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

**C-746-U CONTAINED LANDFILL FOURTH QUARTER CALENDAR YEAR 2015 (OCTOBER–DECEMBER) COMPLIANCE MONITORING REPORT, PADUCAH GASEOUS DIFFUSION PLANT, PADUCAH, KENTUCKY, PAD-ENM-0093/V4, PERMIT NUMBER SW07300014, SW07300015, SW07300045**

Enclosed is the subject report for the fourth quarter calendar year 2015. This report is required in accordance with Condition ACTV0006, Special Condition Number 3, of C-746-U Contained Solid Waste Landfill Permit Number SW07300014, SW07300015, SW07300045. The report includes groundwater and surface water analytical data, validation summary, groundwater flow rate and direction determination, figures depicting well locations, and methane monitoring results.

The statistical analyses on the fourth quarter 2015 monitoring well data collected from the C-746-U Landfill were performed in accordance with Condition GSTR0001, Standard Requirement 3, using the U.S. Environmental Protection Agency guidance document, *Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Final Guidance* (1989). This report also serves as the statistical exceedance notification for the fourth quarter calendar year 2015, in accordance with Condition GSTR0001, Standard Requirement 8, of the C-746-U Solid Waste Landfill Permit Number SW07300014, SW07300015, SW07300045.

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

Sincerely,

Jennifer Woodard
Paducah Site Lead
Portsmouth/Paducah Project Office

Enclosure:
C-746-U Contained Landfill Fourth Quarter CY 2015 (October–December) Compliance Monitoring Report

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PAD-ENM-0093/V4

# C-746-U Contained Landfill
# Fourth Quarter Calendar Year 2015
# (October–December)
# Compliance Monitoring Report
# Paducah Gaseous Diffusion Plant,
# Paducah, Kentucky

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**PAD-ENM-0093/V4**

# C-746-U Contained Landfill
# Fourth Quarter Calendar Year 2015
# (October–December)
# Compliance Monitoring Report
# Paducah Gaseous Diffusion Plant,
# Paducah, Kentucky

Date Issued—February 2016

U.S. DEPARTMENT OF ENERGY
Office of Environmental Management

Prepared by
FLUOR FEDERAL SERVICES, INC.,
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Paducah Gaseous Diffusion Plant
under Task Order DE-DT0007774

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# ACRONYMS

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

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# 1. INTRODUCTION

This report, *C-746-U Contained Landfill Fourth Quarter Calendar Year 2015 (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. This report was written in accordance with the approved *Groundwater Monitoring Plan for the Solid Waste Permitted Landfills (C-746-S Residential Landfill, C-746-T Inert Landfill, and C-746-U Contained Landfill) at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky* (LATA Kentucky 2014), Technical Application, Attachment 25 of the Solid Waste Landfill permit.

The Groundwater, Surface Water, Leachate, and Methane Monitoring Sample Data Reporting Form is provided in Appendix A. The facility information sheet is provided in Appendix B. Groundwater analytical results are recorded on the Kentucky Division of Waste Management (KDWM) Groundwater Sample Analyses forms, which are presented in Appendix C. The statistical analyses and qualification statement are provided in Appendix D. The groundwater flow rate and direction determinations are provided in Appendix E. Appendix F contains the notifications for all permit required parameters whose concentrations exceed the maximum contaminant level (MCL) for Kentucky solid waste facilities provided in 401 *KAR* 47:030 § 6 and for all permit required parameters listed in 40 *CFR* § 302.4, Appendix A, that do not have an MCL and whose concentrations exceed the historical background concentrations [upper tolerance limit (UTL), as established at a 95% confidence]. Appendix G provides a chart of MCL exceedances and exceedances of the historical background UTL that have occurred, beginning in the fourth quarter calendar year 2002. Methane monitoring was conducted in accordance with 401 *KAR* 48:090 § 4 and the approved Explosive Gas Monitoring Program (KEEC 2011), Technical Application Attachment 12 of the Solid Waste Landfill permit. Methane monitoring results are documented on the approved C-746-U Landfill Methane Monitoring Report form provided in Appendix H. The form includes pertinent remarks/observations as required by 401 *KAR* 48:090 § 4. Surface water was monitored, as specified in 401 *KAR* 48:300 § 2, and the approved *Surface Water Monitoring Plan for C-746-U Contained Landfill Permit Number KY-073-00045, Paducah Gaseous Diffusion Plant, Paducah, Kentucky* (PRS 2008), Technical Application Attachment 24 of the Solid Waste Landfill permit. Surface water results are provided in Appendix I.

## 1.1 BACKGROUND

The C-746-U Landfill is an operating solid waste landfill located north of the Paducah Gaseous Diffusion Plant and north of the C-746-S&T Landfills. Construction and operation of the C-746-U Landfill were permitted in November 1996. The operation is regulated under Solid Waste Landfill Permit Number SW07300014, SW07300015, SW07300045. The permitted C-746-U Landfill area covers about 60 acres and includes a liner and leachate collection system. C-746-U Landfill currently is operating in Phases 3, 4, and 5. Phases 1, 2, and most of Phase 3 have long-term cover. Phases 6 through 23 have not been constructed.

## 1.2 MONITORING PERIOD ACTIVITIES

### 1.2.1 Groundwater Monitoring

Three zones are monitored at the site: the Upper Continental Recharge System (UCRS), Upper Regional Gravel Aquifer (URGA), and the Lower Regional Gravel Aquifer (LRGA). There are 21 monitoring wells (MWs) under permit for the C-746-U Landfill: 9 UCRS wells, 6 URGA wells, and 6 LRGA wells. A map

of the MW locations is presented in Figure 1. All MWs were sampled this quarter except MW359, MW376, and MW377 (all screened in the UCRS), which had an insufficient amount of water to obtain samples; therefore, there are no analytical results for these locations.

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

Groundwater sampling was conducted within the fourth quarter 2015 in accordance with the Groundwater Monitoring Plan (LATA Kentucky 2014) using Fluor Federal Services, Inc., procedure CP4-ES-2101, *Groundwater Sampling*. The analytical laboratory used U.S. Environmental Protection Agency-approved methods, as applicable. Appropriate sample containers and preservatives were used. The parameters specified in Permit Condition GSTR0001, Special Condition 1, 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 28, 2015, in MWs of the C-746-U Landfill (see Table E.1), in MWs of the C-746-S&T Landfills, and in MWs of the surrounding region (shown on Figure E.4). Water level measurements in 39 vicinity wells define the potentiometric surface for the RGA. Normal regional flow in the RGA is northeastward, toward the Ohio River. The hydraulic gradient in the vicinity of the C-746-U Landfill in October was $5.86 \times 10^{-4}$ ft/ft. The hydraulic gradient for the URGA and LRGA at the C-746-U Landfill were $8.58 \times 10^{-4}$ ft/ft and $8.69 \times 10^{-4}$ ft/ft, respectively. Calculated groundwater flow rates (average linear velocity) at the C-746-U Landfill range from 1.46 to 2.49 ft/day for the URGA and 1.48 to 2.52 ft/day for the LRGA (see Table E.3).

### 1.2.2 Methane Monitoring

In accordance with the Explosive Gas Monitoring Program (KEEC 2011), landfill operations staff monitored for the occurrence of methane in four on-site building locations and four locations along the landfill boundary on December 9, 2015. 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-U Landfill Methane Log provided in Appendix H.

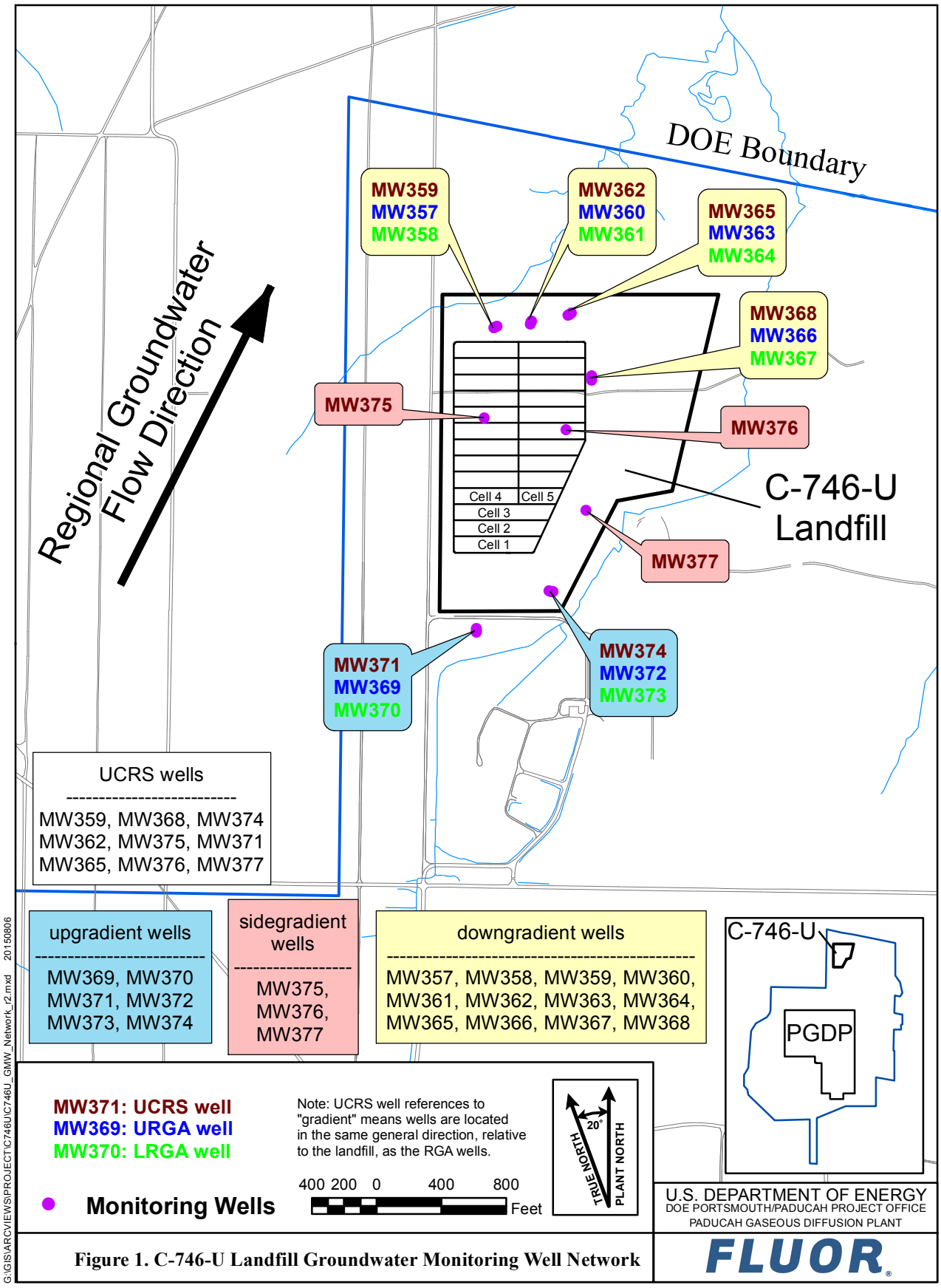


**Figure 1. C-746-U Landfill Groundwater Monitoring Well Network**

### 1.2.3 Surface Water Monitoring

Surface water was sampled in accordance with 401 *KAR* 48:300 § 2 and the approved Surface Water Monitoring Plan (PRS 2008). Sampling was performed at three locations monitored for the C-746-U Landfill. The C-746-U Landfill has an upstream location, L154; a downstream location, L351; and a location capturing runoff from the landfill surface, L150. Figure 2 is a map of the surface water monitoring locations. The parameters identified in the Solid Waste Landfill Permit were analyzed for the three locations sampled, in report only format, pursuant to Permit Condition GMNP0001, Standard Requirement 1. Surface water results are provided in Appendix I.

## 1.3 KEY RESULTS

Parameters that had concentrations that exceeded the respective MCL are listed in Table 1. Those constituents that exceeded their respective MCL were evaluated further against their historical background UTL. Table 2 identifies parameters (without MCLs) with concentrations that exceeded the statistically derived historical background UTL concentrations[1] during the fourth quarter 2015, as well as parameters that exceeded their MCL (beta activity) 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 the KDWM, in accordance with 401 *KAR* 48:300 § 7, prior to the submittal of this report.

There were no new MCL exceedances for this quarter. 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 exceedance for trichloroethene in MW357 (downgradient well), does not exceed the historical background concentration and is considered to be a Type 1 exceedance—not attributable to the C-746-U Landfill.

The MCL exceedance for beta activity in MW358 (downgradient well) was shown to exceed both the historical background UTL and the current background UTL; therefore, preliminarily it was considered to be a Type 2 exceedance because the source(s) of the exceedance is not determined. To further evaluate the preliminary Type 2 exceedance, the parameter was subjected to the Mann-Kendall statistical test for trend using the most recent eight quarters of data. The result is summarized in Table 4. The preliminary Type 2 exceedance did not have an increasing trend and should be considered to be a Type 1 exceedance (not attributable to the landfill).

This report serves as the notification of parameters that had statistically significant increased concentrations relative to historical background concentrations, as required by Permit Number SW07300014, SW07300015, SW07300045, Condition GSTR0003, Standard Requirement 8; and 401 *KAR* 48:300 § 7.

[1] The term "concentration" may refer to a field measurement result such as pH, oxidation-reduction potential, or an analytical parameter such as trichloroethene or polychlorinated biphenyls.

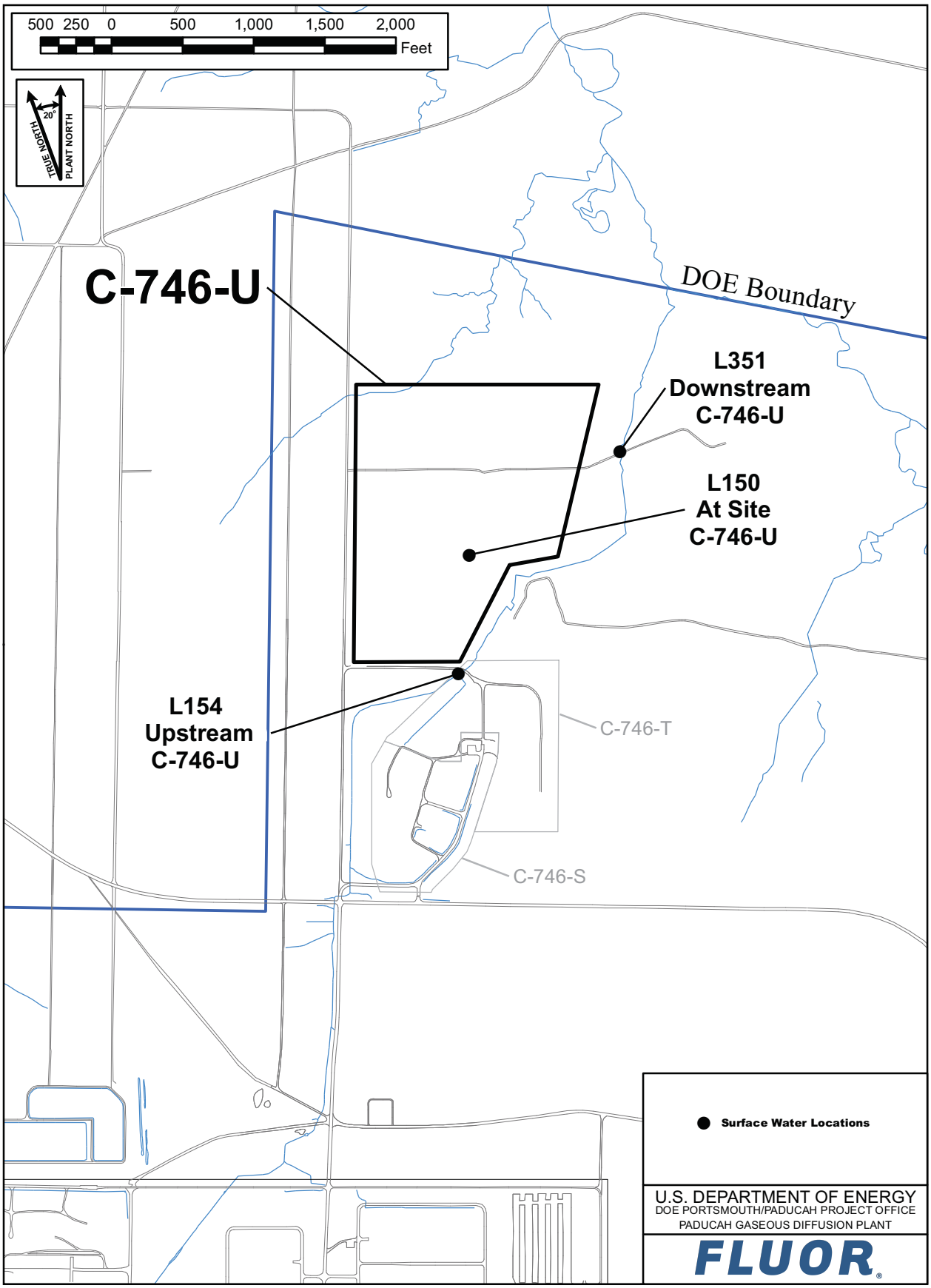


**Figure 2. C-746-U Landfill Surface Water Monitoring Locations**

**Table 1. Summary of MCL Exceedances**

| UCRS | URGA | LRGA |
|---|---|---|
| None | MW357: Trichloroethene | MW358: Beta activity |
| | MW372: Beta activity, trichloroethene | MW373: Trichloroethene |

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

| UCRS* | URGA | LRGA |
|---|---|---|
| MW362: Dissolved oxygen, oxidation-reduction potential, sulfate | MW357: Oxidation-reduction potential | MW358: Beta activity,[a] oxidation-reduction potential |
| MW365: Dissolved oxygen, oxidation-reduction potential, sulfate | MW360: Oxidation-reduction potential, sodium | MW361: Oxidation-reduction potential, technetium-99 |
| MW368: Dissolved oxygen, oxidation-reduction potential, sulfate | MW363: Oxidation-reduction potential | MW364: Oxidation-reduction potential |
| MW371: Oxidation-reduction potential, sulfate | MW366: Oxidation-reduction potential | MW367: Oxidation-reduction potential, thorium-230 |
| MW374: Oxidation-reduction potential | MW369: Oxidation-reduction potential | MW370: Oxidation-reduction potential, technetium-99 |
| MW375: Oxidation-reduction potential, sulfate | MW372: Beta activity,[a] calcium, conductivity, dissolved solids, magnesium, oxidation-reduction potential, technetium-99 | MW373: Oxidation-reduction potential |

*Gradients in the UCRS are downward. UCRS gradient designations refer to the locations of wells in the same direction, relative to the landfill as the RGA wells.
Sidegradient wells: MW375, MW376, MW377
Downgradient wells: MW357, MW358, MW359, MW360, MW361, MW362, MW363, MW364, MW365, MW366, MW367, MW368
Upgradient wells: MW369, MW370, MW371, MW372, MW373, MW374
[a] Beta activity has an MCL; the exceedances of the MCL were subjected to a comparison against the statistically derived historical background.

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

| URGA | LRGA |
|---|---|
| None | MW358: Beta activity |

**Table 4. C-746-U Landfill Downgradient Wells Trend Summary Utilizing the Previous Eight Quarters**

| Location | Well ID | Parameter | Sample Size | Alpha[1] | p-Value [2] | S[3] | Var(S)[4] | Sen's Slope[5] | Kendall Correlation[6] | Decision[7] |
|---|---|---|---|---|---|---|---|---|---|---|
| C-746-U Landfill Downgradient Well | MW358 | Beta Activity | 8 | 0.05 | 0.274 | 6.000 | 0.000 | 1.810 | 0.214 | No Trend |

**Footnotes:**

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

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

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

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

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

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

[7]The Mann-Kendall decision operates on two hypothesis, the $H_0$ and $H_a$. $H_0$ assumes there is no trend in the data, whereas $H_a$ assumes either a positve or negative trend. Two different tests were ran to test for positive or negative trends. This table reports the test with the lowest p-value.

**Note:** Statistics generated using XLSTAT Version 2015.2.01.16684

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 evaluation against current background UTL for those constituents present in downgradient wells with historical UTL exceedances. In accordance with the approved Groundwater Monitoring Plan, constituents in downgradient wells that exceed the historical UTL, but do not exceed the current UTL, are considered not to have a landfill source; therefore, they are a Type 1 exceedance. The constituent listed in Table 3 that exceeded both the historical UTL and the current UTL, beta activity, does not have an identified source and preliminarily is considered to be a Type 2 exceedance per the approved Groundwater Monitoring Plan. To evaluate the preliminary Type 2 exceedance further, beta activity 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. This preliminary Type 2 exceedance in a downgradient well did not have an increasing trend and is considered to be a Type 1 exceedance (not attributable to the landfill).

The statistical evaluation of current UCRS wells (downgradient) against the current UCRS background UTL identified UCRS wells with sulfate values that exceed both the historical and current background (Table 5). Because these wells are not hydrogeologically downgradient of the C-746-U Landfill, these exceedances are not attributable to C-746-U sources and are considered Type 1 exceedances.

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

| UCRS |
|---|
| MW362: Sulfate |
| MW365: Sulfate |
| MW368: Sulfate |

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

# 2. DATA EVALUATION/STATISTICAL SYNOPSIS

The statistical analyses conducted on the fourth quarter 2015 groundwater data collected from the C-746-U Contained Landfill MWs were performed in accordance with the *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 statistical analyses for this report use data from the first eight quarters that were sampled for each parameter, beginning with the first two baseline sampling events in 2002, when available. The sampling dates associated with background data are listed next to the result in the statistical analysis sheets in Appendix D (Attachments D1 and D2).

For those parameters that exceed the respective Kentucky solid waste facility MCL found in 401 *KAR* 47:030 § 6, these exceedances were documented and evaluated further as follows. Exceedances were reviewed against historical background results (UTL). If the MCL exceedance was found not to exceed the historical UTL, the exceedance was noted as a Type 1 exceedance—an exceedance not attributable to the landfill. 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 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.

For those parameters that do not have a Kentucky solid waste facility MCL, the same process was used. If a constituent without an MCL exceeded its historical background UTL and its current background UTL, it was evaluated further to identify the source of the exceedance, if possible. If the source of the exceedance could not be identified, it was reported as a Type 2 exceedance.

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

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

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

**Table 6. Monitoring Wells Included in Statistical Analysis***

| UCRS | URGA | LRGA |
|---|---|---|
| MW359*** | MW357 | MW358 |
| MW362 | MW360 | MW361 |
| MW365 | MW363 | MW364 |
| MW368 | MW366 | MW367 |
| MW371** | MW369 (upgradient) | MW370 (upgradient) |
| MW374** | MW372 (upgradient) | MW373 (upgradient) |
| MW375 | | |
| MW376*** | | |
| MW377*** | | |

*A map showing the monitoring well locations is shown on Figure 1.
**In the same direction (relative to the landfill) as RGA wells considered to be upgradient.
***MW359, MW376, and MW377 had insufficient water to permit a water sample for laboratory analysis.

## 2.1 STATISTICAL ANALYSIS OF GROUNDWATER DATA

Parameters requiring statistical analysis are summarized in Appendix D for each hydrogeological 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.

### 2.1.1 Upper Continental Recharge System

In this quarter, 27 parameters, including those with MCLs, required statistical analysis in the UCRS. During the fourth quarter, dissolved oxygen, oxidation-reduction potential, and sulfate displayed concentrations that exceeded their respective historical UTL and are listed in Table 2. Sulfate exceeded the current background UTL and is included on Table 5.

### 2.1.2 Upper Regional Gravel Aquifer

In this quarter, 29 parameters, including those with MCLs, required statistical analysis in the URGA. During the fourth quarter, beta activity, calcium, conductivity, dissolved solids, magnesium, oxidation-reduction potential, sodium, and technetium-99 displayed concentrations that exceeded their respective historical UTL and are listed in Table 2. There were no exceedances of the current background UTL for any URGA downgradient wells as summarized in Table 3.

### 2.1.3 Lower Regional Gravel Aquifer

In this quarter, 27 parameters, including those with MCLs, required statistical analysis in the LRGA. During the fourth quarter, beta activity, oxidation-reduction potential, technetium-99, and thorium-230 displayed concentrations that exceeded their respective historical UTL and are listed in Table 2. Beta activity exceeded the current background UTL for LRGA downgradient wells as summarized in Table 3.

## 2.2 DATA VERIFICATION AND VALIDATION

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

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

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# 3. PROFESSIONAL GEOLOGIST AUTHORIZATION

**DOCUMENT IDENTIFICATION:** *C-746-U Contained Landfill*
*Fourth Quarter Calendar Year 2015 (October–December)*
*Compliance Monitoring Report,*
*Paducah Gaseous Diffusion Plant,*
*Paducah, Kentucky* (PAD-ENM-0093/V4)

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

Kenneth R. Davis
Kenneth R. Davis

PG1194

February 22, 2016
Date

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# 4. REFERENCES

KEEC (Kentucky Energy and Environment Cabinet) 2011. Solid Waste Landfill Permit, Number SW07300014, SW07300015, SW07300045, Division of Waste Management, Solid Waste Branch, Technical Application Attachment 12, "Explosive Gas Monitoring Program," January 21.

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

PRS (Paducah Remediation Services, LLC) 2008. *Surface Water Monitoring Plan for C-746-U Contained Landfill Permit Number KY-073-00045, Paducah Gaseous Diffusion Plant, Paducah, Kentucky*, Paducah Remediation Services, LLC, Kevil, KY, June.

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# APPENDIX A

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

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

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

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

Activity: C-746-U Contained Landfill

Permit No: SW07300014, SW07300015, SW07300045

Finds/Unit No: _____

Quarter & Year: 4th Qtr. CY 2015

***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.

Mark J. Duff, Director, Environmental Management
Fluor Federal Services, Inc.

2-26-16
Date

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

2/26/16
Date

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# APPENDIX B

# FACILITY INFORMATION SHEET

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# FACILITY INFORMATION SHEET

Sampling Date: Groundwater: October 2015; Surface Water: November 2015; Methane: December 2015 | County: McCracken | Permit Nos. SW07300014, SW07300015, SW07300045

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

Site Address: 5501 Hobbs Road (Street) | Kevil, Kentucky (City/State) | 42053 (Zip)

Phone No: (270) 441-6800 | Latitude: N 37° 07' 45" | Longitude: W 88° 47' 55"

## OWNER INFORMATION

Facility Owner: U.S. DOE – Robert E. Edwards III, Acting Manager | Phone No: (859) 227-5020

Contact Person: Mark J. Duff | Phone No: (270) 441-6127

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

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: 352 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) | 29047 (Zip)

## LABORATORY RECORD #2

Laboratory: . | Lab ID No:

Contact Person: | Phone No:

Mailing Address: Street | City/State | Zip

## LABORATORY RECORD #3

Laboratory: | Lab ID No:

Contact Person: | Phone No:

Mailing Address: 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/CONTAINED-QUARTERLY**
**Facility: US DOE - Paducah Gaseous Diffusion Plant**
**Permit Number: 073-00045**

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 | 8004-4798 | 8004-4799 | 8004-0981 | 8004-4800 |
| Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.) | 357 | 358 | 359 | 360 |
| 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) | 10/7/2015 12:07 | 10/7/2015 13:22 | NA | 10/7/2015 09:33 |
| Duplicate ("Y" or "N")[2] | N | N | N | N |
| Split ("Y" or "N")[3] | N | N | N | N |
| Facility Sample ID Number (if applicable) | MW357UG1-16 | MW358UG1-16 | NA | MW360UG1-16 |
| Laboratory Sample ID Number (if applicable) | 382815003 | 382815005 | NA | 382815007 |
| Date of Analysis (Month/Day/Year) For Volatile Organics Analysis | 10/13/2015 | 10/13/2015 | NA | 10/13/2015 |
| 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 | 0.446 | | 0.482 | | | * | 0.158 | J |
| 16887-00-6 | | Chloride(s) | T | mg/L | 9056 | 31.5 | | 35.3 | | | * | 10.5 | |
| 16984-48-8 | | Fluoride | T | mg/L | 9056 | 0.148 | | 0.16 | | | * | 0.293 | |
| S0595- - | | Nitrate & Nitrite | T | mg/L | 9056 | 1.4 | | 0.844 | | | * | 0.119 | J |
| 14808-79-8 | | Sulfate | T | mg/L | 9056 | 52 | | 78.3 | | | * | 29.6 | |
| NS1894 | | Barometric Pressure Reading | T | Inches/Hg | Field | 30.11 | | 30.09 | | | * | 30.13 | |
| S0145- - | | Specific Conductance | T | μMH0/cm | Field | 435 | | 499 | | | * | 562 | |

[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/CONTAINED-QUARTERLY**
**Facility: US DOE - Paducah Gaseous Diffusion Plant**
**Permit Number: 073-00045**

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

# GROUNDWATER SAMPLE ANALYSIS - (Cont.)

| AKGWA NUMBER[1], Facility Well/Spring Number | | | | | | 8004-4798 | | 8004-4799 | | 8004-0981 | | 8004-4800 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Facility's Local Well or Spring Number (e.g., MW-1, MW-2, BLANK-F, etc.) | | | | | | 357 | | 358 | | 359 | | 360 | |
| 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 | 323.39 | | 323.44 | | | * | 323.37 | |
| N238 | | Dissolved Oxygen | T | mg/L | Field | 3.37 | | 1.89 | | | * | 1.7 | |
| S0266- - | | Total Dissolved Solids | T | mg/L | 160.1 | 201 | | 257 | | | * | 277 | |
| S0296- - | | pH | T | Units | Field | 6.18 | | 6.28 | | | * | 6.55 | |
| NS215 | | Eh | T | mV | Field | 582 | | 380 | | | * | 440 | |
| S0907 - - | | Temperature | T | °C | Field | 20.06 | | 18.89 | | | * | 16.56 | |
| 7429-90-5 | | Aluminum | T | mg/L | 6020 | 0.025 | J | <0.05 | | | * | <0.05 | |
| 7440-36-0 | | Antimony | T | mg/L | 6020 | <0.003 | | <0.003 | | | * | <0.003 | |
| 7440-38-2 | | Arsenic | T | mg/L | 6020 | <0.005 | | <0.005 | | | * | 0.00215 | J |
| 7440-39-3 | | Barium | T | mg/L | 6020 | 0.0641 | | 0.0496 | | | * | 0.162 | |
| 7440-41-7 | | Beryllium | T | mg/L | 6020 | <0.0005 | | <0.0005 | | | * | <0.0005 | |
| 7440-42-8 | | Boron | T | mg/L | 6020 | 0.47 | | 0.486 | | | * | 0.0497 | |
| 7440-43-9 | | Cadmium | T | mg/L | 6020 | <0.001 | | <0.001 | | | * | <0.001 | |
| 7440-70-2 | | Calcium | T | mg/L | 6020 | 26.8 | | 33.5 | | | * | 27.3 | |
| 7440-47-3 | | Chromium | T | mg/L | 6020 | <0.01 | | <0.01 | | | * | <0.01 | |
| 7440-48-4 | | Cobalt | T | mg/L | 6020 | 0.00096 | J | 0.000656 | J | | * | 0.0164 | |
| 7440-50-8 | | Copper | T | mg/L | 6020 | 0.000766 | J | 0.000466 | J | | * | <0.001 | |
| 7439-89-6 | | Iron | T | mg/L | 6020 | 0.0871 | J | 1.06 | | | * | 1.94 | |
| 7439-92-1 | | Lead | T | mg/L | 6020 | <0.002 | | <0.002 | | | * | <0.002 | |
| 7439-95-4 | | Magnesium | T | mg/L | 6020 | 12.2 | * | 16.1 | * | | * | 10.8 | * |
| 7439-96-5 | | Manganese | T | mg/L | 6020 | 0.0273 | | 0.143 | | | * | 0.202 | |
| 7439-97-6 | | Mercury | T | mg/L | 7470 | <0.0002 | | <0.0002 | | | * | <0.0002 | |

**RESIDENTIAL/CONTAINED-QUARTERLY**
**Facility: US DOE - Paducah Gaseous Diffusion Plant**
**Permit Number: 073-00045**

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

# GROUNDWATER SAMPLE ANALYSIS - (Cont.)

| AKGWA NUMBER[1], Facility Well/Spring Number | | | | | | 8004-4798 | | 8004-4799 | | 8004-0981 | | 8004-4800 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.) | | | | | | 357 | | 358 | | 359 | | 360 | |
| 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 | | | * | 0.000502 | |
| 7440-02-0 | | Nickel | T | mg/L | 6020 | 0.00089 | J | 0.00292 | | | * | 0.00209 | |
| 7440-09-7 | | Potassium | T | mg/L | 6020 | 1.7 | | 2.38 | | | * | 0.711 | |
| 7440-16-6 | | Rhodium | T | mg/L | 6020 | <0.005 | | <0.005 | | | * | <0.005 | |
| 7782-49-2 | | Selenium | T | mg/L | 6020 | <0.005 | | 0.00157 | J | | * | <0.005 | |
| 7440-22-4 | | Silver | T | mg/L | 6020 | <0.001 | | <0.001 | | | * | <0.001 | |
| 7440-23-5 | | Sodium | T | mg/L | 6020 | 44.2 | | 43 | | | * | 90.4 | |
| 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 | | | * | 0.000348 | |
| 7440-62-2 | | Vanadium | T | mg/L | 6020 | <0.01 | | <0.01 | | | * | <0.01 | |
| 7440-66-6 | | Zinc | T | mg/L | 6020 | <0.01 | | 0.00405 | 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 | |

**RESIDENTIAL/CONTAINED-QUARTERLY**
**Facility: US DOE - Paducah Gaseous Diffusion Plant**
**Permit Number: 073-00045**

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

# GROUNDWATER SAMPLE ANALYSIS - (Cont.)

| AKGWA NUMBER[1], Facility Well/Spring Number | | | | | | 8004-4798 | | 8004-4799 | | 8004-0981 | | 8004-4800 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.) | | | | | | 357 | | 358 | | 359 | | 360 | |
| 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 | 0.00578 | | 0.00378 | | | * | <0.001 | |

**RESIDENTIAL/CONTAINED-QUARTERLY**
**Facility: US DOE - Paducah Gaseous Diffusion Plant**
**Permit Number: 073-00045**

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

# GROUNDWATER SAMPLE ANALYSIS - (Cont.)

| AKGWA NUMBER[1], Facility Well/Spring Number | | | | | | 8004-4798 | | 8004-4799 | | 8004-0981 | | 8004-4800 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.) | | | | | | 357 | | 358 | | 359 | | 360 | |
| 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 | <0.0000206 | | <0.0000209 | | | * | <0.0000203 | |
| 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 | <0.101 | | <0.1 | | | * | <0.105 | |
| 12674-11-2 | | PCB-1016 | T | ug/L | 8082 | <0.101 | | <0.1 | | | * | <0.105 | |
| 11104-28-2 | | PCB-1221 | T | ug/L | 8082 | <0.101 | | <0.1 | | | * | <0.105 | |
| 11141-16-5 | | PCB-1232 | T | ug/L | 8082 | <0.101 | | <0.1 | | | * | <0.105 | |
| 53469-21-9 | | PCB-1242 | T | ug/L | 8082 | <0.101 | | <0.1 | | | * | <0.105 | |
| 12672-29-6 | | PCB-1248 | T | ug/L | 8082 | <0.101 | | <0.1 | | | * | <0.105 | |

**RESIDENTIAL/CONTAINED-QUARTERLY**
**Facility: US DOE - Paducah Gaseous Diffusion Plant**
**Permit Number: 073-00045**

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

# GROUNDWATER SAMPLE ANALYSIS - (Cont.)

| AKGWA NUMBER[1], Facility Well/Spring Number | | | | | | 8004-4798 | | 8004-4799 | | 8004-0981 | | 8004-4800 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.) | | | | | | 357 | | 358 | | 359 | | 360 | |
| 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 | <0.101 | | <0.1 | | | * | <0.105 | |
| 11096-82-5 | | PCB-1260 | T | ug/L | 8082 | <0.101 | | <0.1 | | | * | <0.105 | |
| 11100-14-4 | | PCB-1268 | T | ug/L | 8082 | <0.101 | | <0.1 | | | * | <0.105 | |
| 12587-46-1 | | Gross Alpha | T | pCi/L | 9310 | 6.29 | * | 0.831 | * | | * | -2.9 | * |
| 12587-47-2 | | Gross Beta | T | pCi/L | 9310 | 10.3 | * | 51 | * | | * | 3.78 | * |
| 10043-66-0 | | Iodine-131 | T | pCi/L | | | * | | * | | * | | * |
| 13982-63-3 | | Radium-226 | T | pCi/L | HASL 300 | 0.221 | * | 0.451 | * | | * | 0.425 | * |
| 10098-97-2 | | Strontium-90 | T | pCi/L | 905.0 | -0.734 | * | -1.97 | * | | * | -1.18 | * |
| 14133-76-7 | | Technetium-99 | T | pCi/L | Tc-02-RC | 42.5 | * | 38.9 | * | | * | 1.29 | * |
| 14269-63-7 | | Thorium-230 | T | pCi/L | Th-01-RC | -0.253 | * | 0.291 | * | | * | -0.0218 | * |
| 10028-17-8 | | Tritium | T | pCi/L | 906.0 | 51.4 | * | -33.1 | * | | * | 75.1 | * |
| S0130- - | | Chemical Oxygen Demand | T | mg/L | 410.4 | <20 | | 8.68 | J | | * | <20 | |
| 57-12-5 | | Cyanide | T | mg/L | 9012 | <0.2 | | <0.2 | | | * | <0.2 | |
| 20461-54-5 | | Iodide | T | mg/L | 300.0 | <0.5 | | <0.5 | | | * | <0.5 | |
| S0268- - | | Total Organic Carbon | T | mg/L | 9060 | 0.644 | J | 0.892 | J | | * | 2.02 | |
| S0586- - | | Total Organic Halides | T | mg/L | 9020 | 0.00686 | BJ | 0.0082 | BJ | | * | 0.0218 | B |
| | | | | | | | | | | | | | |
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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: 073-00045**

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** | | | | | | 8004-4795 | | 8004-0986 | | 8004-4796 | | 8004-4797 | |
| **Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.)** | | | | | | 361 | | 362 | | 363 | | 364 | |
| **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)** | | | | | | 10/7/2015 08:08 | | 10/14/2015 07:23 | | 10/8/2015 07:35 | | 10/8/2015 08:46 | |
| **Duplicate ("Y" or "N")[2]** | | | | | | N | | N | | N | | N | |
| **Split ("Y" or "N")[3]** | | | | | | N | | N | | N | | N | |
| **Facility Sample ID Number (if applicable)** | | | | | | MW361UG1-16 | | MW362UG1-16 | | MW363UG1-16 | | MW364UG1-16 | |
| **Laboratory Sample ID Number (if applicable)** | | | | | | 382815001 | | 383342001 | | 382901001 | | 382901003 | |
| **Date of Analysis (Month/Day/Year) For Volatile Organics Analysis** | | | | | | 10/13/2015 | | 10/19/2015 | | 10/14/2015 | | 10/14/2015 | |
| **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** | 0.434 | | 0.135 | J | 0.164 | J | 0.391 | |
| **16887-00-6** | | **Chloride(s)** | **T** | **mg/L** | **9056** | 31.1 | | 8.53 | | 32.5 | | 31.6 | |
| **16984-48-8** | | **Fluoride** | **T** | **mg/L** | **9056** | 0.141 | | 0.295 | | 0.155 | | 0.12 | |
| **S0595- -** | | **Nitrate & Nitrite** | **T** | **mg/L** | **9056** | 1.16 | | 0.496 | | 4.16 | | 0.947 | |
| **14808-79-8** | | **Sulfate** | **T** | **mg/L** | **9056** | 73.9 | | 35.2 | | 23.6 | | 67.2 | |
| **NS1894** | | **Barometric Pressure Reading** | **T** | **Inches/Hg** | **Field** | 30.13 | | 29.97 | | 30.08 | | 30.1 | |
| **S0145- -** | | **Specific Conductance** | **T** | **μMH0/cm** | **Field** | 472 | | 762 | | 401 | | 456 | |

[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/CONTAINED-QUARTERLY**
**Facility: US DOE - Paducah Gaseous Diffusion Plant**
**Permit Number: 073-00045**

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

# GROUNDWATER SAMPLE ANALYSIS - (Cont.)

| AKGWA NUMBER[1], Facility Well/Spring Number | | | | | | 8004-4795 | | 8004-0986 | | 8004-4796 | | 8004-4797 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Facility's Local Well or Spring Number (e.g., MW-1, MW-2, BLANK-F, etc.) | | | | | | 361 | | 362 | | 363 | | 364 | |
| 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 | 323.39 | | 336.21 | | 323.3 | | 323.25 | |
| N238 | | Dissolved Oxygen | T | mg/L | Field | 2.99 | | 3.52 | | 1.51 | | 2.52 | |
| S0266- - | | Total Dissolved Solids | T | mg/L | 160.1 | 229 | | 386 | | 191 | | 221 | |
| S0296- - | | pH | T | Units | Field | 6.08 | | 7 | | 6.18 | | 6.07 | |
| NS215 | | Eh | T | mV | Field | 780 | | 620 | | 630 | | 509 | |
| S0907 - - | | Temperature | T | °C | Field | 16.33 | | 14.11 | | 16.5 | | 16.61 | |
| 7429-90-5 | | Aluminum | T | mg/L | 6020 | <0.05 | | 1.78 | * | 0.032 | J | 0.0159 | 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 | | 0.00183 | J | <0.005 | | <0.005 | |
| 7440-39-3 | | Barium | T | mg/L | 6020 | 0.0568 | | 0.117 | | 0.187 | | 0.0711 | |
| 7440-41-7 | | Beryllium | T | mg/L | 6020 | <0.0005 | | <0.0005 | | <0.0005 | | <0.0005 | |
| 7440-42-8 | | Boron | T | mg/L | 6020 | 0.176 | | 0.0208 | B | 0.0272 | | 0.0126 | 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 | 29.6 | | 23.4 | | 26.9 | | 28.7 | |
| 7440-47-3 | | Chromium | T | mg/L | 6020 | <0.01 | | 0.0025 | J | <0.01 | | <0.01 | |
| 7440-48-4 | | Cobalt | T | mg/L | 6020 | 0.000438 | J | 0.00158 | | 0.00103 | | 0.000529 | J |
| 7440-50-8 | | Copper | T | mg/L | 6020 | 0.000609 | J | 0.00214 | | <0.001 | | 0.000578 | J |
| 7439-89-6 | | Iron | T | mg/L | 6020 | 0.0398 | J | 1.23 | | 0.0827 | J | 0.161 | |
| 7439-92-1 | | Lead | T | mg/L | 6020 | <0.002 | | 0.000727 | J | <0.002 | | <0.002 | |
| 7439-95-4 | | Magnesium | T | mg/L | 6020 | 14.1 | * | 10.7 | | 10.4 | | 12.1 | |
| 7439-96-5 | | Manganese | T | mg/L | 6020 | 0.0287 | | 0.0284 | | 0.147 | | 0.046 | |
| 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 | | | | | | 8004-4795 | | 8004-0986 | | 8004-4796 | | 8004-4797 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.) | | | | | | 361 | | 362 | | 363 | | 364 | |
| 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 | | 0.00109 | | <0.0005 | | <0.0005 | |
| 7440-02-0 | | Nickel | T | mg/L | 6020 | 0.000781 | J | 0.00252 | | 0.00114 | J | 0.0034 | |
| 7440-09-7 | | Potassium | T | mg/L | 6020 | 2.11 | | 0.486 | | 1.47 | | 1.97 | |
| 7440-16-6 | | Rhodium | T | mg/L | 6020 | <0.005 | | <0.005 | | <0.005 | | <0.005 | |
| 7782-49-2 | | Selenium | T | mg/L | 6020 | 0.00163 | J | 0.0018 | 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 | 44.9 | | 176 | | 33.2 | | 40.3 | |
| 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 | | 0.00582 | B | <0.0002 | | <0.0002 | |
| 7440-62-2 | | Vanadium | T | mg/L | 6020 | <0.01 | | 0.0035 | J | <0.01 | | <0.01 | |
| 7440-66-6 | | Zinc | T | mg/L | 6020 | <0.01 | | 0.00423 | J | <0.01 | | 0.0351 | |
| 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 | |

**RESIDENTIAL/CONTAINED-QUARTERLY**
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**Permit Number: 073-00045**

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

# GROUNDWATER SAMPLE ANALYSIS - (Cont.)

| AKGWA NUMBER[1], Facility Well/Spring Number | | | | | | 8004-4795 | | 8004-0986 | | 8004-4796 | | 8004-4797 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.) | | | | | | 361 | | 362 | | 363 | | 364 | |
| 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 | 0.00476 | | <0.001 | | 0.00091 | J | 0.0044 | |

**RESIDENTIAL/CONTAINED-QUARTERLY**
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LAB ID: None
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# GROUNDWATER SAMPLE ANALYSIS - (Cont.)

| AKGWA NUMBER[1], Facility Well/Spring Number | | | | | | 8004-4795 | | 8004-0986 | | 8004-4796 | | 8004-4797 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.) | | | | | | 361 | | 362 | | 363 | | 364 | |
| 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 | <0.0000205 | | <0.0000206 | | <0.0000178 | | <0.0000203 | |
| 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 | <0.101 | | <0.1 | | 0.06 | J | <0.0971 | |
| 12674-11-2 | | PCB-1016 | T | ug/L | 8082 | <0.101 | | <0.1 | | <0.0952 | | <0.0971 | |
| 11104-28-2 | | PCB-1221 | T | ug/L | 8082 | <0.101 | | <0.1 | | <0.0952 | | <0.0971 | |
| 11141-16-5 | | PCB-1232 | T | ug/L | 8082 | <0.101 | | <0.1 | | <0.0952 | | <0.0971 | |
| 53469-21-9 | | PCB-1242 | T | ug/L | 8082 | <0.101 | | <0.1 | | 0.06 | J | <0.0971 | |
| 12672-29-6 | | PCB-1248 | T | ug/L | 8082 | <0.101 | | <0.1 | | <0.0952 | | <0.0971 | |

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LAB ID: None
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# GROUNDWATER SAMPLE ANALYSIS - (Cont.)

| AKGWA NUMBER[1], Facility Well/Spring Number | | | | | | 8004-4795 | | 8004-0986 | | 8004-4796 | | 8004-4797 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.) | | | | | | 361 | | 362 | | 363 | | 364 | |
| 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 | <0.101 | | <0.1 | | <0.0952 | | <0.0971 | |
| 11096-82-5 | | PCB-1260 | T | ug/L | 8082 | <0.101 | | <0.1 | | <0.0952 | | <0.0971 | |
| 11100-14-4 | | PCB-1268 | T | ug/L | 8082 | <0.101 | | <0.1 | | <0.0952 | | <0.0971 | |
| 12587-46-1 | | Gross Alpha | T | pCi/L | 9310 | 2.22 | * | -3.87 | * | -2.4 | * | -1.68 | * |
| 12587-47-2 | | Gross Beta | T | pCi/L | 9310 | 30.8 | * | -1.38 | * | 2.53 | * | 30.2 | * |
| 10043-66-0 | | Iodine-131 | T | pCi/L | | | * | | * | | * | | * |
| 13982-63-3 | | Radium-226 | T | pCi/L | HASL 300 | 0.188 | * | 1.2 | * | 0.066 | * | 0.288 | * |
| 10098-97-2 | | Strontium-90 | T | pCi/L | 905.0 | 2.82 | * | -1.42 | * | -3.52 | * | -0.172 | * |
| 14133-76-7 | | Technetium-99 | T | pCi/L | Tc-02-RC | 48.4 | * | -5.99 | * | 6.6 | * | 39.5 | * |
| 14269-63-7 | | Thorium-230 | T | pCi/L | Th-01-RC | 0.121 | * | 0.142 | * | 0.276 | * | 0.00919 | * |
| 10028-17-8 | | Tritium | T | pCi/L | 906.0 | 9.79 | * | 13.5 | * | 43.2 | * | 171 | * |
| S0130- - | | Chemical Oxygen Demand | T | mg/L | 410.4 | <20 | | <20 | | <20 | | <20 | |
| 57-12-5 | | Cyanide | T | mg/L | 9012 | <0.2 | | <0.2 | | <0.2 | | <0.2 | |
| 20461-54-5 | | Iodide | T | mg/L | 300.0 | <0.5 | | <0.5 | | <0.5 | | <0.5 | |
| S0268- - | | Total Organic Carbon | T | mg/L | 9060 | 0.848 | J | 2.82 | | 0.831 | J | 0.624 | J |
| S0586- - | | Total Organic Halides | T | mg/L | 9020 | 0.0052 | BJ | 0.025 | | 0.00738 | J | 0.00686 | J |
| | | | | | | | | | | | | | |
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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: 073-00045**

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 | | | | | | 8004-0984 | | 8004-0982 | | 8004-4793 | | 8004-0983 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.) | | | | | | 365 | | 366 | | 367 | | 368 | |
| 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) | | | | | | 10/14/2015 08:52 | | 10/8/2015 09:54 | | 10/8/2015 12:20 | | 10/14/2015 10:18 | |
| Duplicate ("Y" or "N")[2] | | | | | | N | | N | | N | | N | |
| Split ("Y" or "N")[3] | | | | | | N | | N | | N | | N | |
| Facility Sample ID Number (if applicable) | | | | | | MW365UG1-16 | | MW366UG1-16 | | MW367UG1-16 | | MW368UG1-16 | |
| Laboratory Sample ID Number (if applicable) | | | | | | 383342003 | | 382901005 | | 382901009 | | 383342005 | |
| Date of Analysis (Month/Day/Year) For Volatile Organics Analysis | | | | | | 10/19/2015 | | 10/14/2015 | | 10/14/2015 | | 10/19/2015 | |
| 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 | <0.2 | | 0.478 | | 0.132 | J | <0.2 | |
| 16887-00-6 | | Chloride(s) | T | mg/L | 9056 | 5.73 | | 38.7 | | 9.38 | | 1.3 | |
| 16984-48-8 | | Fluoride | T | mg/L | 9056 | 0.216 | | 0.14 | | 0.0706 | J | 0.327 | |
| S0595- - | | Nitrate & Nitrite | T | mg/L | 9056 | 0.464 | | 0.599 | | <0.1 | | 0.318 | |
| 14808-79-8 | | Sulfate | T | mg/L | 9056 | 56.3 | | 53.4 | | 22.9 | | 29 | |
| NS1894 | | Barometric Pressure Reading | T | Inches/Hg | Field | 23.99 | | 30.09 | | 30.06 | | 23.99 | |
| S0145- - | | Specific Conductance | T | μMH0/cm | Field | 415 | | 475 | | 281 | | 457 | |

[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/CONTAINED-QUARTERLY**
**Facility: US DOE - Paducah Gaseous Diffusion Plant**
**Permit Number: 073-00045**

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

# GROUNDWATER SAMPLE ANALYSIS - (Cont.)

| AKGWA NUMBER[1], Facility Well/Spring Number | | | | | | 8004-0984 | | 8004-0982 | | 8004-4793 | | 8004-0983 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Facility's Local Well or Spring Number (e.g., MW-1, MW-2, BLANK-F, etc.) | | | | | | 365 | | 366 | | 367 | | 368 | |
| 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 | 328.2 | | 323.42 | | 323.42 | | 327.14 | |
| N238 | | Dissolved Oxygen | T | mg/L | Field | 3.39 | | 1.13 | | 1.44 | | 3.82 | |
| S0266- - | | Total Dissolved Solids | T | mg/L | 160.1 | 196 | | 246 | | 136 | | 277 | |
| S0296- - | | pH | T | Units | Field | 6.38 | | 6.17 | | 6.03 | | 6.58 | |
| NS215 | | Eh | T | mV | Field | 523 | | 482 | | 336 | | 523 | |
| S0907 - - | | Temperature | T | °C | Field | 15.72 | | 16.83 | | 20.11 | | 16.67 | |
| 7429-90-5 | | Aluminum | T | mg/L | 6020 | 0.0448 | *J | 0.0228 | J | 0.0332 | J | 2.4 | * |
| 7440-36-0 | | Antimony | T | mg/L | 6020 | <0.003 | | <0.003 | | <0.003 | | <0.003 | |
| 7440-38-2 | | Arsenic | T | mg/L | 6020 | <0.005 | | <0.005 | | 0.00471 | J | 0.00867 | |
| 7440-39-3 | | Barium | T | mg/L | 6020 | 0.11 | | 0.168 | | 0.163 | | 0.0173 | |
| 7440-41-7 | | Beryllium | T | mg/L | 6020 | <0.0005 | | <0.0005 | | <0.0005 | | <0.0005 | |
| 7440-42-8 | | Boron | T | mg/L | 6020 | 0.00749 | BJ | 0.13 | | 0.0194 | | 0.0125 | BJ |
| 7440-43-9 | | Cadmium | T | mg/L | 6020 | <0.001 | | <0.001 | | <0.001 | | <0.001 | |
| 7440-70-2 | | Calcium | T | mg/L | 6020 | 21.5 | | 30.7 | | 14.6 | | 21.6 | |
| 7440-47-3 | | Chromium | T | mg/L | 6020 | <0.01 | | <0.01 | | <0.01 | | <0.01 | |
| 7440-48-4 | | Cobalt | T | mg/L | 6020 | 0.00203 | | 0.000636 | J | 0.00566 | | 0.00108 | |
| 7440-50-8 | | Copper | T | mg/L | 6020 | 0.00233 | | 0.000376 | J | 0.000467 | J | 0.00317 | |
| 7439-89-6 | | Iron | T | mg/L | 6020 | 0.0563 | J | 0.0819 | J | 12.5 | | 1.17 | |
| 7439-92-1 | | Lead | T | mg/L | 6020 | <0.002 | | <0.002 | | <0.002 | | 0.00121 | J |
| 7439-95-4 | | Magnesium | T | mg/L | 6020 | 10.2 | | 12.7 | | 7.75 | | 8.32 | |
| 7439-96-5 | | Manganese | T | mg/L | 6020 | 0.0428 | | 0.0655 | | 1.61 | | 0.0416 | |
| 7439-97-6 | | Mercury | T | mg/L | 7470 | <0.0002 | | <0.0002 | | <0.0002 | | <0.0002 | |

**RESIDENTIAL/CONTAINED-QUARTERLY**
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**Permit Number: 073-00045**

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

# GROUNDWATER SAMPLE ANALYSIS - (Cont.)

| AKGWA NUMBER[1], Facility Well/Spring Number | | | | | | 8004-0984 | | 8004-0982 | | 8004-4793 | | 8004-0983 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.) | | | | | | 365 | | 366 | | 367 | | 368 | |
| 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 | 0.000172 | J | <0.0005 | | <0.0005 | | 0.00276 | |
| 7440-02-0 | | Nickel | T | mg/L | 6020 | 0.00727 | | 0.00118 | J | 0.0032 | | 0.00372 | |
| 7440-09-7 | | Potassium | T | mg/L | 6020 | 0.241 | J | 1.84 | | 2.71 | | 0.875 | |
| 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 | 52.8 | | 41.6 | | 17.8 | | 86.2 | |
| 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 | 0.000135 | BJ | <0.0002 | | <0.0002 | | 0.000347 | B |
| 7440-62-2 | | Vanadium | T | mg/L | 6020 | 0.0033 | J | <0.01 | | <0.01 | | 0.0168 | |
| 7440-66-6 | | Zinc | T | mg/L | 6020 | 0.0243 | | <0.01 | | 0.00767 | J | 0.0074 | 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 | |

**RESIDENTIAL/CONTAINED-QUARTERLY**
**Facility: US DOE - Paducah Gaseous Diffusion Plant**
**Permit Number: 073-00045**

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

# GROUNDWATER SAMPLE ANALYSIS - (Cont.)

| AKGWA NUMBER[1], Facility Well/Spring Number | | | | | | 8004-0984 | | 8004-0982 | | 8004-4793 | | 8004-0983 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.) | | | | | | 365 | | 366 | | 367 | | 368 | |
| 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 | | 0.00383 | | <0.001 | | <0.001 | |

**RESIDENTIAL/CONTAINED-QUARTERLY**
**Facility: US DOE - Paducah Gaseous Diffusion Plant**
**Permit Number: 073-00045**

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

# GROUNDWATER SAMPLE ANALYSIS - (Cont.)

| AKGWA NUMBER[1], Facility Well/Spring Number | | | | | | 8004-0984 | | 8004-0982 | | 8004-4793 | | 8004-0983 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.) | | | | | | 365 | | 366 | | 367 | | 368 | |
| 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 | <0.0000205 | | <0.0000204 | | <0.0000209 | | <0.0000206 | |
| 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 | 0.182 | | <0.0971 | | <0.0952 | | 0.135 | |
| 12674-11-2 | | PCB-1016 | T | ug/L | 8082 | <0.098 | | <0.0971 | | <0.0952 | | <0.0962 | |
| 11104-28-2 | | PCB-1221 | T | ug/L | 8082 | <0.098 | | <0.0971 | | <0.0952 | | <0.0962 | |
| 11141-16-5 | | PCB-1232 | T | ug/L | 8082 | <0.098 | | <0.0971 | | <0.0952 | | <0.0962 | |
| 53469-21-9 | | PCB-1242 | T | ug/L | 8082 | 0.182 | | <0.0971 | | <0.0952 | | 0.135 | |
| 12672-29-6 | | PCB-1248 | T | ug/L | 8082 | <0.098 | | <0.0971 | | <0.0952 | | <0.0962 | |

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**Permit Number: 073-00045**

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LAB ID: None
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# GROUNDWATER SAMPLE ANALYSIS - (Cont.)

| AKGWA NUMBER[1], Facility Well/Spring Number | | | | | | 8004-0984 | | 8004-0982 | | 8004-4793 | | 8004-0983 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.) | | | | | | 365 | | 366 | | 367 | | 368 | |
| 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 | <0.098 | | <0.0971 | | <0.0952 | | <0.0962 | |
| 11096-82-5 | | PCB-1260 | T | ug/L | 8082 | <0.098 | | <0.0971 | | <0.0952 | | <0.0962 | |
| 11100-14-4 | | PCB-1268 | T | ug/L | 8082 | <0.098 | | <0.0971 | | <0.0952 | | <0.0962 | |
| 12587-46-1 | | Gross Alpha | T | pCi/L | 9310 | 5.05 | * | 3.67 | * | 1.13 | * | 1.75 | * |
| 12587-47-2 | | Gross Beta | T | pCi/L | 9310 | 0.677 | * | 29.4 | * | 3.61 | * | -0.465 | * |
| 10043-66-0 | | Iodine-131 | T | pCi/L | | | * | | * | | * | | * |
| 13982-63-3 | | Radium-226 | T | pCi/L | HASL 300 | 0.391 | * | 0.445 | * | 1.42 | * | 0.238 | * |
| 10098-97-2 | | Strontium-90 | T | pCi/L | 905.0 | 0.428 | * | -0.447 | * | -1.08 | * | -0.343 | * |
| 14133-76-7 | | Technetium-99 | T | pCi/L | Tc-02-RC | -11.4 | * | 48.6 | * | -4.6 | * | -3.55 | * |
| 14269-63-7 | | Thorium-230 | T | pCi/L | Th-01-RC | 0.0706 | * | -0.0516 | * | 0.0524 | * | -0.143 | * |
| 10028-17-8 | | Tritium | T | pCi/L | 906.0 | -13.4 | * | -131 | * | -234 | * | -106 | * |
| S0130- - | | Chemical Oxygen Demand | T | mg/L | 410.4 | <20 | | <20 | | <20 | | <20 | |
| 57-12-5 | | Cyanide | T | mg/L | 9012 | <0.2 | | <0.2 | | <0.2 | | <0.2 | |
| 20461-54-5 | | Iodide | T | mg/L | 300.0 | <0.5 | | <0.5 | | <0.5 | | <0.5 | |
| S0268- - | | Total Organic Carbon | T | mg/L | 9060 | 1.62 | J | 0.836 | J | 0.593 | J | 1.48 | J |
| S0586- - | | Total Organic Halides | T | mg/L | 9020 | 0.0229 | | 0.00524 | J | <0.01 | | 0.00524 | J |
| | | | | | | | | | | | | | |
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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: 073-00045**

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** | | | | | | 8004-4820 | | 8004-4818 | | 8004-4819 | | 8004-4808 | |
| **Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.)** | | | | | | 369 | | 370 | | 371 | | 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)** | | | | | | 10/13/2015 11:29 | | 10/13/2015 14:05 | | 10/13/2015 12:47 | | 10/13/2015 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)** | | | | | | MW369UG1-16 | | MW370UG1-16 | | MW371UG1-16 | | MW372UG1-16 | |
| **Laboratory Sample ID Number (if applicable)** | | | | | | 383206003 | | 383206005 | | 383206007 | | 383206001 | |
| **Date of Analysis (Month/Day/Year) For Volatile Organics Analysis** | | | | | | 10/16/2015 | | 10/16/2015 | | 10/16/2015 | | 10/16/2015 | |
| **Gradient with respect to Monitored Unit (UP, DOWN, SIDE, UNKNOWN)** | | | | | | UP | | UP | | UP | | 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** | 0.378 | J | <0.2 | | 0.503 | | 0.663 | J |
| **16887-00-6** | | **Chloride(s)** | **T** | **mg/L** | **9056** | 34.6 | | 5.57 | | 39.4 | | 49.4 | |
| **16984-48-8** | | **Fluoride** | **T** | **mg/L** | **9056** | 0.181 | | 0.276 | | 0.154 | | 0.162 | |
| **S0595- -** | | **Nitrate & Nitrite** | **T** | **mg/L** | **9056** | 0.599 | | 0.278 | J | 1.28 | | 0.312 | |
| **14808-79-8** | | **Sulfate** | **T** | **mg/L** | **9056** | 7.89 | | 11 | | 19.5 | | 116 | |
| **NS1894** | | **Barometric Pressure Reading** | **T** | **Inches/Hg** | **Field** | 29.85 | | 29.87 | | 29.86 | | 29.84 | |
| **S0145- -** | | **Specific Conductance** | **T** | **μMH0/cm** | **Field** | 370 | | 432 | | 778 | | 751 | |

[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/CONTAINED-QUARTERLY**
**Facility: US DOE - Paducah Gaseous Diffusion Plant**
**Permit Number: 073-00045**

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

# GROUNDWATER SAMPLE ANALYSIS - (Cont.)

| AKGWA NUMBER[1], Facility Well/Spring Number | | | | | | 8004-4820 | | 8004-4818 | | 8004-4819 | | 8004-4808 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Facility's Local Well or Spring Number (e.g., MW-1, MW-2, BLANK-F, etc.) | | | | | | 369 | | 370 | | 371 | | 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 | 324.84 | | 324.82 | | 341.65 | | 324.86 | |
| N238 | | Dissolved Oxygen | T | mg/L | Field | 1.73 | | 4.29 | | 1.78 | | 1.72 | |
| S0266- - | | Total Dissolved Solids | T | mg/L | 160.1 | 189 | | 414 | | 211 | | 419 | |
| S0296- - | | pH | T | Units | Field | 6.24 | | 6.19 | | 6.63 | | 6.29 | |
| NS215 | | Eh | T | mV | Field | 382 | | 416 | | 393 | | 294 | |
| S0907 - - | | Temperature | T | °C | Field | 17.06 | | 19.06 | | 18.39 | | 15.39 | |
| 7429-90-5 | | Aluminum | T | mg/L | 6020 | 0.0774 | | <0.05 | | 0.0815 | | 0.0637 | |
| 7440-36-0 | | Antimony | T | mg/L | 6020 | <0.003 | | <0.003 | | <0.003 | | <0.003 | |
| 7440-38-2 | | Arsenic | T | mg/L | 6020 | <0.005 | | <0.005 | | <0.005 | | <0.005 | |
| 7440-39-3 | | Barium | T | mg/L | 6020 | 0.389 | | 0.207 | | 0.177 | | 0.0518 | |
| 7440-41-7 | | Beryllium | T | mg/L | 6020 | <0.0005 | | <0.0005 | | <0.0005 | | <0.0005 | |
| 7440-42-8 | | Boron | T | mg/L | 6020 | 0.0139 | J | 0.0328 | | <0.015 | | 1.28 | |
| 7440-43-9 | | Cadmium | T | mg/L | 6020 | <0.001 | | <0.001 | | <0.001 | | <0.001 | |
| 7440-70-2 | | Calcium | T | mg/L | 6020 | 17.1 | | 27.3 | | 35.8 | | 61.9 | |
| 7440-47-3 | | Chromium | T | mg/L | 6020 | <0.01 | | <0.01 | | <0.01 | | <0.01 | |
| 7440-48-4 | | Cobalt | T | mg/L | 6020 | 0.00742 | | 0.000578 | J | <0.001 | | 0.000346 | J |
| 7440-50-8 | | Copper | T | mg/L | 6020 | 0.00145 | | 0.000816 | J | 0.000533 | J | <0.001 | |
| 7439-89-6 | | Iron | T | mg/L | 6020 | 0.148 | | <0.1 | | 0.0702 | J | 0.502 | |
| 7439-92-1 | | Lead | T | mg/L | 6020 | <0.002 | | <0.002 | | <0.002 | | <0.002 | |
| 7439-95-4 | | Magnesium | T | mg/L | 6020 | 6.93 | | 11.6 | | 14.5 | | 23.5 | |
| 7439-96-5 | | Manganese | T | mg/L | 6020 | 0.019 | | 0.00374 | J | 0.00182 | J | 0.0199 | |
| 7439-97-6 | | Mercury | T | mg/L | 7470 | <0.0002 | | <0.0002 | | <0.0002 | | <0.0002 | |

**RESIDENTIAL/CONTAINED-QUARTERLY**
**Facility: US DOE - Paducah Gaseous Diffusion Plant**
**Permit Number: 073-00045**

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

# GROUNDWATER SAMPLE ANALYSIS - (Cont.)

| AKGWA NUMBER[1], Facility Well/Spring Number | | | | | | 8004-4820 | | 8004-4818 | | 8004-4819 | | 8004-4808 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.) | | | | | | 369 | | 370 | | 371 | | 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 | <0.0005 | | <0.0005 | | 0.000377 | J | 0.000402 | J |
| 7440-02-0 | | Nickel | T | mg/L | 6020 | 0.00888 | | 0.00116 | J | 0.00137 | J | 0.00135 | J |
| 7440-09-7 | | Potassium | T | mg/L | 6020 | 0.554 | | 2.38 | | 0.418 | | 2.42 | |
| 7440-16-6 | | Rhodium | T | mg/L | 6020 | <0.005 | | <0.005 | | <0.005 | | <0.005 | |
| 7782-49-2 | | Selenium | T | mg/L | 6020 | 0.00153 | J | <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 | 48.3 | | 50.4 | | 136 | | 58.9 | |
| 7440-25-7 | | Tantalum | T | mg/L | 6020 | <0.005 | * | <0.005 | * | <0.005 | * | <0.005 | * |
| 7440-28-0 | | Thallium | T | mg/L | 6020 | <0.002 | | <0.002 | | <0.002 | | <0.002 | |
| 7440-61-1 | | Uranium | T | mg/L | 6020 | <0.0002 | | <0.0002 | | 0.0018 | | <0.0002 | |
| 7440-62-2 | | Vanadium | T | mg/L | 6020 | <0.01 | | <0.01 | | <0.01 | | <0.01 | |
| 7440-66-6 | | Zinc | T | mg/L | 6020 | <0.01 | | <0.01 | | <0.01 | | <0.01 | |
| 108-05-4 | | Vinyl acetate | T | mg/L | 8260 | <0.005 | | <0.005 | | <0.005 | | <0.005 | |
| 67-64-1 | | Acetone | T | mg/L | 8260 | <0.005 | | <0.005 | | <0.005 | | <0.005 | |
| 107-02-8 | | Acrolein | T | mg/L | 8260 | <0.005 | | <0.005 | | <0.005 | | <0.005 | |
| 107-13-1 | | Acrylonitrile | T | mg/L | 8260 | <0.005 | | <0.005 | | <0.005 | | <0.005 | |
| 71-43-2 | | Benzene | T | mg/L | 8260 | <0.001 | | <0.001 | | <0.001 | | <0.001 | |
| 108-90-7 | | Chlorobenzene | T | mg/L | 8260 | <0.001 | | <0.001 | | <0.001 | | <0.001 | |
| 1330-20-7 | | Xylenes | T | mg/L | 8260 | <0.003 | | <0.003 | | <0.003 | | <0.003 | |
| 100-42-5 | | Styrene | T | mg/L | 8260 | <0.001 | | <0.001 | | <0.001 | | <0.001 | |
| 108-88-3 | | Toluene | T | mg/L | 8260 | <0.001 | | <0.001 | | <0.001 | | <0.001 | |
| 74-97-5 | | Chlorobromomethane | T | mg/L | 8260 | <0.001 | | <0.001 | | <0.001 | | <0.001 | |

# GROUNDWATER SAMPLE ANALYSIS - (Cont.)

| AKGWA NUMBER[1], Facility Well/Spring Number | | | | | | 8004-4820 | | 8004-4818 | | 8004-4819 | | 8004-4808 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.) | | | | | | 369 | | 370 | | 371 | | 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 | | 0.00032 | J |
| 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 | 0.00123 | | 0.0008 | J | <0.001 | | 0.00918 | |

# GROUNDWATER SAMPLE ANALYSIS - (Cont.)

| AKGWA NUMBER[1], Facility Well/Spring Number | | | | | | 8004-4820 | | 8004-4818 | | 8004-4819 | | 8004-4808 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.) | | | | | | 369 | | 370 | | 371 | | 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 | <0.00002 | | <0.0000205 | | <0.0000206 | | <0.0000206 | |
| 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 | | <0.098 | | <0.0962 | | 0.0511 | J |
| 12674-11-2 | | PCB-1016 | T | ug/L | 8082 | <0.0971 | | <0.098 | | <0.0962 | | <0.0962 | |
| 11104-28-2 | | PCB-1221 | T | ug/L | 8082 | <0.0971 | | <0.098 | | <0.0962 | | <0.0962 | |
| 11141-16-5 | | PCB-1232 | T | ug/L | 8082 | <0.0971 | | <0.098 | | <0.0962 | | <0.0962 | |
| 53469-21-9 | | PCB-1242 | T | ug/L | 8082 | <0.0971 | | <0.098 | | <0.0962 | | 0.0511 | J |
| 12672-29-6 | | PCB-1248 | T | ug/L | 8082 | <0.0971 | | <0.098 | | <0.0962 | | <0.0962 | |

**RESIDENTIAL/CONTAINED-QUARTERLY**
**Facility: US DOE - Paducah Gaseous Diffusion Plant**
**Permit Number: 073-00045**

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

# GROUNDWATER SAMPLE ANALYSIS - (Cont.)

| AKGWA NUMBER[1], Facility Well/Spring Number | | | | | | 8004-4820 | | 8004-4818 | | 8004-4819 | | 8004-4808 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.) | | | | | | 369 | | 370 | | 371 | | 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 | <0.0971 | | <0.098 | | <0.0962 | | <0.0962 | |
| 11096-82-5 | | PCB-1260 | T | ug/L | 8082 | <0.0971 | | <0.098 | | <0.0962 | | <0.0962 | |
| 11100-14-4 | | PCB-1268 | T | ug/L | 8082 | <0.0971 | | <0.098 | | <0.0962 | | <0.0962 | |
| 12587-46-1 | | Gross Alpha | T | pCi/L | 9310 | -2.55 | * | 0.324 | * | -1.57 | * | 2.94 | * |
| 12587-47-2 | | Gross Beta | T | pCi/L | 9310 | 28 | * | 33.1 | * | 3.94 | * | 86.8 | * |
| 10043-66-0 | | Iodine-131 | T | pCi/L | | | * | | * | | * | | * |
| 13982-63-3 | | Radium-226 | T | pCi/L | HASL 300 | 1.19 | * | 0.903 | * | 0.44 | * | 1.03 | * |
| 10098-97-2 | | Strontium-90 | T | pCi/L | 905.0 | -1.78 | * | -1.21 | * | -1.78 | * | -1.19 | * |
| 14133-76-7 | | Technetium-99 | T | pCi/L | Tc-02-RC | 46.7 | * | 50.5 | * | -14.7 | * | 89.5 | * |
| 14269-63-7 | | Thorium-230 | T | pCi/L | Th-01-RC | -0.445 | * | 0.414 | * | -0.0226 | * | -0.381 | * |
| 10028-17-8 | | Tritium | T | pCi/L | 906.0 | -106 | * | -18 | * | -62.1 | * | -77.1 | * |
| S0130- - | | Chemical Oxygen Demand | T | mg/L | 410.4 | <20 | | 31.1 | | <20 | | <20 | |
| 57-12-5 | | Cyanide | T | mg/L | 9012 | <0.2 | | <0.2 | | <0.2 | | <0.2 | |
| 20461-54-5 | | Iodide | T | mg/L | 300.0 | <0.5 | | <0.5 | | <0.5 | | <0.5 | |
| S0268- - | | Total Organic Carbon | T | mg/L | 9060 | 1.12 | J | 0.847 | J | 2.02 | | 1.91 | J |
| S0586- - | | Total Organic Halides | T | mg/L | 9020 | 0.0187 | | 0.0119 | | 0.0105 | | 0.0138 | |
| | | | | | | | | | | | | | |
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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: 073-00045**

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 | | 8004-0990 | | 8004-0985 | | 8004-0988 | |
| Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.) | | | | | | 373 | | 374 | | 375 | | 376 | |
| 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) | | | | | | 10/13/2015 10:14 | | 10/14/2015 12:26 | | 10/14/2015 13:51 | | NA | |
| Duplicate ("Y" or "N")[2] | | | | | | N | | N | | N | | N | |
| Split ("Y" or "N")[3] | | | | | | N | | N | | N | | N | |
| Facility Sample ID Number (if applicable) | | | | | | MW373UG1-16 | | MW374UG1-16 | | MW375UG1-16 | | NA | |
| Laboratory Sample ID Number (if applicable) | | | | | | 383206009 | | 383342007 | | 383342009 | | NA | |
| Date of Analysis (Month/Day/Year) For Volatile Organics Analysis | | | | | | 10/16/2015 | | 10/19/2015 | | 10/20/2015 | | NA | |
| Gradient with respect to Monitored Unit (UP, DOWN, SIDE, UNKNOWN) | | | | | | UP | | UP | | 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 | 0.575 | J | 0.919 | | <0.2 | | | * |
| 16887-00-6 | | Chloride(s) | T | mg/L | 9056 | 48.6 | | 74.8 | | 5.69 | | | * |
| 16984-48-8 | | Fluoride | T | mg/L | 9056 | 0.168 | | 0.125 | | 0.221 | | | * |
| S0595- - | | Nitrate & Nitrite | T | mg/L | 9056 | 0.973 | | <0.2 | | 1.56 | | | * |
| 14808-79-8 | | Sulfate | T | mg/L | 9056 | 160 | | 6.31 | | 23.4 | | | * |
| NS1894 | | Barometric Pressure Reading | T | Inches/Hg | Field | 29.84 | | 30.02 | | 30.02 | | | * |
| S0145- - | | Specific Conductance | T | μMH0/cm | Field | 849 | | 701 | | 350 | | | * |

[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/CONTAINED-QUARTERLY**
**Facility: US DOE - Paducah Gaseous Diffusion Plant**
**Permit Number: 073-00045**

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

# GROUNDWATER SAMPLE ANALYSIS - (Cont.)

| AKGWA NUMBER[1], Facility Well/Spring Number | | | | | | 8004-4792 | | 8004-0990 | | 8004-0985 | | 8004-0988 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Facility's Local Well or Spring Number (e.g., MW-1, MW-2, BLANK-F, etc.) | | | | | | 373 | | 374 | | 375 | | 376 | |
| 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 | 324.81 | | 335.06 | | 330.52 | | | * |
| N238 | | Dissolved Oxygen | T | mg/L | Field | 1.99 | | 1.1 | | 2.14 | | | * |
| S0266- - | | Total Dissolved Solids | T | mg/L | 160.1 | 480 | | 289 | | 146 | | | * |
| S0296- - | | pH | T | Units | Field | 6.19 | | 6.62 | | 6.5 | | | * |
| NS215 | | Eh | T | mV | Field | 312 | | 449 | | 468 | | | * |
| S0907 - - | | Temperature | T | °C | Field | 16.56 | | 18.89 | | 18.94 | | | * |
| 7429-90-5 | | Aluminum | T | mg/L | 6020 | <0.05 | | 0.0841 | * | 0.027 | *J | | * |
| 7440-36-0 | | Antimony | T | mg/L | 6020 | <0.003 | | <0.003 | | <0.003 | | | * |
| 7440-38-2 | | Arsenic | T | mg/L | 6020 | <0.005 | | 0.00289 | J | 0.00205 | J | | * |
| 7440-39-3 | | Barium | T | mg/L | 6020 | 0.026 | | 0.148 | | 0.165 | | | * |
| 7440-41-7 | | Beryllium | T | mg/L | 6020 | <0.0005 | | <0.0005 | | <0.0005 | | | * |
| 7440-42-8 | | Boron | T | mg/L | 6020 | 1.75 | | 0.0133 | BJ | 0.008 | BJ | | * |
| 7440-43-9 | | Cadmium | T | mg/L | 6020 | <0.001 | | <0.001 | | <0.001 | | | * |
| 7440-70-2 | | Calcium | T | mg/L | 6020 | 71.8 | | 21.8 | | 14 | | | * |
| 7440-47-3 | | Chromium | T | mg/L | 6020 | <0.01 | | <0.01 | | <0.01 | | | * |
| 7440-48-4 | | Cobalt | T | mg/L | 6020 | 0.000271 | J | 0.00212 | | <0.001 | | | * |
| 7440-50-8 | | Copper | T | mg/L | 6020 | 0.00048 | J | 0.000941 | J | 0.000777 | J | | * |
| 7439-89-6 | | Iron | T | mg/L | 6020 | <0.1 | | 0.885 | | <0.1 | | | * |
| 7439-92-1 | | Lead | T | mg/L | 6020 | <0.002 | | <0.002 | | <0.002 | | | * |
| 7439-95-4 | | Magnesium | T | mg/L | 6020 | 26.1 | | 6.4 | | 6 | | | * |
| 7439-96-5 | | Manganese | T | mg/L | 6020 | 0.0146 | | 0.224 | | 0.00118 | J | | * |
| 7439-97-6 | | Mercury | T | mg/L | 7470 | <0.0002 | | <0.0002 | | <0.0002 | | | * |

**RESIDENTIAL/CONTAINED-QUARTERLY**
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**Permit Number: 073-00045**

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

# GROUNDWATER SAMPLE ANALYSIS - (Cont.)

| AKGWA NUMBER[1], Facility Well/Spring Number | | | | | | 8004-4792 | | 8004-0990 | | 8004-0985 | | 8004-0988 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.) | | | | | | 373 | | 374 | | 375 | | 376 | |
| 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 | | 0.00021 | J | <0.0005 | | | * |
| 7440-02-0 | | Nickel | T | mg/L | 6020 | 0.000914 | J | 0.00124 | J | 0.00163 | J | | * |
| 7440-09-7 | | Potassium | T | mg/L | 6020 | 2.7 | | 0.456 | | 0.274 | J | | * |
| 7440-16-6 | | Rhodium | T | mg/L | 6020 | <0.005 | | <0.005 | | <0.005 | | | * |
| 7782-49-2 | | Selenium | T | mg/L | 6020 | <0.005 | | 0.00523 | | 0.0027 | J | | * |
| 7440-22-4 | | Silver | T | mg/L | 6020 | <0.001 | | 0.000114 | J | <0.001 | | | * |
| 7440-23-5 | | Sodium | T | mg/L | 6020 | 59.5 | | 131 | | 61.3 | | | * |
| 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 | | 0.000229 | B | <0.0002 | | | * |
| 7440-62-2 | | Vanadium | T | mg/L | 6020 | <0.01 | | 0.00757 | J | 0.0103 | | | * |
| 7440-66-6 | | Zinc | T | mg/L | 6020 | <0.01 | | <0.01 | | <0.01 | | | * |
| 108-05-4 | | Vinyl acetate | T | mg/L | 8260 | <0.005 | | <0.005 | | <0.005 | | | * |
| 67-64-1 | | Acetone | T | mg/L | 8260 | <0.005 | | <0.005 | | <0.005 | | | * |
| 107-02-8 | | Acrolein | T | mg/L | 8260 | <0.005 | | <0.005 | | <0.005 | | | * |
| 107-13-1 | | Acrylonitrile | T | mg/L | 8260 | <0.005 | | <0.005 | | <0.005 | | | * |
| 71-43-2 | | Benzene | T | mg/L | 8260 | <0.001 | | <0.001 | | <0.001 | | | * |
| 108-90-7 | | Chlorobenzene | T | mg/L | 8260 | <0.001 | | <0.001 | | <0.001 | | | * |
| 1330-20-7 | | Xylenes | T | mg/L | 8260 | <0.003 | | <0.003 | | <0.003 | | | * |
| 100-42-5 | | Styrene | T | mg/L | 8260 | <0.001 | | <0.001 | | <0.001 | | | * |
| 108-88-3 | | Toluene | T | mg/L | 8260 | <0.001 | | <0.001 | | <0.001 | | | * |
| 74-97-5 | | Chlorobromomethane | T | mg/L | 8260 | <0.001 | | <0.001 | | <0.001 | | | * |

**RESIDENTIAL/CONTAINED-QUARTERLY**
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LAB ID: None
For Official Use Only

# GROUNDWATER SAMPLE ANALYSIS - (Cont.)

| AKGWA NUMBER[1], Facility Well/Spring Number | | | | | | 8004-4792 | | 8004-0990 | | 8004-0985 | | 8004-0988 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.) | | | | | | 373 | | 374 | | 375 | | 376 | |
| 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 | 0.00914 | | <0.001 | | <0.001 | | | * |

**RESIDENTIAL/CONTAINED-QUARTERLY**
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**Permit Number: 073-00045**

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

# GROUNDWATER SAMPLE ANALYSIS - (Cont.)

| AKGWA NUMBER[1], Facility Well/Spring Number | | | | | | 8004-4792 | | 8004-0990 | | 8004-0985 | | 8004-0988 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.) | | | | | | 373 | | 374 | | 375 | | 376 | |
| 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 | <0.0000205 | | <0.0000202 | | <0.0000204 | | | * |
| 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 | <0.099 | | <0.099 | | <0.098 | | | * |
| 12674-11-2 | | PCB-1016 | T | ug/L | 8082 | <0.099 | | <0.099 | | <0.098 | | | * |
| 11104-28-2 | | PCB-1221 | T | ug/L | 8082 | <0.099 | | <0.099 | | <0.098 | | | * |
| 11141-16-5 | | PCB-1232 | T | ug/L | 8082 | <0.099 | | <0.099 | | <0.098 | | | * |
| 53469-21-9 | | PCB-1242 | T | ug/L | 8082 | <0.099 | | <0.099 | | <0.098 | | | * |
| 12672-29-6 | | PCB-1248 | T | ug/L | 8082 | <0.099 | | <0.099 | | <0.098 | | | * |

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**Permit Number: 073-00045**

FINDS/UNIT: KY8-890-008-982 / 1
LAB ID: None
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# GROUNDWATER SAMPLE ANALYSIS - (Cont.)

| AKGWA NUMBER[1], Facility Well/Spring Number | | | | | | 8004-4792 | | 8004-0990 | | 8004-0985 | | 8004-0988 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.) | | | | | | 373 | | 374 | | 375 | | 376 | |
| 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 | | <0.099 | | <0.098 | | | * |
| 11096-82-5 | | PCB-1260 | T | ug/L | 8082 | <0.099 | | <0.099 | | <0.098 | | | * |
| 11100-14-4 | | PCB-1268 | T | ug/L | 8082 | <0.099 | | <0.099 | | <0.098 | | | * |
| 12587-46-1 | | Gross Alpha | T | pCi/L | 9310 | -3.1 | * | 6.84 | * | -4.78 | * | | * |
| 12587-47-2 | | Gross Beta | T | pCi/L | 9310 | 10.7 | * | -5.83 | * | 2.77 | * | | * |
| 10043-66-0 | | Iodine-131 | T | pCi/L | | | * | | * | | * | | * |
| 13982-63-3 | | Radium-226 | T | pCi/L | HASL 300 | 0.73 | * | 0.596 | * | 0.201 | * | | * |
| 10098-97-2 | | Strontium-90 | T | pCi/L | 905.0 | 0.175 | * | -0.321 | * | 1.07 | * | | * |
| 14133-76-7 | | Technetium-99 | T | pCi/L | Tc-02-RC | 15.9 | * | -15.4 | * | -7.41 | * | | * |
| 14269-63-7 | | Thorium-230 | T | pCi/L | Th-01-RC | -0.022 | * | 0.675 | * | -0.208 | * | | * |
| 10028-17-8 | | Tritium | T | pCi/L | 906.0 | -130 | * | 2.84 | * | -81.5 | * | | * |
| S0130- - | | Chemical Oxygen Demand | T | mg/L | 410.4 | <20 | | <20 | | <20 | | | * |
| 57-12-5 | | Cyanide | T | mg/L | 9012 | <0.2 | | <0.2 | | <0.2 | | | * |
| 20461-54-5 | | Iodide | T | mg/L | 300.0 | <0.5 | | <0.5 | | <0.5 | | | * |
| S0268- - | | Total Organic Carbon | T | mg/L | 9060 | 1.11 | J | 2.26 | | 0.847 | J | | * |
| S0586- - | | Total Organic Halides | T | mg/L | 9020 | 0.0112 | | 0.0201 | | 0.0104 | | | * |
| | | | | | | | | | | | | | |
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Division of Waste Management
Solid Waste Branch
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Frankfort, KY 40601 (502)564-6716

**RESIDENTIAL/CONTAINED-QUARTERLY**
**Facility: US DOE - Paducah Gaseous Diffusion Plant**
**Permit Number: 073-00045**

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 | 8004-0989 | 0000-0000 | 0000-0000 | 0000-0000 |
|---|---|---|---|---|
| Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.) | 377 | E. BLANK | F. BLANK | T. BLANK 1 |
| Sample Sequence # | 1 | 1 | 1 | 1 |
| If sample is a Blank, specify Type: (F)ield, (T)rip, (M)ethod, or (E)quipment | NA | E | F | T |
| Sample Date and Time (Month/Day/Year hour: minutes) | NA | 10/8/2015 06:55 | 10/8/2015 12:30 | 10/7/2015 07:30 |
| Duplicate ("Y" or "N")[2] | N | N | N | N |
| Split ("Y" or "N")[3] | N | N | N | N |
| Facility Sample ID Number (if applicable) | NA | RI1UG1-16 | FB1UG1-16 | TB1UG1-16 |
| Laboratory Sample ID Number (if applicable) | NA | 382901012 | 382901011 | 382815009 |
| Date of Analysis (Month/Day/Year) For Volatile Organics Analysis | NA | 10/14/2015 | 10/14/2015 | 10/13/2015 |
| Gradient with respect to Monitored Unit (UP, DOWN, SIDE, UNKNOWN) | SIDE | 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/CONTAINED-QUARTERLY**
**Facility: US DOE - Paducah Gaseous Diffusion Plant**
**Permit Number: 073-00045**

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

# GROUNDWATER SAMPLE ANALYSIS - (Cont.)

| AKGWA NUMBER[1], Facility Well/Spring Number | | | | | | 8004-0989 | | 0000-0000 | | 0000-0000 | | 0000-0000 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Facility's Local Well or Spring Number (e.g., MW-1, MW-2, BLANK-F, etc.) | | | | | | 377 | | E. BLANK | | F. BLANK | | T. BLANK 1 | |
| 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 | | <0.05 | | | * |
| 7440-36-0 | | Antimony | T | mg/L | 6020 | | * | <0.003 | | <0.003 | | | * |
| 7440-38-2 | | Arsenic | T | mg/L | 6020 | | * | <0.005 | | <0.005 | | | * |
| 7440-39-3 | | Barium | T | mg/L | 6020 | | * | <0.002 | | <0.002 | | | * |
| 7440-41-7 | | Beryllium | T | mg/L | 6020 | | * | <0.0005 | | <0.0005 | | | * |
| 7440-42-8 | | Boron | T | mg/L | 6020 | | * | <0.015 | | <0.015 | | | * |
| 7440-43-9 | | Cadmium | T | mg/L | 6020 | | * | <0.001 | | <0.001 | | | * |
| 7440-70-2 | | Calcium | T | mg/L | 6020 | | * | <0.2 | | <0.2 | | | * |
| 7440-47-3 | | Chromium | T | mg/L | 6020 | | * | <0.01 | | <0.01 | | | * |
| 7440-48-4 | | Cobalt | T | mg/L | 6020 | | * | <0.001 | | <0.001 | | | * |
| 7440-50-8 | | Copper | T | mg/L | 6020 | | * | <0.001 | | <0.001 | | | * |
| 7439-89-6 | | Iron | T | mg/L | 6020 | | * | <0.1 | | <0.1 | | | * |
| 7439-92-1 | | Lead | T | mg/L | 6020 | | * | <0.002 | | <0.002 | | | * |
| 7439-95-4 | | Magnesium | T | mg/L | 6020 | | * | <0.03 | | <0.03 | | | * |
| 7439-96-5 | | Manganese | T | mg/L | 6020 | | * | <0.005 | | <0.005 | | | * |
| 7439-97-6 | | Mercury | T | mg/L | 7470 | | * | <0.0002 | | <0.0002 | | | * |

**RESIDENTIAL/CONTAINED-QUARTERLY**
**Facility: US DOE - Paducah Gaseous Diffusion Plant**
**Permit Number: 073-00045**

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

# GROUNDWATER SAMPLE ANALYSIS - (Cont.)

| AKGWA NUMBER[1], Facility Well/Spring Number | | | | | | 8004-0989 | | 0000-0000 | | 0000-0000 | | 0000-0000 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.) | | | | | | 377 | | E. BLANK | | F. BLANK | | T. BLANK 1 | |
| 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 | | | * |
| 7440-02-0 | | Nickel | T | mg/L | 6020 | | * | <0.002 | | <0.002 | | | * |
| 7440-09-7 | | Potassium | T | mg/L | 6020 | | * | <0.3 | | <0.3 | | | * |
| 7440-16-6 | | Rhodium | T | mg/L | 6020 | | * | <0.005 | | <0.005 | | | * |
| 7782-49-2 | | Selenium | T | mg/L | 6020 | | * | <0.005 | | <0.005 | | | * |
| 7440-22-4 | | Silver | T | mg/L | 6020 | | * | <0.001 | | <0.001 | | | * |
| 7440-23-5 | | Sodium | T | mg/L | 6020 | | * | <0.25 | | <0.25 | | | * |
| 7440-25-7 | | Tantalum | T | mg/L | 6020 | | * | <0.005 | | <0.005 | | | * |
| 7440-28-0 | | Thallium | T | mg/L | 6020 | | * | <0.002 | | <0.002 | | | * |
| 7440-61-1 | | Uranium | T | mg/L | 6020 | | * | <0.0002 | | <0.0002 | | | * |
| 7440-62-2 | | Vanadium | T | mg/L | 6020 | | * | <0.01 | | <0.01 | | | * |
| 7440-66-6 | | Zinc | T | mg/L | 6020 | | * | <0.01 | | <0.01 | | | * |
| 108-05-4 | | Vinyl acetate | T | mg/L | 8260 | | * | <0.005 | | <0.005 | | <0.005 | |
| 67-64-1 | | Acetone | T | mg/L | 8260 | | * | <0.005 | | <0.005 | | <0.005 | |
| 107-02-8 | | Acrolein | T | mg/L | 8260 | | * | <0.005 | | <0.005 | | <0.005 | |
| 107-13-1 | | Acrylonitrile | T | mg/L | 8260 | | * | <0.005 | | <0.005 | | <0.005 | |
| 71-43-2 | | Benzene | T | mg/L | 8260 | | * | <0.001 | | <0.001 | | <0.001 | |
| 108-90-7 | | Chlorobenzene | T | mg/L | 8260 | | * | <0.001 | | <0.001 | | <0.001 | |
| 1330-20-7 | | Xylenes | T | mg/L | 8260 | | * | <0.003 | | <0.003 | | <0.003 | |
| 100-42-5 | | Styrene | T | mg/L | 8260 | | * | <0.001 | | <0.001 | | <0.001 | |
| 108-88-3 | | Toluene | T | mg/L | 8260 | | * | <0.001 | | <0.001 | | <0.001 | |
| 74-97-5 | | Chlorobromomethane | T | mg/L | 8260 | | * | <0.001 | | <0.001 | | <0.001 | |

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**Permit Number: 073-00045**

FINDS/UNIT: KY8-890-008-982 / 1
LAB ID: None
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# GROUNDWATER SAMPLE ANALYSIS - (Cont.)

| AKGWA NUMBER[1], Facility Well/Spring Number | | | | | | 8004-0989 | | 0000-0000 | | 0000-0000 | | 0000-0000 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.) | | | | | | 377 | | E. BLANK | | F. BLANK | | T. BLANK 1 | |
| 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 | | * | <0.001 | | <0.001 | | <0.001 | |

# GROUNDWATER SAMPLE ANALYSIS - (Cont.)

| AKGWA NUMBER[1], Facility Well/Spring Number | | | | | | 8004-0989 | | 0000-0000 | | 0000-0000 | | 0000-0000 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.) | | | | | | 377 | | E. BLANK | | F. BLANK | | T. BLANK 1 | |
| 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 | | * | <0.0000208 | | <0.0000208 | | <0.0000204 | |
| 78-87-5 | | Propane, 1,2-Dichloro- | T | mg/L | 8260 | | * | <0.001 | | <0.001 | | <0.001 | |
| 10061-02-6 | | trans-1,3-Dichloro-1-propene | T | mg/L | 8260 | | * | <0.001 | | <0.001 | | <0.001 | |
| 10061-01-5 | | cis-1,3-Dichloro-1-propene | T | mg/L | 8260 | | * | <0.001 | | <0.001 | | <0.001 | |
| 156-60-5 | | trans-1,2-Dichloroethene | T | mg/L | 8260 | | * | <0.001 | | <0.001 | | <0.001 | |
| 75-69-4 | | Trichlorofluoromethane | T | mg/L | 8260 | | * | <0.001 | | <0.001 | | <0.001 | |
| 96-18-4 | | 1,2,3-Trichloropropane | T | mg/L | 8260 | | * | <0.001 | | <0.001 | | <0.001 | |
| 95-50-1 | | Benzene, 1,2-Dichloro- | T | mg/L | 8260 | | * | <0.001 | | <0.001 | | <0.001 | |
| 106-46-7 | | Benzene, 1,4-Dichloro- | T | mg/L | 8260 | | * | <0.001 | | <0.001 | | <0.001 | |
| 1336-36-3 | | PCB,Total | T | ug/L | 8082 | | * | <0.0952 | | <0.0952 | | | * |
| 12674-11-2 | | PCB-1016 | T | ug/L | 8082 | | * | <0.0952 | | <0.0952 | | | * |
| 11104-28-2 | | PCB-1221 | T | ug/L | 8082 | | * | <0.0952 | | <0.0952 | | | * |
| 11141-16-5 | | PCB-1232 | T | ug/L | 8082 | | * | <0.0952 | | <0.0952 | | | * |
| 53469-21-9 | | PCB-1242 | T | ug/L | 8082 | | * | <0.0952 | | <0.0952 | | | * |
| 12672-29-6 | | PCB-1248 | T | ug/L | 8082 | | * | <0.0952 | | <0.0952 | | | * |

**RESIDENTIAL/CONTAINED-QUARTERLY**
**Facility: US DOE - Paducah Gaseous Diffusion Plant**
**Permit Number: 073-00045**

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

# GROUNDWATER SAMPLE ANALYSIS - (Cont.)

| AKGWA NUMBER[1], Facility Well/Spring Number | | | | | | 8004-0989 | | 0000-0000 | | 0000-0000 | | 0000-0000 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.) | | | | | | 377 | | E. BLANK | | F. BLANK | | T. BLANK 1 | |
| 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 | | <0.0952 | | | * |
| 11096-82-5 | | PCB-1260 | T | ug/L | 8082 | | * | <0.0952 | | <0.0952 | | | * |
| 11100-14-4 | | PCB-1268 | T | ug/L | 8082 | | * | <0.0952 | | <0.0952 | | | * |
| 12587-46-1 | | Gross Alpha | T | pCi/L | 9310 | | * | -0.0109 | * | -0.147 | * | | * |
| 12587-47-2 | | Gross Beta | T | pCi/L | 9310 | | * | 3.89 | * | 4.11 | * | | * |
| 10043-66-0 | | Iodine-131 | T | pCi/L | | | * | | * | | * | | * |
| 13982-63-3 | | Radium-226 | T | pCi/L | HASL 300 | | * | 0.178 | * | 0.467 | * | | * |
| 10098-97-2 | | Strontium-90 | T | pCi/L | 905.0 | | * | -1.01 | * | -0.094 | * | | * |
| 14133-76-7 | | Technetium-99 | T | pCi/L | Tc-02-RC | | * | 1.59 | * | -2.63 | * | | * |
| 14269-63-7 | | Thorium-230 | T | pCi/L | Th-01-RC | | * | -0.042 | * | 0.194 | * | | * |
| 10028-17-8 | | Tritium | T | pCi/L | 906.0 | | * | 155 | * | 132 | * | | * |
| 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 | | <0.5 | | | * |
| S0268- - | | Total Organic Carbon | T | mg/L | 9060 | | * | | * | | * | | * |
| S0586- - | | Total Organic Halides | T | mg/L | 9020 | | * | | * | | * | | * |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
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Division of Waste Management
Solid Waste Branch
14 Reilly Road
Frankfort, KY 40601 (502)564-6716

**RESIDENTIAL/CONTAINED-QUARTERLY**
**Facility: US DOE - Paducah Gaseous Diffusion Plant**
**Permit Number: 073-00045**

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 | | 8004-4793 | |
| **Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.)** | | | | | | T. BLANK 2 | | T. BLANK 3 | | T. BLANK 4 | | 367 | |
| **Sample Sequence #** | | | | | | 1 | | 1 | | 1 | | 2 | |
| **If sample is a Blank, specify Type: (F)ield, (T)rip, (M)ethod, or (E)quipment** | | | | | | T | | T | | T | | NA | |
| **Sample Date and Time (Month/Day/Year hour: minutes)** | | | | | | 10/8/2015 06:50 | | 10/13/2015 07:45 | | 10/14/2015 06:50 | | 10/8/2015 12:20 | |
| **Duplicate ("Y" or "N")[2]** | | | | | | N | | N | | N | | Y | |
| **Split ("Y" or "N")[3]** | | | | | | N | | N | | N | | N | |
| **Facility Sample ID Number (if applicable)** | | | | | | TB2UG1-16 | | TB3UG1-16 | | TB4UG1-16 | | MW367DUG1-16 | |
| **Laboratory Sample ID Number (if applicable)** | | | | | | 382901013 | | 383206011 | | 383342011 | | 382901007 | |
| **Date of Analysis (Month/Day/Year) For Volatile Organics Analysis** | | | | | | 10/14/2015 | | 10/16/2015 | | 10/20/2015 | | 10/14/2015 | |
| **Gradient with respect to Monitored Unit (UP, DOWN, SIDE, UNKNOWN)** | | | | | | NA | | NA | | NA | | 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** | | * | | * | | * | 0.131 | J |
| **16887-00-6** | | **Chloride(s)** | **T** | **mg/L** | **9056** | | * | | * | | * | 9.39 | |
| **16984-48-8** | | **Fluoride** | **T** | **mg/L** | **9056** | | * | | * | | * | 0.0708 | J |
| **S0595- -** | | **Nitrate & Nitrite** | **T** | **mg/L** | **9056** | | * | | * | | * | <0.2 | |
| **14808-79-8** | | **Sulfate** | **T** | **mg/L** | **9056** | | * | | * | | * | 22.8 | |
| **NS1894** | | **Barometric Pressure Reading** | **T** | **Inches/Hg** | **Field** | | * | | * | | * | 30.06 | |
| **S0145- -** | | **Specific Conductance** | **T** | **μMH0/cm** | **Field** | | * | | * | | * | 281 | |

[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/CONTAINED-QUARTERLY**
**Facility: US DOE - Paducah Gaseous Diffusion Plant**
**Permit Number: 073-00045**

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

# GROUNDWATER SAMPLE ANALYSIS - (Cont.)

| AKGWA NUMBER[1], Facility Well/Spring Number | | | | | | 0000-0000 | | 0000-0000 | | 0000-0000 | | 8004-4793 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Facility's Local Well or Spring Number (e.g., MW-1, MW-2, BLANK-F, etc.) | | | | | | T. BLANK 2 | | T. BLANK 3 | | T. BLANK 4 | | 367 | |
| 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 | | * | | * | | * | 323.42 | |
| N238 | | Dissolved Oxygen | T | mg/L | Field | | * | | * | | * | 1.44 | |
| S0266- - | | Total Dissolved Solids | T | mg/L | 160.1 | | * | | * | | * | 124 | |
| S0296- - | | pH | T | Units | Field | | * | | * | | * | 6.03 | |
| NS215 | | Eh | T | mV | Field | | * | | * | | * | 336 | |
| S0907 - - | | Temperature | T | °C | Field | | * | | * | | * | 20.11 | |
| 7429-90-5 | | Aluminum | T | mg/L | 6020 | | * | | * | | * | 0.0298 | J |
| 7440-36-0 | | Antimony | T | mg/L | 6020 | | * | | * | | * | <0.003 | |
| 7440-38-2 | | Arsenic | T | mg/L | 6020 | | * | | * | | * | 0.00532 | |
| 7440-39-3 | | Barium | T | mg/L | 6020 | | * | | * | | * | 0.165 | |
| 7440-41-7 | | Beryllium | T | mg/L | 6020 | | * | | * | | * | <0.0005 | |
| 7440-42-8 | | Boron | T | mg/L | 6020 | | * | | * | | * | 0.0202 | |
| 7440-43-9 | | Cadmium | T | mg/L | 6020 | | * | | * | | * | <0.001 | |
| 7440-70-2 | | Calcium | T | mg/L | 6020 | | * | | * | | * | 14.6 | |
| 7440-47-3 | | Chromium | T | mg/L | 6020 | | * | | * | | * | <0.01 | |
| 7440-48-4 | | Cobalt | T | mg/L | 6020 | | * | | * | | * | 0.00587 | |
| 7440-50-8 | | Copper | T | mg/L | 6020 | | * | | * | | * | <0.001 | |
| 7439-89-6 | | Iron | T | mg/L | 6020 | | * | | * | | * | 12.6 | |
| 7439-92-1 | | Lead | T | mg/L | 6020 | | * | | * | | * | <0.002 | |
| 7439-95-4 | | Magnesium | T | mg/L | 6020 | | * | | * | | * | 7.97 | |
| 7439-96-5 | | Manganese | T | mg/L | 6020 | | * | | * | | * | 1.69 | |
| 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 | | 8004-4793 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.) | | | | | | T. BLANK 2 | | T. BLANK 3 | | T. BLANK 4 | | 367 | |
| 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 | | * | | * | | * | 0.00308 | |
| 7440-09-7 | | Potassium | T | mg/L | 6020 | | * | | * | | * | 2.78 | |
| 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 | | * | | * | | * | 17.9 | |
| 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 | | * | | * | | * | 0.00739 | 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 | |

**RESIDENTIAL/CONTAINED-QUARTERLY**
**Facility: US DOE - Paducah Gaseous Diffusion Plant**
**Permit Number: 073-00045**

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

# GROUNDWATER SAMPLE ANALYSIS - (Cont.)

| AKGWA NUMBER[1], Facility Well/Spring Number | | | | | | 0000-0000 | | 0000-0000 | | 0000-0000 | | 8004-4793 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.) | | | | | | T. BLANK 2 | | T. BLANK 3 | | T. BLANK 4 | | 367 | |
| 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 | | 0.00031 | J |

**RESIDENTIAL/CONTAINED-QUARTERLY**
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**Permit Number: 073-00045**

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

# GROUNDWATER SAMPLE ANALYSIS - (Cont.)

| AKGWA NUMBER[1], Facility Well/Spring Number | | | | | | 0000-0000 | | 0000-0000 | | 0000-0000 | | 8004-4793 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.) | | | | | | T. BLANK 2 | | T. BLANK 3 | | T. BLANK 4 | | 367 | |
| 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 | <0.0000209 | | <0.000021 | | <0.0000208 | | <0.0000207 | |
| 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 | | * | | * | | * | <0.962 | |
| 12674-11-2 | | PCB-1016 | T | ug/L | 8082 | | * | | * | | * | <0.962 | |
| 11104-28-2 | | PCB-1221 | T | ug/L | 8082 | | * | | * | | * | <0.962 | |
| 11141-16-5 | | PCB-1232 | T | ug/L | 8082 | | * | | * | | * | <0.962 | |
| 53469-21-9 | | PCB-1242 | T | ug/L | 8082 | | * | | * | | * | <0.962 | |
| 12672-29-6 | | PCB-1248 | T | ug/L | 8082 | | * | | * | | * | <0.962 | |

**RESIDENTIAL/CONTAINED-QUARTERLY**
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**Permit Number: 073-00045**

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

# GROUNDWATER SAMPLE ANALYSIS - (Cont.)

| AKGWA NUMBER[1], Facility Well/Spring Number | | | | | | 0000-0000 | | 0000-0000 | | 0000-0000 | | 8004-4793 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Facility's Local Well or Spring Number (e.g., MW-1, MW-2, etc.) | | | | | | T. BLANK 2 | | T. BLANK 3 | | T. BLANK 4 | | 367 | |
| 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 | | * | | * | | * | <0.962 | |
| 11096-82-5 | | PCB-1260 | T | ug/L | 8082 | | * | | * | | * | <0.962 | |
| 11100-14-4 | | PCB-1268 | T | ug/L | 8082 | | * | | * | | * | <0.962 | |
| 12587-46-1 | | Gross Alpha | T | pCi/L | 9310 | | * | | * | | * | -1.29 | * |
| 12587-47-2 | | Gross Beta | T | pCi/L | 9310 | | * | | * | | * | 0.952 | * |
| 10043-66-0 | | Iodine-131 | T | pCi/L | | | * | | * | | * | | * |
| 13982-63-3 | | Radium-226 | T | pCi/L | HASL 300 | | * | | * | | * | 1.02 | * |
| 10098-97-2 | | Strontium-90 | T | pCi/L | 905.0 | | * | | * | | * | 4.25 | * |
| 14133-76-7 | | Technetium-99 | T | pCi/L | Tc-02-RC | | * | | * | | * | -6.15 | * |
| 14269-63-7 | | Thorium-230 | T | pCi/L | Th-01-RC | | * | | * | | * | 1.03 | * |
| 10028-17-8 | | Tritium | T | pCi/L | 906.0 | | * | | * | | * | 100 | * |
| S0130- - | | Chemical Oxygen Demand | T | mg/L | 410.4 | | * | | * | | * | <20 | |
| 57-12-5 | | Cyanide | T | mg/L | 9012 | | * | | * | | * | <0.2 | |
| 20461-54-5 | | Iodide | T | mg/L | 300.0 | | * | | * | | * | <0.5 | |
| S0268- - | | Total Organic Carbon | T | mg/L | 9060 | | * | | * | | * | 0.607 | J |
| S0586- - | | Total Organic Halides | T | mg/L | 9020 | | * | | * | | * | <0.01 | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
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| | | | | | | | | | | | | | |

RESIDENTIAL/CONTAINED – QUARTERLY
Facility: US DOE - Paducah Gaseous Diffusion Plant
Permit Numbers: 073-00045

Finds/Unit: KY8-890-008-982 / 1
LAB ID: None
For Official Use Only

# GROUNDWATER
# WRITTEN COMMENTS

| Monitoring Point | Facility Sample ID | Constituent | Flag | Description |
|---|---|---|---|---|
| 8004-4798 MW357 | MW357UG1-16 | Magnesium | X | Other specific flags and footnotes may be required to properly define the results. |
| | | Gross alpha | | TPU is 7.72. Rad error is 7.64. |
| | | Gross beta | | TPU is 7.26. Rad error is 7.04. |
| | | Iodine-131 | | Analysis of constituent not required and not performed. |
| | | Radium-226 | | TPU is 0.436. Rad error is 0.436. |
| | | Strontium-90 | | TPU is 1.26. Rad error is 1.26. |
| | | Technetium-99 | | TPU is 14.1. Rad error is 13.3. |
| | | Thorium-230 | | TPU is 0.181. Rad error is 0.18. |
| | | Tritium | | TPU is 98.5. Rad error is 98. |
| 8004-4799 MW358 | MW358UG1-16 | Magnesium | X | Other specific flags and footnotes may be required to properly define the results. |
| | | Gross alpha | | TPU is 6.43. Rad error is 6.41. |
| | | Gross beta | | TPU is 14. Rad error is 11.3. |
| | | Iodine-131 | | Analysis of constituent not required and not performed. |
| | | Radium-226 | | TPU is 0.45. Rad error is 0.45. |
| | | Strontium-90 | | TPU is 1.3. Rad error is 1.3. |
| | | Technetium-99 | | TPU is 14. Rad error is 13.3. |
| | | Thorium-230 | | TPU is 0.545. Rad error is 0.539. |
| | | Tritium | | TPU is 78.5. Rad error is 78.5. |

RESIDENTIAL/CONTAINED – QUARTERLY
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Permit Numbers: 073-00045

Finds/Unit: KY8-890-008-982 / 1
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# GROUNDWATER
# WRITTEN COMMENTS

| Monitoring Point | Facility Sample ID | Constituent | Flag | Description |
|---|---|---|---|---|
| 8004-0981 MW359 | | Bromide | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Chloride | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Fluoride | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Nitrate & Nitrite | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Sulfate | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Barometric Pressure Reading | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Specific Conductance | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Static Water Level Elevation | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Dissolved Oxygen | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Total Dissolved Solids | | During sampling, the well went dry; therefore, no sample was collected. |
| | | pH | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Eh | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Temperature | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Aluminum | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Antimony | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Arsenic | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Barium | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Beryllium | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Boron | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Cadmium | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Calcium | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Chromium | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Cobalt | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Copper | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Iron | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Lead | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Magnesium | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Manganese | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Mercury | | During sampling, the well went dry; therefore, no sample was collected. |

RESIDENTIAL/CONTAINED – QUARTERLY
Facility: US DOE - Paducah Gaseous Diffusion Plant
Permit Numbers: 073-00045

Finds/Unit: KY8-890-008-982 / 1
LAB ID:None
For Official Use Only

# GROUNDWATER
# WRITTEN COMMENTS

| Monitoring Point | Facility Sample ID | Constituent | Flag | Description |
|---|---|---|---|---|
| 8004-0981 MW359 | | Molybdenum | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Nickel | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Potassium | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Rhodium | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Selenium | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Silver | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Sodium | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Tantalum | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Thallium | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Uranium | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Vanadium | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Zinc | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Vinyl acetate | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Acetone | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Acrolein | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Acrylonitrile | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Benzene | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Chlorobenzene | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Xylenes | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Styrene | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Toluene | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Chlorobromomethane | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Bromodichloromethane | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Tribromomethane | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Methyl bromide | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Methyl Ethyl Ketone | | During sampling, the well went dry; therefore, no sample was collected. |
| | | trans-1,4-Dichloro-2-butene | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Carbon disulfide | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Chloroethane | | During sampling, the well went dry; therefore, no sample was collected. |

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| Monitoring Point | Facility Sample ID | Constituent | Flag | Description |
|---|---|---|---|---|
| 8004-0981 MW359 | | Chloroform | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Methyl chloride | | During sampling, the well went dry; therefore, no sample was collected. |
| | | cis-1,2-Dichloroethene | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Methylene bromide | | During sampling, the well went dry; therefore, no sample was collected. |
| | | 1,1-Dichloroethane | | During sampling, the well went dry; therefore, no sample was collected. |
| | | 1,2-Dichloroethane | | During sampling, the well went dry; therefore, no sample was collected. |
| | | 1,1-Dichloroethylene | | During sampling, the well went dry; therefore, no sample was collected. |
| | | 1,2-Dibromoethane | | During sampling, the well went dry; therefore, no sample was collected. |
| | | 1,1,2,2-Tetrachloroethane | | During sampling, the well went dry; therefore, no sample was collected. |
| | | 1,1,1-Trichloroethane | | During sampling, the well went dry; therefore, no sample was collected. |
| | | 1,1,2-Trichloroethane | | During sampling, the well went dry; therefore, no sample was collected. |
| | | 1,1,1,2-Tetrachloroethane | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Vinyl chloride | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Tetrachloroethene | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Trichloroethene | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Ethylbenzene | | During sampling, the well went dry; therefore, no sample was collected. |
| | | 2-Hexanone | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Iodomethane | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Dibromochloromethane | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Carbon tetrachloride | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Dichloromethane | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Methyl Isobutyl Ketone | | During sampling, the well went dry; therefore, no sample was collected. |
| | | 1,2-Dibromo-3-chloropropane | | During sampling, the well went dry; therefore, no sample was collected. |
| | | 1,2-Dichloropropane | | During sampling, the well went dry; therefore, no sample was collected. |
| | | trans-1,3-Dichloropropene | | During sampling, the well went dry; therefore, no sample was collected. |
| | | cis-1,3-Dichloropropene | | During sampling, the well went dry; therefore, no sample was collected. |
| | | trans-1,2-Dichloroethene | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Trichlorofluoromethane | | During sampling, the well went dry; therefore, no sample was collected. |
| | | 1,2,3-Trichloropropane | | During sampling, the well went dry; therefore, no sample was collected. |

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| Monitoring Point | Facility Sample ID | Constituent | Flag | Description |
|---|---|---|---|---|
| 8004-0981 MW359 | | 1,2-Dichlorobenzene | | During sampling, the well went dry; therefore, no sample was collected. |
| | | 1,4-Dichlorobenzene | | During sampling, the well went dry; therefore, no sample was collected. |
| | | PCB, Total | | During sampling, the well went dry; therefore, no sample was collected. |
| | | PCB-1016 | | During sampling, the well went dry; therefore, no sample was collected. |
| | | PCB-1221 | | During sampling, the well went dry; therefore, no sample was collected. |
| | | PCB-1232 | | During sampling, the well went dry; therefore, no sample was collected. |
| | | PCB-1242 | | During sampling, the well went dry; therefore, no sample was collected. |
| | | PCB-1248 | | During sampling, the well went dry; therefore, no sample was collected. |
| | | PCB-1254 | | During sampling, the well went dry; therefore, no sample was collected. |
| | | PCB-1260 | | During sampling, the well went dry; therefore, no sample was collected. |
| | | PCB-1268 | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Gross alpha | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Gross beta | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Iodine-131 | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Radium-226 | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Strontium-90 | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Technetium-99 | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Thorium-230 | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Tritium | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Chemical Oxygen Demand | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Cyanide | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Iodide | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Total Organic Carbon | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Total Organic Halides | | During sampling, the well went dry; therefore, no sample was collected. |

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| Monitoring Point | | Facility Sample ID | Constituent | Flag | Description |
|---|---|---|---|---|---|
| 8004-4800 | MW360 | MW360UG1-16 | Magnesium | X | Other specific flags and footnotes may be required to properly define the results. |
| | | | Gross alpha | | TPU is 5.48. Rad error is 5.48. |
| | | | Gross beta | | TPU is 6.43. Rad error is 6.35. |
| | | | Iodine-131 | | Analysis of constituent not required and not performed. |
| | | | Radium-226 | | TPU is 0.41. Rad error is 0.41. |
| | | | Strontium-90 | | TPU is 1.83. Rad error is 1.83. |
| | | | Technetium-99 | | TPU is 11.4. Rad error is 11.4. |
| | | | Thorium-230 | | TPU is 0.439. Rad error is 0.438. |
| | | | Tritium | | TPU is 102. Rad error is 101. |
| 8004-4795 | MW361 | MW361UG1-16 | Magnesium | X | Other specific flags and footnotes may be required to properly define the results. |
| | | | Gross alpha | | TPU is 5.72. Rad error is 5.71. |
| | | | Gross beta | | TPU is 10.3. Rad error is 8.92. |
| | | | Iodine-131 | | Analysis of constituent not required and not performed. |
| | | | Radium-226 | | TPU is 0.333. Rad error is 0.333. |
| | | | Strontium-90 | | TPU is 4.37. Rad error is 4.35. |
| | | | Technetium-99 | | TPU is 13.2. Rad error is 12. |
| | | | Thorium-230 | | TPU is 0.468. Rad error is 0.465. |
| | | | Tritium | | TPU is 88.7. Rad error is 88.7. |
| 8004-0986 | MW362 | MW362UG1-16 | Aluminum | N | Sample spike recovery not within control limits. |
| | | | Tantalum | N | Sample spike recovery not within control limits. |
| | | | Gross alpha | | TPU is 5.03. Rad error is 5.03. |
| | | | Gross beta | | TPU is 4.87. Rad error is 4.87. |
| | | | Iodine-131 | | Analysis of constituent not required and not performed. |
| | | | Radium-226 | | TPU is 0.639. Rad error is 0.637. |
| | | | Strontium-90 | | TPU is 1.64. Rad error is 1.64. |
| | | | Technetium-99 | | TPU is 12.7. Rad error is 12.7. |
| | | | Thorium-230 | | TPU is 0.535. Rad error is 0.532. |
| | | | Tritium | | TPU is 124. Rad error is 124. |
| 8004-4796 | MW363 | MW363UG1-16 | Gross alpha | | TPU is 6.48. Rad error is 6.48. |
| | | | Gross beta | | TPU is 7.17. Rad error is 7.15. |
| | | | Iodine-131 | | Analysis of constituent not required and not performed. |
| | | | Radium-226 | | TPU is 0.296. Rad error is 0.296. |
| | | | Strontium-90 | | TPU is 1.43. Rad error is 1.43. |
| | | | Technetium-99 | | TPU is 11.2. Rad error is 11.2. |
| | | | Thorium-230 | | TPU is 0.45. Rad error is 0.444. |
| | | | Tritium | | TPU is 94.7. Rad error is 94.3. |

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| Monitoring Point | Facility Sample ID | Constituent | Flag | Description |
|---|---|---|---|---|
| 8004-4797 MW364 | MW364UG1-16 | Gross alpha | | TPU is 5.96. Rad error is 5.96. |
| | | Gross beta | | TPU is 12.1. Rad error is 11. |
| | | Iodine-131 | | Analysis of constituent not required and not performed. |
| | | Radium-226 | | TPU is 0.34. Rad error is 0.34. |
| | | Strontium-90 | | TPU is 3. Rad error is 3. |
| | | Technetium-99 | | TPU is 13.1. Rad error is 12.3. |
| | | Thorium-230 | | TPU is 0.294. Rad error is 0.292. |
| | | Tritium | | TPU is 121. Rad error is 117. |
| 8004-0984 MW365 | MW365UG1-16 | Aluminum | N | Sample spike recovery not within control limits. |
| | | Tantalum | N | Sample spike recovery not within control limits. |
| | | Gross alpha | | TPU is 7.16. Rad error is 7.08. |
| | | Gross beta | | TPU is 7.89. Rad error is 7.89. |
| | | Iodine-131 | | Analysis of constituent not required and not performed. |
| | | Radium-226 | | TPU is 0.39. Rad error is 0.389. |
| | | Strontium-90 | | TPU is 3.48. Rad error is 3.48. |
| | | Technetium-99 | | TPU is 12.4. Rad error is 12.4. |
| | | Thorium-230 | | TPU is 0.566. Rad error is 0.563. |
| | | Tritium | | TPU is 123. Rad error is 123. |
| 8004-0982 MW366 | MW366UG1-16 | Gross alpha | | TPU is 5.4. Rad error is 5.35. |
| | | Gross beta | | TPU is 9.7. Rad error is 8.43. |
| | | Iodine-131 | | Analysis of constituent not required and not performed. |
| | | Radium-226 | | TPU is 0.424. Rad error is 0.423. |
| | | Strontium-90 | | TPU is 1.32. Rad error is 1.32. |
| | | Technetium-99 | | TPU is 13.2. Rad error is 12. |
| | | Thorium-230 | | TPU is 0.317. Rad error is 0.316. |
| | | Tritium | | TPU is 165. Rad error is 165. |
| 8004-4793 MW367 | MW367UG1-16 | Gross alpha | | TPU is 5.67. Rad error is 5.66. |
| | | Gross beta | | TPU is 6.04. Rad error is 6. |
| | | Iodine-131 | | Analysis of constituent not required and not performed. |
| | | Radium-226 | | TPU is 0.721. Rad error is 0.719. |
| | | Strontium-90 | | TPU is 1.95. Rad error is 1.95. |
| | | Technetium-99 | | TPU is 10.9. Rad error is 10.9. |
| | | Thorium-230 | | TPU is 0.399. Rad error is 0.397. |
| | | Tritium | | TPU is 164. Rad error is 164. |

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| Monitoring Point | Facility Sample ID | Constituent | Flag | Description |
|---|---|---|---|---|
| 8004-0983 MW368 | MW368UG1-16 | Aluminum | N | Sample spike recovery not within control limits. |
| | | Tantalum | N | Sample spike recovery not within control limits. |
| | | Gross alpha | | TPU is 5.92. Rad error is 5.92. |
| | | Gross beta | | TPU is 5.78. Rad error is 5.78. |
| | | Iodine-131 | | Analysis of constituent not required and not performed. |
| | | Radium-226 | | TPU is 0.309. Rad error is 0.309. |
| | | Strontium-90 | | TPU is 1.53. Rad error is 1.53. |
| | | Technetium-99 | | TPU is 12.2. Rad error is 12.2. |
| | | Thorium-230 | | TPU is 0.384. Rad error is 0.383. |
| | | Tritium | | TPU is 120. Rad error is 120. |
| 8004-4820 MW369 | MW369UG1-16 | Tantalum | N | Sample spike recovery not within control limits. |
| | | Gross alpha | | TPU is 4.73. Rad error is 4.73. |
| | | Gross beta | | TPU is 11.7. Rad error is 10.7. |
| | | Iodine-131 | | Analysis of constituent not required and not performed. |
| | | Radium-226 | | TPU is 0.633. Rad error is 0.632. |
| | | Strontium-90 | | TPU is 1.04. Rad error is 1.04. |
| | | Technetium-99 | | TPU is 13.7. Rad error is 12.6. |
| | | Thorium-230 | | TPU is 0.334. Rad error is 0.333. |
| | | Tritium | | TPU is 117. Rad error is 117. |
| 8004-4818 MW370 | MW370UG1-16 | Tantalum | N | Sample spike recovery not within control limits. |
| | | Gross alpha | | TPU is 5. Rad error is 4.99. |
| | | Gross beta | | TPU is 10.6. Rad error is 9.14. |
| | | Iodine-131 | | Analysis of constituent not required and not performed. |
| | | Radium-226 | | TPU is 0.573. Rad error is 0.572. |
| | | Strontium-90 | | TPU is 1.83. Rad error is 1.83. |
| | | Technetium-99 | | TPU is 14.8. Rad error is 13.7. |
| | | Thorium-230 | | TPU is 0.599. Rad error is 0.591. |
| | | Tritium | | TPU is 123. Rad error is 123. |
| 8004-4819 MW371 | MW371UG1-16 | Tantalum | N | Sample spike recovery not within control limits. |
| | | Gross alpha | | TPU is 5.73. Rad error is 5.72. |
| | | Gross beta | | TPU is 6.2. Rad error is 6.17. |
| | | Iodine-131 | | Analysis of constituent not required and not performed. |
| | | Radium-226 | | TPU is 0.419. Rad error is 0.418. |
| | | Strontium-90 | | TPU is 1.41. Rad error is 1.41. |
| | | Technetium-99 | | TPU is 11.4. Rad error is 11.4. |
| | | Thorium-230 | | TPU is 0.379. Rad error is 0.378. |
| | | Tritium | | TPU is 121. Rad error is 121. |

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| Monitoring Point | Facility Sample ID | Constituent | Flag | Description |
|---|---|---|---|---|
| 8004-4808 MW372 | MW372UG1-16 | Tantalum | N | Sample spike recovery not within control limits. |
| | | Gross alpha | | TPU is 6.42. Rad error is 6.36. |
| | | Gross beta | | TPU is 19.6. Rad error is 13.6. |
| | | Iodine-131 | | Analysis of constituent not required and not performed. |
| | | Radium-226 | | TPU is 0.656. Rad error is 0.654. |
| | | Strontium-90 | | TPU is 1.59. Rad error is 1.59. |
| | | Technetium-99 | | TPU is 16.6. Rad error is 13.3. |
| | | Thorium-230 | | TPU is 0.372. Rad error is 0.372. |
| | | Tritium | | TPU is 121. Rad error is 121. |
| 8004-4792 MW373 | MW373UG1-16 | Tantalum | N | Sample spike recovery not within control limits. |
| | | Gross alpha | | TPU is 5.27. Rad error is 5.26. |
| | | Gross beta | | TPU is 7.04. Rad error is 6.82. |
| | | Iodine-131 | | Analysis of constituent not required and not performed. |
| | | Radium-226 | | TPU is 0.477. Rad error is 0.476. |
| | | Strontium-90 | | TPU is 1.81. Rad error is 1.81. |
| | | Technetium-99 | | TPU is 12.5. Rad error is 12.3. |
| | | Thorium-230 | | TPU is 0.338. Rad error is 0.337. |
| | | Tritium | | TPU is 118. Rad error is 118. |
| 8004-0990 MW374 | MW374UG1-16 | Aluminum | N | Sample spike recovery not within control limits. |
| | | Tantalum | N | Sample spike recovery not within control limits. |
| | | Gross alpha | | TPU is 7.14. Rad error is 7.05. |
| | | Gross beta | | TPU is 5.7. Rad error is 5.7. |
| | | Iodine-131 | | Analysis of constituent not required and not performed. |
| | | Radium-226 | | TPU is 0.405. Rad error is 0.405. |
| | | Strontium-90 | | TPU is 3.64. Rad error is 3.64. |
| | | Technetium-99 | | TPU is 11.8. Rad error is 11.8. |
| | | Thorium-230 | | TPU is 0.862. Rad error is 0.844. |
| | | Tritium | | TPU is 124. Rad error is 124. |
| 8004-0985 MW375 | MW375UG1-16 | Aluminum | N | Sample spike recovery not within control limits. |
| | | Tantalum | N | Sample spike recovery not within control limits. |
| | | Gross alpha | | TPU is 3.21. Rad error is 3.21. |
| | | Gross beta | | TPU is 5.91. Rad error is 5.89. |
| | | Iodine-131 | | Analysis of constituent not required and not performed. |
| | | Radium-226 | | TPU is 0.358. Rad error is 0.358. |
| | | Strontium-90 | | TPU is 3.41. Rad error is 3.4. |
| | | Technetium-99 | | TPU is 11.6. Rad error is 11.6. |
| | | Thorium-230 | | TPU is 0.326. Rad error is 0.326. |
| | | Tritium | | TPU is 120. Rad error is 120. |

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| Monitoring Point | Facility Sample ID | Constituent | Flag | Description |
|---|---|---|---|---|
| 8004-0988 MW376 | | Bromide | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Chloride | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Fluoride | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Nitrate & Nitrite | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Sulfate | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Barometric Pressure Reading | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Specific Conductance | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Static Water Level Elevation | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Dissolved Oxygen | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Total Dissolved Solids | | During sampling, the well went dry; therefore, no sample was collected. |
| | | pH | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Eh | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Temperature | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Aluminum | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Antimony | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Arsenic | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Barium | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Beryllium | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Boron | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Cadmium | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Calcium | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Chromium | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Cobalt | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Copper | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Iron | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Lead | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Magnesium | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Manganese | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Mercury | | During sampling, the well went dry; therefore, no sample was collected. |

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|---|---|---|---|---|
| 8004-0988 | MW376 | Molybdenum | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Nickel | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Potassium | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Rhodium | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Selenium | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Silver | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Sodium | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Tantalum | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Thallium | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Uranium | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Vanadium | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Zinc | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Vinyl acetate | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Acetone | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Acrolein | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Acrylonitrile | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Benzene | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Chlorobenzene | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Xylenes | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Styrene | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Toluene | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Chlorobromomethane | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Bromodichloromethane | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Tribromomethane | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Methyl bromide | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Methyl Ethyl Ketone | | During sampling, the well went dry; therefore, no sample was collected. |
| | | trans-1,4-Dichloro-2-butene | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Carbon disulfide | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Chloroethane | | During sampling, the well went dry; therefore, no sample was collected. |

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# GROUNDWATER
# WRITTEN COMMENTS

| Monitoring Point | Facility Sample ID | Constituent | Flag | Description |
|---|---|---|---|---|
| 8004-0988 | MW376 | Chloroform | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Methyl chloride | | During sampling, the well went dry; therefore, no sample was collected. |
| | | cis-1,2-Dichloroethene | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Methylene bromide | | During sampling, the well went dry; therefore, no sample was collected. |
| | | 1,1-Dichloroethane | | During sampling, the well went dry; therefore, no sample was collected. |
| | | 1,2-Dichloroethane | | During sampling, the well went dry; therefore, no sample was collected. |
| | | 1,1-Dichloroethylene | | During sampling, the well went dry; therefore, no sample was collected. |
| | | 1,2-Dibromoethane | | During sampling, the well went dry; therefore, no sample was collected. |
| | | 1,1,2,2-Tetrachloroethane | | During sampling, the well went dry; therefore, no sample was collected. |
| | | 1,1,1-Trichloroethane | | During sampling, the well went dry; therefore, no sample was collected. |
| | | 1,1,2-Trichloroethane | | During sampling, the well went dry; therefore, no sample was collected. |
| | | 1,1,1,2-Tetrachloroethane | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Vinyl chloride | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Tetrachloroethene | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Trichloroethene | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Ethylbenzene | | During sampling, the well went dry; therefore, no sample was collected. |
| | | 2-Hexanone | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Iodomethane | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Dibromochloromethane | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Carbon tetrachloride | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Dichloromethane | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Methyl Isobutyl Ketone | | During sampling, the well went dry; therefore, no sample was collected. |
| | | 1,2-Dibromo-3-chloropropane | | During sampling, the well went dry; therefore, no sample was collected. |
| | | 1,2-Dichloropropane | | During sampling, the well went dry; therefore, no sample was collected. |
| | | trans-1,3-Dichloropropene | | During sampling, the well went dry; therefore, no sample was collected. |
| | | cis-1,3-Dichloropropene | | During sampling, the well went dry; therefore, no sample was collected. |
| | | trans-1,2-Dichloroethene | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Trichlorofluoromethane | | During sampling, the well went dry; therefore, no sample was collected. |
| | | 1,2,3-Trichloropropane | | During sampling, the well went dry; therefore, no sample was collected. |

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# GROUNDWATER
# WRITTEN COMMENTS

| Monitoring Point | Facility Sample ID | Constituent | Flag | Description |
|---|---|---|---|---|
| 8004-0988 MW376 | | 1,2-Dichlorobenzene | | During sampling, the well went dry; therefore, no sample was collected. |
| | | 1,4-Dichlorobenzene | | During sampling, the well went dry; therefore, no sample was collected. |
| | | PCB, Total | | During sampling, the well went dry; therefore, no sample was collected. |
| | | PCB-1016 | | During sampling, the well went dry; therefore, no sample was collected. |
| | | PCB-1221 | | During sampling, the well went dry; therefore, no sample was collected. |
| | | PCB-1232 | | During sampling, the well went dry; therefore, no sample was collected. |
| | | PCB-1242 | | During sampling, the well went dry; therefore, no sample was collected. |
| | | PCB-1248 | | During sampling, the well went dry; therefore, no sample was collected. |
| | | PCB-1254 | | During sampling, the well went dry; therefore, no sample was collected. |
| | | PCB-1260 | | During sampling, the well went dry; therefore, no sample was collected. |
| | | PCB-1268 | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Gross alpha | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Gross beta | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Iodine-131 | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Radium-226 | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Strontium-90 | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Technetium-99 | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Thorium-230 | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Tritium | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Chemical Oxygen Demand | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Cyanide | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Iodide | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Total Organic Carbon | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Total Organic Halides | | During sampling, the well went dry; therefore, no sample was collected. |

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# GROUNDWATER
# WRITTEN COMMENTS

| Monitoring Point | Facility Sample ID | Constituent | Flag | Description |
|---|---|---|---|---|
| 8004-0989 MW377 | | Bromide | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Chloride | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Fluoride | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Nitrate & Nitrite | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Sulfate | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Barometric Pressure Reading | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Specific Conductance | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Static Water Level Elevation | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Dissolved Oxygen | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Total Dissolved Solids | | During sampling, the well went dry; therefore, no sample was collected. |
| | | pH | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Eh | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Temperature | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Aluminum | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Antimony | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Arsenic | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Barium | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Beryllium | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Boron | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Cadmium | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Calcium | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Chromium | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Cobalt | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Copper | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Iron | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Lead | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Magnesium | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Manganese | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Mercury | | During sampling, the well went dry; therefore, no sample was collected. |

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# GROUNDWATER
# WRITTEN COMMENTS

| Monitoring Point | Facility Sample ID | Constituent | Flag | Description |
|---|---|---|---|---|
| 8004-0989 | MW377 | Molybdenum | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Nickel | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Potassium | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Rhodium | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Selenium | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Silver | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Sodium | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Tantalum | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Thallium | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Uranium | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Vanadium | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Zinc | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Vinyl acetate | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Acetone | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Acrolein | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Acrylonitrile | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Benzene | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Chlorobenzene | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Xylenes | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Styrene | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Toluene | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Chlorobromomethane | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Bromodichloromethane | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Tribromomethane | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Methyl bromide | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Methyl Ethyl Ketone | | During sampling, the well went dry; therefore, no sample was collected. |
| | | trans-1,4-Dichloro-2-butene | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Carbon disulfide | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Chloroethane | | During sampling, the well went dry; therefore, no sample was collected. |

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# GROUNDWATER
# WRITTEN COMMENTS

| Monitoring Point | Facility Sample ID | Constituent | Flag | Description |
|---|---|---|---|---|
| 8004-0989 MW377 | | Chloroform | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Methyl chloride | | During sampling, the well went dry; therefore, no sample was collected. |
| | | cis-1,2-Dichloroethene | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Methylene bromide | | During sampling, the well went dry; therefore, no sample was collected. |
| | | 1,1-Dichloroethane | | During sampling, the well went dry; therefore, no sample was collected. |
| | | 1,2-Dichloroethane | | During sampling, the well went dry; therefore, no sample was collected. |
| | | 1,1-Dichloroethylene | | During sampling, the well went dry; therefore, no sample was collected. |
| | | 1,2-Dibromoethane | | During sampling, the well went dry; therefore, no sample was collected. |
| | | 1,1,2,2-Tetrachloroethane | | During sampling, the well went dry; therefore, no sample was collected. |
| | | 1,1,1-Trichloroethane | | During sampling, the well went dry; therefore, no sample was collected. |
| | | 1,1,2-Trichloroethane | | During sampling, the well went dry; therefore, no sample was collected. |
| | | 1,1,1,2-Tetrachloroethane | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Vinyl chloride | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Tetrachloroethene | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Trichloroethene | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Ethylbenzene | | During sampling, the well went dry; therefore, no sample was collected. |
| | | 2-Hexanone | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Iodomethane | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Dibromochloromethane | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Carbon tetrachloride | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Dichloromethane | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Methyl Isobutyl Ketone | | During sampling, the well went dry; therefore, no sample was collected. |
| | | 1,2-Dibromo-3-chloropropane | | During sampling, the well went dry; therefore, no sample was collected. |
| | | 1,2-Dichloropropane | | During sampling, the well went dry; therefore, no sample was collected. |
| | | trans-1,3-Dichloropropene | | During sampling, the well went dry; therefore, no sample was collected. |
| | | cis-1,3-Dichloropropene | | During sampling, the well went dry; therefore, no sample was collected. |
| | | trans-1,2-Dichloroethene | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Trichlorofluoromethane | | During sampling, the well went dry; therefore, no sample was collected. |
| | | 1,2,3-Trichloropropane | | During sampling, the well went dry; therefore, no sample was collected. |

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# GROUNDWATER
# WRITTEN COMMENTS

| Monitoring Point | Facility Sample ID | Constituent | Flag | Description |
|---|---|---|---|---|
| 8004-0989 MW377 | | 1,2-Dichlorobenzene | | During sampling, the well went dry; therefore, no sample was collected. |
| | | 1,4-Dichlorobenzene | | During sampling, the well went dry; therefore, no sample was collected. |
| | | PCB, Total | | During sampling, the well went dry; therefore, no sample was collected. |
| | | PCB-1016 | | During sampling, the well went dry; therefore, no sample was collected. |
| | | PCB-1221 | | During sampling, the well went dry; therefore, no sample was collected. |
| | | PCB-1232 | | During sampling, the well went dry; therefore, no sample was collected. |
| | | PCB-1242 | | During sampling, the well went dry; therefore, no sample was collected. |
| | | PCB-1248 | | During sampling, the well went dry; therefore, no sample was collected. |
| | | PCB-1254 | | During sampling, the well went dry; therefore, no sample was collected. |
| | | PCB-1260 | | During sampling, the well went dry; therefore, no sample was collected. |
| | | PCB-1268 | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Gross alpha | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Gross beta | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Iodine-131 | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Radium-226 | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Strontium-90 | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Technetium-99 | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Thorium-230 | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Tritium | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Chemical Oxygen Demand | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Cyanide | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Iodide | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Total Organic Carbon | | During sampling, the well went dry; therefore, no sample was collected. |
| | | Total Organic Halides | | During sampling, the well went dry; therefore, no sample was collected. |

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# GROUNDWATER
# WRITTEN COMMENTS

| Monitoring Point | Facility Sample ID | Constituent | Flag | Description |
|---|---|---|---|---|
| 0000-0000 QC | RI1UG1-16 | 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. |
| | | Gross alpha | | TPU is 5.27. Rad error is 5.27. |
| | | Gross beta | | TPU is 8. Rad error is 7.97. |
| | | Iodine-131 | | Analysis of constituent not required and not performed. |
| | | Radium-226 | | TPU is 0.405. Rad error is 0.405. |
| | | Strontium-90 | | TPU is 1.23. Rad error is 1.23. |
| | | Technetium-99 | | TPU is 10.7. Rad error is 10.7. |
| | | Thorium-230 | | TPU is 0.34. Rad error is 0.339. |
| | | Tritium | | TPU is 117. Rad error is 113. |
| | | 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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# GROUNDWATER
# WRITTEN COMMENTS

| Monitoring Point | Facility Sample ID | Constituent | Flag | Description |
|---|---|---|---|---|
| 0000-0000 QC | FB1UG1-16 | 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. |
| | | Gross alpha | | TPU is 4.73. Rad error is 4.73. |
| | | Gross beta | | TPU is 7.19. Rad error is 7.15. |
| | | Iodine-131 | | Analysis of constituent not required and not performed. |
| | | Radium-226 | | TPU is 0.491. Rad error is 0.49. |
| | | Strontium-90 | | TPU is 2.29. Rad error is 2.29. |
| | | Technetium-99 | | TPU is 10.9. Rad error is 10.9. |
| | | Thorium-230 | | TPU is 0.385. Rad error is 0.38. |
| | | Tritium | | TPU is 113. Rad error is 110. |
| | | Chemical Oxygen Demand | | Analysis of constituent not required and not performed. |
| | | Cyanide | | Analysis of constituent not required and not performed. |
| | | Total Organic Carbon | | Analysis of constituent not required and not performed. |
| | | Total Organic Halides | | Analysis of constituent not required and not performed. |

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# GROUNDWATER
# WRITTEN COMMENTS

| Monitoring Point | Facility Sample ID | Constituent | Flag | Description |
|---|---|---|---|---|
| 0000-0000 QC | TB1UG1-16 | 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. |
| | | Vanadium | | Analysis of constituent not required and not performed. |

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# GROUNDWATER
# WRITTEN COMMENTS

| Monitoring Point | Facility Sample ID | Constituent | Flag | Description |
|---|---|---|---|---|
| 0000-0000 QC | TB1UG1-16 | Zinc | | Analysis of constituent not required and not performed. |
| | | PCB, Total | | Analysis of constituent not required and not performed. |
| | | PCB-1016 | | Analysis of constituent not required and not performed. |
| | | PCB-1221 | | Analysis of constituent not required and not performed. |
| | | PCB-1232 | | Analysis of constituent not required and not performed. |
| | | PCB-1242 | | Analysis of constituent not required and not performed. |
| | | PCB-1248 | | Analysis of constituent not required and not performed. |
| | | PCB-1254 | | Analysis of constituent not required and not performed. |
| | | PCB-1260 | | Analysis of constituent not required and not performed. |
| | | PCB-1268 | | Analysis of constituent not required and not performed. |
| | | Gross alpha | | Analysis of constituent not required and not performed. |
| | | Gross beta | | Analysis of constituent not required and not performed. |
| | | Iodine-131 | | Analysis of constituent not required and not performed. |
| | | Radium-226 | | Analysis of constituent not required and not performed. |
| | | Strontium-90 | | Analysis of constituent not required and not performed. |
| | | Technetium-99 | | Analysis of constituent not required and not performed. |
| | | Thorium-230 | | Analysis of constituent not required and not performed. |
| | | Tritium | | Analysis of constituent not required and not performed. |
| | | Chemical Oxygen Demand | | Analysis of constituent not required and not performed. |
| | | Cyanide | | Analysis of constituent not required and not performed. |
| | | Iodide | | Analysis of constituent not required and not performed. |
| | | Total Organic Carbon | | Analysis of constituent not required and not performed. |
| | | Total Organic Halides | | Analysis of constituent not required and not performed. |

RESIDENTIAL/CONTAINED – QUARTERLY
Facility: US DOE - Paducah Gaseous Diffusion Plant
Permit Numbers: 073-00045

Finds/Unit: KY8-890-008-982 / 1
LAB ID: None
For Official Use Only

# GROUNDWATER
# WRITTEN COMMENTS

| Monitoring Point | Facility Sample ID | Constituent | Flag | Description |
|---|---|---|---|---|
| 0000-0000 QC | TB2UG1-16 | 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. |
| | | Vanadium | | Analysis of constituent not required and not performed. |

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LAB ID:None
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# GROUNDWATER
# WRITTEN COMMENTS

| Monitoring Point | Facility Sample ID | Constituent | Flag | Description |
|---|---|---|---|---|
| 0000-0000 QC | TB2UG1-16 | 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. |

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Finds/Unit: KY8-890-008-982 / 1
LAB ID:None
For Official Use Only

# GROUNDWATER
# WRITTEN COMMENTS

| Monitoring Point | Facility Sample ID | Constituent | Flag | Description |
|---|---|---|---|---|
| 0000-0000 QC | TB3UG1-16 | 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. |
| | | Vanadium | | Analysis of constituent not required and not performed. |

RESIDENTIAL/CONTAINED – QUARTERLY
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Finds/Unit: KY8-890-008-982 / 1
LAB ID:None
For Official Use Only

# GROUNDWATER
# WRITTEN COMMENTS

| Monitoring Point | Facility Sample ID | Constituent | Flag | Description |
|---|---|---|---|---|
| 0000-0000 QC | TB3UG1-16 | Zinc | | Analysis of constituent not required and not performed. |
| | | PCB, Total | | Analysis of constituent not required and not performed. |
| | | PCB-1016 | | Analysis of constituent not required and not performed. |
| | | PCB-1221 | | Analysis of constituent not required and not performed. |
| | | PCB-1232 | | Analysis of constituent not required and not performed. |
| | | PCB-1242 | | Analysis of constituent not required and not performed. |
| | | PCB-1248 | | Analysis of constituent not required and not performed. |
| | | PCB-1254 | | Analysis of constituent not required and not performed. |
| | | PCB-1260 | | Analysis of constituent not required and not performed. |
| | | PCB-1268 | | Analysis of constituent not required and not performed. |
| | | Gross alpha | | Analysis of constituent not required and not performed. |
| | | Gross beta | | Analysis of constituent not required and not performed. |
| | | Iodine-131 | | Analysis of constituent not required and not performed. |
| | | Radium-226 | | Analysis of constituent not required and not performed. |
| | | Strontium-90 | | Analysis of constituent not required and not performed. |
| | | Technetium-99 | | Analysis of constituent not required and not performed. |
| | | Thorium-230 | | Analysis of constituent not required and not performed. |
| | | Tritium | | Analysis of constituent not required and not performed. |
| | | Chemical Oxygen Demand | | Analysis of constituent not required and not performed. |
| | | Cyanide | | Analysis of constituent not required and not performed. |
| | | Iodide | | Analysis of constituent not required and not performed. |
| | | Total Organic Carbon | | Analysis of constituent not required and not performed. |
| | | Total Organic Halides | | Analysis of constituent not required and not performed. |

RESIDENTIAL/CONTAINED – QUARTERLY
Facility: US DOE - Paducah Gaseous Diffusion Plant
Permit Numbers: 073-00045

Finds/Unit: KY8-890-008-982 / 1
LAB ID: None
For Official Use Only

# GROUNDWATER
# WRITTEN COMMENTS

| Monitoring Point | Facility Sample ID | Constituent | Flag | Description |
|---|---|---|---|---|
| 0000-0000 QC | TB4UG1-16 | 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. |
| | | Vanadium | | Analysis of constituent not required and not performed. |

RESIDENTIAL/CONTAINED – QUARTERLY
Facility: US DOE - Paducah Gaseous Diffusion Plant
Permit Numbers: 073-00045

Finds/Unit: KY8-890-008-982 / 1
LAB ID:None
For Official Use Only

# GROUNDWATER
# WRITTEN COMMENTS

| Monitoring Point | Facility Sample ID | Constituent | Flag | Description |
|---|---|---|---|---|
| 0000-0000 QC | TB4UG1-16 | 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. |
| 8004-4793 MW367 | MW367DUG1-16 | Gross alpha | | TPU is 3.42. Rad error is 3.42. |
| | | Gross beta | | TPU is 5.19. Rad error is 5.18. |
| | | Iodine-131 | | Analysis of constituent not required and not performed. |
| | | Radium-226 | | TPU is 0.605. Rad error is 0.604. |
| | | Strontium-90 | | TPU is 3.21. Rad error is 3.13. |
| | | Technetium-99 | | TPU is 10.4. Rad error is 10.4. |
| | | Thorium-230 | | TPU is 0.745. Rad error is 0.717. |
| | | Tritium | | TPU is 106. Rad error is 104. |

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# APPENDIX D

# STATISTICAL ANALYSES AND QUALIFICATION STATEMENT

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# GROUNDWATER STATISTICAL COMMENTS

## Introduction

The statistical analyses conducted on the fourth quarter 2015 groundwater data collected from the C-746-U Landfill monitoring wells (MWs) were performed in accordance with Permit GSTR0001, Standard Requirement 3, using the U.S. Environmental Protection Agency (EPA) guidance document, *EPA Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Interim Final Guidance* (1989).

The statistical evaluation was conducted separately for the three groundwater systems: the Upper Continental Recharge System (UCRS), the Upper Regional Gravel Aquifer (URGA), and the Lower Regional Gravel Aquifer (LRGA). For each groundwater system, data from wells considered to represent background conditions were compared with test wells (downgradient or sidegradient wells) (Exhibit D.1). The fourth quarter 2015 data used to conduct the statistical analyses were collected in October 2015. 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 had 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 those parameters that exceed their MCLs, the most recent results are compared to historical background concentrations, as follows: the data are divided into censored and uncensored observations. The one-sided tolerance interval statistical test is conducted only on parameters that have at least one uncensored (detected) observation. The current result is compared to the results of the one-sided tolerance interval statistical test to determine if the current data exceed the historical background concentration calculated using the first eight quarters of data.

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

Statistical analyses are performed on the first eight quarters of historical background data, not on the data for the current quarter. Once a statistical result is obtained using the background data, the result for the

current quarter is compared to that value. If the value is exceeded, the well is considered to have an exceedance of the statistically derived historical background concentration.

For those parameters that are determined to exceed the historical background concentration, a second one-sided tolerance interval statistical test, or a two-sided tolerance interval statistical test in the case of pH, is conducted. The second one-sided tolerance interval statistical test is conducted to determine whether the current concentration in downgradient wells exceeds the current background, as determined by a comparison against the statistically derived upper TL using the most recent eight quarters of data for the relevant background wells. 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. 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 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 an exceedance of the statistically derived 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, if required).

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

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

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

    - The one-sided upper TL is calculated using the following equation:
      $TL = X + (K \times S)$

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

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

## Type of Data Used

Exhibit D.1 presents the upgradient or background wells (identified as "BG"), the downgradient or test wells (identified as "TW"), and the sidegradient wells (identified as "SG") for the C-746-U Contained Landfill. Exhibit D.2 presents the parameters by groundwater system from the available data set and the statistical test performed using the one-sided tolerance interval.

Exhibits D.3, D.4, and D.5 list the number of analyses (observations), nondetects (censored observations), 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 2015. The observations are representative of the current quarter data. Background data are presented in Attachments D1 and D2. The sampling dates associated with background data are listed next to the result in Attachments D1 and D2. When field duplicate data are available, the higher of the two readings is retained for further evaluation. When a well is sampled on two different dates, the most current available data are used. When a data point has been rejected following data validation, this result is not used, and the next available data point is used for the background or current quarter data.

**Exhibit D.1. Station Identification for Monitoring Wells Analyzed**

| Station | Type | Groundwater Unit |
|---|---|---|
| MW357 | TW | URGA |
| MW358 | TW | LRGA |
| MW359[a]* | TW | UCRS |
| MW360 | TW | URGA |
| MW361 | TW | LRGA |
| MW362[a] | TW | UCRS |
| MW363 | TW | URGA |
| MW364 | TW | LRGA |
| MW365[a] | TW | UCRS |
| MW366 | TW | URGA |
| MW367 | TW | LRGA |
| MW368[a] | TW | UCRS |
| MW369 | BG | URGA |
| MW370 | BG | LRGA |
| MW371[a] | BG | UCRS |
| MW372 | BG | URGA |
| MW373 | BG | LRGA |
| MW374[a] | BG | UCRS |
| MW375[a] | SG | UCRS |
| MW376[a]* | SG | UCRS |
| MW377[a]* | SG | UCRS |

[a]**NOTE:** The gradients in UCRS wells are downward and, hydrogeologically, UCRS wells are not considered upgradient, downgradient, or sidegradient from the C-746-U Landfill. The UCRS wells identified as upgradient, sidegradient, or downgradient are those wells located in the same general direction as the RGA wells considered to be upgradient, sidegradient, or downgradient.
**BG:** upgradient or background wells
**TW:** downgradient or test wells
**SG:** sidegradient wells
***Well was dry this quarter and a groundwater sample could not be collected.

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

| Parameters |
|---|
| Aluminum |
| Beta Activity |
| Boron |
| Bromide |
| Calcium |
| Chemical Oxygen Demand (COD) |
| Chloride |
| *cis*-1,2-Dichloroethene |
| Cobalt |
| Conductivity |
| Copper |
| Dissolved Oxygen |
| Dissolved Solids |
| Iron |
| Magnesium |
| Manganese |
| Molybdenum |
| Nickel |
| Oxidation-Reduction Potential |
| PCB, Total |
| PCB-1242 |
| pH* |
| Potassium |
| Radium-226 |
| Sodium |
| Sulfate |
| Technetium-99 |
| Thorium-230 |
| Total Organic Carbon (TOC) |
| Total Organic Halides (TOX) |
| Trichloroethene |
| Uranium |
| Vanadium |
| Zinc |

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

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

| Parameters | Observations | Censored Observation | Uncensored Observation | Statistical Analysis? |
|---|---|---|---|---|
| 1,1,1,2-Tetrachloroethane | 6 | 6 | 0 | No |
| 1,1,2,2-Tetrachloroethane | 6 | 6 | 0 | No |
| 1,1,2-Trichloroethane | 6 | 6 | 0 | No |
| 1,1-Dichloroethane | 6 | 6 | 0 | No |
| 1,2,3-Trichloropropane | 6 | 6 | 0 | No |
| 1,2-Dibromo-3-chloropropane | 6 | 6 | 0 | No |
| 1,2-Dibromoethane | 6 | 6 | 0 | No |
| 1,2-Dichlorobenzene | 6 | 6 | 0 | No |
| 1,2-Dichloropropane | 6 | 6 | 0 | No |
| 2-Butanone | 6 | 6 | 0 | No |
| 2-Hexanone | 6 | 6 | 0 | No |
| 4-Methyl-2-pentanone | 6 | 6 | 0 | No |
| Acetone | 6 | 6 | 0 | No |
| Acrolein | 6 | 6 | 0 | No |
| Acrylonitrile | 6 | 6 | 0 | No |
| **Aluminum** | **6** | **0** | **6** | **Yes** |
| Antimony | 6 | 6 | 0 | No |
| Aroclor-1268 | 6 | 6 | 0 | No |
| Beryllium | 6 | 6 | 0 | No |
| Boron | 6 | 6 | 0 | No |
| Beta Activity | 6 | 6 | 0 | No |
| **Bromide** | **6** | **3** | **3** | **Yes** |
| Bromochloromethane | 6 | 6 | 0 | No |
| Bromodichloromethane | 6 | 6 | 0 | No |
| Bromoform | 6 | 6 | 0 | No |
| Bromomethane | 6 | 6 | 0 | No |
| **Calcium** | **6** | **0** | **6** | **Yes** |
| Carbon Disulfide | 6 | 6 | 0 | No |
| Chemical Oxygen Demand (COD) | 6 | 6 | 0 | No |
| **Chloride** | **6** | **0** | **6** | **Yes** |
| Chlorobenzene | 6 | 6 | 0 | No |
| Chloroethane | 6 | 6 | 0 | No |
| Chloroform | 6 | 6 | 0 | No |
| Chloromethane | 6 | 6 | 0 | No |
| *cis*-1,2-Dichloroethene | 6 | 6 | 0 | No |
| *cis*-1,3-Dichloropropene | 6 | 6 | 0 | No |
| **Cobalt** | **6** | **2** | **4** | **Yes** |
| **Conductivity** | **6** | **0** | **6** | **Yes** |
| **Copper** | **6** | **0** | **6** | **Yes** |
| Cyanide | 6 | 6 | 0 | No |
| Dibromochloromethane | 6 | 6 | 0 | No |
| Dibromomethane | 6 | 6 | 0 | No |
| Dimethylbenzene, Total | 6 | 6 | 0 | No |
| **Dissolved Oxygen** | **6** | **0** | **6** | **Yes** |
| **Dissolved Solids** | **6** | **0** | **6** | **Yes** |
| Ethylbenzene | 6 | 6 | 0 | No |
| Iodide | 6 | 6 | 0 | No |
| Iodomethane | 6 | 6 | 0 | No |
| **Iron** | **6** | **1** | **5** | **Yes** |
| **Magnesium** | **6** | **0** | **6** | **Yes** |
| **Manganese** | **6** | **0** | **6** | **Yes** |

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

| Parameters | Observations | Censored Observation | Uncensored Observation | Statistical Analysis? |
|---|---|---|---|---|
| Methylene Chloride | 6 | 6 | 0 | No |
| **Molybdenum** | **6** | **1** | **5** | **Yes** |
| **Nickel** | **6** | **0** | **6** | **Yes** |
| **Oxidation-Reduction Potential** | **6** | **0** | **6** | **Yes** |
| **PCB, Total** | **6** | **4** | **2** | **Yes** |
| PCB-1016 | 6 | 6 | 0 | No |
| PCB-1221 | 6 | 6 | 0 | No |
| PCB-1232 | 6 | 6 | 0 | No |
| **PCB-1242** | **6** | **4** | **2** | **Yes** |
| PCB-1248 | 6 | 6 | 0 | No |
| PCB-1254 | 6 | 6 | 0 | No |
| PCB-1260 | 6 | 6 | 0 | No |
| **pH** | **6** | **0** | **6** | **Yes** |
| **Potassium** | **6** | **0** | **6** | **Yes** |
| **Radium-226** | **6** | **4** | **2** | **Yes** |
| Rhodium | 6 | 6 | 0 | No |
| **Sodium** | **6** | **0** | **6** | **Yes** |
| Styrene | 6 | 6 | 0 | No |
| **Sulfate** | **6** | **0** | **6** | **Yes** |
| Tantalum | 6 | 6 | 0 | No |
| Technetium-99 | 6 | 6 | 0 | No |
| Tetrachloroethene | 6 | 6 | 0 | No |
| Thallium | 6 | 6 | 0 | No |
| Thorium-230 | 6 | 6 | 0 | No |
| Toluene | 6 | 6 | 0 | No |
| **Total Organic Carbon (TOC)** | **6** | **0** | **6** | **Yes** |
| **Total Organic Halides (TOX)** | **6** | **0** | **6** | **Yes** |
| *trans*-1,2-Dichloroethene | 6 | 6 | 0 | No |
| *trans*-1,3-Dichloropropene | 6 | 6 | 0 | No |
| *trans*-1,4-Dichloro-2-Butene | 6 | 6 | 0 | No |
| Trichloroethene | 6 | 6 | 0 | No |
| Trichlorofluoromethane | 6 | 6 | 0 | No |
| **Uranium** | **6** | **4** | **2** | **Yes** |
| **Vanadium** | **6** | **4** | **2** | **Yes** |
| Vinyl Acetate | 6 | 6 | 0 | No |
| **Zinc** | **6** | **3** | **3** | **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 | 6 | 6 | 0 | No |
| 1,1,2,2-Tetrachloroethane | 6 | 6 | 0 | No |
| 1,1,2-Trichloroethane | 6 | 6 | 0 | No |
| 1,1-Dichloroethane | 6 | 6 | 0 | No |
| 1,2,3-Trichloropropane | 6 | 6 | 0 | No |
| 1,2-Dibromo-3-chloropropane | 6 | 6 | 0 | No |
| 1,2-Dibromoethane | 6 | 6 | 0 | No |
| 1,2-Dichlorobenzene | 6 | 6 | 0 | No |
| 1,2-Dichloropropane | 6 | 6 | 0 | No |
| 2-Butanone | 6 | 6 | 0 | No |
| 2-Hexanone | 6 | 6 | 0 | No |
| 4-Methyl-2-pentanone | 6 | 6 | 0 | No |
| Acetone | 6 | 6 | 0 | No |
| Acrolein | 6 | 6 | 0 | No |
| Acrylonitrile | 6 | 6 | 0 | No |
| **Aluminum** | **6** | **1** | **5** | **Yes** |
| Antimony | 6 | 6 | 0 | No |
| Aroclor-1268 | 6 | 6 | 0 | No |
| Beryllium | 6 | 6 | 0 | No |
| **Beta Activity** | **6** | **3** | **3** | **Yes** |
| **Boron** | **6** | **0** | **6** | **Yes** |
| **Bromide** | **6** | **0** | **6** | **Yes** |
| Bromochloromethane | 6 | 6 | 0 | No |
| Bromodichloromethane | 6 | 6 | 0 | No |
| Bromoform | 6 | 6 | 0 | No |
| Bromomethane | 6 | 6 | 0 | No |
| **Calcium** | **6** | **0** | **6** | **Yes** |
| Carbon Disulfide | 6 | 6 | 0 | No |
| Chemical Oxygen Demand (COD) | 6 | 6 | 0 | No |
| **Chloride** | **6** | **0** | **6** | **Yes** |
| Chlorobenzene | 6 | 6 | 0 | No |
| Chloroethane | 6 | 6 | 0 | No |
| Chloroform | 6 | 6 | 0 | No |
| Chloromethane | 6 | 6 | 0 | No |
| ***cis*-1,2-Dichloroethene** | **6** | **5** | **1** | **Yes** |
| *cis*-1,3-Dichloropropene | 6 | 6 | 0 | No |
| **Cobalt** | **6** | **1** | **5** | **Yes** |
| **Conductivity** | **6** | **0** | **6** | **Yes** |
| **Copper** | **6** | **3** | **3** | **Yes** |
| Cyanide | 6 | 6 | 0 | No |
| Dibromochloromethane | 6 | 6 | 0 | No |
| Dibromomethane | 6 | 6 | 0 | No |
| Dimethylbenzene, Total | 6 | 6 | 0 | No |
| **Dissolved Oxygen** | **6** | **0** | **6** | **Yes** |
| **Dissolved Solids** | **6** | **0** | **6** | **Yes** |
| Ethylbenzene | 6 | 6 | 0 | No |
| Iodide | 6 | 6 | 0 | No |
| Iodomethane | 6 | 6 | 0 | No |
| **Iron** | **6** | **0** | **6** | **Yes** |
| **Magnesium** | **6** | **0** | **6** | **Yes** |
| **Manganese** | **6** | **0** | **6** | **Yes** |

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

| Parameters | Observations | Censored Observation | Uncensored Observation | Statistical Analysis? |
|---|---|---|---|---|
| Methylene Chloride | 6 | 6 | 0 | No |
| **Molybdenum** | **6** | **5** | **1** | **Yes** |
| **Nickel** | **6** | **0** | **6** | **Yes** |
| **Oxidation-Reduction Potential** | **6** | **0** | **6** | **Yes** |
| **PCB, Total** | **6** | **4** | **2** | **Yes** |
| PCB-1016 | 6 | 6 | 0 | No |
| PCB-1221 | 6 | 6 | 0 | No |
| PCB-1232 | 6 | 6 | 0 | No |
| **PCB-1242** | **6** | **4** | **2** | **Yes** |
| PCB-1248 | 6 | 6 | 0 | No |
| PCB-1254 | 6 | 6 | 0 | No |
| PCB-1260 | 6 | 6 | 0 | No |
| **pH** | **6** | **0** | **6** | **Yes** |
| **Potassium** | **6** | **0** | **6** | **Yes** |
| Radium-226 | 6 | 6 | 0 | No |
| Rhodium | 6 | 6 | 0 | No |
| **Sodium** | **6** | **0** | **6** | **Yes** |
| Styrene | 6 | 6 | 0 | No |
| **Sulfate** | **6** | **0** | **6** | **Yes** |
| Tantalum | 6 | 6 | 0 | No |
| **Technetium-99** | **6** | **2** | **4** | **Yes** |
| Tetrachloroethene | 6 | 6 | 0 | No |
| Thallium | 6 | 6 | 0 | No |
| Thorium-230 | 6 | 6 | 0 | No |
| Toluene | 6 | 6 | 0 | No |
| **Total Organic Carbon (TOC)** | **6** | **0** | **6** | **Yes** |
| **Total Organic Halides (TOX)** | **6** | **2** | **4** | **Yes** |
| *trans*-1,2-Dichloroethene | 6 | 6 | 0 | No |
| *trans*-1,3-Dichloropropene | 6 | 6 | 0 | No |
| *trans*-1,4-Dichloro-2-Butene | 6 | 6 | 0 | No |
| **Trichloroethene** | **6** | **1** | **5** | **Yes** |
| Trichlorofluoromethane | 6 | 6 | 0 | No |
| **Uranium** | **6** | **5** | **1** | **Yes** |
| Vanadium | 6 | 6 | 0 | No |
| Vinyl Acetate | 6 | 6 | 0 | No |
| Zinc | 6 | 6 | 0 | No |

**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 | 6 | 6 | 0 | No |
| 1,1,2,2-Tetrachloroethane | 6 | 6 | 0 | No |
| 1,1,2-Trichloroethane | 6 | 6 | 0 | No |
| 1,1-Dichloroethane | 6 | 6 | 0 | No |
| 1,2,3-Trichloropropane | 6 | 6 | 0 | No |
| 1,2-Dibromo-3-chloropropane | 6 | 6 | 0 | No |
| 1,2-Dibromoethane | 6 | 6 | 0 | No |
| 1,2-Dichlorobenzene | 6 | 6 | 0 | No |
| 1,2-Dichloropropane | 6 | 6 | 0 | No |
| 2-Butanone | 6 | 6 | 0 | No |
| 2-Hexanone | 6 | 6 | 0 | No |
| 4-Methyl-2-pentanone | 6 | 6 | 0 | No |
| Acetone | 6 | 6 | 0 | No |
| Acrolein | 6 | 6 | 0 | No |
| Acrylonitrile | 6 | 6 | 0 | No |
| **Aluminum** | **6** | **4** | **2** | **Yes** |
| Antimony | 6 | 6 | 0 | No |
| Aroclor-1268 | 6 | 6 | 0 | No |
| Beryllium | 6 | 6 | 0 | No |
| **Beta activity** | **6** | **1** | **5** | **Yes** |
| **Boron** | **6** | **0** | **6** | **Yes** |
| **Bromide** | **6** | **1** | **5** | **Yes** |
| Bromochloromethane | 6 | 6 | 0 | No |
| Bromodichloromethane | 6 | 6 | 0 | No |
| Bromoform | 6 | 6 | 0 | No |
| Bromomethane | 6 | 6 | 0 | No |
| **Calcium** | **6** | **0** | **6** | **Yes** |
| Carbon Disulfide | 6 | 6 | 0 | No |
| **Chemical Oxygen Demand (COD)** | **6** | **4** | **2** | **Yes** |
| **Chloride** | **6** | **0** | **6** | **Yes** |
| Chlorobenzene | 6 | 6 | 0 | No |
| Chloroethane | 6 | 6 | 0 | No |
| Chloroform | 6 | 6 | 0 | No |
| Chloromethane | 6 | 6 | 0 | No |
| *cis*-1,2-Dichloroethene | 6 | 6 | 0 | No |
| *cis*-1,3-Dichloropropene | 6 | 6 | 0 | No |
| **Cobalt** | **6** | **0** | **6** | **Yes** |
| **Conductivity** | **6** | **0** | **6** | **Yes** |
| **Copper** | **6** | **0** | **6** | **Yes** |
| Cyanide | 6 | 6 | 0 | No |
| Dibromochloromethane | 6 | 6 | 0 | No |
| Dibromomethane | 6 | 6 | 0 | No |
| Dimethylbenzene, Total | 6 | 6 | 0 | No |
| **Dissolved Oxygen** | **6** | **0** | **6** | **Yes** |
| **Dissolved Solids** | **6** | **0** | **6** | **Yes** |
| Ethylbenzene | 6 | 6 | 0 | No |
| Iodide | 6 | 6 | 0 | No |
| Iodomethane | 6 | 6 | 0 | No |
| **Iron** | **6** | **2** | **4** | **Yes** |
| **Magnesium** | **6** | **0** | **6** | **Yes** |
| **Manganese** | **6** | **0** | **6** | **Yes** |

**Exhibit D.5. Tests Summary for Qualified Parameters—LRGA (Continued)**

| Parameters | Observations | Censored Observation | Uncensored Observation | Statistical Analysis? |
|---|---|---|---|---|
| Methylene chloride | 6 | 6 | 0 | No |
| Molybdenum | 6 | 6 | 0 | No |
| **Nickel** | **6** | **0** | **6** | **Yes** |
| **Oxidation-Reduction Potential** | **6** | **0** | **6** | **Yes** |
| PCB, Total | 6 | 6 | 0 | No |
| PCB-1016 | 6 | 6 | 0 | No |
| PCB-1221 | 6 | 6 | 0 | No |
| PCB-1232 | 6 | 6 | 0 | No |
| PCB-1242 | 6 | 6 | 0 | No |
| PCB-1248 | 6 | 6 | 0 | No |
| PCB-1254 | 6 | 6 | 0 | No |
| PCB-1260 | 6 | 6 | 0 | No |
| **pH** | **6** | **0** | **6** | **Yes** |
| **Potassium** | **6** | **0** | **6** | **Yes** |
| Radium-226 | 6 | 6 | 0 | No |
| Rhodium | 6 | 6 | 0 | No |
| **Sodium** | **6** | **0** | **6** | **Yes** |
| Styrene | 6 | 6 | 0 | No |
| **Sulfate** | **6** | **0** | **6** | **Yes** |
| Tantalum | 6 | 6 | 0 | No |
| **Technetium-99** | **6** | **2** | **4** | **Yes** |
| Tetrachloroethene | 6 | 6 | 0 | No |
| Thallium | 6 | 6 | 0 | No |
| **Thorium-230** | **6** | **5** | **1** | **Yes** |
| Toluene | 6 | 6 | 0 | No |
| **Total Organic Carbon (TOC)** | **6** | **0** | **6** | **Yes** |
| **Total Organic Halides (TOX)** | **6** | **3** | **3** | **Yes** |
| *trans*-1,2-Dichloroethene | 6 | 6 | 0 | No |
| *trans*-1,3-Dichloropropene | 6 | 6 | 0 | No |
| *trans*-1,4-Dichloro-2-Butene | 6 | 6 | 0 | No |
| **Trichloroethene** | **6** | **0** | **6** | **Yes** |
| Trichlorofluoromethane | 6 | 6 | 0 | No |
| Uranium | 6 | 6 | 0 | No |
| Vanadium | 6 | 6 | 0 | No |
| Vinyl Acetate | 6 | 6 | 0 | No |
| **Zinc** | **6** | **3** | **3** | **Yes** |

**Bold** denotes parameters with at least one uncensored observation.

**Discussion of Results from Historical Background Comparison**

For the UCRS, URGA, and LRGA, the concentrations of this quarter were compared to the results of the one-sided upper tolerance interval test calculated using historical background and are presented in Attachment D1. The statistician qualification statement is presented in Attachment D3. For the UCRS, URGA, and LRGA, the test was applied to 27, 29, and 27 parameters, respectively, including those listed in bold print in Exhibits D.3, D.4, and D.5, which include 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 historical background exceedances for dissolved oxygen, oxidation-reduction potential, and sulfate.

**URGA**

This quarter's results identified historical background exceedances for beta activity, calcium, conductivity, dissolved solids, magnesium, oxidation-reduction potential, sodium, and technetium-99.

**LRGA**

This quarter's results identified historical background exceedances for beta activity, oxidation-reduction potential, thorium-230, 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 in comparison to historical data 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 |
|---|---|---|
| **MW362:** Dissolved Oxygen, Oxidation-Reduction Potential, Sulfate | **MW357:** Oxidation-Reduction Potential | **MW358:** Beta Activity, Oxidation-Reduction Potential |
| **MW365:** Dissolved Oxygen, Oxidation-Reduction Potential, Sulfate | **MW360:** Oxidation-Reduction Potential, Sodium | **MW361:** Oxidation-Reduction Potential, Technetium-99 |
| **MW368:** Dissolved Oxygen, Oxidation-Reduction Potential, Sulfate | **MW363:** Oxidation-Reduction Potential | **MW364:** Oxidation-Reduction Potential |
| **MW371:** Oxidation-Reduction Potential, Sulfate | **MW366:** Oxidation-Reduction Potential | **MW367:** Oxidation-Reduction Potential, Thorium-230 |
| **MW374:** Oxidation-Reduction Potential | **MW369:** Oxidation-Reduction Potential | **MW370:** Oxidation-Reduction Potential, Technetium-99 |
| **MW375:** Oxidation-Reduction Potential, Sulfate | **MW372:** Beta Activity, Calcium, Conductivity, Dissolved Solids, Magnesium, Oxidation-Reduction Potential, Technetium-99 | **MW373:** Oxidation-Reduction Potential |

**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 | 2.08 | No exceedance of statistically derived historical background concentration |
| Bromide | Tolerance Interval | 0.34 | No exceedance of statistically derived historical background concentration |
| Calcium | Tolerance Interval | 0.40 | No exceedance of statistically derived historical background concentration |
| Chloride | Tolerance Interval | 0.95 | No exceedance of statistically derived historical background concentration |
| Cobalt | Tolerance Interval | 1.31 | No exceedance of statistically derived historical background concentration |
| Conductivity | Tolerance Interval | 0.45 | No exceedance of statistically derived historical background concentration |
| Copper | Tolerance Interval | 1.28 | No exceedance of statistically derived historical background concentration |
| Dissolved Oxygen | Tolerance Interval | 0.55 | Current results exceed statistically derived historical background concentration in MW362, MW365, and MW368 |
| Dissolved Solids | Tolerance Interval | 0.42 | No exceedance of statistically derived historical background concentration |
| Iron | Tolerance Interval | 0.98 | No exceedance of statistically derived historical background concentration |
| Magnesium | Tolerance Interval | 0.27 | No exceedance of statistically derived historical background concentration |
| Manganese | Tolerance Interval | 0.89 | No exceedance of statistically derived historical background concentration |
| Molybdenum | Tolerance Interval | 1.65 | No exceedance of statistically derived historical background concentration |
| Nickel | Tolerance Interval | 0.98 | No exceedance of statistically derived historical background concentration |
| Oxidation-Reduction Potential | Tolerance Interval | 3.54 | Current results exceed statistically derived historical background concentration in MW362, MW365, MW368, MW371, MW374, and MW375 |
| PCB, Total | Tolerance Interval | 0.92 | No exceedance of statistically derived historical background concentration |

**Exhibit D.7. Tests Summary for Qualified Parameters for Historical Background—UCRS (Continued)**

| Parameter | Performed Test | CV Normality Test* | Results of Tolerance Interval Test Conducted |
|---|---|---|---|
| PCB-1242 | Tolerance Interval | 1.41 | No exceedance of statistically derived historical background concentration |
| pH | Tolerance Interval | 0.05 | No exceedance of statistically derived historical background concentration |
| Potassium | Tolerance Interval | 0.72 | No exceedance of statistically derived historical background concentration |
| Radium-226 | Tolerance Interval | 3.79 | No exceedance of statistically derived historical background concentration |
| Sodium | Tolerance Interval | 0.40 | No exceedance of statistically derived historical background concentration |
| Sulfate | Tolerance Interval | 0.49 | Current results exceed statistically derived historical background concentration in MW362, MW365, MW368, MW371, and MW375 |
| Total Organic Carbon (TOC) | Tolerance Interval | 1.38 | No exceedance of statistically derived historical background concentration |
| Total Organic Halides (TOX) | Tolerance Interval | 1.08 | No exceedance of statistically derived historical background concentration |
| Uranium | Tolerance Interval | 1.68 | No exceedance of statistically derived historical background concentration |
| Vanadium | Tolerance Interval | 1.32 | No exceedance of statistically derived historical background concentration |
| Zinc | Tolerance Interval | 1.38 | No exceedance of statistically derived historical background concentration |

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

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

| Parameter | Performed Test | CV Normality Test* | Results of Tolerance Interval Test Conducted |
|---|---|---|---|
| Aluminum | Tolerance Interval | 1.24 | No exceedance of statistically derived historical background concentration |
| Beta Activity[1] | Tolerance Interval | 0.74 | Current results exceed statistically derived historical background concentration in MW372 |
| Boron | Tolerance Interval | 0.84 | No exceedance of statistically derived historical background concentration |
| Bromide | Tolerance Interval | 0.00 | No exceedance of statistically derived historical background concentration |
| Calcium | Tolerance Interval | 0.29 | Current results exceed statistically derived historical background concentration in MW372 |
| Chloride | Tolerance Interval | 0.10 | 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 | 0.85 | No exceedance of statistically derived historical background concentration |
| Conductivity | Tolerance Interval | 0.12 | Current results exceed statistically derived historical background concentration in MW372 |
| Copper | Tolerance Interval | 0.40 | No exceedance of statistically derived historical background concentration |
| Dissolved Oxygen | Tolerance Interval | 0.76 | No exceedance of statistically derived historical background concentration |
| Dissolved Solids | Tolerance Interval | 0.16 | Current results exceed statistically derived historical background concentration in MW372 |
| Iron | Tolerance Interval | 0.95 | No exceedance of statistically derived historical background concentration |
| Magnesium | Tolerance Interval | 0.27 | Current results exceed statistically derived historical background concentration in MW372 |
| Manganese | Tolerance Interval | 0.66 | No exceedance of statistically derived historical background concentration |
| Molybdenum | Tolerance Interval | 1.20 | No exceedance of statistically derived historical background concentration |
| Nickel | Tolerance Interval | 0.91 | No exceedance of statistically derived historical background concentration |

**Exhibit D.8. Tests Summary for Qualified Parameters for Historical Background—URGA (Continued)**

| Parameter | Performed Test | CV Normality Test* | Results of Tolerance Interval Test Conducted |
|---|---|---|---|
| Oxidation-Reduction Potential | Tolerance Interval | 1.26 | Current results exceed statistically derived historical background concentration in MW357, MW360, MW363, MW366, MW369, and MW372 |
| PCB, Total | Tolerance Interval | 0.90 | No exceedance of statistically derived historical background concentration |
| PCB-1242 | Tolerance Interval | 1.36 | No exceedance of statistically derived historical background concentration |
| pH | Tolerance Interval | 0.03 | No exceedance of statistically derived historical background concentration |
| Potassium | Tolerance Interval | 0.29 | No exceedance of statistically derived historical background concentration |
| Sodium | Tolerance Interval | 0.26 | Current results exceed statistically derived historical background concentration in MW360 |
| Sulfate | Tolerance Interval | 0.75 | No exceedance of statistically derived historical background concentration |
| Technetium-99 | Tolerance Interval | 0.87 | Current results exceed statistically derived historical background concentration in MW372 |
| Total Organic Carbon (TOC) | Tolerance Interval | 1.23 | No exceedance of statistically derived historical background concentration |
| Total Organic Halides (TOX) | Tolerance Interval | 0.95 | No exceedance of statistically derived historical background concentration |
| Trichloroethene[1] | Tolerance Interval | 0.64 | No exceedance of statistically derived historical background concentration |
| Uranium | Tolerance Interval | 0.92 | No exceedance of statistically derived historical background concentration |

CV: coefficient of variation
*If CV > 1.0, used log-transformed data.
[1] A 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 | 2.78 | No exceedance of statistically derived historical background concentration |
| Beta Activity[1] | Tolerance Interval | 0.80 | Current results exceed statistically derived historical background concentration in MW358 |
| Boron | Tolerance Interval | 0.68 | No exceedance of statistically derived historical background concentration |
| Bromide | Tolerance Interval | 0.00 | No exceedance of statistically derived historical background concentration |
| Calcium | Tolerance Interval | 0.31 | No exceedance of statistically derived historical background concentration |
| Chemical Oxygen Demand (COD) | Tolerance Interval | 0.59 | No exceedance of statistically derived historical background concentration |
| Chloride | Tolerance Interval | 0.16 | No exceedance of statistically derived historical background concentration |
| Cobalt | Tolerance Interval | 1.17 | No exceedance of statistically derived historical background concentration |
| Conductivity | Tolerance Interval | 0.26 | No exceedance of statistically derived historical background concentration |
| Copper | Tolerance Interval | 0.40 | No exceedance of statistically derived historical background concentration |
| Dissolved Oxygen | Tolerance Interval | 0.83 | No exceedance of statistically derived historical background concentration |
| Dissolved Solids | Tolerance Interval | 0.30 | No exceedance of statistically derived historical background concentration |
| Iron | Tolerance Interval | 0.96 | No exceedance of statistically derived historical background concentration |
| Magnesium | Tolerance Interval | 0.34 | No exceedance of statistically derived historical background concentration |
| Manganese | Tolerance Interval | 0.62 | No exceedance of statistically derived historical background concentration |
| Nickel | Tolerance Interval | 0.90 | No exceedance of statistically derived historical background concentration |
| Oxidation-Reduction Potential | Tolerance Interval | 1.31 | Current results exceed statistically derived historical background concentration in MW358, MW361, MW364, MW367, MW370, and MW373 |

**Exhibit D.9. Tests Summary for Qualified Parameters for Historical Background—LRGA (Continued)**

| Parameter | Performed Test | CV Normality Test* | Results of Tolerance Interval Test Conducted |
|---|---|---|---|
| pH | Tolerance Interval | 0.03 | No exceedance of statistically derived historical background concentration |
| Potassium | Tolerance Interval | 0.19 | No exceedance of statistically derived historical background concentration |
| Sodium | Tolerance Interval | 0.30 | No exceedance of statistically derived historical background concentration |
| Sulfate | Tolerance Interval | 1.59 | No exceedance of statistically derived historical background concentration |
| Technetium-99 | Tolerance Interval | 1.73 | Current results exceed statistically derived historical background concentration in MW361 and MW370 |
| Thorium-230 | Tolerance Interval | 1.38 | Current results exceed statistically derived historical background concentration in MW367 |
| Total Organic Carbon (TOC) | Tolerance Interval | 1.96 | No exceedance of statistically derived historical background concentration |
| Total Organic Halides (TOX) | Tolerance Interval | 0.98 | No exceedance of statistically derived historical background concentration |
| Trichloroethene[1] | Tolerance Interval | 0.57 | No exceedance of statistically derived historical background concentration |
| Zinc | Tolerance Interval | 0.67 | No exceedance of statistically derived historical background concentration |

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

**Discussion of Results from Current Background Comparison**

For the UCRS, URGA, and LRGA, the concentrations from downgradient wells were compared to the results of the one-sided upper tolerance interval test compared to current background, and are presented in Attachment D2 and the statistician qualification statement is presented in Attachment D3. For the UCRS, URGA, and LRGA, the test was applied to 3, 8, and 3 parameters, respectively, because these parameter concentrations exceeded the historical background TL. A summary of instances where downgradient well concentrations exceeded the TL calculated using current background data is shown in Exhibit D.10, presented by well number.

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

| URGA | LRGA |
|---|---|
| None | MW358: Beta Activity |

**UCRS**

Because gradients in the UCRS are downward (vertical), there are no hydrogeologically downgradient UCRS wells. It should be noted, however, that sulfate concentrations in four UCRS wells (i.e., MW362, MW365, MW368, and MW375) were higher than the current TL this quarter.

**URGA**

This quarter's results showed no exceedances of the current TL in wells located downgradient of the landfill.

**LRGA**

This quarter's results showed an exceedance for beta activity in MW358 for this quarter. MW358 is located downgradient of the landfill.

**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 |
|---|---|---|---|
| Dissolved Oxygen | Tolerance Interval | 0.58 | None of the test wells exceeded the upper TL, which is evidence that concentrations in these wells are not different from current background concentrations to a statistically-significant level. |
| Oxidation-Reduction Potential | Tolerance Interval | 0.37 | None of the test wells exceeded the upper TL, which is evidence that concentrations in these wells are not different from current background concentrations to a statistically-significant level. |
| Sulfate | Tolerance Interval | 0.51 | MW362, MW365, MW368, and MW375 exceeded the upper TL, which is evidence of elevated concentration with respect to current background data. |

CV: coefficient of variation

**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 | 0.98 | 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. |
| Calcium | Tolerance Interval | 0.58 | 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. |
| Conductivity | Tolerance Interval | 0.35 | None of the test wells exceeded the upper TL, which is evidence that concentrations in these wells are not different from current background concentrations to a statistically-significant level. |
| Dissolved Solids | Tolerance Interval | 0.41 | 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 | 0.53 | None of the test wells exceeded the upper TL, which is evidence that concentrations in these wells are not different from current background concentrations to a statistically-significant level. |
| Oxidation-Reduction Potential | Tolerance Interval | 0.51 | 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. |
| Sodium | Tolerance Interval | 0.32 | 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 | 0.95 | 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. |

CV: coefficient of variation

**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 | 0.43 | MW358 exceeded the upper TL, which is evidence of elevated concentration with respect to current background data. |
| Oxidation-Reduction Potential | Tolerance Interval | 0.29 | None of the test wells exceeded the upper TL, which is evidence that concentrations in these wells are not different from current background concentrations to a statistically-significant level. |
| Technetium-99 | Tolerance Interval | 0.44 | 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. |
| Thorium-230 | Tolerance Interval | 1.44 | 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. |

CV: coefficient of variation

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# ATTACHMENT D1

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

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# C-746-U Fourth Quarter 2015 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=** 3.300 | **S=** 6.859 | **CV(1)=** 2.078 | **K factor**=** 2.523 | **TL(1)=** 20.604 | **LL(1)=**N/A |
| **Statistics-Transformed Background Data** | **X=** -0.371 | **S=** 1.678 | **CV(2)=** -4.521 | **K factor**=** 2.523 | **TL(2)=** 3.863 | **LL(2)=**N/A |

**Historical Background Data from Upgradient Wells with Transformed Result**

Well Number: MW371

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/18/2002 | 2.24 | 0.806 |
| 4/22/2002 | 0.2 | -1.609 |
| 7/15/2002 | 0.2 | -1.609 |
| 10/8/2002 | 0.2 | -1.609 |
| 1/8/2003 | 0.2 | -1.609 |
| 4/3/2003 | 0.2 | -1.609 |
| 7/9/2003 | 0.2 | -1.609 |
| 10/6/2003 | 0.2 | -1.609 |

Well Number: MW374

| Date Collected | Result | LN(Result) |
|---|---|---|
| 10/8/2002 | 21.3 | 3.059 |
| 1/7/2003 | 20 | 2.996 |
| 4/2/2003 | 4.11 | 1.413 |
| 7/9/2003 | 1.41 | 0.344 |
| 10/7/2003 | 1.09 | 0.086 |
| 1/6/2004 | 0.854 | -0.158 |
| 4/7/2004 | 0.2 | -1.609 |
| 7/14/2004 | 0.2 | -1.609 |

**Dry/Partially Dry Wells**

| Well No. | Gradient |
|---|---|
| MW359 | Downgradient |
| MW376 | Sidegradient |
| MW377 | Sidegradient |

**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) |
|---|---|---|---|---|---|---|
| MW362 | Downgradient | Yes | 1.78 | N/A | 0.577 | NO |
| MW365 | Downgradient | Yes | 0.0448 | N/A | -3.106 | NO |
| MW368 | Sidegradient | Yes | 2.4 | N/A | 0.875 | NO |
| MW371 | Upgradient | Yes | 0.0815 | N/A | -2.507 | NO |
| MW374 | Upgradient | Yes | 0.0841 | N/A | -2.476 | NO |
| MW375 | Sidegradient | Yes | 0.027 | N/A | -3.612 | 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-U Fourth Quarter 2015 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=** 1.394 **S=** 0.474 **CV(1)=** 0.340 **K factor**=** 2.523 **TL(1)=** 2.590 **LL(1)=**N/A

**Statistics-Transformed Background Data** **X=** 0.279 **S=** 0.332 **CV(2)=** 1.190 **K factor**=** 2.523 **TL(2)=** 1.118 **LL(2)=**N/A

**Historical Background Data from Upgradient Wells with Transformed Result**

| Well Number: | MW371 | |
|---|---|---|
| Date Collected | Result | LN(Result) |
| 3/18/2002 | 1 | 0.000 |
| 4/22/2002 | 1 | 0.000 |
| 7/15/2002 | 1 | 0.000 |
| 10/8/2002 | 1 | 0.000 |
| 1/8/2003 | 1 | 0.000 |
| 4/3/2003 | 1 | 0.000 |
| 7/9/2003 | 1 | 0.000 |
| 10/6/2003 | 1 | 0.000 |

| Well Number: | MW374 | |
|---|---|---|
| Date Collected | Result | LN(Result) |
| 10/8/2002 | 2.1 | 0.742 |
| 1/7/2003 | 2.1 | 0.742 |
| 4/2/2003 | 1.9 | 0.642 |
| 7/9/2003 | 1 | 0.000 |
| 10/7/2003 | 1.9 | 0.642 |
| 1/6/2004 | 1.9 | 0.642 |
| 4/7/2004 | 1.8 | 0.588 |
| 7/14/2004 | 1.6 | 0.470 |

**Dry/Partially Dry Wells**

| Well No. | Gradient |
|---|---|
| MW359 | Downgradient |
| MW376 | Sidegradient |
| MW377 | Sidegradient |

**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) |
|---|---|---|---|---|---|---|
| MW362 | Downgradient | Yes | 0.135 | NO | -2.002 | N/A |
| MW365 | Downgradient | No | 0.2 | N/A | -1.609 | N/A |
| MW368 | Sidegradient | No | 0.2 | N/A | -1.609 | N/A |
| MW371 | Upgradient | Yes | 0.503 | NO | -0.687 | N/A |
| MW374 | Upgradient | Yes | 0.919 | NO | -0.084 | N/A |
| MW375 | Sidegradient | No | 0.2 | 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-U Fourth Quarter 2015 Statistical Analysis Historical Background Comparison

## Calcium UNITS: mg/L UCRS

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

**Statistics-Background Data** **X=** 34.100 **S=** 13.637 **CV(1)=** 0.400 **K factor**=** 2.523 **TL(1)=** 68.505 **LL(1)=**N/A

**Statistics-Transformed Background Data** **X=** 3.466 **S=** 0.356 **CV(2)=** 0.103 **K factor**=** 2.523 **TL(2)=** 4.364 **LL(2)=**N/A

**Historical Background Data from Upgradient Wells with Transformed Result**

| Well Number: | MW371 | |
|---|---|---|
| Date Collected | Result | LN(Result) |
| 3/18/2002 | 17.2 | 2.845 |
| 4/22/2002 | 22.4 | 3.109 |
| 7/15/2002 | 25.5 | 3.239 |
| 10/8/2002 | 26.4 | 3.273 |
| 1/8/2003 | 27.2 | 3.303 |
| 4/3/2003 | 30.3 | 3.411 |
| 7/9/2003 | 25.9 | 3.254 |
| 10/6/2003 | 27 | 3.296 |

| Well Number: | MW374 | |
|---|---|---|
| Date Collected | Result | LN(Result) |
| 10/8/2002 | 67.3 | 4.209 |
| 1/7/2003 | 60.6 | 4.104 |
| 4/2/2003 | 47.2 | 3.854 |
| 7/9/2003 | 34.7 | 3.547 |
| 10/7/2003 | 37.1 | 3.614 |
| 1/6/2004 | 37.7 | 3.630 |
| 4/7/2004 | 32.2 | 3.472 |
| 7/14/2004 | 26.9 | 3.292 |

**Dry/Partially Dry Wells**

| Well No. | Gradient |
|---|---|
| MW359 | Downgradient |
| MW376 | Sidegradient |
| MW377 | Sidegradient |

**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) |
|---|---|---|---|---|---|---|
| MW362 | Downgradient | Yes | 23.4 | NO | 3.153 | N/A |
| MW365 | Downgradient | Yes | 21.5 | NO | 3.068 | N/A |
| MW368 | Sidegradient | Yes | 21.6 | NO | 3.073 | N/A |
| MW371 | Upgradient | Yes | 35.8 | NO | 3.578 | N/A |
| MW374 | Upgradient | Yes | 21.8 | NO | 3.082 | N/A |
| MW375 | Sidegradient | Yes | 14 | NO | 2.639 | 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.*

# C-746-U Fourth Quarter 2015 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=** 91.300 **S=** 86.959 **CV(1)=** 0.952 **K factor**=** 2.523 **TL(1)=** 310.697 **LL(1)=**N/A

**Statistics-Transformed Background Data** **X=** 3.620 **S=** 1.590 **CV(2)=** 0.439 **K factor**=** 2.523 **TL(2)=** 7.631 **LL(2)=**N/A

**Historical Background Data from Upgradient Wells with Transformed Result**

| Well Number: | MW371 | |
|---|---|---|
| Date Collected | Result | LN(Result) |
| 7/15/2002 | 8.3 | 2.116 |
| 10/8/2002 | 7.6 | 2.028 |
| 1/8/2003 | 7.7 | 2.041 |
| 4/3/2003 | 8.8 | 2.175 |
| 7/9/2003 | 8.1 | 2.092 |
| 10/6/2003 | 8.6 | 2.152 |
| 1/7/2004 | 7.6 | 2.028 |
| 4/6/2004 | 7.6 | 2.028 |

| Well Number: | MW374 | |
|---|---|---|
| Date Collected | Result | LN(Result) |
| 10/8/2002 | 199.2 | 5.294 |
| 1/7/2003 | 199.7 | 5.297 |
| 4/2/2003 | 171.8 | 5.146 |
| 7/9/2003 | 178.7 | 5.186 |
| 10/7/2003 | 175.6 | 5.168 |
| 1/6/2004 | 170.4 | 5.138 |
| 4/7/2004 | 156.4 | 5.052 |
| 7/14/2004 | 144.7 | 4.975 |

**Dry/Partially Dry Wells**

| Well No. | Gradient |
|---|---|
| MW359 | Downgradient |
| MW376 | Sidegradient |
| MW377 | Sidegradient |

**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) |
|---|---|---|---|---|---|---|
| MW362 | Downgradient | Yes | 8.53 | NO | 2.144 | N/A |
| MW365 | Downgradient | Yes | 5.73 | NO | 1.746 | N/A |
| MW368 | Sidegradient | Yes | 1.3 | NO | 0.262 | N/A |
| MW371 | Upgradient | Yes | 39.4 | NO | 3.674 | N/A |
| MW374 | Upgradient | Yes | 74.8 | NO | 4.315 | N/A |
| MW375 | Sidegradient | Yes | 5.69 | NO | 1.739 | N/A |

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for 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-U Fourth Quarter 2015 Statistical Analysis Historical Background Comparison

## Cobalt UNITS: mg/L UCRS

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

| | | | | | | |
|---|---|---|---|---|---|---|
| **Statistics-Background Data** | **X=** 0.007 | **S=** 0.009 | **CV(1)=** 1.314 | **K factor**=** 2.523 | **TL(1)=** 0.031 | **LL(1)=**N/A |
| **Statistics-Transformed Background Data** | **X=** -5.843 | **S=** 1.392 | **CV(2)=** -0.238 | **K factor**=** 2.523 | **TL(2)=** -2.331 | **LL(2)=**N/A |

**Historical Background Data from Upgradient Wells with Transformed Result**

| Well Number: | MW371 | |
|---|---|---|
| Date Collected | Result | LN(Result) |
| 3/18/2002 | 0.025 | -3.689 |
| 4/22/2002 | 0.025 | -3.689 |
| 7/15/2002 | 0.025 | -3.689 |
| 10/8/2002 | 0.001 | -6.908 |
| 1/8/2003 | 0.001 | -6.908 |
| 4/3/2003 | 0.001 | -6.908 |
| 7/9/2003 | 0.001 | -6.908 |
| 10/6/2003 | 0.001 | -6.908 |

| Well Number: | MW374 | |
|---|---|---|
| Date Collected | Result | LN(Result) |
| 10/8/2002 | 0.01 | -4.605 |
| 1/7/2003 | 0.01 | -4.605 |
| 4/2/2003 | 0.01 | -4.605 |
| 7/9/2003 | 0.00161 | -6.432 |
| 10/7/2003 | 0.001 | -6.908 |
| 1/6/2004 | 0.001 | -6.908 |
| 4/7/2004 | 0.001 | -6.908 |
| 7/14/2004 | 0.001 | -6.908 |

**Dry/Partially Dry Wells**

| Well No. | Gradient |
|---|---|
| MW359 | Downgradient |
| MW376 | Sidegradient |
| MW377 | Sidegradient |

**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) |
|---|---|---|---|---|---|---|
| MW362 | Downgradient | Yes | 0.00158 | N/A | -6.450 | NO |
| MW365 | Downgradient | Yes | 0.00203 | N/A | -6.200 | NO |
| MW368 | Sidegradient | Yes | 0.00108 | N/A | -6.831 | NO |
| MW371 | Upgradient | No | 0.001 | N/A | -6.908 | N/A |
| MW374 | Upgradient | Yes | 0.00212 | N/A | -6.156 | NO |
| MW375 | Sidegradient | 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-U Fourth Quarter 2015 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=** 918.744 **S=** 417.257 **CV(1)=** 0.454 **K factor**=** 2.523 **TL(1)=** 1971.483 **LL(1)=**N/A

**Statistics-Transformed Background Data** **X=** 6.705 **S=** 0.550 **CV(2)=** 0.082 **K factor**=** 2.523 **TL(2)=** 8.092 **LL(2)=**N/A

**Historical Background Data from Upgradient Wells with Transformed Result**

| Well Number: | MW371 | |
|---|---|---|
| Date Collected | Result | LN(Result) |
| 3/18/2002 | 541 | 6.293 |
| 4/22/2002 | 643 | 6.466 |
| 7/15/2002 | 632 | 6.449 |
| 10/8/2002 | 631 | 6.447 |
| 1/8/2003 | 680 | 6.522 |
| 4/3/2003 | 749 | 6.619 |
| 7/9/2003 | 734 | 6.599 |
| 10/6/2003 | 753 | 6.624 |

| Well Number: | MW374 | |
|---|---|---|
| Date Collected | Result | LN(Result) |
| 3/18/2002 | 1007 | 6.915 |
| 10/8/2002 | 1680 | 7.427 |
| 1/7/2003 | 1715.9 | 7.448 |
| 4/2/2003 | 172 | 5.147 |
| 7/9/2003 | 1231 | 7.116 |
| 10/7/2003 | 1214 | 7.102 |
| 1/6/2004 | 1172 | 7.066 |
| 4/7/2004 | 1145 | 7.043 |

**Dry/Partially Dry Wells**

| Well No. | Gradient |
|---|---|
| MW359 | Downgradient |
| MW376 | Sidegradient |
| MW377 | Sidegradient |

**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) |
|---|---|---|---|---|---|---|
| MW362 | Downgradient | Yes | 762 | NO | 6.636 | N/A |
| MW365 | Downgradient | Yes | 415 | NO | 6.028 | N/A |
| MW368 | Sidegradient | Yes | 457 | NO | 6.125 | N/A |
| MW371 | Upgradient | Yes | 778 | NO | 6.657 | N/A |
| MW374 | Upgradient | Yes | 701 | NO | 6.553 | N/A |
| MW375 | Sidegradient | Yes | 350 | NO | 5.858 | N/A |

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for 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-U Fourth Quarter 2015 Statistical Analysis Historical Background Comparison

## Copper UNITS: mg/L UCRS

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

**Statistics-Background Data** **X=** 0.056 **S=** 0.072 **CV(1)=** 1.275 **K factor**=** 2.523 **TL(1)=** 0.237 **LL(1)=**N/A

**Statistics-Transformed Background Data** **X=** -3.395 **S=** 0.915 **CV(2)=** -0.270 **K factor**=** 2.523 **TL(2)=** -1.086 **LL(2)=**N/A

**Historical Background Data from Upgradient Wells with Transformed Result**

Well Number: MW371

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/18/2002 | 0.025 | -3.689 |
| 4/22/2002 | 0.025 | -3.689 |
| 7/15/2002 | 0.05 | -2.996 |
| 10/8/2002 | 0.02 | -3.912 |
| 1/8/2003 | 0.02 | -3.912 |
| 4/3/2003 | 0.02 | -3.912 |
| 7/9/2003 | 0.02 | -3.912 |
| 10/6/2003 | 0.02 | -3.912 |

Well Number: MW374

| Date Collected | Result | LN(Result) |
|---|---|---|
| 10/8/2002 | 0.2 | -1.609 |
| 1/7/2003 | 0.2 | -1.609 |
| 4/2/2003 | 0.2 | -1.609 |
| 7/9/2003 | 0.02 | -3.912 |
| 10/7/2003 | 0.02 | -3.912 |
| 1/6/2004 | 0.02 | -3.912 |
| 4/7/2004 | 0.02 | -3.912 |
| 7/14/2004 | 0.02 | -3.912 |

**Dry/Partially Dry Wells**

| Well No. | Gradient |
|---|---|
| MW359 | Downgradient |
| MW376 | Sidegradient |
| MW377 | Sidegradient |

**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) |
|---|---|---|---|---|---|---|
| MW362 | Downgradient | Yes | 0.00214 | N/A | -6.147 | NO |
| MW365 | Downgradient | Yes | 0.00233 | N/A | -6.062 | NO |
| MW368 | Sidegradient | Yes | 0.00317 | N/A | -5.754 | NO |
| MW371 | Upgradient | Yes | 0.000533 | N/A | -7.537 | NO |
| MW374 | Upgradient | Yes | 0.000941 | N/A | -6.969 | NO |
| MW375 | Sidegradient | Yes | 0.000777 | N/A | -7.160 | 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-U Fourth Quarter 2015 Statistical Analysis Historical Background Comparison

## Dissolved Oxygen UNITS: mg/L UCRS

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

| | | | | | | |
|---|---|---|---|---|---|---|
| **Statistics-Background Data** | **X=** 1.138 | **S=** 0.621 | **CV(1)=** 0.546 | **K factor**=** 2.523 | **TL(1)=** 2.704 | **LL(1)=**N/A |
| **Statistics-Transformed Background Data** | **X=** -0.013 | **S=** 0.577 | **CV(2)=** -43.069 | **K factor**=** 2.523 | **TL(2)=** 1.441 | **LL(2)=**N/A |

**Historical Background Data from Upgradient Wells with Transformed Result**

Well Number: MW371

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/18/2002 | 2.26 | 0.815 |
| 4/22/2002 | 1.15 | 0.140 |
| 7/15/2002 | 0.94 | -0.062 |
| 10/8/2002 | 0.74 | -0.301 |
| 1/8/2003 | 2.62 | 0.963 |
| 4/3/2003 | 1.5 | 0.405 |
| 7/9/2003 | 1.66 | 0.507 |
| 10/6/2003 | 1.28 | 0.247 |

Well Number: MW374

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/18/2002 | 0.6 | -0.511 |
| 10/8/2002 | 0.67 | -0.400 |
| 1/7/2003 | 0.23 | -1.470 |
| 4/2/2003 | 0.65 | -0.431 |
| 7/9/2003 | 0.92 | -0.083 |
| 10/7/2003 | 0.99 | -0.010 |
| 1/6/2004 | 1.11 | 0.104 |
| 4/7/2004 | 0.88 | -0.128 |

**Dry/Partially Dry Wells**

| Well No. | Gradient |
|---|---|
| MW359 | Downgradient |
| MW376 | Sidegradient |
| MW377 | Sidegradient |

**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) |
|---|---|---|---|---|---|---|
| MW362 | Downgradient | Yes | 3.52 | YES | 1.258 | N/A |
| MW365 | Downgradient | Yes | 3.39 | YES | 1.221 | N/A |
| MW368 | Sidegradient | Yes | 3.82 | YES | 1.340 | N/A |
| MW371 | Upgradient | Yes | 1.78 | NO | 0.577 | N/A |
| MW374 | Upgradient | Yes | 1.1 | NO | 0.095 | N/A |
| MW375 | Sidegradient | Yes | 2.14 | NO | 0.761 | N/A |

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for 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 Lower Tolerance Limit, which is evidence of elevated concentration with respect to historical background data.**

**Wells with Exceedances**

MW362
MW365
MW368

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

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

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

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

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

** *Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities,Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-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-U Fourth Quarter 2015 Statistical Analysis Historical Background Comparison

## Dissolved Solids UNITS: mg/L UCRS

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

**Statistics-Background Data** **X=** 590.000 **S=** 248.068 **CV(1)=** 0.420 **K factor**=** 2.523 **TL(1)=** 1215.876 **LL(1)=**N/A

**Statistics-Transformed Background Data** **X=** 6.308 **S=** 0.383 **CV(2)=** 0.061 **K factor**=** 2.523 **TL(2)=** 7.274 **LL(2)=**N/A

**Historical Background Data from Upgradient Wells with Transformed Result**

| Well Number: | MW371 | |
|---|---|---|
| Date Collected | Result | LN(Result) |
| 3/18/2002 | 274 | 5.613 |
| 4/22/2002 | 409 | 6.014 |
| 7/15/2002 | 418 | 6.035 |
| 10/8/2002 | 424 | 6.050 |
| 1/8/2003 | 431 | 6.066 |
| 4/3/2003 | 444 | 6.096 |
| 7/9/2003 | 445 | 6.098 |
| 10/6/2003 | 438 | 6.082 |

| Well Number: | MW374 | |
|---|---|---|
| Date Collected | Result | LN(Result) |
| 10/8/2002 | 1136 | 7.035 |
| 1/7/2003 | 1101 | 7.004 |
| 4/2/2003 | 863 | 6.760 |
| 7/9/2003 | 682 | 6.525 |
| 10/7/2003 | 589 | 6.378 |
| 1/6/2004 | 603 | 6.402 |
| 4/7/2004 | 601 | 6.399 |
| 7/14/2004 | 582 | 6.366 |

**Dry/Partially Dry Wells**

| Well No. | Gradient |
|---|---|
| MW359 | Downgradient |
| MW376 | Sidegradient |
| MW377 | Sidegradient |

**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) |
|---|---|---|---|---|---|---|
| MW362 | Downgradient | Yes | 386 | NO | 5.956 | N/A |
| MW365 | Downgradient | Yes | 196 | NO | 5.278 | N/A |
| MW368 | Sidegradient | Yes | 277 | NO | 5.624 | N/A |
| MW371 | Upgradient | Yes | 211 | NO | 5.352 | N/A |
| MW374 | Upgradient | Yes | 289 | NO | 5.666 | N/A |
| MW375 | Sidegradient | Yes | 146 | NO | 4.984 | N/A |

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for 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-U Fourth Quarter 2015 Statistical Analysis Historical Background Comparison

## Iron UNITS: mg/L UCRS

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

| | | | | | | |
|---|---|---|---|---|---|---|
| **Statistics-Background Data** | **X=** 6.612 | **S=** 6.487 | **CV(1)=** 0.981 | **K factor**=** 2.523 | **TL(1)=** 22.979 | **LL(1)=**N/A |
| **Statistics-Transformed Background Data** | **X=** 1.363 | **S=** 1.147 | **CV(2)=** 0.841 | **K factor**=** 2.523 | **TL(2)=** 4.256 | **LL(2)=**N/A |

**Historical Background Data from Upgradient Wells with Transformed Result**

Well Number: MW371

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/18/2002 | 1.31 | 0.270 |
| 4/22/2002 | 0.913 | -0.091 |
| 7/15/2002 | 0.881 | -0.127 |
| 10/8/2002 | 3.86 | 1.351 |
| 1/8/2003 | 1.88 | 0.631 |
| 4/3/2003 | 3.18 | 1.157 |
| 7/9/2003 | 0.484 | -0.726 |
| 10/6/2003 | 2.72 | 1.001 |

Well Number: MW374

| Date Collected | Result | LN(Result) |
|---|---|---|
| 10/8/2002 | 23 | 3.135 |
| 1/7/2003 | 13.9 | 2.632 |
| 4/2/2003 | 14 | 2.639 |
| 7/9/2003 | 14.2 | 2.653 |
| 10/7/2003 | 7.92 | 2.069 |
| 1/6/2004 | 7.86 | 2.062 |
| 4/7/2004 | 4.82 | 1.573 |
| 7/14/2004 | 4.87 | 1.583 |

**Dry/Partially Dry Wells**

| Well No. | Gradient |
|---|---|
| MW359 | Downgradient |
| MW376 | Sidegradient |
| MW377 | Sidegradient |

**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) |
|---|---|---|---|---|---|---|
| MW362 | Downgradient | Yes | 1.23 | NO | 0.207 | N/A |
| MW365 | Downgradient | Yes | 0.0563 | NO | -2.877 | N/A |
| MW368 | Sidegradient | Yes | 1.17 | NO | 0.157 | N/A |
| MW371 | Upgradient | Yes | 0.0702 | NO | -2.656 | N/A |
| MW374 | Upgradient | Yes | 0.885 | NO | -0.122 | N/A |
| MW375 | Sidegradient | No | 0.1 | N/A | -2.303 | N/A |

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

**Conclusion of Statistical Analysis on Historical Data**

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

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

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

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

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

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

** *Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities,Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-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-U Fourth Quarter 2015 Statistical Analysis Historical Background Comparison

## Magnesium UNITS: mg/L UCRS

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

| | | | | | | |
|---|---|---|---|---|---|---|
| **Statistics-Background Data** | **X=** 11.347 | **S=** 3.019 | **CV(1)=** 0.266 | **K factor**=** 2.523 | **TL(1)=** 18.963 | **LL(1)=**N/A |
| **Statistics-Transformed Background Data** | **X=** 2.401 | **S=** 0.237 | **CV(2)=** 0.099 | **K factor**=** 2.523 | **TL(2)=** 2.999 | **LL(2)=**N/A |

**Historical Background Data from Upgradient Wells with Transformed Result**

Well Number: MW371

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/18/2002 | 7.1 | 1.960 |
| 4/22/2002 | 9.77 | 2.279 |
| 7/15/2002 | 10.4 | 2.342 |
| 10/8/2002 | 10.2 | 2.322 |
| 1/8/2003 | 10.7 | 2.370 |
| 4/3/2003 | 11.9 | 2.477 |
| 7/9/2003 | 10.8 | 2.380 |
| 10/6/2003 | 10.9 | 2.389 |

Well Number: MW374

| Date Collected | Result | LN(Result) |
|---|---|---|
| 10/8/2002 | 20 | 2.996 |
| 1/7/2003 | 16.1 | 2.779 |
| 4/2/2003 | 13.1 | 2.573 |
| 7/9/2003 | 10.3 | 2.332 |
| 10/7/2003 | 11.1 | 2.407 |
| 1/6/2004 | 11 | 2.398 |
| 4/7/2004 | 9.69 | 2.271 |
| 7/14/2004 | 8.49 | 2.139 |

**Dry/Partially Dry Wells**

| Well No. | Gradient |
|---|---|
| MW359 | Downgradient |
| MW376 | Sidegradient |
| MW377 | Sidegradient |

**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) |
|---|---|---|---|---|---|---|
| MW362 | Downgradient | Yes | 10.7 | NO | 2.370 | N/A |
| MW365 | Downgradient | Yes | 10.2 | NO | 2.322 | N/A |
| MW368 | Sidegradient | Yes | 8.32 | NO | 2.119 | N/A |
| MW371 | Upgradient | Yes | 14.5 | NO | 2.674 | N/A |
| MW374 | Upgradient | Yes | 6.4 | NO | 1.856 | N/A |
| MW375 | Sidegradient | Yes | 6 | NO | 1.792 | N/A |

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for 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-U Fourth Quarter 2015 Statistical Analysis Historical Background Comparison

## Manganese UNITS: mg/L UCRS

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

| | | | | | | |
|---|---|---|---|---|---|---|
| **Statistics-Background Data** | **X=** 0.248 | **S=** 0.222 | **CV(1)=** 0.894 | **K factor**=** 2.523 | **TL(1)=** 0.809 | **LL(1)=**N/A |
| **Statistics-Transformed Background Data** | **X=** -1.873 | **S=** 1.068 | **CV(2)=** -0.570 | **K factor**=** 2.523 | **TL(2)=** 0.821 | **LL(2)=**N/A |

**Historical Background Data from Upgradient Wells with Transformed Result**

Well Number: MW371

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/18/2002 | 0.063 | -2.765 |
| 4/22/2002 | 0.067 | -2.703 |
| 7/15/2002 | 0.074 | -2.604 |
| 10/8/2002 | 0.0521 | -2.955 |
| 1/8/2003 | 0.0385 | -3.257 |
| 4/3/2003 | 0.0551 | -2.899 |
| 7/9/2003 | 0.0546 | -2.908 |
| 10/6/2003 | 0.0543 | -2.913 |

Well Number: MW374

| Date Collected | Result | LN(Result) |
|---|---|---|
| 10/8/2002 | 0.596 | -0.518 |
| 1/7/2003 | 0.565 | -0.571 |
| 4/2/2003 | 0.675 | -0.393 |
| 7/9/2003 | 0.397 | -0.924 |
| 10/7/2003 | 0.312 | -1.165 |
| 1/6/2004 | 0.299 | -1.207 |
| 4/7/2004 | 0.329 | -1.112 |
| 7/14/2004 | 0.342 | -1.073 |

**Dry/Partially Dry Wells**

| Well No. | Gradient |
|---|---|
| MW359 | Downgradient |
| MW376 | Sidegradient |
| MW377 | Sidegradient |

**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) |
|---|---|---|---|---|---|---|
| MW362 | Downgradient | Yes | 0.0284 | NO | -3.561 | N/A |
| MW365 | Downgradient | Yes | 0.0428 | NO | -3.151 | N/A |
| MW368 | Sidegradient | Yes | 0.0416 | NO | -3.180 | N/A |
| MW371 | Upgradient | Yes | 0.00182 | NO | -6.309 | N/A |
| MW374 | Upgradient | Yes | 0.224 | NO | -1.496 | N/A |
| MW375 | Sidegradient | Yes | 0.00118 | NO | -6.742 | N/A |

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for 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-U Fourth Quarter 2015 Statistical Analysis Historical Background Comparison

## Molybdenum UNITS: mg/L UCRS

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

| | | | | | | |
|---|---|---|---|---|---|---|
| **Statistics-Background Data** | **X=** 0.006 | **S=** 0.010 | **CV(1)=** 1.650 | **K factor**=** 2.523 | **TL(1)=** 0.030 | **LL(1)=**N/A |
| **Statistics-Transformed Background Data** | **X=** -6.108 | **S=** 1.239 | **CV(2)=** -0.203 | **K factor**=** 2.523 | **TL(2)=** -2.983 | **LL(2)=**N/A |

**Historical Background Data from Upgradient Wells with Transformed Result**

| Well Number: | MW371 | |
|---|---|---|
| Date Collected | Result | LN(Result) |
| 3/18/2002 | 0.025 | -3.689 |
| 4/22/2002 | 0.025 | -3.689 |
| 7/15/2002 | 0.025 | -3.689 |
| 10/8/2002 | 0.001 | -6.908 |
| 1/8/2003 | 0.00121 | -6.717 |
| 4/3/2003 | 0.001 | -6.908 |
| 7/9/2003 | 0.00111 | -6.803 |
| 10/6/2003 | 0.001 | -6.908 |

| Well Number: | MW374 | |
|---|---|---|
| Date Collected | Result | LN(Result) |
| 10/8/2002 | 0.00222 | -6.110 |
| 1/7/2003 | 0.00201 | -6.210 |
| 4/2/2003 | 0.00159 | -6.444 |
| 7/9/2003 | 0.00242 | -6.024 |
| 10/7/2003 | 0.001 | -6.908 |
| 1/6/2004 | 0.001 | -6.908 |
| 4/7/2004 | 0.001 | -6.908 |
| 7/14/2004 | 0.001 | -6.908 |

**Dry/Partially Dry Wells**

| Well No. | Gradient |
|---|---|
| MW359 | Downgradient |
| MW376 | Sidegradient |
| MW377 | Sidegradient |

**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) |
|---|---|---|---|---|---|---|
| MW362 | Downgradient | Yes | 0.00109 | N/A | -6.822 | NO |
| MW365 | Downgradient | Yes | 0.000172 | N/A | -8.668 | NO |
| MW368 | Sidegradient | Yes | 0.00276 | N/A | -5.893 | NO |
| MW371 | Upgradient | Yes | 0.000377 | N/A | -7.883 | NO |
| MW374 | Upgradient | Yes | 0.00021 | N/A | -8.468 | NO |
| MW375 | Sidegradient | 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-U Fourth Quarter 2015 Statistical Analysis Historical Background Comparison

## Nickel UNITS: mg/L UCRS

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

| | | | | | | |
|---|---|---|---|---|---|---|
| **Statistics-Background Data** | **X=** 0.023 | **S=** 0.022 | **CV(1)=** 0.980 | **K factor**=** 2.523 | **TL(1)=** 0.078 | **LL(1)=**N/A |
| **Statistics-Transformed Background Data** | **X=** -4.349 | **S=** 1.109 | **CV(2)=** -0.255 | **K factor**=** 2.523 | **TL(2)=** -1.552 | **LL(2)=**N/A |

**Historical Background Data from Upgradient Wells with Transformed Result**

| Well Number: | MW371 | |
|---|---|---|
| Date Collected | Result | LN(Result) |
| 3/18/2002 | 0.05 | -2.996 |
| 4/22/2002 | 0.05 | -2.996 |
| 7/15/2002 | 0.05 | -2.996 |
| 10/8/2002 | 0.0124 | -4.390 |
| 1/8/2003 | 0.005 | -5.298 |
| 4/3/2003 | 0.005 | -5.298 |
| 7/9/2003 | 0.005 | -5.298 |
| 10/6/2003 | 0.005 | -5.298 |

| Well Number: | MW374 | |
|---|---|---|
| Date Collected | Result | LN(Result) |
| 10/8/2002 | 0.05 | -2.996 |
| 1/7/2003 | 0.05 | -2.996 |
| 4/2/2003 | 0.05 | -2.996 |
| 7/9/2003 | 0.00794 | -4.836 |
| 10/7/2003 | 0.005 | -5.298 |
| 1/6/2004 | 0.005 | -5.298 |
| 4/7/2004 | 0.005 | -5.298 |
| 7/14/2004 | 0.005 | -5.298 |

**Dry/Partially Dry Wells**

| Well No. | Gradient |
|---|---|
| MW359 | Downgradient |
| MW376 | Sidegradient |
| MW377 | Sidegradient |

**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) |
|---|---|---|---|---|---|---|
| MW362 | Downgradient | Yes | 0.00252 | NO | -5.983 | N/A |
| MW365 | Downgradient | Yes | 0.00727 | NO | -4.924 | N/A |
| MW368 | Sidegradient | Yes | 0.00372 | NO | -5.594 | N/A |
| MW371 | Upgradient | Yes | 0.00137 | NO | -6.593 | N/A |
| MW374 | Upgradient | Yes | 0.00124 | NO | -6.693 | N/A |
| MW375 | Sidegradient | Yes | 0.00163 | NO | -6.419 | N/A |

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

**Conclusion of Statistical Analysis on Historical Data**

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

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

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

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

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

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

** *Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities,Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-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-U Fourth Quarter 2015 Statistical Analysis Historical Background Comparison

## Oxidation-Reduction Potential UNITS: mV UCRS

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

| | | | | | | |
|---|---|---|---|---|---|---|
| **Statistics-Background Data** | **X=** 22.281 | **S=** 78.889 | **CV(1)=** 3.541 | **K factor**=** 2.523 | **TL(1)=** 221.319 | **LL(1)=**N/A |
| **Statistics-Transformed Background Data** | **X=** 3.642 | **S=** 1.729 | **CV(2)=** 0.475 | **K factor**=** 2.523 | **TL(2)=** 5.106 | **LL(2)=**N/A |

**Historical Background Data from Upgradient Wells with Transformed Result**

Well Number: MW371

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/18/2002 | 75 | 4.317 |
| 4/22/2002 | 165 | 5.106 |
| 7/15/2002 | 65 | 4.174 |
| 4/3/2003 | -19 | #Func! |
| 7/9/2003 | 114 | 4.736 |
| 10/6/2003 | -22 | #Func! |
| 1/7/2004 | 20.5 | 3.020 |
| 4/6/2004 | 113 | 4.727 |

Well Number: MW374

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/18/2002 | 135 | 4.905 |
| 4/2/2003 | -56 | #Func! |
| 7/9/2003 | -68 | #Func! |
| 10/7/2003 | -50 | #Func! |
| 1/6/2004 | -85 | #Func! |
| 4/7/2004 | 6 | 1.792 |
| 7/14/2004 | -38 | #Func! |
| 10/7/2004 | 1 | 0.000 |

**Dry/Partially Dry Wells**

| Well No. | Gradient |
|---|---|
| MW359 | Downgradient |
| MW376 | Sidegradient |
| MW377 | Sidegradient |

**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) |
|---|---|---|---|---|---|---|
| MW362 | Downgradient | Yes | 620 | N/A | 6.430 | YES |
| MW365 | Downgradient | Yes | 523 | N/A | 6.260 | YES |
| MW368 | Sidegradient | Yes | 523 | N/A | 6.260 | YES |
| MW371 | Upgradient | Yes | 393 | N/A | 5.974 | YES |
| MW374 | Upgradient | Yes | 449 | N/A | 6.107 | YES |
| MW375 | Sidegradient | Yes | 468 | N/A | 6.148 | 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 Lower Tolerance Limit, which is evidence of elevated concentration with respect to historical background data.**

**Wells with Exceedances**

MW362
MW365
MW368
MW371
MW374
MW375

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

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

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

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

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

** *Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities,Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-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-U Fourth Quarter 2015 Statistical Analysis Historical Background Comparison

## PCB, Total 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=** 0.224 | **S=** 0.207 | **CV(1)=** 0.922 | **K factor**=** 2.523 | **TL(1)=** 0.746 | **LL(1)=**N/A |
| **Statistics-Transformed Background Data** | **X=** -1.647 | **S=** 0.440 | **CV(2)=** -0.267 | **K factor**=** 2.523 | **TL(2)=** -0.537 | **LL(2)=**N/A |

**Historical Background Data from Upgradient Wells with Transformed Result**

Well Number: MW371

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/18/2002 | 1 | 0.000 |
| 4/22/2002 | 0.17 | -1.772 |
| 7/15/2002 | 0.17 | -1.772 |
| 7/9/2003 | 0.17 | -1.772 |
| 10/6/2003 | 0.17 | -1.772 |
| 7/13/2004 | 0.18 | -1.715 |
| 7/25/2005 | 0.17 | -1.772 |
| 4/5/2006 | 0.18 | -1.715 |

Well Number: MW374

| Date Collected | Result | LN(Result) |
|---|---|---|
| 7/9/2003 | 0.17 | -1.772 |
| 10/7/2003 | 0.17 | -1.772 |
| 7/14/2004 | 0.18 | -1.715 |
| 7/26/2005 | 0.17 | -1.772 |
| 4/6/2006 | 0.18 | -1.715 |
| 7/10/2006 | 0.17 | -1.772 |
| 10/12/2006 | 0.17 | -1.772 |
| 1/8/2007 | 0.17 | -1.772 |

**Dry/Partially Dry Wells**

| Well No. | Gradient |
|---|---|
| MW359 | Downgradient |
| MW376 | Sidegradient |
| MW377 | Sidegradient |

**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) |
|---|---|---|---|---|---|---|
| MW362 | Downgradient | No | 0.1 | N/A | -2.303 | N/A |
| MW365 | Downgradient | Yes | 0.182 | NO | -1.704 | N/A |
| MW368 | Sidegradient | Yes | 0.135 | NO | -2.002 | N/A |
| MW371 | Upgradient | No | 0.0962 | N/A | -2.341 | N/A |
| MW374 | Upgradient | No | 0.099 | N/A | -2.313 | N/A |
| MW375 | Sidegradient | No | 0.098 | N/A | -2.323 | N/A |

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for 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-U Fourth Quarter 2015 Statistical Analysis Historical Background Comparison

## PCB-1242 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=** 0.159 | **S=** 0.224 | **CV(1)=** 1.409 | **K factor**=** 2.523 | **TL(1)=** 0.726 | **LL(1)=**N/A |
| **Statistics-Transformed Background Data** | **X=** -2.134 | **S=** 0.579 | **CV(2)=** -0.272 | **K factor**=** 2.523 | **TL(2)=** -0.672 | **LL(2)=**N/A |

**Historical Background Data from Upgradient Wells with Transformed Result**

Well Number: MW371

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/18/2002 | 1 | 0.000 |
| 4/22/2002 | 0.11 | -2.207 |
| 7/15/2002 | 0.11 | -2.207 |
| 7/9/2003 | 0.13 | -2.040 |
| 10/6/2003 | 0.09 | -2.408 |
| 7/13/2004 | 0.1 | -2.303 |
| 7/25/2005 | 0.09 | -2.408 |
| 4/5/2006 | 0.1 | -2.303 |

Well Number: MW374

| Date Collected | Result | LN(Result) |
|---|---|---|
| 7/9/2003 | 0.13 | -2.040 |
| 10/7/2003 | 0.09 | -2.408 |
| 7/14/2004 | 0.1 | -2.303 |
| 7/26/2005 | 0.1 | -2.303 |
| 4/6/2006 | 0.1 | -2.303 |
| 7/10/2006 | 0.1 | -2.303 |
| 10/12/2006 | 0.1 | -2.303 |
| 1/8/2007 | 0.1 | -2.303 |

**Dry/Partially Dry Wells**

| Well No. | Gradient |
|---|---|
| MW359 | Downgradient |
| MW376 | Sidegradient |
| MW377 | Sidegradient |

**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) |
|---|---|---|---|---|---|---|
| MW362 | Downgradient | No | 0.1 | N/A | -2.303 | N/A |
| MW365 | Downgradient | Yes | 0.182 | N/A | -1.704 | NO |
| MW368 | Sidegradient | Yes | 0.135 | N/A | -2.002 | NO |
| MW371 | Upgradient | No | 0.0962 | N/A | -2.341 | N/A |
| MW374 | Upgradient | No | 0.099 | N/A | -2.313 | N/A |
| MW375 | Sidegradient | No | 0.098 | N/A | -2.323 | N/A |

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for 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-U Fourth Quarter 2015 Statistical Analysis Historical Background Comparison

## pH UNITS: Std Unit UCRS

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

**Statistics-Background Data** **X=** 6.619 **S=** 0.295 **CV(1)=** 0.045 **K factor**=** 2.904 **TL(1)=** 7.475 **LL(1)=**5.7635

**Statistics-Transformed Background Data** **X=** 1.889 **S=** 0.046 **CV(2)=** 0.024 **K factor**=** 2.904 **TL(2)=** 2.023 **LL(2)=**1.7548

**Historical Background Data from Upgradient Wells with Transformed Result**

| Well Number: | MW371 | |
|---|---|---|
| Date Collected | Result | LN(Result) |
| 3/18/2002 | 6.3 | 1.841 |
| 4/22/2002 | 6.5 | 1.872 |
| 7/15/2002 | 6.5 | 1.872 |
| 10/8/2002 | 6.6 | 1.887 |
| 1/8/2003 | 6.6 | 1.887 |
| 4/3/2003 | 6.9 | 1.932 |
| 7/9/2003 | 6.7 | 1.902 |
| 10/6/2003 | 7 | 1.946 |

| Well Number: | MW374 | |
|---|---|---|
| Date Collected | Result | LN(Result) |
| 3/18/2002 | 5.75 | 1.749 |
| 10/8/2002 | 6.6 | 1.887 |
| 1/7/2003 | 6.82 | 1.920 |
| 4/2/2003 | 6.86 | 1.926 |
| 7/9/2003 | 6.7 | 1.902 |
| 10/7/2003 | 6.6 | 1.887 |
| 1/6/2004 | 6.9 | 1.932 |
| 4/7/2004 | 6.58 | 1.884 |

**Dry/Partially Dry Wells**

| Well No. | Gradient |
|---|---|
| MW359 | Downgradient |
| MW376 | Sidegradient |
| MW377 | Sidegradient |

**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)? |
|---|---|---|---|---|---|---|
| MW362 | Downgradient | Yes | 7 | NO | 1.946 | N/A |
| MW365 | Downgradient | Yes | 6.38 | NO | 1.853 | N/A |
| MW368 | Sidegradient | Yes | 6.58 | NO | 1.884 | N/A |
| MW371 | Upgradient | Yes | 6.63 | NO | 1.892 | N/A |
| MW374 | Upgradient | Yes | 6.62 | NO | 1.890 | N/A |
| MW375 | Sidegradient | Yes | 6.5 | NO | 1.872 | N/A |

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

**Conclusion of Statistical Analysis on Historical Data**

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

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

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

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

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

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

** *Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities,Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-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-U Fourth Quarter 2015 Statistical Analysis Historical Background Comparison

## Potassium UNITS: mg/L UCRS

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

**Statistics-Background Data** **X=** 1.262 **S=** 0.907 **CV(1)=** 0.718 **K factor**=** 2.523 **TL(1)=** 3.549 **LL(1)=**N/A

**Statistics-Transformed Background Data** **X=** -0.023 **S=** 0.752 **CV(2)=** -32.218 **K factor**=** 2.523 **TL(2)=** 1.874 **LL(2)=**N/A

**Historical Background Data from Upgradient Wells with Transformed Result**

| Well Number: | MW371 | |
|---|---|---|
| Date Collected | Result | LN(Result) |
| 3/18/2002 | 2 | 0.693 |
| 4/22/2002 | 2 | 0.693 |
| 7/15/2002 | 2 | 0.693 |
| 10/8/2002 | 0.408 | -0.896 |
| 1/8/2003 | 0.384 | -0.957 |
| 4/3/2003 | 0.368 | -1.000 |
| 7/9/2003 | 0.587 | -0.533 |
| 10/6/2003 | 0.382 | -0.962 |

| Well Number: | MW374 | |
|---|---|---|
| Date Collected | Result | LN(Result) |
| 10/8/2002 | 3.04 | 1.112 |
| 1/7/2003 | 2.83 | 1.040 |
| 4/2/2003 | 2 | 0.693 |
| 7/9/2003 | 1.09 | 0.086 |
| 10/7/2003 | 0.802 | -0.221 |
| 1/6/2004 | 0.897 | -0.109 |
| 4/7/2004 | 0.689 | -0.373 |
| 7/14/2004 | 0.716 | -0.334 |

**Dry/Partially Dry Wells**

| Well No. | Gradient |
|---|---|
| MW359 | Downgradient |
| MW376 | Sidegradient |
| MW377 | Sidegradient |

**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) |
|---|---|---|---|---|---|---|
| MW362 | Downgradient | Yes | 0.486 | NO | -0.722 | N/A |
| MW365 | Downgradient | Yes | 0.241 | NO | -1.423 | N/A |
| MW368 | Sidegradient | Yes | 0.875 | NO | -0.134 | N/A |
| MW371 | Upgradient | Yes | 0.418 | NO | -0.872 | N/A |
| MW374 | Upgradient | Yes | 0.456 | NO | -0.785 | N/A |
| MW375 | Sidegradient | Yes | 0.274 | NO | -1.295 | N/A |

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for 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-U Fourth Quarter 2015 Statistical Analysis Historical Background Comparison

## Radium-226 UNITS: pCi/L UCRS

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

| | | | | | | |
|---|---|---|---|---|---|---|
| **Statistics-Background Data** | **X=** 3.560 | **S=** 13.483 | **CV(1)=** 3.787 | **K factor**=** 2.523 | **TL(1)=** 37.577 | **LL(1)=**N/A |
| **Statistics-Transformed Background Data** | **X=** -1.189 | **S=** 1.742 | **CV(2)=** -1.465 | **K factor**=** 2.523 | **TL(2)=** 3.991 | **LL(2)=**N/A |

**Historical Background Data from Upgradient Wells with Transformed Result**

| Well Number: | MW371 | |
|---|---|---|
| Date Collected | Result | LN(Result) |
| 7/15/2002 | 54.1 | 3.991 |
| 10/8/2002 | 0.0937 | -2.368 |
| 1/8/2003 | 0.378 | -0.973 |
| 10/6/2003 | 0.179 | -1.720 |
| 1/7/2004 | 0.898 | -0.108 |
| 4/6/2004 | 0.108 | -2.226 |
| 7/13/2004 | -0.149 | #Func! |
| 10/7/2004 | 0.154 | -1.871 |

| Well Number: | MW374 | |
|---|---|---|
| Date Collected | Result | LN(Result) |
| 10/8/2002 | 0.298 | -1.211 |
| 1/7/2003 | -0.844 | #Func! |
| 10/7/2003 | 0.806 | -0.216 |
| 1/6/2004 | 0.0306 | -3.487 |
| 4/7/2004 | 0.35 | -1.050 |
| 7/14/2004 | 0.273 | -1.298 |
| 10/7/2004 | 0.205 | -1.585 |
| 1/11/2005 | 0.0799 | -2.527 |

**Dry/Partially Dry Wells**

| Well No. | Gradient |
|---|---|
| MW359 | Downgradient |
| MW376 | Sidegradient |
| MW377 | Sidegradient |

**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) |
|---|---|---|---|---|---|---|
| MW362 | Downgradient | Yes | 1.2 | N/A | 0.182 | NO |
| MW365 | Downgradient | No | 0.391 | N/A | -0.939 | N/A |
| MW368 | Sidegradient | No | 0.238 | N/A | -1.435 | N/A |
| MW371 | Upgradient | No | 0.44 | N/A | -0.821 | N/A |
| MW374 | Upgradient | Yes | 0.596 | N/A | -0.518 | NO |
| MW375 | Sidegradient | No | 0.201 | N/A | -1.604 | N/A |

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for 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-U Fourth Quarter 2015 Statistical Analysis Historical Background Comparison

## Sodium UNITS: mg/L UCRS

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

**Statistics-Background Data** **X=** 183.063 **S=** 73.222 **CV(1)=** 0.400 **K factor**=** 2.523 **TL(1)=** 367.800 **LL(1)=**N/A

**Statistics-Transformed Background Data** **X=** 5.146 **S=** 0.356 **CV(2)=** 0.069 **K factor**=** 2.523 **TL(2)=** 6.044 **LL(2)=**N/A

**Historical Background Data from Upgradient Wells with Transformed Result**

| Well Number: | MW371 | |
|---|---|---|
| Date Collected | Result | LN(Result) |
| 3/18/2002 | 129 | 4.860 |
| 4/22/2002 | 131 | 4.875 |
| 7/15/2002 | 127 | 4.844 |
| 10/8/2002 | 123 | 4.812 |
| 1/8/2003 | 128 | 4.852 |
| 4/3/2003 | 144 | 4.970 |
| 7/9/2003 | 126 | 4.836 |
| 10/6/2003 | 120 | 4.787 |

| Well Number: | MW374 | |
|---|---|---|
| Date Collected | Result | LN(Result) |
| 10/8/2002 | 336 | 5.817 |
| 1/7/2003 | 329 | 5.796 |
| 4/2/2003 | 287 | 5.659 |
| 7/9/2003 | 181 | 5.198 |
| 10/7/2003 | 182 | 5.204 |
| 1/6/2004 | 206 | 5.328 |
| 4/7/2004 | 182 | 5.204 |
| 7/14/2004 | 198 | 5.288 |

**Dry/Partially Dry Wells**

| Well No. | Gradient |
|---|---|
| MW359 | Downgradient |
| MW376 | Sidegradient |
| MW377 | Sidegradient |

**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) |
|---|---|---|---|---|---|---|
| MW362 | Downgradient | Yes | 176 | NO | 5.170 | N/A |
| MW365 | Downgradient | Yes | 52.8 | NO | 3.967 | N/A |
| MW368 | Sidegradient | Yes | 86.2 | NO | 4.457 | N/A |
| MW371 | Upgradient | Yes | 136 | NO | 4.913 | N/A |
| MW374 | Upgradient | Yes | 131 | NO | 4.875 | N/A |
| MW375 | Sidegradient | Yes | 61.3 | NO | 4.116 | N/A |

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for 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-U Fourth Quarter 2015 Statistical Analysis Historical Background Comparison

## Sulfate UNITS: mg/L UCRS

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

**Statistics-Background Data** **X=** 6.469 **S=** 3.153 **CV(1)=** 0.487 **K factor**=** 2.523 **TL(1)=** 14.423 **LL(1)=**N/A

**Statistics-Transformed Background Data** **X=** 1.794 **S=** 0.357 **CV(2)=** 0.199 **K factor**=** 2.523 **TL(2)=** 2.694 **LL(2)=**N/A

**Historical Background Data from Upgradient Wells with Transformed Result**

Well Number: MW371

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/18/2002 | 16.3 | 2.791 |
| 4/22/2002 | 8.6 | 2.152 |
| 7/15/2002 | 6.7 | 1.902 |
| 10/8/2002 | 5 | 1.609 |
| 1/8/2003 | 5 | 1.609 |
| 4/3/2003 | 5 | 1.609 |
| 7/9/2003 | 5 | 1.609 |
| 10/6/2003 | 5 | 1.609 |

Well Number: MW374

| Date Collected | Result | LN(Result) |
|---|---|---|
| 10/8/2002 | 5 | 1.609 |
| 1/7/2003 | 5 | 1.609 |
| 4/2/2003 | 5 | 1.609 |
| 7/9/2003 | 5.6 | 1.723 |
| 10/7/2003 | 5 | 1.609 |
| 1/6/2004 | 5 | 1.609 |
| 4/7/2004 | 11.3 | 2.425 |
| 7/14/2004 | 5 | 1.609 |

**Dry/Partially Dry Wells**

| Well No. | Gradient |
|---|---|
| MW359 | Downgradient |
| MW376 | Sidegradient |
| MW377 | Sidegradient |

**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) |
|---|---|---|---|---|---|---|
| MW362 | Downgradient | Yes | 35.2 | YES | 3.561 | N/A |
| MW365 | Downgradient | Yes | 56.3 | YES | 4.031 | N/A |
| MW368 | Sidegradient | Yes | 29 | YES | 3.367 | N/A |
| MW371 | Upgradient | Yes | 19.5 | YES | 2.970 | N/A |
| MW374 | Upgradient | Yes | 6.31 | NO | 1.842 | N/A |
| MW375 | Sidegradient | Yes | 23.4 | YES | 3.153 | N/A |

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

**Conclusion of Statistical Analysis on Historical Data**

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

**Wells with Exceedances**

MW362
MW365
MW368
MW371
MW375

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

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

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

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

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

** *Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities,Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-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-U Fourth Quarter 2015 Statistical Analysis Historical Background Comparison

## Total Organic Carbon (TOC) UNITS: mg/L UCRS

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

| | | | | | | |
|---|---|---|---|---|---|---|
| **Statistics-Background Data** | **X=** 17.631 | **S=** 24.314 | **CV(1)=** 1.379 | **K factor**=** 2.523 | **TL(1)=** 78.977 | **LL(1)=**N/A |
| **Statistics-Transformed Background Data** | **X=** 2.318 | **S=** 0.979 | **CV(2)=** 0.422 | **K factor**=** 2.523 | **TL(2)=** 4.788 | **LL(2)=**N/A |

**Historical Background Data from Upgradient Wells with Transformed Result**

Well Number: MW371

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/18/2002 | 11.1 | 2.407 |
| 4/22/2002 | 7 | 1.946 |
| 7/15/2002 | 4.1 | 1.411 |
| 10/8/2002 | 6 | 1.792 |
| 1/8/2003 | 5.3 | 1.668 |
| 4/3/2003 | 5.3 | 1.668 |
| 7/9/2003 | 2.9 | 1.065 |
| 10/6/2003 | 3.2 | 1.163 |

Well Number: MW374

| Date Collected | Result | LN(Result) |
|---|---|---|
| 10/8/2002 | 90 | 4.500 |
| 1/7/2003 | 64 | 4.159 |
| 4/2/2003 | 25 | 3.219 |
| 7/9/2003 | 16 | 2.773 |
| 10/7/2003 | 13 | 2.565 |
| 1/6/2004 | 10 | 2.303 |
| 4/7/2004 | 7.2 | 1.974 |
| 7/14/2004 | 12 | 2.485 |

**Dry/Partially Dry Wells**

| Well No. | Gradient |
|---|---|
| MW359 | Downgradient |
| MW376 | Sidegradient |
| MW377 | Sidegradient |

**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) |
|---|---|---|---|---|---|---|
| MW362 | Downgradient | Yes | 2.82 | N/A | 1.037 | NO |
| MW365 | Downgradient | Yes | 1.62 | N/A | 0.482 | NO |
| MW368 | Sidegradient | Yes | 1.48 | N/A | 0.392 | NO |
| MW371 | Upgradient | Yes | 2.02 | N/A | 0.703 | NO |
| MW374 | Upgradient | Yes | 2.26 | N/A | 0.815 | NO |
| MW375 | Sidegradient | Yes | 0.847 | N/A | -0.166 | 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-U Fourth Quarter 2015 Statistical Analysis Historical Background Comparison

## Total Organic Halides (TOX) UNITS: ug/L UCRS

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

**Statistics-Background Data** **X=** 214.094 **S=** 231.089 **CV(1)=** 1.079 **K factor**=** 2.523 **TL(1)=** 797.131 **LL(1)=**N/A

**Statistics-Transformed Background Data** **X=** 4.867 **S=** 1.065 **CV(2)=** 0.219 **K factor**=** 2.523 **TL(2)=** 7.554 **LL(2)=**N/A

**Historical Background Data from Upgradient Wells with Transformed Result**

Well Number: MW371

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/18/2002 | 50 | 3.912 |
| 4/22/2002 | 105 | 4.654 |
| 7/15/2002 | 70 | 4.248 |
| 10/8/2002 | 52 | 3.951 |
| 1/8/2003 | 20.2 | 3.006 |
| 4/3/2003 | 104 | 4.644 |
| 7/9/2003 | 34.2 | 3.532 |
| 10/6/2003 | 46.1 | 3.831 |

Well Number: MW374

| Date Collected | Result | LN(Result) |
|---|---|---|
| 10/8/2002 | 903 | 6.806 |
| 1/7/2003 | 539 | 6.290 |
| 4/2/2003 | 295 | 5.687 |
| 7/9/2003 | 272 | 5.606 |
| 10/7/2003 | 197 | 5.283 |
| 1/6/2004 | 330 | 5.799 |
| 4/7/2004 | 183 | 5.209 |
| 7/14/2004 | 225 | 5.416 |

**Dry/Partially Dry Wells**

| Well No. | Gradient |
|---|---|
| MW359 | Downgradient |
| MW376 | Sidegradient |
| MW377 | Sidegradient |

**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) |
|---|---|---|---|---|---|---|
| MW362 | Downgradient | Yes | 25 | N/A | 3.219 | NO |
| MW365 | Downgradient | Yes | 22.9 | N/A | 3.131 | NO |
| MW368 | Sidegradient | Yes | 5.24 | N/A | 1.656 | NO |
| MW371 | Upgradient | Yes | 10.5 | N/A | 2.351 | NO |
| MW374 | Upgradient | Yes | 20.1 | N/A | 3.001 | NO |
| MW375 | Sidegradient | Yes | 10.4 | N/A | 2.342 | 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-U Fourth Quarter 2015 Statistical Analysis Historical Background Comparison

## Uranium UNITS: mg/L UCRS

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

| | | | | | | |
|---|---|---|---|---|---|---|
| **Statistics-Background Data** | **X=** 0.007 | **S=** 0.012 | **CV(1)=** 1.678 | **K factor**=** 2.523 | **TL(1)=** 0.037 | **LL(1)=**N/A |
| **Statistics-Transformed Background Data** | **X=** -5.884 | **S=** 1.299 | **CV(2)=** -0.221 | **K factor**=** 2.523 | **TL(2)=** -2.607 | **LL(2)=**N/A |

**Historical Background Data from Upgradient Wells with Transformed Result**

| Well Number: | MW371 | |
|---|---|---|
| Date Collected | Result | LN(Result) |
| 3/18/2002 | 0.001 | -6.908 |
| 4/22/2002 | 0.001 | -6.908 |
| 7/15/2002 | 0.001 | -6.908 |
| 10/8/2002 | 0.027 | -3.612 |
| 1/8/2003 | 0.001 | -6.908 |
| 4/3/2003 | 0.001 | -6.908 |
| 7/9/2003 | 0.00109 | -6.822 |
| 10/6/2003 | 0.001 | -6.908 |

| Well Number: | MW374 | |
|---|---|---|
| Date Collected | Result | LN(Result) |
| 10/8/2002 | 0.0438 | -3.128 |
| 1/7/2003 | 0.011 | -4.510 |
| 4/2/2003 | 0.00905 | -4.705 |
| 7/9/2003 | 0.00694 | -4.970 |
| 10/7/2003 | 0.001 | -6.908 |
| 1/6/2004 | 0.00315 | -5.760 |
| 4/7/2004 | 0.00258 | -5.960 |
| 7/14/2004 | 0.0018 | -6.320 |

**Dry/Partially Dry Wells**

| Well No. | Gradient |
|---|---|
| MW359 | Downgradient |
| MW376 | Sidegradient |
| MW377 | Sidegradient |

**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) |
|---|---|---|---|---|---|---|
| MW362 | Downgradient | Yes | 0.00582 | N/A | -5.146 | NO |
| MW365 | Downgradient | No | 0.000135 | N/A | -8.910 | N/A |
| MW368 | Sidegradient | No | 0.000347 | N/A | -7.966 | N/A |
| MW371 | Upgradient | Yes | 0.0018 | N/A | -6.320 | NO |
| MW374 | Upgradient | No | 0.000229 | N/A | -8.382 | N/A |
| MW375 | Sidegradient | No | 0.0002 | N/A | -8.517 | N/A |

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

**Conclusion of Statistical Analysis on Historical Data**

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

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

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

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

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

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

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

# C-746-U Fourth Quarter 2015 Statistical Analysis Historical Background Comparison

## Vanadium UNITS: mg/L UCRS

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

| | | | | | | |
|---|---|---|---|---|---|---|
| **Statistics-Background Data** | **X=** 0.055 | **S=** 0.072 | **CV(1)=** 1.319 | **K factor**=** 2.523 | **TL(1)=** 0.237 | **LL(1)=**N/A |
| **Statistics-Transformed Background Data** | **X=** -3.438 | **S=** 0.912 | **CV(2)=** -0.265 | **K factor**=** 2.523 | **TL(2)=** -1.138 | **LL(2)=**N/A |

**Historical Background Data from Upgradient Wells with Transformed Result**

| Well Number: | MW371 | |
|---|---|---|
| Date Collected | Result | LN(Result) |
| 3/18/2002 | 0.025 | -3.689 |
| 4/22/2002 | 0.025 | -3.689 |
| 7/15/2002 | 0.025 | -3.689 |
| 10/8/2002 | 0.02 | -3.912 |
| 1/8/2003 | 0.02 | -3.912 |
| 4/3/2003 | 0.02 | -3.912 |
| 7/9/2003 | 0.02 | -3.912 |
| 10/6/2003 | 0.02 | -3.912 |

| Well Number: | MW374 | |
|---|---|---|
| Date Collected | Result | LN(Result) |
| 10/8/2002 | 0.2 | -1.609 |
| 1/7/2003 | 0.2 | -1.609 |
| 4/2/2003 | 0.2 | -1.609 |
| 7/9/2003 | 0.02 | -3.912 |
| 10/7/2003 | 0.02 | -3.912 |
| 1/6/2004 | 0.02 | -3.912 |
| 4/7/2004 | 0.02 | -3.912 |
| 7/14/2004 | 0.02 | -3.912 |

**Dry/Partially Dry Wells**

| Well No. | Gradient |
|---|---|
| MW359 | Downgradient |
| MW376 | Sidegradient |
| MW377 | Sidegradient |

**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) |
|---|---|---|---|---|---|---|
| MW362 | Downgradient | Yes | 0.0035 | N/A | -5.655 | NO |
| MW365 | Downgradient | No | 0.0033 | N/A | -5.714 | N/A |
| MW368 | Sidegradient | Yes | 0.0168 | N/A | -4.086 | NO |
| MW371 | Upgradient | No | 0.01 | N/A | -4.605 | N/A |
| MW374 | Upgradient | No | 0.00757 | N/A | -4.884 | N/A |
| MW375 | Sidegradient | No | 0.0103 | N/A | -4.576 | N/A |

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

**Conclusion of Statistical Analysis on Historical Data**

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

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

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

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

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

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

** *Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities,Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-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-U Fourth Quarter 2015 Statistical Analysis Historical Background Comparison

## Zinc UNITS: mg/L UCRS

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

| | | | | | | |
|---|---|---|---|---|---|---|
| **Statistics-Background Data** | **X=** 0.060 | **S=** 0.083 | **CV(1)=** 1.380 | **K factor**=** 2.523 | **TL(1)=** 0.270 | **LL(1)=**N/A |
| **Statistics-Transformed Background Data** | **X=** -3.259 | **S=** 0.840 | **CV(2)=** -0.258 | **K factor**=** 2.523 | **TL(2)=** -1.140 | **LL(2)=**N/A |

**Historical Background Data from Upgradient Wells with Transformed Result**

Well Number: MW371

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/18/2002 | 0.1 | -2.303 |
| 4/22/2002 | 0.1 | -2.303 |
| 7/15/2002 | 0.1 | -2.303 |
| 10/8/2002 | 0.025 | -3.689 |
| 1/8/2003 | 0.035 | -3.352 |
| 4/3/2003 | 0.035 | -3.352 |
| 7/9/2003 | 0.0376 | -3.281 |
| 10/6/2003 | 0.02 | -3.912 |

Well Number: MW374

| Date Collected | Result | LN(Result) |
|---|---|---|
| 10/8/2002 | 0.025 | -3.689 |
| 1/7/2003 | 0.35 | -1.050 |
| 4/2/2003 | 0.035 | -3.352 |
| 7/9/2003 | 0.02 | -3.912 |
| 10/7/2003 | 0.02 | -3.912 |
| 1/6/2004 | 0.02 | -3.912 |
| 4/7/2004 | 0.02 | -3.912 |
| 7/14/2004 | 0.02 | -3.912 |

**Dry/Partially Dry Wells**

| Well No. | Gradient |
|---|---|
| MW359 | Downgradient |
| MW376 | Sidegradient |
| MW377 | Sidegradient |

**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) |
|---|---|---|---|---|---|---|
| MW362 | Downgradient | Yes | 0.00423 | N/A | -5.466 | NO |
| MW365 | Downgradient | Yes | 0.0243 | N/A | -3.717 | NO |
| MW368 | Sidegradient | Yes | 0.0074 | N/A | -4.906 | NO |
| MW371 | Upgradient | No | 0.01 | N/A | -4.605 | N/A |
| MW374 | Upgradient | No | 0.01 | N/A | -4.605 | N/A |
| MW375 | Sidegradient | 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-U Fourth Quarter 2015 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=** 0.625 | **S=** 0.774 | **CV(1)=** 1.239 | **K factor**=** 2.523 | **TL(1)=** 2.578 | **LL(1)=**N/A |
| **Statistics-Transformed Background Data** | **X=** -0.973 | **S=** 0.935 | **CV(2)=** -0.961 | **K factor**=** 2.523 | **TL(2)=** 1.386 | **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: MW369

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/18/2002 | 0.255 | -1.366 |
| 4/22/2002 | 0.2 | -1.609 |
| 7/15/2002 | 0.322 | -1.133 |
| 10/8/2002 | 0.2 | -1.609 |
| 1/8/2003 | 0.2 | -1.609 |
| 4/3/2003 | 0.2 | -1.609 |
| 7/8/2003 | 0.2 | -1.609 |
| 10/6/2003 | 0.689 | -0.373 |

Well Number: MW372

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/19/2002 | 2.61 | 0.959 |
| 4/23/2002 | 0.2 | -1.609 |
| 7/16/2002 | 1.14 | 0.131 |
| 10/8/2002 | 0.862 | -0.149 |
| 1/7/2003 | 2.32 | 0.842 |
| 4/2/2003 | 0.2 | -1.609 |
| 7/9/2003 | 0.2 | -1.609 |
| 10/7/2003 | 0.2 | -1.609 |

**Current Quarter Data**

| Well No. | Gradient | Detected? | Result | Result >TL(1)? | LN(Result) | LN(Result) >TL(2) |
|---|---|---|---|---|---|---|
| MW357 | Downgradient | Yes | 0.025 | N/A | -3.689 | NO |
| MW360 | Downgradient | No | 0.05 | N/A | -2.996 | N/A |
| MW363 | Downgradient | Yes | 0.032 | N/A | -3.442 | NO |
| MW366 | Sidegradient | Yes | 0.0228 | N/A | -3.781 | NO |
| MW369 | Upgradient | Yes | 0.0774 | N/A | -2.559 | NO |
| MW372 | Upgradient | Yes | 0.0637 | N/A | -2.754 | 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-U Fourth Quarter 2015 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=** 15.996 | **S=** 11.899 | **CV(1)=** 0.744 | **K factor**=** 2.523 | **TL(1)=** 46.017 | **LL(1)=**N/A |
| **Statistics-Transformed Background Data** | **X=** 2.497 | **S=** 0.783 | **CV(2)=** 0.314 | **K factor**=** 2.523 | **TL(2)=** 4.473 | **LL(2)=**N/A |

**Historical Background Data from Upgradient Wells with Transformed Result**

| Well Number: | MW369 | |
|---|---|---|
| Date Collected | Result | LN(Result) |
| 3/18/2002 | 32.5 | 3.481 |
| 4/22/2002 | 35.4 | 3.567 |
| 7/15/2002 | 12.9 | 2.557 |
| 10/8/2002 | 7.59 | 2.027 |
| 1/8/2003 | 9.58 | 2.260 |
| 4/3/2003 | 6.69 | 1.901 |
| 7/8/2003 | 9.1 | 2.208 |
| 10/6/2003 | 7.31 | 1.989 |

| Well Number: | MW372 | |
|---|---|---|
| Date Collected | Result | LN(Result) |
| 3/19/2002 | 28.5 | 3.350 |
| 4/23/2002 | 5.37 | 1.681 |
| 7/16/2002 | 19.9 | 2.991 |
| 10/8/2002 | 38.7 | 3.656 |
| 1/7/2003 | 13 | 2.565 |
| 4/2/2003 | 3.94 | 1.371 |
| 7/9/2003 | 3.56 | 1.270 |
| 10/7/2003 | 21.9 | 3.086 |

**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) |
|---|---|---|---|---|---|---|
| MW357 | Downgradient | No | 10.3 | N/A | 2.332 | N/A |
| MW360 | Downgradient | No | 3.78 | N/A | 1.330 | N/A |
| MW363 | Downgradient | No | 2.53 | N/A | 0.928 | N/A |
| MW366 | Sidegradient | Yes | 29.4 | N/A | 3.381 | N/A |
| MW369 | Upgradient | Yes | 28 | N/A | 3.332 | N/A |
| MW372 | Upgradient | Yes | 86.8 | YES | 4.464 | N/A |

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for 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 Lower 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-U Fourth Quarter 2015 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=** 0.985 | **S=** 0.825 | **CV(1)=** 0.838 | **K factor**=** 2.523 | **TL(1)=** 3.067 | **LL(1)=**N/A |
| **Statistics-Transformed Background Data** | **X=** -0.430 | **S=** 0.990 | **CV(2)=** -2.302 | **K factor**=** 2.523 | **TL(2)=** 2.068 | **LL(2)=**N/A |

**Historical Background Data from Upgradient Wells with Transformed Result**

Well Number: MW369

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/18/2002 | 2 | 0.693 |
| 4/22/2002 | 2 | 0.693 |
| 7/15/2002 | 2 | 0.693 |
| 10/8/2002 | 0.2 | -1.609 |
| 1/8/2003 | 0.2 | -1.609 |
| 4/3/2003 | 0.2 | -1.609 |
| 7/8/2003 | 0.2 | -1.609 |
| 10/6/2003 | 0.2 | -1.609 |

Well Number: MW372

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/19/2002 | 2 | 0.693 |
| 4/23/2002 | 2 | 0.693 |
| 7/16/2002 | 2 | 0.693 |
| 10/8/2002 | 0.492 | -0.709 |
| 1/7/2003 | 0.492 | -0.709 |
| 4/2/2003 | 0.6 | -0.511 |
| 7/9/2003 | 0.57 | -0.562 |
| 10/7/2003 | 0.604 | -0.504 |

**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) |
|---|---|---|---|---|---|---|
| MW357 | Downgradient | Yes | 0.47 | NO | -0.755 | N/A |
| MW360 | Downgradient | Yes | 0.0497 | NO | -3.002 | N/A |
| MW363 | Downgradient | Yes | 0.0272 | NO | -3.605 | N/A |
| MW366 | Sidegradient | Yes | 0.13 | NO | -2.040 | N/A |
| MW369 | Upgradient | Yes | 0.0139 | NO | -4.276 | N/A |
| MW372 | Upgradient | Yes | 1.28 | NO | 0.247 | N/A |

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for 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-U Fourth Quarter 2015 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: MW369

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/18/2002 | 1 | 0.000 |
| 4/22/2002 | 1 | 0.000 |
| 7/15/2002 | 1 | 0.000 |
| 10/8/2002 | 1 | 0.000 |
| 1/8/2003 | 1 | 0.000 |
| 4/3/2003 | 1 | 0.000 |
| 7/8/2003 | 1 | 0.000 |
| 10/6/2003 | 1 | 0.000 |

Well Number: MW372

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/19/2002 | 1 | 0.000 |
| 4/23/2002 | 1 | 0.000 |
| 7/16/2002 | 1 | 0.000 |
| 10/8/2002 | 1 | 0.000 |
| 1/7/2003 | 1 | 0.000 |
| 4/2/2003 | 1 | 0.000 |
| 7/9/2003 | 1 | 0.000 |
| 10/7/2003 | 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) |
|---|---|---|---|---|---|---|
| MW357 | Downgradient | Yes | 0.446 | NO | -0.807 | N/A |
| MW360 | Downgradient | Yes | 0.158 | NO | -1.845 | N/A |
| MW363 | Downgradient | Yes | 0.164 | NO | -1.808 | N/A |
| MW366 | Sidegradient | Yes | 0.478 | NO | -0.738 | N/A |
| MW369 | Upgradient | Yes | 0.378 | NO | -0.973 | N/A |
| MW372 | Upgradient | Yes | 0.663 | NO | -0.411 | 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-U Fourth Quarter 2015 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=** 32.763 | **S=** 9.391 | **CV(1)=** 0.287 | **K factor**=** 2.523 | **TL(1)=** 56.456 | **LL(1)=**N/A |
| **Statistics-Transformed Background Data** | **X=** 3.449 | **S=** 0.299 | **CV(2)=** 0.087 | **K factor**=** 2.523 | **TL(2)=** 4.202 | **LL(2)=**N/A |

**Historical Background Data from Upgradient Wells with Transformed Result**

Well Number: MW369

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/18/2002 | 29.5 | 3.384 |
| 4/22/2002 | 29.8 | 3.395 |
| 7/15/2002 | 25.3 | 3.231 |
| 10/8/2002 | 21.9 | 3.086 |
| 1/8/2003 | 20.9 | 3.040 |
| 4/3/2003 | 22.2 | 3.100 |
| 7/8/2003 | 22.9 | 3.131 |
| 10/6/2003 | 21.7 | 3.077 |

Well Number: MW372

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/19/2002 | 41.5 | 3.726 |
| 4/23/2002 | 43.6 | 3.775 |
| 7/16/2002 | 40.4 | 3.699 |
| 10/8/2002 | 38.8 | 3.658 |
| 1/7/2003 | 41.1 | 3.716 |
| 4/2/2003 | 42.9 | 3.759 |
| 7/9/2003 | 35.1 | 3.558 |
| 10/7/2003 | 46.6 | 3.842 |

**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) |
|---|---|---|---|---|---|---|
| MW357 | Downgradient | Yes | 26.8 | NO | 3.288 | N/A |
| MW360 | Downgradient | Yes | 27.3 | NO | 3.307 | N/A |
| MW363 | Downgradient | Yes | 26.9 | NO | 3.292 | N/A |
| MW366 | Sidegradient | Yes | 30.7 | NO | 3.424 | N/A |
| MW369 | Upgradient | Yes | 17.1 | NO | 2.839 | N/A |
| MW372 | Upgradient | Yes | 61.9 | YES | 4.126 | N/A |

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for 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 Lower 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-U Fourth Quarter 2015 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=** 44.119 | **S=** 4.554 | **CV(1)=** 0.103 | **K factor**=** 2.523 | **TL(1)=** 55.607 | **LL(1)=**N/A |
| **Statistics-Transformed Background Data** | **X=** 3.782 | **S=** 0.099 | **CV(2)=** 0.026 | **K factor**=** 2.523 | **TL(2)=** 4.033 | **LL(2)=**N/A |

**Historical Background Data from Upgradient Wells with Transformed Result**

Well Number: MW369

| Date Collected | Result | LN(Result) |
|---|---|---|
| 7/15/2002 | 48.3 | 3.877 |
| 10/8/2002 | 47.7 | 3.865 |
| 1/8/2003 | 45.7 | 3.822 |
| 4/3/2003 | 47.4 | 3.859 |
| 7/8/2003 | 55.9 | 4.024 |
| 10/6/2003 | 47.4 | 3.859 |
| 1/7/2004 | 45.5 | 3.818 |
| 4/7/2004 | 43.4 | 3.770 |

Well Number: MW372

| Date Collected | Result | LN(Result) |
|---|---|---|
| 7/16/2002 | 39.8 | 3.684 |
| 10/8/2002 | 41 | 3.714 |
| 1/7/2003 | 39.4 | 3.674 |
| 4/2/2003 | 39.2 | 3.669 |
| 7/9/2003 | 39.8 | 3.684 |
| 10/7/2003 | 40 | 3.689 |
| 1/5/2004 | 43.4 | 3.770 |
| 4/5/2004 | 42 | 3.738 |

**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) |
|---|---|---|---|---|---|---|
| MW357 | Downgradient | Yes | 31.5 | NO | 3.450 | N/A |
| MW360 | Downgradient | Yes | 10.5 | NO | 2.351 | N/A |
| MW363 | Downgradient | Yes | 32.5 | NO | 3.481 | N/A |
| MW366 | Sidegradient | Yes | 38.7 | NO | 3.656 | N/A |
| MW369 | Upgradient | Yes | 34.6 | NO | 3.544 | N/A |
| MW372 | Upgradient | Yes | 49.4 | NO | 3.900 | N/A |

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for 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-U Fourth Quarter 2015 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: MW369

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/18/2002 | 5 | 1.609 |
| 4/22/2002 | 5 | 1.609 |
| 7/15/2002 | 5 | 1.609 |
| 10/8/2002 | 5 | 1.609 |
| 1/8/2003 | 5 | 1.609 |
| 4/3/2003 | 5 | 1.609 |
| 7/8/2003 | 5 | 1.609 |
| 10/6/2003 | 5 | 1.609 |

Well Number: MW372

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/19/2002 | 5 | 1.609 |
| 4/23/2002 | 5 | 1.609 |
| 7/16/2002 | 5 | 1.609 |
| 10/8/2002 | 5 | 1.609 |
| 1/7/2003 | 5 | 1.609 |
| 4/2/2003 | 5 | 1.609 |
| 7/9/2003 | 5 | 1.609 |
| 10/7/2003 | 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) |
|---|---|---|---|---|---|---|
| MW357 | Downgradient | No | 1 | N/A | 0.000 | N/A |
| MW360 | Downgradient | No | 1 | N/A | 0.000 | N/A |
| MW363 | Downgradient | No | 1 | N/A | 0.000 | N/A |
| MW366 | Sidegradient | No | 1 | N/A | 0.000 | N/A |
| MW369 | Upgradient | No | 1 | N/A | 0.000 | N/A |
| MW372 | Upgradient | Yes | 0.32 | NO | -1.139 | N/A |

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for 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-U Fourth Quarter 2015 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=** 0.025 | **S=** 0.021 | **CV(1)=** 0.845 | **K factor**=** 2.523 | **TL(1)=** 0.077 | **LL(1)=**N/A |
| **Statistics-Transformed Background Data** | **X=** -4.090 | **S=** 1.006 | **CV(2)=** -0.246 | **K factor**=** 2.523 | **TL(2)=** -1.553 | **LL(2)=**N/A |

**Historical Background Data from Upgradient Wells with Transformed Result**

Well Number: MW369

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/18/2002 | 0.025 | -3.689 |
| 4/22/2002 | 0.025 | -3.689 |
| 7/15/2002 | 0.025 | -3.689 |
| 10/8/2002 | 0.00938 | -4.669 |
| 1/8/2003 | 0.00548 | -5.207 |
| 4/3/2003 | 0.00587 | -5.138 |
| 7/8/2003 | 0.0541 | -2.917 |
| 10/6/2003 | 0.0689 | -2.675 |

Well Number: MW372

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/19/2002 | 0.025 | -3.689 |
| 4/23/2002 | 0.025 | -3.689 |
| 7/16/2002 | 0.025 | -3.689 |
| 10/8/2002 | 0.00158 | -6.450 |
| 1/7/2003 | 0.0147 | -4.220 |
| 4/2/2003 | 0.0116 | -4.457 |
| 7/9/2003 | 0.0653 | -2.729 |
| 10/7/2003 | 0.00788 | -4.843 |

**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) |
|---|---|---|---|---|---|---|
| MW357 | Downgradient | Yes | 0.00096 | NO | -6.949 | N/A |
| MW360 | Downgradient | Yes | 0.0164 | NO | -4.110 | N/A |
| MW363 | Downgradient | Yes | 0.00103 | NO | -6.878 | N/A |
| MW366 | Sidegradient | Yes | 0.000636 | NO | -7.360 | N/A |
| MW369 | Upgradient | Yes | 0.00742 | NO | -4.904 | N/A |
| MW372 | Upgradient | No | 0.000346 | N/A | -7.969 | N/A |

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for 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-U Fourth Quarter 2015 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=** 482.856 | **S=** 57.603 | **CV(1)=** 0.119 | **K factor**=** 2.523 | **TL(1)=** 628.189 | **LL(1)=**N/A |
| **Statistics-Transformed Background Data** | **X=** 6.173 | **S=** 0.123 | **CV(2)=** 0.020 | **K factor**=** 2.523 | **TL(2)=** 6.484 | **LL(2)=**N/A |

**Historical Background Data from Upgradient Wells with Transformed Result**

Well Number: MW369

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/18/2002 | 388 | 5.961 |
| 4/22/2002 | 404 | 6.001 |
| 7/15/2002 | 394 | 5.976 |
| 10/8/2002 | 403 | 5.999 |
| 1/8/2003 | 520 | 6.254 |
| 4/3/2003 | 487 | 6.188 |
| 7/8/2003 | 478 | 6.170 |
| 10/6/2003 | 476 | 6.165 |

Well Number: MW372

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/19/2002 | 508 | 6.230 |
| 4/23/2002 | 501 | 6.217 |
| 7/16/2002 | 507 | 6.229 |
| 10/8/2002 | 495 | 6.205 |
| 1/7/2003 | 508.7 | 6.232 |
| 4/2/2003 | 515 | 6.244 |
| 7/9/2003 | 576 | 6.356 |
| 10/7/2003 | 565 | 6.337 |

**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) |
|---|---|---|---|---|---|---|
| MW357 | Downgradient | Yes | 435 | NO | 6.075 | N/A |
| MW360 | Downgradient | Yes | 562 | NO | 6.332 | N/A |
| MW363 | Downgradient | Yes | 401 | NO | 5.994 | N/A |
| MW366 | Sidegradient | Yes | 475 | NO | 6.163 | N/A |
| MW369 | Upgradient | Yes | 370 | NO | 5.914 | N/A |
| MW372 | Upgradient | Yes | 751 | YES | 6.621 | N/A |

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for 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 Lower 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-U Fourth Quarter 2015 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=** 0.025 | **S=** 0.010 | **CV(1)=** 0.400 | **K factor**=** 2.523 | **TL(1)=** 0.050 | **LL(1)=**N/A |
| **Statistics-Transformed Background Data** | **X=** -3.742 | **S=** 0.307 | **CV(2)=** -0.082 | **K factor**=** 2.523 | **TL(2)=** -2.967 | **LL(2)=**N/A |

**Historical Background Data from Upgradient Wells with Transformed Result**

Well Number: MW369

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/18/2002 | 0.025 | -3.689 |
| 4/22/2002 | 0.025 | -3.689 |
| 7/15/2002 | 0.05 | -2.996 |
| 10/8/2002 | 0.02 | -3.912 |
| 1/8/2003 | 0.02 | -3.912 |
| 4/3/2003 | 0.02 | -3.912 |
| 7/8/2003 | 0.02 | -3.912 |
| 10/6/2003 | 0.02 | -3.912 |

Well Number: MW372

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/19/2002 | 0.025 | -3.689 |
| 4/23/2002 | 0.025 | -3.689 |
| 7/16/2002 | 0.05 | -2.996 |
| 10/8/2002 | 0.02 | -3.912 |
| 1/7/2003 | 0.02 | -3.912 |
| 4/2/2003 | 0.02 | -3.912 |
| 7/9/2003 | 0.02 | -3.912 |
| 10/7/2003 | 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) |
|---|---|---|---|---|---|---|
| MW357 | Downgradient | Yes | 0.000766 | NO | -7.174 | N/A |
| MW360 | Downgradient | No | 0.001 | N/A | -6.908 | N/A |
| MW363 | Downgradient | No | 0.001 | N/A | -6.908 | N/A |
| MW366 | Sidegradient | Yes | 0.000376 | NO | -7.886 | N/A |
| MW369 | Upgradient | Yes | 0.00145 | NO | -6.536 | N/A |
| MW372 | 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-U Fourth Quarter 2015 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=** 1.781 | **S=** 1.351 | **CV(1)=** 0.759 | **K factor**=** 2.523 | **TL(1)=** 5.190 | **LL(1)=**N/A |
| **Statistics-Transformed Background Data** | **X=** 0.228 | **S=** 1.065 | **CV(2)=** 4.665 | **K factor**=** 2.523 | **TL(2)=** 2.915 | **LL(2)=**N/A |

**Historical Background Data from Upgradient Wells with Transformed Result**

Well Number: MW369

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/18/2002 | 5.41 | 1.688 |
| 4/22/2002 | 1.57 | 0.451 |
| 7/15/2002 | 0.8 | -0.223 |
| 10/8/2002 | 1.09 | 0.086 |
| 1/8/2003 | 2.69 | 0.990 |
| 4/3/2003 | 2.04 | 0.713 |
| 7/8/2003 | 1.19 | 0.174 |
| 10/6/2003 | 1.78 | 0.577 |

Well Number: MW372

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/19/2002 | 3.89 | 1.358 |
| 4/23/2002 | 0.05 | -2.996 |
| 7/16/2002 | 1.33 | 0.285 |
| 10/8/2002 | 2.66 | 0.978 |
| 1/7/2003 | 0.4 | -0.916 |
| 4/2/2003 | 0.91 | -0.094 |
| 7/9/2003 | 1.42 | 0.351 |
| 10/7/2003 | 1.26 | 0.231 |

**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) |
|---|---|---|---|---|---|---|
| MW357 | Downgradient | Yes | 3.37 | NO | 1.215 | N/A |
| MW360 | Downgradient | Yes | 1.7 | NO | 0.531 | N/A |
| MW363 | Downgradient | Yes | 1.51 | NO | 0.412 | N/A |
| MW366 | Sidegradient | Yes | 1.13 | NO | 0.122 | N/A |
| MW369 | Upgradient | Yes | 1.73 | NO | 0.548 | N/A |
| MW372 | Upgradient | Yes | 1.72 | NO | 0.542 | N/A |

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for 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-U Fourth Quarter 2015 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=** 285.188 | **S=** 44.908 | **CV(1)=** 0.157 | **K factor**=** 2.523 | **TL(1)=** 398.489 | **LL(1)=**N/A |
| **Statistics-Transformed Background Data** | **X=** 5.640 | **S=** 0.175 | **CV(2)=** 0.031 | **K factor**=** 2.523 | **TL(2)=** 6.080 | **LL(2)=**N/A |

**Historical Background Data from Upgradient Wells with Transformed Result**

Well Number: MW369

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/18/2002 | 173 | 5.153 |
| 4/22/2002 | 246 | 5.505 |
| 7/15/2002 | 232 | 5.447 |
| 10/8/2002 | 275 | 5.617 |
| 1/8/2003 | 269 | 5.595 |
| 4/3/2003 | 250 | 5.521 |
| 7/8/2003 | 295 | 5.687 |
| 10/6/2003 | 276 | 5.620 |

Well Number: MW372

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/19/2002 | 295 | 5.687 |
| 4/23/2002 | 322 | 5.775 |
| 7/16/2002 | 329 | 5.796 |
| 10/8/2002 | 290 | 5.670 |
| 1/7/2003 | 316 | 5.756 |
| 4/2/2003 | 311 | 5.740 |
| 7/9/2003 | 347 | 5.849 |
| 10/7/2003 | 337 | 5.820 |

**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) |
|---|---|---|---|---|---|---|
| MW357 | Downgradient | Yes | 201 | NO | 5.303 | N/A |
| MW360 | Downgradient | Yes | 277 | NO | 5.624 | N/A |
| MW363 | Downgradient | Yes | 191 | NO | 5.252 | N/A |
| MW366 | Sidegradient | Yes | 246 | NO | 5.505 | N/A |
| MW369 | Upgradient | Yes | 189 | NO | 5.242 | N/A |
| MW372 | Upgradient | Yes | 419 | YES | 6.038 | N/A |

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for 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 Lower 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-U Fourth Quarter 2015 Statistical Analysis Historical Background Comparison

## Iron UNITS: mg/L URGA

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

| | | | | | | |
|---|---|---|---|---|---|---|
| **Statistics-Background Data** | **X=** 7.385 | **S=** 6.991 | **CV(1)=** 0.947 | **K factor**=** 2.523 | **TL(1)=** 25.024 | **LL(1)=**N/A |
| **Statistics-Transformed Background Data** | **X=** 1.358 | **S=** 1.323 | **CV(2)=** 0.974 | **K factor**=** 2.523 | **TL(2)=** 4.697 | **LL(2)=**N/A |

**Historical Background Data from Upgradient Wells with Transformed Result**

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

Well Number: MW369

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/18/2002 | 0.656 | -0.422 |
| 4/22/2002 | 0.695 | -0.364 |
| 7/15/2002 | 7.1 | 1.960 |
| 10/8/2002 | 21.5 | 3.068 |
| 1/8/2003 | 18.5 | 2.918 |
| 4/3/2003 | 14.9 | 2.701 |
| 7/8/2003 | 11.3 | 2.425 |
| 10/6/2003 | 14.9 | 2.701 |

Well Number: MW372

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/19/2002 | 5.95 | 1.783 |
| 4/23/2002 | 0.792 | -0.233 |
| 7/16/2002 | 1.78 | 0.577 |
| 10/8/2002 | 0.776 | -0.254 |
| 1/7/2003 | 3.55 | 1.267 |
| 4/2/2003 | 5.02 | 1.613 |
| 7/9/2003 | 10 | 2.303 |
| 10/7/2003 | 0.733 | -0.311 |

**Current Quarter Data**

| Well No. | Gradient | Detected? | Result | Result >TL(1)? | LN(Result) | LN(Result) >TL(2) |
|---|---|---|---|---|---|---|
| MW357 | Downgradient | Yes | 0.0871 | NO | -2.441 | N/A |
| MW360 | Downgradient | Yes | 1.94 | NO | 0.663 | N/A |
| MW363 | Downgradient | Yes | 0.0827 | NO | -2.493 | N/A |
| MW366 | Sidegradient | Yes | 0.0819 | NO | -2.502 | N/A |
| MW369 | Upgradient | Yes | 0.148 | NO | -1.911 | N/A |
| MW372 | Upgradient | Yes | 0.502 | NO | -0.689 | 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-U Fourth Quarter 2015 Statistical Analysis Historical Background Comparison

## Magnesium UNITS: mg/L URGA

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

| | | | | | | |
|---|---|---|---|---|---|---|
| **Statistics-Background Data** | **X=** 12.864 | **S=** 3.505 | **CV(1)=** 0.272 | **K factor**=** 2.523 | **TL(1)=** 21.707 | **LL(1)=**N/A |
| **Statistics-Transformed Background Data** | **X=** 2.517 | **S=** 0.290 | **CV(2)=** 0.115 | **K factor**=** 2.523 | **TL(2)=** 3.248 | **LL(2)=**N/A |

**Historical Background Data from Upgradient Wells with Transformed Result**

Well Number: MW369

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/18/2002 | 11.4 | 2.434 |
| 4/22/2002 | 12 | 2.485 |
| 7/15/2002 | 10 | 2.303 |
| 10/8/2002 | 8.62 | 2.154 |
| 1/8/2003 | 7.89 | 2.066 |
| 4/3/2003 | 7.97 | 2.076 |
| 7/8/2003 | 10.3 | 2.332 |
| 10/6/2003 | 9.14 | 2.213 |

Well Number: MW372

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/19/2002 | 15.7 | 2.754 |
| 4/23/2002 | 16.6 | 2.809 |
| 7/16/2002 | 15.4 | 2.734 |
| 10/8/2002 | 15.8 | 2.760 |
| 1/7/2003 | 15.8 | 2.760 |
| 4/2/2003 | 16.4 | 2.797 |
| 7/9/2003 | 15.2 | 2.721 |
| 10/7/2003 | 17.6 | 2.868 |

**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) |
|---|---|---|---|---|---|---|
| MW357 | Downgradient | Yes | 12.2 | NO | 2.501 | N/A |
| MW360 | Downgradient | Yes | 10.8 | NO | 2.380 | N/A |
| MW363 | Downgradient | Yes | 10.4 | NO | 2.342 | N/A |
| MW366 | Sidegradient | Yes | 12.7 | NO | 2.542 | N/A |
| MW369 | Upgradient | Yes | 6.93 | NO | 1.936 | N/A |
| MW372 | Upgradient | Yes | 23.5 | YES | 3.157 | N/A |

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for 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 Lower 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-U Fourth Quarter 2015 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=** 0.413 | **S=** 0.274 | **CV(1)=** 0.664 | **K factor**=** 2.523 | **TL(1)=** 1.105 | **LL(1)=**N/A |
| **Statistics-Transformed Background Data** | **X=** -1.226 | **S=** 1.008 | **CV(2)=** -0.822 | **K factor**=** 2.523 | **TL(2)=** 1.317 | **LL(2)=**N/A |

**Historical Background Data from Upgradient Wells with Transformed Result**

Well Number: MW369

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/18/2002 | 0.034 | -3.381 |
| 4/22/2002 | 0.062 | -2.781 |
| 7/15/2002 | 0.436 | -0.830 |
| 10/8/2002 | 0.867 | -0.143 |
| 1/8/2003 | 0.828 | -0.189 |
| 4/3/2003 | 0.672 | -0.397 |
| 7/8/2003 | 0.321 | -1.136 |
| 10/6/2003 | 0.714 | -0.337 |

Well Number: MW372

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/19/2002 | 0.205 | -1.585 |
| 4/23/2002 | 0.345 | -1.064 |
| 7/16/2002 | 0.21 | -1.561 |
| 10/8/2002 | 0.0539 | -2.921 |
| 1/7/2003 | 0.537 | -0.622 |
| 4/2/2003 | 0.415 | -0.879 |
| 7/9/2003 | 0.654 | -0.425 |
| 10/7/2003 | 0.254 | -1.370 |

**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) |
|---|---|---|---|---|---|---|
| MW357 | Downgradient | Yes | 0.0273 | NO | -3.601 | N/A |
| MW360 | Downgradient | Yes | 0.202 | NO | -1.599 | N/A |
| MW363 | Downgradient | Yes | 0.147 | NO | -1.917 | N/A |
| MW366 | Sidegradient | Yes | 0.0655 | NO | -2.726 | N/A |
| MW369 | Upgradient | Yes | 0.019 | NO | -3.963 | N/A |
| MW372 | Upgradient | Yes | 0.0199 | NO | -3.917 | N/A |

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for 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-U Fourth Quarter 2015 Statistical Analysis Historical Background Comparison

## Molybdenum UNITS: mg/L URGA

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

| | | | | | | |
|---|---|---|---|---|---|---|
| **Statistics-Background Data** | **X=** 0.010 | **S=** 0.012 | **CV(1)=** 1.199 | **K factor**=** 2.523 | **TL(1)=** 0.040 | **LL(1)=**N/A |
| **Statistics-Transformed Background Data** | **X=** -5.698 | **S=** 1.607 | **CV(2)=** -0.282 | **K factor**=** 2.523 | **TL(2)=** -1.643 | **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: MW369

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/18/2002 | 0.025 | -3.689 |
| 4/22/2002 | 0.025 | -3.689 |
| 7/15/2002 | 0.025 | -3.689 |
| 10/8/2002 | 0.001 | -6.908 |
| 1/8/2003 | 0.001 | -6.908 |
| 4/3/2003 | 0.001 | -6.908 |
| 7/8/2003 | 0.001 | -6.908 |
| 10/6/2003 | 0.001 | -6.908 |

Well Number: MW372

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/19/2002 | 0.025 | -3.689 |
| 4/23/2002 | 0.025 | -3.689 |
| 7/16/2002 | 0.025 | -3.689 |
| 10/8/2002 | 0.001 | -6.908 |
| 1/7/2003 | 0.001 | -6.908 |
| 4/2/2003 | 0.001 | -6.908 |
| 7/9/2003 | 0.00105 | -6.859 |
| 10/7/2003 | 0.001 | -6.908 |

**Current Quarter Data**

| Well No. | Gradient | Detected? | Result | Result >TL(1)? | LN(Result) | LN(Result) >TL(2) |
|---|---|---|---|---|---|---|
| MW357 | Downgradient | No | 0.0005 | N/A | -7.601 | N/A |
| MW360 | Downgradient | Yes | 0.000502 | N/A | -7.597 | NO |
| MW363 | Downgradient | No | 0.0005 | N/A | -7.601 | N/A |
| MW366 | Sidegradient | No | 0.0005 | N/A | -7.601 | N/A |
| MW369 | Upgradient | No | 0.0005 | N/A | -7.601 | N/A |
| MW372 | Upgradient | No | 0.000402 | N/A | -7.819 | N/A |

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for 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-U Fourth Quarter 2015 Statistical Analysis Historical Background Comparison

## Nickel UNITS: mg/L URGA

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

| | | | | | | |
|---|---|---|---|---|---|---|
| **Statistics-Background Data** | **X=** 0.024 | **S=** 0.021 | **CV(1)=** 0.910 | **K factor**=** 2.523 | **TL(1)=** 0.078 | **LL(1)=**N/A |
| **Statistics-Transformed Background Data** | **X=** -4.246 | **S=** 1.075 | **CV(2)=** -0.253 | **K factor**=** 2.523 | **TL(2)=** -1.535 | **LL(2)=**N/A |

**Historical Background Data from Upgradient Wells with Transformed Result**

Well Number: MW369

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/18/2002 | 0.05 | -2.996 |
| 4/22/2002 | 0.05 | -2.996 |
| 7/15/2002 | 0.05 | -2.996 |
| 10/8/2002 | 0.005 | -5.298 |
| 1/8/2003 | 0.005 | -5.298 |
| 4/3/2003 | 0.005 | -5.298 |
| 7/8/2003 | 0.013 | -4.343 |
| 10/6/2003 | 0.0104 | -4.566 |

Well Number: MW372

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/19/2002 | 0.05 | -2.996 |
| 4/23/2002 | 0.05 | -2.996 |
| 7/16/2002 | 0.05 | -2.996 |
| 10/8/2002 | 0.005 | -5.298 |
| 1/7/2003 | 0.005 | -5.298 |
| 4/2/2003 | 0.005 | -5.298 |
| 7/9/2003 | 0.019 | -3.963 |
| 10/7/2003 | 0.005 | -5.298 |

**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) |
|---|---|---|---|---|---|---|
| MW357 | Downgradient | Yes | 0.00089 | NO | -7.024 | N/A |
| MW360 | Downgradient | Yes | 0.00209 | NO | -6.171 | N/A |
| MW363 | Downgradient | Yes | 0.00114 | NO | -6.777 | N/A |
| MW366 | Sidegradient | Yes | 0.00118 | NO | -6.742 | N/A |
| MW369 | Upgradient | Yes | 0.00888 | NO | -4.724 | N/A |
| MW372 | Upgradient | Yes | 0.00135 | NO | -6.608 | N/A |

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for 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-U Fourth Quarter 2015 Statistical Analysis Historical Background Comparison

## Oxidation-Reduction Potential UNITS: mV URGA

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

| | | | | | | |
|---|---|---|---|---|---|---|
| **Statistics-Background Data** | **X=** 74.563 | **S=** 94.243 | **CV(1)=** 1.264 | **K factor**=** 2.523 | **TL(1)=** 312.337 | **LL(1)=**N/A |
| **Statistics-Transformed Background Data** | **X=** 4.554 | **S=** 0.784 | **CV(2)=** 0.172 | **K factor**=** 2.523 | **TL(2)=** 5.371 | **LL(2)=**N/A |

**Historical Background Data from Upgradient Wells with Transformed Result**

Well Number: MW369

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/18/2002 | 215 | 5.371 |
| 4/22/2002 | 110 | 4.700 |
| 7/15/2002 | 20 | 2.996 |
| 1/8/2003 | -5 | #Func! |
| 4/3/2003 | -18 | #Func! |
| 7/8/2003 | -67 | #Func! |
| 10/6/2003 | -1 | #Func! |
| 1/7/2004 | 55 | 4.007 |

Well Number: MW372

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/19/2002 | 210 | 5.347 |
| 4/23/2002 | 65 | 4.174 |
| 7/16/2002 | 215 | 5.371 |
| 10/8/2002 | 185 | 5.220 |
| 1/7/2003 | 45 | 3.807 |
| 4/2/2003 | 65 | 4.174 |
| 7/9/2003 | -39 | #Func! |
| 10/7/2003 | 138 | 4.927 |

**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) |
|---|---|---|---|---|---|---|
| MW357 | Downgradient | Yes | 582 | N/A | 6.366 | YES |
| MW360 | Downgradient | Yes | 440 | N/A | 6.087 | YES |
| MW363 | Downgradient | Yes | 630 | N/A | 6.446 | YES |
| MW366 | Sidegradient | Yes | 482 | N/A | 6.178 | YES |
| MW369 | Upgradient | Yes | 382 | N/A | 5.945 | YES |
| MW372 | Upgradient | Yes | 294 | N/A | 5.684 | 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 Lower Tolerance Limit, which is evidence of elevated concentration with respect to historical background data.**

**Wells with Exceedances**

MW357
MW360
MW363
MW366
MW369
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-U Fourth Quarter 2015 Statistical Analysis Historical Background Comparison

## PCB, Total UNITS: UG/L URGA

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

| | | | | | | |
|---|---|---|---|---|---|---|
| **Statistics-Background Data** | **X=** 0.390 | **S=** 0.350 | **CV(1)=** 0.897 | **K factor**=** 2.523 | **TL(1)=** 1.272 | **LL(1)=**N/A |
| **Statistics-Transformed Background Data** | **X=** -1.238 | **S=** 0.737 | **CV(2)=** -0.595 | **K factor**=** 2.523 | **TL(2)=** 0.622 | **LL(2)=**N/A |

**Historical Background Data from Upgradient Wells with Transformed Result**

Well Number: MW369

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/18/2002 | 1 | 0.000 |
| 4/22/2002 | 0.17 | -1.772 |
| 7/15/2002 | 0.17 | -1.772 |
| 7/8/2003 | 1.15 | 0.140 |
| 10/6/2003 | 0.605 | -0.503 |
| 7/13/2004 | 0.42 | -0.868 |
| 7/20/2005 | 0.28 | -1.273 |
| 4/4/2006 | 0.23 | -1.470 |

Well Number: MW372

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/19/2002 | 1 | 0.000 |
| 4/23/2002 | 0.17 | -1.772 |
| 7/16/2002 | 0.17 | -1.772 |
| 7/9/2003 | 0.17 | -1.772 |
| 10/7/2003 | 0.17 | -1.772 |
| 7/14/2004 | 0.18 | -1.715 |
| 7/21/2005 | 0.17 | -1.772 |
| 4/5/2006 | 0.18 | -1.715 |

**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) |
|---|---|---|---|---|---|---|
| MW357 | Downgradient | No | 0.101 | N/A | -2.293 | N/A |
| MW360 | Downgradient | No | 0.105 | N/A | -2.254 | N/A |
| MW363 | Downgradient | Yes | 0.06 | NO | -2.813 | N/A |
| MW366 | Sidegradient | No | 0.0971 | N/A | -2.332 | N/A |
| MW369 | Upgradient | No | 0.0971 | N/A | -2.332 | N/A |
| MW372 | Upgradient | Yes | 0.0511 | NO | -2.974 | N/A |

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for 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-U Fourth Quarter 2015 Statistical Analysis Historical Background Comparison

## PCB-1242 UNITS: UG/L URGA

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

| | | | | | | |
|---|---|---|---|---|---|---|
| **Statistics-Background Data** | **X=** 0.281 | **S=** 0.383 | **CV(1)=** 1.361 | **K factor**=** 2.523 | **TL(1)=** 1.247 | **LL(1)=**N/A |
| **Statistics-Transformed Background Data** | **X=** -1.835 | **S=** 0.938 | **CV(2)=** -0.511 | **K factor**=** 2.523 | **TL(2)=** 0.532 | **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: MW369

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/18/2002 | 1 | 0.000 |
| 4/22/2002 | 0.11 | -2.207 |
| 7/15/2002 | 0.11 | -2.207 |
| 7/8/2003 | 1.15 | 0.140 |
| 10/6/2003 | 0.09 | -2.408 |
| 7/13/2004 | 0.1 | -2.303 |
| 7/20/2005 | 0.1 | -2.303 |
| 4/4/2006 | 0.1 | -2.303 |

Well Number: MW372

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/19/2002 | 1 | 0.000 |
| 4/23/2002 | 0.11 | -2.207 |
| 7/16/2002 | 0.11 | -2.207 |
| 7/9/2003 | 0.13 | -2.040 |
| 10/7/2003 | 0.09 | -2.408 |
| 7/14/2004 | 0.1 | -2.303 |
| 7/21/2005 | 0.1 | -2.303 |
| 4/5/2006 | 0.1 | -2.303 |

**Current Quarter Data**

| Well No. | Gradient | Detected? | Result | Result >TL(1)? | LN(Result) | LN(Result) >TL(2) |
|---|---|---|---|---|---|---|
| MW357 | Downgradient | No | 0.101 | N/A | -2.293 | N/A |
| MW360 | Downgradient | No | 0.105 | N/A | -2.254 | N/A |
| MW363 | Downgradient | Yes | 0.06 | N/A | -2.813 | NO |
| MW366 | Sidegradient | No | 0.0971 | N/A | -2.332 | N/A |
| MW369 | Upgradient | No | 0.0971 | N/A | -2.332 | N/A |
| MW372 | Upgradient | Yes | 0.0511 | N/A | -2.974 | 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-U Fourth Quarter 2015 Statistical Analysis Historical Background Comparison

## pH UNITS: Std Unit URGA

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

| | | | | | | |
|---|---|---|---|---|---|---|
| **Statistics-Background Data** | **X=** 6.274 | **S=** 0.194 | **CV(1)=** 0.031 | **K factor**=** 2.904 | **TL(1)=** 6.837 | **LL(1)=**5.7114 |
| **Statistics-Transformed Background Data** | **X=** 1.836 | **S=** 0.031 | **CV(2)=** 0.017 | **K factor**=** 2.904 | **TL(2)=** 1.925 | **LL(2)=**1.7467 |

**Historical Background Data from Upgradient Wells with Transformed Result**

Well Number: MW369

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/18/2002 | 6.1 | 1.808 |
| 4/22/2002 | 6.1 | 1.808 |
| 7/15/2002 | 6.1 | 1.808 |
| 10/8/2002 | 6.5 | 1.872 |
| 1/8/2003 | 6.5 | 1.872 |
| 4/3/2003 | 6.6 | 1.887 |
| 7/8/2003 | 6.5 | 1.872 |
| 10/6/2003 | 6.5 | 1.872 |

Well Number: MW372

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/19/2002 | 6.1 | 1.808 |
| 4/23/2002 | 6.12 | 1.812 |
| 7/16/2002 | 6.1 | 1.808 |
| 10/8/2002 | 6.06 | 1.802 |
| 1/7/2003 | 6.26 | 1.834 |
| 4/2/2003 | 6.15 | 1.816 |
| 7/9/2003 | 6.3 | 1.841 |
| 10/7/2003 | 6.4 | 1.856 |

**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)? |
|---|---|---|---|---|---|---|
| MW357 | Downgradient | Yes | 6.18 | NO | 1.821 | N/A |
| MW360 | Downgradient | Yes | 6.55 | NO | 1.879 | N/A |
| MW363 | Downgradient | Yes | 6.18 | NO | 1.821 | N/A |
| MW366 | Sidegradient | Yes | 6.17 | NO | 1.820 | N/A |
| MW369 | Upgradient | Yes | 6.24 | NO | 1.831 | N/A |
| MW372 | Upgradient | Yes | 6.29 | NO | 1.839 | N/A |

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for 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-U Fourth Quarter 2015 Statistical Analysis Historical Background Comparison

## Potassium UNITS: mg/L URGA

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

| | | | | | | |
|---|---|---|---|---|---|---|
| **Statistics-Background Data** | **X=** 1.663 | **S=** 0.488 | **CV(1)=** 0.293 | **K factor**=** 2.523 | **TL(1)=** 2.895 | **LL(1)=**N/A |
| **Statistics-Transformed Background Data** | **X=** 0.456 | **S=** 0.362 | **CV(2)=** 0.794 | **K factor**=** 2.523 | **TL(2)=** 1.368 | **LL(2)=**N/A |

**Historical Background Data from Upgradient Wells with Transformed Result**

Well Number: MW369

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/18/2002 | 2 | 0.693 |
| 4/22/2002 | 2.21 | 0.793 |
| 7/15/2002 | 2 | 0.693 |
| 10/8/2002 | 0.966 | -0.035 |
| 1/8/2003 | 0.727 | -0.319 |
| 4/3/2003 | 0.8 | -0.223 |
| 7/8/2003 | 1.62 | 0.482 |
| 10/6/2003 | 1.14 | 0.131 |

Well Number: MW372

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/19/2002 | 2.04 | 0.713 |
| 4/23/2002 | 2.03 | 0.708 |
| 7/16/2002 | 2 | 0.693 |
| 10/8/2002 | 1.54 | 0.432 |
| 1/7/2003 | 1.88 | 0.631 |
| 4/2/2003 | 2.09 | 0.737 |
| 7/9/2003 | 1.78 | 0.577 |
| 10/7/2003 | 1.79 | 0.582 |

**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) |
|---|---|---|---|---|---|---|
| MW357 | Downgradient | Yes | 1.7 | NO | 0.531 | N/A |
| MW360 | Downgradient | Yes | 0.711 | NO | -0.341 | N/A |
| MW363 | Downgradient | Yes | 1.47 | NO | 0.385 | N/A |
| MW366 | Sidegradient | Yes | 1.84 | NO | 0.610 | N/A |
| MW369 | Upgradient | Yes | 0.554 | NO | -0.591 | N/A |
| MW372 | Upgradient | Yes | 2.42 | NO | 0.884 | N/A |

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for 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-U Fourth Quarter 2015 Statistical Analysis Historical Background Comparison

## Sodium UNITS: mg/L URGA

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

| | | | | | | |
|---|---|---|---|---|---|---|
| **Statistics-Background Data** | **X=** 45.100 | **S=** 11.875 | **CV(1)=** 0.263 | **K factor**=** 2.523 | **TL(1)=** 75.061 | **LL(1)=**N/A |
| **Statistics-Transformed Background Data** | **X=** 3.780 | **S=** 0.242 | **CV(2)=** 0.064 | **K factor**=** 2.523 | **TL(2)=** 4.390 | **LL(2)=**N/A |

**Historical Background Data from Upgradient Wells with Transformed Result**

Well Number: MW369

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/18/2002 | 35.7 | 3.575 |
| 4/22/2002 | 37.6 | 3.627 |
| 7/15/2002 | 42.4 | 3.747 |
| 10/8/2002 | 66.9 | 4.203 |
| 1/8/2003 | 67.9 | 4.218 |
| 4/3/2003 | 61.8 | 4.124 |
| 7/8/2003 | 45.6 | 3.820 |
| 10/6/2003 | 59.1 | 4.079 |

Well Number: MW372

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/19/2002 | 37.2 | 3.616 |
| 4/23/2002 | 38.6 | 3.653 |
| 7/16/2002 | 35.6 | 3.572 |
| 10/8/2002 | 37.5 | 3.624 |
| 1/7/2003 | 34.1 | 3.529 |
| 4/2/2003 | 34.4 | 3.538 |
| 7/9/2003 | 44.1 | 3.786 |
| 10/7/2003 | 43.1 | 3.764 |

**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) |
|---|---|---|---|---|---|---|
| MW357 | Downgradient | Yes | 44.2 | NO | 3.789 | N/A |
| MW360 | Downgradient | Yes | 90.4 | YES | 4.504 | N/A |
| MW363 | Downgradient | Yes | 33.2 | NO | 3.503 | N/A |
| MW366 | Sidegradient | Yes | 41.6 | NO | 3.728 | N/A |
| MW369 | Upgradient | Yes | 48.3 | NO | 3.877 | N/A |
| MW372 | Upgradient | Yes | 58.9 | NO | 4.076 | N/A |

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for 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 Lower Tolerance Limit, which is evidence of elevated concentration with respect to historical background data.**

**Wells with Exceedances**

MW360

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

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

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

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

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

** *Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities,Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-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-U Fourth Quarter 2015 Statistical Analysis Historical Background Comparison

## Sulfate UNITS: mg/L URGA

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

| | | | | | | |
|---|---|---|---|---|---|---|
| **Statistics-Background Data** | **X=** 45.031 | **S=** 33.919 | **CV(1)=** 0.753 | **K factor**=** 2.523 | **TL(1)=** 130.609 | **LL(1)=**N/A |
| **Statistics-Transformed Background Data** | **X=** 3.420 | **S=** 0.981 | **CV(2)=** 0.287 | **K factor**=** 2.523 | **TL(2)=** 5.894 | **LL(2)=**N/A |

**Historical Background Data from Upgradient Wells with Transformed Result**

Well Number: MW369

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/18/2002 | 15.5 | 2.741 |
| 4/22/2002 | 15.8 | 2.760 |
| 7/15/2002 | 13.8 | 2.625 |
| 10/8/2002 | 6.9 | 1.932 |
| 1/8/2003 | 10.5 | 2.351 |
| 4/3/2003 | 10.5 | 2.351 |
| 7/8/2003 | 10.9 | 2.389 |
| 10/6/2003 | 16.3 | 2.791 |

Well Number: MW372

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/19/2002 | 71.7 | 4.272 |
| 4/23/2002 | 74.7 | 4.313 |
| 7/16/2002 | 74.1 | 4.305 |
| 10/8/2002 | 70.5 | 4.256 |
| 1/7/2003 | 75.8 | 4.328 |
| 4/2/2003 | 81.8 | 4.404 |
| 7/9/2003 | 83.6 | 4.426 |
| 10/7/2003 | 88.1 | 4.478 |

**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) |
|---|---|---|---|---|---|---|
| MW357 | Downgradient | Yes | 52 | NO | 3.951 | N/A |
| MW360 | Downgradient | Yes | 29.6 | NO | 3.388 | N/A |
| MW363 | Downgradient | Yes | 23.6 | NO | 3.161 | N/A |
| MW366 | Sidegradient | Yes | 53.4 | NO | 3.978 | N/A |
| MW369 | Upgradient | Yes | 7.89 | NO | 2.066 | N/A |
| MW372 | Upgradient | Yes | 116 | NO | 4.754 | N/A |

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for 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-U Fourth Quarter 2015 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=** 20.821 | **S=** 18.044 | **CV(1)=** 0.867 | **K factor**=** 2.523 | **TL(1)=** 66.344 | **LL(1)=**N/A |
| **Statistics-Transformed Background Data** | **X=** 2.770 | **S=** 1.150 | **CV(2)=** 0.415 | **K factor**=** 2.523 | **TL(2)=** 3.972 | **LL(2)=**N/A |

**Historical Background Data from Upgradient Wells with Transformed Result**

Well Number: MW369

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/18/2002 | 41.7 | 3.731 |
| 4/22/2002 | 53.1 | 3.972 |
| 7/15/2002 | 18.1 | 2.896 |
| 10/8/2002 | 16.4 | 2.797 |
| 1/8/2003 | 3.49 | 1.250 |
| 4/3/2003 | 9.34 | 2.234 |
| 7/8/2003 | 17.5 | 2.862 |
| 10/6/2003 | 17 | 2.833 |

Well Number: MW372

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/19/2002 | 44.8 | 3.802 |
| 4/23/2002 | 0.802 | -0.221 |
| 7/16/2002 | 19.8 | 2.986 |
| 10/8/2002 | 46.1 | 3.831 |
| 1/7/2003 | -0.973 | #Func! |
| 4/2/2003 | 9.07 | 2.205 |
| 7/9/2003 | 0 | #Func! |
| 10/7/2003 | 36.9 | 3.608 |

**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) |
|---|---|---|---|---|---|---|
| MW357 | Downgradient | Yes | 42.5 | NO | 3.750 | N/A |
| MW360 | Downgradient | No | 1.29 | N/A | 0.255 | N/A |
| MW363 | Downgradient | No | 6.6 | N/A | 1.887 | N/A |
| MW366 | Sidegradient | Yes | 48.6 | NO | 3.884 | N/A |
| MW369 | Upgradient | Yes | 46.7 | NO | 3.844 | N/A |
| MW372 | Upgradient | Yes | 89.5 | YES | 4.494 | N/A |

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for 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 Lower 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-U Fourth Quarter 2015 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=** 3.513 | **S=** 4.307 | **CV(1)=** 1.226 | **K factor**=** 2.523 | **TL(1)=** 14.378 | **LL(1)=**N/A |
| **Statistics-Transformed Background Data** | **X=** 0.851 | **S=** 0.828 | **CV(2)=** 0.973 | **K factor**=** 2.523 | **TL(2)=** 2.940 | **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: MW369

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/18/2002 | 1.7 | 0.531 |
| 4/22/2002 | 1.6 | 0.470 |
| 7/15/2002 | 3.1 | 1.131 |
| 10/8/2002 | 17.7 | 2.874 |
| 1/8/2003 | 9 | 2.197 |
| 4/3/2003 | 4 | 1.386 |
| 7/8/2003 | 4.9 | 1.589 |
| 10/6/2003 | 2.4 | 0.875 |

Well Number: MW372

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/19/2002 | 1 | 0.000 |
| 4/23/2002 | 1.2 | 0.182 |
| 7/16/2002 | 1 | 0.000 |
| 10/8/2002 | 1 | 0.000 |
| 1/7/2003 | 1.6 | 0.470 |
| 4/2/2003 | 1.5 | 0.405 |
| 7/9/2003 | 3 | 1.099 |
| 10/7/2003 | 1.5 | 0.405 |

**Current Quarter Data**

| Well No. | Gradient | Detected? | Result | Result >TL(1)? | LN(Result) | LN(Result) >TL(2) |
|---|---|---|---|---|---|---|
| MW357 | Downgradient | Yes | 0.644 | N/A | -0.440 | NO |
| MW360 | Downgradient | Yes | 2.02 | N/A | 0.703 | NO |
| MW363 | Downgradient | Yes | 0.831 | N/A | -0.185 | NO |
| MW366 | Sidegradient | Yes | 0.836 | N/A | -0.179 | NO |
| MW369 | Upgradient | Yes | 1.12 | N/A | 0.113 | NO |
| MW372 | Upgradient | Yes | 1.91 | N/A | 0.647 | 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-U Fourth Quarter 2015 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=** 67.963 | **S=** 64.316 | **CV(1)=** 0.946 | **K factor**=** 2.523 | **TL(1)=** 230.231 | **LL(1)=**N/A |
| **Statistics-Transformed Background Data** | **X=** 3.772 | **S=** 1.023 | **CV(2)=** 0.271 | **K factor**=** 2.523 | **TL(2)=** 6.353 | **LL(2)=**N/A |

**Historical Background Data from Upgradient Wells with Transformed Result**

Well Number: MW369

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/18/2002 | 50 | 3.912 |
| 4/22/2002 | 50 | 3.912 |
| 7/15/2002 | 81 | 4.394 |
| 10/8/2002 | 202 | 5.308 |
| 1/8/2003 | 177 | 5.176 |
| 4/3/2003 | 93.1 | 4.534 |
| 7/8/2003 | 17.5 | 2.862 |
| 10/6/2003 | 37.5 | 3.624 |

Well Number: MW372

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/19/2002 | 184 | 5.215 |
| 4/23/2002 | 50 | 3.912 |
| 7/16/2002 | 50 | 3.912 |
| 10/8/2002 | 50 | 3.912 |
| 1/7/2003 | 10 | 2.303 |
| 4/2/2003 | 12.7 | 2.542 |
| 7/9/2003 | 10 | 2.303 |
| 10/7/2003 | 12.6 | 2.534 |

**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) |
|---|---|---|---|---|---|---|
| MW357 | Downgradient | No | 6.86 | N/A | 1.926 | N/A |
| MW360 | Downgradient | No | 21.8 | N/A | 3.082 | N/A |
| MW363 | Downgradient | Yes | 7.38 | NO | 1.999 | N/A |
| MW366 | Sidegradient | Yes | 5.24 | NO | 1.656 | N/A |
| MW369 | Upgradient | Yes | 18.7 | NO | 2.929 | N/A |
| MW372 | Upgradient | Yes | 13.8 | NO | 2.625 | N/A |

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for 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-U Fourth Quarter 2015 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=** 5.625 | **S=** 3.594 | **CV(1)=** 0.639 | **K factor**=** 2.523 | **TL(1)=** 14.693 | **LL(1)=**N/A |
| **Statistics-Transformed Background Data** | **X=** 1.571 | **S=** 0.565 | **CV(2)=** 0.360 | **K factor**=** 2.523 | **TL(2)=** 2.995 | **LL(2)=**N/A |

**Historical Background Data from Upgradient Wells with Transformed Result**

Well Number: MW369

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/18/2002 | 11 | 2.398 |
| 4/22/2002 | 16 | 2.773 |
| 7/15/2002 | 8 | 2.079 |
| 10/8/2002 | 3 | 1.099 |
| 1/8/2003 | 2 | 0.693 |
| 4/3/2003 | 3 | 1.099 |
| 7/8/2003 | 3 | 1.099 |
| 10/6/2003 | 2 | 0.693 |

Well Number: MW372

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/19/2002 | 5 | 1.609 |
| 4/23/2002 | 5 | 1.609 |
| 7/16/2002 | 4 | 1.386 |
| 10/8/2002 | 6 | 1.792 |
| 1/7/2003 | 5 | 1.609 |
| 4/2/2003 | 6 | 1.792 |
| 7/9/2003 | 5 | 1.609 |
| 10/7/2003 | 6 | 1.792 |

**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) |
|---|---|---|---|---|---|---|
| MW357 | Downgradient | Yes | 5.78 | NO | 1.754 | N/A |
| MW360 | Downgradient | No | 1 | N/A | 0.000 | N/A |
| MW363 | Downgradient | Yes | 0.91 | N/A | -0.094 | N/A |
| MW366 | Sidegradient | Yes | 3.83 | N/A | 1.343 | N/A |
| MW369 | Upgradient | Yes | 1.23 | N/A | 0.207 | N/A |
| MW372 | Upgradient | Yes | 9.18 | NO | 2.217 | N/A |

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for 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-U Fourth Quarter 2015 Statistical Analysis Historical Background Comparison

## Uranium 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=** 0.001 | **S=** 0.001 | **CV(1)=** 0.917 | **K factor**=** 2.523 | **TL(1)=** 0.005 | **LL(1)=**N/A |
| **Statistics-Transformed Background Data** | **X=** -6.718 | **S=** 0.528 | **CV(2)=** -0.079 | **K factor**=** 2.523 | **TL(2)=** -5.385 | **LL(2)=**N/A |

**Historical Background Data from Upgradient Wells with Transformed Result**

Well Number: MW369

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/18/2002 | 0.001 | -6.908 |
| 4/22/2002 | 0.001 | -6.908 |
| 7/15/2002 | 0.001 | -6.908 |
| 10/8/2002 | 0.00355 | -5.641 |
| 1/8/2003 | 0.001 | -6.908 |
| 4/3/2003 | 0.001 | -6.908 |
| 7/8/2003 | 0.001 | -6.908 |
| 10/6/2003 | 0.001 | -6.908 |

Well Number: MW372

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/19/2002 | 0.001 | -6.908 |
| 4/23/2002 | 0.001 | -6.908 |
| 7/16/2002 | 0.001 | -6.908 |
| 10/8/2002 | 0.00591 | -5.131 |
| 1/7/2003 | 0.001 | -6.908 |
| 4/2/2003 | 0.001 | -6.908 |
| 7/9/2003 | 0.001 | -6.908 |
| 10/7/2003 | 0.001 | -6.908 |

**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) |
|---|---|---|---|---|---|---|
| MW357 | Downgradient | No | 0.0002 | N/A | -8.517 | N/A |
| MW360 | Downgradient | Yes | 0.000348 | NO | -7.963 | N/A |
| MW363 | Downgradient | No | 0.0002 | N/A | -8.517 | N/A |
| MW366 | Sidegradient | No | 0.0002 | N/A | -8.517 | N/A |
| MW369 | Upgradient | No | 0.0002 | N/A | -8.517 | N/A |
| MW372 | Upgradient | No | 0.0002 | N/A | -8.517 | N/A |

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

**Conclusion of Statistical Analysis on Historical Data**

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

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

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

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

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

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

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

# C-746-U Fourth Quarter 2015 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=** 2.026 | **S=** 5.626 | **CV(1)=** 2.777 | **K factor**=** 2.523 | **TL(1)=** 16.219 | **LL(1)=**N/A |
| **Statistics-Transformed Background Data** | **X=** -0.803 | **S=** 1.380 | **CV(2)=** -1.718 | **K factor**=** 2.523 | **TL(2)=** 2.678 | **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: MW370

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/17/2002 | 4.66 | 1.539 |
| 4/23/2002 | 0.2 | -1.609 |
| 7/15/2002 | 0.2 | -1.609 |
| 10/8/2002 | 0.2 | -1.609 |
| 1/8/2003 | 0.2 | -1.609 |
| 4/3/2003 | 0.2 | -1.609 |
| 7/9/2003 | 0.2 | -1.609 |
| 10/6/2003 | 0.2 | -1.609 |

Well Number: MW373

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/18/2002 | 22.7 | 3.122 |
| 4/23/2002 | 1.46 | 0.378 |
| 7/16/2002 | 0.253 | -1.374 |
| 10/8/2002 | 0.482 | -0.730 |
| 1/7/2003 | 0.608 | -0.498 |
| 4/2/2003 | 0.446 | -0.807 |
| 7/9/2003 | 0.2 | -1.609 |
| 10/7/2003 | 0.2 | -1.609 |

**Current Quarter Data**

| Well No. | Gradient | Detected? | Result | Result >TL(1)? | LN(Result) | LN(Result) >TL(2) |
|---|---|---|---|---|---|---|
| MW358 | Downgradient | No | 0.05 | N/A | -2.996 | N/A |
| MW361 | Downgradient | No | 0.05 | N/A | -2.996 | N/A |
| MW364 | Downgradient | Yes | 0.0159 | N/A | -4.141 | NO |
| MW367 | Sidegradient | Yes | 0.0332 | N/A | -3.405 | NO |
| MW370 | Upgradient | No | 0.05 | N/A | -2.996 | N/A |
| MW373 | 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.*

# C-746-U Fourth Quarter 2015 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=** 9.815 | **S=** 7.838 | **CV(1)=** 0.799 | **K factor**=** 2.523 | **TL(1)=** 29.591 | **LL(1)=**N/A |
| **Statistics-Transformed Background Data** | **X=** 2.072 | **S=** 0.630 | **CV(2)=** 0.304 | **K factor**=** 2.523 | **TL(2)=** 3.662 | **LL(2)=**N/A |

**Historical Background Data from Upgradient Wells with Transformed Result**

Well Number: MW370

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/17/2002 | 10.1 | 2.313 |
| 4/23/2002 | 4.46 | 1.495 |
| 7/15/2002 | 6.58 | 1.884 |
| 10/8/2002 | 4.9 | 1.589 |
| 1/8/2003 | 4.47 | 1.497 |
| 4/3/2003 | 8.65 | 2.158 |
| 7/9/2003 | 3.66 | 1.297 |
| 10/6/2003 | 5.38 | 1.683 |

Well Number: MW373

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/18/2002 | 15.1 | 2.715 |
| 4/23/2002 | 6.26 | 1.834 |
| 7/16/2002 | 6.22 | 1.828 |
| 10/8/2002 | 4.06 | 1.401 |
| 1/7/2003 | 11.2 | 2.416 |
| 4/2/2003 | 18.5 | 2.918 |
| 7/9/2003 | 13.3 | 2.588 |
| 10/7/2003 | 34.2 | 3.532 |

**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) |
|---|---|---|---|---|---|---|
| MW358 | Downgradient | Yes | 51 | YES | 3.932 | N/A |
| MW361 | Downgradient | Yes | 30.8 | N/A | 3.428 | N/A |
| MW364 | Downgradient | Yes | 30.2 | N/A | 3.408 | N/A |
| MW367 | Sidegradient | No | 3.61 | N/A | 1.284 | N/A |
| MW370 | Upgradient | Yes | 33.1 | N/A | 3.500 | N/A |
| MW373 | Upgradient | Yes | 10.7 | N/A | 2.370 | N/A |

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for 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 Lower Tolerance Limit, which is evidence of elevated concentration with respect to historical background data.**

**Wells with Exceedances**

MW358

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

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

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

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

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

** *Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities,Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-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-U Fourth Quarter 2015 Statistical Analysis Historical Background Comparison

## Boron UNITS: mg/L LRGA

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

| | | | | | | |
|---|---|---|---|---|---|---|
| **Statistics-Background Data** | **X=** 1.140 | **S=** 0.780 | **CV(1)=** 0.684 | **K factor**=** 2.523 | **TL(1)=** 3.108 | **LL(1)=**N/A |
| **Statistics-Transformed Background Data** | **X=** -0.235 | **S=** 1.006 | **CV(2)=** -4.287 | **K factor**=** 2.523 | **TL(2)=** 2.303 | **LL(2)=**N/A |

**Historical Background Data from Upgradient Wells with Transformed Result**

Well Number: MW370

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/17/2002 | 2 | 0.693 |
| 4/23/2002 | 2 | 0.693 |
| 7/15/2002 | 2 | 0.693 |
| 10/8/2002 | 0.2 | -1.609 |
| 1/8/2003 | 0.2 | -1.609 |
| 4/3/2003 | 0.2 | -1.609 |
| 7/9/2003 | 0.2 | -1.609 |
| 10/6/2003 | 0.2 | -1.609 |

Well Number: MW373

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/18/2002 | 2 | 0.693 |
| 4/23/2002 | 2 | 0.693 |
| 7/16/2002 | 2 | 0.693 |
| 10/8/2002 | 0.79 | -0.236 |
| 1/7/2003 | 0.807 | -0.214 |
| 4/2/2003 | 1.13 | 0.122 |
| 7/9/2003 | 1.28 | 0.247 |
| 10/7/2003 | 1.24 | 0.215 |

**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) |
|---|---|---|---|---|---|---|
| MW358 | Downgradient | Yes | 0.486 | NO | -0.722 | N/A |
| MW361 | Downgradient | Yes | 0.176 | NO | -1.737 | N/A |
| MW364 | Downgradient | Yes | 0.0126 | NO | -4.374 | N/A |
| MW367 | Sidegradient | Yes | 0.0202 | NO | -3.902 | N/A |
| MW370 | Upgradient | Yes | 0.0328 | NO | -3.417 | N/A |
| MW373 | Upgradient | Yes | 1.75 | NO | 0.560 | N/A |

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for 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-U Fourth Quarter 2015 Statistical Analysis Historical Background Comparison

## Bromide UNITS: mg/L LRGA

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

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

**Historical Background Data from Upgradient Wells with Transformed Result**

Well Number: MW370

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/17/2002 | 1 | 0.000 |
| 4/23/2002 | 1 | 0.000 |
| 7/15/2002 | 1 | 0.000 |
| 10/8/2002 | 1 | 0.000 |
| 1/8/2003 | 1 | 0.000 |
| 4/3/2003 | 1 | 0.000 |
| 7/9/2003 | 1 | 0.000 |
| 10/6/2003 | 1 | 0.000 |

Well Number: MW373

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/18/2002 | 1 | 0.000 |
| 4/23/2002 | 1 | 0.000 |
| 7/16/2002 | 1 | 0.000 |
| 10/8/2002 | 1 | 0.000 |
| 1/7/2003 | 1 | 0.000 |
| 4/2/2003 | 1 | 0.000 |
| 7/9/2003 | 1 | 0.000 |
| 10/7/2003 | 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) |
|---|---|---|---|---|---|---|
| MW358 | Downgradient | Yes | 0.482 | NO | -0.730 | N/A |
| MW361 | Downgradient | Yes | 0.434 | NO | -0.835 | N/A |
| MW364 | Downgradient | Yes | 0.391 | NO | -0.939 | N/A |
| MW367 | Sidegradient | Yes | 0.132 | NO | -2.025 | N/A |
| MW370 | Upgradient | No | 0.2 | N/A | -1.609 | N/A |
| MW373 | Upgradient | Yes | 0.575 | NO | -0.553 | N/A |

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

**Conclusion of Statistical Analysis on Historical Data**

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

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

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

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

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

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

** *Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities,Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-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-U Fourth Quarter 2015 Statistical Analysis Historical Background Comparison

## Calcium UNITS: mg/L LRGA

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

| | | | | | | |
|---|---|---|---|---|---|---|
| **Statistics-Background Data** | **X=** 43.413 | **S=** 13.444 | **CV(1)=** 0.310 | **K factor**=** 2.523 | **TL(1)=** 77.331 | **LL(1)=**N/A |
| **Statistics-Transformed Background Data** | **X=** 3.723 | **S=** 0.323 | **CV(2)=** 0.087 | **K factor**=** 2.523 | **TL(2)=** 4.539 | **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: MW370

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/17/2002 | 34.8 | 3.550 |
| 4/23/2002 | 43.4 | 3.770 |
| 7/15/2002 | 33.2 | 3.503 |
| 10/8/2002 | 29.2 | 3.374 |
| 1/8/2003 | 31.3 | 3.444 |
| 4/3/2003 | 32.4 | 3.478 |
| 7/9/2003 | 22.9 | 3.131 |
| 10/6/2003 | 28 | 3.332 |

Well Number: MW373

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/18/2002 | 61.9 | 4.126 |
| 4/23/2002 | 59.2 | 4.081 |
| 7/16/2002 | 47.6 | 3.863 |
| 10/8/2002 | 46.1 | 3.831 |
| 1/7/2003 | 49.2 | 3.896 |
| 4/2/2003 | 57.8 | 4.057 |
| 7/9/2003 | 52.7 | 3.965 |
| 10/7/2003 | 64.9 | 4.173 |

**Current Quarter Data**

| Well No. | Gradient | Detected? | Result | Result >TL(1)? | LN(Result) | LN(Result) >TL(2) |
|---|---|---|---|---|---|---|
| MW358 | Downgradient | Yes | 33.5 | NO | 3.512 | N/A |
| MW361 | Downgradient | Yes | 29.6 | NO | 3.388 | N/A |
| MW364 | Downgradient | Yes | 28.7 | NO | 3.357 | N/A |
| MW367 | Sidegradient | Yes | 14.6 | NO | 2.681 | N/A |
| MW370 | Upgradient | Yes | 27.3 | NO | 3.307 | N/A |
| MW373 | Upgradient | Yes | 71.8 | NO | 4.274 | N/A |

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for 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-U Fourth Quarter 2015 Statistical Analysis Historical Background Comparison

## Chemical Oxygen Demand (COD) UNITS: mg/L LRGA

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

| | | | | | | |
|---|---|---|---|---|---|---|
| **Statistics-Background Data** | **X=** 41.938 | **S=** 24.732 | **CV(1)=** 0.590 | **K factor**=** 2.523 | **TL(1)=** 104.336 | **LL(1)=**N/A |
| **Statistics-Transformed Background Data** | **X=** 3.658 | **S=** 0.339 | **CV(2)=** 0.093 | **K factor**=** 2.523 | **TL(2)=** 4.512 | **LL(2)=**N/A |

**Historical Background Data from Upgradient Wells with Transformed Result**

Well Number: MW370

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/17/2002 | 35 | 3.555 |
| 4/23/2002 | 134 | 4.898 |
| 7/15/2002 | 35 | 3.555 |
| 10/8/2002 | 35 | 3.555 |
| 1/8/2003 | 35 | 3.555 |
| 4/3/2003 | 35 | 3.555 |
| 7/9/2003 | 35 | 3.555 |
| 10/6/2003 | 35 | 3.555 |

Well Number: MW373

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/18/2002 | 35 | 3.555 |
| 4/23/2002 | 47 | 3.850 |
| 7/16/2002 | 35 | 3.555 |
| 10/8/2002 | 35 | 3.555 |
| 1/7/2003 | 35 | 3.555 |
| 4/2/2003 | 35 | 3.555 |
| 7/9/2003 | 35 | 3.555 |
| 10/7/2003 | 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) |
|---|---|---|---|---|---|---|
| MW358 | Downgradient | Yes | 8.68 | NO | 2.161 | N/A |
| MW361 | Downgradient | No | 20 | N/A | 2.996 | N/A |
| MW364 | Downgradient | No | 20 | N/A | 2.996 | N/A |
| MW367 | Sidegradient | No | 20 | N/A | 2.996 | N/A |
| MW370 | Upgradient | Yes | 31.1 | NO | 3.437 | N/A |
| MW373 | Upgradient | No | 20 | N/A | 2.996 | N/A |

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

**Conclusion of Statistical Analysis on Historical Data**

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

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

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

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

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

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

** *Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities,Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-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-U Fourth Quarter 2015 Statistical Analysis Historical Background Comparison

## Chloride UNITS: mg/L LRGA

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

| | | | | | | |
|---|---|---|---|---|---|---|
| **Statistics-Background Data** | **X=** 45.919 | **S=** 7.524 | **CV(1)=** 0.164 | **K factor**=** 2.523 | **TL(1)=** 64.901 | **LL(1)=**N/A |
| **Statistics-Transformed Background Data** | **X=** 3.814 | **S=** 0.165 | **CV(2)=** 0.043 | **K factor**=** 2.523 | **TL(2)=** 4.231 | **LL(2)=**N/A |

**Historical Background Data from Upgradient Wells with Transformed Result**

Well Number: MW370

| Date Collected | Result | LN(Result) |
|---|---|---|
| 7/15/2002 | 55.5 | 4.016 |
| 10/8/2002 | 53.6 | 3.982 |
| 1/8/2003 | 52.9 | 3.968 |
| 4/3/2003 | 53.6 | 3.982 |
| 7/9/2003 | 51.9 | 3.949 |
| 10/6/2003 | 53 | 3.970 |
| 1/7/2004 | 53 | 3.970 |
| 4/7/2004 | 51.6 | 3.944 |

Well Number: MW373

| Date Collected | Result | LN(Result) |
|---|---|---|
| 7/16/2002 | 40.6 | 3.704 |
| 10/8/2002 | 38.8 | 3.658 |
| 1/7/2003 | 39 | 3.664 |
| 4/2/2003 | 38.4 | 3.648 |
| 7/9/2003 | 38.1 | 3.640 |
| 10/7/2003 | 38 | 3.638 |
| 1/6/2004 | 37.9 | 3.635 |
| 4/7/2004 | 38.8 | 3.658 |

**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) |
|---|---|---|---|---|---|---|
| MW358 | Downgradient | Yes | 35.3 | NO | 3.564 | N/A |
| MW361 | Downgradient | Yes | 31.1 | NO | 3.437 | N/A |
| MW364 | Downgradient | Yes | 31.6 | NO | 3.453 | N/A |
| MW367 | Sidegradient | Yes | 9.39 | NO | 2.240 | N/A |
| MW370 | Upgradient | Yes | 5.57 | NO | 1.717 | N/A |
| MW373 | Upgradient | Yes | 48.6 | NO | 3.884 | N/A |

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for 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-U Fourth Quarter 2015 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=** 0.027 | **S=** 0.032 | **CV(1)=** 1.165 | **K factor**=** 2.523 | **TL(1)=** 0.108 | **LL(1)=**N/A |
| **Statistics-Transformed Background Data** | **X=** -4.058 | **S=** 1.011 | **CV(2)=** -0.249 | **K factor**=** 2.523 | **TL(2)=** -1.507 | **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: MW370

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/17/2002 | 0.025 | -3.689 |
| 4/23/2002 | 0.025 | -3.689 |
| 7/15/2002 | 0.025 | -3.689 |
| 10/8/2002 | 0.0174 | -4.051 |
| 1/8/2003 | 0.0105 | -4.556 |
| 4/3/2003 | 0.00931 | -4.677 |
| 7/9/2003 | 0.137 | -1.988 |
| 10/6/2003 | 0.0463 | -3.073 |

Well Number: MW373

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/18/2002 | 0.025 | -3.689 |
| 4/23/2002 | 0.034 | -3.381 |
| 7/16/2002 | 0.025 | -3.689 |
| 10/8/2002 | 0.00411 | -5.494 |
| 1/7/2003 | 0.00344 | -5.672 |
| 4/2/2003 | 0.00368 | -5.605 |
| 7/9/2003 | 0.0405 | -3.206 |
| 10/7/2003 | 0.00843 | -4.776 |

**Current Quarter Data**

| Well No. | Gradient | Detected? | Result | Result >TL(1)? | LN(Result) | LN(Result) >TL(2) |
|---|---|---|---|---|---|---|
| MW358 | Downgradient | Yes | 0.000656 | N/A | -7.329 | NO |
| MW361 | Downgradient | Yes | 0.000438 | N/A | -7.733 | NO |
| MW364 | Downgradient | Yes | 0.000529 | N/A | -7.545 | NO |
| MW367 | Sidegradient | Yes | 0.00587 | N/A | -5.138 | NO |
| MW370 | Upgradient | Yes | 0.000578 | N/A | -7.456 | NO |
| MW373 | Upgradient | Yes | 0.000271 | N/A | -8.213 | 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-U Fourth Quarter 2015 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=** 608.719 **S=** 156.157 **CV(1)=** 0.257 **K factor**=** 2.523 **TL(1)=** 1002.702 **LL(1)=**N/A

**Statistics-Transformed Background Data** **X=** 6.380 **S=** 0.260 **CV(2)=** 0.041 **K factor**=** 2.523 **TL(2)=** 7.036 **LL(2)=**N/A

**Historical Background Data from Upgradient Wells with Transformed Result**

Well Number: MW370

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/17/2002 | 406 | 6.006 |
| 4/23/2002 | 543 | 6.297 |
| 7/15/2002 | 476 | 6.165 |
| 10/8/2002 | 441 | 6.089 |
| 1/8/2003 | 486 | 6.186 |
| 4/3/2003 | 466 | 6.144 |
| 7/9/2003 | 479 | 6.172 |
| 10/6/2003 | 435 | 6.075 |

Well Number: MW373

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/18/2002 | 661 | 6.494 |
| 4/23/2002 | 801 | 6.686 |
| 7/16/2002 | 774 | 6.652 |
| 10/8/2002 | 680 | 6.522 |
| 1/7/2003 | 686.5 | 6.532 |
| 4/2/2003 | 763 | 6.637 |
| 7/9/2003 | 828 | 6.719 |
| 10/7/2003 | 814 | 6.702 |

**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) |
|---|---|---|---|---|---|---|
| MW358 | Downgradient | Yes | 499 | NO | 6.213 | N/A |
| MW361 | Downgradient | Yes | 472 | NO | 6.157 | N/A |
| MW364 | Downgradient | Yes | 456 | NO | 6.122 | N/A |
| MW367 | Sidegradient | Yes | 281 | NO | 5.638 | N/A |
| MW370 | Upgradient | Yes | 432 | NO | 6.068 | N/A |
| MW373 | Upgradient | Yes | 849 | NO | 6.744 | N/A |

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for 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-U Fourth Quarter 2015 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=** 0.025 | **S=** 0.010 | **CV(1)=** 0.399 | **K factor**=** 2.523 | **TL(1)=** 0.050 | **LL(1)=**N/A |
| **Statistics-Transformed Background Data** | **X=** -3.739 | **S=** 0.308 | **CV(2)=** -0.082 | **K factor**=** 2.523 | **TL(2)=** -2.963 | **LL(2)=**N/A |

**Historical Background Data from Upgradient Wells with Transformed Result**

Well Number: MW370

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/17/2002 | 0.025 | -3.689 |
| 4/23/2002 | 0.025 | -3.689 |
| 7/15/2002 | 0.05 | -2.996 |
| 10/8/2002 | 0.02 | -3.912 |
| 1/8/2003 | 0.02 | -3.912 |
| 4/3/2003 | 0.02 | -3.912 |
| 7/9/2003 | 0.02 | -3.912 |
| 10/6/2003 | 0.02 | -3.912 |

Well Number: MW373

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/18/2002 | 0.026 | -3.650 |
| 4/23/2002 | 0.025 | -3.689 |
| 7/16/2002 | 0.05 | -2.996 |
| 10/8/2002 | 0.02 | -3.912 |
| 1/7/2003 | 0.02 | -3.912 |
| 4/2/2003 | 0.02 | -3.912 |
| 7/9/2003 | 0.02 | -3.912 |
| 10/7/2003 | 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) |
|---|---|---|---|---|---|---|
| MW358 | Downgradient | Yes | 0.000466 | NO | -7.671 | N/A |
| MW361 | Downgradient | Yes | 0.000609 | NO | -7.404 | N/A |
| MW364 | Downgradient | Yes | 0.000578 | NO | -7.456 | N/A |
| MW367 | Sidegradient | Yes | 0.000467 | NO | -7.669 | N/A |
| MW370 | Upgradient | Yes | 0.000816 | NO | -7.111 | N/A |
| MW373 | Upgradient | Yes | 0.00048 | NO | -7.642 | N/A |

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for 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-U Fourth Quarter 2015 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=** 1.387 | **S=** 1.153 | **CV(1)=** 0.831 | **K factor**=** 2.523 | **TL(1)=** 4.295 | **LL(1)=**N/A |
| **Statistics-Transformed Background Data** | **X=** -0.115 | **S=** 1.207 | **CV(2)=** -10.514 | **K factor**=** 2.523 | **TL(2)=** 2.930 | **LL(2)=**N/A |

**Historical Background Data from Upgradient Wells with Transformed Result**

Well Number: MW370

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/17/2002 | 4.32 | 1.463 |
| 4/23/2002 | 1.24 | 0.215 |
| 7/15/2002 | 0.75 | -0.288 |
| 10/8/2002 | 0.94 | -0.062 |
| 1/8/2003 | 3.08 | 1.125 |
| 4/3/2003 | 1.45 | 0.372 |
| 7/9/2003 | 1.22 | 0.199 |
| 10/6/2003 | 1.07 | 0.068 |

Well Number: MW373

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/18/2002 | 3.04 | 1.112 |
| 4/23/2002 | 0.03 | -3.507 |
| 7/16/2002 | 0.23 | -1.470 |
| 10/8/2002 | 0.86 | -0.151 |
| 1/7/2003 | 0.21 | -1.561 |
| 4/2/2003 | 1.19 | 0.174 |
| 7/9/2003 | 1.1 | 0.095 |
| 10/7/2003 | 1.46 | 0.378 |

**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) |
|---|---|---|---|---|---|---|
| MW358 | Downgradient | Yes | 1.89 | NO | 0.637 | N/A |
| MW361 | Downgradient | Yes | 2.99 | NO | 1.095 | N/A |
| MW364 | Downgradient | Yes | 2.52 | NO | 0.924 | N/A |
| MW367 | Sidegradient | Yes | 1.44 | NO | 0.365 | N/A |
| MW370 | Upgradient | Yes | 4.29 | NO | 1.456 | N/A |
| MW373 | Upgradient | Yes | 1.99 | NO | 0.688 | N/A |

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for 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-U Fourth Quarter 2015 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=** 356.188 **S=** 106.752 **CV(1)=** 0.300 **K factor**=** 2.523 **TL(1)=** 625.523 **LL(1)=**N/A

**Statistics-Transformed Background Data** **X=** 5.831 **S=** 0.311 **CV(2)=** 0.053 **K factor**=** 2.523 **TL(2)=** 6.616 **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: MW370

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/17/2002 | 236 | 5.464 |
| 4/23/2002 | 337 | 5.820 |
| 7/15/2002 | 266 | 5.583 |
| 10/8/2002 | 240 | 5.481 |
| 1/8/2003 | 282 | 5.642 |
| 4/3/2003 | 238 | 5.472 |
| 7/9/2003 | 248 | 5.513 |
| 10/6/2003 | 224 | 5.412 |

Well Number: MW373

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/18/2002 | 427 | 6.057 |
| 4/23/2002 | 507 | 6.229 |
| 7/16/2002 | 464 | 6.140 |
| 10/8/2002 | 408 | 6.011 |
| 1/7/2003 | 404 | 6.001 |
| 4/2/2003 | 450 | 6.109 |
| 7/9/2003 | 487 | 6.188 |
| 10/7/2003 | 481 | 6.176 |

**Current Quarter Data**

| Well No. | Gradient | Detected? | Result | Result >TL(1)? | LN(Result) | LN(Result) >TL(2) |
|---|---|---|---|---|---|---|
| MW358 | Downgradient | Yes | 257 | NO | 5.549 | N/A |
| MW361 | Downgradient | Yes | 229 | NO | 5.434 | N/A |
| MW364 | Downgradient | Yes | 221 | NO | 5.398 | N/A |
| MW367 | Sidegradient | Yes | 136 | NO | 4.913 | N/A |
| MW370 | Upgradient | Yes | 414 | NO | 6.026 | N/A |
| MW373 | Upgradient | Yes | 480 | NO | 6.174 | N/A |

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for 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-U Fourth Quarter 2015 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=** 9.230 | **S=** 8.841 | **CV(1)=** 0.958 | **K factor**=** 2.523 | **TL(1)=** 31.535 | **LL(1)=**N/A |
| **Statistics-Transformed Background Data** | **X=** 1.942 | **S=** 0.713 | **CV(2)=** 0.367 | **K factor**=** 2.523 | **TL(2)=** 3.740 | **LL(2)=**N/A |

**Historical Background Data from Upgradient Wells with Transformed Result**

Well Number: MW370

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/17/2002 | 9.34 | 2.234 |
| 4/23/2002 | 4.33 | 1.466 |
| 7/15/2002 | 3.52 | 1.258 |
| 10/8/2002 | 7.45 | 2.008 |
| 1/8/2003 | 7.04 | 1.952 |
| 4/3/2003 | 4.64 | 1.535 |
| 7/9/2003 | 15.8 | 2.760 |
| 10/6/2003 | 6.49 | 1.870 |

Well Number: MW373

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/18/2002 | 37.6 | 3.627 |
| 4/23/2002 | 19 | 2.944 |
| 7/16/2002 | 10.7 | 2.370 |
| 10/8/2002 | 3.75 | 1.322 |
| 1/7/2003 | 3.87 | 1.353 |
| 4/2/2003 | 3.5 | 1.253 |
| 7/9/2003 | 7.72 | 2.044 |
| 10/7/2003 | 2.93 | 1.075 |

**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) |
|---|---|---|---|---|---|---|
| MW358 | Downgradient | Yes | 1.06 | NO | 0.058 | N/A |
| MW361 | Downgradient | Yes | 0.0398 | NO | -3.224 | N/A |
| MW364 | Downgradient | Yes | 0.161 | NO | -1.826 | N/A |
| MW367 | Sidegradient | Yes | 12.6 | NO | 2.534 | N/A |
| MW370 | Upgradient | No | 0.1 | N/A | -2.303 | N/A |
| MW373 | Upgradient | No | 0.1 | N/A | -2.303 | N/A |

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

**Conclusion of Statistical Analysis on Historical Data**

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

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

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

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

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

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

** *Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities,Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-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-U Fourth Quarter 2015 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=** 17.544 | **S=** 5.911 | **CV(1)=** 0.337 | **K factor**=** 2.523 | **TL(1)=** 32.458 | **LL(1)=**N/A |
| **Statistics-Transformed Background Data** | **X=** 2.810 | **S=** 0.343 | **CV(2)=** 0.122 | **K factor**=** 2.523 | **TL(2)=** 3.676 | **LL(2)=**N/A |

**Historical Background Data from Upgradient Wells with Transformed Result**

Well Number: MW370

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/17/2002 | 12.1 | 2.493 |
| 4/23/2002 | 15.1 | 2.715 |
| 7/15/2002 | 12.4 | 2.518 |
| 10/8/2002 | 12.2 | 2.501 |
| 1/8/2003 | 11.5 | 2.442 |
| 4/3/2003 | 12.3 | 2.510 |
| 7/9/2003 | 10 | 2.303 |
| 10/6/2003 | 12.1 | 2.493 |

Well Number: MW373

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/18/2002 | 24.8 | 3.211 |
| 4/23/2002 | 22.7 | 3.122 |
| 7/16/2002 | 18.8 | 2.934 |
| 10/8/2002 | 21.1 | 3.049 |
| 1/7/2003 | 19.9 | 2.991 |
| 4/2/2003 | 25.5 | 3.239 |
| 7/9/2003 | 23.3 | 3.148 |
| 10/7/2003 | 26.9 | 3.292 |

**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) |
|---|---|---|---|---|---|---|
| MW358 | Downgradient | Yes | 16.1 | NO | 2.779 | N/A |
| MW361 | Downgradient | Yes | 14.1 | NO | 2.646 | N/A |
| MW364 | Downgradient | Yes | 12.1 | NO | 2.493 | N/A |
| MW367 | Sidegradient | Yes | 7.97 | NO | 2.076 | N/A |
| MW370 | Upgradient | Yes | 11.6 | NO | 2.451 | N/A |
| MW373 | Upgradient | Yes | 26.1 | NO | 3.262 | N/A |

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for 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-U Fourth Quarter 2015 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=** 1.080 | **S=** 0.674 | **CV(1)=** 0.624 | **K factor**=** 2.523 | **TL(1)=** 2.780 | **LL(1)=**N/A |
| **Statistics-Transformed Background Data** | **X=** -0.114 | **S=** 0.658 | **CV(2)=** -5.762 | **K factor**=** 2.523 | **TL(2)=** 1.547 | **LL(2)=**N/A |

**Historical Background Data from Upgradient Wells with Transformed Result**

Well Number: MW370

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/17/2002 | 0.244 | -1.411 |
| 4/23/2002 | 1.82 | 0.599 |
| 7/15/2002 | 1.22 | 0.199 |
| 10/8/2002 | 0.988 | -0.012 |
| 1/8/2003 | 0.729 | -0.316 |
| 4/3/2003 | 0.637 | -0.451 |
| 7/9/2003 | 2.51 | 0.920 |
| 10/6/2003 | 1.05 | 0.049 |

Well Number: MW373

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/18/2002 | 0.355 | -1.036 |
| 4/23/2002 | 2.16 | 0.770 |
| 7/16/2002 | 1.39 | 0.329 |
| 10/8/2002 | 0.717 | -0.333 |
| 1/7/2003 | 0.587 | -0.533 |
| 4/2/2003 | 0.545 | -0.607 |
| 7/9/2003 | 1.76 | 0.565 |
| 10/7/2003 | 0.57 | -0.562 |

**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) |
|---|---|---|---|---|---|---|
| MW358 | Downgradient | Yes | 0.143 | NO | -1.945 | N/A |
| MW361 | Downgradient | Yes | 0.0287 | NO | -3.551 | N/A |
| MW364 | Downgradient | Yes | 0.046 | NO | -3.079 | N/A |
| MW367 | Sidegradient | Yes | 1.69 | NO | 0.525 | N/A |
| MW370 | Upgradient | Yes | 0.00374 | NO | -5.589 | N/A |
| MW373 | Upgradient | Yes | 0.0146 | NO | -4.227 | N/A |

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for 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-U Fourth Quarter 2015 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=** 0.024 | **S=** 0.022 | **CV(1)=** 0.901 | **K factor**=** 2.523 | **TL(1)=** 0.078 | **LL(1)=**N/A |
| **Statistics-Transformed Background Data** | **X=** -4.239 | **S=** 1.087 | **CV(2)=** -0.256 | **K factor**=** 2.523 | **TL(2)=** -1.497 | **LL(2)=**N/A |

**Historical Background Data from Upgradient Wells with Transformed Result**

Well Number: MW370

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/17/2002 | 0.05 | -2.996 |
| 4/23/2002 | 0.05 | -2.996 |
| 7/15/2002 | 0.05 | -2.996 |
| 10/8/2002 | 0.005 | -5.298 |
| 1/8/2003 | 0.005 | -5.298 |
| 4/3/2003 | 0.005 | -5.298 |
| 7/9/2003 | 0.0264 | -3.634 |
| 10/6/2003 | 0.00971 | -4.635 |

Well Number: MW373

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/18/2002 | 0.05 | -2.996 |
| 4/23/2002 | 0.05 | -2.996 |
| 7/16/2002 | 0.05 | -2.996 |
| 10/8/2002 | 0.005 | -5.298 |
| 1/7/2003 | 0.005 | -5.298 |
| 4/2/2003 | 0.005 | -5.298 |
| 7/9/2003 | 0.0112 | -4.492 |
| 10/7/2003 | 0.005 | -5.298 |

**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) |
|---|---|---|---|---|---|---|
| MW358 | Downgradient | Yes | 0.00292 | NO | -5.836 | N/A |
| MW361 | Downgradient | Yes | 0.000781 | NO | -7.155 | N/A |
| MW364 | Downgradient | Yes | 0.0034 | NO | -5.684 | N/A |
| MW367 | Sidegradient | Yes | 0.0032 | NO | -5.745 | N/A |
| MW370 | Upgradient | Yes | 0.00116 | NO | -6.759 | N/A |
| MW373 | Upgradient | Yes | 0.000914 | NO | -6.998 | N/A |

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for 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-U Fourth Quarter 2015 Statistical Analysis Historical Background Comparison

## Oxidation-Reduction Potential UNITS: mV LRGA

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

| | | | | | | |
|---|---|---|---|---|---|---|
| **Statistics-Background Data** | **X=** 46.688 | **S=** 60.986 | **CV(1)=** 1.306 | **K factor**=** 2.523 | **TL(1)=** 200.555 | **LL(1)=**N/A |
| **Statistics-Transformed Background Data** | **X=** 3.829 | **S=** 1.151 | **CV(2)=** 0.301 | **K factor**=** 2.523 | **TL(2)=** 4.942 | **LL(2)=**N/A |

**Historical Background Data from Upgradient Wells with Transformed Result**

Well Number: MW370

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/17/2002 | 140 | 4.942 |
| 4/23/2002 | -15 | #Func! |
| 7/15/2002 | 5 | 1.609 |
| 4/3/2003 | 49 | 3.892 |
| 7/9/2003 | -35 | #Func! |
| 10/6/2003 | 40 | 3.689 |
| 1/7/2004 | 101 | 4.615 |
| 4/7/2004 | 105 | 4.654 |

Well Number: MW373

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/18/2002 | 140 | 4.942 |
| 4/23/2002 | -20 | #Func! |
| 10/8/2002 | 10 | 2.303 |
| 1/7/2003 | 10 | 2.303 |
| 4/2/2003 | 67 | 4.205 |
| 7/9/2003 | -29 | #Func! |
| 10/7/2003 | 127 | 4.844 |
| 1/6/2004 | 52 | 3.951 |

**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) |
|---|---|---|---|---|---|---|
| MW358 | Downgradient | Yes | 380 | N/A | 5.940 | YES |
| MW361 | Downgradient | Yes | 780 | N/A | 6.659 | YES |
| MW364 | Downgradient | Yes | 509 | N/A | 6.232 | YES |
| MW367 | Sidegradient | Yes | 336 | N/A | 5.817 | YES |
| MW370 | Upgradient | Yes | 416 | N/A | 6.031 | YES |
| MW373 | Upgradient | Yes | 312 | N/A | 5.743 | 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 Lower Tolerance Limit, which is evidence of elevated concentration with respect to historical background data.**

**Wells with Exceedances**

MW358
MW361
MW364
MW367
MW370
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-U Fourth Quarter 2015 Statistical Analysis Historical Background Comparison

## pH UNITS: Std Unit LRGA

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

| | | | | | | |
|---|---|---|---|---|---|---|
| **Statistics-Background Data** | **X=** 6.283 | **S=** 0.159 | **CV(1)=** 0.025 | **K factor**=** 2.904 | **TL(1)=** 6.745 | **LL(1)=**5.8202 |
| **Statistics-Transformed Background Data** | **X=** 1.837 | **S=** 0.025 | **CV(2)=** 0.014 | **K factor**=** 2.904 | **TL(2)=** 1.911 | **LL(2)=**1.7634 |

**Historical Background Data from Upgradient Wells with Transformed Result**

Well Number: MW370

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/17/2002 | 6.3 | 1.841 |
| 4/23/2002 | 6.4 | 1.856 |
| 7/15/2002 | 6.3 | 1.841 |
| 10/8/2002 | 6.3 | 1.841 |
| 1/8/2003 | 6.4 | 1.856 |
| 4/3/2003 | 6.5 | 1.872 |
| 7/9/2003 | 6.3 | 1.841 |
| 10/6/2003 | 6.5 | 1.872 |

Well Number: MW373

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/18/2002 | 6 | 1.792 |
| 4/23/2002 | 6.3 | 1.841 |
| 7/16/2002 | 6.45 | 1.864 |
| 10/8/2002 | 6.18 | 1.821 |
| 1/7/2003 | 6.35 | 1.848 |
| 4/2/2003 | 6.14 | 1.815 |
| 7/9/2003 | 6.1 | 1.808 |
| 10/7/2003 | 6 | 1.792 |

**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)? |
|---|---|---|---|---|---|---|
| MW358 | Downgradient | Yes | 6.28 | NO | 1.837 | N/A |
| MW361 | Downgradient | Yes | 6.08 | NO | 1.805 | N/A |
| MW364 | Downgradient | Yes | 6.07 | NO | 1.803 | N/A |
| MW367 | Sidegradient | Yes | 6.03 | NO | 1.797 | N/A |
| MW370 | Upgradient | Yes | 6.19 | NO | 1.823 | N/A |
| MW373 | Upgradient | Yes | 6.19 | NO | 1.823 | N/A |

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for 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-U Fourth Quarter 2015 Statistical Analysis Historical Background Comparison

## Potassium UNITS: mg/L LRGA

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

| | | | | | | |
|---|---|---|---|---|---|---|
| **Statistics-Background Data** | **X=** 2.823 | **S=** 0.522 | **CV(1)=** 0.185 | **K factor**=** 2.523 | **TL(1)=** 4.139 | **LL(1)=**N/A |
| **Statistics-Transformed Background Data** | **X=** 1.024 | **S=** 0.167 | **CV(2)=** 0.163 | **K factor**=** 2.523 | **TL(2)=** 1.445 | **LL(2)=**N/A |

**Historical Background Data from Upgradient Wells with Transformed Result**

Well Number: MW370

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/17/2002 | 3.22 | 1.169 |
| 4/23/2002 | 3.43 | 1.233 |
| 7/15/2002 | 2.98 | 1.092 |
| 10/8/2002 | 2.46 | 0.900 |
| 1/8/2003 | 2.41 | 0.880 |
| 4/3/2003 | 2.43 | 0.888 |
| 7/9/2003 | 2.44 | 0.892 |
| 10/6/2003 | 2.48 | 0.908 |

Well Number: MW373

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/18/2002 | 4.34 | 1.468 |
| 4/23/2002 | 3.04 | 1.112 |
| 7/16/2002 | 2.93 | 1.075 |
| 10/8/2002 | 2.3 | 0.833 |
| 1/7/2003 | 2.45 | 0.896 |
| 4/2/2003 | 2.7 | 0.993 |
| 7/9/2003 | 2.68 | 0.986 |
| 10/7/2003 | 2.88 | 1.058 |

**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) |
|---|---|---|---|---|---|---|
| MW358 | Downgradient | Yes | 2.38 | NO | 0.867 | N/A |
| MW361 | Downgradient | Yes | 2.11 | NO | 0.747 | N/A |
| MW364 | Downgradient | Yes | 1.97 | NO | 0.678 | N/A |
| MW367 | Sidegradient | Yes | 2.78 | NO | 1.022 | N/A |
| MW370 | Upgradient | Yes | 2.38 | NO | 0.867 | N/A |
| MW373 | Upgradient | Yes | 2.7 | NO | 0.993 | N/A |

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for 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-U Fourth Quarter 2015 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=** 51.544 | **S=** 15.227 | **CV(1)=** 0.295 | **K factor**=** 2.523 | **TL(1)=** 89.962 | **LL(1)=**N/A |
| **Statistics-Transformed Background Data** | **X=** 3.906 | **S=** 0.272 | **CV(2)=** 0.070 | **K factor**=** 2.523 | **TL(2)=** 4.592 | **LL(2)=**N/A |

**Historical Background Data from Upgradient Wells with Transformed Result**

Well Number: MW370

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/17/2002 | 31.8 | 3.459 |
| 4/23/2002 | 50 | 3.912 |
| 7/15/2002 | 44.7 | 3.800 |
| 10/8/2002 | 40 | 3.689 |
| 1/8/2003 | 44.6 | 3.798 |
| 4/3/2003 | 41.9 | 3.735 |
| 7/9/2003 | 40 | 3.689 |
| 10/6/2003 | 38.1 | 3.640 |

Well Number: MW373

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/18/2002 | 43.4 | 3.770 |
| 4/23/2002 | 79.8 | 4.380 |
| 7/16/2002 | 87.7 | 4.474 |
| 10/8/2002 | 61.6 | 4.121 |
| 1/7/2003 | 59.3 | 4.083 |
| 4/2/2003 | 62.1 | 4.129 |
| 7/9/2003 | 50.1 | 3.914 |
| 10/7/2003 | 49.6 | 3.904 |

**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) |
|---|---|---|---|---|---|---|
| MW358 | Downgradient | Yes | 43 | NO | 3.761 | N/A |
| MW361 | Downgradient | Yes | 44.9 | NO | 3.804 | N/A |
| MW364 | Downgradient | Yes | 40.3 | NO | 3.696 | N/A |
| MW367 | Sidegradient | Yes | 17.9 | NO | 2.885 | N/A |
| MW370 | Upgradient | Yes | 50.4 | NO | 3.920 | N/A |
| MW373 | Upgradient | Yes | 59.5 | NO | 4.086 | N/A |

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

**Conclusion of Statistical Analysis on Historical Data**

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

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

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

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

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

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

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

# C-746-U Fourth Quarter 2015 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=** 122.381 **S=** 195.095 **CV(1)=** 1.594 **K factor**=** 2.523 **TL(1)=** 614.606 **LL(1)=**N/A

**Statistics-Transformed Background Data** **X=** 3.985 **S=** 1.323 **CV(2)=** 0.332 **K factor**=** 2.523 **TL(2)=** 7.322 **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: MW370

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/17/2002 | 17.4 | 2.856 |
| 4/23/2002 | 37.9 | 3.635 |
| 7/15/2002 | 15.7 | 2.754 |
| 10/8/2002 | 13.4 | 2.595 |
| 1/8/2003 | 14.4 | 2.667 |
| 4/3/2003 | 18.1 | 2.896 |
| 7/9/2003 | 9.6 | 2.262 |
| 10/6/2003 | 16.5 | 2.803 |

Well Number: MW373

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/18/2002 | 163.3 | 5.096 |
| 4/23/2002 | 809.6 | 6.697 |
| 7/16/2002 | 109.4 | 4.695 |
| 10/8/2002 | 110.6 | 4.706 |
| 1/7/2003 | 113.7 | 4.734 |
| 4/2/2003 | 133 | 4.890 |
| 7/9/2003 | 182.1 | 5.205 |
| 10/7/2003 | 193.4 | 5.265 |

**Current Quarter Data**

| Well No. | Gradient | Detected? | Result | Result >TL(1)? | LN(Result) | LN(Result) >TL(2) |
|---|---|---|---|---|---|---|
| MW358 | Downgradient | Yes | 78.3 | N/A | 4.361 | NO |
| MW361 | Downgradient | Yes | 73.9 | N/A | 4.303 | NO |
| MW364 | Downgradient | Yes | 67.2 | N/A | 4.208 | NO |
| MW367 | Sidegradient | Yes | 22.9 | N/A | 3.131 | NO |
| MW370 | Upgradient | Yes | 11 | N/A | 2.398 | NO |
| MW373 | Upgradient | Yes | 160 | N/A | 5.075 | 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-U Fourth Quarter 2015 Statistical Analysis Historical Background Comparison

## Technetium-99 UNITS: pCi/L LRGA

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

| | | | | | | |
|---|---|---|---|---|---|---|
| **Statistics-Background Data** | **X=** 7.655 | **S=** 13.274 | **CV(1)=** 1.734 | **K factor**=** 2.523 | **TL(1)=** 41.146 | **LL(1)=**N/A |
| **Statistics-Transformed Background Data** | **X=** 1.946 | **S=** 0.939 | **CV(2)=** 0.483 | **K factor**=** 2.523 | **TL(2)=** 3.833 | **LL(2)=**N/A |

**Historical Background Data from Upgradient Wells with Transformed Result**

Well Number: MW370

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/17/2002 | 10.8 | 2.380 |
| 4/23/2002 | 8.53 | 2.144 |
| 7/15/2002 | 5.09 | 1.627 |
| 10/8/2002 | 4.78 | 1.564 |
| 1/8/2003 | -5.12 | #Func! |
| 4/3/2003 | 5.11 | 1.631 |
| 7/9/2003 | 4.25 | 1.447 |
| 10/6/2003 | 6.54 | 1.878 |

Well Number: MW373

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/18/2002 | 16.5 | 2.803 |
| 4/23/2002 | 3.49 | 1.250 |
| 7/16/2002 | 1.42 | 0.351 |
| 10/8/2002 | -6.06 | #Func! |
| 1/7/2003 | -8.41 | #Func! |
| 4/2/2003 | 26.3 | 3.270 |
| 7/9/2003 | 3.06 | 1.118 |
| 10/7/2003 | 46.2 | 3.833 |

**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) |
|---|---|---|---|---|---|---|
| MW358 | Downgradient | Yes | 38.9 | N/A | 3.661 | NO |
| MW361 | Downgradient | Yes | 48.4 | N/A | 3.879 | YES |
| MW364 | Downgradient | Yes | 39.5 | N/A | 3.676 | NO |
| MW367 | Sidegradient | No | -4.6 | N/A | #Error | N/A |
| MW370 | Upgradient | Yes | 50.5 | N/A | 3.922 | YES |
| MW373 | Upgradient | No | 15.9 | N/A | 2.766 | N/A |

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

**Conclusion of Statistical Analysis on Historical Data**

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

**Wells with Exceedances**

MW361
MW370

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

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

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

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

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

** *Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities,Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-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-U Fourth Quarter 2015 Statistical Analysis Historical Background Comparison

## Thorium-230 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=** 0.127 | **S=** 0.175 | **CV(1)=** 1.382 | **K factor**=** 2.523 | **TL(1)=** 0.568 | **LL(1)=**N/A |
| **Statistics-Transformed Background Data** | **X=** -3.222 | **S=** 2.322 | **CV(2)=** -0.721 | **K factor**=** 2.523 | **TL(2)=** -0.629 | **LL(2)=**N/A |

**Historical Background Data from Upgradient Wells with Transformed Result**

| Well Number: | MW370 | |
|---|---|---|
| Date Collected | Result | LN(Result) |
| 10/7/2004 | 0.533 | -0.629 |
| 1/12/2005 | 0.0808 | -2.516 |
| 4/7/2005 | 0.174 | -1.749 |
| 7/20/2005 | 0.000167 | -8.698 |
| 10/12/2005 | 0.00661 | -5.019 |
| 1/9/2006 | 0.00128 | -6.661 |
| 4/5/2006 | -0.0055 | #Func! |
| 7/6/2006 | 0.0775 | -2.557 |

| Well Number: | MW373 | |
|---|---|---|
| Date Collected | Result | LN(Result) |
| 10/7/2004 | 0.379 | -0.970 |
| 1/11/2005 | 0.461 | -0.774 |
| 4/13/2005 | 0.029 | -3.540 |
| 7/26/2005 | 0.143 | -1.945 |
| 10/11/2005 | 0.0894 | -2.415 |
| 1/5/2006 | 0.0458 | -3.083 |
| 4/5/2006 | 0.0106 | -4.547 |
| 7/10/2006 | -0.00134 | #Func! |

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

**#Because the natural log was not 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) |
|---|---|---|---|---|---|---|
| MW358 | Downgradient | No | 0.291 | N/A | -1.234 | N/A |
| MW361 | Downgradient | No | 0.121 | N/A | -2.112 | N/A |
| MW364 | Downgradient | No | 0.00919 | N/A | -4.690 | N/A |
| MW367 | Sidegradient | Yes | 1.03 | N/A | 0.030 | YES |
| MW370 | Upgradient | No | 0.414 | N/A | -0.882 | N/A |
| MW373 | Upgradient | No | -0.022 | 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 Lower Tolerance Limit, which is evidence of elevated concentration with respect to historical background data.**

**Wells with Exceedances**

MW367

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

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

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

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

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

** *Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities,Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-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-U Fourth Quarter 2015 Statistical Analysis Historical Background Comparison

## Total Organic Carbon (TOC) UNITS: mg/L LRGA

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

| | | | | | | |
|---|---|---|---|---|---|---|
| **Statistics-Background Data** | **X=** 6.169 | **S=** 12.072 | **CV(1)=** 1.957 | **K factor**=** 2.523 | **TL(1)=** 36.626 | **LL(1)=**N/A |
| **Statistics-Transformed Background Data** | **X=** 1.069 | **S=** 1.014 | **CV(2)=** 0.948 | **K factor**=** 2.523 | **TL(2)=** 3.626 | **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: MW370

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/17/2002 | 1.2 | 0.182 |
| 4/23/2002 | 4.3 | 1.459 |
| 7/15/2002 | 2.6 | 0.956 |
| 10/8/2002 | 2.3 | 0.833 |
| 1/8/2003 | 3 | 1.099 |
| 4/3/2003 | 1.2 | 0.182 |
| 7/9/2003 | 2.6 | 0.956 |
| 10/6/2003 | 1.7 | 0.531 |

Well Number: MW373

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/18/2002 | 1.1 | 0.095 |
| 4/23/2002 | 17.5 | 2.862 |
| 7/16/2002 | 49 | 3.892 |
| 10/8/2002 | 2.9 | 1.065 |
| 1/7/2003 | 3.9 | 1.361 |
| 4/2/2003 | 2.5 | 0.916 |
| 7/9/2003 | 1.7 | 0.531 |
| 10/7/2003 | 1.2 | 0.182 |

**Current Quarter Data**

| Well No. | Gradient | Detected? | Result | Result >TL(1)? | LN(Result) | LN(Result) >TL(2) |
|---|---|---|---|---|---|---|
| MW358 | Downgradient | Yes | 0.892 | N/A | -0.114 | NO |
| MW361 | Downgradient | Yes | 0.848 | N/A | -0.165 | NO |
| MW364 | Downgradient | Yes | 0.624 | N/A | -0.472 | NO |
| MW367 | Sidegradient | Yes | 0.607 | N/A | -0.499 | NO |
| MW370 | Upgradient | Yes | 0.847 | N/A | -0.166 | NO |
| MW373 | Upgradient | Yes | 1.11 | N/A | 0.104 | NO |

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

**Conclusion of Statistical Analysis on Historical Data**

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

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

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

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

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

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

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

# C-746-U Fourth Quarter 2015 Statistical Analysis Historical Background Comparison

## Total Organic Halides (TOX) UNITS: ug/L LRGA

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

| | | | | | | |
|---|---|---|---|---|---|---|
| **Statistics-Background Data** | **X=** 79.819 | **S=** 78.470 | **CV(1)=** 0.983 | **K factor**=** 2.523 | **TL(1)=** 277.798 | **LL(1)=**N/A |
| **Statistics-Transformed Background Data** | **X=** 3.971 | **S=** 0.950 | **CV(2)=** 0.239 | **K factor**=** 2.523 | **TL(2)=** 6.368 | **LL(2)=**N/A |

**Historical Background Data from Upgradient Wells with Transformed Result**

Well Number: MW370

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/17/2002 | 50 | 3.912 |
| 4/23/2002 | 228 | 5.429 |
| 7/15/2002 | 88 | 4.477 |
| 10/8/2002 | 58 | 4.060 |
| 1/8/2003 | 72.4 | 4.282 |
| 4/3/2003 | 26.6 | 3.281 |
| 7/9/2003 | 16.4 | 2.797 |
| 10/6/2003 | 31.1 | 3.437 |

Well Number: MW373

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/18/2002 | 50 | 3.912 |
| 4/23/2002 | 276 | 5.620 |
| 7/16/2002 | 177 | 5.176 |
| 10/8/2002 | 76 | 4.331 |
| 1/7/2003 | 45.9 | 3.826 |
| 4/2/2003 | 57.8 | 4.057 |
| 7/9/2003 | 10 | 2.303 |
| 10/7/2003 | 13.9 | 2.632 |

**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) |
|---|---|---|---|---|---|---|
| MW358 | Downgradient | No | 8.2 | N/A | 2.104 | N/A |
| MW361 | Downgradient | No | 5.2 | N/A | 1.649 | N/A |
| MW364 | Downgradient | Yes | 6.86 | NO | 1.926 | N/A |
| MW367 | Sidegradient | No | 10 | N/A | 2.303 | N/A |
| MW370 | Upgradient | Yes | 11.9 | NO | 2.477 | N/A |
| MW373 | Upgradient | Yes | 11.2 | NO | 2.416 | N/A |

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for 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-U Fourth Quarter 2015 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=** 12.188 | **S=** 6.950 | **CV(1)=** 0.570 | **K factor**=** 2.523 | **TL(1)=** 29.721 | **LL(1)=**N/A |
| **Statistics-Transformed Background Data** | **X=** 2.305 | **S=** 0.687 | **CV(2)=** 0.298 | **K factor**=** 2.523 | **TL(2)=** 4.039 | **LL(2)=**N/A |

**Historical Background Data from Upgradient Wells with Transformed Result**

Well Number: MW370

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/17/2002 | 19 | 2.944 |
| 4/23/2002 | 17 | 2.833 |
| 7/15/2002 | 15 | 2.708 |
| 10/8/2002 | 18 | 2.890 |
| 1/8/2003 | 17 | 2.833 |
| 4/3/2003 | 18 | 2.890 |
| 7/9/2003 | 15 | 2.708 |
| 10/6/2003 | 16 | 2.773 |

Well Number: MW373

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/18/2002 | 5 | 1.609 |
| 4/23/2002 | 25 | 3.219 |
| 7/16/2002 | 3 | 1.099 |
| 10/8/2002 | 4 | 1.386 |
| 1/7/2003 | 6 | 1.792 |
| 4/2/2003 | 5 | 1.609 |
| 7/9/2003 | 6 | 1.792 |
| 10/7/2003 | 6 | 1.792 |

**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) |
|---|---|---|---|---|---|---|
| MW358 | Downgradient | Yes | 3.78 | N/A | 1.330 | N/A |
| MW361 | Downgradient | Yes | 4.76 | N/A | 1.560 | N/A |
| MW364 | Downgradient | Yes | 4.4 | N/A | 1.482 | N/A |
| MW367 | Sidegradient | Yes | 0.31 | N/A | -1.171 | N/A |
| MW370 | Upgradient | Yes | 0.8 | N/A | -0.223 | N/A |
| MW373 | Upgradient | Yes | 9.14 | NO | 2.213 | N/A |

N/A - Results identified as Non-Detects during laboratory analysis or data validation and were not included in the statistical evaluation. Additionally for parameters that have MCLs, where the result for 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-U Fourth Quarter 2015 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=** 0.055 | **S=** 0.037 | **CV(1)=** 0.673 | **K factor**=** 2.523 | **TL(1)=** 0.147 | **LL(1)=**N/A |
| **Statistics-Transformed Background Data** | **X=** -3.131 | **S=** 0.691 | **CV(2)=** -0.221 | **K factor**=** 2.523 | **TL(2)=** -1.388 | **LL(2)=**N/A |

**Historical Background Data from Upgradient Wells with Transformed Result**

Well Number: MW370

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/17/2002 | 0.1 | -2.303 |
| 4/23/2002 | 0.1 | -2.303 |
| 7/15/2002 | 0.1 | -2.303 |
| 10/8/2002 | 0.025 | -3.689 |
| 1/8/2003 | 0.035 | -3.352 |
| 4/3/2003 | 0.035 | -3.352 |
| 7/9/2003 | 0.02 | -3.912 |
| 10/6/2003 | 0.02 | -3.912 |

Well Number: MW373

| Date Collected | Result | LN(Result) |
|---|---|---|
| 3/18/2002 | 0.1 | -2.303 |
| 4/23/2002 | 0.1 | -2.303 |
| 7/16/2002 | 0.1 | -2.303 |
| 10/8/2002 | 0.025 | -3.689 |
| 1/7/2003 | 0.035 | -3.352 |
| 4/2/2003 | 0.035 | -3.352 |
| 7/9/2003 | 0.0234 | -3.755 |
| 10/7/2003 | 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) |
|---|---|---|---|---|---|---|
| MW358 | Downgradient | Yes | 0.00405 | NO | -5.509 | N/A |
| MW361 | Downgradient | No | 0.01 | N/A | -4.605 | N/A |
| MW364 | Downgradient | Yes | 0.0351 | NO | -3.350 | N/A |
| MW367 | Sidegradient | Yes | 0.00767 | NO | -4.870 | N/A |
| MW370 | Upgradient | No | 0.01 | N/A | -4.605 | N/A |
| MW373 | 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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# ATTACHMENT D2

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

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# C-746-U Fourth Quarter 2015 Statistical Analysis Current Background Comparison

## Dissolved Oxygen UNITS: mg/L UCRS

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

| | | | | | | |
|---|---|---|---|---|---|---|
| **Statistics-Background Data** | **X=** 1.993 | **S=** 1.146 | **CV(1)=** 0.575 | **K factor**=** 2.523 | **TL(1)=** 4.885 | **LL(1)=**N/A |
| **Statistics-Transformed Background Data** | **X=** 0.533 | **S=** 0.589 | **CV(2)=** 1.106 | **K factor**=** 2.523 | **TL(2)=** 2.019 | **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: MW371

| Date Collected | Result | LN(Result) |
|---|---|---|
| 10/8/2013 | 1.38 | 0.322 |
| 1/14/2014 | 1.97 | 0.678 |
| 4/14/2014 | 3.87 | 1.353 |
| 9/22/2014 | 1.34 | 0.293 |
| 10/20/2014 | 0.98 | -0.020 |
| 1/21/2015 | 1.79 | 0.582 |
| 4/13/2015 | 4.44 | 1.491 |
| 7/14/2015 | 2.73 | 1.004 |

Well Number: MW374

| Date Collected | Result | LN(Result) |
|---|---|---|
| 10/9/2013 | 2.74 | 1.008 |
| 1/14/2014 | 1.67 | 0.513 |
| 4/15/2014 | 3.44 | 1.235 |
| 7/7/2014 | 1.76 | 0.565 |
| 10/16/2014 | 0.86 | -0.151 |
| 1/21/2015 | 0.66 | -0.416 |
| 4/9/2015 | 1.59 | 0.464 |
| 7/13/2015 | 0.67 | -0.400 |

**Current Quarter Data**

| Well No. | Gradient | Detected? | Result | Result >TL(1)? | LN(Result) | LN(Result) >TL(2) |
|---|---|---|---|---|---|---|
| MW362 | Downgradient | Yes | 3.52 | NO | 1.258 | N/A |
| MW365 | Downgradient | Yes | 3.39 | NO | 1.221 | N/A |
| MW368 | Sidegradient | Yes | 3.82 | NO | 1.340 | 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-U Fourth Quarter 2015 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=** 444.750 **S=** 164.344 **CV(1)=** 0.370 **K factor**=** 2.523 **TL(1)=** 859.389 **LL(1)=**N/A

**Statistics-Transformed Background Data** **X=** 6.039 **S=** 0.350 **CV(2)=** 0.058 **K factor**=** 2.523 **TL(2)=** 6.921 **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: MW371

| Date Collected | Result | LN(Result) |
|---|---|---|
| 10/8/2013 | 544 | 6.299 |
| 1/14/2014 | 374 | 5.924 |
| 4/14/2014 | 476 | 6.165 |
| 9/22/2014 | 311 | 5.740 |
| 10/20/2014 | 360 | 5.886 |
| 1/21/2015 | 774 | 6.652 |
| 4/13/2015 | 384 | 5.951 |
| 7/14/2015 | 368 | 5.908 |

Well Number: MW374

| Date Collected | Result | LN(Result) |
|---|---|---|
| 10/9/2013 | 802 | 6.687 |
| 1/14/2014 | 515 | 6.244 |
| 4/15/2014 | 499 | 6.213 |
| 7/7/2014 | 259 | 5.557 |
| 10/16/2014 | 257 | 5.549 |
| 1/21/2015 | 530 | 6.273 |
| 4/9/2015 | 395 | 5.979 |
| 7/13/2015 | 268 | 5.591 |

**Current Quarter Data**

| Well No. | Gradient | Detected? | Result | Result >TL(1)? | LN(Result) | LN(Result) >TL(2) |
|---|---|---|---|---|---|---|
| MW362 | Downgradient | Yes | 620 | NO | 6.430 | N/A |
| MW365 | Downgradient | Yes | 523 | NO | 6.260 | N/A |
| MW368 | Sidegradient | Yes | 523 | NO | 6.260 | N/A |
| MW371 | Upgradient | Yes | 393 | NO | 5.974 | N/A |
| MW374 | Upgradient | Yes | 449 | NO | 6.107 | N/A |
| MW375 | Sidegradient | Yes | 468 | NO | 6.148 | 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-U Fourth Quarter 2015 Statistical Analysis — Current Background Comparison

## Sulfate — UNITS: mg/L — UCRS

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is 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=** 9.716 | **S=** 4.907 | **CV(1)=** 0.505 | **K factor**=** 2.523 | **TL(1)=** 22.095 | **LL(1)=**N/A |
| **Statistics-Transformed Background Data** | **X=** 2.162 | **S=** 0.479 | **CV(2)=** 0.221 | **K factor**=** 2.523 | **TL(2)=** 3.370 | **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: MW371

| Date Collected | Result | LN(Result) |
|---|---|---|
| 10/8/2013 | 13 | 2.565 |
| 1/14/2014 | 9.9 | 2.293 |
| 4/14/2014 | 16.4 | 2.797 |
| 7/8/2014 | 18.6 | 2.923 |
| 10/20/2014 | 10.5 | 2.351 |
| 1/21/2015 | 9.23 | 2.222 |
| 4/13/2015 | 13.2 | 2.580 |
| 7/14/2015 | 18.9 | 2.939 |

Well Number: MW374

| Date Collected | Result | LN(Result) |
|---|---|---|
| 10/9/2013 | 6.6 | 1.887 |
| 1/14/2014 | 5.1 | 1.629 |
| 4/15/2014 | 5.63 | 1.728 |
| 7/7/2014 | 5.64 | 1.730 |
| 10/16/2014 | 5.73 | 1.746 |
| 1/21/2015 | 5.39 | 1.685 |
| 4/9/2015 | 5.7 | 1.740 |
| 7/13/2015 | 5.93 | 1.780 |

**Current Quarter Data**

| Well No. | Gradient | Detected? | Result | Result >TL(1)? | LN(Result) | LN(Result) >TL(2) |
|---|---|---|---|---|---|---|
| MW362 | Downgradient | Yes | 35.2 | YES | 3.561 | N/A |
| MW365 | Downgradient | Yes | 56.3 | YES | 4.031 | N/A |
| MW368 | Sidegradient | Yes | 29 | YES | 3.367 | N/A |
| MW371 | Upgradient | Yes | 19.5 | NO | 2.970 | N/A |
| MW375 | Sidegradient | Yes | 23.4 | YES | 3.153 | 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**

MW362
MW365
MW368
MW375

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

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

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

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

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

** *Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities,Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-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-U Fourth Quarter 2015 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=** 41.319 **S=** 40.657 **CV(1)=** 0.984 **K factor**=** 2.523 **TL(1)=** 143.898 **LL(1)=**N/A

**Statistics-Transformed Background Data** **X=** 3.294 **S=** 0.960 **CV(2)=** 0.292 **K factor**=** 2.523 **TL(2)=** 5.717 **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: | MW369 | |
|---|---|---|
| Date Collected | Result | LN(Result) |
| 10/8/2013 | 17.3 | 2.851 |
| 1/14/2014 | 26.8 | 3.288 |
| 4/14/2014 | 15.7 | 2.754 |
| 7/8/2014 | 5.76 | 1.751 |
| 10/20/2014 | 32.1 | 3.469 |
| 1/13/2015 | 33.4 | 3.509 |
| 4/13/2015 | 26.8 | 3.288 |
| 7/14/2015 | 21.1 | 3.049 |

| Well Number: | MW372 | |
|---|---|---|
| Date Collected | Result | LN(Result) |
| 10/9/2013 | 131 | 4.875 |
| 1/14/2014 | 102 | 4.625 |
| 4/16/2014 | 7.56 | 2.023 |
| 7/7/2014 | 30.3 | 3.411 |
| 10/16/2014 | 74 | 4.304 |
| 1/21/2015 | 115 | 4.745 |
| 4/9/2015 | 8.38 | 2.126 |
| 7/13/2015 | 13.9 | 2.632 |

**Current Quarter Data**

| Well No. | Gradient | Detected? | Result | Result >TL(1)? | LN(Result) | LN(Result) >TL(2) |
|---|---|---|---|---|---|---|
| MW372 | Upgradient | Yes | 86.8 | NO | 4.464 | 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-U Fourth Quarter 2015 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=** 38.256 | **S=** 22.038 | **CV(1)=** 0.576 | **K factor**=** 2.523 | **TL(1)=** 93.859 | **LL(1)=**N/A |
| **Statistics-Transformed Background Data** | **X=** 3.470 | **S=** 0.623 | **CV(2)=** 0.180 | **K factor**=** 2.523 | **TL(2)=** 5.043 | **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: MW369

| Date Collected | Result | LN(Result) |
|---|---|---|
| 10/8/2013 | 16.2 | 2.785 |
| 1/14/2014 | 21.8 | 3.082 |
| 4/14/2014 | 16.4 | 2.797 |
| 7/8/2014 | 15.5 | 2.741 |
| 10/20/2014 | 16.8 | 2.821 |
| 1/13/2015 | 16.5 | 2.803 |
| 4/13/2015 | 28 | 3.332 |
| 7/14/2015 | 17.8 | 2.879 |

Well Number: MW372

| Date Collected | Result | LN(Result) |
|---|---|---|
| 10/9/2013 | 60.2 | 4.098 |
| 1/14/2014 | 31.3 | 3.444 |
| 4/16/2014 | 70.5 | 4.256 |
| 7/7/2014 | 59.1 | 4.079 |
| 10/16/2014 | 59.3 | 4.083 |
| 1/21/2015 | 53.5 | 3.980 |
| 4/9/2015 | 66.6 | 4.199 |
| 7/13/2015 | 62.6 | 4.137 |

**Current Quarter Data**

| Well No. | Gradient | Detected? | Result | Result >TL(1)? | LN(Result) | LN(Result) >TL(2) |
|---|---|---|---|---|---|---|
| MW372 | Upgradient | Yes | 61.9 | NO | 4.126 | 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-U Fourth Quarter 2015 Statistical Analysis Current 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 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=** 581.688 **S=** 205.082 **CV(1)=** 0.353 **K factor**=** 2.523 **TL(1)=** 1099.110 **LL(1)=**N/A

**Statistics-Transformed Background Data** **X=** 6.304 **S=** 0.366 **CV(2)=** 0.058 **K factor**=** 2.523 **TL(2)=** 7.227 **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: | MW369 | |
|---|---|---|
| Date Collected | Result | LN(Result) |
| 10/8/2013 | 376 | 5.930 |
| 1/14/2014 | 392 | 5.971 |
| 4/14/2014 | 380 | 5.940 |
| 9/22/2014 | 370 | 5.914 |
| 10/20/2014 | 371 | 5.916 |
| 1/13/2015 | 374 | 5.924 |
| 4/13/2015 | 434 | 6.073 |
| 7/14/2015 | 390 | 5.966 |

| Well Number: | MW372 | |
|---|---|---|
| Date Collected | Result | LN(Result) |
| 10/9/2013 | 791 | 6.673 |
| 1/14/2014 | 759 | 6.632 |
| 4/16/2014 | 837 | 6.730 |
| 7/7/2014 | 839 | 6.732 |
| 10/16/2014 | 766 | 6.641 |
| 1/21/2015 | 701 | 6.553 |
| 4/9/2015 | 769 | 6.645 |
| 7/13/2015 | 758 | 6.631 |

**Current Quarter Data**

| Well No. | Gradient | Detected? | Result | Result >TL(1)? | LN(Result) | LN(Result) >TL(2) |
|---|---|---|---|---|---|---|
| MW372 | Upgradient | Yes | 751 | NO | 6.621 | 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-U Fourth Quarter 2015 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=** 321.375 **S=** 131.364 **CV(1)=** 0.409 **K factor**=** 2.523 **TL(1)=** 652.805 **LL(1)=**N/A

**Statistics-Transformed Background Data** **X=** 5.692 **S=** 0.419 **CV(2)=** 0.074 **K factor**=** 2.523 **TL(2)=** 6.749 **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: MW369

| Date Collected | Result | LN(Result) |
|---|---|---|
| 10/8/2013 | 228 | 5.429 |
| 1/14/2014 | 216 | 5.375 |
| 4/14/2014 | 213 | 5.361 |
| 7/8/2014 | 150 | 5.011 |
| 10/20/2014 | 193 | 5.263 |
| 1/13/2015 | 207 | 5.333 |
| 4/13/2015 | 201 | 5.303 |
| 7/14/2015 | 226 | 5.421 |

Well Number: MW372

| Date Collected | Result | LN(Result) |
|---|---|---|
| 10/9/2013 | 481 | 6.176 |
| 1/14/2014 | 455 | 6.120 |
| 4/16/2014 | 546 | 6.303 |
| 7/7/2014 | 314 | 5.749 |
| 10/16/2014 | 476 | 6.165 |
| 1/21/2015 | 374 | 5.924 |
| 4/9/2015 | 421 | 6.043 |
| 7/13/2015 | 441 | 6.089 |

**Current Quarter Data**

| Well No. | Gradient | Detected? | Result | Result >TL(1)? | LN(Result) | LN(Result) >TL(2) |
|---|---|---|---|---|---|---|
| MW372 | Upgradient | Yes | 419 | NO | 6.038 | 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-U Fourth Quarter 2015 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=** 14.947 | **S=** 7.989 | **CV(1)=** 0.534 | **K factor**=** 2.523 | **TL(1)=** 35.102 | **LL(1)=**N/A |
| **Statistics-Transformed Background Data** | **X=** 2.553 | **S=** 0.584 | **CV(2)=** 0.229 | **K factor**=** 2.523 | **TL(2)=** 4.027 | **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: MW369

| Date Collected | Result | LN(Result) |
|---|---|---|
| 10/8/2013 | 6.5 | 1.872 |
| 1/14/2014 | 9.54 | 2.255 |
| 4/14/2014 | 6.7 | 1.902 |
| 7/8/2014 | 5.66 | 1.733 |
| 10/20/2014 | 7.03 | 1.950 |
| 1/13/2015 | 7.19 | 1.973 |
| 4/13/2015 | 12.7 | 2.542 |
| 7/14/2015 | 7.73 | 2.045 |

Well Number: MW372

| Date Collected | Result | LN(Result) |
|---|---|---|
| 10/9/2013 | 22.8 | 3.127 |
| 1/14/2014 | 12.8 | 2.549 |
| 4/16/2014 | 26.1 | 3.262 |
| 7/7/2014 | 21.6 | 3.073 |
| 10/16/2014 | 22.4 | 3.109 |
| 1/21/2015 | 20.4 | 3.016 |
| 4/9/2015 | 25.2 | 3.227 |
| 7/13/2015 | 24.8 | 3.211 |

**Current Quarter Data**

| Well No. | Gradient | Detected? | Result | Result >TL(1)? | LN(Result) | LN(Result) >TL(2) |
|---|---|---|---|---|---|---|
| MW372 | Upgradient | Yes | 23.5 | NO | 3.157 | 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-U Fourth Quarter 2015 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=** 433.500 **S=** 220.385 **CV(1)=** 0.508 **K factor**=** 2.523 **TL(1)=** 989.531 **LL(1)=**N/A

**Statistics-Transformed Background Data** **X=** 5.915 **S=** 0.632 **CV(2)=** 0.107 **K factor**=** 2.523 **TL(2)=** 7.509 **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: MW369

| Date Collected | Result | LN(Result) |
|---|---|---|
| 10/8/2013 | 750 | 6.620 |
| 1/14/2014 | 438 | 6.082 |
| 4/14/2014 | 514 | 6.242 |
| 9/22/2014 | 331 | 5.802 |
| 10/20/2014 | 405 | 6.004 |
| 1/13/2015 | 779 | 6.658 |
| 4/13/2015 | 404 | 6.001 |
| 7/14/2015 | 410 | 6.016 |

Well Number: MW372

| Date Collected | Result | LN(Result) |
|---|---|---|
| 10/9/2013 | 519 | 6.252 |
| 1/14/2014 | 740 | 6.607 |
| 4/16/2014 | 236 | 5.464 |
| 7/7/2014 | 126 | 4.836 |
| 10/16/2014 | 88 | 4.477 |
| 1/21/2015 | 693 | 6.541 |
| 4/9/2015 | 283 | 5.645 |
| 7/13/2015 | 220 | 5.394 |

**Current Quarter Data**

| Well No. | Gradient | Detected? | Result | Result >TL(1)? | LN(Result) | LN(Result) >TL(2) |
|---|---|---|---|---|---|---|
| MW357 | Downgradient | Yes | 582 | NO | 6.366 | N/A |
| MW360 | Downgradient | Yes | 440 | NO | 6.087 | N/A |
| MW363 | Downgradient | Yes | 630 | NO | 6.446 | N/A |
| MW366 | Sidegradient | Yes | 482 | NO | 6.178 | N/A |
| MW369 | Upgradient | Yes | 382 | NO | 5.945 | N/A |
| MW372 | Upgradient | Yes | 294 | NO | 5.684 | 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-U Fourth Quarter 2015 Statistical Analysis — Current Background Comparison

## Sodium — UNITS: mg/L — URGA

The CV is calculated to determine if background data are normally distributed. If so, the current test well results are compared to the TL. If not, a transformation is performed on the background and test well results, then each transformed test well result is compared to the transformed TL. If the test well result exceeds the TL, that is 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=** 59.381 | **S=** 18.924 | **CV(1)=** 0.319 | **K factor**=** 2.523 | **TL(1)=** 107.127 | **LL(1)=**N/A |
| **Statistics-Transformed Background Data** | **X=** 4.047 | **S=** 0.272 | **CV(2)=** 0.067 | **K factor**=** 2.523 | **TL(2)=** 4.734 | **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: MW369

| Date Collected | Result | LN(Result) |
|---|---|---|
| 10/8/2013 | 52.6 | 3.963 |
| 1/14/2014 | 30.6 | 3.421 |
| 4/14/2014 | 58.7 | 4.072 |
| 7/8/2014 | 48.8 | 3.888 |
| 10/20/2014 | 53.4 | 3.978 |
| 1/13/2015 | 52.2 | 3.955 |
| 4/13/2015 | 46.2 | 3.833 |
| 7/14/2015 | 57.7 | 4.055 |

Well Number: MW372

| Date Collected | Result | LN(Result) |
|---|---|---|
| 10/9/2013 | 61.5 | 4.119 |
| 1/14/2014 | 123 | 4.812 |
| 4/16/2014 | 65.5 | 4.182 |
| 7/7/2014 | 60.7 | 4.106 |
| 10/16/2014 | 59.7 | 4.089 |
| 1/21/2015 | 55.7 | 4.020 |
| 4/9/2015 | 60.5 | 4.103 |
| 7/13/2015 | 63.3 | 4.148 |

**Current Quarter Data**

| Well No. | Gradient | Detected? | Result | Result >TL(1)? | LN(Result) | LN(Result) >TL(2) |
|---|---|---|---|---|---|---|
| MW360 | Downgradient | Yes | 90.4 | NO | 4.504 | 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-U Fourth Quarter 2015 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=** 59.469 | **S=** 56.460 | **CV(1)=** 0.949 | **K factor**=** 2.523 | **TL(1)=** 201.918 | **LL(1)=**N/A |
| **Statistics-Transformed Background Data** | **X=** 3.721 | **S=** 0.861 | **CV(2)=** 0.231 | **K factor**=** 2.523 | **TL(2)=** 5.894 | **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: MW369

| Date Collected | Result | LN(Result) |
|---|---|---|
| 10/8/2013 | 29.7 | 3.391 |
| 1/14/2014 | 25.3 | 3.231 |
| 4/14/2014 | 35.4 | 3.567 |
| 7/8/2014 | 15.8 | 2.760 |
| 10/20/2014 | 43.3 | 3.768 |
| 1/13/2015 | 45.2 | 3.811 |
| 4/13/2015 | 37.3 | 3.619 |
| 7/14/2015 | 36.7 | 3.603 |

Well Number: MW372

| Date Collected | Result | LN(Result) |
|---|---|---|
| 10/9/2013 | 176 | 5.170 |
| 1/14/2014 | 131 | 4.875 |
| 4/16/2014 | 13.4 | 2.595 |
| 7/7/2014 | 26.6 | 3.281 |
| 10/16/2014 | 107 | 4.673 |
| 1/21/2015 | 181 | 5.198 |
| 4/9/2015 | 10.8 | 2.380 |
| 7/13/2015 | 37 | 3.611 |

**Current Quarter Data**

| Well No. | Gradient | Detected? | Result | Result >TL(1)? | LN(Result) | LN(Result) >TL(2) |
|---|---|---|---|---|---|---|
| MW372 | Upgradient | Yes | 89.5 | NO | 4.494 | 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-U Fourth Quarter 2015 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=** 22.294 | **S=** 9.485 | **CV(1)=** 0.425 | **K factor**=** 2.523 | **TL(1)=** 46.224 | **LL(1)=**N/A |
| **Statistics-Transformed Background Data** | **X=** 3.028 | **S=** 0.395 | **CV(2)=** 0.130 | **K factor**=** 2.523 | **TL(2)=** 4.025 | **LL(2)=**N/A |

**Current Background Data from Upgradient Wells with Transformed Result**

Well Number: MW370

| Date Collected | Result | LN(Result) |
|---|---|---|
| 10/8/2013 | 15.1 | 2.715 |
| 1/14/2014 | 11.4 | 2.434 |
| 4/15/2014 | 27.2 | 3.303 |
| 7/8/2014 | 19.2 | 2.955 |
| 10/20/2014 | 14.5 | 2.674 |
| 1/13/2015 | 16 | 2.773 |
| 4/13/2015 | 14.5 | 2.674 |
| 7/14/2015 | 36.1 | 3.586 |

Well Number: MW373

| Date Collected | Result | LN(Result) |
|---|---|---|
| 10/9/2013 | 42.4 | 3.747 |
| 1/14/2014 | 38.6 | 3.653 |
| 4/16/2014 | 19.1 | 2.950 |
| 7/7/2014 | 16.7 | 2.815 |
| 10/16/2014 | 24.9 | 3.215 |
| 1/21/2015 | 14.1 | 2.646 |
| 4/9/2015 | 25.1 | 3.223 |
| 7/13/2015 | 21.8 | 3.082 |

**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) |
|---|---|---|---|---|---|---|
| MW358 | Downgradient | Yes | 51 | YES | 3.932 | 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**

MW358

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

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

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

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

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

** *Read from Table 5, Appendix B of Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities,Interim Guidance, EPA, 1989, based on total number of background results - The K-factor for pH to account for a two-sided tolerance interval instead of a one-sided tolerance limit. The K-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-U Fourth Quarter 2015 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=** 473.250 **S=** 134.952 **CV(1)=** 0.285 **K factor**=** 2.523 **TL(1)=** 813.733 **LL(1)=**N/A

**Statistics-Transformed Background Data** **X=** 6.126 **S=** 0.257 **CV(2)=** 0.042 **K factor**=** 2.523 **TL(2)=** 6.776 **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: MW370

| Date Collected | Result | LN(Result) |
|---|---|---|
| 10/8/2013 | 811 | 6.698 |
| 1/14/2014 | 443 | 6.094 |
| 4/15/2014 | 535 | 6.282 |
| 9/22/2014 | 353 | 5.866 |
| 10/20/2014 | 363 | 5.894 |
| 1/13/2015 | 691 | 6.538 |
| 4/13/2015 | 380 | 5.940 |
| 7/14/2015 | 388 | 5.961 |

Well Number: MW373

| Date Collected | Result | LN(Result) |
|---|---|---|
| 10/9/2013 | 627 | 6.441 |
| 1/14/2014 | 494 | 6.203 |
| 4/16/2014 | 398 | 5.986 |
| 7/7/2014 | 374 | 5.924 |
| 10/16/2014 | 404 | 6.001 |
| 1/21/2015 | 336 | 5.817 |
| 4/9/2015 | 507 | 6.229 |
| 7/13/2015 | 468 | 6.148 |

**Current Quarter Data**

| Well No. | Gradient | Detected? | Result | Result >TL(1)? | LN(Result) | LN(Result) >TL(2) |
|---|---|---|---|---|---|---|
| MW358 | Downgradient | Yes | 380 | NO | 5.940 | N/A |
| MW361 | Downgradient | Yes | 780 | NO | 6.659 | N/A |
| MW364 | Downgradient | Yes | 509 | NO | 6.232 | N/A |
| MW367 | Sidegradient | Yes | 336 | NO | 5.817 | N/A |
| MW370 | Upgradient | Yes | 416 | NO | 6.031 | N/A |
| MW373 | Upgradient | Yes | 312 | NO | 5.743 | 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-U Fourth Quarter 2015 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=** 32.181 | **S=** 14.067 | **CV(1)=** 0.437 | **K factor**=** 2.523 | **TL(1)=** 67.672 | **LL(1)=**N/A |
| **Statistics-Transformed Background Data** | **X=** 3.377 | **S=** 0.464 | **CV(2)=** 0.138 | **K factor**=** 2.523 | **TL(2)=** 4.548 | **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: MW370

| Date Collected | Result | LN(Result) |
|---|---|---|
| 10/8/2013 | 27.9 | 3.329 |
| 1/14/2014 | 10.6 | 2.361 |
| 4/15/2014 | 27.9 | 3.329 |
| 7/8/2014 | 30.8 | 3.428 |
| 10/20/2014 | 22.5 | 3.114 |
| 1/13/2015 | 14.8 | 2.695 |
| 4/13/2015 | 20.9 | 3.040 |
| 7/14/2015 | 60.3 | 4.099 |

Well Number: MW373

| Date Collected | Result | LN(Result) |
|---|---|---|
| 10/9/2013 | 59.9 | 4.093 |
| 1/14/2014 | 37.8 | 3.632 |
| 4/16/2014 | 43.6 | 3.775 |
| 7/7/2014 | 20.1 | 3.001 |
| 10/16/2014 | 38 | 3.638 |
| 1/21/2015 | 28.8 | 3.360 |
| 4/9/2015 | 33.7 | 3.517 |
| 7/13/2015 | 37.3 | 3.619 |

**Current Quarter Data**

| Well No. | Gradient | Detected? | Result | Result >TL(1)? | LN(Result) | LN(Result) >TL(2) |
|---|---|---|---|---|---|---|
| MW361 | Downgradient | Yes | 48.4 | NO | 3.879 | N/A |
| MW370 | Upgradient | Yes | 50.5 | NO | 3.922 | 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-U Fourth Quarter 2015 Statistical Analysis Current Background Comparison

## Thorium-230 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=** 0.974 | **S=** 1.405 | **CV(1)=** 1.443 | **K factor**=** 2.523 | **TL(1)=** 4.520 | **LL(1)=**N/A |
| **Statistics-Transformed Background Data** | **X=** -0.897 | **S=** 1.846 | **CV(2)=** -2.058 | **K factor**=** 2.523 | **TL(2)=** 1.361 | **LL(2)=**N/A |

**Current Background Data from Upgradient Wells with Transformed Result**

Well Number: MW370

| Date Collected | Result | LN(Result) |
|---|---|---|
| 10/8/2013 | 0.0218 | -3.826 |
| 1/14/2014 | 0.0283 | -3.565 |
| 4/15/2014 | 0.782 | -0.246 |
| 7/8/2014 | 0.0902 | -2.406 |
| 10/20/2014 | 3.82 | 1.340 |
| 1/13/2015 | 0.324 | -1.127 |
| 4/13/2015 | -0.0229 | #Func! |
| 7/14/2015 | 0.623 | -0.473 |

Well Number: MW373

| Date Collected | Result | LN(Result) |
|---|---|---|
| 10/9/2013 | -0.0478 | #Func! |
| 1/14/2014 | 0.0381 | -3.268 |
| 4/16/2014 | 3.23 | 1.172 |
| 7/7/2014 | 0.688 | -0.374 |
| 10/16/2014 | 3.9 | 1.361 |
| 1/21/2015 | 1.66 | 0.507 |
| 4/9/2015 | 0.469 | -0.757 |
| 7/13/2015 | -0.0174 | #Func! |

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

**#Because the natural log was not 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) |
|---|---|---|---|---|---|---|
| MW367 | Sidegradient | Yes | 1.03 | N/A | 0.030 | NO |

**Conclusion of Statistical Analysis on Current Data**

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

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

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

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

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

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

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

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# ATTACHMENT D3

# STATISTICIAN QUALIFICATION STATEMENT

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January 22, 2016

Ms. Myrna Redfield
Fluor Federal Services, Inc.
5511 Hobbs Road
Kevil, KY 42053

Dear Ms. Redfield:

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

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

For this project, the statistical analyses conducted on the fourth quarter 2015 monitoring well data collected from the C-746-S&T and C-746-U Landfills were performed in accordance with guidance provided in the U.S. Environmental Protection Agency guidance document, *EPA Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Interim Final Guidance* (1989).

Sincerely,

Jennifer R. Blewett

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# APPENDIX E

# GROUNDWATER FLOW RATE AND DIRECTION

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# GROUNDWATER FLOW RATE AND DIRECTION

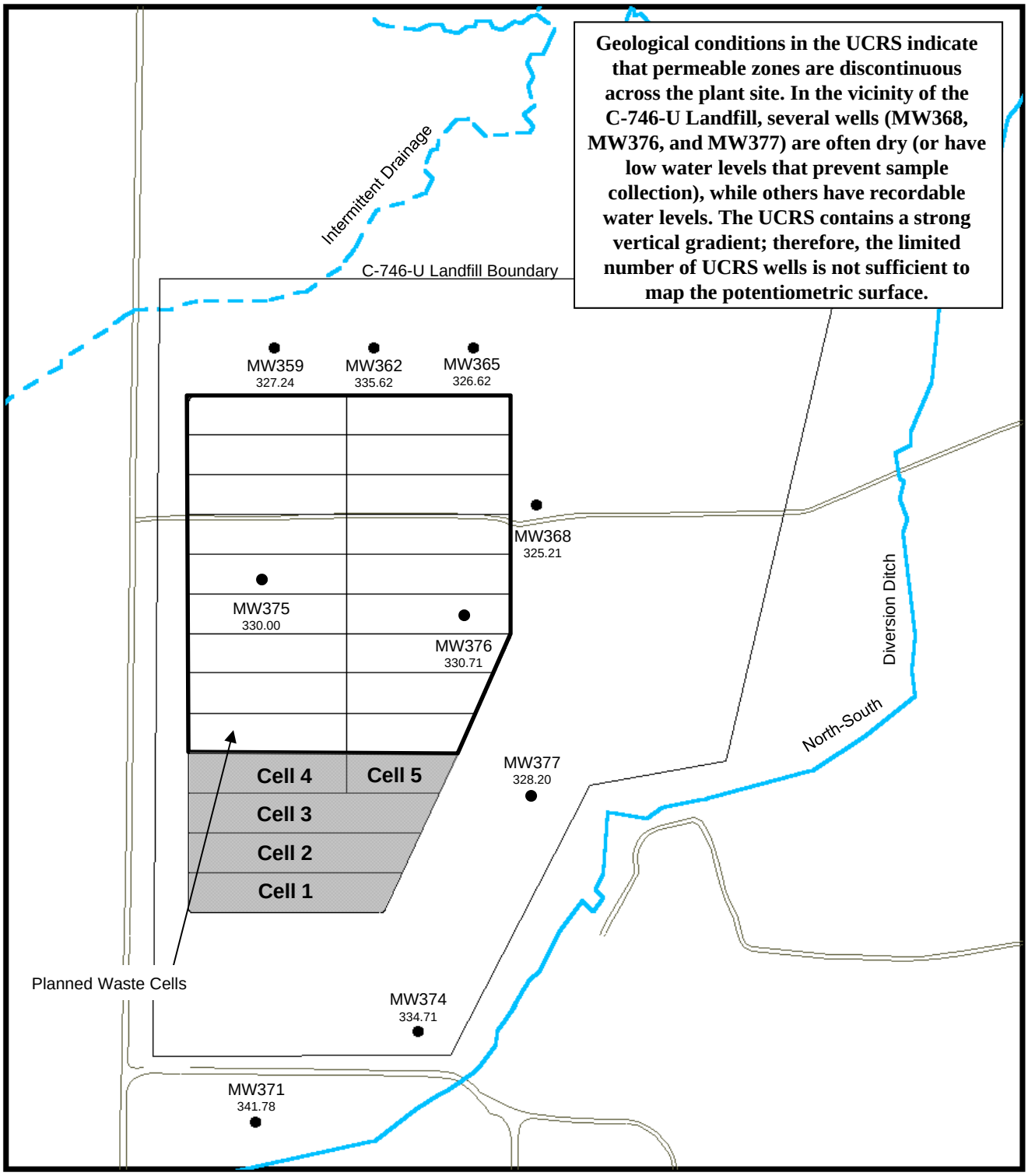
Determination of groundwater flow rate and direction of flow in the uppermost aquifer whenever the monitoring wells (MWs) are sampled is a requirement of 401 *KAR* 48.300, Section 11. The uppermost aquifer below the C-746-U Landfill is the Regional Gravel Aquifer (RGA). Water level measurements currently 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 2015 and determine groundwater flow rate and direction.

Water levels during this reporting period were measured on October 28, 2015. As shown on Figure E.1, all Upper Continental Recharge System (UCRS) wells had sufficient water to permit water level measurement during this reporting period. UCRS wells MW359, MW376, and MW377 had insufficient water to permit sampling.

The UCRS has a strong vertical hydraulic gradient; therefore, the available UCRS wells screened over different elevations are not sufficient for mapping the potentiometric surface. As shown in Table E.1, the RGA data were converted to elevations to plot the potentiometric surfaces within the Upper Regional Gravel Aquifer (URGA) and Lower Regional Gravel Aquifer (LRGA). (At the request of the Commonwealth of Kentucky, the RGA is differentiated into two zones, the URGA and LRGA.) Based on the potentiometric maps (Figures E.2 and E.3), the hydraulic gradients for both the URGA and LRGA at the C-746-U Landfill were similar ($8.58 \times 10^{-4}$ ft/ft and $8.69 \times 10^{-4}$ ft/ft, respectively). 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), along with the C-746-S&T Landfill wells, were used to contour the general RGA potentiometric surface (Figure E.4). The hydraulic gradient for the RGA, as a whole, in the vicinity of the C-746-U Landfill was $5.86 \times 10^{-4}$ 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. SW07300045NWC1 and range from 425 to 725 ft/day (0.150 to 0.256 cm/s). RGA (both URGA and LRGA) effective porosity is assumed to be 25%. Flow velocities were calculated for the URGA and LRGA using the low and high values for hydraulic conductivity, as shown in the Table E.3.

Groundwater flow beneath the C-746-U Landfill typically trends northeastward toward the Ohio River. As demonstrated on the potentiometric map for October 2015, the groundwater flow direction in the immediate area of the landfill ranges from north to northeast.




**LEGEND**

400 0 400 Feet

Contour Interval = N/A

20° True North Plant North

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**Figure E.1. Potentiometric Surface of the Upper Continental Recharge System at the C-746-U Landfill, October 28, 2015**

**Table E.1. C-746-U Landfill Fourth Quarter 2015 (October) Water Levels**

| C-746-U Landfill (October 2015) Water Levels | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Raw Data | | *Corrected Data | |
| Date | Time | Well | Aquifer | Datum Elev (ft amsl) | BP (in Hg) | Delta BP (ft H20) | DTW (ft) | Elev (ft amsl) | DTW (ft) | Elev (ft amsl) |
| 10/28/2015 | 9:06 | MW357 | URGA | 368.99 | 29.68 | 0.01 | 45.82 | 323.17 | 45.83 | 323.16 |
| 10/28/2015 | 9:04 | MW358 | LRGA | 369.13 | 29.68 | 0.01 | 45.97 | 323.16 | 45.98 | 323.15 |
| 10/28/2015 | 9:05 | MW359 | UCRS | 369.11 | 29.68 | 0.01 | 41.86 | 327.25 | 41.87 | 327.24 |
| 10/28/2015 | 9:10 | MW360 | URGA | 362.30 | 29.68 | 0.01 | 39.13 | 323.17 | 39.14 | 323.16 |
| 10/28/2015 | 9:08 | MW361 | LRGA | 361.54 | 29.68 | 0.01 | 38.40 | 323.14 | 38.41 | 323.13 |
| 10/28/2015 | 9:09 | MW362 | UCRS | 362.04 | 29.68 | 0.01 | 26.41 | 335.63 | 26.42 | 335.62 |
| 10/28/2015 | 15:35 | MW363 | URGA | 368.83 | 29.68 | 0.01 | 45.73 | 323.10 | 45.74 | 323.09 |
| 10/28/2015 | 15:34 | MW364 | LRGA | 367.75 | 29.68 | 0.01 | 44.70 | 323.05 | 44.71 | 323.04 |
| 10/28/2015 | 9:14 | MW365 | UCRS | 368.37 | 29.68 | 0.01 | 41.74 | 326.63 | 41.75 | 326.62 |
| 10/28/2015 | 15:40 | MW366 | URGA | 369.27 | 29.68 | 0.01 | 45.96 | 323.31 | 45.97 | 323.30 |
| 10/28/2015 | 15:38 | MW367 | LRGA | 369.66 | 29.68 | 0.01 | 46.36 | 323.30 | 46.37 | 323.29 |
| 10/28/2015 | 9:19 | MW368 | UCRS | 369.27 | 29.68 | 0.01 | 44.05 | 325.22 | 44.06 | 325.21 |
| 10/28/2015 | 9:47 | MW369 | URGA | 364.48 | 29.68 | 0.01 | 39.77 | 324.71 | 39.78 | 324.70 |
| 10/28/2015 | 9:45 | MW370 | LRGA | 365.35 | 29.68 | 0.01 | 40.66 | 324.69 | 40.67 | 324.68 |
| 10/28/2015 | 9:46 | MW371 | UCRS | 364.88 | 29.68 | 0.01 | 23.09 | 341.79 | 23.10 | 341.78 |
| 10/28/2015 | 9:43 | MW372 | URGA | 359.66 | 29.68 | 0.01 | 34.98 | 324.68 | 34.99 | 324.67 |
| 10/28/2015 | 9:41 | MW373 | LRGA | 359.95 | 29.68 | 0.01 | 35.29 | 324.66 | 35.30 | 324.65 |
| 10/28/2015 | 9:42 | MW374 | UCRS | 359.71 | 29.68 | 0.01 | 24.99 | 334.72 | 25.00 | 334.71 |
| 10/28/2015 | 9:36 | MW375 | UCRS | 370.53 | 29.68 | 0.01 | 40.52 | 330.01 | 40.53 | 330.00 |
| 10/28/2015 | 9:34 | MW376 | UCRS | 370.61 | 29.68 | 0.01 | 39.89 | 330.72 | 39.90 | 330.71 |
| 10/28/2015 | 9:32 | MW377 | UCRS | 365.92 | 29.68 | 0.01 | 37.71 | 328.21 | 37.72 | 328.20 |

Initial Barometric Pressure **29.69**

Elev = elevation

amsl = above mean sea level

BP = barometric pressure

DTW = depth to water in feet below datum

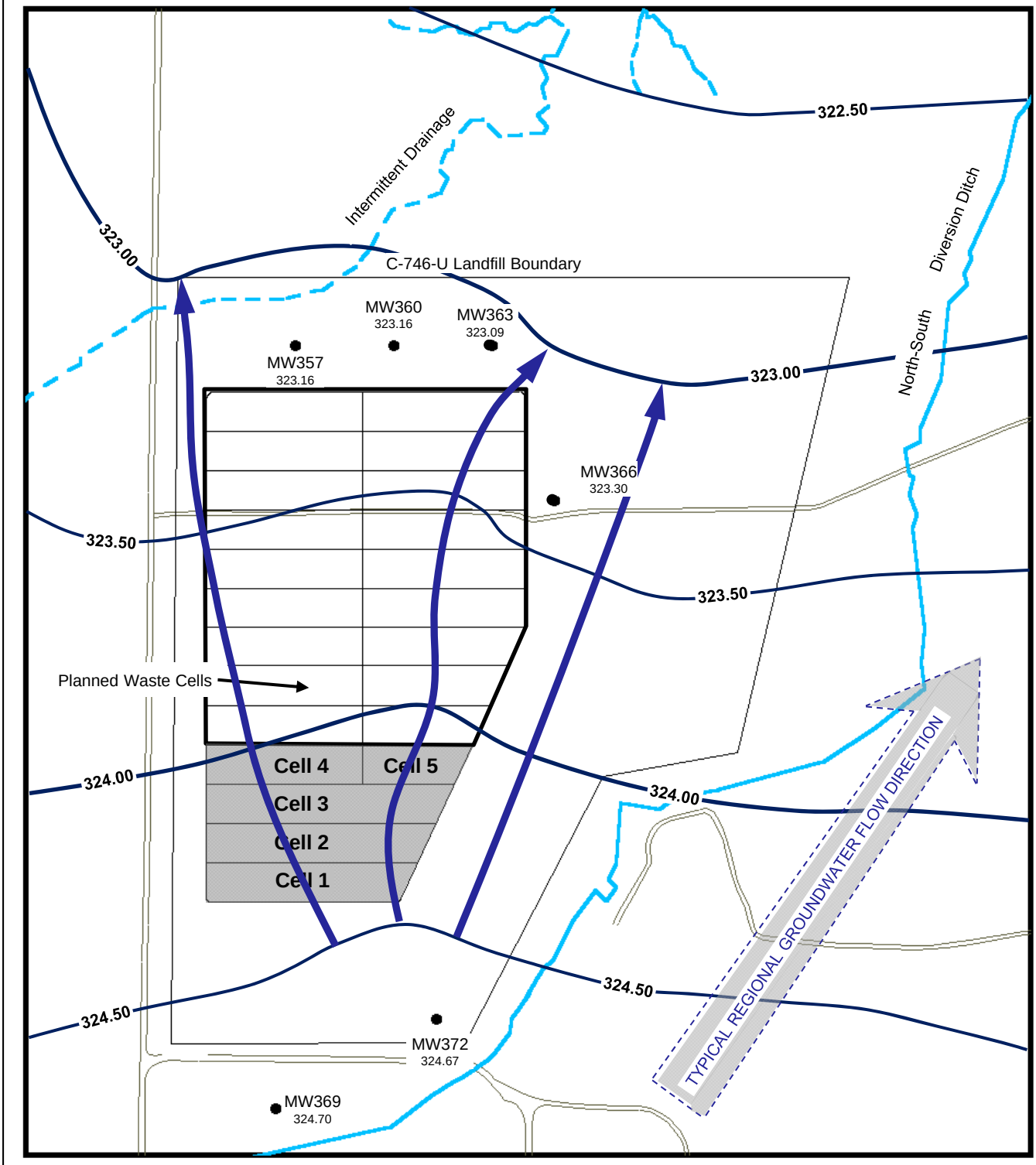
URGA = Upper Regional Gravel Aquifer

LRGA = Lower Regional Gravel Aquifer

UCRS = Upper Continental Recharge System

ND = No Data acquired

*Assumes a barometric efficiency of 1.0




**LEGEND**

400 0 400 Feet

Contour Interval = 0.5 ft
Groundwater Flow Direction
327.00 Potentiometric Surface Contour

20° True North Plant North

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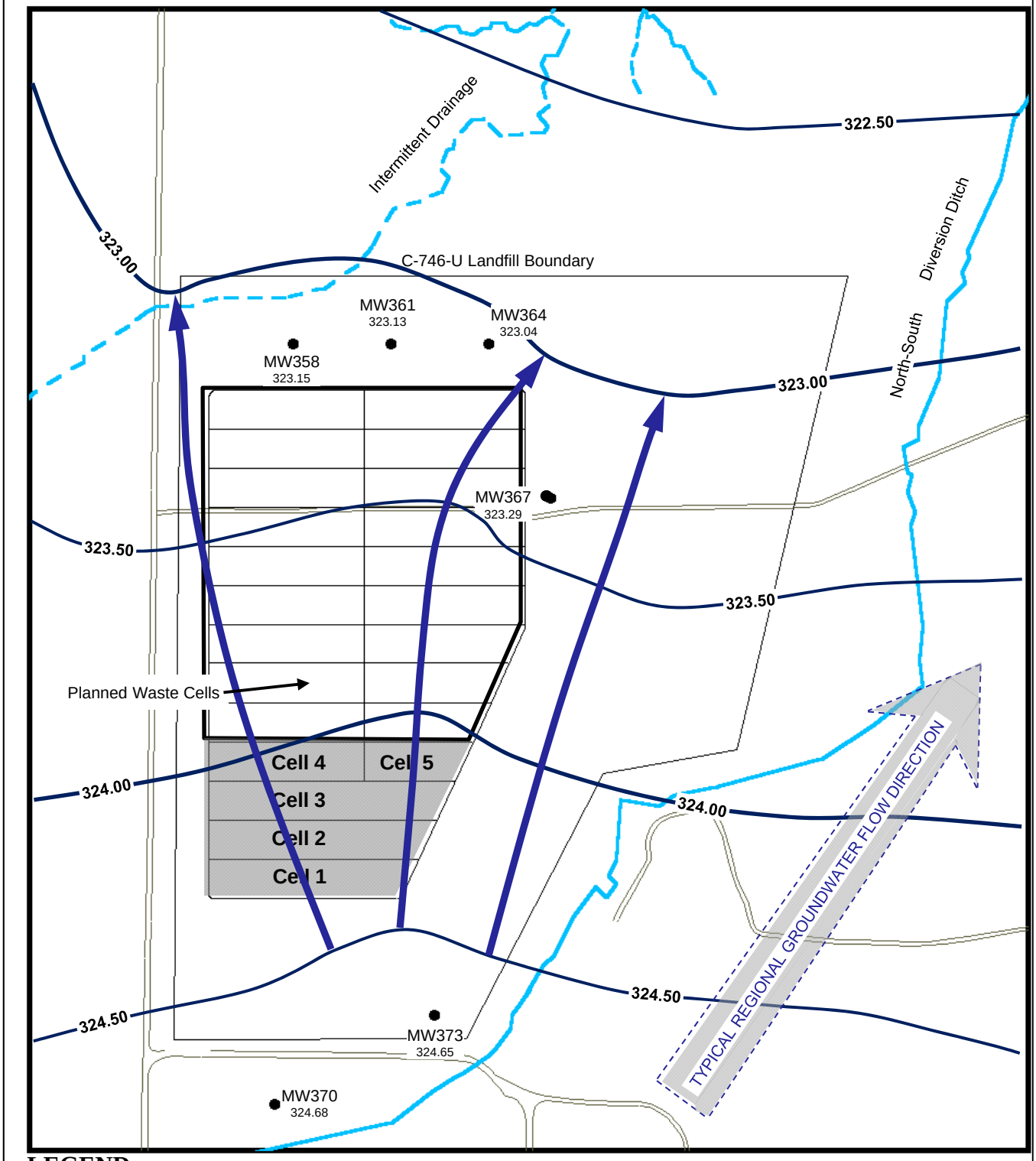
**Figure E.2. Potentiometric Surface of the Upper Regional Gravel Aquifer at the C-746-U Landfill, October 28, 2015**




**LEGEND**

400 0 400 Feet

Contour Interval = 0.5 ft

Groundwater Flow Direction

327.00 Potentiometric Surface Contour

20° True North Plant North

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**Figure E.3. Potentiometric Surface of the Lower Regional Gravel Aquifer at the C-746-U Landfill, October 28, 2015**

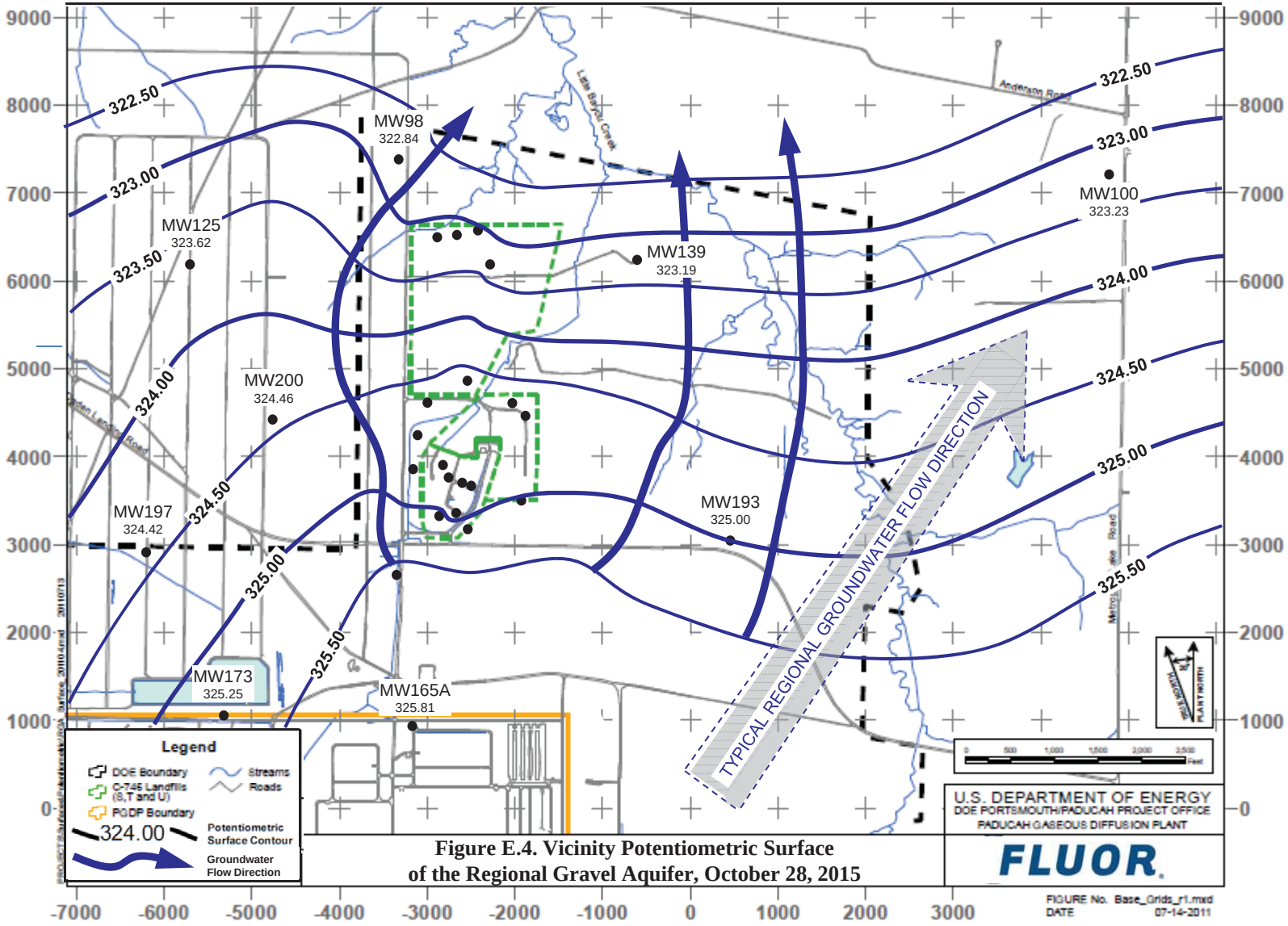


**Figure E.4. Vicinity Potentiometric Surface of the Regional Gravel Aquifer, October 28, 2015**

**Table E.2. C-746-U Landfill Hydraulic Gradients**

| | ft/ft |
|---|---|
| Beneath Landfill—Upper RGA | $8.58 \times 10^{-4}$ |
| Beneath Landfill—Lower RGA | $8.69 \times 10^{-4}$ |
| Vicinity | $5.86 \times 10^{-4}$ |

**Table E.3. C-746-U Landfill 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 |
| Upper RGA | | | | | |
| 725 | 0.256 | 0.62 | $2.20 \times 10^{-4}$ | 2.49 | $8.78 \times 10^{-4}$ |
| 425 | 0.150 | 0.36 | $1.29 \times 10^{-4}$ | 1.46 | $5.15 \times 10^{-4}$ |
| Lower RGA | | | | | |
| 725 | 0.256 | 0.63 | $2.23 \times 10^{-4}$ | 2.52 | $8.90 \times 10^{-4}$ |
| 425 | 0.150 | 0.37 | $1.30 \times 10^{-4}$ | 1.48 | $5.22 \times 10^{-4}$ |

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# 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 has been submitted to the Kentucky Division of Waste Management. The parameters submitted are listed on page F-4. The notification for parameters that do not have MCLs, but had statistically significant increased concentrations relative to historical background concentrations is provided below.

**Statistical Analysis of Parameters Notification**

The statistical analyses conducted on the fourth quarter 2015 groundwater data collected from the C-746-U Landfill 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** | None | |
| **Upper Regional Gravel Aquifer** | Sodium | MW360 |
| | Technetium-99 | MW372 |
| **Lower Regional Gravel Aquifer** | Technetium-99 | MW361, MW370 |

**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.

12/9/2015

**Fluor Federal Services**
**PROJECT ENVIRONMENTAL MEASUREMENTS SYSTEM**
**C-746-U LANDFILL**
**PERMIT NUMBER 073-00045**
**MAXIMUM CONTAMINANT LIMIT (MCL) EXCEEDANCE REPORT**
**Quarterly Groundwater Sampling**

| AKGWA | Station | Analysis | Method | Results | Units | MCL |
|---|---|---|---|---|---|---|
| 8004-4798 | MW357 | Trichloroethene | 8260B | 5.78 | ug/L | 5 |
| 8004-4799 | MW358 | Beta activity | 9310 | 51 | pCi/L | 50 |
| 8004-4808 | MW372 | Beta activity | 9310 | 86.8 | pCi/L | 50 |
| | | Trichloroethene | 8260B | 9.18 | ug/L | 5 |
| 8004-4792 | MW373 | Trichloroethene | 8260B | 9.14 | ug/L | 5 |

NOTE 1: These limits are defined in 401 KAR 47:030.

NOTE 2: MW370, MW372, and MW373 are down-gradient wells for the C-746-S and C-746-T Landfills and upgradient for the the C-746-U Landfill. These wells are sampled with the C-746-U Landfill monitoring well network. These wells are reported on the exceedance reports for C-746-S, C-746-T, and C-746-U.

# APPENDIX G

# CHART OF MCL AND UTL EXCEEDANCES

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**Chart of MCL and Historical UTL Exceedances for the C-746-U Contained Landfill**

| Groundwater Flow System | UCRS | | | | | | | | | URGA | | | | | | LRGA | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Gradient | S | S | S | S | D | D | D | U | U | S | D | D | D | U | U | S | D | D | S | U | U |
| Monitoring Well | 368 | 375 | 376 | 377 | 359 | 362 | 365 | 371 | 374 | 366 | 360 | 363 | 357 | 369 | 372 | 367 | 361 | 364 | 358 | 370 | 373 |
| **ACETONE** | | | | | | | | | | | | | | | | | | | | | |
| Quarter 3, 2002 | | | | | | | | | | ✱ | ✱ | ✱ | | | | | | | | | |
| Quarter 4, 2002 | | | | | | | | | | ✱ | ✱ | ✱ | | | | | | | | | |
| Quarter 1, 2003 | | | | | | | | | | | ✱ | ✱ | | | | | | | | | |
| Quarter 2, 2003 | | | | | | | | | | | ✱ | ✱ | | | | | | | | | |
| Quarter 3, 2003 | ✱ | | | | | | ✱ | | | ✱ | ✱ | ✱ | | | ✱ | | | ✱ | | | |
| Quarter 4, 2003 | | | | | | ✱ | ✱ | | | | ✱ | | | ✱ | | | | | | | |
| Quarter 3, 2004 | | | | | | ✱ | | | | | | | | | | ✱ | | | | | |
| Quarter 3, 2005 | | | | | | ✱ | | | | | | | | | | | | | | | |
| Quarter 4, 2005 | | | | | | ✱ | | | | | | | | | | | | | | | |
| **ALPHA ACTIVITY** | | | | | | | | | | | | | | | | | | | | | |
| Quarter 1, 2004 | | | | | | | | | | | | | | | | | | | | | ■ |
| Quarter 2, 2004 | | | | | | ■ | | | | | | | | | | | | | | | |
| Quarter 3, 2009 | | | | | | ■ | | | | | | | | | | | | | | | |
| **ALUMINUM** | | | | | | | | | | | | | | | | | | | | | |
| Quarter 3, 2003 | | | | | | | | | | | ✱ | | | | | | | | | | |
| **BETA ACTIVITY** | | | | | | | | | | | | | | | | | | | | | |
| Quarter 1, 2004 | | | | | | | | | | | | | | | ■ | | | | | | |
| Quarter 2, 2004 | | | | | | | | | | | | | | | ■ | | | | | | ■ |
| Quarter 3, 2004 | | | | | | | | | | | | | | | ■ | | | | | | |
| Quarter 4, 2004 | | | | | | | | | | | | | | | ■ | | | | | | |
| Quarter 4, 2005 | | | | | | | | | | | | | | | ■ | | | | | | |
| Quarter 1, 2006 | | | | | | | | | | | | | | | ■ | | | | | | ■ |
| Quarter 2, 2006 | | | | | | | | | | | | | | | | | | | | | ■ |
| Quarter 3, 2006 | | | | | | | | | | | | | | | ■ | | | | | | ■ |
| Quarter 4, 2006 | | | | | | | | | | | | | | | ■ | | | | | | ■ |
| Quarter 1, 2007 | | | | | | | | | | ■ | | | | | ■ | | | | | | ■ |
| Quarter 2, 2007 | | | | | | | | | | | | | | | ■ | | | | | | ■ |
| Quarter 3, 2007 | | | | | | | | | | ■ | | | | | ■ | | | | | | |
| Quarter 4, 2007 | | | | | | | | | | ■ | | | | | ■ | | | | | | ■ |
| Quarter 1, 2008 | | | | | | | | | | ■ | | | | | ■ | | | | | | |
| Quarter 2, 2008 | | | | | | | | | | | | | | ■ | | ■ | | | | | |
| Quarter 3, 2008 | | | | | | | | | | ■ | | | | | ■ | | | | ■ | | |
| Quarter 4, 2008 | | | | | | | | | | ■ | | | | | ■ | | | | ■ | | |
| Quarter 1, 2009 | | | | | | | | | | ■ | | | | | ■ | | | | | | |
| Quarter 2, 2009 | | | | | | | | | | | | | | | ■ | ■ | ■ | | | | |
| Quarter 3, 2009 | | | | | | | | | | ■ | | | | | ■ | | | | | | |
| Quarter 4, 2009 | | | | | | | | | | ■ | | | | | ■ | | | | | | |
| Quarter 1, 2010 | | | | | | | | | | | | | | | ■ | | | | | | |
| Quarter 2, 2010 | | | | | | | | | | ■ | | | | | | ■ | | | | | |
| Quarter 3, 2010 | | | | | | | | | | ■ | | | | | | | | | | | |
| Quarter 4, 2010 | | | | | | | | | | | | | | | ■ | | | | | | |
| Quarter 2, 2011 | | | | | | | | | | ■ | | | | | | ■ | | | | | |
| Quarter 4, 2011 | | | | | | | | | | | | | | | ■ | | | | | | |
| Quarter 1, 2012 | | | | | | | | | | ■ | | | | | | | | | | | |
| Quarter 2, 2012 | | | | | | | | | | ■ | | | | | | | | ■ | | | |
| Quarter 3, 2012 | | | | | | | | | | ■ | | | | | ■ | | | | | | |
| Quarter 4, 2012 | | | | | | | | | | | | | | | ■ | | | | | | ■ |
| Quarter 1, 2013 | | | | | | | | | | | | | | | ■ | | | | | | ■ |
| Quarter 3, 2013 | | | | | | | | | | | | | | | ■ | | | | | | ■ |
| Quarter 4, 2013 | | | | | | | | | | | | | | | ■ | | | | | | |
| Quarter 1, 2014 | | | | | | | | | | | | | | | ■ | | | | | | |
| Quarter 4, 2014 | | | | | | | | | | | | | | | ■ | | | | | | |
| Quarter 1, 2015 | | | | | | | | | | | | | | | ■ | | | | | | |
| Quarter 2, 2015 | | | | | | | | | | | | | | | | ■ | | | | | |
| Quarter 4, 2015 | | | | | | | | | | | | | | | ■ | | | | ■ | | |
| **BROMIDE** | | | | | | | | | | | | | | | | | | | | | |
| Quarter 2, 2004 | | | | | | | | | | | | | ✱ | | | | | | | | |

**Chart of MCL and Historical UTL Exceedances for the C-746-U Contained Landfill (Continued)**

| Groundwater Flow System | UCRS | | | | | | | | | URGA | | | | | | LRGA | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Gradient | S | S | S | S | D | D | D | U | U | S | D | D | D | U | U | S | D | D | S | U | U |
| Monitoring Well | 368 | 375 | 376 | 377 | 359 | 362 | 365 | 371 | 374 | 366 | 360 | 363 | 357 | 369 | 372 | 367 | 361 | 364 | 358 | 370 | 373 |
| **CALCIUM** | | | | | | | | | | | | | | | | | | | | | |
| Quarter 3, 2003 | | | | | | | | | | ✱ | | | | | | | | | | | |
| Quarter 2, 2005 | | | | | | | | | | | | | | | | | | | | | ✱ |
| Quarter 3, 2006 | | | | | | | | | | | | | | | ✱ | | | | | | |
| Quarter 2, 2008 | | | | | | | | | | | | | | | ✱ | | | | | | |
| Quarter 3, 2009 | | | | | | | | | | | | | | | ✱ | | | | | | |
| Quarter 4, 2009 | | | | | | | | | | | | | | | ✱ | | | | | | |
| Quarter 1, 2010 | | | | | | | | | | | | | | | ✱ | | | | | | |
| Quarter 2, 2010 | | | | | | | | | | | | | | | ✱ | | | | | | |
| Quarter 3, 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 2, 2014 | | | | | | | | | | | | | | | ✱ | | | | | | ✱ |
| Quarter 3, 2014 | | | | | | | | | | | | | | | ✱ | | | | | | ✱ |
| Quarter 4, 2014 | | | | | | | | | | | | | | | ✱ | | | | | | |
| Quarter 2, 2015 | | | | | | | | | | | | | | | ✱ | | | | | | |
| Quarter 3, 2015 | | | | | | | | | | | | | | | ✱ | | | | | | |
| Quarter 4, 2015 | | | | | | | | | | | | | | | ✱ | | | | | | |
| **CARBON DISULFIDE** | | | | | | | | | | | | | | | | | | | | | |
| Quarter 3, 2003 | | | | | | | | | | ✱ | | | | | | | | | | | |
| Quarter 2, 2005 | | | | | | | ✱ | | | | | | | | | | | | | | |
| Quarter 3, 2005 | | | | | | ✱ | | | | | | | | | | | | | | | |
| Quarter 4, 2005 | | | | | | ✱ | | | | | | | | | | | | | | | |
| Quarter 1, 2006 | | | | | | ✱ | | | | | | | | | | | | | | | |
| Quarter 2, 2006 | | | | | | ✱ | | | | | | | | | | | | | | | |
| Quarter 3, 2010 | | ✱ | | | | | | | | | ✱ | | | | | | | | | | |
| Quarter 4, 2010 | | | | | | | | | | | | | | ✱ | | | | | | | |
| Quarter 1, 2011 | | | | | | | | | | | | | | | ✱ | | | | | | |
| **CHEMICAL OXYGEN DEMAND** | | | | | | | | | | | | | | | | | | | | | |
| Quarter 3, 2002 | | | | | | | | | | ✱ | ✱ | ✱ | ✱ | ✱ | ✱ | | | | | | |
| Quarter 4, 2002 | | | | | | | | | | ✱ | ✱ | | | | | | | | | | |
| Quarter 1, 2003 | | | | | | | | | | ✱ | ✱ | | | | | | | | | | |
| Quarter 2, 2003 | | | | | | | | | | ✱ | ✱ | ✱ | | | | | | | | | |
| Quarter 3, 2003 | ✱ | | | | | | | | | ✱ | ✱ | | | | | ✱ | | | | | |
| Quarter 4, 2003 | | | | | | ✱ | | | | ✱ | ✱ | | | | | | | | | | |
| Quarter 3, 2004 | | | | | | | | | | ✱ | | | | | | | | | | | |
| Quarter 3, 2005 | | | | | | ✱ | | | | ✱ | | | | | ✱ | ✱ | | | ✱ | | |
| Quarter 4, 2005 | | | | | | ✱ | | | | | | | | | | | | ✱ | ✱ | | |
| Quarter 1, 2006 | | | | | | | | | | | | | | | | | | | ✱ | | |
| **CHLORIDE** | | | | | | | | | | | | | | | | | | | | | |
| Quarter 1, 2006 | | | | | | | | | | | | | | | | | | | | ✱ | |
| Quarter 2, 2014 | | | | | | | | | | | | | | | ✱ | | | | | | |
| **COBALT** | | | | | | | | | | | | | | | | | | | | | |
| Quarter 3, 2003 | ✱ | | | | | | ✱ | | | ✱ | ✱ | | ✱ | ✱ | ✱ | ✱ | ✱ | ✱ | | ✱ | |
| Quarter 1, 2004 | | | | | | | | | | | | | | ✱ | | | | | | | |
| **CONDUCTIVITY** | | | | | | | | | | | | | | | | | | | | | |
| Quarter 4, 2002 | | | | | | | | | | ✱ | | | | | | | | | | | |
| Quarter 1, 2003 | | | | | | | | | | ✱ | | | | | | | | | | | |
| Quarter 2, 2003 | | | | | | | | | | ✱ | ✱ | | | | | | | | | | |
| Quarter 4, 2003 | | | | | | | | | | ✱ | | | | | | | | | | | |
| Quarter 1, 2004 | | | | | | | | | | ✱ | | | | | | | | | | | |

**Chart of MCL and Historical UTL Exceedances for the C-746-U Contained Landfill (Continued)**

| Groundwater Flow System | UCRS | | | | | | | | | URGA | | | | | | LRGA | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Gradient | S | S | S | S | D | D | D | U | U | S | D | D | D | U | U | S | D | D | S | U | U |
| Monitoring Well | 368 | 375 | 376 | 377 | 359 | 362 | 365 | 371 | 374 | 366 | 360 | 363 | 357 | 369 | 372 | 367 | 361 | 364 | 358 | 370 | 373 |
| **CONDUCTIVITY** | | | | | | | | | | | | | | | | | | | | | |
| 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 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 | | | | | | | | | | | | | | | ✱ | | | | | | |
| **DISSOLVED OXYGEN** | | | | | | | | | | | | | | | | | | | | | |
| Quarter 1, 2003 | | | | | ✱ | ✱ | | | | ✱ | | | | | | | | | | | |
| Quarter 3, 2003 | | | | | ✱ | | | | | ✱ | | | | | | | | | | | |
| Quarter 4, 2003 | | | | | ✱ | | | | | | | | | | | | | | | | |
| Quarter 1, 2004 | | | | | ✱ | | | | | | | | | | | | | | | | |
| Quarter 2, 2004 | | | | | | | | ✱ | | | | | | | | ✱ | | | | | |
| Quarter 1, 2005 | | | | | ✱ | | | | | | | | | | | | | | | | |
| Quarter 2, 2005 | | | | | | | | ✱ | | | | | | | | | | | | | |
| Quarter 1, 2006 | | | | | ✱ | | | | | | | | | | | | | | | | |
| Quarter 2, 2006 | | | | | ✱ | | | ✱ | | | | | | | | | | | | | |
| Quarter 3, 2006 | | | | | ✱ | | | ✱ | | | | | | | | | | | | | |
| Quarter 4, 2006 | | | | | ✱ | | | | ✱ | | | | | | | | | | | | |
| Quarter 2, 2007 | | | | | ✱ | | | ✱ | | | | | | | | | | | | | |
| Quarter 3, 2007 | | | | | ✱ | | | ✱ | ✱ | | | | | | | | | | | | |
| Quarter 1, 2008 | | | | | ✱ | | | | | | | | | | | | | | ✱ | | |
| Quarter 2, 2008 | | | | | | | | ✱ | ✱ | | | | | | | | | | | | |
| Quarter 3, 2008 | | | | | | | | ✱ | | | | | | | | | | | | | |
| Quarter 1, 2009 | | | | | | | ✱ | | | | | | | | | | | | | | |
| Quarter 2, 2009 | | | | | ✱ | | | ✱ | ✱ | | | | | | | | | | | | |
| Quarter 3, 2009 | | | | | | ✱ | | ✱ | ✱ | | | | | | | | | | | | |

**Chart of MCL and Historical UTL Exceedances for the C-746-U Contained Landfill (Continued)**

| Groundwater Flow System | UCRS | | | | | | | | | URGA | | | | | | LRGA | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Gradient | S | S | S | S | D | D | D | U | U | S | D | D | D | U | U | S | D | D | S | U | U |
| Monitoring Well | 368 | 375 | 376 | 377 | 359 | 362 | 365 | 371 | 374 | 366 | 360 | 363 | 357 | 369 | 372 | 367 | 361 | 364 | 358 | 370 | 373 |
| **DISSOLVED OXYGEN** | | | | | | | | | | | | | | | | | | | | | |
| Quarter 1, 2010 | | | | | ✱ | | ✱ | | | | | | | | | | | | | | |
| Quarter 2, 2010 | | | | | ✱ | ✱ | | ✱ | ✱ | | | | | | | | | | | ✱ | ✱ |
| Quarter 3, 2010 | | | | | ✱ | ✱ | | | | | | | | | | | | | | | |
| Quarter 4, 2010 | | | | | | | ✱ | | | | | ✱ | | | | | | | | ✱ | |
| Quarter 1, 2011 | | | | | | ✱ | | | | | | | | | | | | | | | |
| Quarter 2, 2011 | | | | | ✱ | ✱ | ✱ | ✱ | ✱ | | | | | ✱ | | | | | | | |
| Quarter 3, 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 2, 2014 | ✱ | | | | ✱ | ✱ | ✱ | ✱ | ✱ | | | | | | | | | ✱ | | | |
| Quarter 3, 2014 | ✱ | | | | ✱ | ✱ | ✱ | | | | | | | | | | | | | | |
| Quarter 4, 2014 | | | | | | ✱ | | | | | | | | | | | | | | | |
| Quarter 2, 2015 | | | | | ✱ | ✱ | ✱ | ✱ | | | | | | | | | | | | | |
| Quarter 3, 2015 | | | | | ✱ | ✱ | | ✱ | | | | | | | | | | | | | |
| Quarter 4, 2015 | ✱ | | | | | ✱ | ✱ | | | | | | | | | | | | | | |
| **DISSOLVED SOLIDS** | | | | | | | | | | | | | | | | | | | | | |
| Quarter 4, 2002 | | | | | | | | | | ✱ | | | | | | | | | | | |
| Quarter 1, 2003 | | | | | | | | | | ✱ | | | | | | | | | | | |
| Quarter 2, 2003 | | | | | | | | | | ✱ | | | | | | | | | | | |
| Quarter 3, 2003 | | | | | | | ✱ | | | ✱ | ✱ | | | | | | | | | | |
| Quarter 4, 2003 | | | | | | | | | | ✱ | | | | | | | | | | | |
| Quarter 3, 2005 | | | | | | ✱ | | | | | | | | | | | | | | | |
| Quarter 4, 2006 | | | | | | | | | | | | | | | ✱ | | | | | | |
| Quarter 1, 2007 | | | | | | | | | | | | | | | ✱ | | | | | | |
| Quarter 2, 2007 | | | | | | | | | | | | | | | ✱ | | | | | | |
| 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 4, 2014 | | | | | | | | | | | | | | | ✱ | | | | | | |
| Quarter 2, 2015 | | | | | | | | | | | | | | | ✱ | | | | | | |
| Quarter 3, 2015 | | | | | | | | | | | | | | | ✱ | | | | | | |
| Quarter 4, 2015 | | | | | | | | | | | | | | | ✱ | | | | | | |
| **IODIDE** | | | | | | | | | | | | | | | | | | | | | |
| Quarter 2, 2003 | | | | | | | | | | | | | | | | ✱ | | | | | |
| Quarter 3, 2003 | ✱ | | | | | | | | | ✱ | | | | | | | | | | | |
| Quarter 4, 2003 | | | | | | | ✱ | | | | | | | | | | | | | | |
| Quarter 3, 2010 | | | | | | ✱ | | ✱ | | | | | ✱ | | | | ✱ | | | | |
| **IODINE-131** | | | | | | | | | | | | | | | | | | | | | |
| Quarter 3, 2010 | | | | | | | | | | | | | | | | | | ■ | | | |

**Chart of MCL and Historical UTL Exceedances for the C-746-U Contained Landfill (Continued)**

| Groundwater Flow System | UCRS | | | | | | | | | URGA | | | | | | LRGA | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Gradient | S | S | S | S | D | D | D | U | U | S | D | D | D | U | U | S | D | D | S | U | U |
| Monitoring Well | 368 | 375 | 376 | 377 | 359 | 362 | 365 | 371 | 374 | 366 | 360 | 363 | 357 | 369 | 372 | 367 | 361 | 364 | 358 | 370 | 373 |
| **IODOMETHANE** | | | | | | | | | | | | | | | | | | | | | |
| Quarter 4, 2003 | | | | | | * | | | | | | | | | | | | | | | |
| **IRON** | | | | | | | | | | | | | | | | | | | | | |
| Quarter 4, 2002 | | | | | | * | | | | | | | | | | | | | | | |
| Quarter 3, 2003 | | | | | | | | | | | | | | | | * | | | | | |
| Quarter 4, 2003 | | | | | | | | | | * | | | | | | * | | | | | |
| Quarter 1, 2004 | | | | | | | | | | * | | | | | | * | | | | | |
| Quarter 2, 2004 | | | | | | | | | | * | | | | | | | | | | | |
| Quarter 3, 2004 | | | | | | | | | | * | | | | | | | | | | | |
| Quarter 3, 2005 | | | | | | | | | | | | | | | | * | | | | | |
| **MAGNESIUM** | | | | | | | | | | | | | | | | | | | | | |
| Quarter 2, 2005 | | | | | | | | | | | | | | | * | | | | | | * |
| Quarter 3, 2005 | | | | | | * | | | | | | | | | | | | | | | * |
| Quarter 2, 2006 | | | | | | | | | | | | | | | * | | | | | | * |
| Quarter 3, 2006 | | | | | | | | | | | | | | | * | | | | | | |
| Quarter 1, 2007 | | | | | | | | | | | | | | | * | | | | | | |
| Quarter 2, 2008 | | | | | | | | | | | | | | | * | | | | | | |
| Quarter 2, 2009 | | | | | | | | | | | | | | | * | | | | | | |
| Quarter 3, 2009 | | | | | | | | | | | | | | | * | | | | | | |
| Quarter 4, 2009 | | | | | | | | | | | | | | | * | | | | | | |
| Quarter 1, 2010 | | | | | | | | | | | | | | | * | | | | | | |
| Quarter 2, 2010 | | | | | | | | | | | | | | | * | | | | | | |
| Quarter 3, 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 2, 2014 | | | | | | | | | | | | | | | * | | | | | | |
| Quarter 4, 2014 | | | | | | | | | | | | | | | * | | | | | | |
| Quarter 2, 2015 | | | | | | | | | | | | | | | * | | | | | | |
| Quarter 3, 2015 | | | | | | | | | | | | | | | * | | | | | | |
| Quarter 4, 2015 | | | | | | | | | | | | | | | * | | | | | | |
| **MANGANESE** | | | | | | | | | | | | | | | | | | | | | |
| Quarter 3, 2002 | | | | | | | | | | * | | * | | | | | | | | | |
| Quarter 4, 2002 | | * | | | | * | * | | | * | | * | | * | | | | | | | |
| Quarter 2, 2003 | | | | | | | | | | * | | * | | | | | | | | | |
| Quarter 3, 2003 | | | | | | | | | | * | | * | * | | | * | * | * | * | | |
| Quarter 4, 2003 | | | | | | | | | | * | * | * | * | | | | * | * | | | |
| Quarter 1, 2004 | | | | | | | | | | * | * | * | | | | * | * | * | | | |
| Quarter 2, 2004 | | | | | | | * | | | * | * | * | | | | | | * | | | |
| Quarter 3, 2004 | | | | | | | * | | | * | * | * | | | | * | | | | | |
| Quarter 4, 2004 | | | | | | | | | | * | | * | | | | * | | | | | |
| Quarter 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 3, 2008 | | | | | | | * | | | | | | | | | | | | | | |
| Quarter 4, 2008 | | | | | | | * | | | | | | | | | | | | | | |
| Quarter 3, 2009 | | | | | | | * | | | | | | | | | | | | | | |
| Quarter 3, 2011 | | | | | | | * | | | | | | | | | | | | | | |

**Chart of MCL and Historical UTL Exceedances for the C-746-U Contained Landfill (Continued)**

| Groundwater Flow System | UCRS | | | | | | | | | URGA | | | | | | LRGA | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Gradient | S | S | S | S | D | D | D | U | U | S | D | D | D | U | U | S | D | D | S | U | U |
| Monitoring Well | 368 | 375 | 376 | 377 | 359 | 362 | 365 | 371 | 374 | 366 | 360 | 363 | 357 | 369 | 372 | 367 | 361 | 364 | 358 | 370 | 373 |
| **NICKEL** | | | | | | | | | | | | | | | | | | | | | |
| Quarter 3, 2003 | | | | | | | | | | ✱ | | | | | | | | | | | |
| **OXIDATION-REDUCTION POTENTIAL** | | | | | | | | | | | | | | | | | | | | | |
| Quarter 4, 2002 | | | | | | | | | | | | | | | | | ✱ | | ✱ | | |
| Quarter 1, 2003 | | | | | | | | | | | | | | | | | ✱ | | ✱ | | |
| Quarter 2, 2003 | | | | | | | | | | | | | | | | | | | ✱ | | |
| Quarter 3, 2003 | ✱ | | | | | | | | | | | | | | | | | | | | |
| 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 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 | ✱ | ✱ | | | | ✱ | ✱ | ✱ | ✱ | ✱ | ✱ | ✱ | ✱ | ✱ | ✱ | ✱ | ✱ | ✱ | ✱ | ✱ | ✱ |
| **PCB, TOTAL** | | | | | | | | | | | | | | | | | | | | | |
| Quarter 4, 2003 | | | | | | | | | | | | | | | | | ✱ | | | | |
| Quarter 3, 2004 | | | | | | | | | | | | ✱ | | | | | | | | | |
| Quarter 3, 2005 | | | | | | | ✱ | | | | | | | | | | | | | | |
| Quarter 2, 2006 | | | | | | | ✱ | | | | | | | | | | | | | | |
| Quarter 3, 2006 | | | | | | | ✱ | | | | | | | | | | | | | | |
| Quarter 1, 2007 | | | | | | | ✱ | | | | | | | | | | | | | | |
| Quarter 2, 2007 | | | | | | | ✱ | | | | | | | | | | | | | | |
| Quarter 3, 2007 | | | | | | | ✱ | | | | | | | | | | | | | | |
| Quarter 1, 2008 | | | | | | | ✱ | | | | | | | | | | | | | | |
| Quarter 2, 2008 | | | | | | | ✱ | | | | | | | | | | | | | | |

**Chart of MCL and Historical UTL Exceedances for the C-746-U Contained Landfill (Continued)**

| Groundwater Flow System | UCRS | | | | | | | | | URGA | | | | | | LRGA | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Gradient | S | S | S | S | D | D | D | U | U | S | D | D | D | U | U | S | D | D | S | U | U |
| Monitoring Well | 368 | 375 | 376 | 377 | 359 | 362 | 365 | 371 | 374 | 366 | 360 | 363 | 357 | 369 | 372 | 367 | 361 | 364 | 358 | 370 | 373 |
| **PCB, TOTAL** | | | | | | | | | | | | | | | | | | | | | |
| Quarter 4, 2008 | | | | | | | ✱ | | | | | | | | | | | | | | |
| Quarter 3, 2009 | | | | | | | ✱ | | | | | | | | | | | | | | |
| Quarter 1, 2010 | | | | | | | ✱ | | | | | | | | | | | | | | |
| Quarter 2, 2010 | | | | | | | ✱ | | | | | | | | | | | | | | |
| Quarter 4, 2010 | | | | | | | ✱ | | | | | | | | | | | | | | |
| **PCB-1016** | | | | | | | | | | | | | | | | | | | | | |
| Quarter 3, 2004 | | | | | | | | | | | | ✱ | | | | | | | | | |
| Quarter 2, 2006 | | | | | | | ✱ | | | | | ✱ | | | | | | | | | |
| Quarter 1, 2007 | | | | | | | ✱ | | | | | | | | | | | | | | |
| Quarter 2, 2007 | | | | | | | ✱ | | | | | | | | | | | | | | |
| Quarter 3, 2007 | | | | | | | ✱ | | | | | | | | | | | | | | |
| Quarter 2, 2008 | | | | | | | ✱ | | | | | | | | | | | | | | |
| Quarter 4, 2008 | | | | | | | ✱ | | | | | | | | | | | | | | |
| Quarter 3, 2009 | | | | | | | ✱ | | | | | | | | | | | | | | |
| Quarter 1, 2010 | | | | | | | ✱ | | | | | | | | | | | | | | |
| Quarter 2, 2010 | | | | | | | ✱ | | | | | | | | | | | | | | |
| Quarter 4, 2010 | | | | | | | ✱ | | | | | | | | | | | | | | |
| **PCB-1242** | | | | | | | | | | | | | | | | | | | | | |
| Quarter 3, 2006 | | | | | | | ✱ | | | | | ✱ | | | | | | | | | |
| Quarter 4, 2006 | | | | | | | | | | ✱ | | | | | | | | | | | |
| Quarter 1, 2008 | | | | | | | ✱ | | | | | | | | | | | | | | |
| Quarter 2, 2012 | | | | | | | ✱ | | | | | | | | | | | | | | |
| **PCB-1248** | | | | | | | | | | | | | | | | | | | | | |
| Quarter 2, 2008 | | | | | | | ✱ | | | | | | | | | | | | | | |
| **PCB-1260** | | | | | | | | | | | | | | | | | | | | | |
| Quarter 2, 2006 | | | | | | | ✱ | | | | | | | | | | | | | | |
| **pH** | | | | | | | | | | | | | | | | | | | | | |
| Quarter 3, 2002 | | | | | | | | | | ✱ | | | | | | | | | | | |
| Quarter 4, 2002 | | | | | | | | | | ✱ | | | | | | | | | | | |
| Quarter 1, 2003 | | | | | | | | | | ✱ | | | | | | | | | | | |
| Quarter 2, 2003 | | | | | | | | | | ✱ | | | | | | | | | | | |
| Quarter 3, 2003 | ✱ | | | | | | ✱ | | | ✱ | | | | | | | | | | | |
| Quarter 4, 2003 | | | | | | | ✱ | | | | | | | | | ✱ | | | | | |
| Quarter 1, 2004 | | | | | | | ✱ | | | | | | | | | ✱ | | | | | |
| Quarter 3, 2005 | | | | | | ✱ | | | | | | | | | | | | ✱ | ✱ | | |
| Quarter 4, 2005 | | | | | | ✱ | | | | | | | | | | | | | ✱ | | |
| Quarter 3, 2006 | | | | | | | | | | | | | | | | ✱ | | | | | |
| Quarter 2, 2011 | | | | | | | | | | | | | | ✱ | | | | | | | |
| Quarter 3, 2011 | | | | | | | | | | | | | | ✱ | | | | | | | |
| Quarter 4, 2011 | | | | | | | | | | | | | | ✱ | | | | | | | |
| Quarter 1, 2012 | | | | | | | | | | | | | | | | ✱ | ✱ | | | | |
| Quarter 2, 2012 | | | | | | | | | | | | ✱ | | | | | | | | | |
| Quarter 1, 2013 | | | | | | | | | | ✱ | | ✱ | | | | ✱ | | | | | |
| Quarter 3, 2015 | | | | | | | | | | | | | | | | | ✱ | | | | |
| **POTASSIUM** | | | | | | | | | | | | | | | | | | | | | |
| Quarter 1, 2014 | | | | | | | | | | | | | | | | ✱ | | | | | |
| **RADIUM-228** | | | | | | | | | | | | | | | | | | | | | |
| Quarter 2, 2005 | | | | | | | | | | | | | | ■ | | | | | | | |
| Quarter 4, 2005 | | | | | | ■ | | | | | | ■ | | | | | | ■ | | | |
| **SELENIUM** | | | | | | | | | | | | | | | | | | | | | |
| Quarter 4, 2003 | | | | | | | | | ■ | | | | | | | | | | | | |
| **SODIUM** | | | | | | | | | | | | | | | | | | | | | |
| Quarter 3, 2002 | | | | | | | | | | ✱ | ✱ | | ✱ | | | | | | | | |
| Quarter 4, 2002 | | | | | | | | | | ✱ | ✱ | | | ✱ | | | | | | | |
| Quarter 1, 2003 | | | | | | | | | | ✱ | | | | | | | | | | | |
| Quarter 2, 2003 | | | | | | | | | | ✱ | ✱ | | | | | | | | | | |
| Quarter 3, 2003 | | | | | | | | | | | ✱ | | | | | | | | | | |
| Quarter 1, 2007 | | | | | | | | | | | ✱ | | | | | | | | | | |
| Quarter 1, 2012 | | | | | | | | | | | | | | ✱ | | | | | | | |
| Quarter 1, 2014 | | | | | | | | | | | | | | | ✱ | | | | | | |
| Quarter 3, 2014 | | | | | | | | | | | ✱ | | | | | | | | | | |
| Quarter 4, 2014 | | | | | | | | | | | ✱ | | | | | | | | | | |
| Quarter 4, 2015 | | | | | | | | | | | ✱ | | | | | | | | | | |

**Chart of MCL and Historical UTL Exceedances for the C-746-U Contained Landfill (Continued)**

| Groundwater Flow System | UCRS | | | | | | | | | URGA | | | | | | LRGA | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Gradient | S | S | S | S | D | D | D | U | U | S | D | D | D | U | U | S | D | D | S | U | U |
| Monitoring Well | 368 | 375 | 376 | 377 | 359 | 362 | 365 | 371 | 374 | 366 | 360 | 363 | 357 | 369 | 372 | 367 | 361 | 364 | 358 | 370 | 373 |
| **STRONTIUM-90** | | | | | | | | | | | | | | | | | | | | | |
| Quarter 4, 2008 | | | | | | | ■ | | | | | | | | | | | | | | |
| **SULFATE** | | | | | | | | | | | | | | | | | | | | | |
| Quarter 1, 2003 | | | | | | | ✱ | | | | | | | | | | | | | | |
| Quarter 2, 2003 | | | | | | ✱ | ✱ | | | | | | | | | | | | | | |
| Quarter 3, 2003 | ✱ | | | | | ✱ | | | | | | | | | | | | | | | |
| Quarter 4, 2003 | | | | | ✱ | | ✱ | | | | | | | | | | | | | | |
| Quarter 1, 2004 | | | | | ✱ | ✱ | ✱ | | | | | | | | | | | | | | |
| 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 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 | ✱ | ✱ | | | | ✱ | ✱ | ✱ | | | | | | | | | | | | | |
| **TECHNETIUM-99** | | | | | | | | | | | | | | | | | | | | | |
| Quarter 4, 2002 | | | | | | | | | | | | | | | | | ✱ | ✱ | ✱ | | |
| Quarter 2, 2003 | | | | | | | ✱ | | | | | | ✱ | | | ✱ | ✱ | ✱ | ✱ | | ✱ |
| Quarter 3, 2003 | | | | | | | | | | | | | | | | | ✱ | | | | |
| Quarter 4, 2003 | | | | | | | | | | | | | | | | | ✱ | | | | ✱ |
| Quarter 1, 2004 | | | | | | | | | | | | | | | ✱ | | ✱ | | | | ✱ |
| Quarter 2, 2004 | | | | | | | | | | | | | | | ✱ | | | | | | ✱ |
| Quarter 3, 2004 | | | | | | | | | | | | | | | ✱ | | | | | | ✱ |
| Quarter 4, 2004 | | | | | | | | | | | | | | | ✱ | | ✱ | | | | ✱ |
| Quarter 3, 2005 | | | | | | | | | | | | | | | | | ✱ | | | | |
| Quarter 1, 2006 | | | | | | | | | | | | | | | ✱ | | | | | | ✱ |
| Quarter 2, 2006 | | ✱ | | | | | | | ✱ | | | | | | | | | | | | ✱ |
| Quarter 3, 2006 | | | | | | | | | | | | | | | | | | | | | ✱ |

**Chart of MCL and Historical UTL Exceedances for the C-746-U Contained Landfill (Continued)**

| Groundwater Flow System | UCRS | | | | | | | | | URGA | | | | | | LRGA | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Gradient | S | S | S | S | D | D | D | U | U | S | D | D | D | U | U | S | D | D | S | U | U |
| Monitoring Well | 368 | 375 | 376 | 377 | 359 | 362 | 365 | 371 | 374 | 366 | 360 | 363 | 357 | 369 | 372 | 367 | 361 | 364 | 358 | 370 | 373 |
| **TECHNETIUM-99** | | | | | | | | | | | | | | | | | | | | | |
| 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 2, 2010 | | | | | | | | | | ✱ | | | | | | ✱ | ✱ | ✱ | ✱ | | |
| Quarter 3, 2010 | | | | | | | | | | ✱ | | | | | ✱ | | | | | | |
| Quarter 4, 2010 | | | | | | | | | | | | | | | | | | ✱ | | | |
| Quarter 1, 2011 | | ✱ | | | | | | | | ✱ | | | | | | | ✱ | | | | |
| Quarter 2, 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 | | | | | | | | | | | | | | | ✱ | | ✱ | | | ✱ | |
| **THORIUM-230** | | | | | | | | | | | | | | | | | | | | | |
| Quarter 4, 2015 | | | | | | | | | | | | | | | | ✱ | | | | | |
| **TOLUENE** | | | | | | | | | | | | | | | | | | | | | |
| Quarter 2, 2014 | | | | | | | | | | ✱ | | | | ✱ | | | | | | | |
| **TOTAL ORGANIC CARBON** | | | | | | | | | | | | | | | | | | | | | |
| Quarter 3, 2002 | | | | | | | | | | ✱ | ✱ | ✱ | | ✱ | | | | | | | ✱ |
| Quarter 4, 2002 | | | | | | | | | | ✱ | ✱ | | | ✱ | | | | | | | |
| Quarter 1, 2003 | | | | | | | | | | | ✱ | | | | | | | | | | |
| Quarter 3, 2003 | ✱ | | | | | | | | | ✱ | ✱ | | | | | ✱ | | | | | |
| Quarter 4, 2003 | | | | | | | | | | ✱ | ✱ | | | | | | | | | | |
| Quarter 1, 2004 | | | | | | | | | | | ✱ | | | | | | | | | | |
| Quarter 3, 2005 | | | | | | ✱ | | | | ✱ | | | | | ✱ | ✱ | | | ✱ | | |
| Quarter 4, 2005 | | | | | | ✱ | | | | | | | | | | | | ✱ | ✱ | | |
| Quarter 1, 2006 | | | | | | | | | | | | | | | | | | | ✱ | | |
| **TOTAL ORGANIC HALIDES** | | | | | | | | | | | | | | | | | | | | | |
| Quarter 4, 2002 | | | | | | | | | | ✱ | | | | | | | | | | | |
| Quarter 1, 2003 | | | | | | | | | | ✱ | | | | | | | | | | | |
| Quarter 2, 2003 | | | | | | | | | | ✱ | | | | | | | | | | | |
| Quarter 1, 2004 | | | | | | | | | | | | | | | | ✱ | | | | | |
| **TRICHLOROETHENE** | | | | | | | | | | | | | | | | | | | | | |
| Quarter 3, 2002 | | | | | | | | | | | | | | ■ | | | | | | ■ | |
| 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 | | | | | | | | | | | | | | | ■ | | | | | ■ | ■ |

**Chart of MCL and Historical UTL Exceedances for the C-746-U Contained Landfill (Continued)**

| Groundwater Flow System | UCRS | | | | | | | | | URGA | | | | | | LRGA | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Gradient | S | S | S | S | D | D | D | U | U | S | D | D | D | U | U | S | D | D | S | U | U |
| Monitoring Well | 368 | 375 | 376 | 377 | 359 | 362 | 365 | 371 | 374 | 366 | 360 | 363 | 357 | 369 | 372 | 367 | 361 | 364 | 358 | 370 | 373 |
| **TRICHLOROETHENE** | | | | | | | | | | | | | | | | | | | | | |
| Quarter 4, 2005 | | | | | | | | | | | | | | | ■ | | | | | ■ | ■ |
| Quarter 1, 2006 | | | | | | | | | | | | | | | ■ | | | | | ■ | ■ |
| Quarter 2, 2006 | | | | | | | | | | | | | | | ■ | | | | | ■ | ■ |
| Quarter 3, 2006 | | | | | | | | | | | | | | | ■ | | | | | ■ | ■ |
| Quarter 4, 2006 | | | | | | | | | | | | | | | ■ | | | | | | ■ |
| Quarter 1, 2007 | | | | | | | | | | | | | | | ■ | | | | | ■ | ■ |
| Quarter 2, 2007 | | | | | | | | | | | | | | | ■ | | | | | | ■ |
| Quarter 3, 2007 | | | | | | | | | | | | | | | ■ | | | | | | ■ |
| Quarter 4, 2007 | | | | | | | | | | | | | | | ■ | | | | | | ■ |
| Quarter 1, 2008 | | | | | | | | | | | | | | | ■ | | | | | | ■ |
| Quarter 2, 2008 | | | | | | | | | | | | | | | ■ | | | | ■ | | ■ |
| Quarter 3, 2008 | | | | | | | | | | | | | | | ■ | | | | | | ■ |
| Quarter 4, 2008 | | | | | | | | | | | | | | | ■ | | | | | | ■ |
| Quarter 1, 2009 | | | | | | | | | | | | | | | ■ | | | | | | ■ |
| Quarter 2, 2009 | | | | | | | | | | | | | | | ■ | | | | | | ■ |
| Quarter 3, 2009 | | | | | | | | | | | | | | | ■ | | | | | | ■ |
| Quarter 4, 2009 | | | | | | ■ | ■ | | | | ■ | | ■ | ■ | ■ | | ■ | | | | ■ |
| Quarter 1, 2010 | | | | | | | | | | | | | ■ | | ■ | | | | | | ■ |
| Quarter 2, 2010 | | | | | | | | | | | | | ■ | | ■ | | | | | | ■ |
| Quarter 3, 2010 | | | | | | | | | | | | | ■ | | ■ | | | | | | ■ |
| Quarter 4, 2010 | | | | | | | | | | | | | ■ | | ■ | | | | | | ■ |
| Quarter 2, 2011 | | | | | | | | | | | | | | | ■ | | | | ■ | | ■ |
| Quarter 3, 2011 | | | | | | | | | | | | | ■ | | ■ | | | | ■ | | ■ |
| Quarter 4, 2011 | | | | | | | | | | | | | ■ | | ■ | | | | | | ■ |
| Quarter 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 | | | | | | | | | | | | | ■ | | ■ | | | | | | ■ |
| **TURBIDITY** | | | | | | | | | | | | | | | | | | | | | |
| Quarter 1, 2003 | | | | | | | | | | ✱ | | | | | | | | | | | |
| **URANIUM** | | | | | | | | | | | | | | | | | | | | | |
| Quarter 4, 2002 | | ✱ | | | ✱ | ✱ | ✱ | | | ✱ | ✱ | ✱ | ✱ | ✱ | ✱ | ✱ | | ✱ | ✱ | ✱ | ✱ |
| Quarter 4, 2006 | | | | | | | | | | | | | | | | | | | | | ✱ |
| **ZINC** | | | | | | | | | | | | | | | | | | | | | |
| Quarter 3, 2005 | | | | | | | | | | | | | | | | | | | ✱ | | |

✱ Statistical test results indicate an elevated concentration (i.e., a statistical exceedance).

■ MCL Exceedance

UCRS Upper Continental Recharge System

URGA Upper Regional Gravel Aquifer

LRGA Lower Regional Gravel Aquifer

# APPENDIX H

# METHANE MONITORING DATA

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# C-746-U LANDFILL METHANE LOG

PADUCAH GASEOUS DIFFUSION PLANT
Permit #: 073-00045
McCracken County, Kentucky

Date: December 09, 2015

| Time | Location | % LEL of Methane Reading | Remarks | Weather Conditions |
|---|---|---|---|---|
| 11:00 | C-746-U1 | 0 | Checked at floor level | Inside office |
| | C-746-U2 | 0 | Checked at floor level | Inside shop |
| | C-746-U-T-14 | 0 | Checked at floor level | Inside trailer |
| | C-746-U15 | 0 | Checked at floor level | Inside building |
| | MG1 | 0 | dry casing | Sunny and 62.4° |
| | MG2 | 0 | dry casing | |
| | MG3 | 0 | dry casing | |
| 11:30 | MG4 | 0 | dry casing | |
| N/A | Suspect or Problem Areas | N/A | No problems noted | N/A |
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Tammy Smith 12-9-15

Tammy Smith
Signature

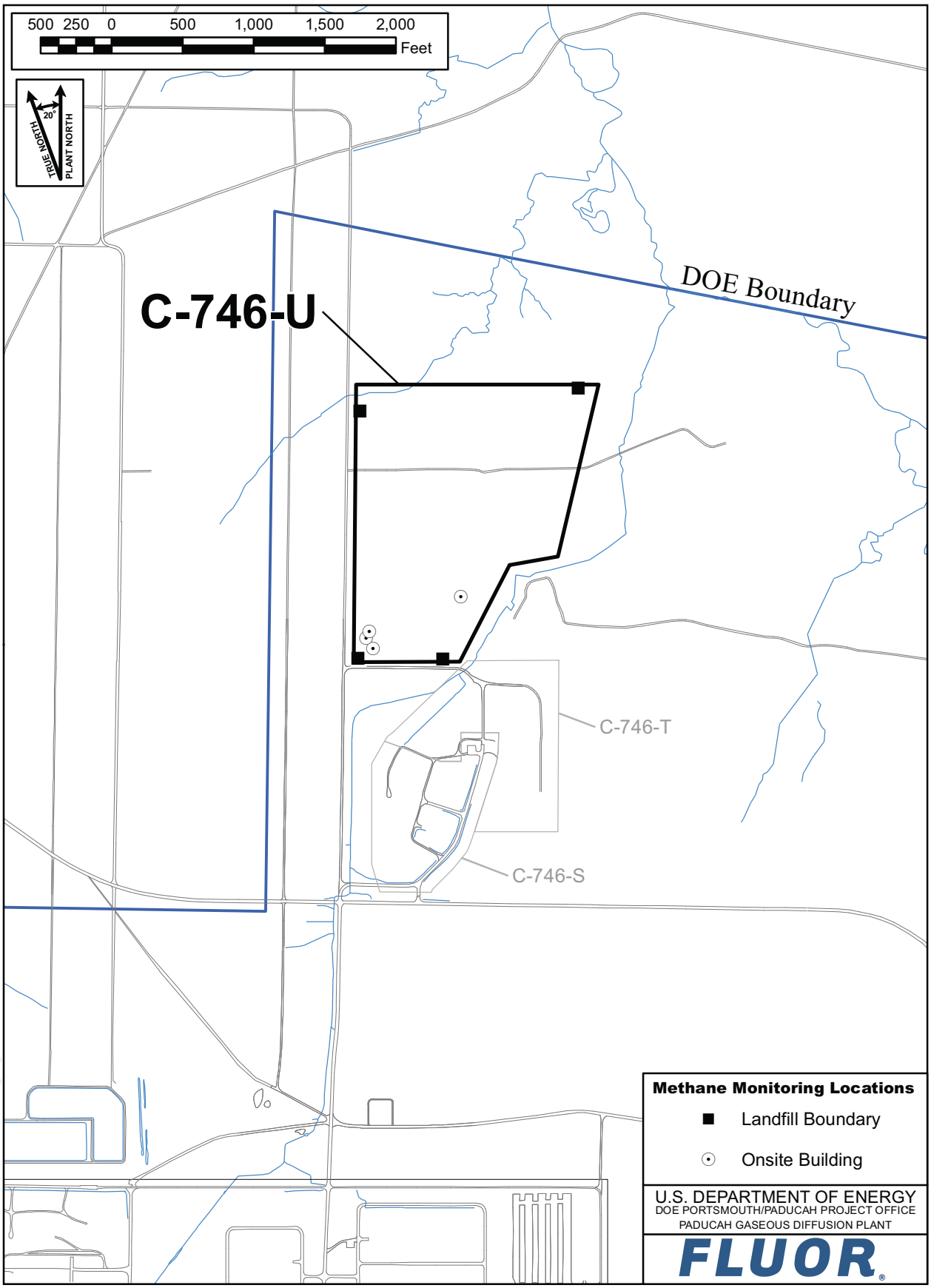


**Figure H.1. C-746-U Methane Monitoring Locations**

# APPENDIX I

# SURFACE WATER SAMPLE ANALYSIS AND WRITTEN COMMENTS

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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: 073-00045**

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") | L150 AT SITE | L154 UPSTREAM | L351 DOWNSTREAM | F. BLANK |
|---|---|---|---|---|
| Sample Sequence # | 1 | 1 | 1 | 1 |
| If sample is a Blank, specify Type: (F)ield, (T)rip, (M)ethod, or (E)quipment | NA | NA | NA | F |
| Sample Date and Time (Month/Day/Year hour: minutes) | 11/17/2015 09:23 | 11/17/2015 09:35 | 11/17/2015 09:09 | 11/17/2015 09:25 |
| Duplicate ("Y" or "N")[1] | N | N | N | N |
| Split ('Y' or "N")[2] | N | N | N | N |
| Facility Sample ID Number (if applicable) | L150US1-16 | L154US1-16 | L351US1-16 | FB1US1-16 |
| Laboratory Sample ID Number (if applicable) | 385808002 | 385808003 | 385808004 | 385808005 |
| Date of Analysis (Month/Day/Year) | 12/12/2015 | 12/12/2015 | 12/14/2015 | 12/14/2015 |

| 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 | 0.02 | | 0.39 | | 0.91 | | | * |
| 16887-00-6 | 2 | Chloride(s) | T | mg/L | 300.0 | 2.53 | | 1.67 | | 1.64 | | 0.0799 | J |
| 14808-79-8 | 0 | Sulfate | T | mg/L | 300.0 | 46.4 | | 4.4 | | 4.22 | | <0.4 | |
| 7439-89-6 | 0 | Iron | T | mg/L | 200.8 | 1.26 | | 0.656 | | 0.848 | | <0.1 | |
| 7440-23-5 | 0 | Sodium | T | mg/L | 200.8 | 2.48 | | 1.66 | | 1.61 | | <0.25 | |
| S0268- - | 0 | Organic Carbon[6] | T | mg/L | 9060 | 5.14 | | 11.5 | | 10.2 | | | * |
| S0097- - | 0 | BOD[6] | T | mg/L | not applicable | | * | | * | | * | | * |
| S0130- - | 0 | Chemical Oxygen Demand | T | mg/L | 410.4 | 30 | | 47.8 | | 25.6 | | | * |

[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: **073-00045**

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") | | | | | | L150 AT SITE | | L154 UPSTREAM | | L351 DOWNSTREAM | | 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 | µMHO/CM | Field | 275 | | 97 | | 94 | | | * |
| S0270- - | 0 | Total Suspended Solids | T | MG/L | 160.2 | 21.3 | | 11.7 | | 19.8 | | | * |
| S0266- - | 0 | Total Dissolved Solids | T | MG/L | 160.1 | 211 | | 120 | | 77.1 | | | * |
| S0269- - | 0 | Total Solids | T | MG/L | 2540B | 237 | | 101 | | 108 | | | * |
| S0296- - | 0 | pH | T | Units | Field | 7.28 | | 7.27 | | 7.12 | | | * |
| 7440-61-1 | | Uranium | T | MG/L | 200.8 | 0.00201 | | 0.00104 | | 0.00239 | | <0.0002 | |
| 12587-46-1 | | Gross Alpha (α) | T | pCi/L | 900.0 | 2.94 | * | -4.22 | * | 4.21 | * | -0.604 | * |
| 12587-47-2 | | Gross Beta (β) | T | pCi/L | 900.0 | 8.05 | * | 10.1 | * | 12.8 | * | 3.76 | * |
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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: 073-00045**

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") | L150 AT SITE |
| Sample Sequence # | 1 |
| If sample is a Blank, specify Type: (F)ield, (T)rip, (M)ethod, or (E)quipment | NA |
| Sample Date and Time (Month/Day/Year hour: minutes) | 11/17/2015 09:23 |
| Duplicate ("Y" or "N")[1] | N |
| Split ('Y' or "N")[2] | N |
| Facility Sample ID Number (if applicable) | L150DUS1-16 |
| Laboratory Sample ID Number (if applicable) | 385808001 |
| Date of Analysis (Month/Day/Year) | 12/12/2015 |

| 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 | 0.02 | | | | | | | |
| 16887-00-6 | 2 | Chloride(s) | T | MG/L | 300.0 | 2.54 | | | | | | | |
| 14808-79-8 | 0 | Sulfate | T | MG/L | 300.0 | 46.6 | | | | | | | |
| 7439-89-6 | 0 | Iron | T | MG/L | 200.8 | 1.14 | | | | | | | |
| 7440-23-5 | 0 | Sodium | T | MG/L | 200.8 | 2.5 | | | | | | | |
| S0268- - | 0 | Organic Carbon[6] | T | MG/L | 9060 | 5.17 | | | | | | | |
| S0097- - | 0 | BOD[6] | T | MG/L | not applicable | | * | | | | | | |
| S0130- - | 0 | Chemical Oxygen Demand | T | MG/L | 410.4 | 12.3 | J | | | | | | |

I-5

[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: **073-00045**

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") | | | | | | L150 AT SITE | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 | 275 | | | | | | | |
| S0270- - | 0 | Total Suspended Solids | T | mg/L | 160.2 | 21.4 | | | | | | | |
| S0266- - | 0 | Total Dissolved Solids | T | mg/L | 160.1 | 210 | | | | | | | |
| S0269- - | 0 | Total Solids | T | mg/L | 2540B | 221 | | | | | | | |
| S0296- - | 0 | pH | T | Units | Field | 7.28 | | | | | | | |
| 7440-61-1 | | Uranium | T | mg/L | 200.8 | 0.00196 | | | | | | | |
| 12587-46-1 | | Gross Alpha (α) | T | pCi/L | 900.0 | -0.995 | * | | | | | | |
| 12587-47-2 | | Gross Beta (β) | T | pCi/L | 900.0 | 5.51 | * | | | | | | |
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**RESIDENTIAL/CONTAINED – QUARTERLY** **Finds/Unit: KY8-890-008-982 / 1**

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

**Permit Numbers: 073-00045** **For Official Use Only**

# SURFACE WATER
# WRITTEN COMMENTS

| Monitoring Point | Facility Sample ID | Constituent | Flag | Description |
|---|---|---|---|---|
| L150 | L150US1-16 | Biochemical Oxygen Demand (BOD) | | Analysis of constituent not required and not performed. |
| | | Alpha activity | | TPU is 7.29. Rad error is 7.27. |
| | | Beta activity | | TPU is 8.13. Rad error is 8.02. |
| L154 | L154US1-16 | Biochemical Oxygen Demand (BOD) | | Analysis of constituent not required and not performed. |
| | | Alpha activity | | TPU is 3.5. Rad error is 3.49. |
| | | Beta activity | | TPU is 10. Rad error is 9.86. |
| L351 | L351US1-16 | Biochemical Oxygen Demand (BOD) | | Analysis of constituent not required and not performed. |
| | | Alpha activity | | TPU is 6.55. Rad error is 6.51. |
| | | Beta activity | | TPU is 9.87. Rad error is 9.59. |
| QC | FB1US1-16 | 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 | | TPU is 4.16. Rad error is 4.15. |
| | | Beta activity | | TPU is 9.04. Rad error is 9.02. |
| L150 | L150DUS1-16 | Biochemical Oxygen Demand (BOD) | | Analysis of constituent not required and not performed. |
| | | Alpha activity | | TPU is 4.08. Rad error is 4.07. |
| | | Beta activity | | TPU is 7.45. Rad error is 7.4. |

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