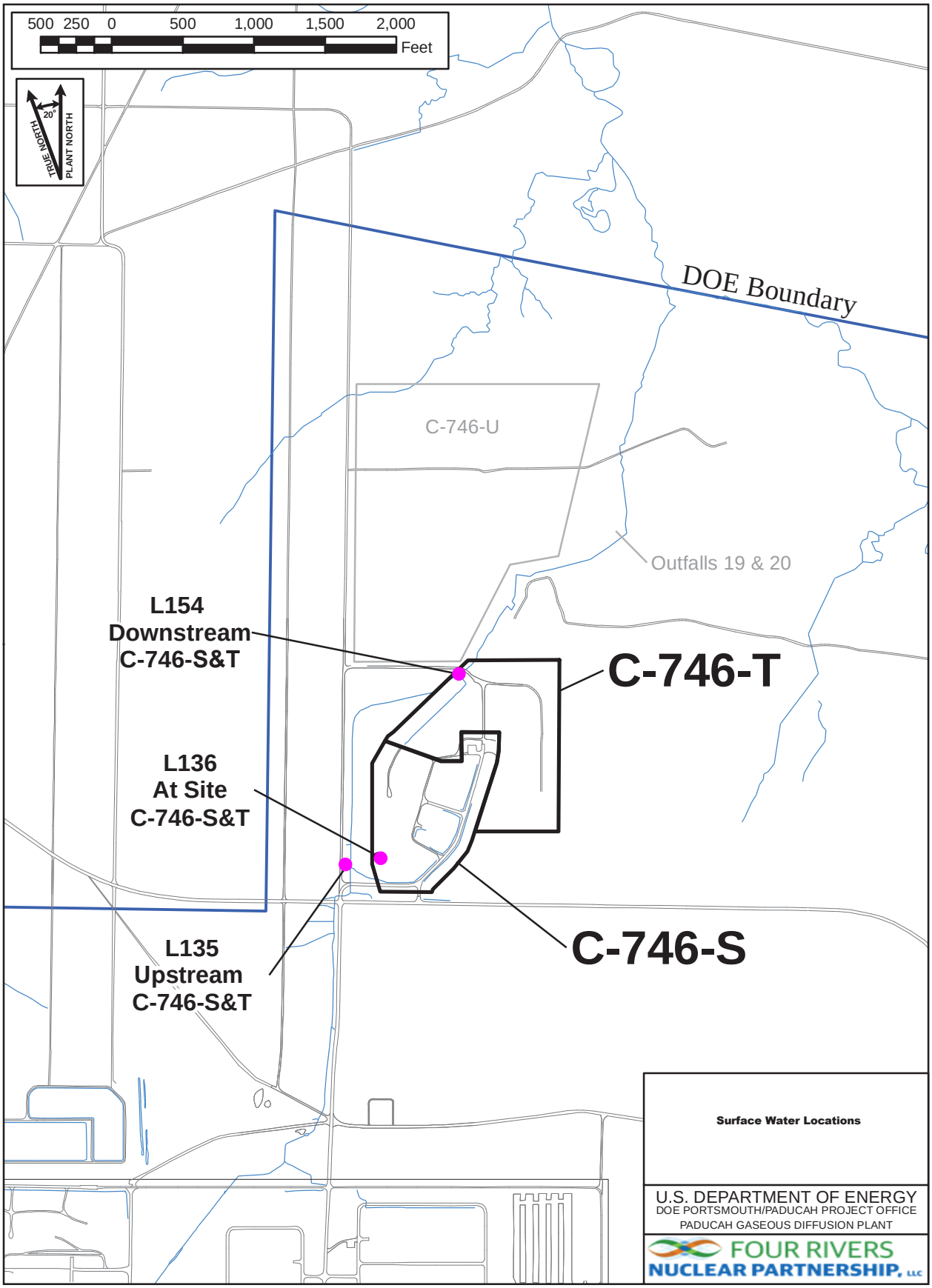

Figure 2. C-746-S&T Landfills Surface Water Monitoring Locations

Table 1. Summary of MCL Exceedances

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

Table 2. Exceedances of Statistically Derived Historical Background Concentrations

UCRS*	URGA	LRGA
MW386: Oxidation-reduction potential	**MW220:** Oxidation-reduction potential	**MW370:** Beta activity, oxidation-reduction potential, sulfate, technetium-99
MW390: Oxidation-reduction potential, technetium-99	**MW221:** Oxidation-reduction potential	**MW373:** Calcium, conductivity, dissolved solids, magnesium, oxidation-reduction potential, sulfate
MW393: Oxidation-reduction potential	**MW369:** Technetium-99	**MW385:** Oxidation-reduction potential, radium-226, sulfate, technetium-99
MW396: Oxidation-reduction potential	**MW372:** Beta activity, calcium, dissolved solids, magnesium, sulfate, technetium-99	**MW388:** Beta activity, oxidation-reduction potential, sulfate, technetium-99
	MW384: Beta activity, oxidation-reduction potential, sulfate, technetium-99	**MW392:** Oxidation-reduction potential
	MW387: Beta activity, magnesium, oxidation-reduction potential, radium-226, sulfate, technetium-99	**MW397:** Chemical oxygen demand (COD), oxidation-reduction potential
	MW391: Magnesium, sulfate	

*Gradients in the UCRS are downward. UCRS gradient designations are identified using the same gradient reference (relative to the landfill) that is attributed to nearby RGA wells.
Sidegradient wells: MW221, MW222, MW223, MW224, MW384, MW385, MW386
Downgradient wells: MW369, MW370, MW372, MW373, MW387, MW388, MW389, MW390, MW391, MW392, MW393
Upgradient wells: MW220, MW394, MW395, MW396, MW397

Table 3. Exceedances of Current Background UTL in Downgradient Wells

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

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

Location	Well ID	Parameter	Sample Size	Alpha[1]	p-Value[2]	S[3]	Decision[4]
C-746-S&T Landfill	MW369	Technetium-99	8	0.05	0.0868	12	No Trend
	MW370	Beta activity	8	0.05	0.0868	12	No Trend
		Sulfate	8	0.05	0.0539	14	No Trend
		Technetium-99	8	0.05	0.268	6	No Trend
	MW372	Beta activity	8	0.05	0.0539	14	No Trend
		Calcium	8	0.05	0.268	6	No Trend
		Magnesium	8	0.05	0.451	2	No Trend
		Sulfate	8	0.05	0.133	10	No Trend
		Technetium-99	8	0.05	0.0539	14	No Trend
	MW373	Calcium	8	0.05	0.0868	-12	No Trend
		Conductivity	8	0.05	0.133	-10	No Trend
		Dissolved Solids	8	0.05	0.159	-9	No Trend
		Magnesium	8	0.05	0.355	-4	No Trend
		Sulfate	8	0.05	0.133	-10	No Trend
	MW387	Beta activity	8	0.05	0.451	-2	No Trend
		Magnesium	8	0.05	0.451	-2	No Trend
		Radium-226	8	0.05	0.193	8	No Trend
		Sulfate	8	0.05	0.268	-6	No Trend
		Technetium-99	8	0.05	0.193	-8	No Trend
	MW388	Beta activity	8	0.05	0.355	-4	No Trend
		Sulfate	8	0.05	0.309	5	No Trend
		Technetium-99	8	0.05	0.133	-10	No Trend
	MW391	Magnesium	8	0.05	0.106	-11	No Trend
		Sulfate	8	0.05	0.355	4	No Trend

Footnotes:

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

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

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

[4] The Mann-Kendall decision operates on two hypotheses, the H_0 and H_a. H_0 assumes there is no trend in the data, whereas H_a assumes either a positive or negative trend.

Note: Statistics generated using ProUCL.

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

In accordance with Permit Condition GSTR0003, Special Condition 2, of the Solid Waste Landfill Permit, the groundwater assessment and corrective action requirements of 401 *KAR* 48:300 § 8 shall not apply to the C-746-S Residential Landfill and the C-746-T Inert Landfill. This variance in the permit provides that groundwater assessment and corrective actions for these landfills will be conducted in accordance with the corrective action requirements of 401 *KAR* 34:060 § 12.

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

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

UCRS
MW390: Technetium-99

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

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

2. DATA EVALUATION/STATISTICAL SYNOPSIS

The statistical analyses conducted on the fourth quarter 2018 groundwater data collected from the C-746-S&T Landfills MWs were performed in accordance with the Groundwater Monitoring Plan (LATA Kentucky 2014). The statistical analyses for this report utilize data from the first eight quarters that were sampled for each parameter, beginning with the first two baseline sampling events in 2002, when available. The sampling dates associated with background data are listed next to the result in the statistical analysis sheets in Appendix D (Attachments D1 and D2).

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

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

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

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

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

Table 6. Monitoring Wells Included in Statistical Analysis*

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

*A map showing the MW locations is shown on Figure 1.
**MW389 had insufficient water to permit a water sample for laboratory analysis.
***In the same direction (relative to the landfill) as RGA wells considered to be upgradient.

2.1 STATISTICAL ANALYSIS OF GROUNDWATER DATA

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

2.1.1 Upper Continental Recharge System

In this quarter, 28 parameters, including those with MCLs, required statistical analysis in the UCRS. During the fourth quarter, oxidation-reduction potential and technetium-99 displayed concentrations that exceeded their respective historical UTLs and are listed in Table 2. Technetium-99 exceeded the current background UTL and is included in Table 5.

2.1.2 Upper Regional Gravel Aquifer

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

2.2 DATA VERIFICATION AND VALIDATION

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

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

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

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

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3. PROFESSIONAL GEOLOGIST AUTHORIZATION

DOCUMENT IDENTIFICATION: *C-746-S&T Landfills*
Fourth Quarter Calendar Year 2018 (October–December)
Compliance Monitoring Report,
Paducah Gaseous Diffusion Plant,
Paducah, Kentucky (FRNP-RPT-0028/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
2/11/2019

Kenneth R. Davis
Kenneth R. Davis

PG113927

February 11, 2019
Date

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4. REFERENCES

LATA Kentucky (LATA Environmental Services of Kentucky, LLC) 2014. *Groundwater Monitoring Plan for the Solid Waste Permitted Landfills (C-746-S Residential Landfill, C-746-T Inert Landfill, and C-746-U Contained Landfill) at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky*, PAD-PROJ-0139, Solid Waste Landfill Permit, Number SW07300014, SW07300015, SW07300045, Technical Application Attachment 25, LATA Environmental Services of Kentucky, LLC, Kevil, KY, June.

PRS (Paducah Remediation Services, LLC) 2008. *Surface Water Monitoring Plan for C-746-S and C-746-T Landfills Permit Numbers KY-073-00014 and 073-00015, Paducah Gaseous Diffusion Plant, Paducah, Kentucky*, Solid Waste Landfill Permit, Number SW07300014, SW07300015, SW07300045, Technical Application Attachment 24, Paducah Remediation Services, LLC, Kevil, KY, June.

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APPENDIX A

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

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

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

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

Activity: C-746-S&T Landfills

Permit No: SW07300014, SW07300015, SW07300045

Finds/Unit No: ____

Quarter & Year: 4th Qtr. CY 2018

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.

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

Date 2/27/19

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

Date 2/27/19

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APPENDIX B

FACILITY INFORMATION SHEET

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FACILITY INFORMATION SHEET

Sampling Date: Groundwater: October 2018; Surface water: October 2018; Methane: November 2018 | County: McCracken | Permit Nos. SW07300014, SW07300015, SW07300045

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

Site Address: 5600 Hobbs Road (Street) | Kevil, Kentucky (City/State) | 42053 (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: David Hutchison | Phone No: (270) 441-5929

Contact Person Title: Director, Environmental Services, Four Rivers Nuclear Partnership, LLC

Mailing Address: 5511 Hobbs Road (Street) | Kevil, Kentucky (City/State) | 42053 (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 (Street) | Kevil, Kentucky (City/State) | 42053 (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 (Street) | Charleston, South Carolina (City/State) | 29407 (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: SW07300014,SW07300015,SW07300045

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)	10/15/2018 07:52	10/15/2018 10:00	10/15/2018 13:43	10/15/2018 12:52
Duplicate ("Y" or "N")[2]	N	N	N	N
Split ("Y" or "N")[3]	N	N	N	N
Facility Sample ID Number (if applicable)	MW220SG1-19	MW221SG1-19	MW222SG1-19	MW223SG1-19
Laboratory Sample ID Number (if applicable)	461848001	461806001	461848003	461806003
Date of Analysis (Month/Day/Year) For Volatile Organics Analysis	10/19/2018	10/19/2018	10/19/2018	10/19/2018
Gradient with respect to Monitored Unit (UP, DOWN, SIDE, UNKNOWN)	UP	SIDE	SIDE	SIDE

CAS RN[4]		CONSTITUENT	TD[5]	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL[6]	FLAGS[7]	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS
24959-67-9		Bromide	T	mg/L	9056	0.205		0.418		0.416		0.416	
16887-00-6		Chloride(s)	T	mg/L	9056	20.6		31.1	*	30.1		28	*
16984-48-8		Fluoride	T	mg/L	9056	0.176		0.17		0.257		0.235	
S0595- -		Nitrate & Nitrite	T	mg/L	9056	1.07	*	0.949		1.09		0.981	
14808-79-8		Sulfate	T	mg/L	9056	16.9		15		12.9		16	
NS1894		Barometric Pressure Reading	T	Inches/Hg	Field	30.1		30.2		30.24		30.25	
S0145- -		Specific Conductance	T	µMH0/cm	Field	342		338		360		334	

[1]AKGWA # is 0000-0000 for any type of blank.
[2]Respond "Y" if the sample was a duplicate of another sample in this report.
[3]Respond "Y" if the sample was split and analyzed by separate laboratories.
[4]Chemical 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.
[7]Flags are as designated, do not use any other type. Use "*," then describe on "Written Comments Page."

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

RESIDENTIAL/INERT-QUARTERLY

Facility: US DOE - Paducah Gaseous Diffusion Plant FINDS/UNIT: KY8-890-008-982 / 1

Permit Number: SW07300014, SW07300015, SW07300045 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	TD[5]	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS
S0906 - -		Static Water Level Elevation	T	Ft. MSL	Field	323.93		323.86		324.19		323.94	
N238		Dissolved Oxygen	T	mg/L	Field	6.37		3.95		4.4		3.48	
S0266- -		Total Dissolved Solids	T	mg/L	160.1	226	*	180	*	234	*	181	*
S0296- -		pH	T	Units	Field	5.87		6.07		6.23		6.12	
NS215		Eh	T	mV	Field	413		410		352		357	
S0907 - -		Temperature	T	°C	Field	14.67		14.33		14.44		14	
7429-90-5		Aluminum	T	mg/L	6020	<0.05		<0.05		0.0461	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	0.0024	J	0.00214	BJ	0.00259	J	0.00219	BJ
7440-39-3		Barium	T	mg/L	6020	0.194		0.22		0.271		0.243	
7440-41-7		Beryllium	T	mg/L	6020	<0.0005		<0.0005		<0.0005		<0.0005	
7440-42-8		Boron	T	mg/L	6020	0.0101	J	0.0168		0.00995	J	0.00787	J
7440-43-9		Cadmium	T	mg/L	6020	<0.001		<0.001		<0.001		<0.001	
7440-70-2		Calcium	T	mg/L	6020	20.6		21.4		17.6		21.6	
7440-47-3		Chromium	T	mg/L	6020	0.00362	J	<0.01		<0.01		0.0105	
7440-48-4		Cobalt	T	mg/L	6020	<0.001		<0.001		0.000591	J	0.000543	J
7440-50-8		Copper	T	mg/L	6020	0.00101		0.000683	J	0.000372	J	0.000357	J
7439-89-6		Iron	T	mg/L	6020	0.0373	J	<0.1		0.0586	J	<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	8.8		9.89		8.32		9.64	
7439-96-5		Manganese	T	mg/L	6020	0.00215	J	<0.005		0.00551		0.00603	
7439-97-6		Mercury	T	mg/L	7470	<0.0002		<0.0002		<0.0002		<0.0002	

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	TD[5]	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS
7439-98-7		Molybdenum	T	mg/L	6020	0.000752		0.00149		0.000393	J	0.00469	
7440-02-0		Nickel	T	mg/L	6020	0.0132		0.0139		0.0292		0.132	
7440-09-7		Potassium	T	mg/L	6020	2.21		1.35		0.664		1.82	
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		44.9		48.3		47.6	
7440-25-7		Tantalum	T	mg/L	6020	<0.005	*	<0.005		<0.005	*	<0.005	
7440-28-0		Thallium	T	mg/L	6020	<0.002		<0.002		<0.002		<0.002	
7440-61-1		Uranium	T	mg/L	6020	<0.0002		0.000072	J	<0.0002		<0.0002	
7440-62-2		Vanadium	T	mg/L	6020	<0.01		<0.01		0.00474	J	<0.01	
7440-66-6		Zinc	T	mg/L	6020	0.00409	J	0.00341	J	0.00359	J	<0.01	
108-05-4		Vinyl acetate	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
67-64-1		Acetone	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
107-02-8		Acrolein	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
107-13-1		Acrylonitrile	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
71-43-2		Benzene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
108-90-7		Chlorobenzene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
1330-20-7		Xylenes	T	mg/L	8260	<0.003		<0.003		<0.003		<0.003	
100-42-5		Styrene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
108-88-3		Toluene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
74-97-5		Chlorobromomethane	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	

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	TD[5]	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS
75-27-4		Bromodichloromethane	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
75-25-2		Tribromomethane	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
74-83-9		Methyl bromide	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
78-93-3		Methyl ethyl ketone	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
110-57-6		trans-1,4-Dichloro-2-butene	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
75-15-0		Carbon disulfide	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
75-00-3		Chloroethane	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
67-66-3		Chloroform	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
74-87-3		Methyl chloride	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
156-59-2		cis-1,2-Dichloroethene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
74-95-3		Methylene bromide	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
75-34-3		1,1-Dichloroethane	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
107-06-2		1,2-Dichloroethane	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
75-35-4		1,1-Dichloroethylene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
106-93-4		Ethane, 1,2-dibromo	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
79-34-5		Ethane, 1,1,2,2-Tetrachloro	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
71-55-6		Ethane, 1,1,1-Trichloro-	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
79-00-5		Ethane, 1,1,2-Trichloro	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
630-20-6		Ethane, 1,1,1,2-Tetrachloro	T	mg/L	8260	<0.001	*	<0.001	*	<0.001	*	<0.001	*
75-01-4		Vinyl chloride	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
127-18-4		Ethene, Tetrachloro-	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
79-01-6		Ethene, Trichloro-	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	

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	TD[5]	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS
100-41-4		Ethylbenzene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
591-78-6		2-Hexanone	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
74-88-4		Iodomethane	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
124-48-1		Methane, Dibromochloro-	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
56-23-5		Carbon Tetrachloride	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
75-09-2		Dichloromethane	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
108-10-1		Methyl isobutyl ketone	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
96-12-8		Propane, 1,2-Dibromo-3-chloro	T	mg/L	8011	<0.0000197		<0.0000192		<0.0000196		<0.0000195	
78-87-5		Propane, 1,2-Dichloro-	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
10061-02-6		trans-1,3-Dichloro-1-propene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
10061-01-5		cis-1,3-Dichloro-1-propene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
156-60-5		trans-1,2-Dichloroethene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
75-69-4		Trichlorofluoromethane	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
96-18-4		1,2,3-Trichloropropane	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
95-50-1		Benzene, 1,2-Dichloro-	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
106-46-7		Benzene, 1,4-Dichloro-	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
1336-36-3		PCB,Total	T	ug/L	8082	<0.0952		<0.098		<0.0943		<0.0952	
12674-11-2		PCB-1016	T	ug/L	8082	<0.0952		<0.098		<0.0943		<0.0952	
11104-28-2		PCB-1221	T	ug/L	8082	<0.0952		<0.098		<0.0943		<0.0952	
11141-16-5		PCB-1232	T	ug/L	8082	<0.0952		<0.098		<0.0943		<0.0952	
53469-21-9		PCB-1242	T	ug/L	8082	<0.0952		<0.098		<0.0943		<0.0952	
12672-29-6		PCB-1248	T	ug/L	8082	<0.0952		<0.098		<0.0943		<0.0952	

RESIDENTIAL/INERT-QUARTERLY

Facility: US DOE - Paducah Gaseous Diffusion Plant FINDS/UNIT: KY8-890-008-982 / 1

Permit Number: SW07300014, SW07300015, SW07300045 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	TD[5]	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS
11097-69-1		PCB-1254	T	ug/L	8082	<0.0952		<0.098		<0.0943		<0.0952	
11096-82-5		PCB-1260	T	ug/L	8082	<0.0952		<0.098		<0.0943		<0.0952	
11100-14-4		PCB-1268	T	ug/L	8082	<0.0952		<0.098		<0.0943		<0.0952	
12587-46-1		Gross Alpha	T	pCi/L	9310	0.0412	*	-5.37	*	2.23	*	-0.81	*
12587-47-2		Gross Beta	T	pCi/L	9310	12.2	*	13.6	*	-1.66	*	3.85	*
10043-66-0		Iodine-131	T	pCi/L			*		*		*		*
13982-63-3		Radium-226	T	pCi/L	AN-1418	0.0489	*	0.152	*	0.0716	*	0.282	*
10098-97-2		Strontium-90	T	pCi/L	905.0	-2.23	*	2.53	*	-2.44	*	-0.809	*
14133-76-7		Technetium-99	T	pCi/L	Tc-02-RC	20.8	*	7.17	*	3.63	*	3.91	*
14269-63-7		Thorium-230	T	pCi/L	Th-01-RC	0.398	*	-0.0241	*	-0.517	*	-0.315	*
10028-17-8		Tritium	T	pCi/L	906.0	-12.1	*	-4.67	*	1.52	*	-29.9	*
S0130- -		Chemical Oxygen Demand	T	mg/L	410.4	<20		11.7	J	15.1	J	13.4	J
57-12-5		Cyanide	T	mg/L	9012	<0.2		<0.2		<0.2		<0.2	
20461-54-5		Iodide	T	mg/L	300.0	<0.5		<0.5		<0.5		<0.5	
S0268- -		Total Organic Carbon	T	mg/L	9060	0.855	J	0.845	J	0.829	J	0.953	J
S0586- -		Total Organic Halides	T	mg/L	9020	0.0109		0.00602	J	0.00554	J	0.00902	J

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: SW07300014,SW07300015,SW07300045

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)						10/15/2018 14:34		10/9/2018 13:24		10/9/2018 12:37		10/10/2018 10:10	
Duplicate ("Y" or "N")[2]						N		N		N		N	
Split ("Y" or "N")[3]						N		N		N		N	
Facility Sample ID Number (if applicable)						MW224SG1-19		MW369UG1-19		MW370UG1-19		MW372UG1-19	
Laboratory Sample ID Number (if applicable)						461806005		461323011		461323013		461432005	
Date of Analysis (Month/Day/Year) For Volatile Organics Analysis						10/19/2018		10/15/2018		10/15/2018		10/15/2018	
Gradient with respect to Monitored Unit (UP, DOWN, SIDE, UNKNOWN)						SIDE		DOWN		DOWN		DOWN	
CAS RN[4]		CONSTITUENT	TD[5]	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL[6]	FLAGS[7]	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS
24959-67-9		Bromide	T	mg/L	9056	0.396		0.391		0.419		0.573	
16887-00-6		Chloride(s)	T	mg/L	9056	29.9	*	33.6	*	35.8	*	47.9	
16984-48-8		Fluoride	T	mg/L	9056	0.248		0.261		0.218		0.189	
S0595- -		Nitrate & Nitrite	T	mg/L	9056	0.762		0.769		1.19		0.957	
14808-79-8		Sulfate	T	mg/L	9056	12.1		9.41	*	21.7	*	66.9	
NS1894		Barometric Pressure Reading	T	Inches/Hg	Field	30.22		29.96		29.98		29.78	
S0145- -		Specific Conductance	T	µMH0/cm	Field	412		374		442		618	

[1]AKGWA # is 0000-0000 for any type of blank.
[2]Respond "Y" if the sample was a duplicate of another sample in this report.
[3]Respond "Y" if the sample was split and analyzed by separate laboratories.
[4]Chemical 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.
[7]Flags 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

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	TD[5]	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS
S0906 - -		Static Water Level Elevation	T	Ft. MSL	Field	324.05		324.59		324.56		324.77	
N238		Dissolved Oxygen	T	mg/L	Field	2.54		1.36		3.31		0.79	
S0266- -		Total Dissolved Solids	T	mg/L	160.1	204	*	196		223		336	
S0296- -		pH	T	Units	Field	6.1		6.05		6.01		6.14	
NS215		Eh	T	mV	Field	364		341		346		295	
S0907 - -		Temperature	T	°C	Field	14.61		21.39		19.83		19.11	
7429-90-5		Aluminum	T	mg/L	6020	<0.05		0.0812		<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	0.00206	BJ	<0.005		0.00254	J	0.00241	J
7440-39-3		Barium	T	mg/L	6020	0.214		0.405		0.229		0.0549	
7440-41-7		Beryllium	T	mg/L	6020	<0.0005		<0.0005		<0.0005		<0.0005	*
7440-42-8		Boron	T	mg/L	6020	0.0153		0.0175	*	0.0326	*	0.899	
7440-43-9		Cadmium	T	mg/L	6020	<0.001		<0.001		<0.001		<0.001	
7440-70-2		Calcium	T	mg/L	6020	20.7		16.3		26.1		49.7	
7440-47-3		Chromium	T	mg/L	6020	<0.01		<0.01		<0.01		<0.01	
7440-48-4		Cobalt	T	mg/L	6020	0.000358	J	0.00626		<0.001		0.00116	
7440-50-8		Copper	T	mg/L	6020	0.000731	J	0.00123		0.000653	J	0.000787	J
7439-89-6		Iron	T	mg/L	6020	<0.1		0.16		<0.1		0.0592	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	9.66		7.02		11.5		19.1	
7439-96-5		Manganese	T	mg/L	6020	0.00335	J	0.0166		<0.005		0.00402	J
7439-97-6		Mercury	T	mg/L	7470	<0.0002		<0.0002		<0.0002		<0.0002	

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	TD[5]	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS
7439-98-7		Molybdenum	T	mg/L	6020	0.000346	J	<0.0005		<0.0005		0.000255	J
7440-02-0		Nickel	T	mg/L	6020	0.0131		0.00681		0.000706	J	0.00158	J
7440-09-7		Potassium	T	mg/L	6020	0.902		0.551		2.24		2.15	
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		0.00208	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	50.3		49.3		40.4		49.8	
7440-25-7		Tantalum	T	mg/L	6020	<0.005		<0.005		<0.005		<0.005	
7440-28-0		Thallium	T	mg/L	6020	<0.002		<0.002		<0.002		<0.002	
7440-61-1		Uranium	T	mg/L	6020	<0.0002		<0.0002		<0.0002		<0.0002	
7440-62-2		Vanadium	T	mg/L	6020	<0.01		0.0039	J	0.00376	J	<0.01	
7440-66-6		Zinc	T	mg/L	6020	<0.01		0.00497	J	0.00576	J	<0.01	
108-05-4		Vinyl acetate	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
67-64-1		Acetone	T	mg/L	8260	<0.005		0.00247	J	<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	

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	TD[5]	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS
75-27-4		Bromodichloromethane	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
75-25-2		Tribromomethane	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
74-83-9		Methyl bromide	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
78-93-3		Methyl ethyl ketone	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
110-57-6		trans-1,4-Dichloro-2-butene	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
75-15-0		Carbon disulfide	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
75-00-3		Chloroethane	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
67-66-3		Chloroform	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
74-87-3		Methyl chloride	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
156-59-2		cis-1,2-Dichloroethene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
74-95-3		Methylene bromide	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
75-34-3		1,1-Dichloroethane	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
107-06-2		1,2-Dichloroethane	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
75-35-4		1,1-Dichloroethylene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
106-93-4		Ethane, 1,2-dibromo	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
79-34-5		Ethane, 1,1,2,2-Tetrachloro	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
71-55-6		Ethane, 1,1,1-Trichloro-	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
79-00-5		Ethane, 1,1,2-Trichloro	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
630-20-6		Ethane, 1,1,1,2-Tetrachloro	T	mg/L	8260	<0.001	*	<0.001		<0.001		<0.001	
75-01-4		Vinyl chloride	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
127-18-4		Ethene, Tetrachloro-	T	mg/L	8260	<0.001		<0.001	*	<0.001	*	<0.001	*
79-01-6		Ethene, Trichloro-	T	mg/L	8260	<0.001		0.00103		0.00067	J	0.00572	

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	TD[5]	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS
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		<0.0000197		<0.0000199		<0.0000195	
78-87-5		Propane, 1,2-Dichloro-	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
10061-02-6		trans-1,3-Dichloro-1-propene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
10061-01-5		cis-1,3-Dichloro-1-propene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
156-60-5		trans-1,2-Dichloroethene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
75-69-4		Trichlorofluoromethane	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
96-18-4		1,2,3-Trichloropropane	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
95-50-1		Benzene, 1,2-Dichloro-	T	mg/L	8260	<0.001		<0.001	*	<0.001	*	<0.001	*
106-46-7		Benzene, 1,4-Dichloro-	T	mg/L	8260	<0.001		<0.001	*	<0.001	*	<0.001	*
1336-36-3		PCB,Total	T	ug/L	8082	<0.0952		<0.0971		<0.0962		<0.0962	
12674-11-2		PCB-1016	T	ug/L	8082	<0.0952		<0.0971		<0.0962		<0.0962	
11104-28-2		PCB-1221	T	ug/L	8082	<0.0952		<0.0971		<0.0962		<0.0962	
11141-16-5		PCB-1232	T	ug/L	8082	<0.0952		<0.0971		<0.0962		<0.0962	
53469-21-9		PCB-1242	T	ug/L	8082	<0.0952		<0.0971		<0.0962		<0.0962	
12672-29-6		PCB-1248	T	ug/L	8082	<0.0952		<0.0971		<0.0962		<0.0962	

RESIDENTIAL/INERT-QUARTERLY

Facility: US DOE - Paducah Gaseous Diffusion Plant FINDS/UNIT: KY8-890-008-982 / 1

Permit Number: SW07300014, SW07300015, SW07300045 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	TD[5]	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS
11097-69-1		PCB-1254	T	ug/L	8082	<0.0952		<0.0971		<0.0962		<0.0962	
11096-82-5		PCB-1260	T	ug/L	8082	<0.0952		<0.0971		<0.0962		<0.0962	
11100-14-4		PCB-1268	T	ug/L	8082	<0.0952		<0.0971		<0.0962		<0.0962	
12587-46-1		Gross Alpha	T	pCi/L	9310	1.28	*	1.2	*	6.45	*	-0.885	*
12587-47-2		Gross Beta	T	pCi/L	9310	13	*	23.2	*	81.7	*	123	*
10043-66-0		Iodine-131	T	pCi/L			*		*		*		*
13982-63-3		Radium-226	T	pCi/L	AN-1418	0.224	*	0.475	*	0.24	*	0.219	*
10098-97-2		Strontium-90	T	pCi/L	905.0	-1.91	*	1.94	*	-1.98	*	2.11	*
14133-76-7		Technetium-99	T	pCi/L	Tc-02-RC	3.72	*	55	*	114	*	158	*
14269-63-7		Thorium-230	T	pCi/L	Th-01-RC	0.447	*	1.22	*	1.21	*	1.07	*
10028-17-8		Tritium	T	pCi/L	906.0	-63.7	*	50.9	*	16.8	*	43.4	*
S0130- -		Chemical Oxygen Demand	T	mg/L	410.4	9.97	J	21.4	B	31.4	B	16.4	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	0.796	J	1.2	J	1.02	J	1	J
S0586- -		Total Organic Halides	T	mg/L	9020	0.0153		0.0157		0.00616	J	0.0143	

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: SW07300014,SW07300015,SW07300045

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)						10/10/2018 08:42		10/16/2018 09:20		10/16/2018 10:26		10/16/2018 11:43	
Duplicate ("Y" or "N")[2]						N		N		N		N	
Split ("Y" or "N")[3]						N		N		N		N	
Facility Sample ID Number (if applicable)						MW373UG1-19		MW384SG1-19		MW385SG1-19		MW386SG1-19	
Laboratory Sample ID Number (if applicable)						461432007		461934001		461934003		461934007	
Date of Analysis (Month/Day/Year) For Volatile Organics Analysis						10/15/2018		10/19/2018		10/19/2018		10/19/2018	
Gradient with respect to Monitored Unit (UP, DOWN, SIDE, UNKNOWN)						DOWN		SIDE		SIDE		SIDE	
CAS RN[4]		CONSTITUENT	TD[5]	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL[6]	FLAGS[7]	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS
24959-67-9		Bromide	T	mg/L	9056	0.572		0.31		0.228		0.153	J
16887-00-6		Chloride(s)	T	mg/L	9056	44.8		37.3		24		14.4	
16984-48-8		Fluoride	T	mg/L	9056	0.188		0.171		0.17		0.617	
S0595- -		Nitrate & Nitrite	T	mg/L	9056	0.952		1.14	*	0.353	J*	<0.4	*
14808-79-8		Sulfate	T	mg/L	9056	113		21.4		18.8		44.8	
NS1894		Barometric Pressure Reading	T	Inches/Hg	Field	29.78		30.31		30.31		30.31	
S0145- -		Specific Conductance	T	µMH0/cm	Field	725		451		436		606	

[1]AKGWA # is 0000-0000 for any type of blank.
[2]Respond "Y" if the sample was a duplicate of another sample in this report.
[3]Respond "Y" if the sample was split and analyzed by separate laboratories.
[4]Chemical 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.
[7]Flags 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

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	TD[5]	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS
S0906 - -		Static Water Level Elevation	T	Ft. MSL	Field	322.76		323.7		323.59		343.61	
N238		Dissolved Oxygen	T	mg/L	Field	1.79		3.3		1.27		2.54	
S0266- -		Total Dissolved Solids	T	mg/L	160.1	393		254	*	277	*	361	*
S0296- -		pH	T	Units	Field	6.19		6.21		6.45		6.64	
NS215		Eh	T	mV	Field	438		418		405		232	
S0907 - -		Temperature	T	°C	Field	19.39		15.17		14.72		15.39	
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	0.00219	J	0.00289	J	0.00289	J	0.00341	J
7440-39-3		Barium	T	mg/L	6020	0.0357		0.167		0.273		0.243	
7440-41-7		Beryllium	T	mg/L	6020	<0.0005	*	<0.0005		<0.0005		<0.0005	
7440-42-8		Boron	T	mg/L	6020	1.24		0.0223		0.0155		<0.015	
7440-43-9		Cadmium	T	mg/L	6020	<0.001		<0.001		<0.001		<0.001	
7440-70-2		Calcium	T	mg/L	6020	57.4		25.7		42.9		22.9	
7440-47-3		Chromium	T	mg/L	6020	<0.01		<0.01		<0.01		<0.01	
7440-48-4		Cobalt	T	mg/L	6020	0.00119		<0.001		<0.001		0.0149	
7440-50-8		Copper	T	mg/L	6020	0.000373	J	0.00037	J	0.000321	J	0.000681	J
7439-89-6		Iron	T	mg/L	6020	0.0428	J	0.0397	J	<0.1		0.938	
7439-92-1		Lead	T	mg/L	6020	<0.002		<0.002		<0.002		<0.002	
7439-95-4		Magnesium	T	mg/L	6020	23.2		11		17		9.93	
7439-96-5		Manganese	T	mg/L	6020	0.0258		0.00795		0.00976		1.87	
7439-97-6		Mercury	T	mg/L	7470	<0.0002		<0.0002		<0.0002		<0.0002	

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	TD[5]	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS
7439-98-7		Molybdenum	T	mg/L	6020	<0.0005		<0.0005		0.000829		0.000714	
7440-02-0		Nickel	T	mg/L	6020	0.00176	J	0.000718	J	0.00136	J	0.0033	
7440-09-7		Potassium	T	mg/L	6020	2.5		1.47		2.1		0.303	
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		0.00201	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	50.2		50.6		33.3		99.5	
7440-25-7		Tantalum	T	mg/L	6020	<0.005		<0.005	*	<0.005	*	<0.005	
7440-28-0		Thallium	T	mg/L	6020	<0.002		<0.002		<0.002		<0.002	
7440-61-1		Uranium	T	mg/L	6020	<0.0002		<0.0002		0.000288		<0.0002	
7440-62-2		Vanadium	T	mg/L	6020	<0.01		0.00382	J	0.00417	J	<0.01	
7440-66-6		Zinc	T	mg/L	6020	<0.01		0.0045	J	0.00448	J	0.00543	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	

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	TD[5]	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS
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	0.00791		0.00041	J	<0.001		<0.001	

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	TD[5]	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS
100-41-4		Ethylbenzene	T	mg/L	8260	<0.001	*	<0.001		<0.001		<0.001	
591-78-6		2-Hexanone	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
74-88-4		Iodomethane	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
124-48-1		Methane, Dibromochloro-	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
56-23-5		Carbon Tetrachloride	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
75-09-2		Dichloromethane	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
108-10-1		Methyl isobutyl ketone	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
96-12-8		Propane, 1,2-Dibromo-3-chloro	T	mg/L	8011	<0.0000195		<0.0000191		<0.0000192		<0.0000193	
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		<0.101		<0.098		<0.099	
12674-11-2		PCB-1016	T	ug/L	8082	<0.0952		<0.101		<0.098		<0.099	
11104-28-2		PCB-1221	T	ug/L	8082	<0.0952		<0.101		<0.098		<0.099	
11141-16-5		PCB-1232	T	ug/L	8082	<0.0952		<0.101		<0.098		<0.099	
53469-21-9		PCB-1242	T	ug/L	8082	<0.0952		<0.101		<0.098		<0.099	
12672-29-6		PCB-1248	T	ug/L	8082	<0.0952		<0.101		<0.098		<0.099	

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	TD[5]	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS
11097-69-1		PCB-1254	T	ug/L	8082	<0.0952		<0.101		<0.098		<0.099	
11096-82-5		PCB-1260	T	ug/L	8082	<0.0952		<0.101		<0.098		<0.099	
11100-14-4		PCB-1268	T	ug/L	8082	<0.0952		<0.101		<0.098		<0.099	
12587-46-1		Gross Alpha	T	pCi/L	9310	2.25	*	3.98	*	1.33	*	0.294	*
12587-47-2		Gross Beta	T	pCi/L	9310	22.8	*	116	*	45.9	*	0.519	*
10043-66-0		Iodine-131	T	pCi/L			*		*		*		*
13982-63-3		Radium-226	T	pCi/L	AN-1418	0.416	*	0.535	*	0.905	*	0.6	*
10098-97-2		Strontium-90	T	pCi/L	905.0	-1.24	*	1.23	*	-1.7	*	-0.0779	*
14133-76-7		Technetium-99	T	pCi/L	Tc-02-RC	20.3	*	168	*	91.9	*	3.84	*
14269-63-7		Thorium-230	T	pCi/L	Th-01-RC	0.317	*	-0.305	*	-0.153	*	0.199	*
10028-17-8		Tritium	T	pCi/L	906.0	63.2	*	-51.9	*	23.6	*	-46.4	*
S0130- -		Chemical Oxygen Demand	T	mg/L	410.4	14.7	BJ	20.1		18.4	J	30.3	
57-12-5		Cyanide	T	mg/L	9012	<0.2		<0.2		<0.2		<0.2	
20461-54-5		Iodide	T	mg/L	300.0	<0.5		<0.5		<0.5		0.168	J
S0268- -		Total Organic Carbon	T	mg/L	9060	1.2	J	1.13	J	1.01	J	5.85	
S0586- -		Total Organic Halides	T	mg/L	9020	0.0116		0.0044	BJ	0.00878	BJ	0.142	B

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

RESIDENTIAL/CONTAINED-QUARTERLY
Facility: US DOE - Paducah Gaseous Diffusion Plant
Permit Number: SW07300014,SW07300015,SW07300045

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)						10/16/2018 07:48		10/16/2018 08:34		NA		10/22/2018 07:46	
Duplicate ("Y" or "N")[2]						N		N		N		N	
Split ("Y" or "N")[3]						N		N		N		N	
Facility Sample ID Number (if applicable)						MW387SG1-19		MW388SG1-19		NA		MW390SG1-19	
Laboratory Sample ID Number (if applicable)						461934009		461934011		NA		462331003	
Date of Analysis (Month/Day/Year) For Volatile Organics Analysis						10/19/2018		10/19/2018		NA		10/27/2018	
Gradient with respect to Monitored Unit (UP, DOWN, SIDE, UNKNOWN)						DOWN		DOWN		DOWN		DOWN	
CAS RN[4]		CONSTITUENT	TD[5]	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL[6]	FLAGS[7]	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS
24959-67-9		Bromide	T	mg/L	9056	0.437		0.35			*	0.471	
16887-00-6		Chloride(s)	T	mg/L	9056	39.7		30.9			*	55.3	
16984-48-8		Fluoride	T	mg/L	9056	0.478		0.172			*	0.263	
S0595- -		Nitrate & Nitrite	T	mg/L	9056	1.06	*	0.938	*		*	2.82	
14808-79-8		Sulfate	T	mg/L	9056	28.5		24.9			*	28.3	
NS1894		Barometric Pressure Reading	T	Inches/Hg	Field	30.31		30.3			*	30.26	
S0145- -		Specific Conductance	T	µMH0/cm	Field	536		454			*	690	

[1]AKGWA # is 0000-0000 for any type of blank.
[2]Respond "Y" if the sample was a duplicate of another sample in this report.
[3]Respond "Y" if the sample was split and analyzed by separate laboratories.
[4]Chemical 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.
[7]Flags 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

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	TD[5]	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS
S0906 - -		Static Water Level Elevation	T	Ft. MSL	Field	323.73		323.66			*	323.87	
N238		Dissolved Oxygen	T	mg/L	Field	3.56		3.53			*	5.9	
S0266- -		Total Dissolved Solids	T	mg/L	160.1	297	*	279	*		*	359	
S0296- -		pH	T	Units	Field	6.05		6.11			*	6.07	
NS215		Eh	T	mV	Field	438		421			*	413	
S0907 - -		Temperature	T	°C	Field	14.33		15.61			*	12.83	
7429-90-5		Aluminum	T	mg/L	6020	<0.05		0.14			*	0.0967	
7440-36-0		Antimony	T	mg/L	6020	<0.003		<0.003			*	<0.003	
7440-38-2		Arsenic	T	mg/L	6020	0.00437	J	0.00306	J		*	<0.005	
7440-39-3		Barium	T	mg/L	6020	0.126		0.229			*	0.245	
7440-41-7		Beryllium	T	mg/L	6020	<0.0005		<0.0005			*	<0.0005	
7440-42-8		Boron	T	mg/L	6020	0.0364		0.0301			*	0.00975	J
7440-43-9		Cadmium	T	mg/L	6020	<0.001		<0.001			*	<0.001	
7440-70-2		Calcium	T	mg/L	6020	35.5		28.1			*	29.4	
7440-47-3		Chromium	T	mg/L	6020	0.00339	J	<0.01			*	<0.01	
7440-48-4		Cobalt	T	mg/L	6020	<0.001		<0.001			*	<0.001	
7440-50-8		Copper	T	mg/L	6020	0.000509	J	0.00125			*	0.00122	
7439-89-6		Iron	T	mg/L	6020	<0.1		0.483			*	0.0989	J
7439-92-1		Lead	T	mg/L	6020	<0.002		<0.002			*	<0.002	
7439-95-4		Magnesium	T	mg/L	6020	15.5		13			*	12.4	
7439-96-5		Manganese	T	mg/L	6020	0.00397	J	0.00393	J		*	0.00156	J
7439-97-6		Mercury	T	mg/L	7470	<0.0002		<0.0002			*	<0.0002	

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	TD[5]	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS
7439-98-7		Molybdenum	T	mg/L	6020	<0.0005		0.000279	J		*	0.000875	
7440-02-0		Nickel	T	mg/L	6020	0.000683	J	0.00146	J		*	0.00217	
7440-09-7		Potassium	T	mg/L	6020	1.9		2.3			*	0.312	
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	57		49.9			*	91.8	
7440-25-7		Tantalum	T	mg/L	6020	<0.005		<0.005			*	<0.005	*
7440-28-0		Thallium	T	mg/L	6020	<0.002		<0.002			*	<0.002	
7440-61-1		Uranium	T	mg/L	6020	<0.0002		<0.0002			*	0.000155	J
7440-62-2		Vanadium	T	mg/L	6020	<0.01		0.00343	J		*	<0.01	
7440-66-6		Zinc	T	mg/L	6020	0.00435	J	0.00519	J		*	<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	

Facility: US DOE - Paducah Gaseous Diffusion Plant FINDS/UNIT: KY8-890-008-982 / 1

Permit Number: SW07300014, SW07300015, SW07300045 LAB ID: None

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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	TD[5]	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS
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	0.0007	J	0.00065	J		*	<0.001	

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	TD[5]	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS
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	<0.0000192		<0.0000198			*	<0.0000194	
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	<0.0962		<0.0962			*	<0.1	
12674-11-2		PCB-1016	T	ug/L	8082	<0.0962		<0.0962			*	<0.1	
11104-28-2		PCB-1221	T	ug/L	8082	<0.0962		<0.0962			*	<0.1	
11141-16-5		PCB-1232	T	ug/L	8082	<0.0962		<0.0962			*	<0.1	
53469-21-9		PCB-1242	T	ug/L	8082	<0.0962		<0.0962			*	<0.1	
12672-29-6		PCB-1248	T	ug/L	8082	<0.0962		<0.0962			*	<0.1	

RESIDENTIAL/INERT-QUARTERLY

Facility: US DOE - Paducah Gaseous Diffusion Plant FINDS/UNIT: KY8-890-008-982 / 1

Permit Number: SW07300014, SW07300015, SW07300045 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	TD[5]	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS
11097-69-1		PCB-1254	T	ug/L	8082	<0.0962		<0.0962			*	<0.1	
11096-82-5		PCB-1260	T	ug/L	8082	<0.0962		<0.0962			*	<0.1	
11100-14-4		PCB-1268	T	ug/L	8082	<0.0962		<0.0962			*	<0.1	
12587-46-1		Gross Alpha	T	pCi/L	9310	10.1	*	-1.2	*		*	1.64	*
12587-47-2		Gross Beta	T	pCi/L	9310	185	*	83.1	*		*	41.5	*
10043-66-0		Iodine-131	T	pCi/L			*		*		*		*
13982-63-3		Radium-226	T	pCi/L	HASL 300	1.55	*	0.616	*		*	0.14	*
10098-97-2		Strontium-90	T	pCi/L	905.0	0.418	*	-0.0523	*		*	-0.627	*
14133-76-7		Technetium-99	T	pCi/L	Tc-02-RC	223	*	117	*		*	67.7	*
14269-63-7		Thorium-230	T	pCi/L	Th-01-RC	0.0504	*	0.413	*		*	-0.0784	*
10028-17-8		Tritium	T	pCi/L	906.0	-98.7	*	75.5	*		*	-87.6	*
S0130- -		Chemical Oxygen Demand	T	mg/L	410.4	25.2		13.4	J		*	23.3	
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	1.26	J	1.18	J		*	2.13	
S0586- -		Total Organic Halides	T	mg/L	9020	0.0139	B	0.0115	B		*	0.0269	

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: SW07300014,SW07300015,SW07300045

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)						10/22/2018 13:49		10/22/2018 12:18		10/22/2018 13:01		10/22/2018 08:36	
Duplicate ("Y" or "N")[2]						N		N		N		N	
Split ("Y" or "N")[3]						N		N		N		N	
Facility Sample ID Number (if applicable)						MW391SG1-19		MW392SG1-19		MW393SG1-19		MW394SG1-19	
Laboratory Sample ID Number (if applicable)						462331005		462331007		462331009		462331001	
Date of Analysis (Month/Day/Year) For Volatile Organics Analysis						10/27/2018		10/27/2018		10/27/2018		10/27/2018	
Gradient with respect to Monitored Unit (UP, DOWN, SIDE, UNKNOWN)						DOWN		DOWN		DOWN		UP	
CAS RN[4]		CONSTITUENT	TD[5]	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL[6]	FLAGS[7]	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS
24959-67-9		Bromide	T	mg/L	9056	0.496		0.526		0.131	J	0.588	
16887-00-6		Chloride(s)	T	mg/L	9056	41.2		45.7		13.2		46.1	
16984-48-8		Fluoride	T	mg/L	9056	0.129		0.18		0.142		0.128	
S0595- -		Nitrate & Nitrite	T	mg/L	9056	0.933		0.59		<0.1		1.18	
14808-79-8		Sulfate	T	mg/L	9056	64.2		8.68		14.1		10.6	
NS1894		Barometric Pressure Reading	T	Inches/Hg	Field	30.2		30.25		30.22		30.25	
S0145- -		Specific Conductance	T	µMH0/cm	Field	525		425		404		410	

[1]AKGWA # is 0000-0000 for any type of blank.
[2]Respond "Y" if the sample was a duplicate of another sample in this report.
[3]Respond "Y" if the sample was split and analyzed by separate laboratories.
[4]Chemical 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.
[7]Flags are as designated, do not use any other type. Use "*," then describe on "Written Comments Page."

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

RESIDENTIAL/INERT-QUARTERLY

Facility: US DOE - Paducah Gaseous Diffusion Plant FINDS/UNIT: KY8-890-008-982 / 1

Permit Number: SW07300014, SW07300015, SW07300045 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	TD[5]	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS
S0906 - -		Static Water Level Elevation	T	Ft. MSL	Field	323.79		323.73		338.91		324.02	
N238		Dissolved Oxygen	T	mg/L	Field	3.46		1.71		4.3		4.1	
S0266- -		Total Dissolved Solids	T	mg/L	160.1	254		197		200		206	
S0296- -		pH	T	Units	Field	5.86		5.88		6.01		6.36	
NS215		Eh	T	mV	Field	309		375		303		386	
S0907 - -		Temperature	T	°C	Field	16.5		16.78		17.06		14.06	
7429-90-5		Aluminum	T	mg/L	6020	<0.05		<0.05		0.0298	J	0.025	J
7440-36-0		Antimony	T	mg/L	6020	<0.003		<0.003		<0.003		<0.003	
7440-38-2		Arsenic	T	mg/L	6020	<0.005		<0.005		0.00481	J	<0.005	
7440-39-3		Barium	T	mg/L	6020	0.102		0.182		0.126		0.234	
7440-41-7		Beryllium	T	mg/L	6020	<0.0005		<0.0005		<0.0005		<0.0005	
7440-42-8		Boron	T	mg/L	6020	0.255		0.026		0.0188		0.022	
7440-43-9		Cadmium	T	mg/L	6020	<0.001		<0.001		<0.001		<0.001	
7440-70-2		Calcium	T	mg/L	6020	36.1		27.1		11.8		25.4	
7440-47-3		Chromium	T	mg/L	6020	<0.01		<0.01		<0.01		<0.01	
7440-48-4		Cobalt	T	mg/L	6020	<0.001		<0.001		<0.001		<0.001	
7440-50-8		Copper	T	mg/L	6020	0.000601	J	0.00571		0.00126		0.000794	J
7439-89-6		Iron	T	mg/L	6020	<0.1		0.0992	J	1.94		0.12	
7439-92-1		Lead	T	mg/L	6020	<0.002		<0.002		<0.002		<0.002	
7439-95-4		Magnesium	T	mg/L	6020	15.6		9.79		3.52		11.3	
7439-96-5		Manganese	T	mg/L	6020	0.00109	J	0.0132		0.046		0.005	
7439-97-6		Mercury	T	mg/L	7470	<0.0002		<0.0002		<0.0002		<0.0002	

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	TD[5]	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS
7439-98-7		Molybdenum	T	mg/L	6020	<0.0005		<0.0005		<0.0005		<0.0005	
7440-02-0		Nickel	T	mg/L	6020	0.0007	J	0.00617		<0.002		0.0047	
7440-09-7		Potassium	T	mg/L	6020	1.63		1.64		0.365		1.19	
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		34.6		71.3		33.4	
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		0.00881	J	<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	

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	TD[5]	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS
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	0.00043	J	0.00113		<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	0.00887		0.0141		0.00091	J	0.00485	

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	TD[5]	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS
100-41-4		Ethylbenzene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
591-78-6		2-Hexanone	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
74-88-4		Iodomethane	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
124-48-1		Methane, Dibromochloro-	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
56-23-5		Carbon Tetrachloride	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
75-09-2		Dichloromethane	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
108-10-1		Methyl isobutyl ketone	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
96-12-8		Propane, 1,2-Dibromo-3-chloro	T	mg/L	8011	<0.0000193		<0.0000191		<0.0000193		<0.0000195	
78-87-5		Propane, 1,2-Dichloro-	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
10061-02-6		trans-1,3-Dichloro-1-propene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
10061-01-5		cis-1,3-Dichloro-1-propene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
156-60-5		trans-1,2-Dichloroethene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
75-69-4		Trichlorofluoromethane	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
96-18-4		1,2,3-Trichloropropane	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
95-50-1		Benzene, 1,2-Dichloro-	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
106-46-7		Benzene, 1,4-Dichloro-	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
1336-36-3		PCB,Total	T	ug/L	8082	<0.0952		<0.0962		<0.0962		<0.0971	
12674-11-2		PCB-1016	T	ug/L	8082	<0.0952		<0.0962		<0.0962		<0.0971	
11104-28-2		PCB-1221	T	ug/L	8082	<0.0952		<0.0962		<0.0962		<0.0971	
11141-16-5		PCB-1232	T	ug/L	8082	<0.0952		<0.0962		<0.0962		<0.0971	
53469-21-9		PCB-1242	T	ug/L	8082	<0.0952		<0.0962		<0.0962		<0.0971	
12672-29-6		PCB-1248	T	ug/L	8082	<0.0952		<0.0962		<0.0962		<0.0971	

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	TD[5]	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS
11097-69-1		PCB-1254	T	ug/L	8082	<0.0952		<0.0962		<0.0962		<0.0971	
11096-82-5		PCB-1260	T	ug/L	8082	<0.0952		<0.0962		<0.0962		<0.0971	
11100-14-4		PCB-1268	T	ug/L	8082	<0.0952		<0.0962		<0.0962		<0.0971	
12587-46-1		Gross Alpha	T	pCi/L	9310	8.52	*	2.54	*	4.98	*	7.03	*
12587-47-2		Gross Beta	T	pCi/L	9310	6.71	*	4.52	*	12	*	11.1	*
10043-66-0		Iodine-131	T	pCi/L			*		*		*		*
13982-63-3		Radium-226	T	pCi/L	AN-1418	0.261	*	0.383	*	0.0636	*	0.442	*
10098-97-2		Strontium-90	T	pCi/L	905.0	2.1	*	0.658	*	-2.06	*	-2.27	*
14133-76-7		Technetium-99	T	pCi/L	Tc-02-RC	12.5	*	5.15	*	2.21	*	13.4	*
14269-63-7		Thorium-230	T	pCi/L	Th-01-RC	-0.072	*	-0.36	*	0.235	*	-0.336	*
10028-17-8		Tritium	T	pCi/L	906.0	29.9	*	62	*	48	*	-3.96	*
S0130- -		Chemical Oxygen Demand	T	mg/L	410.4	<20		<20		<20		11.8	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	0.953	J	1.1	J	2.6		0.897	J
S0586- -		Total Organic Halides	T	mg/L	9020	0.0126		0.0236		0.019		0.00626	J

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

RESIDENTIAL/CONTAINED-QUARTERLY
Facility: US DOE - Paducah Gaseous Diffusion Plant
Permit Number: SW07300014,SW07300015,SW07300045

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)						10/22/2018 10:48		10/22/2018 09:41		10/15/2018 09:06		10/16/2018 07:05	
Duplicate ("Y" or "N")[2]						N		N		N		N	
Split ("Y" or "N")[3]						N		N		N		N	
Facility Sample ID Number (if applicable)						MW395SG1-19		MW396SG1-19		MW397SG1-19		RI1SG1-19	
Laboratory Sample ID Number (if applicable)						462331011		462331013		461848005		461934014	
Date of Analysis (Month/Day/Year) For Volatile Organics Analysis						10/27/2018		10/27/2018		10/19/2018		10/19/2018	
Gradient with respect to Monitored Unit (UP, DOWN, SIDE, UNKNOWN)						UP		UP		UP		NA	
CAS RN[4]		CONSTITUENT	TD[5]	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL[6]	FLAGS[7]	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS
24959-67-9		Bromide	T	mg/L	9056	0.451		0.924	J	0.422			*
16887-00-6		Chloride(s)	T	mg/L	9056	39.9		66		36.1			*
16984-48-8		Fluoride	T	mg/L	9056	0.114		0.507		0.173			*
S0595- -		Nitrate & Nitrite	T	mg/L	9056	1.42		<0.5		1.41	*		*
14808-79-8		Sulfate	T	mg/L	9056	10.2		24.5		10.4			*
NS1894		Barometric Pressure Reading	T	Inches/Hg	Field	30.27		30.26		30.17			*
S0145- -		Specific Conductance	T	µMH0/cm	Field	375		775		321			*

[1]AKGWA # is 0000-0000 for any type of blank.
[2]Respond "Y" if the sample was a duplicate of another sample in this report.
[3]Respond "Y" if the sample was split and analyzed by separate laboratories.
[4]Chemical 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.
[7]Flags are as designated, do not use any other type. Use "*," then describe on "Written Comments Page."

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

RESIDENTIAL/INERT-QUARTERLY

Facility: US DOE - Paducah Gaseous Diffusion Plant FINDS/UNIT: KY8-890-008-982 / 1

Permit Number: SW07300014, SW07300015, SW07300045 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	TD[5]	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS
S0906 - -		Static Water Level Elevation	T	Ft. MSL	Field	324.39		365.64		324.15			*
N238		Dissolved Oxygen	T	mg/L	Field	4.29		0.92		5.46			*
S0266- -		Total Dissolved Solids	T	mg/L	160.1	176		404		184	*		*
S0296- -		pH	T	Units	Field	6.21		6.54		5.98			*
NS215		Eh	T	mV	Field	237		210		407			*
S0907 - -		Temperature	T	°C	Field	16.5		15.39		14.17			*
7429-90-5		Aluminum	T	mg/L	6020	0.199		<0.05		0.0301	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		0.00349	J	0.00237	J	0.00213	J
7440-39-3		Barium	T	mg/L	6020	0.236		0.389		0.137		<0.002	
7440-41-7		Beryllium	T	mg/L	6020	<0.0005		<0.0005		<0.0005		<0.0005	
7440-42-8		Boron	T	mg/L	6020	0.0228		0.00827	J	0.00936	J	<0.015	
7440-43-9		Cadmium	T	mg/L	6020	<0.001		<0.001		<0.001		<0.001	
7440-70-2		Calcium	T	mg/L	6020	24.4		32.5		19.3		<0.2	
7440-47-3		Chromium	T	mg/L	6020	0.00338	J	<0.01		<0.01		<0.01	
7440-48-4		Cobalt	T	mg/L	6020	<0.001		0.00356		<0.001		<0.001	
7440-50-8		Copper	T	mg/L	6020	0.00177		0.00115		0.000692	J	<0.001	
7439-89-6		Iron	T	mg/L	6020	0.63		2.2		0.0442	J	<0.1	
7439-92-1		Lead	T	mg/L	6020	<0.002		<0.002		<0.002		<0.002	
7439-95-4		Magnesium	T	mg/L	6020	10.7		15		8.48		<0.03	
7439-96-5		Manganese	T	mg/L	6020	0.0123		0.528		0.00171	J	<0.005	
7439-97-6		Mercury	T	mg/L	7470	<0.0002		<0.0002		<0.0002		<0.0002	

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	TD[5]	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS
7439-98-7		Molybdenum	T	mg/L	6020	0.000347	J	0.00056		<0.0005		<0.0005	
7440-02-0		Nickel	T	mg/L	6020	0.00147	J	0.00154	J	0.000711	J	<0.002	
7440-09-7		Potassium	T	mg/L	6020	1.44		0.689		1.95		<0.3	
7440-16-6		Rhodium	T	mg/L	6020	<0.005		<0.005		<0.005		<0.005	
7782-49-2		Selenium	T	mg/L	6020	<0.005		<0.005		<0.005		<0.005	
7440-22-4		Silver	T	mg/L	6020	<0.001		<0.001		<0.001		<0.001	
7440-23-5		Sodium	T	mg/L	6020	28.5		70.9		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		0.000078	J	<0.0002		<0.0002	
7440-62-2		Vanadium	T	mg/L	6020	0.00352	J	<0.01		0.00464	J	0.00335	J
7440-66-6		Zinc	T	mg/L	6020	0.00398	J	0.00428	J	0.00519	J	<0.01	
108-05-4		Vinyl acetate	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
67-64-1		Acetone	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
107-02-8		Acrolein	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
107-13-1		Acrylonitrile	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
71-43-2		Benzene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
108-90-7		Chlorobenzene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
1330-20-7		Xylenes	T	mg/L	8260	<0.003		<0.003		<0.003		<0.003	
100-42-5		Styrene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
108-88-3		Toluene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
74-97-5		Chlorobromomethane	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	

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	TD[5]	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS
75-27-4		Bromodichloromethane	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
75-25-2		Tribromomethane	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
74-83-9		Methyl bromide	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
78-93-3		Methyl ethyl ketone	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
110-57-6		trans-1,4-Dichloro-2-butene	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
75-15-0		Carbon disulfide	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
75-00-3		Chloroethane	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
67-66-3		Chloroform	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
74-87-3		Methyl chloride	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
156-59-2		cis-1,2-Dichloroethene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
74-95-3		Methylene bromide	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
75-34-3		1,1-Dichloroethane	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
107-06-2		1,2-Dichloroethane	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
75-35-4		1,1-Dichloroethylene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
106-93-4		Ethane, 1,2-dibromo	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
79-34-5		Ethane, 1,1,2,2-Tetrachloro	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
71-55-6		Ethane, 1,1,1-Trichloro-	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
79-00-5		Ethane, 1,1,2-Trichloro	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
630-20-6		Ethane, 1,1,1,2-Tetrachloro	T	mg/L	8260	<0.001		<0.001		<0.001	*	<0.001	*
75-01-4		Vinyl chloride	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
127-18-4		Ethene, Tetrachloro-	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
79-01-6		Ethene, Trichloro-	T	mg/L	8260	0.00291		<0.001		<0.001		<0.001	

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	TD[5]	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS
100-41-4		Ethylbenzene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
591-78-6		2-Hexanone	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
74-88-4		Iodomethane	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
124-48-1		Methane, Dibromochloro-	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
56-23-5		Carbon Tetrachloride	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
75-09-2		Dichloromethane	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
108-10-1		Methyl isobutyl ketone	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
96-12-8		Propane, 1,2-Dibromo-3-chloro	T	mg/L	8011	<0.0000194		<0.0000196		<0.0000193		<0.0000193	
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		<0.0952		<0.0943		<0.0962	
12674-11-2		PCB-1016	T	ug/L	8082	<0.0971		<0.0952		<0.0943		<0.0962	
11104-28-2		PCB-1221	T	ug/L	8082	<0.0971		<0.0952		<0.0943		<0.0962	
11141-16-5		PCB-1232	T	ug/L	8082	<0.0971		<0.0952		<0.0943		<0.0962	
53469-21-9		PCB-1242	T	ug/L	8082	<0.0971		<0.0952		<0.0943		<0.0962	
12672-29-6		PCB-1248	T	ug/L	8082	<0.0971		<0.0952		<0.0943		<0.0962	

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	TD[5]	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS
11097-69-1		PCB-1254	T	ug/L	8082	<0.0971		<0.0952		<0.0943		<0.0962	
11096-82-5		PCB-1260	T	ug/L	8082	<0.0971		<0.0952		<0.0943		<0.0962	
11100-14-4		PCB-1268	T	ug/L	8082	<0.0971		<0.0952		<0.0943		<0.0962	
12587-46-1		Gross Alpha	T	pCi/L	9310	0.647	*	2.11	*	1.91	*	10.5	*
12587-47-2		Gross Beta	T	pCi/L	9310	9.41	*	5.24	*	5.14	*	-5.54	*
10043-66-0		Iodine-131	T	pCi/L			*		*		*		*
13982-63-3		Radium-226	T	pCi/L	AN-1418	0.612	*	0.171	*	0.415	*	-0.0319	*
10098-97-2		Strontium-90	T	pCi/L	905.0	-1.73	*	1.99	*	1.05	*	-1.16	*
14133-76-7		Technetium-99	T	pCi/L	Tc-02-RC	13.2	*	-3.72	*	18.3	*	6.87	*
14269-63-7		Thorium-230	T	pCi/L	Th-01-RC	-0.00943	*	0.272	*	0.132	*	0.155	*
10028-17-8		Tritium	T	pCi/L	906.0	9.23	*	-4.09	*	20.7	*	-102	*
S0130- -		Chemical Oxygen Demand	T	mg/L	410.4	9.87	J	11.8	J	60.8			*
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		0.682		<0.5		<0.5	
S0268- -		Total Organic Carbon	T	mg/L	9060	0.921	J	4.96		0.778	J		*
S0586- -		Total Organic Halides	T	mg/L	9020	0.0444		0.0371		0.00542	J		*

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

RESIDENTIAL/CONTAINED-QUARTERLY
Facility: US DOE - Paducah Gaseous Diffusion Plant
Permit Number: SW07300014,SW07300015,SW07300045

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)						10/16/2018 11:45		10/15/2018 07:00		10/16/2018 07:00		10/22/2018 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)						FB1SG1-19		TB1SG1-19		TB2SG1-19		TB3SG1-19	
Laboratory Sample ID Number (if applicable)						461934013		461806007		461934015		462331015	
Date of Analysis (Month/Day/Year) For Volatile Organics Analysis						10/19/2018		10/19/2018		10/19/2018		10/27/2018	
Gradient with respect to Monitored Unit (UP, DOWN, SIDE, UNKNOWN)						NA		NA		NA		NA	
CAS RN[4]		CONSTITUENT	TD[5]	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL[6]	FLAGS[7]	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS
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		*		*		*		*

[1]AKGWA # is 0000-0000 for any type of blank.
[2]Respond "Y" if the sample was a duplicate of another sample in this report.
[3]Respond "Y" if the sample was split and analyzed by separate laboratories.
[4]Chemical 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.
[7]Flags are as designated, do not use any other type. Use "*," then describe on "Written Comments Page."

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

RESIDENTIAL/INERT-QUARTERLY

Facility: US DOE - Paducah Gaseous Diffusion Plant FINDS/UNIT: KY8-890-008-982 / 1

Permit Number: SW07300014, SW07300015, SW07300045 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	TD[5]	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS
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	0.00207	J		*		*		*
7440-39-3		Barium	T	mg/L	6020	<0.002			*		*		*
7440-41-7		Beryllium	T	mg/L	6020	<0.0005			*		*		*
7440-42-8		Boron	T	mg/L	6020	<0.015			*		*		*
7440-43-9		Cadmium	T	mg/L	6020	<0.001			*		*		*
7440-70-2		Calcium	T	mg/L	6020	0.0943	J		*		*		*
7440-47-3		Chromium	T	mg/L	6020	<0.01			*		*		*
7440-48-4		Cobalt	T	mg/L	6020	<0.001			*		*		*
7440-50-8		Copper	T	mg/L	6020	<0.001			*		*		*
7439-89-6		Iron	T	mg/L	6020	<0.1			*		*		*
7439-92-1		Lead	T	mg/L	6020	<0.002			*		*		*
7439-95-4		Magnesium	T	mg/L	6020	<0.03			*		*		*
7439-96-5		Manganese	T	mg/L	6020	<0.005			*		*		*
7439-97-6		Mercury	T	mg/L	7470	<0.0002			*		*		*

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	TD[5]	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS
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	0.00349	J		*		*		*
7440-66-6		Zinc	T	mg/L	6020	0.0043	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	

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	TD[5]	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS
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	0.00421	J	<0.005		<0.005		<0.005	
110-57-6		trans-1,4-Dichloro-2-butene	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
75-15-0		Carbon disulfide	T	mg/L	8260	<0.005		<0.005		<0.005		<0.005	
75-00-3		Chloroethane	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
67-66-3		Chloroform	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
74-87-3		Methyl chloride	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
156-59-2		cis-1,2-Dichloroethene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
74-95-3		Methylene bromide	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
75-34-3		1,1-Dichloroethane	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
107-06-2		1,2-Dichloroethane	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
75-35-4		1,1-Dichloroethylene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
106-93-4		Ethane, 1,2-dibromo	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
79-34-5		Ethane, 1,1,2,2-Tetrachloro	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
71-55-6		Ethane, 1,1,1-Trichloro-	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
79-00-5		Ethane, 1,1,2-Trichloro	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
630-20-6		Ethane, 1,1,1,2-Tetrachloro	T	mg/L	8260	<0.001	*	<0.001	*	<0.001	*	<0.001	
75-01-4		Vinyl chloride	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
127-18-4		Ethene, Tetrachloro-	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
79-01-6		Ethene, Trichloro-	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	

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	TD[5]	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS
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	<0.0000192		<0.0000192		<0.0000194		<0.0000194	
78-87-5		Propane, 1,2-Dichloro-	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
10061-02-6		trans-1,3-Dichloro-1-propene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
10061-01-5		cis-1,3-Dichloro-1-propene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
156-60-5		trans-1,2-Dichloroethene	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
75-69-4		Trichlorofluoromethane	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
96-18-4		1,2,3-Trichloropropane	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
95-50-1		Benzene, 1,2-Dichloro-	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
106-46-7		Benzene, 1,4-Dichloro-	T	mg/L	8260	<0.001		<0.001		<0.001		<0.001	
1336-36-3		PCB,Total	T	ug/L	8082	<0.0952			*		*		*
12674-11-2		PCB-1016	T	ug/L	8082	<0.0952			*		*		*
11104-28-2		PCB-1221	T	ug/L	8082	<0.0952			*		*		*
11141-16-5		PCB-1232	T	ug/L	8082	<0.0952			*		*		*
53469-21-9		PCB-1242	T	ug/L	8082	<0.0952			*		*		*
12672-29-6		PCB-1248	T	ug/L	8082	<0.0952			*		*		*

RESIDENTIAL/INERT-QUARTERLY

Facility: US DOE - Paducah Gaseous Diffusion Plant FINDS/UNIT: KY8-890-008-982 / 1

Permit Number: SW07300014, SW07300015, SW07300045 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	TD[5]	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS
11097-69-1		PCB-1254	T	ug/L	8082	<0.0952			*		*		*
11096-82-5		PCB-1260	T	ug/L	8082	<0.0952			*		*		*
11100-14-4		PCB-1268	T	ug/L	8082	<0.0952			*		*		*
12587-46-1		Gross Alpha	T	pCi/L	9310	4.36	*		*		*		*
12587-47-2		Gross Beta	T	pCi/L	9310	-2.37	*		*		*		*
10043-66-0		Iodine-131	T	pCi/L			*		*		*		*
13982-63-3		Radium-226	T	pCi/L	HASL 300	0.415	*		*		*		*
10098-97-2		Strontium-90	T	pCi/L	905.0	0.465	*		*		*		*
14133-76-7		Technetium-99	T	pCi/L	Tc-02-RC	0.39	*		*		*		*
14269-63-7		Thorium-230	T	pCi/L	Th-01-RC	0.778	*		*		*		*
10028-17-8		Tritium	T	pCi/L	906.0	23.8	*		*		*		*
S0130- -		Chemical Oxygen Demand	T	mg/L	410.4		*		*		*		*
57-12-5		Cyanide	T	mg/L	9012		*		*		*		*
20461-54-5		Iodide	T	mg/L	300.0	<0.5			*		*		*
S0268- -		Total Organic Carbon	T	mg/L	9060		*		*		*		*
S0586- -		Total Organic Halides	T	mg/L	9020		*		*		*		*

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: SW07300014,SW07300015,SW07300045

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

GROUNDWATER SAMPLE ANALYSIS(S)

AKGWA NUMBER[1], Facility Well/Spring Number					8004-4804								
Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.)					386								
Sample Sequence #					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)					10/16/2018 11:43								
Duplicate ("Y" or "N")[2]					Y								
Split ("Y" or "N")[3]					N								
Facility Sample ID Number (if applicable)					MW386DSG1-19								
Laboratory Sample ID Number (if applicable)					461934005								
Date of Analysis (Month/Day/Year) For Volatile Organics Analysis					10/19/2018								
Gradient with respect to Monitored Unit (UP, DOWN, SIDE, UNKNOWN)					SIDE								
CAS RN[4]		CONSTITUENT	TD[5]	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL[6]	FLAGS[7]	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS
24959-67-9		Bromide	T	mg/L	9056	0.144	J						
16887-00-6		Chloride(s)	T	mg/L	9056	14.4							
16984-48-8		Fluoride	T	mg/L	9056	0.629							
S0595- -		Nitrate & Nitrite	T	mg/L	9056	<0.5	*						
14808-79-8		Sulfate	T	mg/L	9056	44							
NS1894		Barometric Pressure Reading	T	Inches/Hg	Field	30.31							
S0145- -		Specific Conductance	T	µMH0/cm	Field	606							

[1]AKGWA # is 0000-0000 for any type of blank.
[2]Respond "Y" if the sample was a duplicate of another sample in this report.
[3]Respond "Y" if the sample was split and analyzed by separate laboratories.
[4]Chemical 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.
[7]Flags are as designated, do not use any other type. Use "*," then describe on "Written Comments Page."

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

RESIDENTIAL/INERT-QUARTERLY

Facility: US DOE - Paducah Gaseous Diffusion Plant FINDS/UNIT: KY8-890-008-982 / 1

Permit Number: SW07300014, SW07300015, SW07300045 LAB ID: None

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GROUNDWATER SAMPLE ANALYSIS - (Cont.)

AKGWA NUMBER[1], Facility Well/Spring Number						8004-4804							
Facility's Local Well or Spring Number (e.g., MW-1, MW-2, BLANK-F, etc.)						386							
CAS RN[4]		**CONSTITUENT**	**TD[5]**	**Unit OF MEASURE**	**METHOD**	**DETECTED VALUE OR PQL[6]**	**FLAGS**	**DETECTED VALUE OR PQL[6]**	**FLAGS**	**DETECTED VALUE OR PQL[6]**	**FLAGS**	**DETECTED VALUE OR PQL[6]**	**FLAGS**
S0906 - -		Static Water Level Elevation	T	Ft. MSL	Field	343.61							
N238		Dissolved Oxygen	T	mg/L	Field	2.54							
S0266- -		Total Dissolved Solids	T	mg/L	160.1	356	*						
S0296- -		pH	T	Units	Field	6.64							
NS215		Eh	T	mV	Field	232							
S0907 - -		Temperature	T	°C	Field	15.39							
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	0.00358	J						
7440-39-3		Barium	T	mg/L	6020	0.244							
7440-41-7		Beryllium	T	mg/L	6020	<0.0005							
7440-42-8		Boron	T	mg/L	6020	0.00526	J						
7440-43-9		Cadmium	T	mg/L	6020	<0.001							
7440-70-2		Calcium	T	mg/L	6020	23.3							
7440-47-3		Chromium	T	mg/L	6020	<0.01							
7440-48-4		Cobalt	T	mg/L	6020	0.0147							
7440-50-8		Copper	T	mg/L	6020	0.000737	J						
7439-89-6		Iron	T	mg/L	6020	0.919							
7439-92-1		Lead	T	mg/L	6020	<0.002							
7439-95-4		Magnesium	T	mg/L	6020	9.99							
7439-96-5		Manganese	T	mg/L	6020	1.88							
7439-97-6		Mercury	T	mg/L	7470	<0.0002							

GROUNDWATER SAMPLE ANALYSIS - (Cont.)

AKGWA NUMBER[1], Facility Well/Spring Number						8004-4804							
Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.)						386							
CAS RN[4]		CONSTITUENT	TD[5]	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS
7439-98-7		Molybdenum	T	mg/L	6020	0.000728							
7440-02-0		Nickel	T	mg/L	6020	0.00304							
7440-09-7		Potassium	T	mg/L	6020	0.299	J						
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	99.8							
7440-25-7		Tantalum	T	mg/L	6020	<0.005	*						
7440-28-0		Thallium	T	mg/L	6020	<0.002							
7440-61-1		Uranium	T	mg/L	6020	<0.0002							
7440-62-2		Vanadium	T	mg/L	6020	<0.01							
7440-66-6		Zinc	T	mg/L	6020	0.00605	J						
108-05-4		Vinyl acetate	T	mg/L	8260	<0.005							
67-64-1		Acetone	T	mg/L	8260	<0.005							
107-02-8		Acrolein	T	mg/L	8260	<0.005							
107-13-1		Acrylonitrile	T	mg/L	8260	<0.005							
71-43-2		Benzene	T	mg/L	8260	<0.001							
108-90-7		Chlorobenzene	T	mg/L	8260	<0.001							
1330-20-7		Xylenes	T	mg/L	8260	<0.003							
100-42-5		Styrene	T	mg/L	8260	<0.001							
108-88-3		Toluene	T	mg/L	8260	<0.001							
74-97-5		Chlorobromomethane	T	mg/L	8260	<0.001							

RESIDENTIAL/INERT-QUARTERLY

Facility: US DOE - Paducah Gaseous Diffusion Plant FINDS/UNIT: KY8-890-008-982 / 1

Permit Number: SW07300014, SW07300015, SW07300045 LAB ID: None

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GROUNDWATER SAMPLE ANALYSIS - (Cont.)

AKGWA NUMBER[1], Facility Well/Spring Number	8004-4804			
Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.)	386			

CAS RN[4]		CONSTITUENT	TD[5]	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS
75-27-4		Bromodichloromethane	T	mg/L	8260	<0.001							
75-25-2		Tribromomethane	T	mg/L	8260	<0.001							
74-83-9		Methyl bromide	T	mg/L	8260	<0.001							
78-93-3		Methyl ethyl ketone	T	mg/L	8260	<0.005							
110-57-6		trans-1,4-Dichloro-2-butene	T	mg/L	8260	<0.005							
75-15-0		Carbon disulfide	T	mg/L	8260	<0.005							
75-00-3		Chloroethane	T	mg/L	8260	<0.001							
67-66-3		Chloroform	T	mg/L	8260	<0.001							
74-87-3		Methyl chloride	T	mg/L	8260	<0.001							
156-59-2		cis-1,2-Dichloroethene	T	mg/L	8260	<0.001							
74-95-3		Methylene bromide	T	mg/L	8260	<0.001							
75-34-3		1,1-Dichloroethane	T	mg/L	8260	<0.001							
107-06-2		1,2-Dichloroethane	T	mg/L	8260	<0.001							
75-35-4		1,1-Dichloroethylene	T	mg/L	8260	<0.001							
106-93-4		Ethane, 1,2-dibromo	T	mg/L	8260	<0.001							
79-34-5		Ethane, 1,1,2,2-Tetrachloro	T	mg/L	8260	<0.001							
71-55-6		Ethane, 1,1,1-Trichloro-	T	mg/L	8260	<0.001							
79-00-5		Ethane, 1,1,2-Trichloro	T	mg/L	8260	<0.001							
630-20-6		Ethane, 1,1,1,2-Tetrachloro	T	mg/L	8260	<0.001	*						
75-01-4		Vinyl chloride	T	mg/L	8260	<0.001							
127-18-4		Ethene, Tetrachloro-	T	mg/L	8260	<0.001							
79-01-6		Ethene, Trichloro-	T	mg/L	8260	<0.001							

GROUNDWATER SAMPLE ANALYSIS - (Cont.)

AKGWA NUMBER[1], Facility Well/Spring Number						8004-4804							
Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.)						386							
CAS RN[4]		CONSTITUENT	TD[5]	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS
100-41-4		Ethylbenzene	T	mg/L	8260	<0.001							
591-78-6		2-Hexanone	T	mg/L	8260	<0.005							
74-88-4		Iodomethane	T	mg/L	8260	<0.005							
124-48-1		Methane, Dibromochloro-	T	mg/L	8260	<0.001							
56-23-5		Carbon Tetrachloride	T	mg/L	8260	<0.001							
75-09-2		Dichloromethane	T	mg/L	8260	<0.005							
108-10-1		Methyl isobutyl ketone	T	mg/L	8260	<0.005							
96-12-8		Propane, 1,2-Dibromo-3-chloro	T	mg/L	8011	<0.0000195							
78-87-5		Propane, 1,2-Dichloro-	T	mg/L	8260	<0.001							
10061-02-6		trans-1,3-Dichloro-1-propene	T	mg/L	8260	<0.001							
10061-01-5		cis-1,3-Dichloro-1-propene	T	mg/L	8260	<0.001							
156-60-5		trans-1,2-Dichloroethene	T	mg/L	8260	<0.001							
75-69-4		Trichlorofluoromethane	T	mg/L	8260	<0.001							
96-18-4		1,2,3-Trichloropropane	T	mg/L	8260	<0.001							
95-50-1		Benzene, 1,2-Dichloro-	T	mg/L	8260	<0.001							
106-46-7		Benzene, 1,4-Dichloro-	T	mg/L	8260	<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							

GROUNDWATER SAMPLE ANALYSIS - (Cont.)

AKGWA NUMBER[1], Facility Well/Spring Number						8004-4804							
Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.)						386							
CAS RN[4]		CONSTITUENT	TD[5]	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS	DETECTED VALUE OR PQL[6]	FLAGS
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	1.35	*						
12587-47-2		Gross Beta	T	pCi/L	9310	-0.413	*						
10043-66-0		Iodine-131	T	pCi/L			*						
13982-63-3		Radium-226	T	pCi/L	AN-1418	0.281	*						
10098-97-2		Strontium-90	T	pCi/L	905.0	-1.35	*						
14133-76-7		Technetium-99	T	pCi/L	Tc-02-RC	3.07	*						
14269-63-7		Thorium-230	T	pCi/L	Th-01-RC	-0.0129	*						
10028-17-8		Tritium	T	pCi/L	906.0	-62.4	*						
S0130- -		Chemical Oxygen Demand	T	mg/L	410.4	23.5							
57-12-5		Cyanide	T	mg/L	9012	<0.2							
20461-54-5		Iodide	T	mg/L	300.0	0.168	J						
S0268- -		Total Organic Carbon	T	mg/L	9060	5.89							
S0586- -		Total Organic Halides	T	mg/L	9020	0.148	B						

RESIDENTIAL/INERT – QUARTERLY Finds/Unit: KY8-890-008-982 / 1

Facility: US DOE - Paducah Gaseous Diffusion Plant LAB ID:None

Permit Numbers: SW07300014, SW07300015, SW07300045 For Official Use Only

GROUNDWATER
WRITTEN COMMENTS

Monitoring Point	Facility Sample ID	Constituent	Flag	Description
8000-5201 MW220	MW220SG1-19	Nitrate & Nitrite	H	Analysis performed outside holding time requirement
		Total Dissolved Solids	*	Duplicate analysis not within control limits.
		Tantalum	N	Sample spike (MS/MSD) recovery not within control limits
		1,1,1,2-Tetrachloroethane	Y1	MS/MSD recovery outside acceptance criteria
		Gross alpha	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 7. Rad error is 7.
		Gross beta		TPU is 6.56. Rad error is 6.23.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.344. Rad error is 0.344.
		Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 2.32. Rad error is 2.32.
		Technetium-99		TPU is 12.4. Rad error is 12.2.
		Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.911. Rad error is 0.906.
		Tritium	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 128. Rad error is 128.
8000-5202 MW221	MW221SG1-19	Chloride	W	Post-digestion spike recovery out of control limits.
		Total Dissolved Solids	*	Duplicate analysis not within control limits.
		1,1,1,2-Tetrachloroethane	Y1	MS/MSD recovery outside acceptance criteria
		Gross alpha	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 3.67. Rad error is 3.67.
		Gross beta		TPU is 7.65. Rad error is 7.32.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.299. Rad error is 0.299.
		Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 2.86. Rad error is 2.83.
		Technetium-99	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 11.9. Rad error is 11.9.
		Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.609. Rad error is 0.608.
		Tritium	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 140. Rad error is 140.

RESIDENTIAL/INERT – QUARTERLY Finds/Unit: KY8-890-008-982 / 1

Facility: US DOE - Paducah Gaseous Diffusion Plant LAB ID:None

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GROUNDWATER
WRITTEN COMMENTS

Monitoring Point	Facility Sample ID	Constituent	Flag	Description
8000-5242 MW222	MW222SG1-19	Total Dissolved Solids	*	Duplicate analysis not within control limits.
		Tantalum	N	Sample spike (MS/MSD) recovery not within control limits
		1,1,1,2-Tetrachloroethane	Y1	MS/MSD recovery outside acceptance criteria
		Gross alpha	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 5.43. Rad error is 5.41.
		Gross beta	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 6.19. Rad error is 6.19.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.357. Rad error is 0.357.
		Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 1.62. Rad error is 1.62.
		Technetium-99	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 7.62. Rad error is 7.61.
		Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.701. Rad error is 0.7.
		Tritium	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 145. Rad error is 145.
8000-5243 MW223	MW223SG1-19	Chloride	W	Post-digestion spike recovery out of control limits.
		Total Dissolved Solids	*	Duplicate analysis not within control limits.
		1,1,1,2-Tetrachloroethane	Y1	MS/MSD recovery outside acceptance criteria
		Gross alpha	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 4.7. Rad error is 4.7.
		Gross beta	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 7.23. Rad error is 7.21.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.425. Rad error is 0.424.
		Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 1.75. Rad error is 1.75.
		Technetium-99	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 11.1. Rad error is 11.1.
		Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.361. Rad error is 0.36.
		Tritium	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 132. Rad error is 131.

RESIDENTIAL/INERT – QUARTERLY Finds/Unit: KY8-890-008-982 / 1

Facility: US DOE - Paducah Gaseous Diffusion Plant LAB ID:None

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GROUNDWATER
WRITTEN COMMENTS

Monitoring Point	Facility Sample ID	Constituent	Flag	Description
8000-5244 MW224	MW224SG1-19	Chloride	W	Post-digestion spike recovery out of control limits.
		Total Dissolved Solids	*	Duplicate analysis not within control limits.
		1,1,1,2-Tetrachloroethane	Y1	MS/MSD recovery outside acceptance criteria
		Gross alpha	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 6.11. Rad error is 6.1.
		Gross beta		TPU is 7.36. Rad error is 7.05.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.398. Rad error is 0.397.
		Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 2.45. Rad error is 2.45.
		Technetium-99	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 11.3. Rad error is 11.3.
		Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.723. Rad error is 0.716.
		Tritium	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 129. Rad error is 129.
8004-4820 MW369	MW369UG1-19	Chloride	W	Post-digestion spike recovery out of control limits.
		Sulfate	W	Post-digestion spike recovery out of control limits.
		Boron	N	Sample spike (MS/MSD) recovery not within control limits
		Chlorobenzene	Y2	MS/MSD RPD outside acceptance criteria
		Xylenes	Y2	MS/MSD RPD outside acceptance criteria
		Styrene	Y2	MS/MSD RPD outside acceptance criteria
		Tetrachloroethene	Y2	MS/MSD RPD outside acceptance criteria
		Ethylbenzene	Y2	MS/MSD RPD outside acceptance criteria
		1,2-Dichlorobenzene	Y2	MS/MSD RPD outside acceptance criteria
		1,4-Dichlorobenzene	Y2	MS/MSD RPD outside acceptance criteria
		Gross alpha	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 5.47. Rad error is 5.47.
		Gross beta		TPU is 8.56. Rad error is 7.68.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.702. Rad error is 0.693.
		Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 2.35. Rad error is 2.33.
		Technetium-99		TPU is 13.9. Rad error is 12.5.
		Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 1.48. Rad error is 1.45.
		Tritium	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 131. Rad error is 130.

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Facility: US DOE - Paducah Gaseous Diffusion Plant LAB ID:None

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Monitoring Point	Facility Sample ID	Constituent	Flag	Description
8004-4818 MW370	MW370UG1-19	Chloride	W	Post-digestion spike recovery out of control limits.
		Sulfate	W	Post-digestion spike recovery out of control limits.
		Boron	N	Sample spike (MS/MSD) recovery not within control limits
		Chlorobenzene	Y2	MS/MSD RPD outside acceptance criteria
		Xylenes	Y2	MS/MSD RPD outside acceptance criteria
		Styrene	Y2	MS/MSD RPD outside acceptance criteria
		Tetrachloroethene	Y2	MS/MSD RPD outside acceptance criteria
		Ethylbenzene	Y2	MS/MSD RPD outside acceptance criteria
		1,2-Dichlorobenzene	Y2	MS/MSD RPD outside acceptance criteria
		1,4-Dichlorobenzene	Y2	MS/MSD RPD outside acceptance criteria
		Gross alpha	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 6.64. Rad error is 6.53.
		Gross beta		TPU is 18.2. Rad error is 12.5.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.593. Rad error is 0.589.
		Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 1.76. Rad error is 1.76.
		Technetium-99		TPU is 18.9. Rad error is 14.1.
		Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 1.6. Rad error is 1.57.
		Tritium	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 129. Rad error is 129.
8004-4808 MW372	MW372UG1-19	Beryllium	LN	LCS or LCSD recovery outside of control limits and Sample spike (MS/MSD) recovery not within control limits
		Chlorobenzene	Y2	MS/MSD RPD outside acceptance criteria
		Xylenes	Y2	MS/MSD RPD outside acceptance criteria
		Styrene	Y2	MS/MSD RPD outside acceptance criteria
		Tetrachloroethene	Y2	MS/MSD RPD outside acceptance criteria
		Ethylbenzene	Y2	MS/MSD RPD outside acceptance criteria
		1,2-Dichlorobenzene	Y2	MS/MSD RPD outside acceptance criteria
		1,4-Dichlorobenzene	Y2	MS/MSD RPD outside acceptance criteria
		Gross alpha	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 4.37. Rad error is 4.37.
		Gross beta		TPU is 24.1. Rad error is 13.9.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 1.83. Rad error is 0.432.
		Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 4.14. Rad error is 4.13.
		Technetium-99		TPU is 23.8. Rad error is 16.2.
		Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 1.65. Rad error is 1.63.
		Tritium	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 127. Rad error is 127.

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Monitoring Point	Facility Sample ID	Constituent	Flag	Description
8004-4792 MW373	MW373UG1-19	Beryllium	LN	LCS or LCSD recovery outside of control limits and Sample spike (MS/MSD) recovery not within control limits
		Chlorobenzene	Y2	MS/MSD RPD outside acceptance criteria
		Xylenes	Y2	MS/MSD RPD outside acceptance criteria
		Styrene	Y2	MS/MSD RPD outside acceptance criteria
		Tetrachloroethene	Y2	MS/MSD RPD outside acceptance criteria
		Ethylbenzene	Y2	MS/MSD RPD outside acceptance criteria
		1,2-Dichlorobenzene	Y2	MS/MSD RPD outside acceptance criteria
		1,4-Dichlorobenzene	Y2	MS/MSD RPD outside acceptance criteria
		Gross alpha	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 5.65. Rad error is 5.63.
		Gross beta		TPU is 9.81. Rad error is 9.08.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 3.41. Rad error is 0.437.
		Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 1.71. Rad error is 1.71.
		Technetium-99	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 13.5. Rad error is 13.3.
		Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.719. Rad error is 0.716.
		Tritium	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 134. Rad error is 133.
8004-4809 MW384	MW384SG1-19	Nitrate & Nitrite	H	Analysis performed outside holding time requirement
		Total Dissolved Solids	*	Duplicate analysis not within control limits.
		Tantalum	N	Sample spike (MS/MSD) recovery not within control limits
		1,1,1,2-Tetrachloroethane	Y1	MS/MSD recovery outside acceptance criteria
		Gross alpha	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 5.2. Rad error is 5.16.
		Gross beta		TPU is 23.6. Rad error is 13.9.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.478. Rad error is 0.471.
		Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 3.02. Rad error is 3.01.
		Technetium-99		TPU is 21.9. Rad error is 11.7.
		Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.657. Rad error is 0.656.
		Tritium	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 123. Rad error is 123.

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Monitoring Point	Facility Sample ID	Constituent	Flag	Description
8004-4810 MW385	MW385SG1-19	Nitrate & Nitrite	H	Analysis performed outside holding time requirement
		Total Dissolved Solids	*	Duplicate analysis not within control limits.
		Tantalum	N	Sample spike (MS/MSD) recovery not within control limits
		1,1,1,2-Tetrachloroethane	Y1	MS/MSD recovery outside acceptance criteria
		Gross alpha	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 5.99. Rad error is 5.98.
		Gross beta		TPU is 12.8. Rad error is 10.5.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226		TPU is 0.572. Rad error is 0.545.
		Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 2.31. Rad error is 2.31.
		Technetium-99		TPU is 15.1. Rad error is 11.2.
		Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.5. Rad error is 0.499.
		Tritium	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 142. Rad error is 142.
8004-4804 MW386	MW386SG1-19	Nitrate & Nitrite	H	Analysis performed outside holding time requirement
		Total Dissolved Solids	*	Duplicate analysis not within control limits.
		1,1,1,2-Tetrachloroethane	Y1	MS/MSD recovery outside acceptance criteria
		Gross alpha	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 5.54. Rad error is 5.54.
		Gross beta	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 4.61. Rad error is 4.61.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226		TPU is 0.527. Rad error is 0.502.
		Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 2.68. Rad error is 2.68.
		Technetium-99	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 12. Rad error is 11.9.
		Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.709. Rad error is 0.705.
		Tritium	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 127. Rad error is 127.
8004-4815 MW387	MW387SG1-19	Nitrate & Nitrite	H	Analysis performed outside holding time requirement
		Total Dissolved Solids	*	Duplicate analysis not within control limits.
		1,1,1,2-Tetrachloroethane	Y1	MS/MSD recovery outside acceptance criteria
		Gross alpha		TPU is 6.95. Rad error is 6.73.
		Gross beta		TPU is 34.5. Rad error is 16.9.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226		TPU is 0.859. Rad error is 0.717.
		Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 2.05. Rad error is 2.05.
		Technetium-99		TPU is 29.9. Rad error is 16.9.
		Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.58. Rad error is 0.579.
		Tritium	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 130. Rad error is 130.

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Monitoring Point	Facility Sample ID	Constituent	Flag	Description
8004-4816 MW388	MW388SG1-19	Nitrate & Nitrite	H	Analysis performed outside holding time requirement
		Total Dissolved Solids	*	Duplicate analysis not within control limits.
		1,1,1,2-Tetrachloroethane	Y1	MS/MSD recovery outside acceptance criteria
		Gross alpha	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 5.82. Rad error is 5.82.
		Gross beta		TPU is 19.1. Rad error is 13.2.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.564. Rad error is 0.524.
		Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 2.76. Rad error is 2.76.
		Technetium-99		TPU is 18.1. Rad error is 12.8.
		Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 1.15. Rad error is 1.14.
		Tritium	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 149. Rad error is 148.

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

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

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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.

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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.

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Monitoring Point	Facility Sample ID	Constituent	Flag	Description
8004-4811 MW390	MW390SG1-19	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 4.63. Rad error is 4.62.
		Gross beta		TPU is 12.4. Rad error is 10.4.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.528. Rad error is 0.528.
		Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 2.71. Rad error is 2.71.
		Technetium-99		TPU is 14.2. Rad error is 12.1.
		Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.526. Rad error is 0.526.
		Tritium	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 157. Rad error is 157.
8004-4805 MW391	MW391SG1-19	Tantalum	N	Sample spike (MS/MSD) recovery not within control limits
		Gross alpha		TPU is 6.03. Rad error is 5.86.
		Gross beta	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 7.75. Rad error is 7.67.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.33. Rad error is 0.33.
		Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 2.31. Rad error is 2.29.
		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 0.489. Rad error is 0.488.
		Tritium	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 103. Rad error is 103.
8004-4806 MW392	MW392SG1-19	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 4.22. Rad error is 4.2.
		Gross beta	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 6.73. Rad error is 6.69.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.39. Rad error is 0.39.
		Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 1.46. Rad error is 1.46.
		Technetium-99	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 9.48. Rad error is 9.47.
		Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.381. Rad error is 0.38.
		Tritium	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 105. Rad error is 104.

RESIDENTIAL/INERT – QUARTERLY Finds/Unit: KY8-890-008-982 / 1

Facility: US DOE - Paducah Gaseous Diffusion Plant LAB ID:None

Permit Numbers: SW07300014, SW07300015, SW07300045 For Official Use Only

GROUNDWATER
WRITTEN COMMENTS

Monitoring Point	Facility Sample ID	Constituent	Flag	Description
8004-4807 MW393	MW393SG1-19	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 5.66. Rad error is 5.6.
		Gross beta		TPU is 7.48. Rad error is 7.22.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.285. Rad error is 0.285.
		Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 2.43. Rad error is 2.43.
		Technetium-99	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 11.5. Rad error is 11.5.
		Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.898. Rad error is 0.895.
		Tritium	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 105. Rad error is 104.
8004-4802 MW394	MW394SG1-19	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 6. Rad error is 5.88.
		Gross beta	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 7.96. Rad error is 7.74.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.413. Rad error is 0.413.
		Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 1.68. Rad error is 1.68.
		Technetium-99	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 11.1. Rad error is 11.
		Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.596. Rad error is 0.595.
		Tritium	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 159. Rad error is 159.
8004-4801 MW395	MW395SG1-19	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 3.46. Rad error is 3.46.
		Gross beta	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 6.9. Rad error is 6.73.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.769. Rad error is 0.768.
		Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 2.61. Rad error is 2.61.
		Technetium-99	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 10.7. Rad error is 10.6.
		Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.675. Rad error is 0.674.
		Tritium	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 156. Rad error is 156.

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Facility: US DOE - Paducah Gaseous Diffusion Plant LAB ID:None

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Monitoring Point	Facility Sample ID	Constituent	Flag	Description
8004-4803 MW396	MW396SG1-19	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 4.83. Rad error is 4.82.
		Gross beta	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 6.6. Rad error is 6.55.
		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 2.76. Rad error is 2.74.
		Technetium-99	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 10.5. Rad error is 10.5.
		Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.703. Rad error is 0.699.
		Tritium	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 102. Rad error is 102.
8004-4817 MW397	MW397SG1-19	Nitrate & Nitrite	H	Analysis performed outside holding time requirement
		Total Dissolved Solids	*	Duplicate analysis not within control limits.
		Tantalum	N	Sample spike (MS/MSD) recovery not within control limits
		1,1,1,2-Tetrachloroethane	Y1	MS/MSD recovery outside acceptance criteria
		Gross alpha	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 6.08. Rad error is 6.07.
		Gross beta	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 5.64. Rad error is 5.58.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.475. Rad error is 0.472.
		Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 3.94. Rad error is 3.93.
		Technetium-99		TPU is 8.44. Rad error is 8.2.
		Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.664. Rad error is 0.662.
		Tritium	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 135. Rad error is 135.

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Facility: US DOE - Paducah Gaseous Diffusion Plant LAB ID:None

Permit Numbers: SW07300014, SW07300015, SW07300045 For Official Use Only

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WRITTEN COMMENTS

Monitoring Point	Facility Sample ID	Constituent	Flag	Description
0000-0000 QC	RI1SG1-19	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.
		1,1,1,2-Tetrachloroethane	Y1	MS/MSD recovery outside acceptance criteria
		Gross alpha		TPU is 6.37. Rad error is 6.12.
		Gross beta	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 5.21. Rad error is 5.21.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.3. Rad error is 0.298.
		Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 2.09. Rad error is 2.09.
		Technetium-99	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 8.81. Rad error is 8.78.
		Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.629. Rad error is 0.627.
		Tritium	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 125. Rad error is 125.
		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.

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Facility: US DOE - Paducah Gaseous Diffusion Plant LAB ID:None

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WRITTEN COMMENTS

Monitoring Point	Facility Sample ID	Constituent	Flag	Description
0000-0000 QC	FB1SG1-19	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.
		1,1,1,2-Tetrachloroethane	Y1	MS/MSD recovery outside acceptance criteria
		Gross alpha	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 4.97. Rad error is 4.91.
		Gross beta	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 4.09. Rad error is 4.09.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.472. Rad error is 0.445.
		Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 3.44. Rad error is 3.44.
		Technetium-99	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 7.66. Rad error is 7.66.
		Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.998. Rad error is 0.984.
		Tritium	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 142. Rad error is 142.
		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.

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Facility: US DOE - Paducah Gaseous Diffusion Plant LAB ID:None

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Monitoring Point	Facility Sample ID	Constituent	Flag	Description
0000-0000 QC	TB1SG1-19	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.

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Facility: US DOE - Paducah Gaseous Diffusion Plant LAB ID:None

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WRITTEN COMMENTS

Monitoring Point	Facility Sample ID	Constituent	Flag	Description
0000-0000 QC	TB1SG1-19	Vanadium		Analysis of constituent not required and not performed.
		Zinc		Analysis of constituent not required and not performed.
		1,1,1,2-Tetrachloroethane	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.

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Facility: US DOE - Paducah Gaseous Diffusion Plant LAB ID:None

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WRITTEN COMMENTS

Monitoring Point	Facility Sample ID	Constituent	Flag	Description
0000-0000 QC	TB2SG1-19	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.

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Facility: US DOE - Paducah Gaseous Diffusion Plant LAB ID:None

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Monitoring Point	Facility Sample ID	Constituent	Flag	Description
0000-0000 QC	TB2SG1-19	Vanadium		Analysis of constituent not required and not performed.
		Zinc		Analysis of constituent not required and not performed.
		1,1,1,2-Tetrachloroethane	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.

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Monitoring Point	Facility Sample ID	Constituent	Flag	Description
0000-0000 QC	TB3SG1-19	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.

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Monitoring Point	Facility Sample ID	Constituent	Flag	Description
0000-0000 QC	TB3SG1-19	Vanadium		Analysis of constituent not required and not performed.
		Zinc		Analysis of constituent not required and not performed.
		PCB, Total		Analysis of constituent not required and not performed.
		PCB-1016		Analysis of constituent not required and not performed.
		PCB-1221		Analysis of constituent not required and not performed.
		PCB-1232		Analysis of constituent not required and not performed.
		PCB-1242		Analysis of constituent not required and not performed.
		PCB-1248		Analysis of constituent not required and not performed.
		PCB-1254		Analysis of constituent not required and not performed.
		PCB-1260		Analysis of constituent not required and not performed.
		PCB-1268		Analysis of constituent not required and not performed.
		Gross alpha		Analysis of constituent not required and not performed.
		Gross beta		Analysis of constituent not required and not performed.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226		Analysis of constituent not required and not performed.
		Strontium-90		Analysis of constituent not required and not performed.
		Technetium-99		Analysis of constituent not required and not performed.
		Thorium-230		Analysis of constituent not required and not performed.
		Tritium		Analysis of constituent not required and not performed.
		Chemical Oxygen Demand		Analysis of constituent not required and not performed.
		Cyanide		Analysis of constituent not required and not performed.
		Iodide		Analysis of constituent not required and not performed.
		Total Organic Carbon		Analysis of constituent not required and not performed.
		Total Organic Halides		Analysis of constituent not required and not performed.
8004-4804 MW386	MW386DSG1-19	Nitrate & Nitrite	H	Analysis performed outside holding time requirement
		Total Dissolved Solids	*	Duplicate analysis not within control limits.
		Tantalum	N	Sample spike (MS/MSD) recovery not within control limits
		1,1,1,2-Tetrachloroethane	Y1	MS/MSD recovery outside acceptance criteria
		Gross alpha	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 5.82. Rad error is 5.82.
		Gross beta	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 4.06. Rad error is 4.06.
		Iodine-131		Analysis of constituent not required and not performed.
		Radium-226	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.488. Rad error is 0.483.
		Strontium-90	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 3.5. Rad error is 3.5.
		Technetium-99	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 7.89. Rad error is 7.88.
		Thorium-230	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 0.503. Rad error is 0.502.
		Tritium	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 122. Rad error is 122.

APPENDIX D

STATISTICAL ANALYSES AND QUALIFICATION STATEMENT

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GROUNDWATER STATISTICAL COMMENTS

Introduction

The statistical analyses conducted on the fourth quarter 2018 groundwater data collected from the C-746-S&T Landfills monitoring wells (MWs) were performed in accordance with Permit GSTR0003, Standard Requirement 3, using the U.S. Environmental Protection Agency (EPA) guidance document, *EPA Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Interim Final Guidance* (1989).

The statistical evaluation was conducted separately for the three groundwater systems: the Upper Continental Recharge System (UCRS), the Upper Regional Gravel Aquifer (URGA), and the Lower Regional Gravel Aquifer (LRGA). For each groundwater system, data from wells considered to represent background conditions were compared with test wells (downgradient or sidegradient wells) (Exhibit D.1). The fourth quarter 2018 data used to conduct the statistical analyses were collected in October 2018. The statistical analyses for this report first used data from the first eight quarters that had been sampled for each parameter to develop the historical background value, beginning with the first two baseline sampling events in 2002, when available. Then a second set of statistical analyses was run on analytes that had at least one downgradient well that exceeded the historical background, using the last eight quarters. The sampling dates associated with both the historical and the current background data are listed next to the result in the statistical analysis sheets of this appendix.

Statistical Analysis Process

Constituents of concern that have Kentucky maximum contaminant levels (MCLs) and results that do not exceed their respective MCL are not included in the statistical evaluation. Parameters that have MCLs can be found in 401 *KAR* 47:030 § 6. For parameters with no established MCL and for those parameters that exceed their MCLs, the most recent results are compared to historical background concentrations, as follows: the data are divided into censored and uncensored observations. The one-sided tolerance interval statistical test is conducted only on parameters that have at least one uncensored (detected) observation. The current result is compared to the results of the one-sided tolerance interval statistical test to determine if the current data exceed the historical background concentration calculated using the first eight quarters of data.

For the statistical analysis of pH, a two-sided tolerance interval statistical test is conducted for pH. The test well results are compared to both an upper and lower tolerance limit (TL) to determine if statistically significant deviations in concentrations exist with respect to upgradient (background) well data from the first eight quarters. The tolerance interval statistical analysis is conducted separately for each parameter in each well (no pooling of downgradient data).

Statistical analyses are performed on the first eight quarters of historical background data, not on the data for the current quarter. Once a statistical result is obtained using the background data, the result for the current quarter is compared to that value. If the value is exceeded, the well is considered to have an exceedance of the statistically derived historical background concentration.

Exhibit D.1. Station Identification for Monitoring Wells Analyzed

Station	Type	Groundwater Unit
MW220	BG	URGA
MW221	SG	URGA
MW222	SG	URGA
MW223	SG	URGA
MW224	SG	URGA
MW369	TW	URGA
MW370	TW	LRGA
MW372	TW	URGA
MW373	TW	LRGA
MW384	SG	URGA
MW385	SG	LRGA
MW386[1]	SG	UCRS
MW387	TW	URGA
MW388	TW	LRGA
MW389[1]*	TW	UCRS
MW390[1]	TW	UCRS
MW391	TW	URGA
MW392	TW	LRGA
MW393[1]	TW	UCRS
MW394	BG	URGA
MW395	BG	LRGA
MW396[1]	BG	UCRS
MW397	BG	LRGA

[1]**NOTE:** The gradients in UCRS wells are downward. The UCRS wells identified as up-, side- or downgradient are those wells located in the same general direction as the RGA wells considered to be up-, side-, or downgradient.
BG: upgradient or background wells
TW: downgradient or test wells
SG: sidegradient wells
***** Well was dry this quarter and a groundwater sample could not be collected.

For those parameters that are determined to exceed the historical background concentration, a second one-sided tolerance interval statistical test, or a two-sided tolerance interval statistical test in the case of pH, is conducted. The second one-sided tolerance interval statistical test is conducted to determine whether the current concentration in downgradient wells exceeds the current background, as determined by a comparison against the statistically derived upper TL using the most recent eight quarters of data for the relevant background wells. The tolerance interval statistical analysis is conducted separately for each parameter in each well (no pooling of downgradient data).

For the statistical analysis of pH, a two-sided tolerance interval statistical test is conducted, if required. The test well pH results are compared to both an upper and lower TL to determine if the current pH is different from the current background level to a statistically significant level. Statistical analyses are performed on the last eight quarters of current background data, not on the data for the current quarter. Once a statistical result is obtained using the background data, the result for the current quarter is compared to that value. If the value is exceeded, the well has a statistically significant difference in concentration compared to the current background concentration.

A stepwise list of the one-sided tolerance interval statistical procedure applied to the data is summarized below.[1]

1. The TL is calculated for the background data (first using the first eight quarters, then using the last eight quarters).

    - For each parameter, the background data are used to establish a baseline. On this data set, the mean (X) and the standard deviation (S) are computed.

    - The data set is checked for normality using coefficient of variation (CV). If CV $\leq$ 1.0, then the data are assumed to be normally distributed. Data sets with CV > 1.0 are assumed to be log-normally distributed; for data sets with CV > 1.0, the data are log-transformed and analyzed.

    - The factor (K) for one-sided upper TL with 95% minimum coverage is determined (Table 5, Appendix B; *EPA Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Interim Final Guidance*, 1989) based on the number of background data points.

    - The one-sided upper TL is calculated using the following equation:

      $TL = X + (K \times S)$

2. Each observation from downgradient wells is compared to the calculated one-sided upper TL in Step 1. If an observation value exceeds the TL, then there is statistically significant evidence that the well concentration exceeds the historical background.

Type of Data Used

Exhibit D.1 presents the upgradient or background wells (identified as "BG"), the downgradient or test wells (identified as "TW"), and the sidegradient wells (identified as "SG") for the C-746-S&T Residential and Inert Landfills. Exhibit D.2 presents the parameters from the available data set for which a statistical test was performed using the one-sided tolerance interval.

Exhibits D.3, D.4, and D.5 list the number of analyses (observations), nondetects (censored observations), and detects (uncensored observations) by parameter in the UCRS, the URGA, and the LRGA, respectively. Those parameters displayed with bold-face type indicate the one-sided tolerance interval statistical test was performed. The data presented in Exhibits D.3, D.4, and D.5 were collected during the current quarter, fourth quarter 2018. The observations are representative of the current quarter data. Historical background data are presented in Attachment D1. The sampling dates associated with background data are listed next to the result in Attachment D1. When field duplicate data are available, the higher of the two readings is retained for further evaluation. When a data point has been rejected following data validation, this result is not used, and the next available data point is used for the background or current quarter data. A result has been considered a nondetect if it has a "U" validation code.

[1] For pH, two-sided TLs (upper and lower) were calculated with an adjusted K factor using the following equations:
upper TL = $X + (K \times S)$
lower TL = $X - (K \times S)$

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

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

*****For pH, the test well results were compared to both an upper and lower TL to determine if the current result differs to a statistically significant degree from the historical background values.

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

Parameters	Observations	Censored Observation	Uncensored Observation	Statistical Analysis?
1,1,1,2-Tetrachloroethane	4	4	0	No
1,1,2,2-Tetrachloroethane	4	4	0	No
1,1,2-Trichloroethane	4	4	0	No
1,1-Dichloroethane	4	4	0	No
1,2,3-Trichloropropane	4	4	0	No
1,2-Dibromo-3-chloropropane	4	4	0	No
1,2-Dibromoethane	4	4	0	No
1,2-Dichlorobenzene	4	4	0	No
1,2-Dichloropropane	4	4	0	No
2-Butanone	4	4	0	No
2-Hexanone	4	4	0	No
4-Methyl-2-pentanone	4	4	0	No
Acetone	4	4	0	No
Acrolein	4	4	0	No
Acrylonitrile	4	4	0	No
Aluminum	**4**	**2**	**2**	**Yes**
Antimony	4	4	0	No
Beryllium	4	4	0	No
Boron	**4**	**0**	**4**	**Yes**
Bromide	**4**	**0**	**4**	**Yes**
Bromochloromethane	4	4	0	No
Bromodichloromethane	4	4	0	No
Bromoform	4	4	0	No
Bromomethane	4	4	0	No
Calcium	**4**	**0**	**4**	**Yes**
Carbon disulfide	4	4	0	No
Chemical Oxygen Demand (COD)	**4**	**1**	**3**	**Yes**
Chloride	**4**	**0**	**4**	**Yes**
Chlorobenzene	4	4	0	No
Chloroethane	4	4	0	No
Chloroform	4	4	0	No
Chloromethane	4	4	0	No
cis-1,2-Dichloroethene	4	4	0	No
cis-1,3-Dichloropropene	4	4	0	No
Cobalt	**4**	**2**	**2**	**Yes**
Conductivity	**4**	**0**	**4**	**Yes**
Copper	**4**	**0**	**4**	**Yes**
Cyanide	4	4	0	No
Dibromochloromethane	4	4	0	No
Dibromomethane	4	4	0	No
Dimethylbenzene, Total	4	4	0	No
Dissolved Oxygen	**4**	**0**	**4**	**Yes**
Dissolved Solids	**4**	**0**	**4**	**Yes**
Ethylbenzene	4	4	0	No
Iodide	**4**	**2**	**2**	**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**	**1**	**3**	**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
PCB-1268	4	4	0	No
pH	**4**	**0**	**4**	**Yes**
Potassium	**4**	**0**	**4**	**Yes**
Radium-226	**4**	**3**	**1**	**Yes**
Rhodium	4	4	0	No
Sodium	**4**	**0**	**4**	**Yes**
Styrene	4	4	0	No
Sulfate	**4**	**0**	**4**	**Yes**
Tantalum	4	4	0	No
Technetium-99	**4**	**3**	**1**	**Yes**
Tetrachloroethene	4	4	0	No
Thallium	4	4	0	No
Thorium-230	4	4	0	No
Toluene	4	4	0	No
Total Organic Carbon (TOC)	**4**	**0**	**4**	**Yes**
Total Organic Halides (TOX)	**4**	**0**	**4**	**Yes**
trans-1,2-Dichloroethene	4	4	0	No
trans-1,3-Dichloropropene	4	4	0	No
trans-1,4-Dichloro-2-Butene	4	4	0	No
Trichlorofluoromethane	4	4	0	No
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**	**10**	**1**	**Yes**
Acrolein	11	11	0	No
Acrylonitrile	11	11	0	No
Aluminum	**11**	**8**	**3**	**Yes**
Antimony	11	11	0	No
Beryllium	11	11	0	No
Beta activity	**11**	**4**	**7**	**Yes**
Boron	**11**	**0**	**11**	**Yes**
Bromide	**11**	**0**	**11**	**Yes**
Bromochloromethane	11	11	0	No
Bromodichloromethane	11	11	0	No
Bromoform	11	11	0	No
Bromomethane	11	11	0	No
Calcium	**11**	**0**	**11**	**Yes**
Carbon disulfide	11	11	0	No
Chemical Oxygen Demand (COD)	**11**	**3**	**8**	**Yes**
Chloride	**11**	**0**	**11**	**Yes**
Chlorobenzene	11	11	0	No
Chloroethane	11	11	0	No
Chloroform	11	11	0	No
Chloromethane	11	11	0	No
cis-1,2-Dichloroethene	**11**	**10**	**1**	**Yes**
cis-1,3-Dichloropropene	11	11	0	No
Cobalt	**11**	**6**	**5**	**Yes**
Conductivity	**11**	**0**	**11**	**Yes**
Copper	**11**	**0**	**11**	**Yes**
Cyanide	11	11	0	No
Dibromochloromethane	11	11	0	No
Dibromomethane	11	11	0	No
Dimethylbenzene, Total	11	11	0	No
Dissolved Oxygen	**11**	**0**	**11**	**Yes**
Dissolved Solids	**11**	**0**	**11**	**Yes**
Ethylbenzene	11	11	0	No

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

Parameters	Observations	Censored Observation	Uncensored Observation	Statistical Analysis?
Iodide	11	11	0	No
Iodomethane	11	11	0	No
Iron	**11**	**5**	**6**	**Yes**
Magnesium	**11**	**0**	**11**	**Yes**
Manganese	**11**	**1**	**10**	**Yes**
Methylene chloride	11	11	0	No
Molybdenum	**11**	**5**	**6**	**Yes**
Nickel	**11**	**0**	**11**	**Yes**
Oxidation-Reduction Potential	**11**	**0**	**11**	**Yes**
PCB, Total	11	11	0	No
PCB-1016	11	11	0	No
PCB-1221	11	11	0	No
PCB-1232	11	11	0	No
PCB-1242	11	11	0	No
PCB-1248	11	11	0	No
PCB-1254	11	11	0	No
PCB-1260	11	11	0	No
PCB-1268	11	11	0	No
pH	**11**	**0**	**11**	**Yes**
Potassium	**11**	**0**	**11**	**Yes**
Radium-226	**11**	**10**	**1**	**Yes**
Rhodium	11	11	0	No
Sodium	**11**	**0**	**11**	**Yes**
Styrene	11	11	0	No
Sulfate	**11**	**0**	**11**	**Yes**
Tantalum	11	11	0	No
Technetium-99	**11**	**6**	**5**	**Yes**
Tetrachloroethene	11	11	0	No
Thallium	11	11	0	No
Thorium-230	11	11	0	No
Toluene	11	11	0	No
Total Organic Carbon (TOC)	**11**	**0**	**11**	**Yes**
Total Organic Halides (TOX)	**11**	**1**	**10**	**Yes**
trans-1,2-Dichloroethene	11	11	0	No
trans-1,3-Dichloropropene	11	11	0	No
trans-1,4-Dichloro-2-Butene	11	11	0	No
Trichloroethene	**11**	**5**	**6**	**Yes**
Trichlorofluoromethane	11	11	0	No
Vanadium	**11**	**8**	**3**	**Yes**
Vinyl Acetate	11	11	0	No
Zinc	**11**	**5**	**6**	**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**	**4**	**3**	**Yes**
Antimony	7	7	0	No
Beryllium	7	7	0	No
Beta activity	**7**	**3**	**4**	**Yes**
Boron	**7**	**0**	**7**	**Yes**
Bromide	**7**	**0**	**7**	**Yes**
Bromochloromethane	7	7	0	No
Bromodichloromethane	7	7	0	No
Bromoform	7	7	0	No
Bromomethane	7	7	0	No
Calcium	**7**	**0**	**7**	**Yes**
Carbon disulfide	7	7	0	No
Chemical Oxygen Demand (COD)	**7**	**2**	**5**	**Yes**
Chloride	**7**	**0**	**7**	**Yes**
Chlorobenzene	7	7	0	No
Chloroethane	7	7	0	No
Chloroform	7	7	0	No
Chloromethane	7	7	0	No
cis-1,2-Dichloroethene	**7**	**6**	**1**	**Yes**
cis-1,3-Dichloropropene	7	7	0	No
Cobalt	**7**	**6**	**1**	**Yes**
Conductivity	**7**	**0**	**7**	**Yes**
Copper	**7**	**0**	**7**	**Yes**
Cyanide	7	7	0	No
Dibromochloromethane	7	7	0	No
Dibromomethane	7	7	0	No
Dimethylbenzene, Total	7	7	0	No
Dissolved Oxygen	**7**	**0**	**7**	**Yes**
Dissolved Solids	**7**	**0**	**7**	**Yes**
Ethylbenzene	7	7	0	No
Iodide	7	7	0	No
Iodomethane	7	7	0	No
Iron	**7**	**2**	**5**	**Yes**

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

Parameters	Observations	Censored Observation	Uncensored Observation	Statistical Analysis?
Magnesium	**7**	**0**	**7**	**Yes**
Manganese	**7**	**1**	**6**	**Yes**
Methylene chloride	7	7	0	No
Molybdenum	**7**	**4**	**3**	**Yes**
Nickel	**7**	**0**	**7**	**Yes**
Oxidation-Reduction Potential	**7**	**0**	**7**	**Yes**
PCB, Total	7	7	0	No
PCB-1016	7	7	0	No
PCB-1221	7	7	0	No
PCB-1232	7	7	0	No
PCB-1242	7	7	0	No
PCB-1248	7	7	0	No
PCB-1254	7	7	0	No
PCB-1260	7	7	0	No
PCB-1268	7	7	0	No
pH	**7**	**0**	**7**	**Yes**
Potassium	**7**	**0**	**7**	**Yes**
Radium-226	**7**	**6**	**1**	**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**	**1**	**6**	**Yes**
trans-1,2-Dichloroethene	7	7	0	No
trans-1,3-Dichloropropene	7	7	0	No
trans-1,4-Dichloro-2-Butene	7	7	0	No
Trichloroethene	**7**	**2**	**5**	**Yes**
Trichlorofluoromethane	7	7	0	No
Vanadium	**7**	**2**	**5**	**Yes**
Vinyl Acetate	7	7	0	No
Zinc	**7**	**2**	**5**	**Yes**

Bold denotes parameters with at least one uncensored observation.

Discussion of Results from Historical Background Comparison

For the UCRS, URGA, and LRGA, the concentrations of this quarter were compared to the results of the one-sided 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 28, 31, 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 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 (COD), conductivity, dissolved solids, magnesium, oxidation-reduction potential, radium-226, sulfate, and technetium-99.

Statistical Summary

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

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

UCRS	URGA	LRGA
MW386: Oxidation-reduction potential	**MW220:** Oxidation-reduction potential	**MW370:** Beta activity, oxidation-reduction potential, sulfate, technetium-99
MW390: Oxidation-reduction potential, technetium-99	**MW221:** Oxidation-reduction potential	**MW373:** Calcium, conductivity, dissolved solids, magnesium, oxidation-reduction potential, sulfate
MW393: Oxidation-reduction potential	**MW369:** Technetium-99	**MW385:** Oxidation-reduction potential, radium-226, sulfate, technetium-99
MW396: Oxidation-reduction potential	**MW372:** Beta activity, calcium, dissolved solids, magnesium, sulfate, technetium-99	**MW388:** Beta activity, oxidation-reduction potential, sulfate, technetium-99
	MW384: Beta activity, oxidation-reduction potential, sulfate, technetium-99	**MW392:** Oxidation-reduction potential
	MW387: Beta activity, magnesium, oxidation-reduction potential, radium-226, sulfate, technetium-99	**MW397:** Chemical oxygen demand (COD), oxidation-reduction potential
	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.
Chemical Oxygen Demand (COD)	Tolerance Interval	0.02	No exceedance of statistically derived historical background concentration.
Chloride	Tolerance Interval	0.05	No exceedance of statistically derived historical background concentration.
Cobalt	Tolerance Interval	1.34	No exceedance of statistically derived historical background concentration.
Conductivity	Tolerance Interval	0.12	No exceedance of statistically derived historical background concentration.
Copper	Tolerance Interval	0.48	No exceedance of statistically derived historical background concentration.
Dissolved Oxygen	Tolerance Interval	1.20	No exceedance of statistically derived historical background concentration.
Dissolved Solids	Tolerance Interval	0.19	No exceedance of statistically derived historical background concentration.
Iodide	Tolerance Interval	0.13	No exceedance of statistically derived historical background concentration.
Iron	Tolerance Interval	0.48	No exceedance of statistically derived historical background concentration.
Magnesium	Tolerance Interval	0.20	No exceedance of statistically derived historical background concentration.

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

Parameter	Performed Test	CV Normality Test*	Results of Tolerance Interval Test Conducted
Manganese	Tolerance Interval	0.46	No exceedance of statistically derived historical background concentration.
Molybdenum	Tolerance Interval	1.51	No exceedance of statistically derived historical background concentration.
Nickel	Tolerance Interval	1.27	No exceedance of statistically derived historical background concentration.
Oxidation-Reduction Potential	Tolerance Interval	4.77	Current results exceed statistically derived historical background concentration in MW386, MW390, MW393, and MW396.
pH	Tolerance Interval	0.05	No exceedance of statistically derived historical background concentration.
Potassium	Tolerance Interval	0.28	No exceedance of statistically derived historical background concentration.
Radium-226	Tolerance Interval	1.78	No exceedance of statistically derived historical background concentration.
Sodium	Tolerance Interval	0.30	No exceedance of statistically derived historical background concentration.
Sulfate	Tolerance Interval	0.40	No exceedance of statistically derived historical background concentration.
Technetium-99	Tolerance Interval	0.86	Current results exceed statistically derived historical background concentration in MW390.
Total Organic Carbon (TOC)	Tolerance Interval	0.47	No exceedance of statistically derived historical background concentration.
Total Organic Halides (TOX)	Tolerance Interval	0.38	No exceedance of statistically derived historical background concentration.
Vanadium	Tolerance Interval	0.11	No exceedance of statistically derived historical background concentration.
Zinc	Tolerance Interval	0.79	No exceedance of statistically derived historical background concentration.

CV: coefficient of variation
*If CV > 1.0, used log-transformed data.

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

Parameter	Performed Test	CV Normality Test*	Results of Tolerance Interval Test Conducted
Acetone	Tolerance Interval	0.10	No exceedance of statistically derived historical background concentration.
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 concentrations in MW372, 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 concentrations 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.
cis-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, MW387, and MW391.

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

Parameter	Performed Test	CV Normality Test*	Results of Tolerance Interval Test Conducted
Manganese	Tolerance Interval	2.16	No exceedance of statistically derived historical background concentration.
Molybdenum	Tolerance Interval	1.26	No exceedance of statistically derived historical background concentration.
Nickel	Tolerance Interval	1.79	No exceedance of statistically derived historical background concentration.
Oxidation-Reduction Potential	Tolerance Interval	0.48	Current results exceed statistically derived historical background concentration in MW220, MW221, MW384, and MW387.
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 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 MW372, MW384, MW387, and MW391.
Technetium-99	Tolerance Interval	0.99	Current results exceed statistically derived historical background concentration in MW369, MW372, MW384, and MW387.
Total Organic Carbon (TOC)	Tolerance Interval	0.49	No exceedance of statistically derived historical background concentration.
Total Organic Halides (TOX)	Tolerance Interval	2.57	No exceedance of statistically derived historical background concentration.
Trichloroethene[1]	Tolerance Interval	0.95	No exceedance of statistically derived historical background concentration.
Vanadium	Tolerance Interval	0.08	No exceedance of statistically derived historical background concentration.
Zinc	Tolerance Interval	0.72	No exceedance of statistically derived historical background concentration.

CV: coefficient of variation
* If CV > 1.0, used log-transformed data.
[1] Tolerance interval was calculated based on an MCL exceedance.

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

Parameter	Performed Test	CV Normality Test*	Results of Tolerance Interval Test Conducted
Aluminum	Tolerance Interval	0.86	No exceedance of statistically derived historical background concentration.
Beta Activity[1]	Tolerance Interval	0.36	Current results exceed statistically derived historical background concentration in MW370 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 (COD)	Tolerance Interval	0.04	Current results exceed statistically derived historical background concentration in MW397.
Chloride	Tolerance Interval	0.22	No exceedance of statistically derived historical background concentration.
cis-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.

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
Manganese	Tolerance Interval	1.49	No exceedance of statistically derived historical background concentration.
Molybdenum	Tolerance Interval	1.45	No exceedance of statistically derived historical background concentration.
Nickel	Tolerance Interval	1.09	No exceedance of statistically derived historical background concentration.
Oxidation-Reduction Potential	Tolerance Interval	0.33	Current results exceed statistically derived historical background concentration in MW370, MW373, MW385, MW388, MW392, and MW397.
pH	Tolerance Interval	0.04	No exceedance of statistically derived historical background concentration.
Potassium	Tolerance Interval	0.40	No exceedance of statistically derived historical background concentration.
Radium-226	Tolerance Interval	10.74	Current results exceed statistically derived historical background concentration in MW385.
Sodium	Tolerance Interval	0.47	No exceedance of statistically derived historical background concentration.
Sulfate	Tolerance Interval	0.20	Current results exceed statistically derived historical background concentration in MW370, MW373, MW385, and MW388.
Technetium-99	Tolerance Interval	0.80	Current results exceed statistically derived historical background concentration in MW370, MW385, and MW388.
Total Organic Carbon (TOC)	Tolerance Interval	0.55	No exceedance of statistically derived historical background concentration.
Total Organic Halides (TOX)	Tolerance Interval	0.59	No exceedance of statistically derived historical background concentration.
Trichloroethene[1]	Tolerance Interval	0.78	No exceedance of statistically derived historical background concentration.
Vanadium	Tolerance Interval	0.11	No exceedance of statistically derived historical background concentration.
Zinc	Tolerance Interval	0.76	No exceedance of statistically derived historical background concentration.

CV: coefficient of variation
*If CV > 1.0, used log-transformed data.
[1] Tolerance interval was calculated based on an MCL exceedance.

Discussion of Results from Current Background Comparison

For concentrations in wells in the UCRS, URGA, and LRGA that exceeded the TL test using historical background, the concentrations were compared to the one-sided TL calculated using the most recent eight quarters of data and are presented in Attachment D2. The statistician qualification statement is presented in Attachment D3. For the UCRS, URGA, and LRGA, the test was applied to 2, 8, and 10 parameters, respectively, because these parameter concentrations exceeded the historical background TL.

For downgradient wells only, a summary of instances where concentrations exceeded the TL calculated using current background data is shown in Exhibit D.10.

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

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

UCRS

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

URGA

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

Statistical Summary

Summaries of the statistical tests conducted on data obtained from wells in the UCRS, the URGA, and the LRGA are presented in Exhibit D.11, Exhibit D.12, and Exhibit D.13, respectively.

Exhibit D.11. Test Summaries for Qualified Parameters for Current Background—UCRS

Parameter	Performed Test	CV Normality Test*	Results of Tolerance Interval Test Conducted
Oxidation-Reduction Potential	Tolerance Interval	0.24	None of the test wells exceeded the upper TL, which is evidence that concentrations in these wells are not different from current background concentrations to a statistically significant level.
Technetium-99	Tolerance Interval	-2.12	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	0.78	MW372, MW384, and MW387 exceeded the upper TL, which is evidence of elevated concentration with respect to current background data.
Calcium	Tolerance Interval	0.14	MW372 exceeded the upper TL, which is evidence of elevated concentration with respect to current background data.
Dissolved Solids	Tolerance Interval	0.33	None of the test wells exceeded the upper TL, which is evidence that concentrations in these wells are not different from current background concentrations to a statistically significant level.
Magnesium	Tolerance Interval	0.14	MW372, MW387, and MW391 exceeded the upper TL, which is evidence of elevated concentration with respect to current background data.
Oxidation-Reduction Potential	Tolerance Interval	0.14	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	0.98	MW387 exceeded the upper TL, which is evidence of elevated concentration with respect to current background data.
Sulfate	Tolerance Interval	0.35	MW372, MW387, and MW391 exceeded the upper TL, which is evidence of elevated concentration with respect to current background data.
Technetium-99	Tolerance Interval	0.63	MW369, MW372, 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	0.44	MW370 and MW388 exceeded the upper TL, which is evidence of elevated concentration with respect to current background data.
Calcium	Tolerance Interval	0.19	MW373 exceeded the upper TL, which is evidence of elevated concentration with respect to current background data.
Chemical Oxygen Demand (COD)	Tolerance Interval	0.47	MW397 exceeded the upper TL, which is evidence of elevated concentration with respect to current background data.
Conductivity	Tolerance Interval	0.09	MW373 exceeded the upper TL, which is evidence of elevated concentration with respect to current background data.
Dissolved Solids	Tolerance Interval	0.17	MW373 exceeded the upper TL, which is evidence of elevated concentration with respect to current background data.
Magnesium	Tolerance Interval	0.19	MW373 exceeded the upper TL, which is evidence of elevated concentration with respect to current background data.
Oxidation-Reduction Potential	Tolerance Interval	0.20	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	0.57	MW385 exceeded the upper TL, which is evidence of elevated concentration with respect to current background data.
Sulfate	Tolerance Interval	0.06	MW370, MW373, MW385, and MW388 exceeded the upper TL, which is evidence of elevated concentration with respect to current background data.
Technetium-99	Tolerance Interval	0.53	MW370, MW385, and MW388 exceeded the upper TL, which is evidence of elevated concentration with respect to current background data.

CV: coefficient of variation
* If CV > 1.0, used log-transformed data.

ATTACHMENT D1

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

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

Aluminum UNITS: mg/L UCRS

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

Statistics-Background Data	**X=** 0.320	**S=** 0.182	**CV(1)=** 0.567	**K factor**=** 3.188	**TL(1)=** 0.900	**LL(1)=**N/A
Statistics-Transformed Background Data	**X=** -1.259	**S=** 0.503	**CV(2)=** -0.400	**K factor**=** 3.188	**TL(2)=** 0.345	**LL(2)=**N/A

Historical Background Data from Upgradient Wells with Transformed Result

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

Dry/Partially Dry Wells

Well No.	Gradient
MW389	Downgradient

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

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW386	Sidegradient	No	0.05	N/A	-2.996	N/A
MW390	Downgradient	Yes	0.0967	NO	-2.336	N/A
MW393	Downgradient	Yes	0.0298	NO	-3.513	N/A
MW396	Upgradient	No	0.05	N/A	-2.996	N/A

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

Conclusion of Statistical Analysis on Historical Data

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

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

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

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

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

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

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

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Boron **UNITS: mg/L** **UCRS**

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

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

Historical Background Data from Upgradient Wells with Transformed Result

Well Number:	MW396	
Date Collected	Result	LN(Result)
8/13/2002	2	0.693
9/16/2002	2	0.693
10/16/2002	0.2	-1.609
1/13/2003	0.2	-1.609
4/8/2003	0.2	-1.609
7/16/2003	0.2	-1.609
10/14/2003	0.2	-1.609
1/14/2004	0.2	-1.609

Dry/Partially Dry Wells

Well No.	Gradient
MW389	Downgradient

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

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW386	Sidegradient	Yes	0.00526	N/A	-5.248	NO
MW390	Downgradient	Yes	0.00975	N/A	-4.630	NO
MW393	Downgradient	Yes	0.0188	N/A	-3.974	NO
MW396	Upgradient	Yes	0.00827	N/A	-4.795	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.*

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

Bromide **UNITS: mg/L** **UCRS**

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

Statistics-Background Data	**X=** 1.388	**S=** 0.327	**CV(1)=** 0.236	**K factor**=** 3.188	**TL(1)=** 2.430	**LL(1)=** N/A
Statistics-Transformed Background Data	**X=** 0.301	**S=** 0.252	**CV(2)=** 0.838	**K factor**=** 3.188	**TL(2)=** 1.105	**LL(2)=** N/A

Historical Background Data from Upgradient Wells with Transformed Result

Well Number:	MW396	
Date Collected	Result	LN(Result)
8/13/2002	1.5	0.405
9/16/2002	1.6	0.470
10/16/2002	1.6	0.470
1/13/2003	1	0.000
4/8/2003	1	0.000
7/16/2003	1	0.000
10/14/2003	1.7	0.531
1/14/2004	1.7	0.531

Dry/Partially Dry Wells

Well No.	Gradient
MW389	Downgradient

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

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW386	Sidegradient	Yes	0.153	NO	-1.877	N/A
MW390	Downgradient	Yes	0.471	NO	-0.753	N/A
MW393	Downgradient	Yes	0.131	NO	-2.033	N/A
MW396	Upgradient	Yes	0.924	NO	-0.079	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.*

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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	23.3	NO	3.148	N/A
MW390	Downgradient	Yes	29.4	NO	3.381	N/A
MW393	Downgradient	Yes	11.8	NO	2.468	N/A
MW396	Upgradient	Yes	32.5	NO	3.481	N/A

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

Conclusion of Statistical Analysis on Historical Data

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

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

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

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

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

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

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

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

Chemical Oxygen Demand (COD) UNITS: mg/L UCRS

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

Statistics-Background Data	**X=** 35.375	**S=** 0.744	**CV(1)=** 0.021	**K factor**=** 3.188	**TL(1)=** 37.747	**LL(1)=**N/A
Statistics-Transformed Background Data	**X=** 3.566	**S=** 0.021	**CV(2)=** 0.006	**K factor**=** 3.188	**TL(2)=** 3.632	**LL(2)=**N/A

Historical Background Data from Upgradient Wells with Transformed Result

Well Number:	MW396	
Date Collected	Result	LN(Result)
8/13/2002	36	3.584
9/16/2002	35	3.555
10/16/2002	37	3.611
1/13/2003	35	3.555
4/8/2003	35	3.555
7/16/2003	35	3.555
10/14/2003	35	3.555
1/14/2004	35	3.555

Dry/Partially Dry Wells

Well No.	Gradient
MW389	Downgradient

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

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW386	Sidegradient	Yes	30.3	NO	3.411	N/A
MW390	Downgradient	Yes	23.3	NO	3.148	N/A
MW393	Downgradient	No	20	N/A	2.996	N/A
MW396	Upgradient	Yes	11.8	NO	2.468	N/A

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

Conclusion of Statistical Analysis on Historical Data

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

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

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

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

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

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

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

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

Chloride UNITS: mg/L UCRS

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

Statistics-Background Data	**X=** 101.725	**S=** 5.245	**CV(1)=** 0.052	**K factor**=** 3.188	**TL(1)=** 118.447	**LL(1)=** N/A
Statistics-Transformed Background Data	**X=** 4.621	**S=** 0.053	**CV(2)=** 0.011	**K factor**=** 3.188	**TL(2)=** 4.789	**LL(2)=** N/A

Historical Background Data from Upgradient Wells with Transformed Result

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

Dry/Partially Dry Wells

Well No.	Gradient
MW389	Downgradient

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

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW386	Sidegradient	Yes	14.4	NO	2.667	N/A
MW390	Downgradient	Yes	55.3	NO	4.013	N/A
MW393	Downgradient	Yes	13.2	NO	2.580	N/A
MW396	Upgradient	Yes	66	NO	4.190	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.*

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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	0.0149	N/A	-4.206	NO
MW390	Downgradient	No	0.001	N/A	-6.908	N/A
MW393	Downgradient	No	0.001	N/A	-6.908	N/A
MW396	Upgradient	Yes	0.00356	N/A	-5.638	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.*

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

Conductivity UNITS: umho/cm UCRS

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

Statistics-Background Data **X=** 922.500 **S=** 107.616 **CV(1)=** 0.117 **K factor**=** 3.188 **TL(1)=** 1265.579 **LL(1)=**N/A

Statistics-Transformed Background Data **X=** 6.822 **S=** 0.111 **CV(2)=** 0.016 **K factor**=** 3.188 **TL(2)=** 7.175 **LL(2)=**N/A

Historical Background Data from Upgradient Wells with Transformed Result

Well Number:	MW396	
Date Collected	Result	LN(Result)
8/13/2002	784	6.664
9/30/2002	871	6.770
10/16/2002	868	6.766
1/13/2003	912	6.816
4/8/2003	942	6.848
7/16/2003	910	6.813
10/14/2003	935	6.841
1/14/2004	1158	7.054

Dry/Partially Dry Wells

Well No.	Gradient
MW389	Downgradient

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

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW386	Sidegradient	Yes	606	NO	6.407	N/A
MW390	Downgradient	Yes	690	NO	6.537	N/A
MW393	Downgradient	Yes	404	NO	6.001	N/A
MW396	Upgradient	Yes	775	NO	6.653	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.*

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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	0.000681	NO	-7.292	N/A
MW390	Downgradient	Yes	0.00122	NO	-6.709	N/A
MW393	Downgradient	Yes	0.00126	NO	-6.677	N/A
MW396	Upgradient	Yes	0.00115	NO	-6.768	N/A

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

Conclusion of Statistical Analysis on Historical Data

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

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

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

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

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

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

** *Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities,Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-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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Dissolved Oxygen UNITS: mg/L UCRS

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

Statistics-Background Data	**X=** 1.395	**S=** 1.677	**CV(1)=** 1.202	**K factor**=** 3.188	**TL(1)=** 6.743	**LL(1)=**N/A
Statistics-Transformed Background Data	**X=** -0.043	**S=** 0.814	**CV(2)=** -18.867	**K factor**=** 3.188	**TL(2)=** 2.553	**LL(2)=**N/A

Historical Background Data from Upgradient Wells with Transformed Result

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

Dry/Partially Dry Wells

Well No.	Gradient
MW389	Downgradient

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

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW386	Sidegradient	Yes	2.54	N/A	0.932	NO
MW390	Downgradient	Yes	5.9	N/A	1.775	NO
MW393	Downgradient	Yes	4.3	N/A	1.459	NO
MW396	Upgradient	Yes	0.92	N/A	-0.083	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.*

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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	361	NO	5.889	N/A
MW390	Downgradient	Yes	359	NO	5.883	N/A
MW393	Downgradient	Yes	200	NO	5.298	N/A
MW396	Upgradient	Yes	404	NO	6.001	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.*

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Iodide UNITS: mg/L UCRS

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

Statistics-Background Data	**X=** 2.150	**S=** 0.283	**CV(1)=** 0.132	**K factor**=** 3.188	**TL(1)=** 3.052	**LL(1)=**N/A
Statistics-Transformed Background Data	**X=** 0.759	**S=** 0.123	**CV(2)=** 0.162	**K factor**=** 3.188	**TL(2)=** 1.150	**LL(2)=**N/A

Historical Background Data from Upgradient Wells with Transformed Result

Well Number:	MW396	
Date Collected	Result	LN(Result)
8/13/2002	2	0.693
9/16/2002	2	0.693
10/16/2002	2	0.693
1/13/2003	2	0.693
4/8/2003	2	0.693
7/16/2003	2.7	0.993
10/14/2003	2.5	0.916
1/14/2004	2	0.693

Dry/Partially Dry Wells

Well No.	Gradient
MW389	Downgradient

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

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW386	Sidegradient	Yes	0.168	NO	-1.784	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	0.682	NO	-0.383	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.*

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Iron UNITS: mg/L UCRS

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

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

Historical Background Data from Upgradient Wells with Transformed Result

Well Number:	MW396	
Date Collected	Result	LN(Result)
8/13/2002	1.8	0.588
9/16/2002	9.53	2.254
10/16/2002	7.43	2.006
1/13/2003	9.93	2.296
4/8/2003	10.2	2.322
7/16/2003	9.16	2.215
10/14/2003	11.9	2.477
1/14/2004	2.42	0.884

Dry/Partially Dry Wells

Well No.	Gradient
MW389	Downgradient

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

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW386	Sidegradient	Yes	0.938	NO	-0.064	N/A
MW390	Downgradient	Yes	0.0989	NO	-2.314	N/A
MW393	Downgradient	Yes	1.94	NO	0.663	N/A
MW396	Upgradient	Yes	2.2	NO	0.788	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.*

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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	9.99	NO	2.302	N/A
MW390	Downgradient	Yes	12.4	NO	2.518	N/A
MW393	Downgradient	Yes	3.52	NO	1.258	N/A
MW396	Upgradient	Yes	15	NO	2.708	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.*

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Manganese UNITS: mg/L UCRS

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

Statistics-Background Data	**X=** 0.774	**S=** 0.353	**CV(1)=** 0.456	**K factor**=** 3.188	**TL(1)=** 1.900	**LL(1)=**N/A
Statistics-Transformed Background Data	**X=** -0.566	**S=** 1.192	**CV(2)=** -2.105	**K factor**=** 3.188	**TL(2)=** 3.235	**LL(2)=**N/A

Historical Background Data from Upgradient Wells with Transformed Result

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

Dry/Partially Dry Wells

Well No.	Gradient
MW389	Downgradient

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

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW386	Sidegradient	Yes	1.88	NO	0.631	N/A
MW390	Downgradient	Yes	0.00156	NO	-6.463	N/A
MW393	Downgradient	Yes	0.046	NO	-3.079	N/A
MW396	Upgradient	Yes	0.528	NO	-0.639	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.*

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Molybdenum UNITS: mg/L UCRS

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

Statistics-Background Data	**X=** 0.007	**S=** 0.011	**CV(1)=** 1.507	**K factor**=** 3.188	**TL(1)=** 0.042	**LL(1)=**N/A
Statistics-Transformed Background Data	**X=** -5.928	**S=** 1.420	**CV(2)=** -0.240	**K factor**=** 3.188	**TL(2)=** -1.400	**LL(2)=**N/A

Historical Background Data from Upgradient Wells with Transformed Result

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

Dry/Partially Dry Wells

Well No.	Gradient
MW389	Downgradient

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

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW386	Sidegradient	Yes	0.000728	N/A	-7.225	NO
MW390	Downgradient	Yes	0.000875	N/A	-7.041	NO
MW393	Downgradient	No	0.0005	N/A	-7.601	N/A
MW396	Upgradient	Yes	0.00056	N/A	-7.488	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.*

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Nickel UNITS: mg/L UCRS

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

Statistics-Background Data	**X=** 0.016	**S=** 0.021	**CV(1)=** 1.272	**K factor**=** 3.188	**TL(1)=** 0.083	**LL(1)=**N/A
Statistics-Transformed Background Data	**X=** -4.706	**S=** 1.057	**CV(2)=** -0.225	**K factor**=** 3.188	**TL(2)=** -1.338	**LL(2)=**N/A

Historical Background Data from Upgradient Wells with Transformed Result

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

Dry/Partially Dry Wells

Well No.	Gradient
MW389	Downgradient

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

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW386	Sidegradient	Yes	0.0033	N/A	-5.714	NO
MW390	Downgradient	Yes	0.00217	N/A	-6.133	NO
MW393	Downgradient	No	0.002	N/A	-6.215	N/A
MW396	Upgradient	Yes	0.00154	N/A	-6.476	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.*

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Oxidation-Reduction Potential UNITS: mV UCRS

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

Statistics-Background Data	**X=** 13.000	**S=** 61.952	**CV(1)=** 4.766	**K factor**=** 3.188	**TL(1)=** 210.502	**LL(1)=**N/A
Statistics-Transformed Background Data	**X=** 4.364	**S=** 0.333	**CV(2)=** 0.076	**K factor**=** 3.188	**TL(2)=** 4.736	**LL(2)=**N/A

Historical Background Data from Upgradient Wells with Transformed Result

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

Dry/Partially Dry Wells

Well No.	Gradient
MW389	Downgradient

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

#Because the natural log was not possbile 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	232	N/A	5.447	YES
MW390	Downgradient	Yes	413	N/A	6.023	YES
MW393	Downgradient	Yes	303	N/A	5.714	YES
MW396	Upgradient	Yes	210	N/A	5.347	YES

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

Conclusion of Statistical Analysis on Historical Data

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

Wells with Exceedances

MW386
MW390
MW393
MW396

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

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

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

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

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

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

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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	6.64	NO	1.893	N/A
MW390	Downgradient	Yes	6.07	NO	1.803	N/A
MW393	Downgradient	Yes	6.01	NO	1.793	N/A
MW396	Upgradient	Yes	6.54	NO	1.878	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.*

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Potassium UNITS: mg/L UCRS

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

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

Historical Background Data from Upgradient Wells with Transformed Result

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

Dry/Partially Dry Wells

Well No.	Gradient
MW389	Downgradient

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

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW386	Sidegradient	Yes	0.303	NO	-1.194	N/A
MW390	Downgradient	Yes	0.312	NO	-1.165	N/A
MW393	Downgradient	Yes	0.365	NO	-1.008	N/A
MW396	Upgradient	Yes	0.689	NO	-0.373	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.*

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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 possbile 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	0.6	N/A	-0.511	NO
MW390	Downgradient	No	0.14	N/A	-1.966	N/A
MW393	Downgradient	No	0.0636	N/A	-2.755	N/A
MW396	Upgradient	No	0.171	N/A	-1.766	N/A

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

Conclusion of Statistical Analysis on Historical Data

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

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

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

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

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

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

** *Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities,Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-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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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	99.8	NO	4.603	N/A
MW390	Downgradient	Yes	91.8	NO	4.520	N/A
MW393	Downgradient	Yes	71.3	NO	4.267	N/A
MW396	Upgradient	Yes	70.9	NO	4.261	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.*

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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	44.8	NO	3.802	N/A
MW390	Downgradient	Yes	28.3	NO	3.343	N/A
MW393	Downgradient	Yes	14.1	NO	2.646	N/A
MW396	Upgradient	Yes	24.5	NO	3.199	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.*

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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	3.84	N/A	1.345	N/A
MW390	Downgradient	Yes	67.7	YES	4.215	N/A
MW393	Downgradient	No	2.21	N/A	0.793	N/A
MW396	Upgradient	No	-3.72	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 = [Sum ([(background result-X)^2]/[count of background results -1])]^0.5

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

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

** *Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities,Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-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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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	5.89	NO	1.773	N/A
MW390	Downgradient	Yes	2.13	NO	0.756	N/A
MW393	Downgradient	Yes	2.6	NO	0.956	N/A
MW396	Upgradient	Yes	4.96	NO	1.601	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.*

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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	26.9	NO	3.292	N/A
MW393	Downgradient	Yes	19	NO	2.944	N/A
MW396	Upgradient	Yes	37.1	NO	3.614	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.*

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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	No	0.01	N/A	-4.605	N/A
MW390	Downgradient	No	0.01	N/A	-4.605	N/A
MW393	Downgradient	Yes	0.00881	NO	-4.732	N/A
MW396	Upgradient	No	0.01	N/A	-4.605	N/A

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

Conclusion of Statistical Analysis on Historical Data

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

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

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

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

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

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

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

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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	0.00605	NO	-5.108	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	0.00428	NO	-5.454	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.*

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Acetone **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=** 10.250	**S=** 1.000	**CV(1)=** 0.098	**K factor**=** 2.523	**TL(1)=** 12.773	**LL(1)=** N/A
Statistics-Transformed Background Data	**X=** 2.324	**S=** 0.084	**CV(2)=** 0.036	**K factor**=** 2.523	**TL(2)=** 2.536	**LL(2)=** N/A

Historical Background Data from Upgradient Wells with Transformed Result

Well Number: MW220

Date Collected	Result	LN(Result)
10/14/2002	10	2.303
1/15/2003	10	2.303
4/10/2003	10	2.303
7/14/2003	10	2.303
10/13/2003	10	2.303
4/13/2004	10	2.303
7/21/2004	10	2.303
10/11/2004	10	2.303

Well Number: MW394

Date Collected	Result	LN(Result)
8/13/2002	10	2.303
9/30/2002	10	2.303
10/16/2002	10	2.303
1/13/2003	10	2.303
4/10/2003	10	2.303
7/16/2003	10	2.303
10/14/2003	14	2.639
4/12/2004	10	2.303

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	5	N/A	1.609	N/A
MW221	Sidegradient	No	5	N/A	1.609	N/A
MW222	Sidegradient	No	5	N/A	1.609	N/A
MW223	Sidegradient	No	5	N/A	1.609	N/A
MW224	Sidegradient	No	5	N/A	1.609	N/A
MW369	Downgradient	Yes	2.47	NO	0.904	N/A
MW372	Downgradient	No	5	N/A	1.609	N/A
MW384	Sidegradient	No	5	N/A	1.609	N/A
MW387	Downgradient	No	5	N/A	1.609	N/A
MW391	Downgradient	No	5	N/A	1.609	N/A
MW394	Upgradient	No	5	N/A	1.609	N/A

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

Conclusion of Statistical Analysis on Historical Data

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

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

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

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

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

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

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

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

Aluminum UNITS: mg/L URGA

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

Statistics-Background Data	**X=** 0.221	**S=** 0.061	**CV(1)=** 0.277	**K factor**=** 2.523	**TL(1)=** 0.376	**LL(1)=**N/A
Statistics-Transformed Background Data	**X=** -1.534	**S=** 0.212	**CV(2)=** -0.138	**K factor**=** 2.523	**TL(2)=** -0.999	**LL(2)=**N/A

Historical Background Data from Upgradient Wells with Transformed Result

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

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

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	0.05	N/A	-2.996	N/A
MW221	Sidegradient	No	0.05	N/A	-2.996	N/A
MW222	Sidegradient	Yes	0.0461	NO	-3.077	N/A
MW223	Sidegradient	No	0.05	N/A	-2.996	N/A
MW224	Sidegradient	No	0.05	N/A	-2.996	N/A
MW369	Downgradient	Yes	0.0812	NO	-2.511	N/A
MW372	Downgradient	No	0.05	N/A	-2.996	N/A
MW384	Sidegradient	No	0.05	N/A	-2.996	N/A
MW387	Downgradient	No	0.05	N/A	-2.996	N/A
MW391	Downgradient	No	0.05	N/A	-2.996	N/A
MW394	Upgradient	Yes	0.025	NO	-3.689	N/A

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

Conclusion of Statistical Analysis on Historical Data

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

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

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

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

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

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

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

C-746-S/T Fourth Quarter 2018 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

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

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

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

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	Yes	12.2	N/A	2.501	N/A
MW221	Sidegradient	Yes	13.6	N/A	2.610	N/A
MW222	Sidegradient	No	-1.66	N/A	#Error	N/A
MW223	Sidegradient	No	3.85	N/A	1.348	N/A
MW224	Sidegradient	Yes	13	N/A	2.565	N/A
MW369	Downgradient	Yes	23.2	N/A	3.144	N/A
MW372	Downgradient	Yes	123	YES	4.812	N/A
MW384	Sidegradient	Yes	116	YES	4.754	N/A
MW387	Downgradient	Yes	185	YES	5.220	N/A
MW391	Downgradient	No	6.71	N/A	1.904	N/A
MW394	Upgradient	No	11.1	N/A	2.407	N/A

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

Conclusion of Statistical Analysis on Historical Data

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

Wells with Exceedances

MW372
MW384
MW387

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

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

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

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

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

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

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

Boron UNITS: mg/L URGA

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

Statistics-Background Data	**X=** 0.425	**S=** 0.615	**CV(1)=** 1.447	**K factor**=** 2.523	**TL(1)=** 1.976	**LL(1)=**N/A
Statistics-Transformed Background Data	**X=** -1.322	**S=** 0.786	**CV(2)=** -0.595	**K factor**=** 2.523	**TL(2)=** 0.663	**LL(2)=**N/A

Historical Background Data from Upgradient Wells with Transformed Result

Well Number:	MW220	
Date Collected	Result	LN(Result)
10/14/2002	0.2	-1.609
1/15/2003	0.2	-1.609
4/10/2003	0.2	-1.609
7/14/2003	0.2	-1.609
10/13/2003	0.2	-1.609
1/13/2004	0.2	-1.609
4/13/2004	0.2	-1.609
7/21/2004	0.2	-1.609

Well Number:	MW394	
Date Collected	Result	LN(Result)
8/13/2002	2	0.693
9/16/2002	2	0.693
10/16/2002	0.2	-1.609
1/13/2003	0.2	-1.609
4/10/2003	0.2	-1.609
7/16/2003	0.2	-1.609
10/14/2003	0.2	-1.609
1/13/2004	0.2	-1.609

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

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	Yes	0.0101	N/A	-4.595	NO
MW221	Sidegradient	Yes	0.0168	N/A	-4.086	NO
MW222	Sidegradient	Yes	0.00995	N/A	-4.610	NO
MW223	Sidegradient	Yes	0.00787	N/A	-4.845	NO
MW224	Sidegradient	Yes	0.0153	N/A	-4.180	NO
MW369	Downgradient	Yes	0.0175	N/A	-4.046	NO
MW372	Downgradient	Yes	0.899	N/A	-0.106	NO
MW384	Sidegradient	Yes	0.0223	N/A	-3.803	NO
MW387	Downgradient	Yes	0.0364	N/A	-3.313	NO
MW391	Downgradient	Yes	0.255	N/A	-1.366	NO
MW394	Upgradient	Yes	0.022	N/A	-3.817	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.*

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

Bromide **UNITS: mg/L** **URGA**

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

Statistics-Background Data	**X=** 1.000	**S=** 0.000	**CV(1)=** 0.000	**K factor**=** 2.523	**TL(1)=** 1.000	**LL(1)=**N/A
Statistics-Transformed Background Data	**X=** 0.000	**S=** 0.000	**CV(2)=** #Num!	**K factor**=** 2.523	**TL(2)=** 0.000	**LL(2)=**N/A

Historical Background Data from Upgradient Wells with Transformed Result

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

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

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

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	Yes	0.205	NO	-1.585	N/A
MW221	Sidegradient	Yes	0.418	NO	-0.872	N/A
MW222	Sidegradient	Yes	0.416	NO	-0.877	N/A
MW223	Sidegradient	Yes	0.416	NO	-0.877	N/A
MW224	Sidegradient	Yes	0.396	NO	-0.926	N/A
MW369	Downgradient	Yes	0.391	NO	-0.939	N/A
MW372	Downgradient	Yes	0.573	NO	-0.557	N/A
MW384	Sidegradient	Yes	0.31	NO	-1.171	N/A
MW387	Downgradient	Yes	0.437	NO	-0.828	N/A
MW391	Downgradient	Yes	0.496	NO	-0.701	N/A
MW394	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 = [Sum ([(background result-X)^2]/[count of background results -1])]^0.5

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

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

** *Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities,Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-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 2018 Statistical Analysis Historical Background Comparison

Calcium UNITS: mg/L URGA

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

Statistics-Background Data	**X=** 27.638	**S=** 4.743	**CV(1)=** 0.172	**K factor**=** 2.523	**TL(1)=** 39.604	**LL(1)=**N/A
Statistics-Transformed Background Data	**X=** 3.304	**S=** 0.183	**CV(2)=** 0.055	**K factor**=** 2.523	**TL(2)=** 3.765	**LL(2)=**N/A

Historical Background Data from Upgradient Wells with Transformed Result

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

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

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

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	Yes	20.6	NO	3.025	N/A
MW221	Sidegradient	Yes	21.4	NO	3.063	N/A
MW222	Sidegradient	Yes	17.6	NO	2.868	N/A
MW223	Sidegradient	Yes	21.6	NO	3.073	N/A
MW224	Sidegradient	Yes	20.7	NO	3.030	N/A
MW369	Downgradient	Yes	16.3	NO	2.791	N/A
MW372	Downgradient	Yes	49.7	YES	3.906	N/A
MW384	Sidegradient	Yes	25.7	NO	3.246	N/A
MW387	Downgradient	Yes	35.5	NO	3.570	N/A
MW391	Downgradient	Yes	36.1	NO	3.586	N/A
MW394	Upgradient	Yes	25.4	NO	3.235	N/A

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

Conclusion of Statistical Analysis on Historical Data

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

Wells with Exceedances

MW372

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

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

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

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

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

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

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

Chemical Oxygen Demand (COD) UNITS: mg/L URGA

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

Statistics-Background Data	**X=** 35.000	**S=** 0.000	**CV(1)=** 0.000	**K factor**=** 2.523	**TL(1)=** 35.000	**LL(1)=**N/A
Statistics-Transformed Background Data	**X=** 3.555	**S=** 0.000	**CV(2)=** 0.000	**K factor**=** 2.523	**TL(2)=** 3.555	**LL(2)=**N/A

Historical Background Data from Upgradient Wells with Transformed Result

Well Number:	MW220	
Date Collected	Result	LN(Result)
10/14/2002	35	3.555
1/15/2003	35	3.555
4/10/2003	35	3.555
7/14/2003	35	3.555
10/13/2003	35	3.555
1/13/2004	35	3.555
4/13/2004	35	3.555
7/21/2004	35	3.555

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	20	N/A	2.996	N/A
MW221	Sidegradient	Yes	11.7	NO	2.460	N/A
MW222	Sidegradient	Yes	15.1	NO	2.715	N/A
MW223	Sidegradient	Yes	13.4	NO	2.595	N/A
MW224	Sidegradient	Yes	9.97	NO	2.300	N/A
MW369	Downgradient	Yes	21.4	NO	3.063	N/A
MW372	Downgradient	No	16.4	N/A	2.797	N/A
MW384	Sidegradient	Yes	20.1	NO	3.001	N/A
MW387	Downgradient	Yes	25.2	NO	3.227	N/A
MW391	Downgradient	No	20	N/A	2.996	N/A
MW394	Upgradient	Yes	11.8	NO	2.468	N/A

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

Conclusion of Statistical Analysis on Historical Data

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

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

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

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

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

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

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

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

Chloride UNITS: mg/L URGA

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

Statistics-Background Data	**X=** 49.044	**S=** 11.278	**CV(1)=** 0.230	**K factor**=** 2.523	**TL(1)=** 77.499	**LL(1)=**N/A
Statistics-Transformed Background Data	**X=** 3.866	**S=** 0.244	**CV(2)=** 0.063	**K factor**=** 2.523	**TL(2)=** 4.482	**LL(2)=**N/A

Historical Background Data from Upgradient Wells with Transformed Result

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

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

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

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	Yes	20.6	NO	3.025	N/A
MW221	Sidegradient	Yes	31.1	NO	3.437	N/A
MW222	Sidegradient	Yes	30.1	NO	3.405	N/A
MW223	Sidegradient	Yes	28	NO	3.332	N/A
MW224	Sidegradient	Yes	29.9	NO	3.398	N/A
MW369	Downgradient	Yes	33.6	NO	3.515	N/A
MW372	Downgradient	Yes	47.9	NO	3.869	N/A
MW384	Sidegradient	Yes	37.3	NO	3.619	N/A
MW387	Downgradient	Yes	39.7	NO	3.681	N/A
MW391	Downgradient	Yes	41.2	NO	3.718	N/A
MW394	Upgradient	Yes	46.1	NO	3.831	N/A

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

Conclusion of Statistical Analysis on Historical Data

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

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

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

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

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

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

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

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

cis-1,2-Dichloroethene UNITS: ug/L URGA

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

Statistics-Background Data	**X=** 5.000	**S=** 0.000	**CV(1)=** 0.000	**K factor**=** 2.523	**TL(1)=** 5.000	**LL(1)=**N/A
Statistics-Transformed Background Data	**X=** 1.609	**S=** 0.000	**CV(2)=** 0.000	**K factor**=** 2.523	**TL(2)=** 1.609	**LL(2)=**N/A

Historical Background Data from Upgradient Wells with Transformed Result

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

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

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	1	N/A	0.000	N/A
MW221	Sidegradient	No	1	N/A	0.000	N/A
MW222	Sidegradient	No	1	N/A	0.000	N/A
MW223	Sidegradient	No	1	N/A	0.000	N/A
MW224	Sidegradient	No	1	N/A	0.000	N/A
MW369	Downgradient	No	1	N/A	0.000	N/A
MW372	Downgradient	No	1	N/A	0.000	N/A
MW384	Sidegradient	No	1	N/A	0.000	N/A
MW387	Downgradient	No	1	N/A	0.000	N/A
MW391	Downgradient	Yes	0.43	NO	-0.844	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.

Conclusion of Statistical Analysis on Historical Data

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

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

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

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

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

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

** *Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities,Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-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 2018 Statistical Analysis Historical Background Comparison

Cobalt UNITS: mg/L URGA

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

Statistics-Background Data	**X=** 0.016	**S=** 0.040	**CV(1)=** 2.440	**K factor**=** 2.523	**TL(1)=** 0.116	**LL(1)=**N/A
Statistics-Transformed Background Data	**X=** -5.582	**S=** 1.573	**CV(2)=** -0.282	**K factor**=** 2.523	**TL(2)=** -1.613	**LL(2)=**N/A

Historical Background Data from Upgradient Wells with Transformed Result

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

Well Number: MW220

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

Well Number: MW394

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

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	No	0.001	N/A	-6.908	N/A
MW221	Sidegradient	No	0.001	N/A	-6.908	N/A
MW222	Sidegradient	Yes	0.000591	N/A	-7.434	NO
MW223	Sidegradient	Yes	0.000543	N/A	-7.518	NO
MW224	Sidegradient	Yes	0.000358	N/A	-7.935	NO
MW369	Downgradient	Yes	0.00626	N/A	-5.074	NO
MW372	Downgradient	Yes	0.00116	N/A	-6.759	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.*

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

Conductivity UNITS: umho/cm URGA

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

Statistics-Background Data	**X=** 382.132	**S=** 107.134	**CV(1)=** 0.280	**K factor**=** 2.523	**TL(1)=** 652.432	**LL(1)=**N/A
Statistics-Transformed Background Data	**X=** 5.716	**S=** 1.164	**CV(2)=** 0.204	**K factor**=** 2.523	**TL(2)=** 8.652	**LL(2)=**N/A

Historical Background Data from Upgradient Wells with Transformed Result

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

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

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

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	Yes	342	NO	5.835	N/A
MW221	Sidegradient	Yes	338	NO	5.823	N/A
MW222	Sidegradient	Yes	360	NO	5.886	N/A
MW223	Sidegradient	Yes	334	NO	5.811	N/A
MW224	Sidegradient	Yes	412	NO	6.021	N/A
MW369	Downgradient	Yes	374	NO	5.924	N/A
MW372	Downgradient	Yes	618	NO	6.426	N/A
MW384	Sidegradient	Yes	451	NO	6.111	N/A
MW387	Downgradient	Yes	536	NO	6.284	N/A
MW391	Downgradient	Yes	525	NO	6.263	N/A
MW394	Upgradient	Yes	410	NO	6.016	N/A

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

Conclusion of Statistical Analysis on Historical Data

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

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

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

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

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

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

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

C-746-S/T Fourth Quarter 2018 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

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

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

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	Yes	0.00101	NO	-6.898	N/A
MW221	Sidegradient	Yes	0.000683	NO	-7.289	N/A
MW222	Sidegradient	Yes	0.000372	NO	-7.897	N/A
MW223	Sidegradient	Yes	0.000357	NO	-7.938	N/A
MW224	Sidegradient	Yes	0.000731	NO	-7.221	N/A
MW369	Downgradient	Yes	0.00123	NO	-6.701	N/A
MW372	Downgradient	Yes	0.000787	NO	-7.147	N/A
MW384	Sidegradient	Yes	0.00037	NO	-7.902	N/A
MW387	Downgradient	Yes	0.000509	NO	-7.583	N/A
MW391	Downgradient	Yes	0.000601	NO	-7.417	N/A
MW394	Upgradient	Yes	0.000794	NO	-7.138	N/A

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

Conclusion of Statistical Analysis on Historical Data

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

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

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

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

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

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

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

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

Dissolved Oxygen UNITS: mg/L URGA

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

Statistics-Background Data	**X=** 3.784	**S=** 1.887	**CV(1)=** 0.499	**K factor**=** 2.523	**TL(1)=** 8.545	**LL(1)=**N/A
Statistics-Transformed Background Data	**X=** 1.182	**S=** 0.612	**CV(2)=** 0.518	**K factor**=** 2.523	**TL(2)=** 2.727	**LL(2)=**N/A

Historical Background Data from Upgradient Wells with Transformed Result

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

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

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

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	Yes	6.37	NO	1.852	N/A
MW221	Sidegradient	Yes	3.95	NO	1.374	N/A
MW222	Sidegradient	Yes	4.4	NO	1.482	N/A
MW223	Sidegradient	Yes	3.48	NO	1.247	N/A
MW224	Sidegradient	Yes	2.54	NO	0.932	N/A
MW369	Downgradient	Yes	1.36	NO	0.307	N/A
MW372	Downgradient	Yes	0.79	NO	-0.236	N/A
MW384	Sidegradient	Yes	3.3	NO	1.194	N/A
MW387	Downgradient	Yes	3.56	NO	1.270	N/A
MW391	Downgradient	Yes	3.46	NO	1.241	N/A
MW394	Upgradient	Yes	4.1	NO	1.411	N/A

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

Conclusion of Statistical Analysis on Historical Data

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

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

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

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

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

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

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

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

Dissolved Solids UNITS: mg/L URGA

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

Statistics-Background Data	**X=** 232.688	**S=** 27.490	**CV(1)=** 0.118	**K factor**=** 2.523	**TL(1)=** 302.045	**LL(1)=**N/A
Statistics-Transformed Background Data	**X=** 5.443	**S=** 0.118	**CV(2)=** 0.022	**K factor**=** 2.523	**TL(2)=** 5.740	**LL(2)=**N/A

Historical Background Data from Upgradient Wells with Transformed Result

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

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

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

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	Yes	226	NO	5.421	N/A
MW221	Sidegradient	Yes	180	NO	5.193	N/A
MW222	Sidegradient	Yes	234	NO	5.455	N/A
MW223	Sidegradient	Yes	181	NO	5.198	N/A
MW224	Sidegradient	Yes	204	NO	5.318	N/A
MW369	Downgradient	Yes	196	NO	5.278	N/A
MW372	Downgradient	Yes	336	YES	5.817	N/A
MW384	Sidegradient	Yes	254	NO	5.537	N/A
MW387	Downgradient	Yes	297	NO	5.694	N/A
MW391	Downgradient	Yes	254	NO	5.537	N/A
MW394	Upgradient	Yes	206	NO	5.328	N/A

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

Conclusion of Statistical Analysis on Historical Data

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

Wells with Exceedances

MW372

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

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

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

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

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

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

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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

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

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

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

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	Yes	0.0373	N/A	-3.289	NO
MW221	Sidegradient	No	0.1	N/A	-2.303	N/A
MW222	Sidegradient	Yes	0.0586	N/A	-2.837	NO
MW223	Sidegradient	No	0.1	N/A	-2.303	N/A
MW224	Sidegradient	No	0.1	N/A	-2.303	N/A
MW369	Downgradient	Yes	0.16	N/A	-1.833	NO
MW372	Downgradient	Yes	0.0592	N/A	-2.827	NO
MW384	Sidegradient	Yes	0.0397	N/A	-3.226	NO
MW387	Downgradient	No	0.1	N/A	-2.303	N/A
MW391	Downgradient	No	0.1	N/A	-2.303	N/A
MW394	Upgradient	Yes	0.12	N/A	-2.120	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.*

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Magnesium UNITS: mg/L URGA

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

Statistics-Background Data	**X=** 10.796	**S=** 1.703	**CV(1)=** 0.158	**K factor**=** 2.523	**TL(1)=** 15.092	**LL(1)=**N/A
Statistics-Transformed Background Data	**X=** 2.368	**S=** 0.158	**CV(2)=** 0.067	**K factor**=** 2.523	**TL(2)=** 2.766	**LL(2)=**N/A

Historical Background Data from Upgradient Wells with Transformed Result

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

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

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

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	Yes	8.8	NO	2.175	N/A
MW221	Sidegradient	Yes	9.89	NO	2.292	N/A
MW222	Sidegradient	Yes	8.32	NO	2.119	N/A
MW223	Sidegradient	Yes	9.64	NO	2.266	N/A
MW224	Sidegradient	Yes	9.66	NO	2.268	N/A
MW369	Downgradient	Yes	7.02	NO	1.949	N/A
MW372	Downgradient	Yes	19.1	YES	2.950	N/A
MW384	Sidegradient	Yes	11	NO	2.398	N/A
MW387	Downgradient	Yes	15.5	YES	2.741	N/A
MW391	Downgradient	Yes	15.6	YES	2.747	N/A
MW394	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.

Conclusion of Statistical Analysis on Historical Data

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

Wells with Exceedances

MW372
MW387
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.*

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

Manganese UNITS: mg/L URGA

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

Statistics-Background Data	**X=** 0.287	**S=** 0.619	**CV(1)=** 2.156	**K factor**=** 2.523	**TL(1)=** 1.848	**LL(1)=**N/A
Statistics-Transformed Background Data	**X=** -2.455	**S=** 1.619	**CV(2)=** -0.659	**K factor**=** 2.523	**TL(2)=** 1.630	**LL(2)=**N/A

Historical Background Data from Upgradient Wells with Transformed Result

Well Number:	MW220	
Date Collected	Result	LN(Result)
10/14/2002	0.0306	-3.487
1/15/2003	0.0291	-3.537
4/10/2003	0.0137	-4.290
7/14/2003	2.54	0.932
10/13/2003	0.378	-0.973
1/13/2004	0.159	-1.839
4/13/2004	0.00707	-4.952
7/21/2004	0.0841	-2.476

Well Number:	MW394	
Date Collected	Result	LN(Result)
8/13/2002	0.542	-0.612
9/16/2002	0.155	-1.864
10/16/2002	0.103	-2.273
1/13/2003	0.128	-2.056
4/10/2003	0.005	-5.298
7/16/2003	0.272	-1.302
10/14/2003	0.0795	-2.532
1/13/2004	0.0658	-2.721

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

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	Yes	0.00215	N/A	-6.142	NO
MW221	Sidegradient	No	0.005	N/A	-5.298	N/A
MW222	Sidegradient	Yes	0.00551	N/A	-5.201	NO
MW223	Sidegradient	Yes	0.00603	N/A	-5.111	NO
MW224	Sidegradient	Yes	0.00335	N/A	-5.699	NO
MW369	Downgradient	Yes	0.0166	N/A	-4.098	NO
MW372	Downgradient	Yes	0.00402	N/A	-5.516	NO
MW384	Sidegradient	Yes	0.00795	N/A	-4.835	NO
MW387	Downgradient	Yes	0.00397	N/A	-5.529	NO
MW391	Downgradient	Yes	0.00109	N/A	-6.822	NO
MW394	Upgradient	Yes	0.005	N/A	-5.298	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.*

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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

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

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

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	Yes	0.000752	N/A	-7.193	NO
MW221	Sidegradient	Yes	0.00149	N/A	-6.509	NO
MW222	Sidegradient	Yes	0.000393	N/A	-7.842	NO
MW223	Sidegradient	Yes	0.00469	N/A	-5.362	NO
MW224	Sidegradient	Yes	0.000346	N/A	-7.969	NO
MW369	Downgradient	No	0.0005	N/A	-7.601	N/A
MW372	Downgradient	Yes	0.000255	N/A	-8.274	NO
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.*

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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

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

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

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

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	Yes	0.0132	N/A	-4.328	NO
MW221	Sidegradient	Yes	0.0139	N/A	-4.276	NO
MW222	Sidegradient	Yes	0.0292	N/A	-3.534	NO
MW223	Sidegradient	Yes	0.132	N/A	-2.025	NO
MW224	Sidegradient	Yes	0.0131	N/A	-4.335	NO
MW369	Downgradient	Yes	0.00681	N/A	-4.989	NO
MW372	Downgradient	Yes	0.00158	N/A	-6.450	NO
MW384	Sidegradient	Yes	0.000718	N/A	-7.239	NO
MW387	Downgradient	Yes	0.000683	N/A	-7.289	NO
MW391	Downgradient	Yes	0.0007	N/A	-7.264	NO
MW394	Upgradient	Yes	0.0047	N/A	-5.360	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.*

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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

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

Historical Background Data from Upgradient Wells with Transformed Result

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

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

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	Yes	413	YES	6.023	N/A
MW221	Sidegradient	Yes	410	YES	6.016	N/A
MW222	Sidegradient	Yes	352	NO	5.864	N/A
MW223	Sidegradient	Yes	357	NO	5.878	N/A
MW224	Sidegradient	Yes	364	NO	5.897	N/A
MW369	Downgradient	Yes	341	NO	5.832	N/A
MW372	Downgradient	Yes	295	NO	5.687	N/A
MW384	Sidegradient	Yes	418	YES	6.035	N/A
MW387	Downgradient	Yes	438	YES	6.082	N/A
MW391	Downgradient	Yes	309	NO	5.733	N/A
MW394	Upgradient	Yes	386	NO	5.956	N/A

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

Conclusion of Statistical Analysis on Historical Data

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
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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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

Well Number: MW394

Date Collected	Result	LN(Result)
8/13/2002	5.8	1.758
9/30/2002	5.93	1.780
10/16/2002	5.42	1.690
1/13/2003	6	1.792
4/10/2003	6.04	1.798
7/16/2003	6.2	1.825
10/14/2003	6.4	1.856
1/13/2004	6.39	1.855

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	5.87	NO	1.770	N/A
MW221	Sidegradient	Yes	6.07	NO	1.803	N/A
MW222	Sidegradient	Yes	6.23	NO	1.829	N/A
MW223	Sidegradient	Yes	6.12	NO	1.812	N/A
MW224	Sidegradient	Yes	6.1	NO	1.808	N/A
MW369	Downgradient	Yes	6.05	NO	1.800	N/A
MW372	Downgradient	Yes	6.14	NO	1.815	N/A
MW384	Sidegradient	Yes	6.21	NO	1.826	N/A
MW387	Downgradient	Yes	6.05	NO	1.800	N/A
MW391	Downgradient	Yes	5.86	NO	1.768	N/A
MW394	Upgradient	Yes	6.36	NO	1.850	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.*

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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

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

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

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

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	Yes	2.21	N/A	0.793	NO
MW221	Sidegradient	Yes	1.35	N/A	0.300	NO
MW222	Sidegradient	Yes	0.664	N/A	-0.409	NO
MW223	Sidegradient	Yes	1.82	N/A	0.599	NO
MW224	Sidegradient	Yes	0.902	N/A	-0.103	NO
MW369	Downgradient	Yes	0.551	N/A	-0.596	NO
MW372	Downgradient	Yes	2.15	N/A	0.765	NO
MW384	Sidegradient	Yes	1.47	N/A	0.385	NO
MW387	Downgradient	Yes	1.9	N/A	0.642	NO
MW391	Downgradient	Yes	1.63	N/A	0.489	NO
MW394	Upgradient	Yes	1.19	N/A	0.174	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.*

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Radium-226 UNITS: pCi/L URGA

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

Statistics-Background Data	**X=** 0.036	**S=** 0.382	**CV(1)=** 10.588	**K factor**=** 2.523	**TL(1)=** 1.001	**LL(1)=**N/A
Statistics-Transformed Background Data	**X=** -1.873	**S=** 1.110	**CV(2)=** -0.592	**K factor**=** 2.523	**TL(2)=** -0.538	**LL(2)=**N/A

Historical Background Data from Upgradient Wells with Transformed Result

Well Number:	MW220	
Date Collected	Result	LN(Result)
10/14/2002	-0.804	#Func!
1/15/2003	0	#Func!
10/13/2003	0.389	-0.944
1/13/2004	-0.12	#Func!
4/13/2004	0.159	-1.839
7/21/2004	0.382	-0.962
10/11/2004	0.211	-1.556
1/20/2005	0.229	-1.474

Well Number:	MW394	
Date Collected	Result	LN(Result)
10/16/2002	0.584	-0.538
1/13/2003	-0.839	#Func!
10/14/2003	0.0325	-3.427
1/13/2004	-0.00402	#Func!
4/12/2004	-0.000337	#Func!
7/20/2004	0.29	-1.238
10/12/2004	0.0366	-3.308
1/18/2005	0.0319	-3.445

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

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

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	No	0.0489	N/A	-3.018	N/A
MW221	Sidegradient	No	0.152	N/A	-1.884	N/A
MW222	Sidegradient	No	0.0716	N/A	-2.637	N/A
MW223	Sidegradient	No	0.282	N/A	-1.266	N/A
MW224	Sidegradient	No	0.224	N/A	-1.496	N/A
MW369	Downgradient	No	0.475	N/A	-0.744	N/A
MW372	Downgradient	No	0.219	N/A	-1.519	N/A
MW384	Sidegradient	No	0.535	N/A	-0.625	N/A
MW387	Downgradient	Yes	1.55	N/A	0.438	YES
MW391	Downgradient	No	0.261	N/A	-1.343	N/A
MW394	Upgradient	No	0.442	N/A	-0.816	N/A

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

Conclusion of Statistical Analysis on Historical Data

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

Wells with Exceedances

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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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

Well Number:	MW220	
Date Collected	Result	LN(Result)
10/14/2002	35.4	3.567
1/15/2003	40.6	3.704
4/10/2003	51	3.932
7/14/2003	58.2	4.064
10/13/2003	38.1	3.640
1/13/2004	37	3.611
4/13/2004	43.2	3.766
7/21/2004	33.8	3.520

Well Number:	MW394	
Date Collected	Result	LN(Result)
8/13/2002	32.9	3.493
9/16/2002	29.9	3.398
10/16/2002	29	3.367
1/13/2003	27.1	3.300
4/10/2003	24.8	3.211
7/16/2003	35.6	3.572
10/14/2003	33.9	3.523
1/13/2004	31.3	3.444

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

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	Yes	39	NO	3.664	N/A
MW221	Sidegradient	Yes	44.9	NO	3.804	N/A
MW222	Sidegradient	Yes	48.3	NO	3.877	N/A
MW223	Sidegradient	Yes	47.6	NO	3.863	N/A
MW224	Sidegradient	Yes	50.3	NO	3.918	N/A
MW369	Downgradient	Yes	49.3	NO	3.898	N/A
MW372	Downgradient	Yes	49.8	NO	3.908	N/A
MW384	Sidegradient	Yes	50.6	NO	3.924	N/A
MW387	Downgradient	Yes	57	NO	4.043	N/A
MW391	Downgradient	Yes	36	NO	3.584	N/A
MW394	Upgradient	Yes	33.4	NO	3.509	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.*

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Sulfate UNITS: mg/L URGA

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

Statistics-Background Data	**X=** 10.481	**S=** 2.648	**CV(1)=** 0.253	**K factor**=** 2.523	**TL(1)=** 17.161	**LL(1)=**N/A
Statistics-Transformed Background Data	**X=** 2.322	**S=** 0.239	**CV(2)=** 0.103	**K factor**=** 2.523	**TL(2)=** 2.925	**LL(2)=**N/A

Historical Background Data from Upgradient Wells with Transformed Result

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

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

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

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	Yes	16.9	NO	2.827	N/A
MW221	Sidegradient	Yes	15	NO	2.708	N/A
MW222	Sidegradient	Yes	12.9	NO	2.557	N/A
MW223	Sidegradient	Yes	16	NO	2.773	N/A
MW224	Sidegradient	Yes	12.1	NO	2.493	N/A
MW369	Downgradient	Yes	9.41	NO	2.242	N/A
MW372	Downgradient	Yes	66.9	YES	4.203	N/A
MW384	Sidegradient	Yes	21.4	YES	3.063	N/A
MW387	Downgradient	Yes	28.5	YES	3.350	N/A
MW391	Downgradient	Yes	64.2	YES	4.162	N/A
MW394	Upgradient	Yes	10.6	NO	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

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

Wells with Exceedances

MW372
MW384
MW387
MW391

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

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

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

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

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

** *Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities,Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-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 2018 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 possbile 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	20.8	NO	3.035	N/A
MW221	Sidegradient	No	7.17	N/A	1.970	N/A
MW222	Sidegradient	No	3.63	N/A	1.289	N/A
MW223	Sidegradient	No	3.91	N/A	1.364	N/A
MW224	Sidegradient	No	3.72	N/A	1.314	N/A
MW369	Downgradient	Yes	55	YES	4.007	N/A
MW372	Downgradient	Yes	158	YES	5.063	N/A
MW384	Sidegradient	Yes	168	YES	5.124	N/A
MW387	Downgradient	Yes	223	YES	5.407	N/A
MW391	Downgradient	No	12.5	N/A	2.526	N/A
MW394	Upgradient	No	13.4	N/A	2.595	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
MW372
MW384
MW387

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

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

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

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

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

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

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

Total Organic Carbon (TOC) UNITS: mg/L URGA

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

Statistics-Background Data	**X=** 1.494	**S=** 0.737	**CV(1)=** 0.493	**K factor**=** 2.523	**TL(1)=** 3.353	**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

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

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

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

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	Yes	0.855	NO	-0.157	N/A
MW221	Sidegradient	Yes	0.845	NO	-0.168	N/A
MW222	Sidegradient	Yes	0.829	NO	-0.188	N/A
MW223	Sidegradient	Yes	0.953	NO	-0.048	N/A
MW224	Sidegradient	Yes	0.796	NO	-0.228	N/A
MW369	Downgradient	Yes	1.2	NO	0.182	N/A
MW372	Downgradient	Yes	1	NO	0.000	N/A
MW384	Sidegradient	Yes	1.13	NO	0.122	N/A
MW387	Downgradient	Yes	1.26	NO	0.231	N/A
MW391	Downgradient	Yes	0.953	NO	-0.048	N/A
MW394	Upgradient	Yes	0.897	NO	-0.109	N/A

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

Conclusion of Statistical Analysis on Historical Data

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

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

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

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

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

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

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

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

Total Organic Halides (TOX) UNITS: ug/L URGA

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

Statistics-Background Data	**X=** 63.475	**S=** 163.135	**CV(1)=** 2.570	**K factor**=** 2.523	**TL(1)=** 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

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

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

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	Yes	10.9	N/A	2.389	NO
MW221	Sidegradient	Yes	6.02	N/A	1.795	NO
MW222	Sidegradient	Yes	5.54	N/A	1.712	NO
MW223	Sidegradient	Yes	9.02	N/A	2.199	NO
MW224	Sidegradient	Yes	15.3	N/A	2.728	NO
MW369	Downgradient	Yes	15.7	N/A	2.754	NO
MW372	Downgradient	Yes	14.3	N/A	2.660	NO
MW384	Sidegradient	No	4.4	N/A	1.482	N/A
MW387	Downgradient	Yes	13.9	N/A	2.632	NO
MW391	Downgradient	Yes	12.6	N/A	2.534	NO
MW394	Upgradient	Yes	6.26	N/A	1.834	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.*

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

Trichloroethene UNITS: ug/L URGA

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

Statistics-Background Data	**X=** 8.813	**S=** 8.376	**CV(1)=** 0.951	**K factor**=** 2.523	**TL(1)=** 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

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

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

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	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	1.03	N/A	0.030	N/A
MW372	Downgradient	Yes	5.72	NO	1.744	N/A
MW384	Sidegradient	Yes	0.41	N/A	-0.892	N/A
MW387	Downgradient	Yes	0.7	N/A	-0.357	N/A
MW391	Downgradient	Yes	8.87	NO	2.183	N/A
MW394	Upgradient	Yes	4.85	N/A	1.579	N/A

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

Conclusion of Statistical Analysis on Historical Data

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

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

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

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

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

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

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

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

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

Well Number:	MW220	
Date Collected	Result	LN(Result)
10/14/2002	0.02	-3.912
1/15/2003	0.02	-3.912
4/10/2003	0.02	-3.912
7/14/2003	0.02	-3.912
10/13/2003	0.02	-3.912
1/13/2004	0.02	-3.912
4/13/2004	0.02	-3.912
7/21/2004	0.02	-3.912

Well Number:	MW394	
Date Collected	Result	LN(Result)
8/13/2002	0.025	-3.689
9/16/2002	0.025	-3.689
10/16/2002	0.02	-3.912
1/13/2003	0.02	-3.912
4/10/2003	0.02	-3.912
7/16/2003	0.02	-3.912
10/14/2003	0.02	-3.912
1/13/2004	0.02	-3.912

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	0.01	N/A	-4.605	N/A
MW221	Sidegradient	No	0.01	N/A	-4.605	N/A
MW222	Sidegradient	Yes	0.00474	NO	-5.352	N/A
MW223	Sidegradient	No	0.01	N/A	-4.605	N/A
MW224	Sidegradient	No	0.01	N/A	-4.605	N/A
MW369	Downgradient	Yes	0.0039	NO	-5.547	N/A
MW372	Downgradient	No	0.01	N/A	-4.605	N/A
MW384	Sidegradient	Yes	0.00382	NO	-5.568	N/A
MW387	Downgradient	No	0.01	N/A	-4.605	N/A
MW391	Downgradient	No	0.01	N/A	-4.605	N/A
MW394	Upgradient	No	0.01	N/A	-4.605	N/A

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

Conclusion of Statistical Analysis on Historical Data

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

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

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

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

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

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

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

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

Zinc UNITS: mg/L URGA

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

Statistics-Background Data	**X=** 0.036	**S=** 0.026	**CV(1)=** 0.722	**K factor**=** 2.523	**TL(1)=** 0.101	**LL(1)=**N/A
Statistics-Transformed Background Data	**X=** -3.485	**S=** 0.525	**CV(2)=** -0.151	**K factor**=** 2.523	**TL(2)=** -2.162	**LL(2)=**N/A

Historical Background Data from Upgradient Wells with Transformed Result

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

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

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

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	Yes	0.00409	NO	-5.499	N/A
MW221	Sidegradient	Yes	0.00341	NO	-5.681	N/A
MW222	Sidegradient	Yes	0.00359	NO	-5.630	N/A
MW223	Sidegradient	No	0.01	N/A	-4.605	N/A
MW224	Sidegradient	No	0.01	N/A	-4.605	N/A
MW369	Downgradient	Yes	0.00497	NO	-5.304	N/A
MW372	Downgradient	No	0.01	N/A	-4.605	N/A
MW384	Sidegradient	Yes	0.0045	NO	-5.404	N/A
MW387	Downgradient	Yes	0.00435	NO	-5.438	N/A
MW391	Downgradient	No	0.01	N/A	-4.605	N/A
MW394	Upgradient	No	0.01	N/A	-4.605	N/A

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

Conclusion of Statistical Analysis on Historical Data

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

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

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

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

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

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

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

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

Aluminum UNITS: mg/L LRGA

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

Statistics-Background Data	**X=** 0.258	**S=** 0.221	**CV(1)=** 0.856	**K factor**=** 2.523	**TL(1)=** 0.815	**LL(1)=**N/A
Statistics-Transformed Background Data	**X=** -2.266	**S=** 2.485	**CV(2)=** -1.097	**K factor**=** 2.523	**TL(2)=** 4.003	**LL(2)=**N/A

Historical Background Data from Upgradient Wells with Transformed Result

Well Number: MW395

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

Well Number: MW397

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

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	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	Yes	0.14	NO	-1.966	N/A
MW392	Downgradient	No	0.05	N/A	-2.996	N/A
MW395	Upgradient	Yes	0.199	NO	-1.614	N/A
MW397	Upgradient	Yes	0.0301	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.

Conclusion of Statistical Analysis on Historical Data

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

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

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

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

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

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

** *Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities,Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-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 2018 Statistical Analysis Historical Background Comparison

Beta activity UNITS: pCi/L LRGA

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

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

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

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	81.7	YES	4.403	N/A
MW373	Downgradient	Yes	22.8	N/A	3.127	N/A
MW385	Sidegradient	Yes	45.9	N/A	3.826	N/A
MW388	Downgradient	Yes	83.1	YES	4.420	N/A
MW392	Downgradient	No	4.52	N/A	1.509	N/A
MW395	Upgradient	No	9.41	N/A	2.242	N/A
MW397	Upgradient	No	5.14	N/A	1.637	N/A

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

Conclusion of Statistical Analysis on Historical Data

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

Wells with Exceedances

MW370
MW388

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

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

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

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

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

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

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Boron UNITS: mg/L LRGA

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

Statistics-Background Data	**X=** 0.650	**S=** 0.805	**CV(1)=** 1.238	**K factor**=** 2.523	**TL(1)=** 2.681	**LL(1)=**N/A
Statistics-Transformed Background Data	**X=** -1.034	**S=** 1.030	**CV(2)=** -0.996	**K factor**=** 2.523	**TL(2)=** 1.564	**LL(2)=**N/A

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

Historical Background Data from Upgradient Wells with Transformed Result

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	0.0326	N/A	-3.423	NO
MW373	Downgradient	Yes	1.24	N/A	0.215	NO
MW385	Sidegradient	Yes	0.0155	N/A	-4.167	NO
MW388	Downgradient	Yes	0.0301	N/A	-3.503	NO
MW392	Downgradient	Yes	0.026	N/A	-3.650	NO
MW395	Upgradient	Yes	0.0228	N/A	-3.781	NO
MW397	Upgradient	Yes	0.00936	N/A	-4.671	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.*

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Bromide **UNITS: mg/L** **LRGA**

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

Statistics-Background Data	**X=** 1.000	**S=** 0.000	**CV(1)=** 0.000	**K factor**=** 2.523	**TL(1)=** 1.000	**LL(1)=**N/A
Statistics-Transformed Background Data	**X=** 0.000	**S=** 0.000	**CV(2)=** #Num!	**K factor**=** 2.523	**TL(2)=** 0.000	**LL(2)=**N/A

Historical Background Data from Upgradient Wells with Transformed Result

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

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

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	0.419	NO	-0.870	N/A
MW373	Downgradient	Yes	0.572	NO	-0.559	N/A
MW385	Sidegradient	Yes	0.228	NO	-1.478	N/A
MW388	Downgradient	Yes	0.35	NO	-1.050	N/A
MW392	Downgradient	Yes	0.526	NO	-0.642	N/A
MW395	Upgradient	Yes	0.451	NO	-0.796	N/A
MW397	Upgradient	Yes	0.422	NO	-0.863	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.*

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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 evidence of an exceedance of the statistically-derived historical background concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the 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

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

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

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	26.1	NO	3.262	N/A
MW373	Downgradient	Yes	57.4	YES	4.050	N/A
MW385	Sidegradient	Yes	42.9	NO	3.759	N/A
MW388	Downgradient	Yes	28.1	NO	3.336	N/A
MW392	Downgradient	Yes	27.1	NO	3.300	N/A
MW395	Upgradient	Yes	24.4	NO	3.195	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.

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.*

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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 evidence of an exceedance of the statistically-derived historical background concentration in that well. For pH only, the current test well results are compared to the TL and LL. If the test well result for pH exceeds the 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	31.4	NO	3.447	N/A
MW373	Downgradient	No	14.7	N/A	2.688	N/A
MW385	Sidegradient	Yes	18.4	NO	2.912	N/A
MW388	Downgradient	Yes	13.4	NO	2.595	N/A
MW392	Downgradient	No	20	N/A	2.996	N/A
MW395	Upgradient	Yes	9.87	NO	2.289	N/A
MW397	Upgradient	Yes	60.8	YES	4.108	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

MW397

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

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

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

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

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

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

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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

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

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

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	35.8	NO	3.578	N/A
MW373	Downgradient	Yes	44.8	NO	3.802	N/A
MW385	Sidegradient	Yes	24	NO	3.178	N/A
MW388	Downgradient	Yes	30.9	NO	3.431	N/A
MW392	Downgradient	Yes	45.7	NO	3.822	N/A
MW395	Upgradient	Yes	39.9	NO	3.686	N/A
MW397	Upgradient	Yes	36.1	NO	3.586	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.*

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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

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

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

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	No	1	N/A	0.000	N/A
MW373	Downgradient	No	1	N/A	0.000	N/A
MW385	Sidegradient	No	1	N/A	0.000	N/A
MW388	Downgradient	No	1	N/A	0.000	N/A
MW392	Downgradient	Yes	1.13	NO	0.122	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.

Conclusion of Statistical Analysis on Historical Data

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

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

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

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

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

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

** *Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities,Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-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 2018 Statistical Analysis Historical Background Comparison

Cobalt UNITS: mg/L LRGA

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

Statistics-Background Data	**X=** 0.007	**S=** 0.011	**CV(1)=** 1.515	**K factor**=** 2.523	**TL(1)=** 0.034	**LL(1)=**N/A
Statistics-Transformed Background Data	**X=** -6.053	**S=** 1.416	**CV(2)=** -0.234	**K factor**=** 2.523	**TL(2)=** -2.480	**LL(2)=**N/A

Historical Background Data from Upgradient Wells with Transformed Result

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

Well Number: MW395

Date Collected	Result	LN(Result)
8/13/2002	0.025	-3.689
9/16/2002	0.025	-3.689
10/16/2002	0.001	-6.908
1/13/2003	0.00148	-6.516
4/10/2003	0.00151	-6.496
7/16/2003	0.001	-6.908
10/14/2003	0.001	-6.908
1/13/2004	0.001	-6.908

Well Number: MW397

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

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW370	Downgradient	No	0.001	N/A	-6.908	N/A
MW373	Downgradient	Yes	0.00119	N/A	-6.734	NO
MW385	Sidegradient	No	0.001	N/A	-6.908	N/A
MW388	Downgradient	No	0.001	N/A	-6.908	N/A
MW392	Downgradient	No	0.001	N/A	-6.908	N/A
MW395	Upgradient	No	0.001	N/A	-6.908	N/A
MW397	Upgradient	No	0.001	N/A	-6.908	N/A

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

Conclusion of Statistical Analysis on Historical Data

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

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

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

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

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

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

** *Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities,Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-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 2018 Statistical Analysis Historical Background Comparison

Conductivity UNITS: umho/cm LRGA

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

Statistics-Background Data	**X=** 377.875	**S=**	52.101	**CV(1)=** 0.138	**K factor**=** 2.523	**TL(1)=** 509.326	**LL(1)=**N/A
Statistics-Transformed Background Data	**X=** 5.926	**S=**	0.136	**CV(2)=** 0.023	**K factor**=** 2.523	**TL(2)=** 6.270	**LL(2)=**N/A

Historical Background Data from Upgradient Wells with Transformed Result

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

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

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	442	NO	6.091	N/A
MW373	Downgradient	Yes	725	YES	6.586	N/A
MW385	Sidegradient	Yes	436	NO	6.078	N/A
MW388	Downgradient	Yes	454	NO	6.118	N/A
MW392	Downgradient	Yes	425	NO	6.052	N/A
MW395	Upgradient	Yes	375	NO	5.927	N/A
MW397	Upgradient	Yes	321	NO	5.771	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

MW373

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

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

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

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

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

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

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

Copper UNITS: mg/L LRGA

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

Statistics-Background Data	**X=** 0.028	**S=** 0.013	**CV(1)=** 0.474	**K factor**=** 2.523	**TL(1)=** 0.061	**LL(1)=**N/A
Statistics-Transformed Background Data	**X=** -3.662	**S=** 0.406	**CV(2)=** -0.111	**K factor**=** 2.523	**TL(2)=** -2.638	**LL(2)=**N/A

Historical Background Data from Upgradient Wells with Transformed Result

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

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

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	0.000653	NO	-7.334	N/A
MW373	Downgradient	Yes	0.000373	NO	-7.894	N/A
MW385	Sidegradient	Yes	0.000321	NO	-8.044	N/A
MW388	Downgradient	Yes	0.00125	NO	-6.685	N/A
MW392	Downgradient	Yes	0.00571	NO	-5.166	N/A
MW395	Upgradient	Yes	0.00177	NO	-6.337	N/A
MW397	Upgradient	Yes	0.000692	NO	-7.276	N/A

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

Conclusion of Statistical Analysis on Historical Data

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

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

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

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

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

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

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

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

Dissolved Oxygen UNITS: mg/L LRGA

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

Statistics-Background Data	**X=** 4.678	**S=** 2.431	**CV(1)=** 0.520	**K factor**=** 2.523	**TL(1)=** 10.812	**LL(1)=**N/A
Statistics-Transformed Background Data	**X=** 1.414	**S=** 0.550	**CV(2)=** 0.389	**K factor**=** 2.523	**TL(2)=** 2.802	**LL(2)=**N/A

Historical Background Data from Upgradient Wells with Transformed Result

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

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

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	3.31	NO	1.197	N/A
MW373	Downgradient	Yes	1.79	NO	0.582	N/A
MW385	Sidegradient	Yes	1.27	NO	0.239	N/A
MW388	Downgradient	Yes	3.53	NO	1.261	N/A
MW392	Downgradient	Yes	1.71	NO	0.536	N/A
MW395	Upgradient	Yes	4.29	NO	1.456	N/A
MW397	Upgradient	Yes	5.46	NO	1.697	N/A

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

Conclusion of Statistical Analysis on Historical Data

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

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

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

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

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

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

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

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

Dissolved Solids UNITS: mg/L LRGA

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

Statistics-Background Data	**X=** 219.250	**S=** 34.107	**CV(1)=** 0.156	**K factor**=** 2.523	**TL(1)=** 305.301	**LL(1)=**N/A
Statistics-Transformed Background Data	**X=** 5.379	**S=** 0.152	**CV(2)=** 0.028	**K factor**=** 2.523	**TL(2)=** 5.762	**LL(2)=**N/A

Historical Background Data from Upgradient Wells with Transformed Result

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

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

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	223	NO	5.407	N/A
MW373	Downgradient	Yes	393	YES	5.974	N/A
MW385	Sidegradient	Yes	277	NO	5.624	N/A
MW388	Downgradient	Yes	279	NO	5.631	N/A
MW392	Downgradient	Yes	197	NO	5.283	N/A
MW395	Upgradient	Yes	176	NO	5.170	N/A
MW397	Upgradient	Yes	184	NO	5.215	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

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.*

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

Iron UNITS: mg/L LRGA

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

Statistics-Background Data	**X=** 0.400	**S=** 0.514	**CV(1)=** 1.286	**K factor**=** 2.523	**TL(1)=** 1.698	**LL(1)=**N/A
Statistics-Transformed Background Data	**X=** -2.197	**S=** 2.634	**CV(2)=** -1.199	**K factor**=** 2.523	**TL(2)=** 4.449	**LL(2)=**N/A

Historical Background Data from Upgradient Wells with Transformed Result

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

Well Number: MW395

Date Collected	Result	LN(Result)
8/13/2002	0.294	-1.224
9/16/2002	0.2	-1.609
10/16/2002	0.0002	-8.517
1/13/2003	1.33	0.285
4/10/2003	1.31	0.270
7/16/2003	0.2	-1.609
10/14/2003	0.1	-2.303
1/13/2004	0.1	-2.303

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

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW370	Downgradient	No	0.1	N/A	-2.303	N/A
MW373	Downgradient	Yes	0.0428	N/A	-3.151	NO
MW385	Sidegradient	No	0.1	N/A	-2.303	N/A
MW388	Downgradient	Yes	0.483	N/A	-0.728	NO
MW392	Downgradient	Yes	0.0992	N/A	-2.311	NO
MW395	Upgradient	Yes	0.63	N/A	-0.462	NO
MW397	Upgradient	Yes	0.0442	N/A	-3.119	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.*

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

Magnesium UNITS: mg/L LRGA

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

Statistics-Background Data	**X=** 9.102	**S=** 4.685	**CV(1)=** 0.515	**K factor**=** 2.523	**TL(1)=** 20.922	**LL(1)=**N/A
Statistics-Transformed Background Data	**X=** 1.423	**S=** 2.408	**CV(2)=** 1.692	**K factor**=** 2.523	**TL(2)=** 7.500	**LL(2)=**N/A

Historical Background Data from Upgradient Wells with Transformed Result

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

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

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	11.5	NO	2.442	N/A
MW373	Downgradient	Yes	23.2	YES	3.144	N/A
MW385	Sidegradient	Yes	17	NO	2.833	N/A
MW388	Downgradient	Yes	13	NO	2.565	N/A
MW392	Downgradient	Yes	9.79	NO	2.281	N/A
MW395	Upgradient	Yes	10.7	NO	2.370	N/A
MW397	Upgradient	Yes	8.48	NO	2.138	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

MW373

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

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

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

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

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

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

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

Manganese UNITS: mg/L LRGA

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

Statistics-Background Data	**X=** 0.131	**S=** 0.195	**CV(1)=** 1.487	**K factor**=** 2.523	**TL(1)=** 0.624	**LL(1)=**N/A
Statistics-Transformed Background Data	**X=** -3.104	**S=** 1.529	**CV(2)=** -0.493	**K factor**=** 2.523	**TL(2)=** 0.755	**LL(2)=**N/A

Historical Background Data from Upgradient Wells with Transformed Result

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

Well Number: MW395

Date Collected	Result	LN(Result)
8/13/2002	0.361	-1.019
9/16/2002	0.028	-3.576
10/16/2002	0.026	-3.650
1/13/2003	0.0713	-2.641
4/10/2003	0.629	-0.464
7/16/2003	0.297	-1.214
10/14/2003	0.0198	-3.922
1/13/2004	0.0126	-4.374

Well Number: MW397

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

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW370	Downgradient	No	0.005	N/A	-5.298	N/A
MW373	Downgradient	Yes	0.0258	N/A	-3.657	NO
MW385	Sidegradient	Yes	0.00976	N/A	-4.629	NO
MW388	Downgradient	Yes	0.00393	N/A	-5.539	NO
MW392	Downgradient	Yes	0.0132	N/A	-4.328	NO
MW395	Upgradient	Yes	0.0123	N/A	-4.398	NO
MW397	Upgradient	Yes	0.00171	N/A	-6.371	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.*

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

Molybdenum UNITS: mg/L LRGA

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

Statistics-Background Data	**X=** 0.007	**S=** 0.011	**CV(1)=** 1.451	**K factor**=** 2.523	**TL(1)=** 0.034	**LL(1)=**N/A
Statistics-Transformed Background Data	**X=** -5.990	**S=** 1.443	**CV(2)=** -0.241	**K factor**=** 2.523	**TL(2)=** -2.349	**LL(2)=**N/A

Historical Background Data from Upgradient Wells with Transformed Result

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

Well Number: MW395

Date Collected	Result	LN(Result)
8/13/2002	0.025	-3.689
9/16/2002	0.025	-3.689
10/16/2002	0.001	-6.908
1/13/2003	0.00609	-5.101
4/10/2003	0.001	-6.908
7/16/2003	0.001	-6.908
10/14/2003	0.001	-6.908
1/13/2004	0.001	-6.908

Well Number: MW397

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

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW370	Downgradient	No	0.0005	N/A	-7.601	N/A
MW373	Downgradient	No	0.0005	N/A	-7.601	N/A
MW385	Sidegradient	Yes	0.000829	N/A	-7.095	NO
MW388	Downgradient	Yes	0.000279	N/A	-8.184	NO
MW392	Downgradient	No	0.0005	N/A	-7.601	N/A
MW395	Upgradient	Yes	0.000347	N/A	-7.966	NO
MW397	Upgradient	No	0.0005	N/A	-7.601	N/A

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

Conclusion of Statistical Analysis on Historical Data

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

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

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

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

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

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

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

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

Nickel UNITS: mg/L LRGA

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

Statistics-Background Data	**X=** 0.018	**S=** 0.020	**CV(1)=** 1.089	**K factor**=** 2.523	**TL(1)=** 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	0.000706	N/A	-7.256	NO
MW373	Downgradient	Yes	0.00176	N/A	-6.342	NO
MW385	Sidegradient	Yes	0.00136	N/A	-6.600	NO
MW388	Downgradient	Yes	0.00146	N/A	-6.529	NO
MW392	Downgradient	Yes	0.00617	N/A	-5.088	NO
MW395	Upgradient	Yes	0.00147	N/A	-6.522	NO
MW397	Upgradient	Yes	0.000711	N/A	-7.249	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.*

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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

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

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

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	346	YES	5.846	N/A
MW373	Downgradient	Yes	438	YES	6.082	N/A
MW385	Sidegradient	Yes	405	YES	6.004	N/A
MW388	Downgradient	Yes	421	YES	6.043	N/A
MW392	Downgradient	Yes	375	YES	5.927	N/A
MW395	Upgradient	Yes	237	NO	5.468	N/A
MW397	Upgradient	Yes	407	YES	6.009	N/A

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

Conclusion of Statistical Analysis on Historical Data

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

Wells with Exceedances

MW370
MW373
MW385
MW388
MW392
MW397

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

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

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

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

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

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

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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

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

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	6.01	NO	1.793	N/A
MW373	Downgradient	Yes	6.19	NO	1.823	N/A
MW385	Sidegradient	Yes	6.45	NO	1.864	N/A
MW388	Downgradient	Yes	6.11	NO	1.810	N/A
MW392	Downgradient	Yes	5.88	NO	1.772	N/A
MW395	Upgradient	Yes	6.21	NO	1.826	N/A
MW397	Upgradient	Yes	5.98	NO	1.788	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.*

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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

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

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

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	2.24	NO	0.806	N/A
MW373	Downgradient	Yes	2.5	NO	0.916	N/A
MW385	Sidegradient	Yes	2.1	NO	0.742	N/A
MW388	Downgradient	Yes	2.3	NO	0.833	N/A
MW392	Downgradient	Yes	1.64	NO	0.495	N/A
MW395	Upgradient	Yes	1.44	NO	0.365	N/A
MW397	Upgradient	Yes	1.95	NO	0.668	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.*

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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 possbile 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	0.24	N/A	-1.427	N/A
MW373	Downgradient	No	0.416	N/A	-0.877	N/A
MW385	Sidegradient	Yes	0.905	N/A	-0.100	YES
MW388	Downgradient	No	0.616	N/A	-0.485	N/A
MW392	Downgradient	No	0.383	N/A	-0.960	N/A
MW395	Upgradient	No	0.612	N/A	-0.491	N/A
MW397	Upgradient	No	0.415	N/A	-0.879	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 = [Sum ([(background result-X)^2]/[count of background results -1])]^0.5

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

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

** *Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities,Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-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 2018 Statistical Analysis Historical Background Comparison

Sodium UNITS: mg/L LRGA

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

Statistics-Background Data	**X=** 29.560	**S=** 13.894	**CV(1)=** 0.470	**K factor**=** 2.523	**TL(1)=** 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

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

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

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	40.4	NO	3.699	N/A
MW373	Downgradient	Yes	50.2	NO	3.916	N/A
MW385	Sidegradient	Yes	33.3	NO	3.506	N/A
MW388	Downgradient	Yes	49.9	NO	3.910	N/A
MW392	Downgradient	Yes	34.6	NO	3.544	N/A
MW395	Upgradient	Yes	28.5	NO	3.350	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.

Conclusion of Statistical Analysis on Historical Data

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

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

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

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

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

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

** *Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities,Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-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 2018 Statistical Analysis Historical Background Comparison

Sulfate UNITS: mg/L LRGA

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

Statistics-Background Data	**X=** 10.756	**S=** 2.147	**CV(1)=** 0.200	**K factor**=** 2.523	**TL(1)=** 16.173	**LL(1)=**N/A
Statistics-Transformed Background Data	**X=** 2.356	**S=** 0.203	**CV(2)=** 0.086	**K factor**=** 2.523	**TL(2)=** 2.869	**LL(2)=**N/A

Historical Background Data from Upgradient Wells with Transformed Result

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

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

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	21.7	YES	3.077	N/A
MW373	Downgradient	Yes	113	YES	4.727	N/A
MW385	Sidegradient	Yes	18.8	YES	2.934	N/A
MW388	Downgradient	Yes	24.9	YES	3.215	N/A
MW392	Downgradient	Yes	8.68	NO	2.161	N/A
MW395	Upgradient	Yes	10.2	NO	2.322	N/A
MW397	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.

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.*

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Technetium-99 UNITS: pCi/L LRGA

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

Statistics-Background Data	**X=** 11.359	**S=** 9.138	**CV(1)=** 0.805	**K factor**=** 2.523	**TL(1)=** 34.414	**LL(1)=**N/A
Statistics-Transformed Background Data	**X=** 2.398	**S=** 0.859	**CV(2)=** 0.358	**K factor**=** 2.523	**TL(2)=** 3.246	**LL(2)=**N/A

Historical Background Data from Upgradient Wells with Transformed Result

Well Number: MW395

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

Well Number: MW397

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

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

#Because the natural log was not possbile 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	114	YES	4.736	N/A
MW373	Downgradient	No	20.3	N/A	3.011	N/A
MW385	Sidegradient	Yes	91.9	YES	4.521	N/A
MW388	Downgradient	Yes	117	YES	4.762	N/A
MW392	Downgradient	No	5.15	N/A	1.639	N/A
MW395	Upgradient	No	13.2	N/A	2.580	N/A
MW397	Upgradient	Yes	18.3	NO	2.907	N/A

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

Conclusion of Statistical Analysis on Historical Data

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

Wells with Exceedances

MW370
MW385
MW388

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

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

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

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

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

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

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Total Organic Carbon (TOC) UNITS: mg/L LRGA

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

Statistics-Background Data	**X=** 1.544	**S=** 0.856	**CV(1)=** 0.554	**K factor**=** 2.523	**TL(1)=** 3.702	**LL(1)=**N/A
Statistics-Transformed Background Data	**X=** 0.325	**S=** 0.452	**CV(2)=** 1.393	**K factor**=** 2.523	**TL(2)=** 1.465	**LL(2)=**N/A

Historical Background Data from Upgradient Wells with Transformed Result

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

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

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	1.02	NO	0.020	N/A
MW373	Downgradient	Yes	1.2	NO	0.182	N/A
MW385	Sidegradient	Yes	1.01	NO	0.010	N/A
MW388	Downgradient	Yes	1.18	NO	0.166	N/A
MW392	Downgradient	Yes	1.1	NO	0.095	N/A
MW395	Upgradient	Yes	0.921	NO	-0.082	N/A
MW397	Upgradient	Yes	0.778	NO	-0.251	N/A

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

Conclusion of Statistical Analysis on Historical Data

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

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

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

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

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

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

** *Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities,Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-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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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

Well Number: MW395

Date Collected	Result	LN(Result)
8/13/2002	50	3.912
9/16/2002	50	3.912
10/16/2002	50	3.912
1/13/2003	18.3	2.907
4/10/2003	51.2	3.936
7/16/2003	42.6	3.752
10/14/2003	12.3	2.510
1/13/2004	10	2.303

Well Number: MW397

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

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	6.16	NO	1.818	N/A
MW373	Downgradient	Yes	11.6	NO	2.451	N/A
MW385	Sidegradient	No	8.78	N/A	2.172	N/A
MW388	Downgradient	Yes	11.5	NO	2.442	N/A
MW392	Downgradient	Yes	23.6	NO	3.161	N/A
MW395	Upgradient	Yes	44.4	NO	3.793	N/A
MW397	Upgradient	Yes	5.42	NO	1.690	N/A

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

Conclusion of Statistical Analysis on Historical Data

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

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

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

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

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

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

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

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

Trichloroethene UNITS: ug/L LRGA

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

Statistics-Background Data	**X=** 7.313	**S=** 5.701	**CV(1)=** 0.780	**K factor**=** 2.523	**TL(1)=** 21.695	**LL(1)=**N/A
Statistics-Transformed Background Data	**X=** 1.467	**S=** 1.213	**CV(2)=** 0.827	**K factor**=** 2.523	**TL(2)=** 4.528	**LL(2)=**N/A

Historical Background Data from Upgradient Wells with Transformed Result

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

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

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	0.67	N/A	-0.400	N/A
MW373	Downgradient	Yes	7.91	NO	2.068	N/A
MW385	Sidegradient	No	1	N/A	0.000	N/A
MW388	Downgradient	Yes	0.65	N/A	-0.431	N/A
MW392	Downgradient	Yes	14.1	NO	2.646	N/A
MW395	Upgradient	Yes	2.91	N/A	1.068	N/A
MW397	Upgradient	No	1	N/A	0.000	N/A

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

Conclusion of Statistical Analysis on Historical Data

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

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

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

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

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

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

** *Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities,Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-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 2018 Statistical Analysis Historical Background Comparison

Vanadium 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=** 0.021	**S=** 0.002	**CV(1)=** 0.105	**K factor**=** 2.523	**TL(1)=** 0.027	**LL(1)=**N/A
Statistics-Transformed Background Data	**X=** -3.856	**S=** 0.100	**CV(2)=** -0.026	**K factor**=** 2.523	**TL(2)=** -3.604	**LL(2)=**N/A

Historical Background Data from Upgradient Wells with Transformed Result

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	0.02	-3.912
1/13/2003	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
4/12/2004	0.02	-3.912

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	0.02	-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

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	0.00376	NO	-5.583	N/A
MW373	Downgradient	No	0.01	N/A	-4.605	N/A
MW385	Sidegradient	Yes	0.00417	NO	-5.480	N/A
MW388	Downgradient	Yes	0.00343	NO	-5.675	N/A
MW392	Downgradient	No	0.01	N/A	-4.605	N/A
MW395	Upgradient	Yes	0.00352	NO	-5.649	N/A
MW397	Upgradient	Yes	0.00464	NO	-5.373	N/A

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

Conclusion of Statistical Analysis on Historical Data

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

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

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

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

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

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

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

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

Zinc UNITS: mg/L LRGA

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

Statistics-Background Data	**X=** 0.044	**S=** 0.034	**CV(1)=** 0.760	**K factor**=** 2.523	**TL(1)=** 0.129	**LL(1)=**N/A
Statistics-Transformed Background Data	**X=** -3.342	**S=** 0.659	**CV(2)=** -0.197	**K factor**=** 2.523	**TL(2)=** -1.679	**LL(2)=**N/A

Historical Background Data from Upgradient Wells with Transformed Result

Well Number: MW395

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

Well Number: MW397

Date Collected	Result	LN(Result)
8/13/2002	0.1	-2.303
9/16/2002	0.1	-2.303
10/17/2002	0.025	-3.689
1/13/2003	0.035	-3.352
4/8/2003	0.035	-3.352
7/16/2003	0.02	-3.912
10/14/2003	0.02	-3.912
1/13/2004	0.02	-3.912

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	0.00576	NO	-5.157	N/A
MW373	Downgradient	No	0.01	N/A	-4.605	N/A
MW385	Sidegradient	Yes	0.00448	NO	-5.408	N/A
MW388	Downgradient	Yes	0.00519	NO	-5.261	N/A
MW392	Downgradient	No	0.01	N/A	-4.605	N/A
MW395	Upgradient	Yes	0.00398	NO	-5.526	N/A
MW397	Upgradient	Yes	0.00519	NO	-5.261	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.*

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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 2018 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=** 242.625 **S=** 59.020 **CV(1)=** 0.243 **K factor**=** 3.188 **TL(1)=** 430.782 **LL(1)=** N/A

Statistics-Transformed Background Data **X=** 5.467 **S=** 0.232 **CV(2)=** 0.043 **K factor**=** 3.188 **TL(2)=** 6.208 **LL(2)=** N/A

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

Current Background Data from Upgradient Wells with Transformed Result

Well Number:	MW396	
Date Collected	Result	LN(Result)
10/12/2016	221	5.398
1/17/2017	209	5.342
4/20/2017	172	5.147
7/19/2017	291	5.673
10/9/2017	217	5.380
1/23/2018	203	5.313
4/19/2018	275	5.617
7/19/2018	353	5.866

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW386	Sidegradient	Yes	232	NO	5.447	N/A
MW390	Downgradient	Yes	413	NO	6.023	N/A
MW393	Downgradient	Yes	303	NO	5.714	N/A
MW396	Upgradient	Yes	210	NO	5.347	N/A

Conclusion of Statistical Analysis on Current Data

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

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

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

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

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

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

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

C-746-S/T Fourth Quarter 2018 Statistical Analysis Current Background Comparison

Technetium-99 UNITS: pCi/L UCRS

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

Statistics-Background Data	**X=** -3.418	**S=** 7.244	**CV(1)=** -2.120	**K factor**=** 3.188	**TL(1)=** 19.678	**LL(1)=** N/A
Statistics-Transformed Background Data	**X=** 0.966	**S=** 0.711	**CV(2)=** 0.736	**K factor**=** 3.188	**TL(2)=** 1.766	**LL(2)=** N/A

Current Background Data from Upgradient Wells with Transformed Result

Well Number:	MW396	
Date Collected	Result	LN(Result)
10/12/2016	-10.9	#Func!
1/17/2017	3.72	1.314
4/20/2017	-7.44	#Func!
7/19/2017	1.19	0.174
10/9/2017	-11.3	#Func!
1/23/2018	5.85	1.766
4/19/2018	-10.3	#Func!
7/19/2018	1.84	0.610

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 possbile for all background values, the TL was considered equal to the maximum background value.

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW390	Downgradient	Yes	67.7	YES	4.215	N/A

Conclusion of Statistical Analysis on Current Data

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

Wells with Exceedances

MW390

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

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

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

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

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

** *Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities,Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-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 2018 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=** 9.842	**S=** 7.654	**CV(1)=** 0.778	**K factor**=** 2.523	**TL(1)=** 29.152	**LL(1)=** N/A
Statistics-Transformed Background Data	**X=** 2.257	**S=** 0.686	**CV(2)=** 0.304	**K factor**=** 2.523	**TL(2)=** 3.114	**LL(2)=** N/A

Current Background Data from Upgradient Wells with Transformed Result

Well Number: MW220

Date Collected	Result	LN(Result)
10/10/2016	21.7	3.077
1/11/2017	13.6	2.610
4/19/2017	20.1	3.001
7/19/2017	22.5	3.114
10/9/2017	13.1	2.573
1/23/2018	12.8	2.549
4/17/2018	14.4	2.667
7/19/2018	8.64	2.156

Well Number: MW394

Date Collected	Result	LN(Result)
10/12/2016	2.51	0.920
1/17/2017	5.57	1.717
4/20/2017	9.09	2.207
7/19/2017	6.29	1.839
10/9/2017	-0.603	#Func!
1/23/2018	-3.27	#Func!
4/19/2018	8.1	2.092
7/19/2018	2.94	1.078

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 possbile 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)
MW372	Downgradient	Yes	123	YES	4.812	N/A
MW384	Sidegradient	Yes	116	YES	4.754	N/A
MW387	Downgradient	Yes	185	YES	5.220	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
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 2018 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=** 24.044	**S=** 3.304	**CV(1)=** 0.137	**K factor**=** 2.523	**TL(1)=** 32.379	**LL(1)=** N/A
Statistics-Transformed Background Data	**X=** 3.171	**S=** 0.141	**CV(2)=** 0.045	**K factor**=** 2.523	**TL(2)=** 3.527	**LL(2)=** N/A

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

Current Background Data from Upgradient Wells with Transformed Result

Well Number: MW220

Date Collected	Result	LN(Result)
10/10/2016	20.5	3.020
1/11/2017	19.6	2.976
4/19/2017	20.8	3.035
7/19/2017	22.7	3.122
10/9/2017	19.9	2.991
1/23/2018	18.8	2.934
4/17/2018	22.6	3.118
7/19/2018	25.5	3.239

Well Number: MW394

Date Collected	Result	LN(Result)
10/12/2016	28.6	3.353
1/17/2017	26.7	3.285
4/20/2017	27.9	3.329
7/19/2017	26.1	3.262
10/9/2017	25.7	3.246
1/23/2018	26	3.258
4/19/2018	25.4	3.235
7/19/2018	27.9	3.329

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW372	Downgradient	Yes	49.7	YES	3.906	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

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

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

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

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

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

** *Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities,Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-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 2018 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=** 212.625 **S=** 69.215 **CV(1)=** 0.326 **K factor**=** 2.523 **TL(1)=** 387.253 **LL(1)=** N/A

Statistics-Transformed Background Data **X=** 5.325 **S=** 0.250 **CV(2)=** 0.047 **K factor**=** 2.523 **TL(2)=** 5.956 **LL(2)=** N/A

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

Current Background Data from Upgradient Wells with Transformed Result

Well Number: MW220

Date Collected	Result	LN(Result)
10/10/2016	187	5.231
1/11/2017	201	5.303
4/19/2017	193	5.263
7/19/2017	451	6.111
10/9/2017	147	4.990
1/23/2018	163	5.094
4/17/2018	183	5.209
7/19/2018	207	5.333

Well Number: MW394

Date Collected	Result	LN(Result)
10/12/2016	219	5.389
1/17/2017	213	5.361
4/20/2017	203	5.313
7/19/2017	203	5.313
10/9/2017	170	5.136
1/23/2018	187	5.231
4/19/2018	271	5.602
7/19/2018	204	5.318

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW372	Downgradient	Yes	336	NO	5.817	N/A

Conclusion of Statistical Analysis on Current Data

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

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

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

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

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

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

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

C-746-S/T Fourth Quarter 2018 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=** 10.406	**S=** 1.471	**CV(1)=**0.141	**K factor**=** 2.523	**TL(1)=** 14.116	**LL(1)=**N/A
Statistics-Transformed Background Data	**X=** 2.333	**S=** 0.146	**CV(2)=**0.063	**K factor**=** 2.523	**TL(2)=** 2.701	**LL(2)=**N/A

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

Current Background Data from Upgradient Wells with Transformed Result

Well Number:	MW220	
Date Collected	Result	LN(Result)
10/10/2016	8.7	2.163
1/11/2017	8.48	2.138
4/19/2017	9.11	2.209
7/19/2017	9.36	2.236
10/9/2017	8.67	2.160
1/23/2018	8.04	2.084
4/17/2018	9.63	2.265
7/19/2018	11.1	2.407

Well Number:	MW394	
Date Collected	Result	LN(Result)
10/12/2016	12.1	2.493
1/17/2017	11.7	2.460
4/20/2017	11.6	2.451
7/19/2017	11.4	2.434
10/9/2017	11.4	2.434
1/23/2018	11.5	2.442
4/19/2018	11.7	2.460
7/19/2018	12	2.485

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW372	Downgradient	Yes	19.1	YES	2.950	N/A
MW387	Downgradient	Yes	15.5	YES	2.741	N/A
MW391	Downgradient	Yes	15.6	YES	2.747	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 = [Sum ([(background result-X)^2]/[count of background results -1])]^0.5

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

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

** *Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities,Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-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 2018 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=** 353.313 **S=** 50.665 **CV(1)=** 0.143 **K factor**=** 2.523 **TL(1)=** 481.139 **LL(1)=** N/A

Statistics-Transformed Background Data **X=** 5.857 **S=** 0.147 **CV(2)=** 0.025 **K factor**=** 2.523 **TL(2)=** 6.227 **LL(2)=** N/A

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

Current Background Data from Upgradient Wells with Transformed Result

Well Number:	MW220	
Date Collected	Result	LN(Result)
10/10/2016	414	6.026
1/11/2017	417	6.033
4/19/2017	283	5.645
7/19/2017	350	5.858
10/9/2017	436	6.078
1/23/2018	362	5.892
4/17/2018	305	5.720
7/19/2018	390	5.966

Well Number:	MW394	
Date Collected	Result	LN(Result)
10/12/2016	369	5.911
1/17/2017	397	5.984
4/20/2017	306	5.724
7/19/2017	338	5.823
10/9/2017	337	5.820
1/23/2018	264	5.576
4/19/2018	310	5.737
7/19/2018	375	5.927

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW220	Upgradient	Yes	413	NO	6.023	N/A
MW221	Sidegradient	Yes	410	NO	6.016	N/A
MW384	Sidegradient	Yes	418	NO	6.035	N/A
MW387	Downgradient	Yes	438	NO	6.082	N/A

Conclusion of Statistical Analysis on Current Data

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

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

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

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

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

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

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

C-746-S/T Fourth Quarter 2018 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=** 0.305	**S=** 0.300	**CV(1)=** 0.984	**K factor**=** 2.523	**TL(1)=** 1.061	**LL(1)=** N/A
Statistics-Transformed Background Data	**X=** -1.221	**S=** 0.716	**CV(2)=** -0.586	**K factor**=** 2.523	**TL(2)=** 0.140	**LL(2)=** N/A

Current Background Data from Upgradient Wells with Transformed Result

Well Number: MW220

Date Collected	Result	LN(Result)
10/10/2016	1.15	0.140
1/11/2017	0.308	-1.178
4/19/2017	0.178	-1.726
7/19/2017	0.476	-0.742
10/9/2017	0.212	-1.551
1/23/2018	-0.246	#Func!
4/17/2018	0	#Func!
7/19/2018	0.15	-1.897

Well Number: MW394

Date Collected	Result	LN(Result)
10/12/2016	0.419	-0.870
1/17/2017	0.518	-0.658
4/20/2017	0.0524	-2.949
7/19/2017	0.462	-0.772
10/9/2017	0.271	-1.306
1/23/2018	0.232	-1.461
4/19/2018	0.379	-0.970
7/19/2018	0.314	-1.158

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 possbile 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)
MW387	Downgradient	Yes	1.55	YES	0.438	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

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 2018 Statistical Analysis Current Background Comparison

Sulfate UNITS: mg/L URGA

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

Statistics-Background Data	**X=** 15.200	**S=** 5.246	**CV(1)=** 0.345	**K factor**=** 2.523	**TL(1)=** 28.436	**LL(1)=** N/A
Statistics-Transformed Background Data	**X=** 2.666	**S=** 0.342	**CV(2)=** 0.128	**K factor**=** 2.523	**TL(2)=** 3.529	**LL(2)=** N/A

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

Current Background Data from Upgradient Wells with Transformed Result

Well Number: MW220

Date Collected	Result	LN(Result)
10/10/2016	18.7	2.929
1/11/2017	18.4	2.912
4/19/2017	19.9	2.991
7/19/2017	22.7	3.122
10/9/2017	17.6	2.868
1/23/2018	16.4	2.797
4/17/2018	21.1	3.049
7/19/2018	24.7	3.207

Well Number: MW394

Date Collected	Result	LN(Result)
10/12/2016	10.4	2.342
1/17/2017	10.8	2.380
4/20/2017	10.5	2.351
7/19/2017	10.2	2.322
10/9/2017	10.5	2.351
1/23/2018	10.4	2.342
4/19/2018	10.4	2.342
7/19/2018	10.5	2.351

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW372	Downgradient	Yes	66.9	YES	4.203	N/A
MW384	Sidegradient	Yes	21.4	NO	3.063	N/A
MW387	Downgradient	Yes	28.5	YES	3.350	N/A
MW391	Downgradient	Yes	64.2	YES	4.162	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 = [Sum ([(background result-X)^2]/[count of background results -1])]^0.5

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

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

** *Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities,Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-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 2018 Statistical Analysis Current Background Comparison

Technetium-99 UNITS: pCi/L URGA

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

Statistics-Background Data	**X=** 13.031	**S=** 8.216	**CV(1)=**0.630	**K factor**=** 2.523	**TL(1)=** 33.760	**LL(1)=**N/A
Statistics-Transformed Background Data	**X=** 2.167	**S=** 1.278	**CV(2)=**0.590	**K factor**=** 2.523	**TL(2)=** 5.390	**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)
10/10/2016	12.3	2.510
1/11/2017	23.2	3.144
4/19/2017	20.7	3.030
7/19/2017	22.7	3.122
10/9/2017	18.3	2.907
1/23/2018	27.4	3.311
4/17/2018	19.9	2.991
7/19/2018	14	2.639

Well Number: MW394

Date Collected	Result	LN(Result)
10/12/2016	4.39	1.479
1/17/2017	7.79	2.053
4/20/2017	7.82	2.057
7/19/2017	11.1	2.407
10/9/2017	1.99	0.688
1/23/2018	6.15	1.816
4/19/2018	0.158	-1.845
7/19/2018	10.6	2.361

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW369	Downgradient	Yes	55	YES	4.007	N/A
MW372	Downgradient	Yes	158	YES	5.063	N/A
MW384	Sidegradient	Yes	168	YES	5.124	N/A
MW387	Downgradient	Yes	223	YES	5.407	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
MW372
MW384
MW387

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

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

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

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

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

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

C-746-S/T Fourth Quarter 2018 Statistical Analysis Current Background Comparison

Beta activity UNITS: pCi/L LRGA

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

Statistics-Background Data	**X=** 7.277	**S=** 3.199	**CV(1)=** 0.440	**K factor**=** 2.523	**TL(1)=** 15.349	**LL(1)=** N/A
Statistics-Transformed Background Data	**X=** 1.892	**S=** 0.451	**CV(2)=** 0.238	**K factor**=** 2.523	**TL(2)=** 3.031	**LL(2)=** N/A

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

Current Background Data from Upgradient Wells with Transformed Result

Well Number: MW395

Date Collected	Result	LN(Result)
10/12/2016	3.62	1.286
1/17/2017	5.31	1.670
4/20/2017	7.61	2.029
7/19/2017	5.16	1.641
10/9/2017	8.17	2.100
1/23/2018	7.59	2.027
4/19/2018	5.4	1.686
7/19/2018	7.89	2.066

Well Number: MW397

Date Collected	Result	LN(Result)
10/11/2016	5.73	1.746
1/11/2017	4.42	1.486
4/20/2017	12.1	2.493
7/19/2017	9.5	2.251
10/9/2017	11.9	2.477
1/23/2018	2.66	0.978
4/17/2018	5.57	1.717
7/19/2018	13.8	2.625

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW370	Downgradient	Yes	81.7	YES	4.403	N/A
MW388	Downgradient	Yes	83.1	YES	4.420	N/A

Conclusion of Statistical Analysis on Current Data

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

Wells with Exceedances

MW370
MW388

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

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

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

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

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

** *Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities,Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-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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Calcium UNITS: mg/L LRGA

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

Statistics-Background Data	**X=** 22.181	**S=** 4.234	**CV(1)=** 0.191	**K factor**=** 2.523	**TL(1)=** 32.864	**LL(1)=** N/A
Statistics-Transformed Background Data	**X=** 3.082	**S=** 0.193	**CV(2)=** 0.063	**K factor**=** 2.523	**TL(2)=** 3.570	**LL(2)=** N/A

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

Current Background Data from Upgradient Wells with Transformed Result

Well Number: MW395

Date Collected	Result	LN(Result)
10/12/2016	27.2	3.303
1/17/2017	25.9	3.254
4/20/2017	28.2	3.339
7/19/2017	26.2	3.266
10/9/2017	25.3	3.231
1/23/2018	24.5	3.199
4/19/2018	24.5	3.199
7/19/2018	27.1	3.300

Well Number: MW397

Date Collected	Result	LN(Result)
10/11/2016	19.3	2.960
1/11/2017	19.5	2.970
4/20/2017	18.2	2.901
7/19/2017	17.2	2.845
10/9/2017	18.7	2.929
1/23/2018	19.4	2.965
4/17/2018	16.8	2.821
7/19/2018	16.9	2.827

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW373	Downgradient	Yes	57.4	YES	4.050	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

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.*

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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=** 19.148	**S=** 8.977	**CV(1)=** 0.469	**K factor**=** 2.523	**TL(1)=** 41.797	**LL(1)=** N/A
Statistics-Transformed Background Data	**X=** 2.869	**S=** 0.402	**CV(2)=** 0.140	**K factor**=** 2.523	**TL(2)=** 3.884	**LL(2)=** N/A

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

Current Background Data from Upgradient Wells with Transformed Result

Well Number: MW395

Date Collected	Result	LN(Result)
10/12/2016	11.7	2.460
1/17/2017	20	2.996
4/20/2017	12.6	2.534
7/19/2017	12.7	2.542
10/9/2017	14.2	2.653
1/23/2018	18.9	2.939
4/19/2018	42.2	3.742
7/19/2018	24.3	3.190

Well Number: MW397

Date Collected	Result	LN(Result)
10/11/2016	16.7	2.815
1/11/2017	18.9	2.939
4/20/2017	9.17	2.216
7/19/2017	20	2.996
10/9/2017	14.2	2.653
1/23/2018	18.9	2.939
4/17/2018	37.4	3.622
7/19/2018	14.5	2.674

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW397	Upgradient	Yes	60.8	YES	4.108	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

MW397

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

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

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

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

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

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

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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=** 354.688 **S=** 32.230 **CV(1)=** 0.091 **K factor**=** 2.523 **TL(1)=** 436.003 **LL(1)=** N/A

Statistics-Transformed Background Data **X=** 5.867 **S=** 0.091 **CV(2)=** 0.016 **K factor**=** 2.523 **TL(2)=** 6.098 **LL(2)=** N/A

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

Current Background Data from Upgradient Wells with Transformed Result

Well Number: MW395

Date Collected	Result	LN(Result)
10/12/2016	377	5.932
1/17/2017	386	5.956
4/20/2017	392	5.971
7/19/2017	392	5.971
10/9/2017	378	5.935
1/23/2018	384	5.951
4/19/2018	372	5.919
7/19/2018	396	5.981

Well Number: MW397

Date Collected	Result	LN(Result)
10/11/2016	334	5.811
1/11/2017	337	5.820
4/20/2017	320	5.768
7/19/2017	315	5.753
10/9/2017	333	5.808
1/23/2018	326	5.787
4/17/2018	307	5.727
8/21/2018	326	5.787

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW373	Downgradient	Yes	725	YES	6.586	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

MW373

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

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

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

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

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

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

C-746-S/T Fourth Quarter 2018 Statistical Analysis Current Background Comparison

Dissolved Solids UNITS: mg/L LRGA

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

Statistics-Background Data **X=** 185.813 **S=** 31.773 **CV(1)=** 0.171 **K factor**=** 2.523 **TL(1)=** 265.975 **LL(1)=** N/A

Statistics-Transformed Background Data **X=** 5.211 **S=** 0.172 **CV(2)=** 0.033 **K factor**=** 2.523 **TL(2)=** 5.646 **LL(2)=** N/A

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

Current Background Data from Upgradient Wells with Transformed Result

Well Number: MW395

Date Collected	Result	LN(Result)
10/12/2016	214	5.366
1/17/2017	223	5.407
4/20/2017	204	5.318
7/19/2017	210	5.347
10/9/2017	163	5.094
1/23/2018	176	5.170
4/19/2018	257	5.549
7/19/2018	203	5.313

Well Number: MW397

Date Collected	Result	LN(Result)
10/11/2016	166	5.112
1/11/2017	187	5.231
4/20/2017	180	5.193
7/19/2017	171	5.142
10/9/2017	156	5.050
1/23/2018	179	5.187
4/17/2018	124	4.820
7/19/2018	160	5.075

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW373	Downgradient	Yes	393	YES	5.974	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

MW373

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

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

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

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

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

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

C-746-S/T Fourth Quarter 2018 Statistical Analysis Current Background Comparison

Magnesium UNITS: mg/L LRGA

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

Statistics-Background Data	**X=** 9.656	**S=** 1.874	**CV(1)=** 0.194	**K factor**=** 2.523	**TL(1)=** 14.383	**LL(1)=** N/A
Statistics-Transformed Background Data	**X=** 2.249	**S=** 0.200	**CV(2)=** 0.089	**K factor**=** 2.523	**TL(2)=** 2.753	**LL(2)=** N/A

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

Current Background Data from Upgradient Wells with Transformed Result

Well Number: MW395

Date Collected	Result	LN(Result)
10/12/2016	12	2.485
1/17/2017	11.4	2.434
4/20/2017	11.6	2.451
7/19/2017	10.9	2.389
10/9/2017	11.4	2.434
1/23/2018	10.8	2.380
4/19/2018	11.4	2.434
7/19/2018	11.7	2.460

Well Number: MW397

Date Collected	Result	LN(Result)
10/11/2016	8.26	2.111
1/11/2017	8.54	2.145
4/20/2017	7.83	2.058
7/19/2017	7.37	1.997
10/9/2017	8.41	2.129
1/23/2018	8.61	2.153
4/17/2018	6.89	1.930
7/19/2018	7.38	1.999

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW373	Downgradient	Yes	23.2	YES	3.144	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

MW373

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

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

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

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

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

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

C-746-S/T Fourth Quarter 2018 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=** 337.188 **S=** 66.849 **CV(1)=** 0.198 **K factor**=** 2.523 **TL(1)=** 505.848 **LL(1)=** N/A

Statistics-Transformed Background Data **X=** 5.798 **S=** 0.234 **CV(2)=** 0.040 **K factor**=** 2.523 **TL(2)=** 6.388 **LL(2)=** N/A

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

Current Background Data from Upgradient Wells with Transformed Result

Well Number: MW395

Date Collected	Result	LN(Result)
10/12/2016	357	5.878
1/17/2017	299	5.700
4/20/2017	190	5.247
7/19/2017	392	5.971
10/9/2017	385	5.953
1/23/2018	195	5.273
4/19/2018	367	5.905
7/19/2018	336	5.817

Well Number: MW397

Date Collected	Result	LN(Result)
10/11/2016	378	5.935
1/11/2017	416	6.031
4/20/2017	282	5.642
7/19/2017	352	5.864
10/9/2017	362	5.892
1/23/2018	361	5.889
4/17/2018	319	5.765
8/21/2018	404	6.001

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW370	Downgradient	Yes	346	NO	5.846	N/A
MW373	Downgradient	Yes	438	NO	6.082	N/A
MW385	Sidegradient	Yes	405	NO	6.004	N/A
MW388	Downgradient	Yes	421	NO	6.043	N/A
MW392	Downgradient	Yes	375	NO	5.927	N/A
MW397	Upgradient	Yes	407	NO	6.009	N/A

Conclusion of Statistical Analysis on Current Data

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

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

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

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

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

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

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

C-746-S/T Fourth Quarter 2018 Statistical Analysis Current Background Comparison

Radium-226 UNITS: pCi/L LRGA

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

Statistics-Background Data	**X=** 0.347	**S=** 0.198	**CV(1)=** 0.569	**K factor**=** 2.523	**TL(1)=** 0.846	**LL(1)=** N/A
Statistics-Transformed Background Data	**X=** -1.280	**S=** 1.132	**CV(2)=** -0.885	**K factor**=** 2.523	**TL(2)=** 1.625	**LL(2)=** N/A

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

Current Background Data from Upgradient Wells with Transformed Result

Well Number: MW395

Date Collected	Result	LN(Result)
10/12/2016	0.669	-0.402
1/17/2017	0.347	-1.058
4/20/2017	0.198	-1.619
7/19/2017	0.437	-0.828
10/9/2017	0.345	-1.064
1/23/2018	0.592	-0.524
4/19/2018	0.316	-1.152
7/19/2018	0.307	-1.181

Well Number: MW397

Date Collected	Result	LN(Result)
10/11/2016	0.575	-0.553
1/11/2017	0.374	-0.983
4/20/2017	0.41	-0.892
7/19/2017	0.555	-0.589
10/9/2017	0.123	-2.096
1/23/2018	0.3	-1.204
4/17/2018	0	#Func!
7/19/2018	0.00638	-5.055

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW385	Sidegradient	Yes	0.905	YES	-0.100	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

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

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

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

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

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

** *Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities,Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-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 2018 Statistical Analysis Current Background Comparison

Sulfate UNITS: mg/L LRGA

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

Statistics-Background Data	**X=** 10.382	**S=** 0.663	**CV(1)=** 0.064	**K factor**=** 2.523	**TL(1)=** 12.053	**LL(1)=** N/A
Statistics-Transformed Background Data	**X=** 2.338	**S=** 0.063	**CV(2)=** 0.027	**K factor**=** 2.523	**TL(2)=** 2.498	**LL(2)=** N/A

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

Current Background Data from Upgradient Wells with Transformed Result

Well Number: MW395

Date Collected	Result	LN(Result)
10/12/2016	9.86	2.288
1/17/2017	10.1	2.313
4/20/2017	10.4	2.342
7/19/2017	10	2.303
10/9/2017	10.1	2.313
1/23/2018	10.4	2.342
4/19/2018	10.5	2.351
7/19/2018	10.4	2.342

Well Number: MW397

Date Collected	Result	LN(Result)
10/11/2016	11.3	2.425
1/11/2017	11.6	2.451
4/20/2017	9.7	2.272
7/19/2017	10.1	2.313
10/9/2017	11.1	2.407
1/23/2018	11.4	2.434
4/17/2018	9.21	2.220
7/19/2018	9.94	2.297

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW370	Downgradient	Yes	21.7	YES	3.077	N/A
MW373	Downgradient	Yes	113	YES	4.727	N/A
MW385	Sidegradient	Yes	18.8	YES	2.934	N/A
MW388	Downgradient	Yes	24.9	YES	3.215	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.*

C-746-S/T Fourth Quarter 2018 Statistical Analysis Current Background Comparison

Technetium-99 UNITS: pCi/L LRGA

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

Statistics-Background Data	**X=** 13.163	**S=** 6.928	**CV(1)=** 0.526	**K factor**=** 2.523	**TL(1)=** 30.642	**LL(1)=** N/A
Statistics-Transformed Background Data	**X=** 2.416	**S=** 0.651	**CV(2)=** 0.270	**K factor**=** 2.523	**TL(2)=** 4.058	**LL(2)=** N/A

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

Current Background Data from Upgradient Wells with Transformed Result

Well Number: MW395

Date Collected	Result	LN(Result)
10/12/2016	2.15	0.765
1/17/2017	11.4	2.434
4/20/2017	9.95	2.298
7/19/2017	19.2	2.955
10/9/2017	3.67	1.300
1/23/2018	15.7	2.754
4/19/2018	9.83	2.285
7/19/2018	9.05	2.203

Well Number: MW397

Date Collected	Result	LN(Result)
10/11/2016	9.1	2.208
1/11/2017	8.85	2.180
4/20/2017	14.9	2.701
7/19/2017	29.8	3.395
10/9/2017	13	2.565
1/23/2018	13.2	2.580
4/17/2018	18.9	2.939
7/19/2018	21.9	3.086

Current Quarter Data

Well No.	Gradient	Detected?	Result	Result >TL(1)?	LN(Result)	LN(Result) >TL(2)
MW370	Downgradient	Yes	114	YES	4.736	N/A
MW385	Sidegradient	Yes	91.9	YES	4.521	N/A
MW388	Downgradient	Yes	117	YES	4.762	N/A

Conclusion of Statistical Analysis on Current Data

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

Wells with Exceedances

MW370
MW385
MW388

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

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

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

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

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

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

ATTACHMENT D3

STATISTICIAN QUALIFICATION STATEMENT

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FOUR RIVERS
NUCLEAR PARTNERSHIP, LLC

Four Rivers Nuclear Partnership, LLC
5511 Hobbs Road
Kevil, KY 42053
www.fourriversnuclearpartnership.com

January 7, 2019

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

Dear Ms. Layne:

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

As an Environmental Scientist, with a bachelor's degree in science, I have over 20 years of experience in reviewing and assessing laboratory analytical results associated with environmental sampling and investigation activities. For the generation of these statistical analyses, my work was observed and reviewed by a senior chemist and geologist with Four Rivers Nuclear Partnership, LLC.

For this project, the statistical analyses conducted on the fourth quarter 2018 monitoring well data collected from the C-746-S&T and C-746-U Landfills were performed in accordance with guidance provided in the U.S. Environmental Protection Agency guidance document, *EPA Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Interim Final Guidance* (1989).

Sincerely,

Jennifer R. Watson

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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 2018 and to determine the groundwater flow rate and direction.

Water levels during this reporting period were measured on October 24, 2018. As shown on Figure E.1, MW389, screened in the Upper Continental Recharge System (UCRS), is usually dry, while other UCRS wells have recordable water levels. During this reporting period, MW389 had insufficient water for both measurement of the water level and for sampling.

The UCRS has a strong vertical hydraulic gradient; therefore, the limited number of available UCRS wells, screened over different elevations, is not sufficient for mapping the potentiometric surface. Figure E.1 shows the location of UCRS MWs. The Upper Regional Gravel Aquifer (URGA) and Lower Regional Gravel Aquifer (LRGA) data were corrected for barometric pressure, if necessary, and converted to elevations to plot the potentiometric surface of the RGA, as a whole, as shown on Table E.1. Figure E.2 is a composite or average map of the URGA and LRGA elevations where well clusters exist. The contour lines are placed based on the average water level elevations of the clusters.[1] Based on the site potentiometric map (Figure E.2), the hydraulic gradient beneath the landfill, as measured along the defined groundwater flow directions, is 5.01×10^{-4} ft/ft. Additional water level measurements in October (Figure E.3) document the vicinity groundwater hydraulic gradient for the RGA to be 5.58×10^{-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 2018, 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.

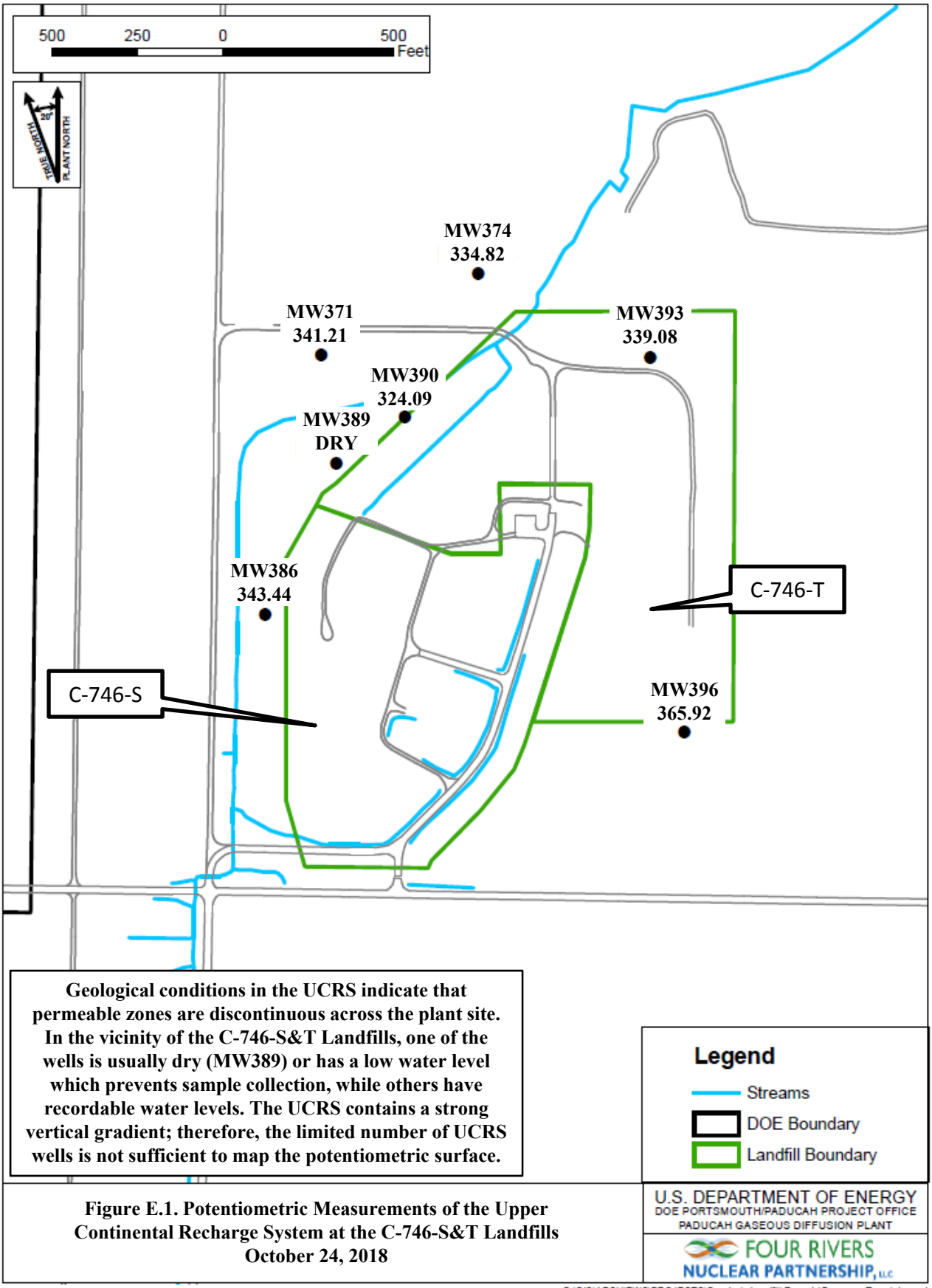

Figure E.1. Potentiometric Measurements of the Upper Continental Recharge System at the C-746-S&T Landfills October 24, 2018

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

C-746-S&T Landfills (October 2018) Water Levels										
							Raw Data		*Corrected Data	
Date	Time	Well	Formation	Datum Elev (ft amsl)	BP (in Hg)	Delta BP (ft H20)	DTW (ft)	Elev (ft amsl)	DTW (ft)	Elev (ft amsl)
10/24/2018	9:27	MW220	URGA	382.27	30.33	-0.02	57.88	324.39	57.86	324.41
10/24/2018	9:33	MW221	URGA	391.51	30.33	-0.02	67.54	323.97	67.52	323.99
10/24/2018	15:09	MW222	URGA	395.39	30.25	0.07	71.17	324.22	71.24	324.15
10/24/2018	9:36	MW223	URGA	394.49	30.33	-0.02	70.49	324.00	70.47	324.02
10/24/2018	9:40	MW224	URGA	395.82	30.33	-0.02	71.73	324.09	71.71	324.11
10/24/2018	9:30	MW225	URGA	385.88	30.33	-0.02	61.75	324.13	61.73	324.15
10/24/2018	7:17	MW353	LRGA	375.12	30.31	0.00	50.46	324.66	50.46	324.66
10/24/2018	15:14	MW384	URGA	365.42	30.25	0.07	41.30	324.12	41.37	324.05
10/24/2018	15:16	MW385	LRGA	365.86	30.25	0.07	41.70	324.16	41.77	324.09
10/24/2018	9:22	MW386	UCRS	365.47	30.33	-0.02	22.05	343.42	22.03	343.44
10/24/2018	9:17	MW387	URGA	363.65	30.33	-0.02	39.61	324.04	39.59	324.06
10/24/2018	9:18	MW388	LRGA	363.64	30.33	-0.02	39.59	324.05	39.57	324.07
10/24/2018	--	MW389	UCRS	364.26	--	--	DRY	--	DRY	--
10/24/2018	9:12	MW390	UCRS	360.60	30.33	-0.02	36.53	324.07	36.51	324.09
10/24/2018	8:53	MW391	URGA	366.83	30.33	-0.02	42.82	324.01	42.80	324.03
10/24/2018	8:55	MW392	LRGA	366.07	30.33	-0.02	42.03	324.04	42.01	324.06
10/24/2018	8:54	MW393	UCRS	366.81	30.33	-0.02	27.75	339.06	27.73	339.08
10/24/2018	9:01	MW394	URGA	378.64	30.33	-0.02	54.26	324.38	54.24	324.40
10/24/2018	9:02	MW395	LRGA	379.34	30.33	-0.02	55.02	324.32	55.00	324.34
10/24/2018	9:03	MW396	UCRS	378.84	30.33	-0.02	12.94	365.90	12.92	365.92
10/24/2018	9:07	MW397	LRGA	387.12	30.33	-0.02	62.83	324.29	62.81	324.31
10/24/2018	8:57	MW418	URGA	367.37	30.33	-0.02	43.24	324.13	43.22	324.15
10/24/2018	8:58	MW419	LRGA	367.22	30.33	-0.02	43.09	324.13	43.07	324.15

Initial Barometric Pressure **30.31**

Elev = elevation

amsl = above mean sea level

BP = barometric pressure

DTW = depth to water in feet below datum

URGA = Upper Regional Gravel Aquifer

LRGA = Lower Regional Gravel Aquifer

UCRS = Upper Continental Recharge System

*Assumes a barometric efficiency of 1.0

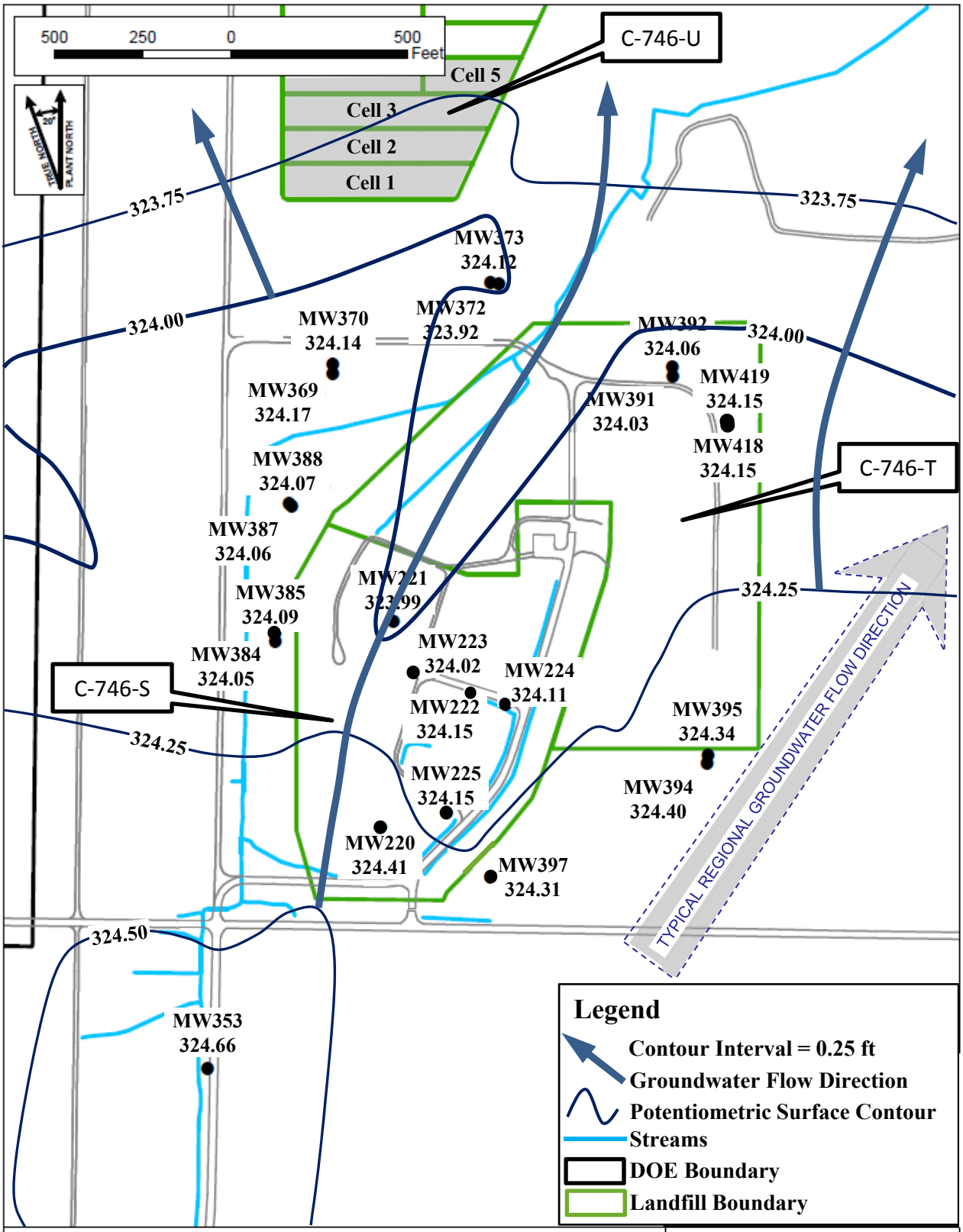

Figure E.2. Composite Potentiometric Surface of the Regional Gravel Aquifer at the C-746-S&T Landfills October 24, 2018

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

FOUR RIVERS NUCLEAR PARTNERSHIP, LLC

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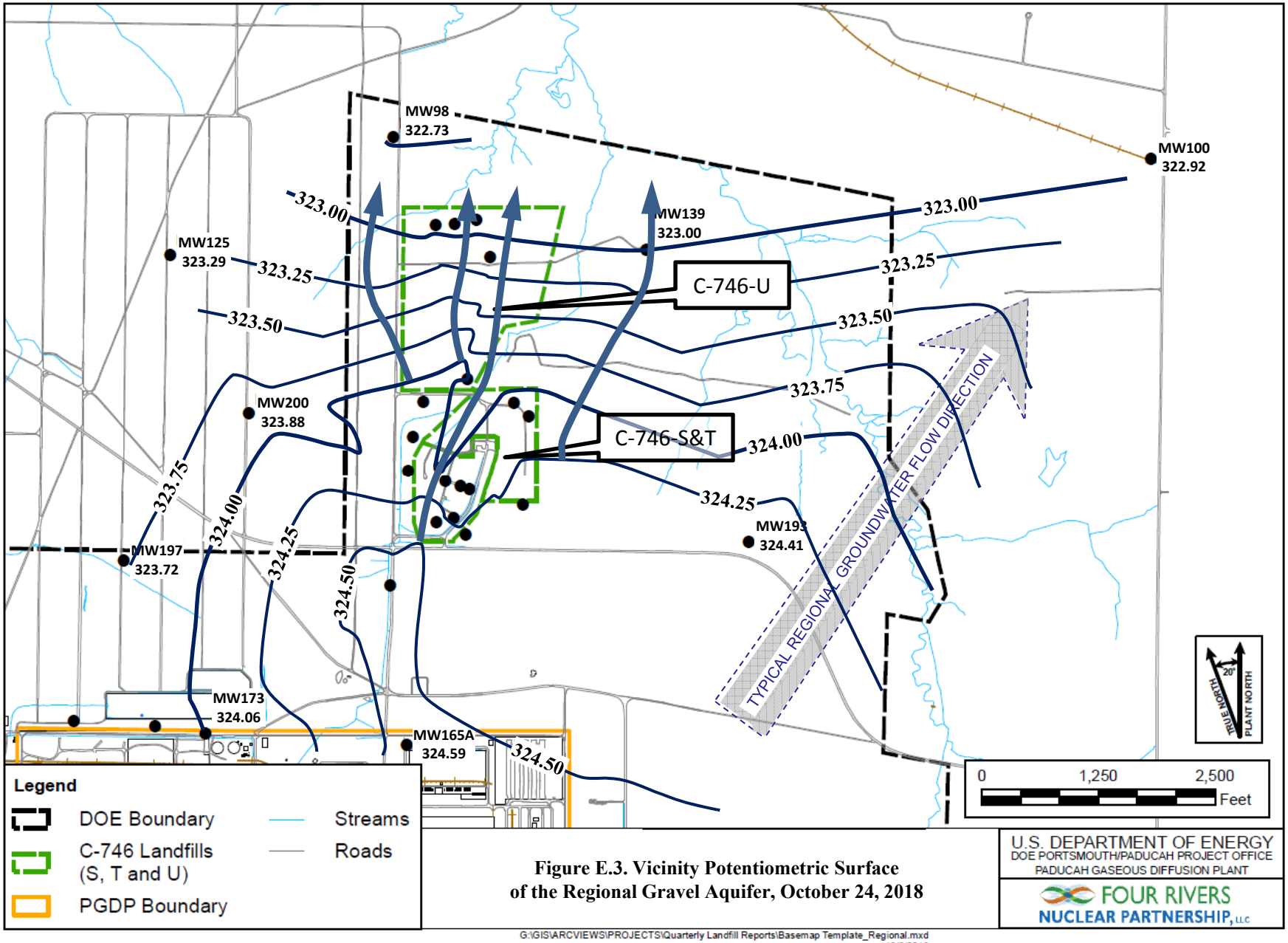

Figure E.3. Vicinity Potentiometric Surface of the Regional Gravel Aquifer, October 24, 2018

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

FOUR RIVERS NUCLEAR PARTNERSHIP, LLC

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

	ft/ft
Beneath Landfill Mound	5.01×10^{-4}
Vicinity	5.58×10^{-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
Beneath Landfill Mound					
725	0.256	0.363	1.28×10^{-4}	1.45	5.13×10^{-4}
425	0.150	0.213	7.51×10^{-5}	0.851	3.00×10^{-4}
Vicinity					
725	0.256	0.405	1.43×10^{-4}	1.62	5.72×10^{-4}
425	0.150	0.237	8.37×10^{-5}	0.949	3.35×10^{-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 2018 groundwater data collected from the C-746-S&T Landfills monitoring wells were performed in accordance with *Groundwater Monitoring Plan for the Solid Waste Permitted Landfills (C-746-S Residential Landfill, C-746-T Inert Landfill, and C-746-U Contained Landfill) at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky* (LATA Kentucky 2014).

The following are the permit required parameters in 40 *CFR* § 302.4, Appendix A, which had statistically significant increased concentrations relative to historical background concentrations.

	Parameter	**Monitoring Well**
Upper Continental Recharge System	Technetium-99	MW390
Upper Regional Gravel Aquifer	Technetium-99	MW369, MW372, MW384, MW387
Lower Regional Gravel Aquifer	Technetium-99	MW370, MW385, MW388

NOTE: Although technetium-99 is not cited in 40 *CFR* § 302.4, Appendix A, this radionuclide is being reported along with the parameters of this regulation.

11/26/2018

Four Rivers Nuclear Partnership, LLC
PROJECT ENVIRONMENTAL MEASUREMENTS SYSTEM
C-746-S&T LANDFILLS
SOLID WASTE PERMIT NUMBER SW07300014, SW07300015, SW07300045
MAXIMUM CONTAMINANT LEVEL (MCL) EXCEEDANCE REPORT
Quarterly Groundwater Sampling

AKGWA	Station	Analysis	Method	Results	Units	MCL
8004-4818	MW370	Beta activity	9310	81.7	pCi/L	50
8004-4808	MW372	Beta activity	9310	123	pCi/L	50
		Trichloroethene	8260B	5.72	ug/L	5
8004-4792	MW373	Trichloroethene	8260B	7.91	ug/L	5
8004-4809	MW384	Beta activity	9310	116	pCi/L	50
8004-4815	MW387	Beta activity	9310	185	pCi/L	50
8004-4816	MW388	Beta activity	9310	83.1	pCi/L	50
8004-4805	MW391	Trichloroethene	8260B	8.87	ug/L	5
8004-4806	MW392	Trichloroethene	8260B	14.1	ug/L	5

NOTE 1: MCLs are defined in 401 KAR 47:030.

NOTE 2: MW369, MW370, MW372, and MW373 are down-gradient wells for the C-746-S and C-746-T Landfills and upgradient for the C-746-U Landfill. These wells are sampled with the C-746-U Landfill monitoring well network. These wells are reported on the exceedance reports for C-746-S, C-746-T, and C-746-U.

APPENDIX G

CHART OF MCL AND UTL EXCEEDANCES

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Chart of MCL and Historical UTL Exceedances for the C-746-S&T Landfills

Groundwater Flow System	UCRS					URGA											LRGA						
Gradient	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							*							*									
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Quarter 4, 2005			*				*				*												
Quarter 1, 2006							*						*										
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Quarter 1, 2007							*										*						
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Quarter 1, 2010			*				*				*												
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Quarter 4, 2014			*																				
Quarter 1, 2016							*																
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Quarter 1, 2017							*																
Quarter 4, 2017																							*
Quarter 1, 2018							*																
BARIUM																							
Quarter 3, 2003							■	■															
Quarter 4, 2003							■	■															
BETA ACTIVITY																							
Quarter 4, 2002													■										
Quarter 1, 2003													■				■						
Quarter 2, 2003			■	■													■			■			
Quarter 3, 2003			■										■				■						

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

Groundwater Flow System	UCRS					URGA											LRGA						
Gradient	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												■	■										
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Quarter 3, 2010										■			■				■						
Quarter 4, 2010										■		■	■				■						
Quarter 1, 2011										■			■				■						
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Quarter 3, 2011										■			■				■			■			
Quarter 4, 2011										■		■	■				■						
Quarter 1, 2012			■							■			■				■			■			
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Quarter 3, 2012										■		■	■				■						
Quarter 4, 2012										■		■	■				■		■	■			
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Quarter 4, 2013										■		■	■				■			■			
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Quarter 3, 2018			■							■			■				■	■		■			
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BROMIDE																							
Quarter 1, 2003			*																				
Quarter 4, 2003			*																				
Quarter 1, 2004			*																				

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

Groundwater Flow System	UCRS					URGA											LRGA						
Gradient	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																							
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CALCIUM																							
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Quarter 4, 2015												*							*				

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

Groundwater Flow System	UCRS					URGA											LRGA						
Gradient	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 1, 2016												*							*				
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CARBON DISULFIDE																							
Quarter 4, 2010											*												
Quarter 1, 2011												*									*		
Quarter 2, 2017													*										
CHEMICAL OXYGEN DEMAND																							
Quarter 1, 2003				*																			
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Quarter 3, 2016			*								*												
Quarter 4, 2016																	*						
Quarter 2, 2017							*																
Quarter 3, 2017	*														*								

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

Groundwater Flow System	UCRS					URGA											LRGA						
Gradient	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
CHEMICAL OXYGEN DEMAND																							
Quarter 4, 2017						*																	
Quarter 2, 2018														*								*	
Quarter 3, 2018												*											
Quarter 4, 2018																							*
CHLORIDE																							
Quarter 1, 2003			*																				
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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										*		*							*				

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

Groundwater Flow System	UCRS					URGA											LRGA						
Gradient	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, 2005												*							*				
Quarter 3, 2005																			*				
Quarter 4, 2005										*		*							*				
Quarter 1, 2006												*							*				
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Quarter 1, 2010												*							*				
Quarter 2, 2010												*							*				
Quarter 3, 2010												*							*				
Quarter 4, 2010												*							*				
Quarter 1, 2011										*		*							*				
Quarter 2, 2011												*							*				
Quarter 3, 2011												*							*				
Quarter 4, 2011												*							*				
Quarter 1, 2012											*	*							*				
Quarter 2, 2012												*							*				
Quarter 3, 2012												*							*				
Quarter 4, 2012												*							*				
Quarter 1, 2013												*							*				
Quarter 2, 2013												*							*				
Quarter 3, 2013												*							*				
Quarter 4, 2013												*							*				
Quarter 1, 2014												*							*				
Quarter 2, 2014												*							*				
Quarter 3, 2014												*							*				
Quarter 4, 2014												*							*				
Quarter 1, 2015												*							*				
Quarter 2, 2015												*							*				
Quarter 3, 2015												*							*				
Quarter 4, 2015												*							*				
Quarter 1, 2016												*							*				
Quarter 2, 2016																			*				
Quarter 3, 2016												*							*				
Quarter 4, 2016																			*				
Quarter 1, 2017																			*				
Quarter 2, 2017																			*				
Quarter 3, 2017																			*				
Quarter 4, 2017																			*				
Quarter 1, 2018																			*				
Quarter 2, 2018																			*				
Quarter 3, 2018																			*				
Quarter 4, 2018																			*				
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										*		*							*				

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

Groundwater Flow System	UCRS					URGA											LRGA						
Gradient	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 3, 2004										*		*							*				
Quarter 4, 2004										*		*							*				
Quarter 1, 2005												*							*				
Quarter 2, 2005																			*				
Quarter 3, 2005																	*	*	*	*	*		
Quarter 4, 2005																	*	*	*	*	*		
Quarter 1, 2006																	*	*	*	*	*		
Quarter 2, 2006																	*	*	*	*	*		
Quarter 3, 2006																	*	*	*	*	*		
Quarter 4, 2006										*		*					*		*				
Quarter 1, 2007																			*				
Quarter 2, 2007										*		*							*				
Quarter 3, 2007										*		*							*				
Quarter 4, 2007												*							*				
Quarter 1, 2008												*							*				
Quarter 2, 2008												*							*				
Quarter 3, 2008												*							*				
Quarter 4, 2008										*		*							*				
Quarter 1, 2009												*							*				
Quarter 2, 2009												*	*						*				
Quarter 3, 2009												*	*						*				
Quarter 4, 2009												*	*						*				
Quarter 1, 2010												*	*						*				
Quarter 2, 2010										*		*	*						*				
Quarter 3, 2010										*		*							*				
Quarter 4, 2010										*		*							*				
Quarter 1, 2011										*		*							*				
Quarter 2, 2011												*	*						*				
Quarter 3, 2011												*							*				
Quarter 4, 2011												*							*				
Quarter 1, 2012											*	*	*						*				
Quarter 2, 2012												*							*				
Quarter 3, 2012										*		*	*						*				
Quarter 4, 2012												*	*						*				
Quarter 1, 2013										*		*							*				
Quarter 2, 2013												*							*				
Quarter 3, 2013												*							*				
Quarter 4, 2013												*							*				
Quarter 1, 2014												*	*						*				
Quarter 2, 2014												*							*				
Quarter 3, 2014									*			*	*						*				
Quarter 4, 2014												*	*						*				
Quarter 1, 2015												*							*				
Quarter 2, 2015												*							*				
Quarter 3, 2015												*							*				
Quarter 4, 2015									*			*						*	*				
Quarter 1, 2016												*							*				
Quarter 2, 2016												*	*	*					*				
Quarter 3, 2016												*							*				
Quarter 4, 2016												*							*				
Quarter 1, 2017												*							*				
Quarter 2, 2017												*							*				
Quarter 3, 2017												*		*	*				*				
Quarter 4, 2017												*							*				
Quarter 1, 2018												*							*				
Quarter 2, 2018												*							*				
Quarter 3, 2018												*		*					*				
Quarter 4, 2018												*							*				
IODIDE																							
Quarter 4, 2002																					*		
Quarter 2, 2003						*																	
Quarter 3, 2003													*										

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

Groundwater Flow System	UCRS					URGA											LRGA						
Gradient	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
IODIDE																							
Quarter 1, 2004				*																			
Quarter 3, 2010																					*		
Quarter 2, 2013										*													
IRON																							
Quarter 1, 2003							*			*	*			*									
Quarter 2, 2003										*	*	*	*										
Quarter 3, 2003							*	*	*	*	*	*											
Quarter 4, 2003											*												
Quarter 1, 2004											*												
Quarter 2, 2004										*	*												
Quarter 3, 2004										*													
Quarter 4, 2004										*													
Quarter 1, 2005												*											
Quarter 2, 2005											*	*											
Quarter 1, 2006							*																
Quarter 2, 2006												*											
Quarter 3, 2006											*												
Quarter 1, 2007											*	*											
Quarter 2, 2007											*												
Quarter 2, 2008												*											
Quarter 3, 2008												*											
MAGNESIUM																							
Quarter 1, 2003			*																				
Quarter 2, 2003			*									*							*				
Quarter 3, 2003			*				*					*											
Quarter 4, 2003			*									*							*				
Quarter 1, 2004			*									*		*					*				
Quarter 2, 2004			*									*							*				
Quarter 3, 2004			*									*							*				
Quarter 4, 2004			*									*							*				
Quarter 1, 2005												*							*				
Quarter 2, 2005												*							*				
Quarter 3, 2005												*							*				
Quarter 4, 2005												*							*				
Quarter 1, 2006												*							*				
Quarter 2, 2006												*							*				
Quarter 3, 2006												*							*				
Quarter 4, 2006												*							*				
Quarter 1, 2007												*							*				
Quarter 2, 2007												*							*				
Quarter 3, 2007												*							*				
Quarter 4, 2007												*							*				
Quarter 1, 2008												*							*				
Quarter 2, 2008												*							*				
Quarter 3, 2008												*							*				
Quarter 4, 2008												*							*				
Quarter 1, 2009												*							*				
Quarter 2, 2009												*							*				
Quarter 3, 2009												*	*						*				
Quarter 4, 2009												*							*				
Quarter 1, 2010												*							*				
Quarter 2, 2010												*	*						*				
Quarter 3, 2010												*							*				
Quarter 4, 2010												*							*				
Quarter 1, 2011												*							*				
Quarter 2, 2011												*	*						*				
Quarter 3, 2011												*							*				
Quarter 4, 2011												*							*				
Quarter 1, 2012												*							*				
Quarter 2, 2012												*							*				
Quarter 3, 2012												*	*						*				
Quarter 4, 2012												*	*						*				

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

Groundwater Flow System	UCRS					URGA											LRGA						
Gradient	S	D	D	D	U	S	S	S	S	S	D	D	D	D	U	U	S	D	D	D	D	U	U
Monitoring Well	386	389	390	393	396	221	222	223	224	384	369	372	387	391	220	394	385	370	373	388	392	395	397
MAGNESIUM																							
Quarter 1, 2013												*							*				
Quarter 2, 2013												*							*				
Quarter 3, 2013												*							*				
Quarter 4, 2013												*							*				
Quarter 1, 2014																		*	*				
Quarter 2, 2014												*	*						*				
Quarter 3, 2014												*							*				
Quarter 4, 2014												*	*						*				
Quarter 1, 2015												*	*						*				
Quarter 2, 2015												*							*				
Quarter 3, 2015												*							*				
Quarter 4, 2015												*							*				
Quarter 1, 2016												*							*				
Quarter 2, 2016												*		*					*				
Quarter 3, 2016												*							*				
Quarter 4, 2016												*		*					*				
Quarter 1, 2017												*		*					*				
Quarter 2, 2017												*											
Quarter 3, 2017												*		*									
Quarter 4, 2017												*							*				
Quarter 1, 2018												*	*						*				
Quarter 2, 2018												*											
Quarter 3, 2018												*											
Quarter 4, 2018												*	*	*					*				
MANGANESE																							
Quarter 4, 2002																					*		
Quarter 3, 2003							*	*															
Quarter 4, 2003							*	*															
Quarter 1, 2004							*																
Quarter 2, 2004							*																
Quarter 4, 2004							*	*															
Quarter 1, 2005							*																
Quarter 3, 2005																					*		
Quarter 3, 2009	*																						
OXIDATION-REDUCTION POTENTIAL																							
Quarter 4, 2003			*																				
Quarter 2, 2004			*																				
Quarter 3, 2004			*															*					
Quarter 4, 2004			*			*																	
Quarter 1, 2005			*															*					
Quarter 2, 2005	*		*																				
Quarter 3, 2005	*		*																				
Quarter 4, 2005			*																				
Quarter 2, 2006			*																				
Quarter 3, 2006			*															*					
Quarter 4, 2006			*																				
Quarter 1, 2007			*																				
Quarter 2, 2007			*				*																
Quarter 3, 2007			*				*																
Quarter 4, 2007			*																				
Quarter 1, 2008			*			*			*														
Quarter 2, 2008	*		*	*		*							*				*		*	*			
Quarter 3, 2008			*	*		*							*				*		*	*			
Quarter 4, 2008			*	*		*	*	*	*				*				*	*		*			
Quarter 1, 2009			*				*	*	*				*	*				*		*			
Quarter 3, 2009			*	*		*											*	*	*	*			
Quarter 4, 2009			*			*			*									*		*			
Quarter 1, 2010	*		*																	*			
Quarter 2, 2010	*		*	*					*				*				*	*		*			
Quarter 3, 2010	*		*	*		*											*	*	*	*			
Quarter 4, 2010			*					*			*			*			*	*	*	*			
Quarter 1, 2011	*			*		*	*	*	*		*		*	*			*	*		*	*		
Quarter 2, 2011	*		*	*			*	*	*	*	*		*	*			*	*	*	*	*		
Quarter 3, 2011	*		*	*			*	*		*			*		*		*	*	*	*			

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

Groundwater Flow System	UCRS					URGA											LRGA						
Gradient	S	D	D	D	U	S	S	S	S	S	D	D	D	D	U	U	S	D	D	D	D	U	U
Monitoring Well	386	389	390	393	396	221	222	223	224	384	369	372	387	391	220	394	385	370	373	388	392	395	397
OXIDATION-REDUCTION POTENTIAL																							
Quarter 4, 2011	*		*	*			*				*						*	*		*			
Quarter 1, 2012	*		*	*		*	*	*	*	*			*	*			*	*	*	*	*		
Quarter 2, 2012	*		*				*		*		*		*	*			*	*	*	*	*		
Quarter 3, 2012	*		*			*	*	*	*	*			*	*			*	*	*	*	*		
Quarter 4, 2012				*		*		*	*	*	*		*	*			*	*	*	*	*		
Quarter 1, 2013				*		*		*	*		*		*	*				*		*	*		
Quarter 2, 2013	*			*			*		*		*		*				*	*	*	*	*		
Quarter 3, 2013	*		*	*		*	*	*	*	*			*				*	*	*	*			
Quarter 4, 2013			*	*		*	*	*	*	*	*	*	*	*			*	*	*	*	*		
Quarter 1, 2014	*		*	*		*	*		*		*	*	*	*			*	*	*	*	*		
Quarter 2, 2014	*		*	*		*	*		*		*		*				*	*	*	*	*		
Quarter 3, 2014	*		*	*		*											*	*	*	*			
Quarter 4, 2014	*		*	*							*		*				*	*	*	*	*		
Quarter 1, 2015	*		*	*	*	*	*	*	*		*	*	*	*	*	*	*	*	*	*	*	*	*
Quarter 2, 2015	*		*	*	*	*	*				*			*	*	*	*	*	*	*	*	*	*
Quarter 3, 2015	*		*	*	*	*	*	*	*	*	*		*	*	*	*	*	*	*	*	*	*	*
Quarter 4, 2015	*		*	*	*	*	*	*	*	*			*		*	*	*	*	*	*	*	*	*
Quarter 1, 2016	*		*	*	*	*	*	*	*	*	*		*		*		*	*		*	*	*	*
Quarter 2, 2016	*		*	*	*	*		*	*	*			*	*	*	*	*	*		*	*	*	*
Quarter 3, 2016	*		*	*	*	*	*	*	*	*			*	*	*		*	*	*	*	*	*	*
Quarter 4, 2016	*		*	*	*		*	*		*			*		*		*	*	*	*	*	*	*
Quarter 1, 2017	*		*	*	*			*	*						*			*		*		*	*
Quarter 2, 2017	*		*	*	*												*			*	*		
Quarter 3, 2017	*		*	*	*												*	*	*	*	*	*	*
Quarter 4, 2017	*		*	*	*	*	*	*	*	*	*		*	*	*		*	*	*	*	*	*	*
Quarter 1, 2018	*		*	*	*	*												*	*	*	*		*
Quarter 2, 2018	*		*	*	*												*	*	*	*	*	*	*
Quarter 3, 2018	*		*	*	*	*	*	*	*								*	*	*	*	*	*	*
Quarter 4, 2018	*		*	*	*	*				*			*		*		*	*	*	*	*		*
PCB-1016																							
Quarter 4, 2003							*	*	*		*							*					
Quarter 3, 2004											*												
Quarter 3, 2005							*				*												
Quarter 1, 2006											*												
Quarter 2, 2006											*												
Quarter 4, 2006											*												
Quarter 1, 2007											*	*											
Quarter 2, 2007												*											
Quarter 3, 2007											*												
Quarter 2, 2008											*	*											
Quarter 3, 2008											*												
Quarter 4, 2008											*												
Quarter 1, 2009											*												
Quarter 2, 2009											*												
Quarter 3, 2009											*												
Quarter 4, 2009											*												
Quarter 1, 2010											*												
Quarter 2, 2010											*												
Quarter 3, 2010											*												
Quarter 4, 2010											*												
PCB-1232																							
Quarter 1, 2011											*												
PCB-1248																							
Quarter 2, 2008												*											
PCB-1260																							
Quarter 2, 2006																		*					
pH																							
Quarter 4, 2002																	*						
Quarter 2, 2003																	*						
Quarter 3, 2003																	*						
Quarter 4, 2003							*										*						
Quarter 1, 2004							*										*						
Quarter 2, 2004																	*						
Quarter 3, 2004																	*						

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

Groundwater Flow System	UCRS					URGA											LRGA						
Gradient	S	D	D	D	U	S	S	S	S	S	D	D	D	D	U	U	S	D	D	D	D	U	U
Monitoring Well	386	389	390	393	396	221	222	223	224	384	369	372	387	391	220	394	385	370	373	388	392	395	397
pH																							
Quarter 4, 2004																	*						
Quarter 3, 2005										*							*				*		
Quarter 4, 2005										*							*						
Quarter 1, 2006																	*						
Quarter 2, 2006																	*						
Quarter 3, 2006																	*						
Quarter 3, 2007																	*						
Quarter 4, 2007																	*						
Quarter 4, 2008																	*						
Quarter 1, 2009																	*						
Quarter 1, 2011																	*						
Quarter 2, 2011											*												
Quarter 3, 2011											*												
Quarter 1, 2012														*									
Quarter 1, 2013										*			*				*						
Quarter 4, 2014																					*		
Quarter 2, 2016																		*	*				
POTASSIUM																							
Quarter 4, 2002																		*	*				
Quarter 3, 2004																			*				
Quarter 2, 2005																			*				
Quarter 3, 2005																			*				
Quarter 4, 2005																			*				
Quarter 2, 2006																			*				
Quarter 3, 2006																			*				
Quarter 4, 2006																			*				
Quarter 4, 2008																			*				
Quarter 3, 2012																			*				
Quarter 1, 2013																			*				
Quarter 2, 2013																			*				
Quarter 3, 2013																			*				
RADIUM-226																							
Quarter 4, 2002			*										*	*							*		
Quarter 2, 2004																			*				
Quarter 2, 2005									*														
Quarter 1, 2009											*												
Quarter 3, 2014									*			*											
Quarter 4, 2014			*								*							*					
Quarter 1, 2015			*				*			*		*						*					
Quarter 2, 2015			*				*			*		*						*					
Quarter 3, 2015			*																				
Quarter 4, 2015					*	*									*		*				*	*	
Quarter 2, 2016			*						*		*	*	*	*	*	*		*					
Quarter 3, 2016																		*					
Quarter 4, 2016	*		*			*			*				*		*					*		*	
Quarter 1, 2017			*							*	*							*					
Quarter 2, 2017																	*	*		*	*		
Quarter 3, 2017					*				*	*	*									*			
Quarter 4, 2017																		*		*			
Quarter 1, 2018												*						*		*			
Quarter 4, 2018													*				*						
RADIUM-228																							
Quarter 2, 2005							■				■												
Quarter 3, 2005			■																				
Quarter 4, 2005							■		■														
Quarter 1, 2006					■																		
SELENIUM																							
Quarter 4, 2002			■		■																		
Quarter 1, 2003					■																	■	
Quarter 2, 2003			■																				
Quarter 3, 2003			■		■																		
Quarter 4, 2003			■																				

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

Groundwater Flow System	UCRS					URGA											LRGA						
Gradient	S	D	D	D	U	S	S	S	S	S	D	D	D	D	U	U	S	D	D	D	D	U	U
Monitoring Well	386	389	390	393	396	221	222	223	224	384	369	372	387	391	220	394	385	370	373	388	392	395	397
SODIUM																							
Quarter 4, 2002																			*		*		
Quarter 1, 2003				*					*	*	*												
Quarter 2, 2003				*						*	*		*										
Quarter 3, 2003							*	*		*													
Quarter 4, 2003							*		*	*													
Quarter 1, 2004									*	*				*									
Quarter 2, 2004										*													
Quarter 3, 2004										*													
Quarter 4, 2004									*	*													
Quarter 1, 2005										*									*				
Quarter 2, 2005										*									*				
Quarter 3, 2005									*	*									*				
Quarter 4, 2005									*	*													
Quarter 1, 2006									*	*													
Quarter 2, 2006									*														
Quarter 3, 2006									*	*		*							*				
Quarter 4, 2006									*	*							*						
Quarter 1, 2007									*			*											
Quarter 2, 2007									*	*													
Quarter 3, 2007									*														
Quarter 4, 2007									*														
Quarter 1, 2008									*														
Quarter 3, 2008												*											
Quarter 4, 2008									*	*													
Quarter 1, 2009									*			*							*				
Quarter 3, 2009												*											
Quarter 4, 2009									*			*											
Quarter 1, 2010												*											
Quarter 2, 2010										*		*											
Quarter 3, 2010										*													
Quarter 4, 2010									*	*													
Quarter 1, 2011										*													
Quarter 2, 2011									*														
Quarter 4, 2011																			*				
Quarter 1, 2012											*												
Quarter 3, 2012												*							*				
Quarter 4, 2012												*											
Quarter 1, 2013										*		*							*				
Quarter 2, 2013												*											
Quarter 3, 2013												*							*				
Quarter 4, 2013												*							*				
Quarter 1, 2014												*											
Quarter 2, 2014									*		*	*							*				
Quarter 3, 2014												*							*				
Quarter 4, 2014									*	*		*	*										
Quarter 1, 2015													*										
Quarter 2, 2015												*											
Quarter 3, 2015										*		*											
Quarter 4, 2015									*	*		*											
Quarter 2, 2016											*												
Quarter 3, 2016											*												*
Quarter 1, 2017										*	*		*					*					
Quarter 2, 2017									*	*	*												
Quarter 2, 2018													*										
Quarter 3, 2018														*									
STRONTIUM-90																							
Quarter 2, 2003										■													
Quarter 1, 2004										■													
SULFATE																							
Quarter 4, 2002																			*				
Quarter 1, 2003												*	*				*		*				
Quarter 2, 2003										*		*	*					*	*				

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

Groundwater Flow System	UCRS					URGA											LRGA						
Gradient	S	D	D	D	U	S	S	S	S	S	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 3, 2003										*		*	*						*				
Quarter 4, 2003										*		*	*						*				
Quarter 1, 2004										*		*	*					*	*				
Quarter 2, 2004										*		*	*				*	*	*	*			
Quarter 3, 2004									*	*		*	*					*	*				
Quarter 4, 2004										*		*	*					*	*				
Quarter 1, 2005										*		*	*				*	*	*				
Quarter 2, 2005										*		*	*					*	*				
Quarter 3, 2005										*		*	*				*	*	*				
Quarter 4, 2005										*		*	*					*	*	*			
Quarter 1, 2006										*		*	*				*	*	*	*			
Quarter 2, 2006									*	*		*	*				*	*	*	*			
Quarter 3, 2006									*	*		*	*				*		*	*			
Quarter 4, 2006									*	*		*	*				*		*				
Quarter 1, 2007									*	*		*	*				*		*	*			
Quarter 2, 2007									*	*		*	*				*		*	*			
Quarter 3, 2007									*	*		*	*				*		*	*			
Quarter 4, 2007										*		*	*				*	*	*	*			
Quarter 1, 2008										*		*	*				*	*	*	*			
Quarter 2, 2008								*		*	*	*	*	*			*	*	*	*			
Quarter 3, 2008										*		*	*				*	*	*	*			
Quarter 4, 2008										*		*	*				*		*				
Quarter 1, 2009										*		*	*				*	*	*				
Quarter 2, 2009									*	*		*	*				*	*	*	*			
Quarter 3, 2009									*	*		*	*				*	*	*	*			
Quarter 4, 2009	*									*		*	*				*	*	*				
Quarter 1, 2010	*								*	*		*	*				*		*				
Quarter 2, 2010									*	*		*	*				*	*	*	*			
Quarter 3, 2010										*		*	*				*	*	*	*			
Quarter 4, 2010	*									*		*	*				*	*	*				
Quarter 1, 2011	*									*		*	*				*	*	*				
Quarter 2, 2011	*									*		*	*	*			*	*	*	*			
Quarter 3, 2011	*									*		*	*	*			*	*	*	*			
Quarter 4, 2011	*									*		*	*				*	*	*	*			
Quarter 1, 2012	*									*		*	*				*	*	*	*			
Quarter 2, 2012	*									*		*	*				*	*	*	*			
Quarter 3, 2012	*									*		*	*				*	*	*	*			
Quarter 4, 2012										*		*	*				*	*	*	*			
Quarter 1, 2013										*		*	*				*	*	*	*			
Quarter 2, 2013										*		*	*	*			*	*	*	*			
Quarter 3, 2013										*		*	*	*			*	*	*	*			
Quarter 4, 2013										*		*	*				*	*	*	*			
Quarter 1, 2014								*		*		*	*				*	*	*	*			
Quarter 2, 2014										*		*	*	*			*	*	*	*			
Quarter 3, 2014										*		*	*	*			*	*	*	*			
Quarter 4, 2014										*		*	*				*	*	*	*			
Quarter 1, 2015										*		*	*				*	*	*	*			
Quarter 2, 2015										*	*	*	*	*	*		*	*	*	*			
Quarter 3, 2015								*		*		*	*	*	*		*	*	*	*			
Quarter 4, 2015										*		*	*	*			*		*	*			
Quarter 1, 2016								*		*		*	*	*			*	*	*	*			
Quarter 2, 2016								*		*		*	*	*	*		*	*	*	*			
Quarter 3, 2016								*		*		*	*	*	*		*	*	*	*			
Quarter 4, 2016										*		*	*	*	*		*	*	*	*			
Quarter 1, 2017										*		*	*	*	*		*	*	*	*			
Quarter 2, 2017								*		*		*	*	*	*		*	*	*	*			
Quarter 3, 2017								*		*		*	*	*	*		*	*	*	*			
Quarter 4, 2017										*		*	*	*	*		*	*	*	*			
Quarter 1, 2018										*		*	*	*			*	*	*	*			
Quarter 2, 2018								*		*	*	*	*	*	*		*	*	*	*			
Quarter 3, 2018								*		*		*		*	*		*	*	*	*			
Quarter 4, 2018										*		*	*	*			*	*	*	*			

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

Groundwater Flow System	UCRS					URGA											LRGA						
Gradient	S	D	D	D	U	S	S	S	S	S	D	D	D	D	U	U	S	D	D	D	D	U	U
Monitoring Well	386	389	390	393	396	221	222	223	224	384	369	372	387	391	220	394	385	370	373	388	392	395	397
TECHNETIUM-99																							
Quarter 4, 2002																			*				
Quarter 1, 2003													*				*		*				
Quarter 2, 2003	*		*							*			*				*						
Quarter 3, 2003			*										*				*			*			
Quarter 4, 2003			*							*		*	*				*		*	*			
Quarter 1, 2004			*									*	*				*		*				
Quarter 2, 2004			*									*	*				*		*	*			
Quarter 3, 2004			*									*					*		*				
Quarter 4, 2004			*							*		*	*				*	*	*				
Quarter 1, 2005			*							*		*	*				*			*			
Quarter 2, 2005			*							*			*				*	*	*	*			
Quarter 3, 2005			*							*			*				*	*	*	*			
Quarter 4, 2005			*							*		*	*				*		*	*			
Quarter 1, 2006										*		*	*						*	*			
Quarter 2, 2006			*							*			*				*	*	*	*			
Quarter 3, 2006			*							*			*				*	*	*	*			
Quarter 4, 2006	*									*		*	*						*	*			
Quarter 1, 2007			*							*			*				*		*	*			
Quarter 2, 2007			*							*		*	*				*	*		*			
Quarter 3, 2007			*							*	*	*	*				*		*	*			
Quarter 4, 2007			*							*		*	*				*		*	*			
Quarter 1, 2008			*							*		*	*				*	*	*	*			
Quarter 2, 2008			*							*	*		*				*		*	*			
Quarter 3, 2008										*		*	*				*			*			
Quarter 4, 2008			*							*		*	*				*	*	*	*			
Quarter 1, 2009			*							*		*	*				*						
Quarter 2, 2009			*							*		*	*				*	*		*			
Quarter 3, 2009			*							*	*	*	*				*			*			
Quarter 4, 2009			*							*		*	*				*						
Quarter 1, 2010			*							*		*	*				*						
Quarter 2, 2010			*							*			*				*	*		*			
Quarter 3, 2010			*							*	*	*	*				*						
Quarter 4, 2010			*							*		*	*				*						
Quarter 1, 2011										*			*				*						
Quarter 2, 2011			*							*			*				*			*			
Quarter 3, 2011			*							*			*				*			*			
Quarter 4, 2011			*							*	*	*	*				*						
Quarter 1, 2012			*							*			*				*			*			
Quarter 2, 2012			*							*			*				*		*	*			
Quarter 3, 2012			*							*		*	*				*						
Quarter 4, 2012										*		*	*				*		*	*			
Quarter 1, 2013										*			*				*		*	*			
Quarter 2, 2013										*		*	*				*		*	*			
Quarter 3, 2013			*							*		*	*				*		*	*			
Quarter 4, 2013			*							*		*	*				*		*	*			
Quarter 1, 2014			*							*	*		*				*		*	*			
Quarter 2, 2014			*							*	*		*	*			*		*	*			
Quarter 3, 2014			*							*			*				*			*			
Quarter 4, 2014			*							*	*	*	*				*		*	*			
Quarter 1, 2015			*							*	*	*	*				*			*			
Quarter 2, 2015			*							*	*		*				*			*			
Quarter 3, 2015			*							*	*	*	*				*	*	*	*			
Quarter 4, 2015			*							*	*	*	*				*	*		*			
Quarter 1, 2016			*							*	*		*				*		*	*			
Quarter 2, 2016			*			*				*			*				*	*		*			
Quarter 3, 2016			*							*		*	*				*	*		*			
Quarter 4, 2016			*							*	*		*				*			*			
Quarter 1, 2017			*							*			*				*	*		*			
Quarter 2, 2017			*							*			*				*	*		*			
Quarter 3, 2017			*							*	*		*				*	*		*			
Quarter 4, 2017			*							*		*	*				*	*		*			

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

Groundwater Flow System	UCRS					URGA										LRGA						
Gradient	S	D	D	D	U	S	S	S	S	S	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 1, 2018			*							*	*		*				*	*		*			
Quarter 2, 2018			*							*	*	*	*				*	*		*			
Quarter 3, 2018			*							*		*	*				*	*		*			
Quarter 4, 2018			*							*	*	*	*				*	*		*			
THORIUM-230																							
Quarter 1, 2012	*								*					*									
Quarter 4, 2014	*		*																				
Quarter 3, 2015	*								*	*			*		*								
Quarter 1, 2017			*							*							*						
THORIUM-234																							
Quarter 2, 2003						*			*					*									
Quarter 4, 2007									*														
TOLUENE																							
Quarter 2, 2014										*	*		*										
TOTAL ORGANIC CARBON																							
Quarter 4, 2002																					*		
Quarter 1, 2003				*						*	*							*	*		*		
Quarter 2, 2003										*	*		*								*		
Quarter 3, 2003							*	*	*	*	*	*											
Quarter 4, 2003							*		*	*													
Quarter 1, 2004										*													
Quarter 2, 2004										*	*												
Quarter 3, 2004										*													
Quarter 4, 2004										*													
Quarter 1, 2005										*													
Quarter 2, 2005										*											*		
Quarter 3, 2005										*		*									*		
Quarter 4, 2005										*											*		
Quarter 1, 2006										*													
Quarter 2, 2006										*		*											
Quarter 4, 2006																	*						
Quarter 1, 2007	*									*													
Quarter 3, 2007	*					*	*	*	*	*			*	*			*						
Quarter 2, 2011											*												
Quarter 3, 2012	*																						
Quarter 3, 2016																			*				
TOTAL ORGANIC HALIDES																							
Quarter 4, 2002																		*	*		*		
Quarter 1, 2003				*														*			*		
Quarter 3, 2003				*																	*		
Quarter 2, 2004																					*		
Quarter 3, 2004	*																						
Quarter 1, 2005	*																						
Quarter 2, 2005	*																						
Quarter 3, 2005	*																						
Quarter 4, 2005	*																						
Quarter 1, 2006	*																						
Quarter 2, 2006	*																						
Quarter 3, 2006	*																						
Quarter 4, 2006																	*						
Quarter 1, 2007	*																						
Quarter 2, 2007	*																						
Quarter 3, 2007	*																						
Quarter 4, 2007	*																				*		
Quarter 1, 2008	*																						
Quarter 4, 2008	*																						
Quarter 4, 2008	*																						
Quarter 1, 2009	*																						
Quarter 2, 2009	*																				*		
Quarter 3, 2009	*																						
Quarter 4, 2009	*																						
Quarter 1, 2010	*																						
Quarter 2, 2010	*																						
Quarter 3, 2010	*																						

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

Groundwater Flow System	UCRS					URGA											LRGA						
Gradient	S	D	D	D	U	S	S	S	S	S	D	D	D	D	U	U	S	D	D	D	D	U	U
Monitoring Well	386	389	390	393	396	221	222	223	224	384	369	372	387	391	220	394	385	370	373	388	392	395	397
TOTAL ORGANIC HALIDES																							
Quarter 4, 2010	✱																						
Quarter 1, 2011	✱																						
Quarter 3, 2013																					✱		
TRICHLOROETHENE																							
Quarter 4, 2002														■		■					■	■	
Quarter 1, 2003														■		■					■	■	
Quarter 2, 2003														■		■					■	■	
Quarter 3, 2003														■		■					■	■	
Quarter 4, 2003														■		■					■	■	
Quarter 1, 2004														■		■					■	■	
Quarter 2, 2004												■		■		■		■	■		■	■	
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 2, 2007												■		■		■			■		■	■	
Quarter 3, 2007												■		■		■			■		■	■	
Quarter 4, 2007												■		■		■			■		■	■	
Quarter 1, 2008												■		■		■			■		■		
Quarter 2, 2008												■		■		■			■		■		
Quarter 3, 2008												■		■		■			■		■		
Quarter 4, 2008												■		■		■			■		■		
Quarter 1, 2009												■		■		■			■		■		
Quarter 2, 2009												■		■		■			■		■		
Quarter 3, 2009												■		■		■			■		■		
Quarter 4, 2009											■	■		■		■			■		■		
Quarter 1, 2010												■		■		■			■		■		
Quarter 2, 2010												■		■		■			■		■		
Quarter 3, 2010												■		■		■			■		■	■	
Quarter 4, 2010												■		■		■			■		■	■	
Quarter 1, 2011												■		■		■			■		■	■	
Quarter 2, 2011												■		■		■			■		■		
Quarter 3, 2011												■		■		■			■		■		
Quarter 4, 2011												■		■		■			■		■	■	
Quarter 1, 2012												■		■		■			■		■	■	
Quarter 2, 2012												■		■					■		■		
Quarter 3, 2012												■		■					■		■		
Quarter 4, 2012											■	■		■		■			■		■		
Quarter 1, 2013												■		■		■			■		■		
Quarter 2, 2013												■		■					■		■		
Quarter 3, 2013												■		■					■		■		
Quarter 4, 2013												■		■		■			■		■		
Quarter 1, 2014												■		■		■			■		■		
Quarter 2, 2014												■		■							■		
Quarter 3, 2014												■		■					■		■		
Quarter 4, 2014												■		■		■			■		■		
Quarter 1, 2015												■		■		■			■		■		
Quarter 2, 2015												■		■					■		■		
Quarter 3, 2015												■		■	■				■		■		
Quarter 4, 2015												■		■		■			■		■		
Quarter 1, 2016												■		■		■			■		■		
Quarter 2, 2016												■		■					■		■		
Quarter 3, 2016												■		■		■			■		■		
Quarter 4, 2016												■		■		■			■		■		
Quarter 1, 2017												■		■		■			■		■		
Quarter 2, 2017												■		■					■		■		
Quarter 3, 2017												■		■					■		■		
Quarter 4, 2017											■			■					■		■		

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

Groundwater Flow System	UCRS					URGA											LRGA						
Gradient	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
TRICHLOROETHENE																							
Quarter 1, 2018												■		■		■			■		■		
Quarter 2, 2018												■	■	■					■		■		
Quarter 3, 2018												■		■					■		■		
Quarter 4, 2018												■		■					■		■		
TURBIDITY																							
Quarter 4, 2002																					✱		
Quarter 1, 2003							✱					✱		✱									
URANIUM																							
Quarter 4, 2002																		✱	✱				
Quarter 1, 2003																			✱				
Quarter 4, 2003							✱																
Quarter 1, 2004							✱	✱	✱					✱			✱						
Quarter 4, 2004																	✱						
Quarter 4, 2006																			✱		✱		
ZINC																							
Quarter 3, 2003												✱											
Quarter 4, 2003							✱		✱			✱											
Quarter 4, 2004							✱																
Quarter 4, 2007							✱	✱	✱														

✱ Statistical test results indicate an elevated concentration (i.e., a statistically significant increase)

■ MCL Exceedance

■ Previously reported as an MCL exceedance; however, result was equal to MCL

UCRS Upper Continental Recharge System

URGA Upper Regional Gravel Aquifer

LRGA Lower Regional Gravel Aquifer

S Sidegradient; D Downgradient; U Upgradient

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APPENDIX H

METHANE MONITORING DATA

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CP3-WM-0017-F03 - C-746-S & T LANDFILL METHANE MONITORING REPORT

Date:	11/14/2018	Time:	0800am	Monitor:	Robert Kirby

Weather Conditions:
Mostly cloudy at 36 degrees

Monitoring Equipment:
RAE Systems, Multi-RAE, Serial# 7970

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)	10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170	0
Cell 2 Gas Vent (3)	10 20 30	0
Cell 3 Gas Vent (7)	10 20 30 40 50 60 70	0
Landfill Office	Checked at floor level	0
Suspect or Problem Areas	No areas noted	N/A

Remarks:

ALL VENTS CHECKED 1" FROM THE MOUTH OF VENT

Performed by:

Tammy Smith — **Signature**

11/14/18 — **Date**

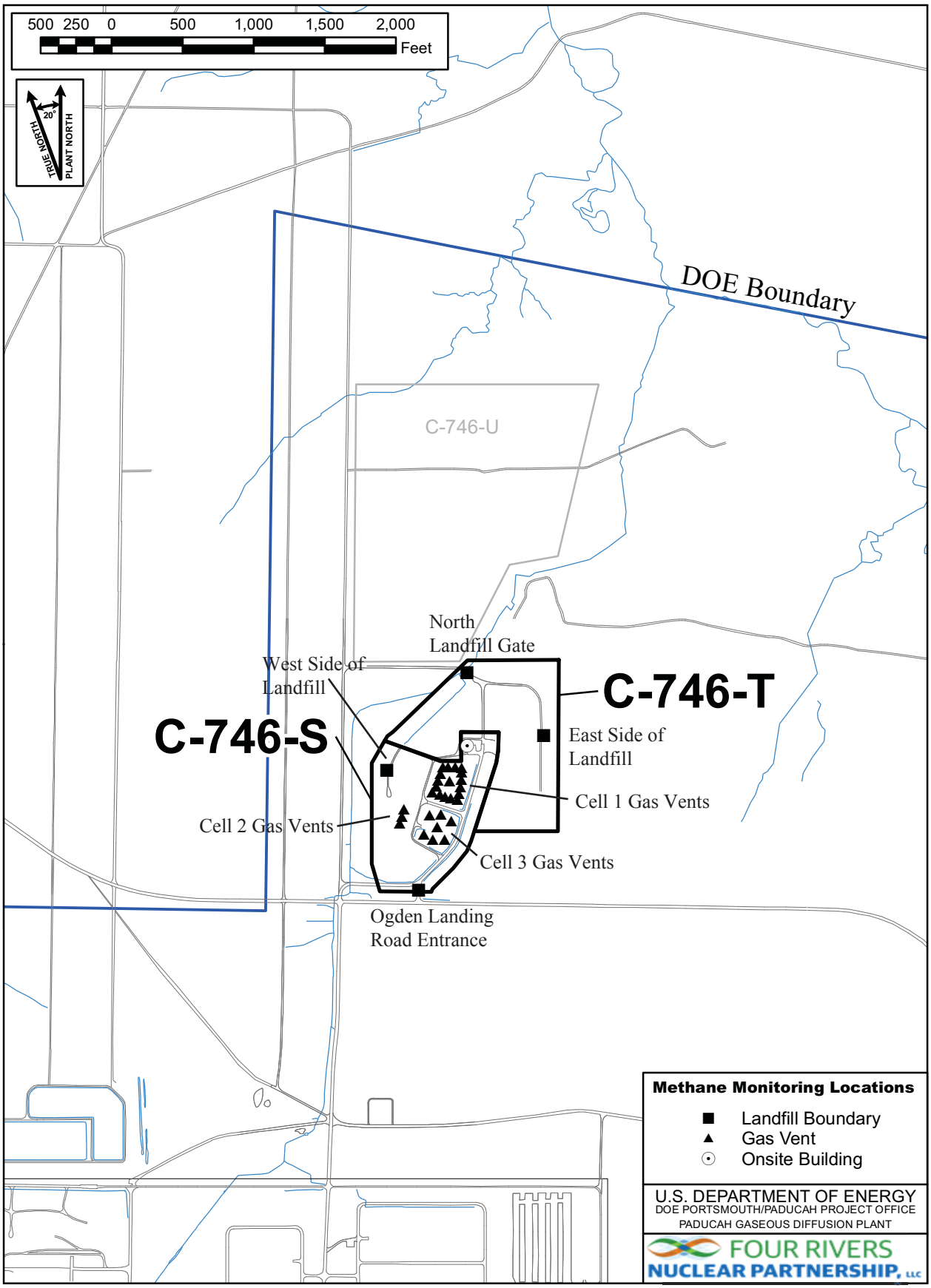

Figure H.1. C-746-S&T Methane Monitoring Locations

APPENDIX I

SURFACE WATER ANALYSES AND WRITTEN COMMENTS

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

RESIDENTIAL/INERT-QUARTERLY
Facility: US DOE - Paducah Gaseous Diffusion Plant
Permit Number: SW07300014, SW07300015, SW07300045

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)	10/31/2018 14:48	10/31/2018 14:22	10/31/2018 14:34	10/31/2018 14:50
Duplicate ("Y" or "N")[1]	N	N	N	N
Split ('Y' or "N")[2]	N	N	N	N
Facility Sample ID Number (if applicable)	L135SS1-19	L154US1-19	L136SS1-19	FB1SS1-19
Laboratory Sample ID Number (if applicable)	463250002	463254003	463250003	463250004
Date of Analysis (Month/Day/Year)	11/17/2018	11/17/2018	11/17/2018	11/17/2018

CAS RN[3]		CONSTITUENT	TD[4]	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL[5]	FLAGS[7]	DETECTED VALUE OR PQL[5]	FLAGS[7]	DETECTED VALUE OR PQL[5]	FLAGS[7]	DETECTED VALUE OR PQL[5]	FLAGS[7]
A200-00-0	0	Flow	T	MGD	Field		*		*		*		*
16887-00-6	2	Chloride(s)	T	mg/L	300.0	5.94		6.98		2.42		<0.2	
14808-79-8	0	Sulfate	T	mg/L	300.0	7.21		10		7.73		<0.4	
7439-89-6	0	Iron	T	mg/L	200.8	0.412		1.03		0.2		<0.1	
7440-23-5	0	Sodium	T	mg/L	200.8	1.94		3.55		0.844		<0.25	
S0268- -	0	Organic Carbon[6]	T	mg/L	9060	17.3		19.5		16.6			*
S0097- -	0	BOD[6]	T	mg/L	not applicable		*		*		*		*
S0130- -	0	Chemical Oxygen Demand	T	mg/L	410.4	67	B	70.2	B	62.2	B		*

I-3

[1]Respond "Y" if the sample was a duplicate of another sample in this report
[2]Respond "Y" if the sample was split and analyzed by separate laboratories.
[3]Chemical 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
[6]Facility has either/or option on Organic Carbon and (BOD) Biochemical Oxygen Demand - both are not required
[7]Flags 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: **SW07300014, SW07300015, SW07300045**

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	TD[4]	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL[5]	FLAGS[7]	DETECTED VALUE OR PQL[5]	FLAGS[7]	DETECTED VALUE OR PQL[5]	FLAGS[7]	DETECTED VALUE OR PQL[5]	FLAGS[7]
S0145- -	1	Specific Conductance	T	µhmo/cm	Field	113		133		128			*
S0270- -	0	Total Suspended Solids	T	mg/L	160.2	26.8		44.8		6	J		*
S0266- -	0	Total Dissolved Solids	T	mg/L	160.1	110		97.1		103			*
S0269- -	0	Total Solids	T	mg/L	SM-2540B	144		157		109			*
S0296- -	0	pH	T	Units	Field	7.17		7.02		6.89			*
7440-61-1		Uranium	T	mg/L	200.8	0.0017		0.000327		0.000217		<0.0002	
12587-46-1		Gross Alpha (α)	T	pCi/L	9310	7.92	*	2.45	*	4.32	*	0.589	*
12587-47-2		Gross Beta (β)	T	pCi/L	9310	16.7	*	15	*	3.5	*	1.53	*

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: SW07300014, SW07300015, SW07300045

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)						10/31/2018 14:48							
Duplicate ("Y" or "N")[1]						Y							
Split ('Y' or "N")[2]						N							
Facility Sample ID Number (if applicable)						L135DSS1-19							
Laboratory Sample ID Number (if applicable)						463250001							
Date of Analysis (Month/Day/Year)						11/17/2018							
CAS RN[3]		CONSTITUENT	TD[4]	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL[5]	FLAGS[7]	DETECTED VALUE OR PQL[5]	FLAGS[7]	DETECTED VALUE OR PQL[5]	FLAGS[7]	DETECTED VALUE OR PQL[5]	FLAGS[7]
A200-00-0	0	Flow	T	MGD	Field		*						
16887-00-6	2	Chloride(s)	T	MG/L	300.0	5.95							
14808-79-8	0	Sulfate	T	MG/L	300.0	7.29							
7439-89-6	0	Iron	T	MG/L	200.8	0.342							
7440-23-5	0	Sodium	T	MG/L	200.8	2.04							
S0268- -	0	Organic Carbon[6]	T	MG/L	9060	14							
S0097- -	0	BOD[6]	T	MG/L	not applicable		*						
S0130- -	0	Chemical Oxygen Demand	T	MG/L	410.4	76.7	B						

[1]Respond "Y" if the sample was a duplicate of another sample in this report
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[3]Chemical Abstracts Service Registry Number or unique identifier number assigned by agency.
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[5]"<" indicates a non-detect; do not use "ND" or "BDL". Value then shown is Practical Quantification Limit
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[7]Flags are as designated, do not use any other type. Use "*," then describe on "Written Comments" page.

STANDARD FLAGS:
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SURFACE WATER - QUARTERLY

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

Permit Number: **SW07300014, SW07300015,SW07300045**

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	TD[4]	Unit OF MEASURE	METHOD	DETECTED VALUE OR PQL[5]	FLAGS[7]	DETECTED VALUE OR PQL[5]	FLAGS[7]	DETECTED VALUE OR PQL[5]	FLAGS[7]	DETECTED VALUE OR PQL[5]	FLAGS[7]
S0145- -	1	Specific Conductance	T	µmho/cm	Field	113							
S0270- -	0	Total Suspended Solids	T	mg/L	160.2	23.2							
S0266- -	0	Total Dissolved Solids	T	mg/L	160.1	157							
S0269- -	0	Total Solids	T	mg/L	SM-2540B	154							
S0296- -	0	pH	T	Units	Field	7.17							
7440-61-1		Uranium	T	mg/L	200.8	0.00174							
12587-46-1		Gross Alpha (α)	T	pCi/L	900.0	3.18	*						
12587-47-2		Gross Beta (β)	T	pCi/L	900.0	22.4	*						

RESIDENTIAL/INERT – QUARTERLY
Facility: US DOE - Paducah Gaseous Diffusion Plant
Permit Number: SW07300014, SW07300015, SW07300045

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	L135SS1-19	Flow Rate		Analysis of constituent not required and not performed.
		Biochemical Oxygen Demand (BOD		Analysis of constituent not required and not performed.
		Alpha activity		TPU is 5.87. Rad error is 5.71.
		Beta activity		TPU is 8.42. Rad error is 7.94.
L154	L154US1-19	Flow Rate		Analysis of constituent not required and not performed.
		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 4.17. Rad error is 4.15.
		Beta activity		TPU is 8.27. Rad error is 7.87.
L136	L136SS1-19	Flow Rate		Analysis of constituent not required and not performed.
		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 4.53. Rad error is 4.46.
		Beta activity	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 7.01. Rad error is 6.99.
QC	FB1SS1-19	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 3.39. Rad error is 3.39.
		Beta activity	U	Indicates analyte/nuclide was analyzed for, but not detected. TPU is 7.47. Rad error is 7.47.
L135	L135DSS1-19	Flow Rate		Analysis of constituent not required and not performed.
		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 3.79. Rad error is 3.75.
		Beta activity		TPU is 9.63. Rad error is 8.88.

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