LMS/MND/S11737

Sitewide Groundwater Monitoring Report Mound, Ohio, Site

Calendar Year 2013

May 2014

U.S. DEPARTMENT OF ENERGY | Legacy Management

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The Ohio Environmental Protection Agency (Ohio EPA) and U.S. Environmental Protection Agency have accepted the *Sitewide Groundwater Monitoring Report, Mound, Ohio, Site—Calendar Year 2013* (dated May 2014) as the final report without revision stipulating the inclusion of OEPA comments along with DOE's responses as an addendum to the document. DOE has agreed to incorporate the changes indicated in these responses into the sitewide report for calendar year 2014.

Response to Comments from Ohio Environmental Protection Agency on the Sitewide Groundwater Monitoring Report, Calendar Year 2013, received on December 31, 2014

1. **Section 2.5 discusses trend analysis methodology. Trend analysis was conducted using the Mann-Kendall test; however, it is not clear that seasonal variability has been considered. Seasonal variability in ground water concentration time series data can make discerning trends difficult. The Mann Kendall test does not consider seasonal variability, but an analysis using the Seasonal Kendall test would address short-term seasonal variability and allow for evaluation of overall trends. Please provide information on whether or not seasonal variability has been considered in the trend analyses of the wells.**

   The Phase I VOC data from the wells and seep were statistically evaluated, and it was determined there was no seasonal variability. This is discussed in Section 3.2, "Trend Analysis," of the *Phase I Groundwater Monitoring Report, Calendar Year 2009* (LMS/MND/S06200, March 2010).

   Tritium data from seep 0601 and, to a lesser extent, seep 0602 indicate possible seasonal influences, as discussed in the *Parcel 6, 7, and 8 Groundwater Monitoring Report, Calendar Year 2009* (LMS/MND/S06216, March 2010). Although graphs of the tritium data for the seeps indicate that levels typically increase in the fall, no statistical evaluation for seasonality has been performed. Starting in 2012, the Core Team approved decreasing the sampling frequency for tritium in the Parcel 6, 7, and 8 seeps and monitoring wells from quarterly to semiannually because tritium levels were less than the MCL (except in seep 0601) and were declining. Samples are collected in the first and third quarters of the year to capture seasonal variations in the tritium levels, as recommended in the *Parcel 6, 7, and 8 Groundwater Monitoring Report, Calendar Year 2011* (LMS/MND/S08562, September 2012).

   VOC samples continue to be collected quarterly because concentrations in several seeps and wells continue to exceed the MCL, and increasing trends have been identified at several locations. Seasonal trends have not been evaluated because the influence of the uncovered tritium capture pits was being evaluated (finalized in 2011), and a limited data set was available (trending is performed on post-2005 data). However, a statistical evaluation for seasonal variations in the VOC data will be included in the sitewide groundwater report for calendar year 2014.

2. **Please include the statistical analyses as an appendix.**

   Summary sheets will be included in an appendix for the sitewide groundwater report for calendar year 2014.

3. **Figure 13 shows both seeps and wells; however they are identified with the same symbol for a "monitoring well". Please update this figure so that different symbols are used.**

   Figure 13 will be revised in the sitewide groundwater report for calendar year 2014.

4. **Section 4.2 references a tritium background value of 1.5 nCi/L. The calculation to determine the tritium background concentration used ground water data collected from areas that had been influenced by Mound activity and shouldn't be used as a background reference concentrations. Please do not use 1.5 nCi/L as a tritium background level in this report or other Mound documents. Suggest deleting the sentence "The two remaining wells had tritium levels similar to background (1.5 nCi/L)" from this document.**

   The 1.5 nCi/L value for background tritium level is incorrect. The value of 0.77 nCi/L used in the *Parcel 6, 7, and 8 Groundwater Monitoring Report, Calendar Year 2011* (LMS/MND/S08562, September 2012) that was obtained from the *Operable Unit 9 Hydrogeologic Investigation: Groundwater Seeps Report, Technical Memorandum, Rev. 1* (April 1995) should be used. Comparison of monitoring well data to background level was done to indicate areas where impact may be present. The correct value will be used and referenced in the sitewide groundwater report for calendar year 2014.

5. **Section 4.3 notes that a statistical upward trend in TCE concentrations was calculated for well 347. For 2013, the quarterly concentrations ranged from 23.2 to 27.5 µg/L TCE which is approaching the trigger level of 30 µg/L. The document states that regular monitoring will continue at this well and Ohio EPA agrees.**

   Noted

6. **Section 4.5.1 notes that grading in the area of B Building uncovered a large tritium capture pit. It then states that after the ports were covered, TCE concentrations decreased slightly. Please describe the relationship between the TCE detections and tritium capture pits.**

   This investigation was discussed in the *Groundwater Monitoring Report, Calendar Year 2011* (LMS/MND/S08562, September 2012). A reference to this report will be made in the sitewide groundwater report for calendar year 2014.

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Sitewide Groundwater Monitoring Report
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Abbreviations

BVA	Buried Valley Aquifer
cVOC	chlorinated volatile organic compound
DCE	dichloroethene
DOE	U.S. Department of Energy
EPA	U.S. Environmental Protection Agency
MCL	maximum contaminant level
µg/L	micrograms per liter
MNA	monitored natural attenuation
nCi/L	nanocuries per liter
Ohio EPA	Ohio Environmental Protection Agency
OU-1	Operable Unit 1
PCE	tetrachloroethene (perchloroethene)
pCi/L	picocuries per liter
RAO	remedial action objective
RIN	Report Identification Number
TCE	trichloroethene
VC	vinyl chloride
VOC	volatile organic compound
VSP	Visual Sample Plan

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1.0 Introduction

1.1 Purpose

This report was prepared in support of the selected remedies for Phase I and Parcels 6, 7, and 8 of the Mound, Ohio, Site as outlined in the *Operations and Maintenance (O&M) Plan for the U.S. Department of Energy, Mound Site*, *Miamisburg, Ohio* (Sitewide Operations and Maintenance Plan) (DOE 2012). It summarizes the data collected in 2013 and documents the progress of the monitored natural attenuation (MNA) remedies for both areas of the Mound site. All sampling and data analyses were performed in accordance with the Sitewide Operations and Maintenance Plan (DOE 2012), unless noted otherwise.

This report includes data collected during the groundwater sampling performed in 2013. Data are presented in both time-series and map-view plots. Trend analysis was performed on selected wells using the nonparametric Mann-Kendall test. This type of long-term trend analysis can be used to confirm trends in contaminant concentrations over time. The time-series plots will also be used to evaluate changes in data over time and to interpret the effectiveness of the MNA remedy.

This report also documents operational changes that occurred during the reporting period and identifies maintenance activities associated with the monitoring wells being sampled.

1.2 Project Description

The Mound site is located in Miamisburg, Ohio, approximately 10 miles southwest of Dayton. In 1995, the U.S. Department of Energy (DOE) Mound Plant, named after the Miamisburg Indian Mound that is adjacent to the site, was comprised of 120 buildings on 306 acres. The Great Miami River located west of the site flows from northeast to southwest through Miamisburg and dominates the geography of the region surrounding the Mound site. Figure 1 shows the location of Phase I and Parcels 6, 7, and 8.

DOE remediated the Mound site to an "industrial use" standard consistent with the exposure assumptions provided in the *Mound 2000 Residual Risk Evaluation Methodology* (DOE 1997) and endorsed by the U.S. Environmental Protection Agency (EPA) and Ohio Environmental Protection Agency (Ohio EPA). The remedies for groundwater at the site combine groundwater monitoring and institutional controls in the form of deed restrictions on future land and groundwater use. These combined remedies will prevent current and future exposure of workers, the public, and the environment to contaminated groundwater from the Mound site.

The long-term remedial action objective (RAO) for groundwater is to meet Safe Water Drinking Act maximum contaminant levels (MCLs) through MNA in the Phase I and Parcels 6, 7 and 8 areas. Until these goals are achieved, the near-term RAO is to prohibit the extraction and use of groundwater underlying the premises unless prior written approval is obtained from Ohio EPA and Ohio Department of Health.

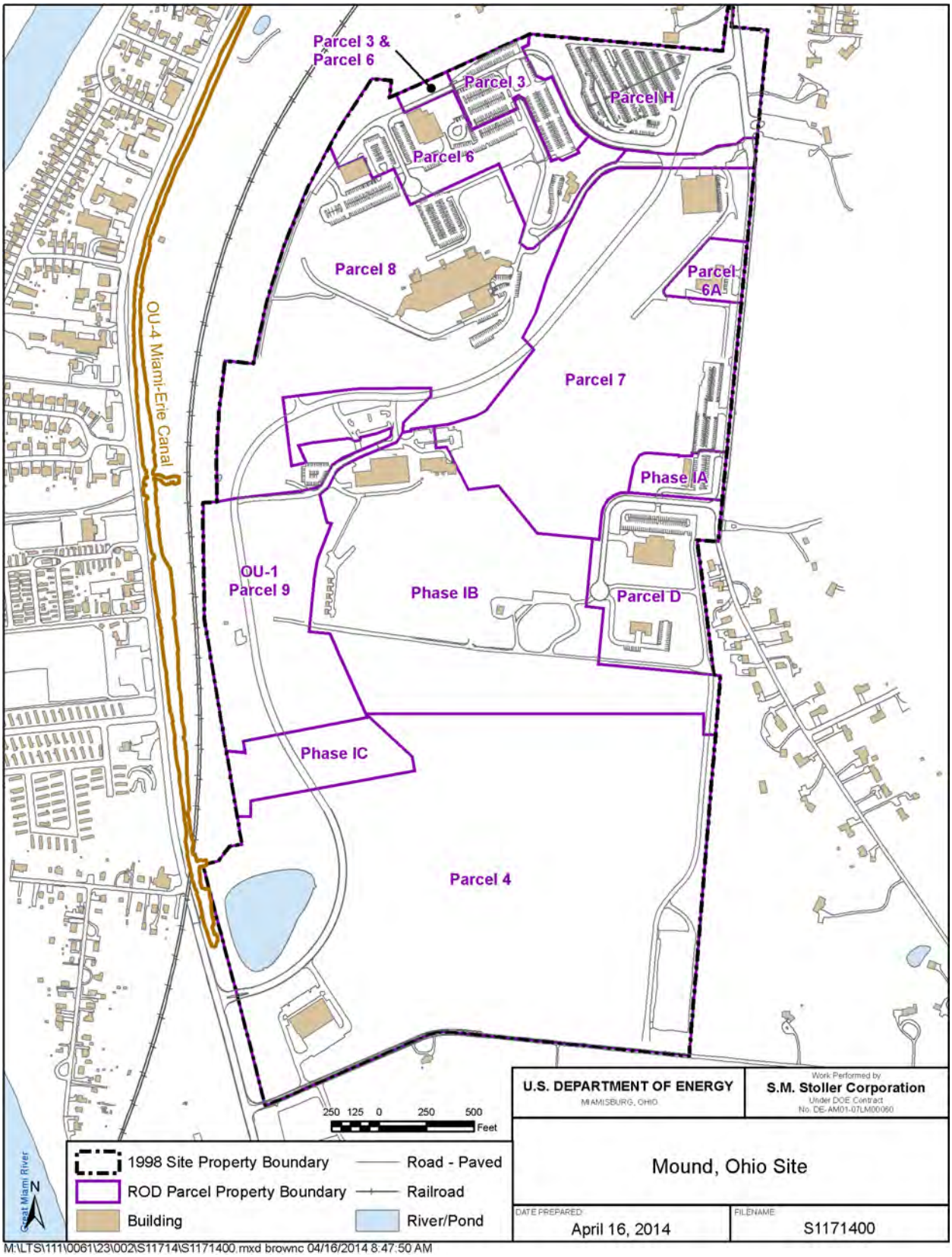

Figure 1. Mound, Ohio, Site

1.2.1 Phase I

Phase I is an approximately 52-acre area made up of three distinct sections and lies on the southern border of the Mound Plant property. This area contains monitoring wells that are screened in both the Buried Valley Aquifer (BVA) and the upgradient bedrock aquifer system. MNA is being used as the remedy for a small, discrete section of the bedrock groundwater system contaminated with trichloroethene (TCE) to ensure that concentrations of TCE within the bedrock groundwater are decreasing to levels below the Safe Drinking Water Act MCL and do not impact the downgradient BVA.

1.2.2 Parcels 6, 7, and 8

Parcels 6, 7, and 8 occupy approximately 101 acres of the northern portion of the Mound Plant site. The main production facilities were located within Parcels 6 and 8, and this area is called the Main Hill area. A tributary valley runs between these two parcels and Parcel 7; it contains a narrow tongue of glacial deposits that are in hydraulic communication with the BVA. Groundwater within the fractured bedrock beneath the Main Hill area, and in topographic highs within Parcel 7, flows along horizontal bedding planes and fractures and ultimately discharges to seeps or to the downgradient BVA.

Two monitoring wells in the BVA indicate volatile organic compound (VOC) impact, primarily TCE, that exceeds MCLs of the Safe Drinking Water Act. MNA is the remedy for the VOCs in groundwater associated with the Main Hill. Sampling is being performed to assess the contaminant concentrations and to verify that the BVA downgradient of these wells is not being affected.

Six seeps are also associated with this area and are located along the Main Hill of the plant property. Two seeps are within the plant property boundary, and the remaining four are offsite to the north. Several seeps have elevated levels of tritium and VOCs. These seeps, as well as several downgradient wells, are being monitored to verify that source removal (buildings and soil) on the Main Hill will result in decreasing concentrations over time.

1.3 Geology and Hydrology

1.3.1 Hydrogeologic Setting

The aquifer system at the Mound site consists of two distinct hydrogeologic environments: groundwater flow through the Ordovician shale and limestone bedrock beneath the hills, and groundwater flow within the unconsolidated glacial deposits and alluvium associated with the BVA in the Great Miami River valley. A thin tributary valley divides the two main portions of the Mound site and contains a narrow tongue of glacial deposits that are in hydraulic communication with the BVA. The bedrock flow system is dominated by fracture flow and is not considered a highly productive aquifer. The BVA is dominated by porous flow, with interbedded gravel deposits providing the major pathway for water movement. The unconsolidated deposits are Quaternary-age sediments that consist of both glacial and fluvial deposits. The BVA is a highly productive aquifer capable of yielding a significant quantity of water, and it is designated a sole-source aquifer. The general structure and flow characteristics for these two interconnected systems are depicted on Figure 2.

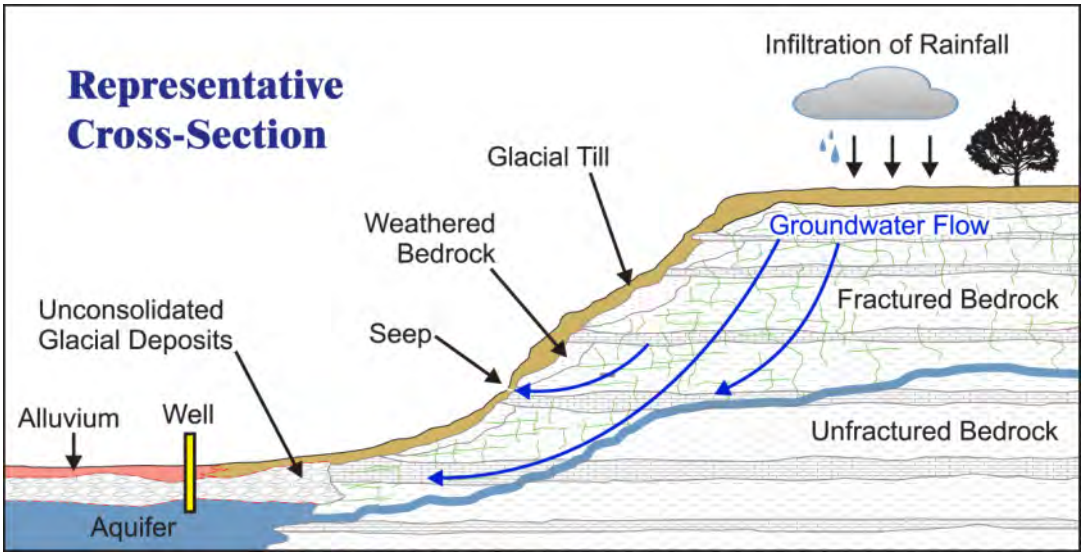

Figure 2. Generalized Cross Section Showing Flow from Bedrock to the BVA

For detailed descriptions of the geology, lithology, and groundwater flow regimes at the Mound site and specific hydrogeologic information for each area, refer to hydrogeologic investigation reports and work plans prepared for the site (DOE 1992, DOE 1994a, DOE 1994b, DOE 1995a, and DOE 1995b).

1.3.2 Groundwater Flow

Static water levels were measured prior to sampling at each well location. Since these measurements were made within a short time frame, the data were used to depict the general groundwater flow in the area (Figure 3). Two groundwater regimes are present at the site: groundwater in the bedrock and groundwater in the BVA. Groundwater flow in the bedrock typically mimics the topography, with groundwater discharging to the BVA or at seeps from the upper bedrock. Groundwater flow in the BVA flows south, following the downstream course of the Great Miami River.

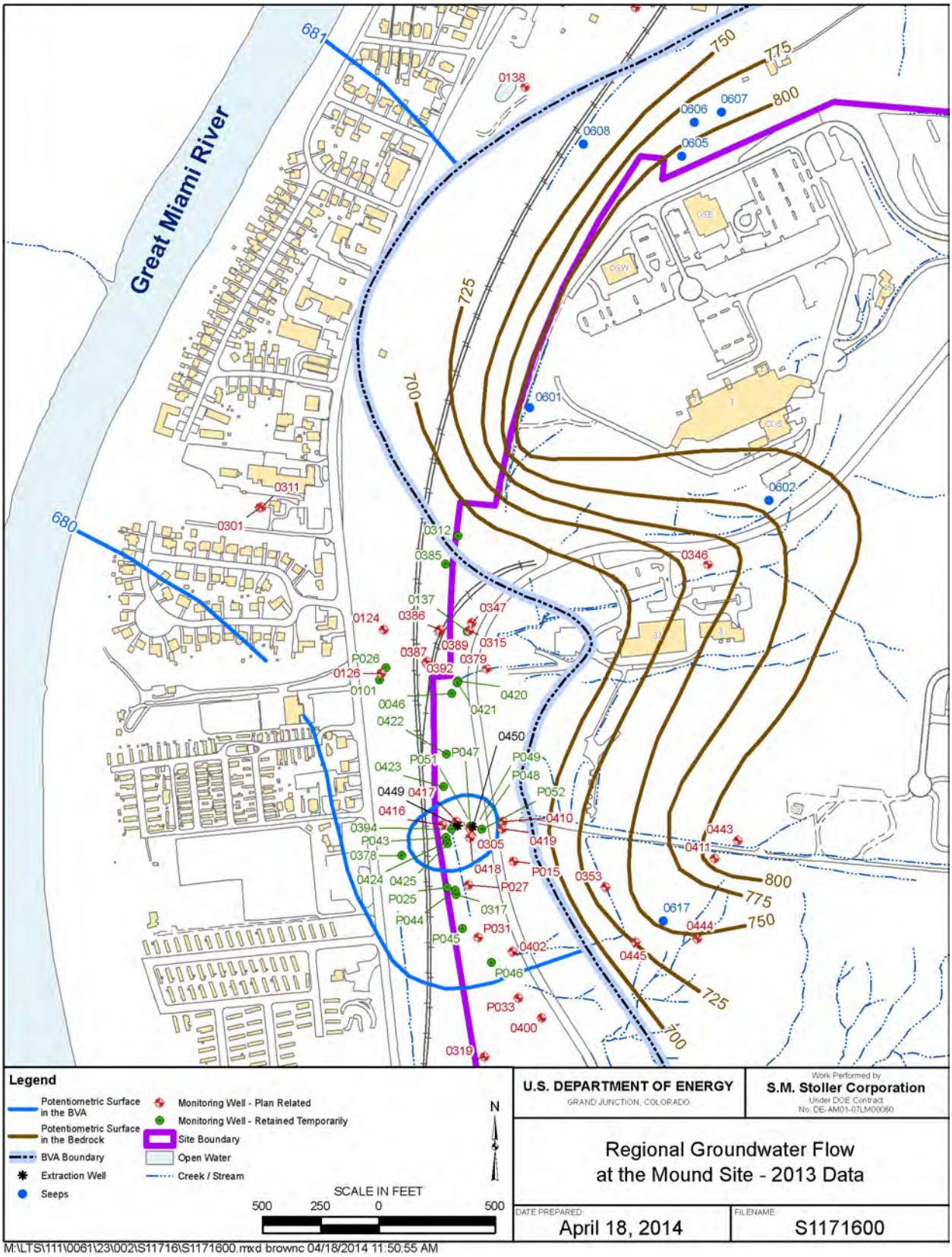

Figure 3. Regional Groundwater Flow at the Mound Site

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2.0 Monitoring Programs

2.1 Phase I

The Phase I groundwater monitoring program was established to verify that the BVA is not negatively affected by TCE-contaminated groundwater within the bedrock aquifer system. Groundwater in Phase I is monitored for TCE and its degradation products to verify that concentrations of TCE are decreasing by natural attenuation. The objective of this monitoring is to protect the BVA by verifying that the concentration of TCE near well 0411, well 0443, and seep 0617 is decreasing and to confirm that TCE is not adversely affecting the BVA. This program may be decreased or terminated when TCE concentrations in well 0411, well 0443, and seep 0617 meet conditions outlined in the monitoring plan, such as reaching the MCL for four consecutive sampling events.

2.1.1 Monitored Natural Attenuation of TCE

Under the Phase I MNA monitoring program, samples are collected semiannually from selected wells and a seep (Figure 4) and analyzed as outlined in Table 1. Sampling was performed in the first and third quarters of 2013.

Table 1. Remedy (MNA) Monitoring for Phase I

Monitoring Location	Area	Parameters
Well 0411	Well 0411 area	TCE Dichloroethene Vinyl chloride
Well 0443		
Well 0353	Downgradient bedrock monitoring	
Well 0444		
Well 0445		
Seep 0617		
Well 0400	Downgradient BVA monitoring	
Well 0402		
Well P033		

All locations are sampled semiannually.

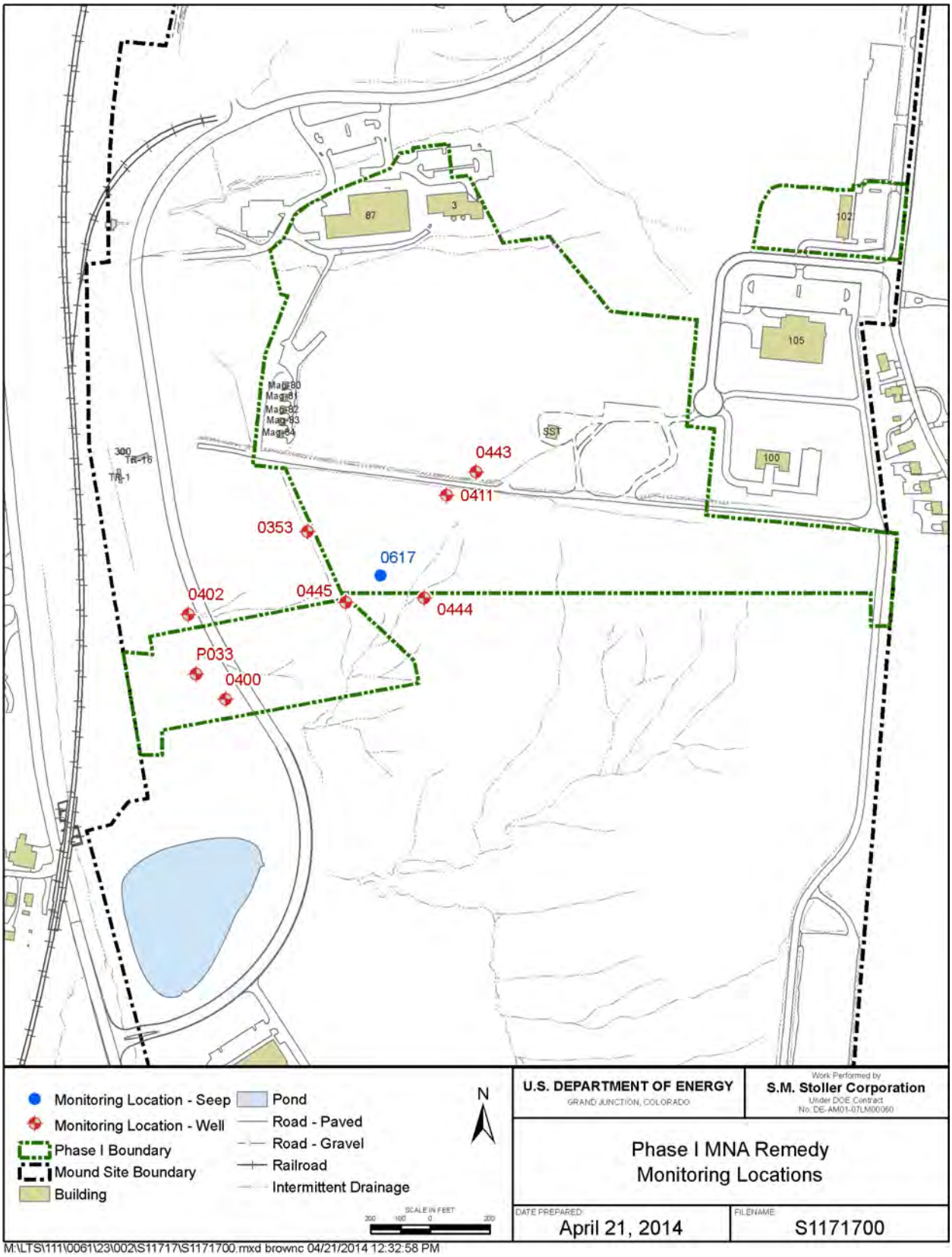

Figure 4. Phase I MNA Remedy Monitoring Locations

2.1.2 Triggers

The contaminant data are evaluated against previous data collected at each location to determine if MNA is adequately addressing groundwater impact and to monitor the geochemical conditions in the aquifer. Trigger levels and response actions have been established for each contaminant as presented in the Sitewide Operations and Maintenance Plan (DOE 2012). The triggers are summarized in Table 2.

Table 2. Trigger Levels for Phase I MNA Remedy

Location	TCE (µg/L)	DCE (µg/L)	Vinyl Chloride (µg/L)
0353	5	70	2
0400	5	70	2
0402	5	70	2
0411	30	70	2
0443	30	70	2
0444	5	70	2
0445	5	70	2
P033	5	70	2
0617 (seep)	16	70	2

DCE = dichloroethene
µg/L = micrograms per liter

EPA and Ohio EPA must be notified if trigger levels are exceeded. After notification, the Core Team (EPA, Ohio EPA, and DOE) will determine an appropriate course of action.

2.2 Parcels 6, 7, and 8

Groundwater in the Parcels 6, 7, and 8 area is monitored for TCE and its degradation products to verify that the downgradient BVA is not affected and that concentrations are decreasing. In addition, groundwater discharging from seeps is monitored for tritium and TCE and its degradation products to verify that source removal will result in decreasing concentrations over time.

The sampling program focuses on the following areas:

- **Well 0315/0347 Area:** Wells at the edge of the BVA on the southwestern corner of Parcel 8 that have elevated concentrations of VOCs. The program consists of wells that have TCE concentrations greater than the MCL and downgradient wells to the west. Wells 0315 and 0347 (source wells) and other selected downgradient BVA wells are monitored for VOCs—namely, tetrachlorethene (also known as perchloroethene or PCE), dichloroethene (DCE) isomers, TCE, and vinyl chloride (VC).
- **Main Hill Seeps:** Seeps on the northern and southern sides of the Main Hill that have elevated concentrations of VOCs and tritium. The program consists of seeps and downgradient wells to the west. Water from seeps 0601, 0602, 0605, 0606, 0607, and 0608 is collected and analyzed for VOCs and tritium. Select wells within the BVA that are downgradient of the bedrock groundwater discharge area of the Main Hill are also sampled to monitor VOCs and tritium.

2.2.1 Monitored Natural Attenuation of TCE and Tritium

Under the Parcels 6, 7, and 8 MNA monitoring program, samples are collected quarterly for VOCs and semiannually for tritium in selected wells and seeps (Figure 5). Table 3 provides a summary of the monitoring locations.

Table 3. Monitoring for Parcels 6, 7, and 8 Area

Monitoring Location	Area	VOC	Tritium
Well 0315	Source wells	X	
Well 0347		X	
Well 0118	Downgradient BVA monitoring	X	X
Well 0124		X	
Well 0126		X	
Well 0138		X	X
Well 0301		X	X
Well 0346		X	X
Well 0379		X	X
Well 0386		X	
Well 0387		X	
Well 0389		X	
Well 0392		X	
Seep 0601	Main Hill seeps	X	X
Seep 0602		X	X
Seep 0605		X	X
Seep 0606		X	X
Seep 0607		X	X
Seep 0608		X	X

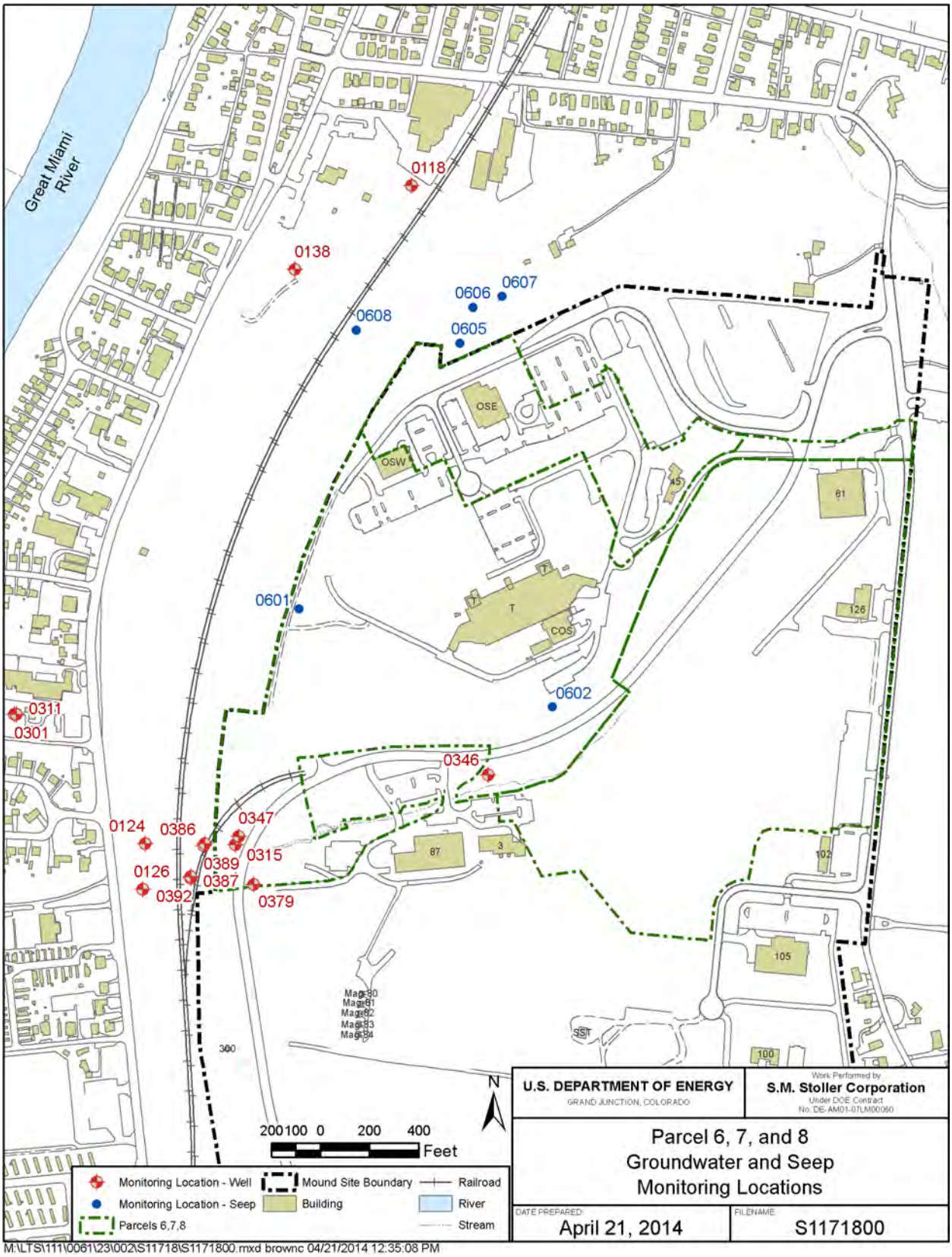

Figure 5. Parcels 6, 7, and 8 Remedy Monitoring Locations

2.2.2 Triggers

The contaminant data are evaluated against previous data collected at each location to determine if downward trends are occurring. Trigger levels and response actions have been established for each contaminant as presented in the Sitewide Operations and Maintenance Plan. The triggers are summarized in Table 4.

Table 4. Trigger Levels for Parcels 6, 7, and 8 Monitoring Locations

Location	TCE (µg/L)	PCE (µg/L)	Tritium (nCi/L)
0315	30		
0347	30		
0124	5		
0126	5		
0386	5		
0387	5		
0389	5		
0392	5		
0601 (seep)		75	1,500
0605 (seep)	150		

µg/L = micrograms per liter
nCi/L = nanocuries per liter
pCi/L = picocuries per liter

EPA and the Ohio EPA must be notified if these trigger levels are exceeded. After notification, the Core Team (EPA, Ohio EPA, and DOE) will determine an appropriate course of action.

2.3 Monitoring Network

The monitoring well and seep locations sampled under these programs were selected to provide data of sufficient quality to meet the objectives of the groundwater remedies for either Phase I or Parcels 6, 7, and 8. These wells were initially installed to support various site characterization activities and were designed and constructed to provide high-quality groundwater data. Appendix A contains construction information for each well used to support these remedies.

2.4 Deviations from the Sitewide Operations and Maintenance Plan

Sampling was performed as outlined in the Sitewide Operations and Maintenance Plan, which compiles the sampling requirements outlined in previous plans for each area. Modifications to these monitoring programs (i.e., reduction in sampling frequency or discontinuation of monitoring locations) are also incorporated into the Sitewide Operations and Maintenance Plan.

Sampling was performed as follows:

- All required locations in Phase I were sampled in 2013.
- All required locations in Parcels 6, 7, and 8 were sampled in 2013 except seep 0602, which was dry during the second and third quarters of 2013.
- Site-specific sampling methods for the Mound site were followed during these sampling events. These methods were developed by the Mound Groundwater Technical Team and approved by the Mound Core Team and are integrated into the Sitewide Operations and Maintenance Plan.

2.5 Trend Analysis Methodology

The computer program Visual Sample Plan (VSP), developed by Battelle Memorial Institute, was used to perform trend analysis; the method used was the nonparametric Mann-Kendall test. The analyses indicate the potential presence of statistically significant downward or upward trends in concentrations at a given location.

The Mann-Kendall test is used for temporal trend identification because it can easily accommodate missing data and does not require the data to conform to a particular distribution (such as a normal or log-normal distribution). The nonparametric method is valid for data sets that have a high number of nondetect data points. Data reported as trace concentrations or less than the detection limit can be used by assigning them a common value that is smaller than the smallest measured value in the data set (i.e., one-half the specified detection limit). This approach is valid because only the relative magnitudes of the data points, rather than their measured values, are used in the method. A possible consequence of this approach is that the test can produce biased results if a large fraction of data within a time series are nondetect and if detection limits change between sampling events. The specified detection limit (on the date of analysis) was used in place of concentrations reported as nondetect.

The two-tailed version of the Mann-Kendall test was used to detect either an upward or downward trend for each data set. As part of this approach, a test statistic, Z, was calculated. A positive value of Z indicated that the data were skewed in an upward direction, and a negative value of Z indicated that the data were skewed in a downward direction. The alpha value (or false rejection rate) used to identify a significant trend was 0.05. The beta value (or false acceptance rate) was set at 0.10. A nonparametric estimate of the slope, which is calculated independently of the trend, was determined for each data set using the Sen's nonparametric estimate of the slope in the VSP program. In addition, a 95 percent ($1-\alpha$) two-sided confidence interval about the true slope was obtained.

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3.0 Phase I MNA Remedy

3.1 Monitoring Results

Monitoring results for 2013 (Table 5) continue to show low-level detections of TCE and *cis*-1,2-DCE, a TCE degradation product, in wells 0411 and 0443 and in seep 0617. All VOC concentrations were below the applicable trigger levels (Table 2). Concentrations of TCE in wells 0411 and 0443 and seep 0617 continue to exceed the MCL of 5 micrograms per liter (µg/L). No detectable concentrations of *trans*-1,2-DCE or VC were reported at these three monitoring locations. An estimated detection of TCE was reported in BVA well 0402; however, the value was within historical ranges and is attributable to VOC impact in Operable Unit (OU)-1. No detectable concentrations of *cis*-1,2-DCE, *trans*-1,2-DCE, or VC were reported in the downgradient BVA wells.

Table 5. Summary of VOC Monitoring Results in Phase I for 2013

Well ID	Location	Parameter	First Semiannual Event	Second Semiannual Event
Source Area Wells and Seep				
0411	0411 Area	TCE (µg/L)	**12.5**	**13.3**
		cis-1,2-DCE (µg/L)	4.7	3.6
		VC (µg/L)	ND (<1)	ND (<1)
0443	0411 Area	TCE (µg/L)	**7.2**	**8.8**
		cis-1,2-DCE (µg/L)	0.57 (J)	0.38 (J)
		VC (µg/L)	ND (<1)	ND (<1)
0617	Seep/Bedrock	TCE (µg/L)	**10.4**	**6.7**
		cis-1,2-DCE (µg/L)	2.4	1.6
		VC (µg/L)	ND (<1)	ND (<1)
Downgradient Wells				
0353	Bedrock	TCE (µg/L)	ND (<1)	ND (<1)
		cis-1,2-DCE (µg/L)	ND (<1)	ND (<1)
		VC (µg/L)	ND (<1)	ND (<1)
0444	Bedrock	TCE (µg/L)	ND (<1)	ND (<1)
		cis-1,2-DCE (µg/L)	ND (<1)	ND (<1)
		VC (µg/L)	ND (<1)	ND (<1)
0445	Bedrock	TCE (µg/L)	ND (<1)	ND (<1)
		cis-1,2-DCE (µg/L)	ND (<1)	ND (<1)
		VC (µg/L)	ND (<1)	ND (<1)
0400	BVA	TCE (µg/L)	ND (<1)	ND (<1)
		cis-1,2-DCE (µg/L)	ND (<1)	ND (<1)
		VC (µg/L)	ND (<1)	ND (<1)
0402	BVA	TCE (µg/L)	ND (<1)	0.21 (J)
		cis-1,2-DCE (µg/L)	ND (<1)	ND (<1)
		VC (µg/L)	ND (<1)	ND (<1)
P033	BVA	TCE (µg/L)	ND (<1)	ND (<1)
		cis-1,2-DCE (µg/L)	ND (<1)	ND (<1)
		VC (µg/L)	ND (<1)	ND (<1)

J = estimated value less than the reporting limit
ND = not detected above reporting limit
Values in **bold** exceed the MCL of 5 µg/L for TCE

TCE concentrations in well 0411 (Figure 6) decreased since monitoring began in 1999. Since 2002, the concentrations of TCE in well 0411 have ranged between 9 and 15 µg/L. Concentrations increased slightly in 2012 and 2013. The time-concentration plots for well 0443 and seep 0617 indicate that concentrations vary and are less than those in well 0411.

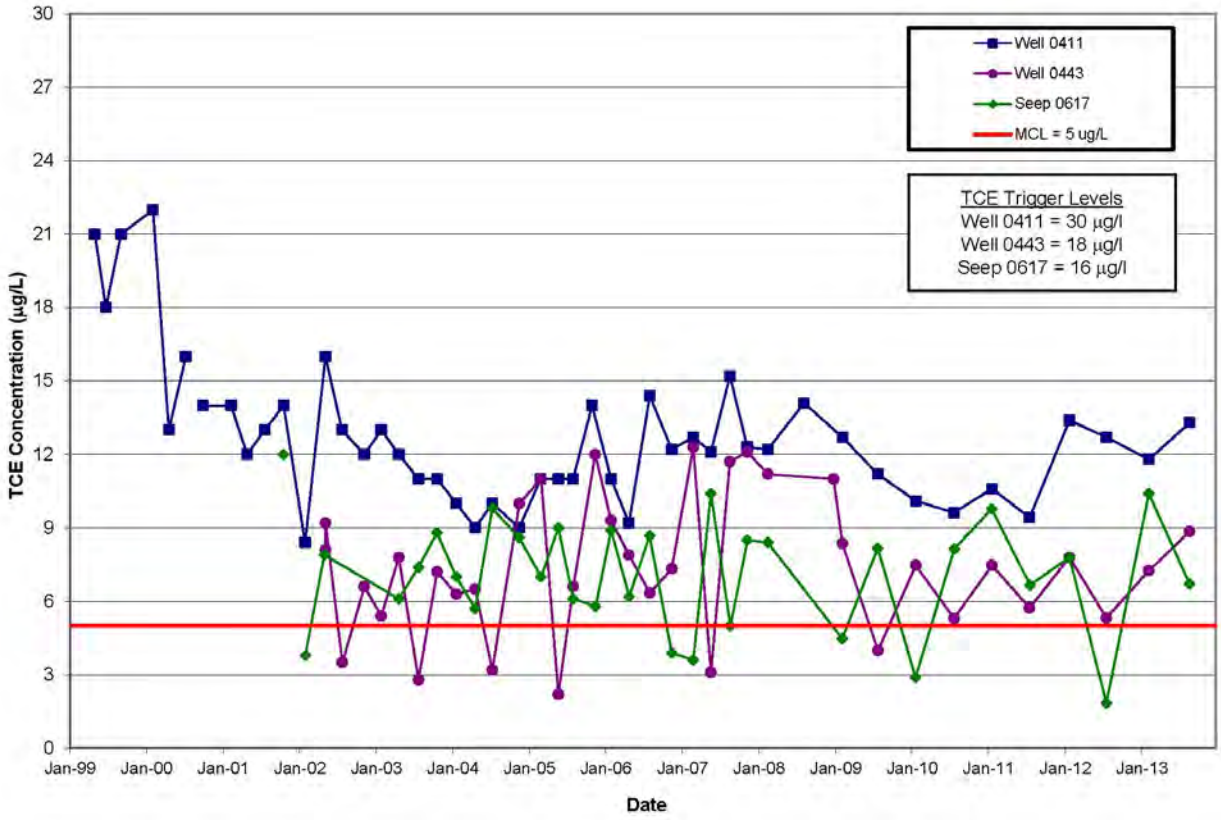

Figure 6. TCE Concentrations in Phase I—1999 Through 2013

The concentrations of *cis*-1,2-DCE in groundwater (Figure 7) have been variable. Detectable concentrations have consistently been reported in well 0411 and seep 0617 since 2008. Estimated detections less than 1 µg/L have been reported in well 0443 during the same period. None of the locations had concentrations of *cis*-1,2-DCE that exceeded the MCL of 70 µg/L.

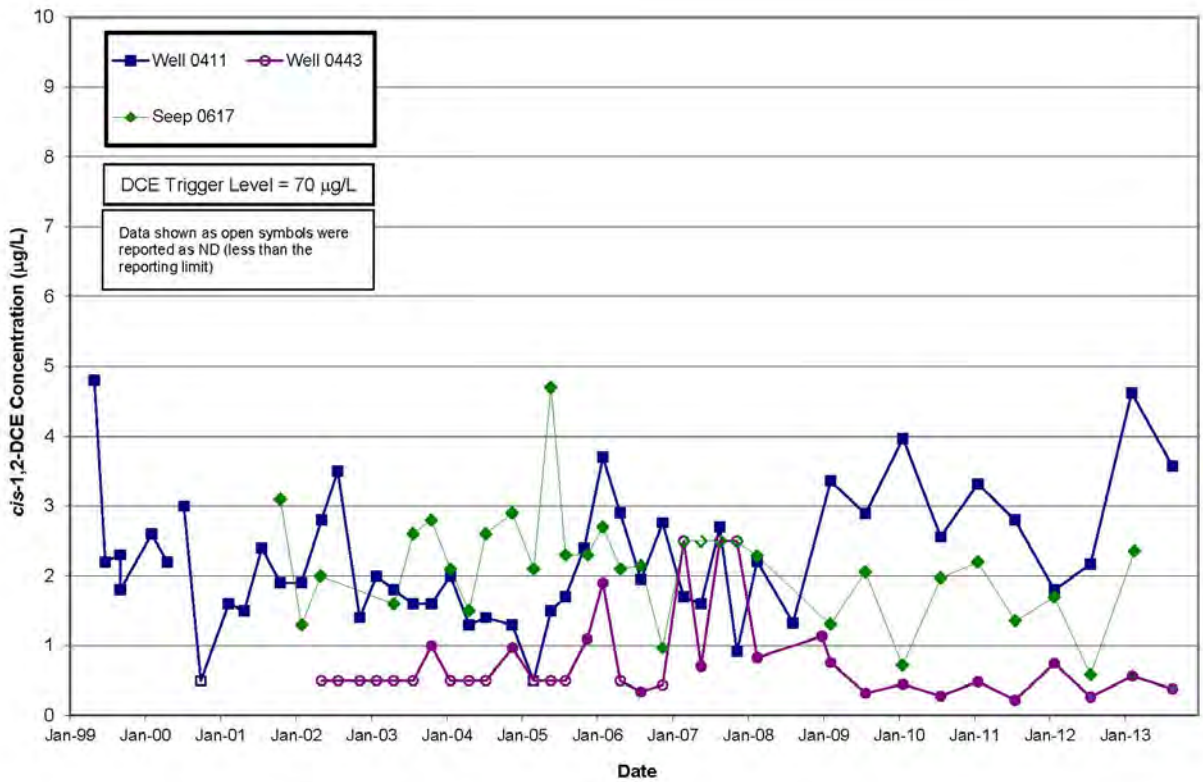

Figure 7. cis-1,2-DCE Concentrations in Phase I—1999 Through 2013

The distributions of TCE and DCE in groundwater (Figure 8) indicate that impact is localized in the bedrock groundwater near wells 0411 and 0443 and seep 0617. Wells screened in the bedrock and BVA that are downgradient of the area of VOC impact do not have detectable concentrations of TCE or DCE, with the exception of well 0402, where estimated detections have occasionally been reported. It has been determined that VOC impact in well 0402 is attributable to groundwater impact from OU-1, which is located immediately upgradient.

3.2 Trend Analysis

Trend analysis for TCE data collected since 1999 continues to indicate decreasing TCE concentrations in well 0411 and seep 0617, as indicated by negative slopes of the trend lines (Table 6). A statistical downward trend was calculated for TCE in well 0411. No statistical trend, either upward or downward, was evident in the data for TCE in well 0443 and seep 0617.

Table 6. Summary of Trend Analysis Results for TCE in Phase I for 2013

Location	Analyte	No. of Samples	Trend	Slope (µg/L/year)	Confidence Interval (µg/L/yr)	
					Lower	Upper
0411	TCE	47	**Down**	–0.25	–0.50	–0.03
0443		35	None	0.20	–0.14	0.56
0617		33	None	–0.12	–0.39	0.21
0411	*cis*-1,2-DCE	47	None	0.05	–0.02	0.13
0443		35	None	0	–0.02	0
0617		33	**Down**	–0.07	–0.14	0

µg/L/year = micrograms per liter per year

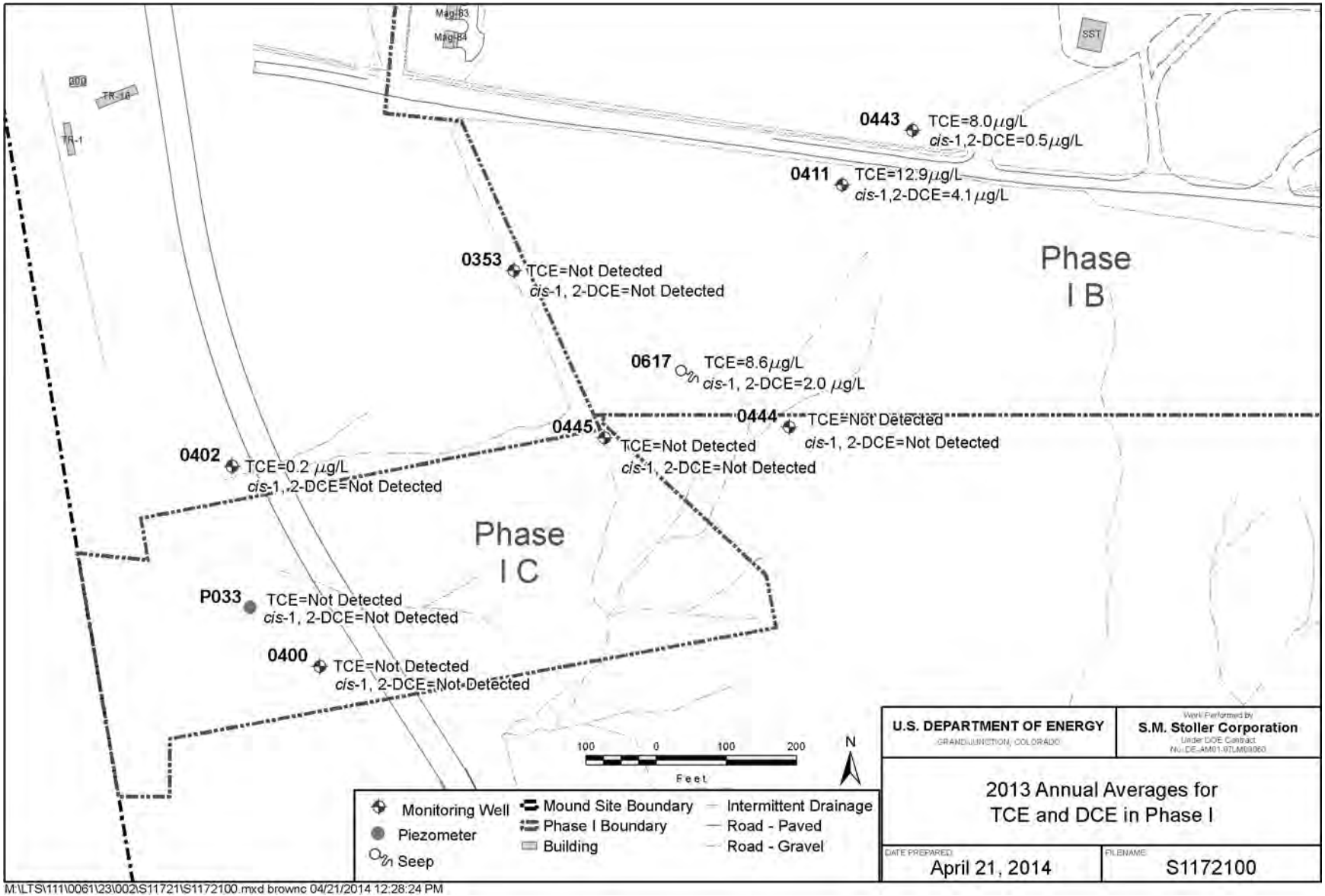

Figure 8. 2013 Annual Averages for TCE and DCE in Phase I

Decreasing *cis*-1,2-DCE concentrations, although small, are present in seep 0617, as indicated by a negative slope. A statistical downward trend was calculated for *cis*-1,2-DCE in this seep. Statistically, no trends, either upward or downward, were determined for the *cis*-1,2-DCE data in the wells and seep.

Evaluation of the slope of the downward trend in TCE concentrations in well 0411 may indicate the time frame when concentrations may approach the MCL of 5 µg/L. The nonparametric slope calculated for the trend analysis continues to suggest that the MCL may be reached by 2033. The exponential curve fit to the data estimates that the MCL may be reached by 2047. The nonparametric analysis and the exponential curve fit typically represent the decrease of contaminant concentrations in groundwater over time and provide good estimates of cleanup time frames.

3.3 Groundwater Elevations

A map of the average groundwater elevations measured in the Phase I area during 2013 (Figure 9) indicates two flow regimes: bedrock and BVA. The approximate location of contact of the BVA with the bedrock is indicated on this figure. Groundwater originating from the well 0411/0443 area flows southwest within the bedrock, following the bedrock topography. This groundwater enters the BVA along this contact. Flow within the BVA is generally to the south-southeast (parallel to the bedrock contact), although the groundwater elevations measured in the three wells screened in the BVA are similar. Appendix B presents a summary of the groundwater elevations measured during 2013.

3.4 Data Evaluation

The distribution of TCE and *cis*-1,2-DCE in groundwater continues to indicate that chlorinated volatile organic compound (cVOC) impact is localized in the bedrock groundwater near wells 0411 and 0443 and downgradient seep 0617. Concentrations at these three monitoring locations continues to exceed the MCL of 5 µg/L. Overall, TCE concentrations in well 0411, which has the highest concentrations in Phase I, have decreased since monitoring began in 1999. Low levels of *cis*-1,2-DCE continue to be present at all three locations. Trend analysis continued to indicate decreasing concentrations of TCE in well 0411 and seep 0617 and a statistical downward trend in TCE concentrations in well 0411. Trend analysis estimates that the MCL of 5 µg/L for TCE in well 0411 may be reached between 2033 and 2047. No statistical trends were present in the data from well 0443 and seep 0617. Data continued to show that the downgradient BVA is not affected by localized TCE in the bedrock groundwater.

3.5 Recommendations

No changes to the Phase I MNA monitoring program are warranted based on data collected in 2013. On the basis of no upward trends in TCE concentrations and the concentrations being considerably less than the trigger levels, monitoring frequency is recommended to remain semiannual for 2014. Sampling will continue during the first and third quarters of the year in an effort to bracket possible seasonal variations.

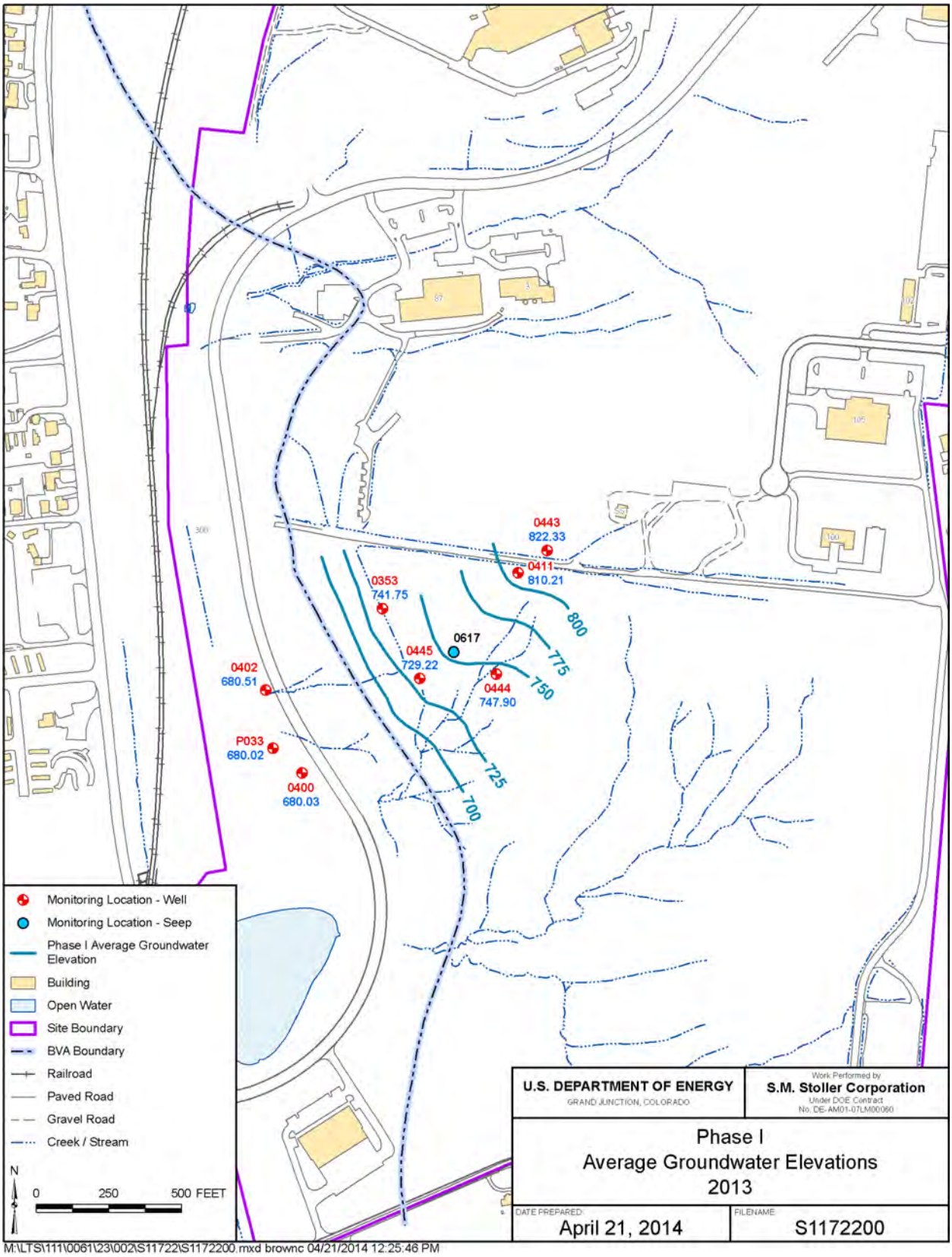

Figure 9. 2013 Average Groundwater Elevations in Phase I

4.0 Parcels 6, 7, and 8 MNA Remedy

4.1 Monitoring Results—cVOCs

4.1.1 Seeps

Concentrations of TCE in all Main Hill seeps continued to exceed the MCL in 2013 (Table 7). However, no locations had concentrations that exceeded the trigger level of 150 µg/L (established for seep 0605). The highest concentrations of TCE were in seep 0602, which is onsite. This seep was sampled only during the first and fourth quarters and was dry the remainder of the sampling periods. PCE concentrations continued to exceed the MCL of 5 µg/L in seep 0601; however, PCE concentrations at this location did not exceed the trigger level of 75 µg/L. Estimated detections of PCE were reported in seeps 0605 and 0607. Detectable concentrations of *cis*-1,2-DCE were reported in seeps 0602, 0605, and 0607; seep 0602 had the highest concentrations. Estimated detections of *cis*-1,2-DCE (less than 1 µg/L) were reported in seeps 0601 and 0606. Estimated detections of *trans*-1,2-DCE (less than 1 µg/L) were reported in seep 0602. No VC was detected in the seeps.

Table 7. Summary of VOC Results in the Main Hill Seeps for 2013

Location	Area	VOC Concentrations				
		VOC	Q1	Q2	Q3	Q4
Seeps						
0601	Onsite	TCE (µg/L)	**6.3**	**6.14**	**6.5**	**7.3**
		PCE (µg/L)	**7.9**	**8.5**	**7.6**	**6.3**
		cis-1,2-DCE (µg/L)	0.65 (J)	0.53 (J)	0.59 (J)	0.78 (J)
		trans-1,2-DCE (µg/L)	ND (<1)	ND (<1)	ND (<1)	ND (<1)
0602	Onsite	TCE (µg/L)	**32.6**	Dry	Dry	4.6
		PCE (µg/L)	ND (<1)			ND (<1)
		cis-1,2-DCE (µg/L)	42.3			12.2
		trans-1,2-DCE (µg/L)	0.72 (J)			0.20 (J)
0605	Offsite	TCE (µg/L)	**13.9**	**14.7**	**11.0**	**13.5**
		PCE (µg/L)	ND (<1)	0.18 (J)	ND (<1)	0.20 (J)
		cis-1,2-DCE (µg/L)	3.0	2.0	1.5	1.3
		trans-1,2-DCE (µg/L)	0.36 (J)	0.27 (J)	0.24 (J)	0.30 (J)
0606	Offsite	TCE (µg/L)	2.2	**6.7**	**5.0**	**7.7**
		PCE (µg/L)	ND (<1)	ND (<1)	ND (<1)	ND (<1)
		cis-1,2-DCE (µg/L)	0.27 (J)	0.81 (J)	0.64 (J)	0.85 (J)
		trans-1,2-DCE (µg/L)	ND (<1)	ND (<1)	ND (<1)	ND (<1)
0607	Offsite	TCE (µg/L)	**5.6**	**9.0**	**7.8**	**6.4**
		PCE (µg/L)	ND (<1)	ND (<1)	ND (<1)	0.20 (J)
		cis-1,2-DCE (µg/L)	0.86 (J)	1.2	0.71 (J)	0.70 (J)
		trans-1,2-DCE (µg/L)	ND (<1)	ND (<1)	ND (<1)	ND (<1)
0608	Offsite	TCE (µg/L)	1.1	0.24 (J)	0.16 (J)	1.1
		PCE (µg/L)	ND (<1)	ND (<1)	ND (<1)	ND (<1)
		cis-1,2-DCE (µg/L)	ND (<1)	ND (<1)	ND (<1)	ND (<1)
		trans-1,2-DCE (µg/L)	ND (< 1)	ND (< 1)	ND (<1)	ND (<1)

ND = Not detected
J = Estimated value that is less than the reporting limit
Q = Quarter

PCE trigger level at 0601 = 75 µg/L
TCE trigger level at the seeps = 150 µg/L
Values in **bold** exceed the MCL

A graph of TCE concentrations measured in the seeps since the remediation of contaminated buildings and soil on the Main Hill was completed (mid-2006) (Figure 10) shows that the highest concentrations of TCE were measured in seep 0602. Concentrations of TCE have varied significantly at this location, ranging from 15 µg/L to 139 µg/L. TCE concentrations in seep 0605 have been consistently less than 20 µg/L and the concentrations in the remainder of the seeps have been less than 10 µg/L.

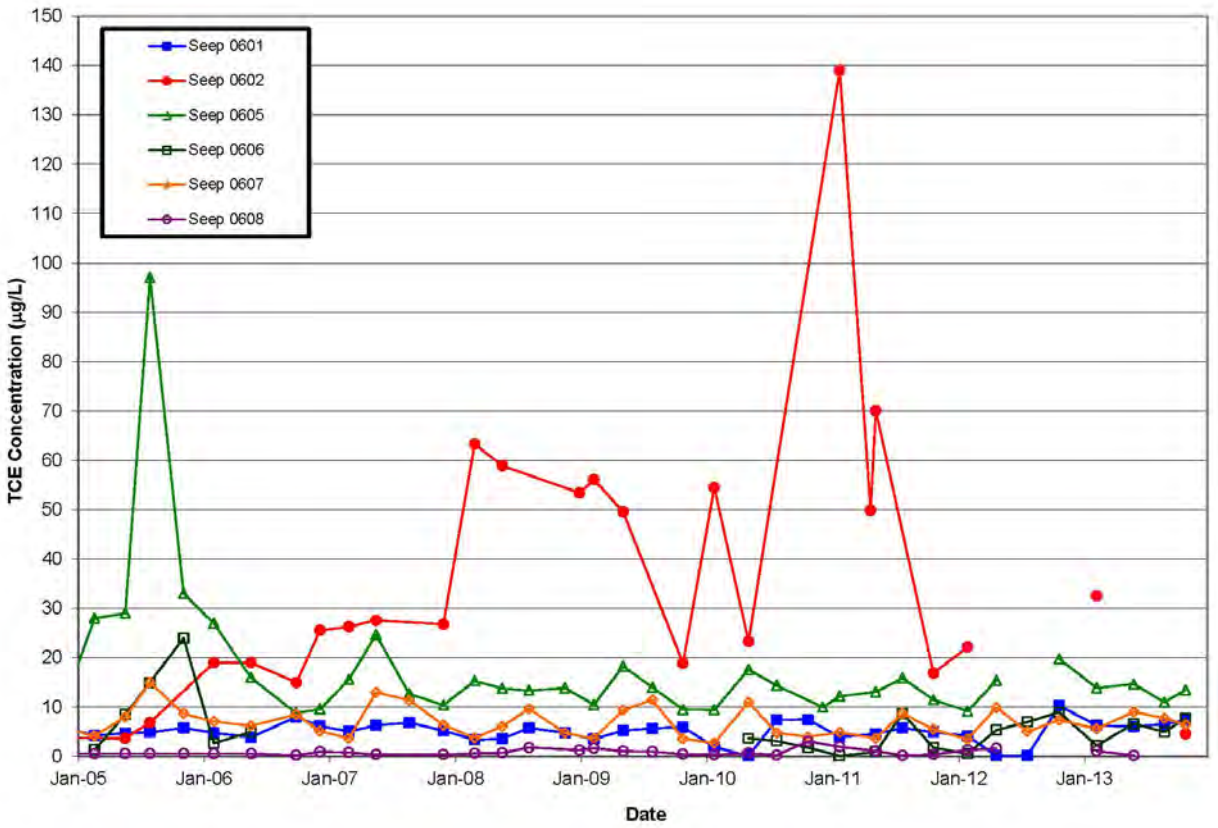

Figure 10. TCE Concentrations in Parcels 6, 7, and 8 Main Hill Seeps

Seep 0601 is the only location where detectable concentrations of PCE were reported. PCE concentrations in this seep (Figure 11) have shown a general decrease since remediation on the Main Hill. Estimated detections of PCE (less than 1 µg/L) were reported in seeps 0605 and 0607.

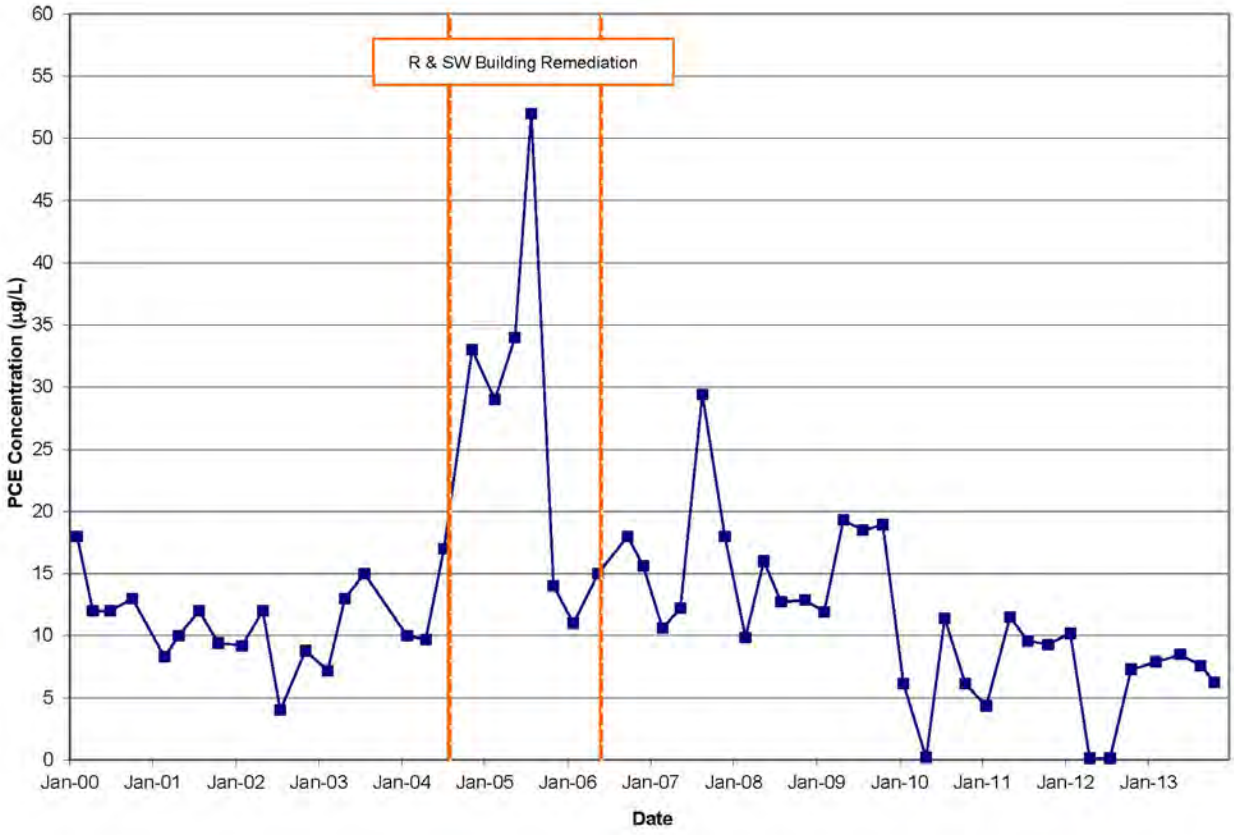

Figure 11. PCE Concentrations in Parcels 6, 7, and 8 Seep 0601

4.1.2 Groundwater

Monitoring results for 2013 (Table 8) continue to show detections of TCE in wells 0315, 0347, 0379, and 0386; the highest concentrations are detected in wells 0315 and 0347 (source area wells), where concentrations also exceed the MCL. The concentrations of TCE reported in wells 0315 and 0347 were less than the trigger level of 30 µg/L established for these source area wells. Well 0386 is located downgradient of wells 0315 and 0347 just outside the Mound site boundary. Well 0379 is located onsite within the tributary valley where wells 0315 and 0347 are also located. Estimated detections of TCE were reported in well 0389. No detectable concentrations of TCE were measured in the other wells. All TCE concentrations were below applicable trigger levels.

Estimated detections of PCE less than 1 µg/L were reported in wells 0126, 0311, 0379, 0387, 0389, and 0392. No trigger levels for PCE have been set for these locations. No detectable concentrations of *cis*-1,2-DCE, *trans*-1,2-DCE, or VC were reported in any of the downgradient wells.

Table 8. Summary of VOC Results in Parcels 6, 7, and 8 Groundwater for 2013

Location	Area	VOC Concentrations				
		VOC	Q1	Q2	Q3	Q4
Onsite Wells						
0315	Source Area	TCE (µg/L)	**12.5**	**7.2**	**10.1**	**12.9**
		PCE (µg/L)	ND (<1)	ND (<1)	ND (<1)	ND (<1)
0347	Source Area	TCE (µg/L)	**27.5**	**23.2**	**27.0**	**23.3**
		PCE (µg/L)	ND (<1)	ND (<1)	ND (<1)	ND (<1)
0346	Onsite	TCE (µg/L)	ND (<1)	ND (<1)	ND (<1)	ND (<1)
		PCE (µg/L)	ND (<1)	ND (<1)	ND (<1)	ND (<1)
0379	Onsite	TCE (µg/L)	1.9	1.8	2.5	1.6
		PCE (µg/L)	0.38 (J)	0.32 (J)	0.32 (J)	0.36 (J)
Downgradient Wells—Near						
0386	BVA	TCE (µg/L)	2.8	2.4	3.0	2.6
		PCE (µg/L)	ND (<1)	ND (<1)	ND (<1)	0.19 (J)
0387	BVA	TCE (µg/L)	ND (<1)	ND (<1)	ND (<1)	ND (<1)
		PCE (µg/L)	0.36 (J)	0.19 (J)	0.22 (J)	0.25 (J)
0389	BVA	TCE (µg/L)	0.53 (J)	ND (<1)	ND (<1)	0.55 (J)
		PCE (µg/L)	0.26 (J)	ND (<1)	ND (<1)	0.31 (J)
0392	BVA	TCE (µg/L)	ND (<1)	ND (<1)	ND (<1)	ND (<1)
		PCE (µg/L)	0.31 (J)	0.27 (J)	0.32 (J)	0.33 (J)
Downgradient Wells—Far						
0118	BVA	TCE (µg/L)	ND (<1)	ND (<1)	ND (<1)	ND (<1)
		PCE (µg/L)	ND (<1)	ND (<1)	ND (<1)	ND (<1)
0124	BVA	TCE (µg/L)	ND (<1)	ND (<1)	ND (<1)	ND (<1)
		PCE (µg/L)	ND (<1)	ND (<1)	ND (<1)	ND (<1)
0126	BVA	TCE (µg/L)	ND (<1)	ND (<1)	ND (<1)	ND (<1)
		PCE (µg/L)	0.92 (J)	0.92 (J)	0.95 (J)	0.83 (J)
0138	BVA	TCE (µg/L)	ND (<1)	ND (<1)	ND (<1)	ND (<1)
		PCE (µg/L)	ND (<1)	ND (<1)	ND (<1)	ND (<1)
0301	BVA	TCE (µg/L)	ND (<1)	ND (<1)	ND (<1)	ND (<1)
		PCE (µg/L)	ND (<1)	ND (<1)	ND (<1)	ND (<1)
0311	BVA	TCE (µg/L)	ND (<1)	ND (<1)	ND (<1)	ND (<1)
		PCE (µg/L)	0.25 (J)	0.21 (J)	0.25 (J)	0.20 (J)

J = Estimated value that is less than the reporting limit
ND = Not detected
Q = Quarter
TCE trigger level for 0315 and 0347 = 30 µg/L
TCE trigger level for other wells = 5 µg/L
Values in **bold** exceed the MCL

A graph of TCE concentrations measured in select wells shows that concentrations in the groundwater are variable (Figure 12). Concentrations in wells 0315 and 0347 have consistently been greater than the MCL of 5 µg/L. These two locations also exhibit the greatest variability. The concentrations of TCE in the downgradient wells (where detectable concentrations are measured) have been less than the MCL since 2000.

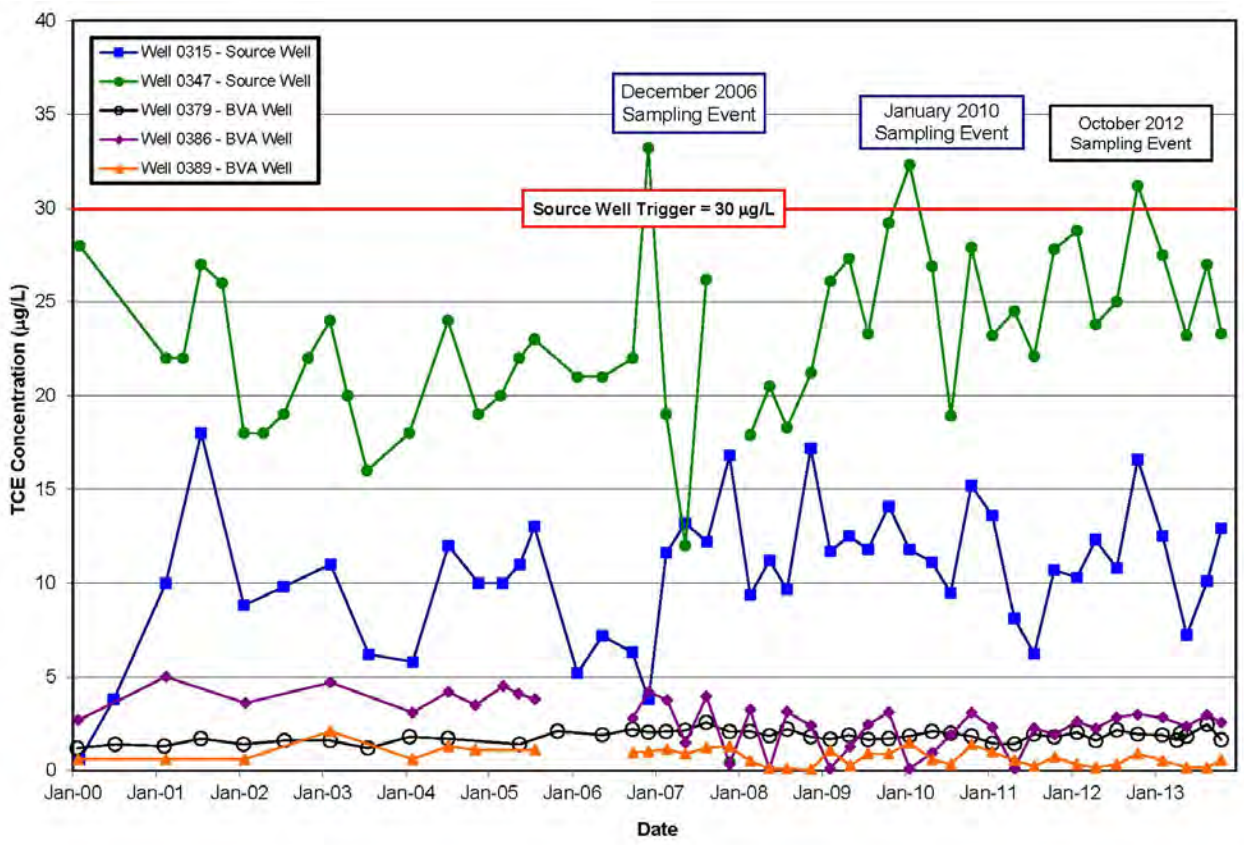

Figure 12. TCE Concentrations in Parcels 6, 7, and 8 Groundwater

4.1.3 Distribution of TCE

The distribution of TCE in groundwater (Figure 13) in the Main Hill area indicates that the highest area of impact is associated with the seeps, particularly seep 0602. The greatest groundwater impact is still associated with wells 0315 and 0347. TCE concentrations in these wells continue to exceed the MCL. The two BVA wells immediately downgradient of this area have TCE concentrations below the MCL, with slight impact extending downgradient. Figure 13 depicts the 2013 annual averages of TCE in the monitoring network.

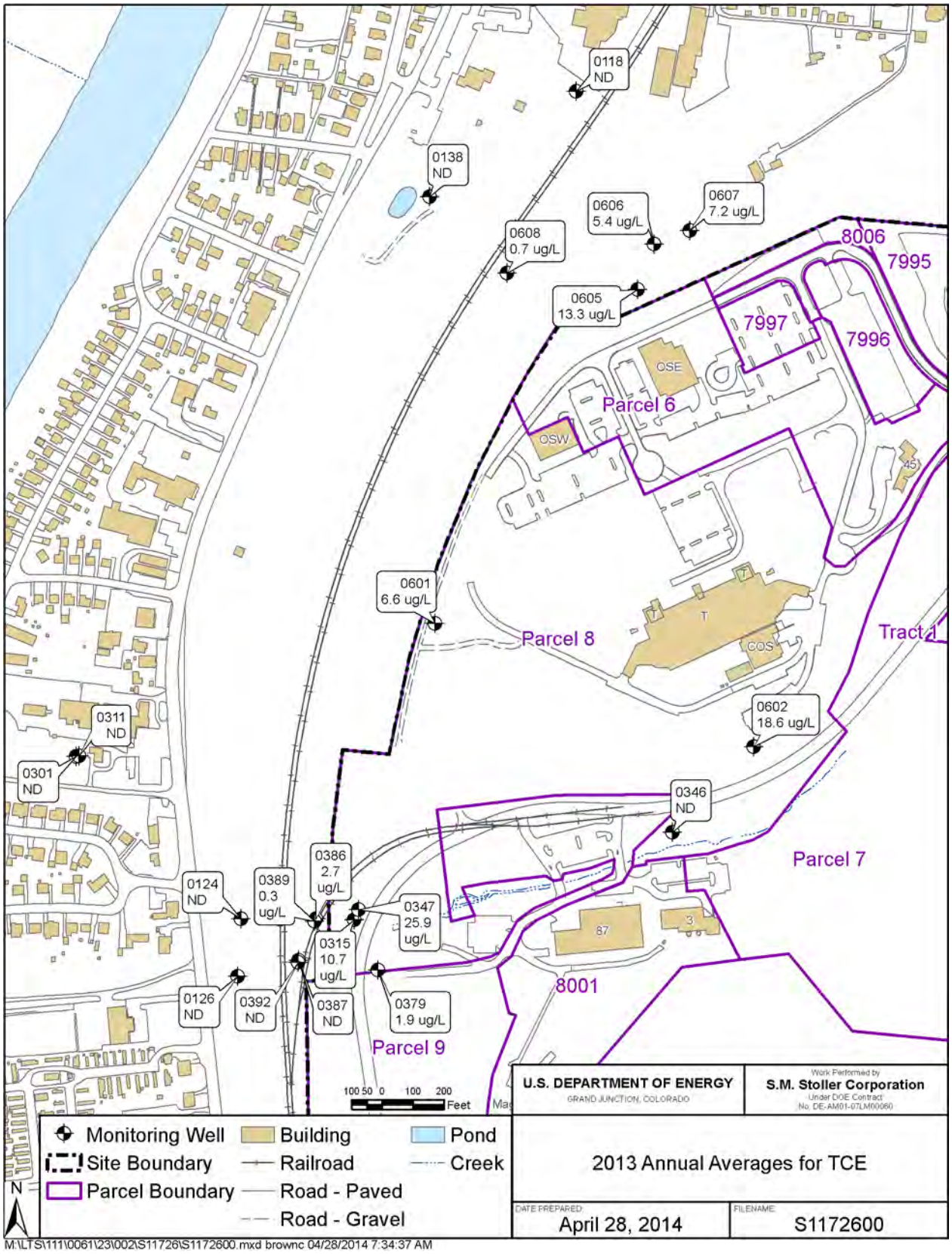

Figure 13. 2013 Annual Averages for TCE in Parcels 6, 7, and 8 Seeps and Groundwater

4.2 Monitoring Results—Tritium

Tritium levels in the Main Hill seeps continued to be elevated in 2013 and were higher than those in the downgradient groundwater wells (Table 9). The highest tritium activity was observed in seep 0601, which is located onsite. Seep 0601 is the only location that exceeded the MCL of 20 nanocuries per liter (nCi/L) during 2013. None of the seeps had tritium levels that exceeded the trigger level of 1,500 nCi/L.

Three wells downgradient of the Main Hill area continued to show detectable levels of tritium in 2013 (Table 9). Estimated detections of tritium were reported in two additional wells. The highest levels were observed in well 0347, downgradient of seep 0601. The two remaining wells had tritium levels similar to background (1.5 nCi/L). None of the groundwater wells had tritium levels that exceeded the MCL of 20 nCi/L.

Table 9. Summary of Tritium Results in the Main Hill Area for 2013

Location	Tritium Activity (nCi/L)	
	S1	S2
Seeps		
0601	**26.3**	46.9
0602	8.8	Dry
0605	10.7	9.6
0606	3.0	7.4
0607	4.5	5.1
0608	8.2	6.1
Downgradient Wells		
0118	ND (<0.34)	ND (<0.33)
0138	ND (<0.32)	1.2
0301	ND (<0.33)	ND (<0.32)
0311	0.64 (J)	ND (<0.32)
0346	0.49 (J)	0.66 (J)
0347	3.4	2.5
0379	1.2	0.85

J = Estimated value that is less than the reporting limit
ND = Not detected
S = Semiannual
Tritium trigger level at the seeps = 1,500 nCi/L
Values in **bold** exceed the MCL of 20 nCi/L

Tritium levels in the seeps were highest during remediation activities on the Main Hill (2004−2006). Tritium data collected after building demolition and soil removal indicate decreasing levels in all of the seeps (Figure 14). The decreasing tritium levels from post-remediation data suggest that the majority of the source was removed from the Main Hill area and that, with continued flushing, levels should continue to decline. Starting in 2009, the tritium levels in all of the seeps except seep 0601 were less than the MCL of 20 nCi/L. Changes in tritium levels in seep 0601 indicate a seasonal effect, as levels typically increase in late summer to early fall.

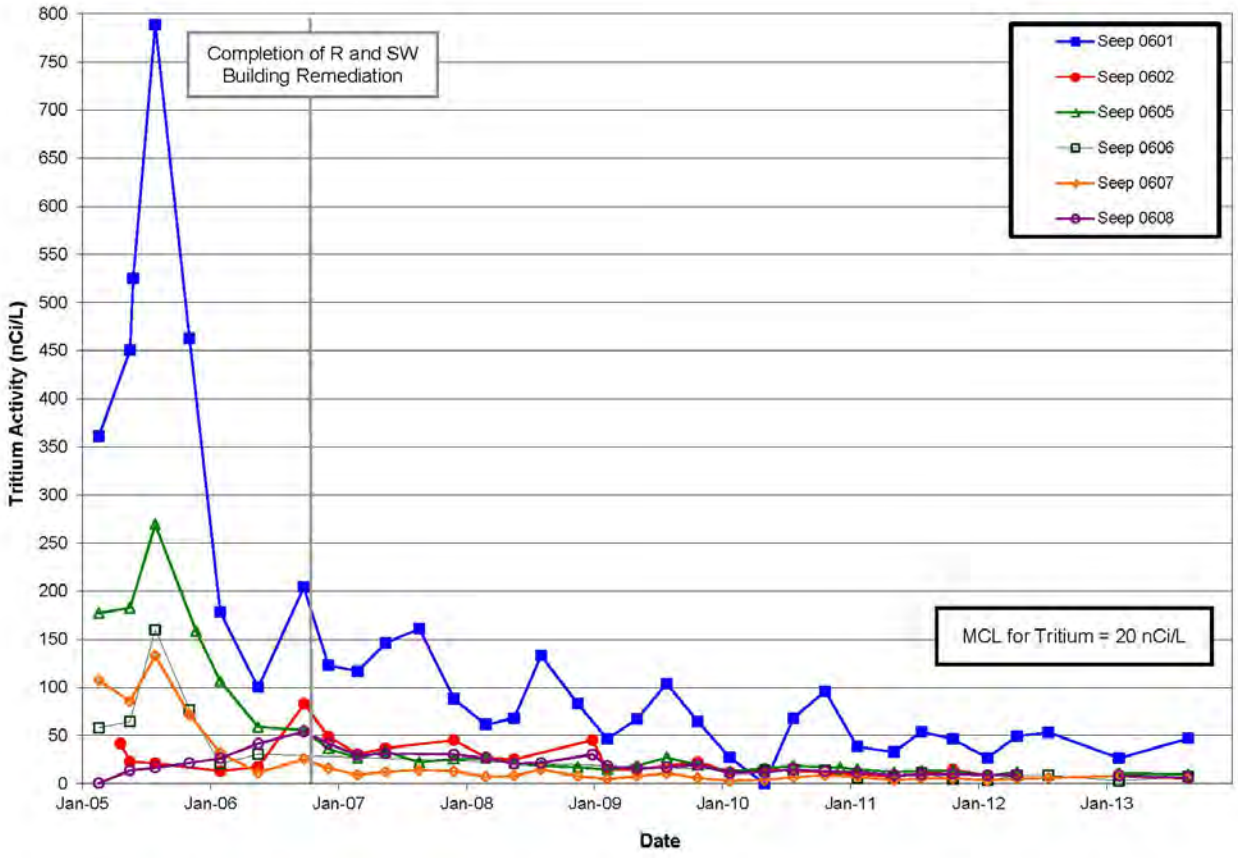

Figure 14. Tritium Activity in Parcels 6, 7, and 8 Main Hill Seeps

A graph of tritium levels in downgradient wells (Figure 15) illustrates that groundwater impact in the wells lagged behind impact expressed in the seeps. Groundwater impact increased near the end of remediation activities on the Main Hill, and impact in the seeps occurred as remediation activities were being performed and began to decrease as activities were completed. Wells 0138 and 0347 had the highest levels of tritium and responded rapidly to remediation activities. Tritium levels in wells 0138, 0346, and 0379 have leveled off and are similar to background.

Comparisons of tritium concentrations in the seeps with those measured in downgradient monitoring wells indicate that the seeps responded more quickly than the wells because they are direct discharge points for groundwater originating beneath the Main Hill.

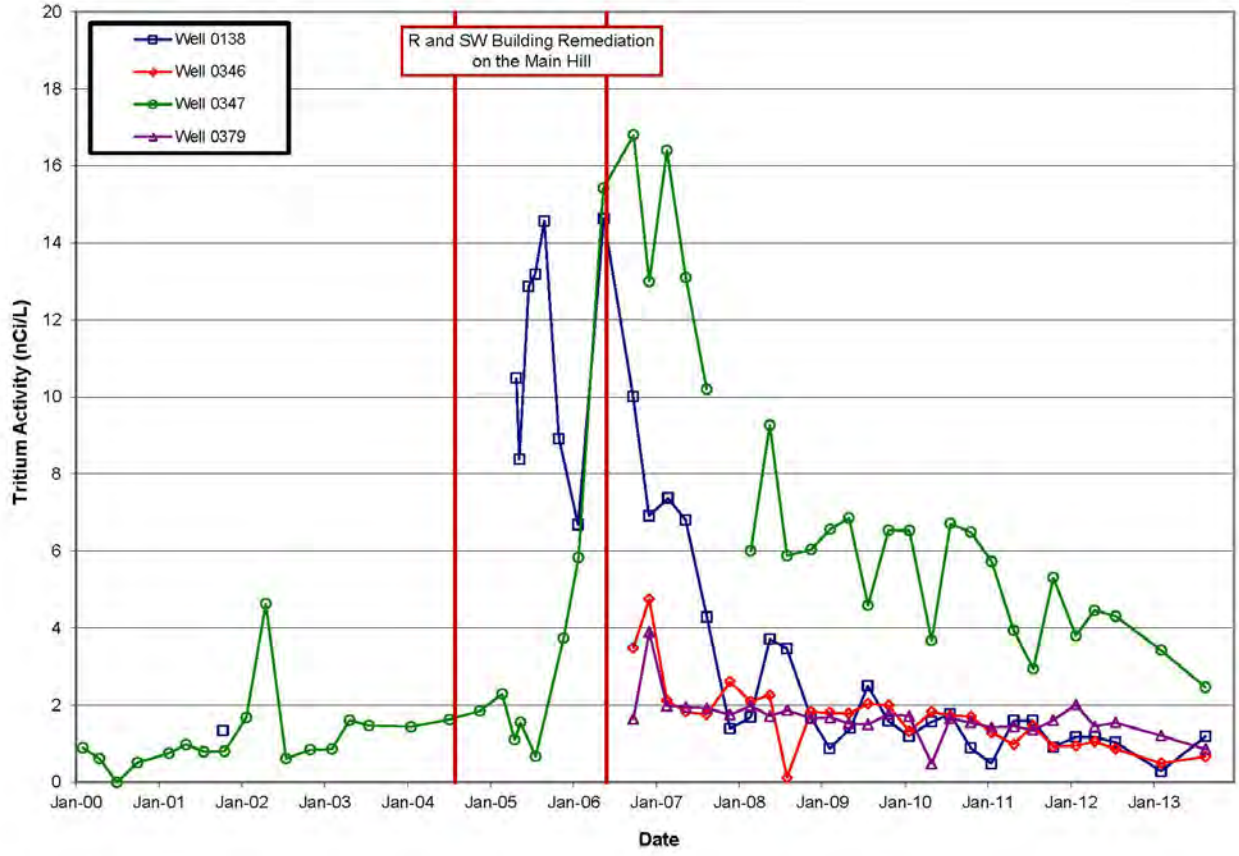

Figure 15. Tritium Activity in Parcels 6, 7, and 8 Wells 0138, 0346, 0347, and 0379

The distribution of tritium in groundwater (Figure 16) in the Main Hill area indicates that the greatest impact is still associated with the seeps, particularly seep 0601. Downgradient well 0347 also had elevated levels of tritium. Figure 16 depicts the 2013 annual averages of tritium in the monitoring network.

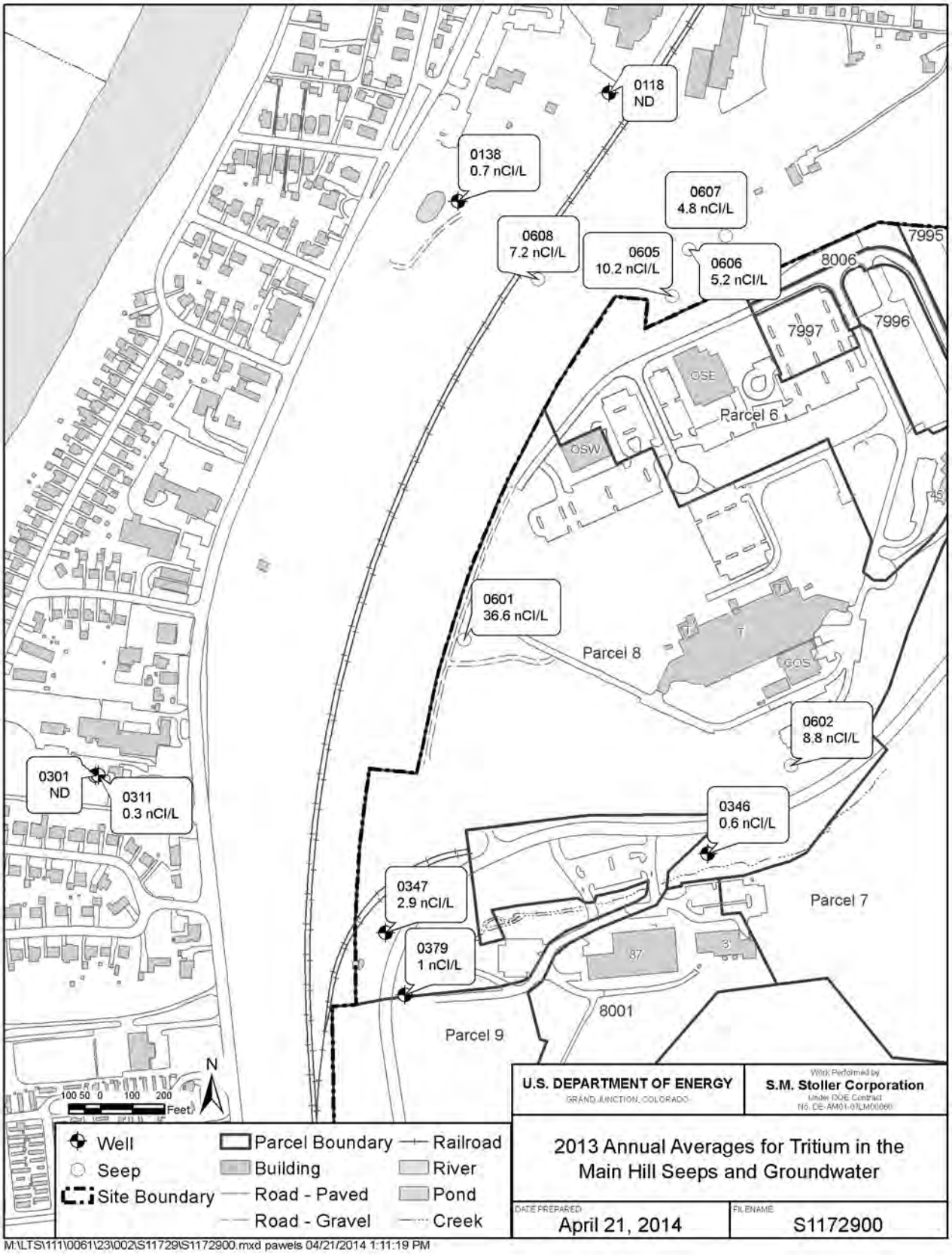

Figure 16. 2013 Annual Averages for Tritium in Parcels 6, 7, and 8 Seeps and Groundwater

4.3 Trend Analysis

Trend analysis was performed on VOC, tritium, and other radionuclide data using the nonparametric Mann-Kendall test. Trend analysis is reported for data collected since 2005. This period was selected to represent data collected since the completion of remediation activities on the Main Hill.

4.3.1 cVOCs

Trend analysis for TCE data collected since 2005 indicates increasing TCE concentrations in seeps 0601, 0602, and 0608, as indicated by positive slopes (Table 10). Although the slopes are positive for seeps 0601 and 0608, the slope values are near zero and indicate slight increases. TCE concentrations are decreasing in seeps 0605, 0606, and 0607, as indicated by negative slopes. A statistical downward trend was calculated for seep 0605.

TCE data from wells 0315, 0347, 0386, and 0389 show increasing concentrations of TCE in source area wells 0315 and 0347, as implied by positive slopes (Table 10). A statistical upward trend in TCE concentrations was calculated for well 0347. No statistical trend, upward or downward, was identified in well 0315. Decreasing TCE concentrations are indicated for wells 0386 and 0389, as implied by negative slopes. A downward trend was calculated for well 0389. Trend analysis was not performed on data from the remainder of the wells because results consistently showed nondetects or sporadic estimated detections.

Table 10. Summary of Trend Analysis Results for VOCs in Parcels 6, 7, and 8 (2005–2013)

Location	Number of Samples	Trend	Slope (µg/L/year)	Confidence Interval (µg/L/year)	
				Lower	Upper
TCE					
0601	36	None	0.10	–0.18	0.29
0602	24	None	3.6	–0.67	10.1
0605	35	**Down**	–0.83	–1.9	–0.03
0606	21	None	–0.84	–0.92	0.88
0607	36	None	–0.12	–0.61	0.25
0608	33	None	0.02	–0.04	0.11
0315	35	None	0.19	–0.27	0.62
0347	35	**Up**	0.71	0.21	1.4
0386	33	None	–0.12	–0.24	0.04
0389	31	**Down**	–0.08	–0.15	0.01
PCE					
0601	36	**Down**	–1.8	–2.9	–1.0
***cis*-1,2-DCE**					
0602	24	None	1.0	–0.78	3.4
0605	35	**Down**	–2.3	–3.2	–1.5

µg/L/year = micrograms per liter per year

Concentrations of PCE in seep 0601 are decreasing, as implied by a negative slope (Table 10) and a statistical downward trend was indicated in the data from this seep. Data from seeps 0602 and 0605 were evaluated for trends in *cis*-1,2-DCE concentrations (Table 10). Concentrations of *cis*-1,2-DCE are increasing in seep 0602; however, an upward trend is not indicated in the data. A statistical downward trend was calculated in the *cis*-1,2-DCE data from seep 0605.

4.3.2 Tritium

Trend analysis for tritium data collected since 2005 indicates decreasing tritium levels in all of the seeps and the four wells with detectable tritium levels, as implied by negative slopes. Statistical downward trends in tritium were calculated in all of the seeps and in wells 0138, 0346, and 0379 (Table 11).

Table 11. Summary of Trend Analysis Results for Tritium in the Main Hill Seeps and Downgradient Wells (2005−2013)

Location	Number of Samples	Trend	Slope (nCi/L/year)	Confidence Interval (nCi/L/year)	
				Lower	Upper
0601	34	**Down**	–25.8	–41.7	–16.7
0602	23	**Down**	–3.7	–6.3	–1.6
0605	32	**Down**	–6.6	–11.0	–3.8
0606	18	**Down**	–5.0	–8.6	–2.5
0607	33	**Down**	–2.4	–4.2	–1.5
0608	31	**Down**	–3.1	–4.5	–2.0
0138	35	**Down**	–1.2	–1.7	–0.84
0346	27	**Down**	–0.29	–0.38	–0.21
0347	34	None	–0.47	–1.2	0.18
0379	27	**Down**	–0.11	–0.15	–0.07

nCi/L/year = nanocuries per liter per year

4.4 Groundwater Elevations

A map of the average groundwater elevations measured in the Parcels 6, 7 and 8 area during 2012 (Figure 17) indicates two flow regimes: bedrock and BVA. The approximate location of contact of the BVA with the bedrock is indicated on this figure. Groundwater originating from the well 0411/0443 area flows southwest within the bedrock, following the bedrock topography. This groundwater enters the BVA along this contact. Flow within the BVA is parallel to the bedrock contact. Flow near wells 0315/0347 is generally to the south-southeast. Appendix B presents a summary of the groundwater elevations measured during 2013.

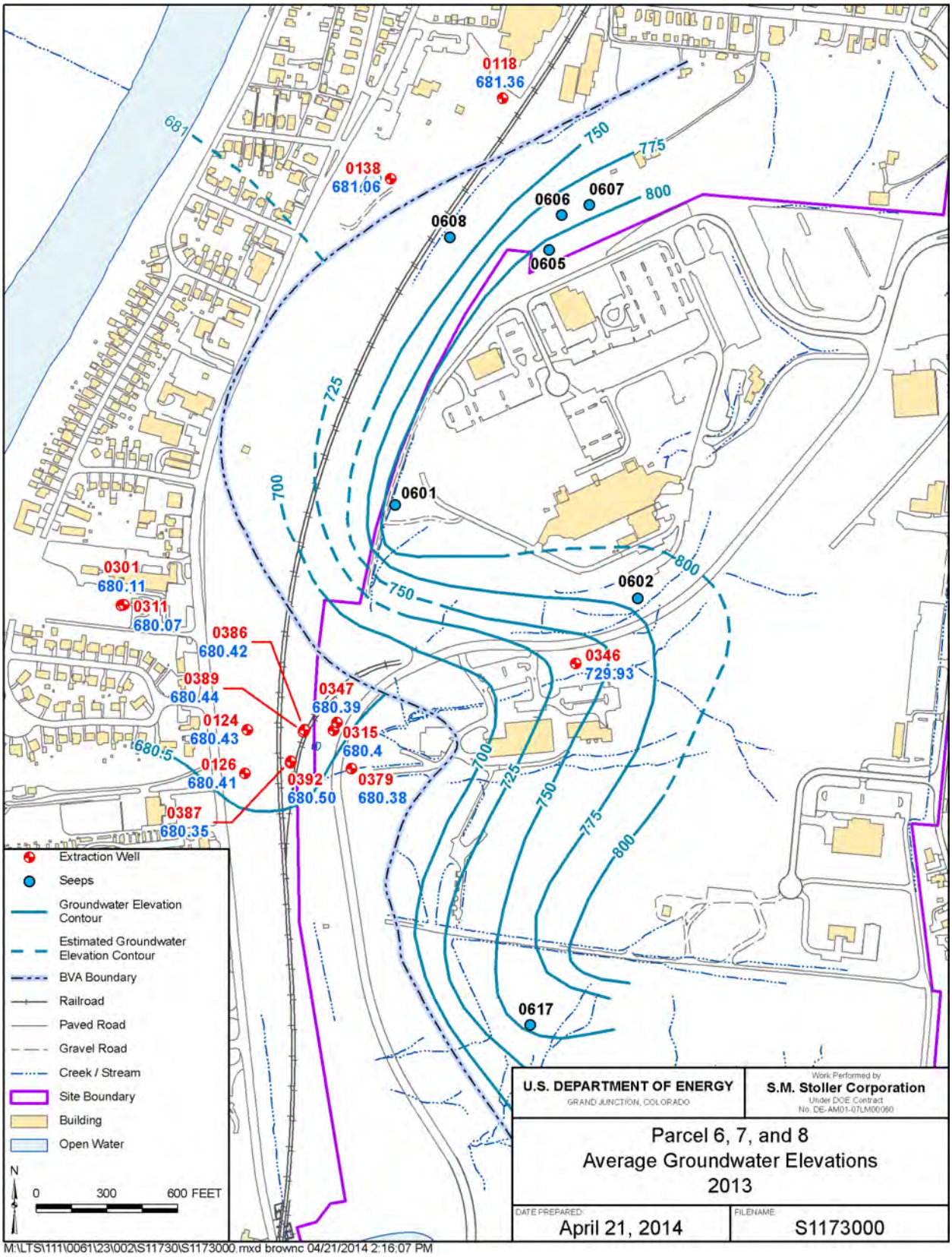

Figure 17. 2013 Averages for Groundwater Elevations in Parcels 6, 7, and 8

4.5 Data Evaluation

4.5.1 cVOCs

Concentrations of TCE in the Main Hill seeps continued to exceed the MCL in 2013; however, no locations had concentrations that exceeded the trigger level of 150 µg/L (established for seep 0605). The highest concentrations were measured in seep 0602, which is onsite. PCE concentrations continued to exceed the MCL of 5 µg/L at seep 0601; however, concentrations at this location did not exceed the trigger level of 75 µg/L. Detectable concentrations of *cis*-1,2-DCE were reported in seeps 0602, 0605, and 0607, with the highest concentrations reported for seep 0602. Estimated detections of *trans*-1,2-DCE, another breakdown product, were reported in seeps 0602 and 0605. No VC was detected in 2013.

Monitoring results for 2013 continued to show TCE in wells 0315, 0347, 0379, and 0386 with the highest concentrations in wells 0315 and 0347. Concentrations of TCE in wells 0315 and 0347 exceeded the MCL of 5 µg/L but did not exceed the trigger level of 30 µg/L (established for wells 0315 and 0347). No DCE or VC was detected in the downgradient wells.

Trend analysis for TCE data collected since 2005 indicated increasing TCE concentrations in seep 0602 and wells 0315 and 0347. A statistical upward trend in TCE concentrations was calculated for well 0347. Trend analysis indicated decreasing TCE concentrations in seeps 0605, 0606, and 0607. Statistical downward trends in TCE concentrations were calculated for seep 0605 and well 0389. A downward trend in PCE concentrations was calculated for data from seep 0601.

Data collected over the past several years indicates variable concentrations of cVOCs, primarily TCE, in the groundwater in the Parcels 6, 7, and 8. Concentrations of TCE have been significantly variable in seep 0602, which is located on the southern side of the Main Hill Area (Parcel 8). Elevated concentrations of TCE have consistently been measured in wells 0315 and 0347, both located in the Tributary Valley along the southern boundary of Parcel 8. The TCE concentrations in well 0347 have periodically exceeded the trigger level of 30 µg/L since 2006. Trend analysis shows increasing TCE concentrations at these 3 locations, with a statistical upward trend in well 0347. Review of the time-series data shows there may be some seasonality to the TCE concentrations in the two wells with the highest concentrations occurring in the later fall and winter timeframes.

Site improvements started in 2006 on the Main Hill and included a new parking lot constructed where B Building was located. It was discovered in late 2009 that grading in the area had exposed two manholes over a large tritium capture pit that was located along the western side of SW Building. These test pits extend into the weathered bedrock. Surface water had been infiltrating into these uncovered access ports and was lost to the subsurface. The access ports were covered in October 2009. After covering the ports, the TCE concentrations decreased slightly but became more varied.

Several data evaluations and field reconnaissance actions have been undertaken to determine the mechanism for the changes in TCE concentrations in this area. In response to the significant TCE increase in seep 0602 measured in 2011 (refer to Figure 10), locations for potential residual sources and types of transport mechanisms were reviewed. This included review of former

building operations on the Main Hill and a field reconnaissance to determine whether additional areas were present where surface water could enter the subsurface. Several areas could be potential sources of residual VOC contamination upgradient of this seep (possibly T Building, E Building, or DS Building). A large foundation system is located around T Building, which is upgradient of seep 0602. This drain could intercept VOC-impacted groundwater and divert it upgradient of seep 0602.

A field reconnaissance was performed in April 2011 to visually inspect for locations where surface water may enter the subsurface upgradient of seep 0602. Surface erosion was observed around the east head house for T Building. Water was observed leaking into several rooms that are on the east side of T Building. A soil berm was constructed in November 2011 to divert surface water away from the east head house.

Seep 0602 and the downgradient wells 0315, 0346, 0347, 0386, 0387, 0389, and 0392 are located in the tributary valley. As discussed in Section 1.3, the tributary valley is a narrow tongue of glacial deposits connected to the BVA that overlies the fractured bedrock at the site. Water infiltrating on the Main Hill moves through the fractured bedrock and ultimately discharges into the unconsolidated materials. Figure 18 depicts the bedrock topography beneath the tributary valley. Groundwater flow within the bedrock mimics the bedrock topography. TCE-impacted groundwater originated on the Main Hill may move southward and discharge to seeps or the tributary valley. Seep 0602 is located along the northern side of the tributary valley and the wells are located along the axis of the valley. Figure 19 depicts the cross section along the transect from well pair 0315/0347 within the tributary valley to well 0126 in the BVA. Annual average TCE concentrations posted on the cross section show that the deep wells that are screened directly above the bedrock have the highest TCE concentrations. It is likely that these wells monitor the TCE-impacted groundwater discharging from the bedrock.

4.5.2 Tritium

Tritium levels in the Main Hill seeps continued to be higher than those in the downgradient groundwater wells. The highest tritium activity was observed in seep 0601, which is onsite; this location exceeded the MCL of 20 nCi/L. No locations had tritium levels that exceeded the trigger level of 1,500 nCi/L. Detectable levels of tritium were measured in three wells (0138, 0347, and 0379) downgradient of the seeps; however, most of the levels were similar to background. The highest tritium levels in groundwater are in well 0347. None of the groundwater wells had tritium levels that exceeded the MCL of 20 nCi/L.

Trend analysis of tritium data collected since 2005 indicated decreasing levels in all of the seeps and in four downgradient wells. Statistical downward trends were calculated for all of the seeps and wells 0138, 0346, and 0379. The downward trends determined from post-remediation data continue to support the interpretation that the majority of the source was removed from the Main Hill area during remediation and that flushing should continue to lower the levels. Also, tritium concentrations will likely decrease more rapidly than those of the VOCs because tritium does not attenuate through degradation or sorption in the natural environment; therefore, it moves more quickly in the groundwater system.

4.6 Recommendations

The evaluation of the 2013 data does not indicate that the cVOC monitoring program should be changed. TCE concentrations greater than the MCL have continued to be measured in several seeps and in downgradient monitoring wells. Also, increasing trends in TCE concentrations have been identified at several locations. Quarterly sampling will continue at the seep and monitoring well locations.

No changes to the tritium monitoring program are warranted at this time; semiannual sampling for tritium will continue in 2014. Samples continue to be collected during the first and third quarters of the year to capture seasonal variation in the tritium levels.

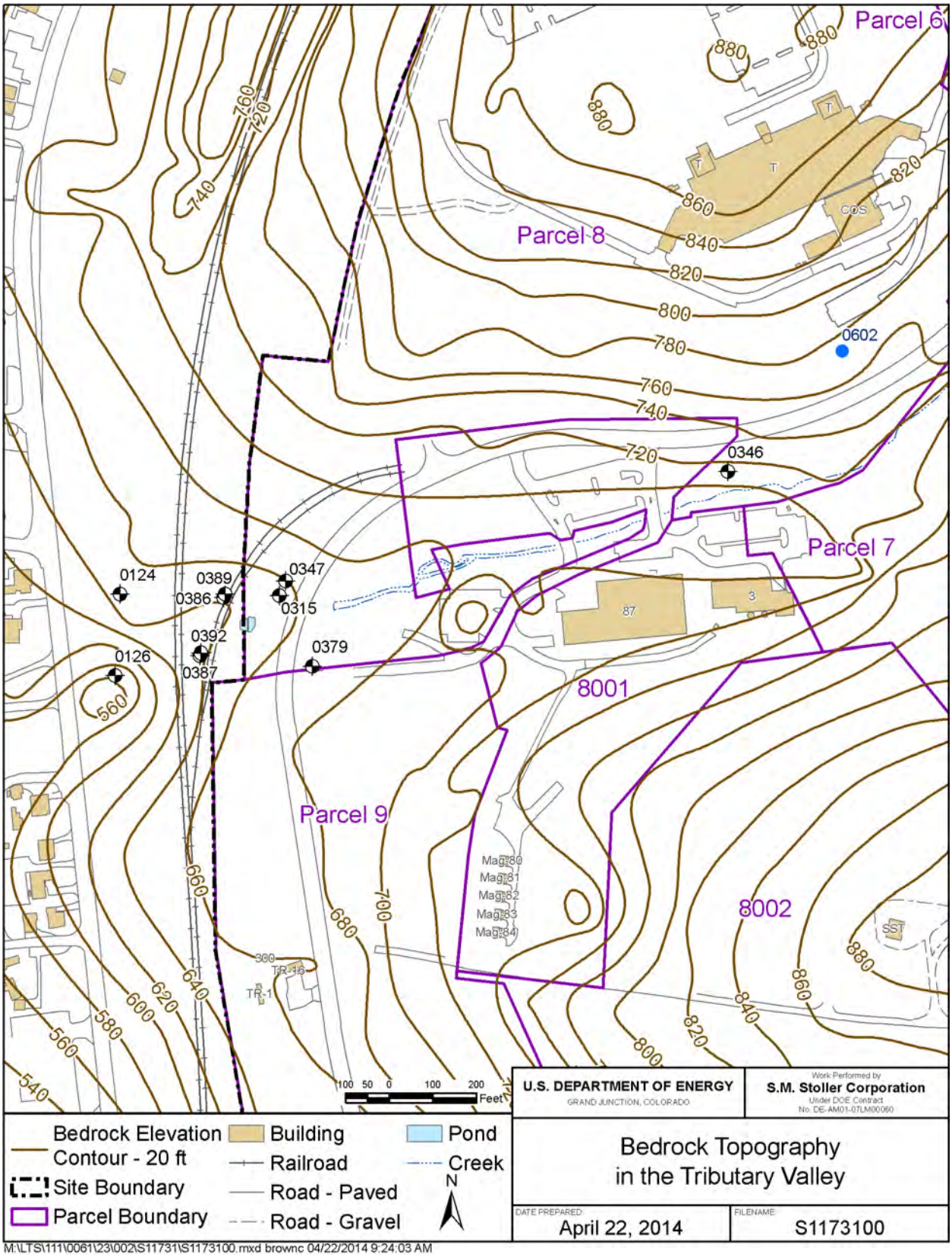

Figure 18. Bedrock Topography in the Tributary Valley

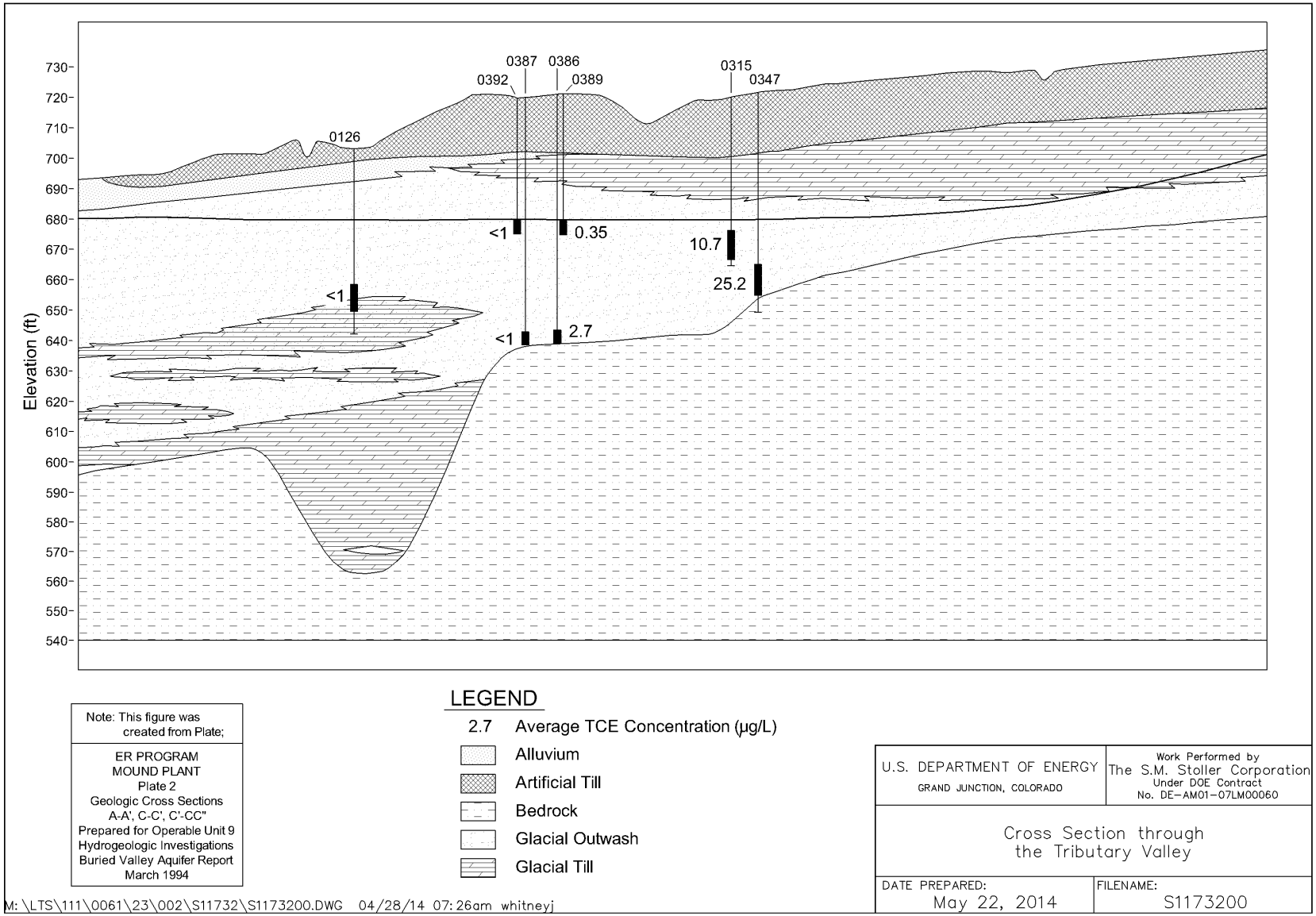

Figure 19. Cross Section Through the Tributary Valley

5.0 Inspection of the Monitoring System

A routine maintenance program has been established for the long-term groundwater monitoring locations at the Mound site. This program includes periodic inspections that focus on the integrity of each well and the condition of the protective casing and surface pad, the surrounding area, and the route of access. These inspections are usually performed during each sampling event. Overall, the wells were in good condition and some routine repainting and vegetation removal were performed during 2013.

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6.0 Data Validation

All data collected was validated in accordance with procedures specified in the Sitewide Operations and Maintenance Plan (DOE 2012). This procedure also fulfills the requirements of applicable procedures in the *Mound Methods Compendium* (MD 80045). Data validation was documented in reports prepared for each data package. All 2013 data, including data validation qualifiers, are summarized in Appendix C.

Laboratory performance is assessed by a review and evaluation of the following quality indicators:

- Sample shipping and receiving practices
- Chain of custody
- Laboratory blanks
- Preparation blanks
- Laboratory replicates
- Serial dilutions
- Detection limits
- Peak integrations
- Matrix spikes and matrix spike duplicates
- Holding times
- Instrument calibrations
- Interference check samples
- Radiochemical uncertainty
- Laboratory control samples
- Sample dilutions
- Surrogate recoveries
- Confirmation analyses
- Electronic data

A total of six Report Identification Numbers (RINs) were established for the 2013 environmental sampling efforts at the Mound site. An RIN is a set of samples that are relinquished to the laboratory using a Chain of Custody form accompanied by a Laboratory Authorization form. Data Assessment Reports are prepared for each RIN and are presented in Appendix D.

The laboratory prepares an analytical package for each RIN that includes a summary of results, a complete set of supporting analytical data for every analysis reported, and an electronic data deliverable that is used to upload analytical data into databases for validation and qualification prior to the release of the data. Every RIN received from the laboratory is thoroughly reviewed and evaluated before the data package is finalized and released to the public. Table 12 lists the RINs associated with this report.

Table 12. RINs for Calendar Year 2013 Sampling

RIN	Area	Sampling Date(s)
13015068	Parcels 6, 7, and 8	February 11–12, 2013
13015069	Phase I	February 11–14, 2013
13055358	Parcels 6, 7, and 8	May 28–30, 2013
13085558	Parcels 6, 7, and 8	August 26–27, 2013
13085559	Phase I	August 27–28, 2013
13105700	Parcels 6, 7, and 8	October 28–29, 2013

The data assessment reports also summarize and assess the sampling quality control for each sampling event. The following items are included:

- Sampling protocol
- Trip blanks
- Outliers
- Equipment blanks
- Field duplicates

7.0 References

DOE (U.S. Department of Energy), 1992. *Remedial Investigation/Feasibility Study, Operable Unit 9, Site-Wide Work Plan, Final*, May.

DOE (U.S. Department of Energy), 1994a. *Operable Unit 9; Hydrogeologic Investigation: Bedrock Report, Technical Memorandum*, January.

DOE (U.S. Department of Energy), 1994b. *Operable Unit 9; Hydrogeologic Investigation: Buried Valley Aquifer Report, Technical Memorandum, Revision 1*, September.

DOE (U.S. Department of Energy), 1995a. *Operable Unit 1 Record of Decision, Final*, June.

DOE (U.S. Department of Energy), 1995b. *Work Plan for Environmental Restoration at the Mound Plant, The Mound 2000 Approach*.

DOE (U.S. Department of Energy), 1997. *Mound 2000 Residual Risk Evaluation Methodology*, Revision 0 (Final), January.

DOE (U.S. Department of Energy), 2012. *Operations and Maintenance (O&M) Plan for the U.S. Department of Energy Mound Site*, *Miamisburg Ohio (Draft Final)*, October.

Mound Methods Compendium, Issue 2, MD-80045, prepared by BWXT of Ohio, Inc.

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Appendix A

Well Construction Summary

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Location ID	Program	Northing	Easting	Ground Elevation	TOC Elevation	Well Depth	Top of Screen Elevation	Bottom of Screen Elevation	Screen Length	Well Material	Screened Formation
0118	Parcels 6, 7, & 8	600464.95	1464737.80	705.36	704.86	40.1	674.73	664.73	10	4-inch SS	BVA
0124	Parcels 6, 7, & 8	597789.14	1463654.10	704.18	705.12	55.9	659.18	649.18	10	4-inch SS	BVA
0126	Parcels 6, 7, & 8	597603.58	1463643.30	704.61	705.54	54.8	660.78	650.78	10	4-inch SS	BVA
0138	Parcels 6, 7, & 8	600124.02	1464263.30	698.59	697.76	40.2	667.59	657.59	10	4-inch SS	BVA
0301	Parcels 6, 7, & 8	598315.05	1463120.40	693.10	692.46	84.9	617.60	607.60	10	4-inch SS	BVA
0311	Parcels 6, 7, & 8	598316.27	1463129.30	693.58	692.91	29.8	672.38	663.08	9.3	4-inch SS	BVA
0315	Phase I	597786.28	1464020.40	722.57	723.99	54.8	679.17	669.17	10	4-inch SS	BVA
0346	Parcels 6, 7, & 8	598070.11	1465048.90	743.50	742.97	45.5	702.50	697.50	5	4-inch SS	BVA
0347	Parcels 6, 7, & 8	597819.31	1464034.10	723.76	725.20	68.4	666.76	656.76	10	4-inch SS	BVA
0353	Phase I	596686.11	1464609.40	744.04	745.33	19.3	731.04	726.04	5	4-inch SS	Bedrock
0379	Parcels 6, 7, & 8	597624.41	1464095.90	715.24	716.11	40.9	685.24	675.24	10	4-inch SS	BVA
0386	Parcels 6, 7, & 8	597789.23	1463896.00	725.16	724.79	86.6	648.16	638.16	10	4-inch SS	BVA
0387	Parcels 6, 7, & 8	597654.63	1463839.50	721.26	720.89	81.6	644.26	639.26	5	4-inch SS	BVA
0389	Parcels 6, 7, & 8	597781.29	1463891.90	724.96	724.65	51.7	682.96	672.96	10	4-inch SS	BVA
0392	Parcels 6, 7, & 8	597648.77	1463838.30	721.18	720.84	44.7	681.18	676.18	5	4-inch SS	BVA
0400	Phase I	596122.80	1464333.10	703.22	705.11	34.4	680.72	670.72	10	2-inch SS	BVA
0402	Phase I	596407.78	1464208.00	702.48	704.02	32.3	681.74	671.74	10	2-inch SS	BVA
0411	Phase I	596808.81	1465077.10	834.83	836.57	39.7	806.89	796.89	10	2-inch SS	Bedrock
0443	Phase I	596886.22	1465177.11	856.89	858.78	39.6	829.20	819.20	10	2-inch PVC	Bedrock
0444	Phase I	596463.35	1465001.58	770.71	773.00	32.8	750.20	740.20	10	2-inch PVC	Bedrock
0445	Phase I	596448.12	1464738.54	741.29	743.43	42.5	710.93	700.93	10	2-inch PVC	Bedrock
P033	Phase I	596208.15	1464233.80	706.03	705.83	24.8	686.03	681.03	5	2-inch PVC	BVA
0601	Parcels 6, 7, & 8	598743.22	1464280.80	817.52						Seep	Bedrock
0602	Parcels 6, 7, & 8	598346.65	1465311.40	779.61						Seep	Bedrock
0605	Parcels 6, 7, & 8	599824.63	1464935.40	817.70						Seep	Bedrock
0606	Parcels 6, 7, & 8	699971.45	1464989.00	789.23						Seep	Bedrock
0607	Parcels 6, 7, & 8	600015.30	1465105.70	797.00						Seep	Bedrock
0608	Parcels 6, 7, & 8	599877.40	1464513.60	726.09						Seep	Bedrock
0617	Phase I	596539.80	1464855.80	766.07						Seep	Bedrock

TOC = top of casing
SS = stainless steel

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Appendix B

2013 Groundwater Elevations

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Table B-1. Phase I Groundwater Elevations

Location ID	Date	Elevation Top of Casing	Depth from Top of Casing	Groundwater Elevation
0353	2/13/2013	745.33	2.42	742.91
0353	8/28/2013	745.33	4.74	740.59
0400	2/14/2013	705.11	24.03	681.08
0400	8/28/2013	705.11	26.14	678.97
0402	2/14/2013	704.02	22.85	681.17
0402	8/28/2013	704.02	24.98	679.04
0411	2/14/2013	836.57	22.81	813.76
0411	8/28/2013	836.57	29.92	806.65
0443	2/14/2013	858.78	36.45	822.33
0443	8/28/2013	858.78	below top of pump	
0444	2/13/2013	773	25.2	747.8
0444	8/28/2013	773	25	748
0445	2/13/2013	743.43	14.43	729
0445	8/28/2013	743.43	14	729.43
P033	2/14/2013	705.83	24.75	681.08
P033	8/28/2013	705.83	26.87	678.96

Table B-2. Parcels 6, 7, and 8 Groundwater Elevations

Location ID	Date	Elevation Top of Casing	Depth from Top of Casing	Groundwater Elevation
0118	2/11/2013	704.86	22.34	682.52
0118	5/29/2013	704.86	23.05	681.81
0118	8/27/2013	704.86	24.7	680.16
0118	10/29/2013	704.86	23.92	680.94
0124	2/11/2013	705.12	23.46	681.66
0124	5/29/2013	705.12	24.08	681.04
0124	8/27/2013	705.12	25.78	679.34
0124	10/29/2013	705.12	25.45	679.67
0126	2/11/2013	705.54	23.91	681.63
0126	5/29/2013	705.54	24.51	681.03
0126	8/27/2013	705.54	26.21	679.33
0126	10/29/2013	705.54	25.9	679.64
0138	2/11/2013	697.76	15.51	682.25
0138	5/29/2013	697.76	16.22	681.54
0138	8/27/2013	697.76	17.91	679.85
0138	10/29/2013	697.76	17.16	680.6
0301	2/11/2013	692.46	11.15	681.31
0301	5/29/2013	692.46	11.79	680.67

Table B-2 (continued). Parcels 6, 7, and 8 Groundwater Elevations

Location ID	Date	Elevation Top of Casing	Depth from Top of Casing	Groundwater Elevation
0301	8/27/2013	692.46	13.45	679.01
0301	10/29/2013	692.46	13.02	679.44
0311	2/11/2013	692.91	11.65	681.26
0311	5/29/2013	692.91	12.28	680.63
0311	8/27/2013	692.91	13.95	678.96
0311	10/29/2013	692.91	13.5	679.41
0315	2/12/2013	723.99	42.45	681.54
0315	5/28/2013	723.99	42.91	681.08
0315	8/26/2013	723.99	44.63	679.36
0315	10/28/2013	723.99	44.35	679.64
0346	2/12/2013	742.97	13.35	729.62
0346	5/28/2013	742.97	11.75	731.22
0346	8/26/2013	742.97	13.09	729.88
0346	10/29/2013	742.97	13.96	729.01
0347	2/12/2013	725.2	43.66	681.54
0347	5/28/2013	725.2	44.13	681.07
0347	8/26/2013	725.2	45.87	679.33
0347	10/28/2013	725.2	45.57	679.63
0379	2/11/2013	716.11	34.51	681.6
0379	5/2/2013	716.11	33.4	682.71
0379	5/29/2013	716.11	35.11	681
0379	8/27/2013	716.11	36.81	679.3
0379	10/28/2013	716.11	36.49	679.62
0386	2/12/2013	724.79	43.22	681.57
0386	5/28/2013	724.79	43.7	681.09
0386	8/26/2013	724.79	45.43	679.36
0386	10/28/2013	724.79	45.15	679.64
0387	2/13/2013	720.89	39.4	681.49
0387	5/28/2013	720.89	39.87	681.02
0387	8/26/2013	720.89	41.59	679.3
0387	10/28/2013	720.89	41.3	679.59
0389	2/12/2013	724.65	43.12	681.53
0389	5/28/2013	724.65	43.52	681.13
0389	8/26/2013	724.65	45.25	679.4
0389	10/28/2013	724.65	44.95	679.7
0392	2/12/2013	720.84	39.21	681.63
0392	5/28/2013	720.84	39.66	681.18
0392	8/26/2013	720.84	41.4	679.44
0392	10/28/2013	720.84	41.1	679.74

Appendix C

2013 Groundwater and Seep Data Summary

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Sample ID	Area	Analyte	Sample Date	Value	Units	Detection Limit	Lab Qualifiers	Validation Qualifiers	Sample Type
0118	Parcels 6-7-8	cis-1,2-Dichloroethene	2/11/2013	0.16	ug/L	0.16	U		F
0118	Parcels 6-7-8	cis-1,2-Dichloroethene	5/29/2013	0.16	ug/L	0.16	U	F	F
0118	Parcels 6-7-8	cis-1,2-Dichloroethene	8/27/2013	0.16	ug/L	0.16	U	F	F
0118	Parcels 6-7-8	cis-1,2-Dichloroethene	10/29/2013	0.16	ug/L	0.16	U	F	F
0118	Parcels 6-7-8	Dissolved Oxygen	2/11/2013	4.67	mg/L				F
0118	Parcels 6-7-8	Dissolved Oxygen	5/29/2013	5.51	mg/L			F	F
0118	Parcels 6-7-8	Dissolved Oxygen	8/27/2013	6.1	mg/L			F	F
0118	Parcels 6-7-8	Dissolved Oxygen	10/29/2013	6.09	mg/L			F	F
0118	Parcels 6-7-8	Oxidation Reduction Potential	2/11/2013	189.6	mV				F
0118	Parcels 6-7-8	Oxidation Reduction Potential	5/29/2013	-42.7	mV			F	F
0118	Parcels 6-7-8	Oxidation Reduction Potential	8/27/2013	96	mV			F	F
0118	Parcels 6-7-8	Oxidation Reduction Potential	10/29/2013	75.6	mV			F	F
0118	Parcels 6-7-8	pH	2/11/2013	7.1	s.u.				F
0118	Parcels 6-7-8	pH	5/29/2013	7.14	s.u.			F	F
0118	Parcels 6-7-8	pH	8/27/2013	7.21	s.u.			F	F
0118	Parcels 6-7-8	pH	10/29/2013	7	s.u.			F	F
0118	Parcels 6-7-8	Specific Conductance	2/11/2013	1161	umhos/cm				F
0118	Parcels 6-7-8	Specific Conductance	5/29/2013	1151	umhos/cm			F	F
0118	Parcels 6-7-8	Specific Conductance	8/27/2013	1116	umhos/cm			F	F
0118	Parcels 6-7-8	Specific Conductance	10/29/2013	1182	umhos/cm			F	F
0118	Parcels 6-7-8	Temperature	2/11/2013	13.34	C				F
0118	Parcels 6-7-8	Temperature	5/29/2013	14.64	C			F	F
0118	Parcels 6-7-8	Temperature	8/27/2013	15.33	C			F	F
0118	Parcels 6-7-8	Temperature	10/29/2013	13.7	C			F	F
0118	Parcels 6-7-8	Tetrachloroethene	2/11/2013	0.16	ug/L	0.16	U		F
0118	Parcels 6-7-8	Tetrachloroethene	5/29/2013	0.16	ug/L	0.16	U	F	F
0118	Parcels 6-7-8	Tetrachloroethene	8/27/2013	0.16	ug/L	0.16	U	F	F
0118	Parcels 6-7-8	Tetrachloroethene	10/29/2013	0.16	ug/L	0.16	U	F	F
0118	Parcels 6-7-8	trans-1,2-Dichloroethene	2/11/2013	0.16	ug/L	0.16	U		F
0118	Parcels 6-7-8	trans-1,2-Dichloroethene	5/29/2013	0.16	ug/L	0.16	U	F	F
0118	Parcels 6-7-8	trans-1,2-Dichloroethene	8/27/2013	0.16	ug/L	0.16	U	F	F
0118	Parcels 6-7-8	trans-1,2-Dichloroethene	10/29/2013	0.16	ug/L	0.16	U	F	F

Sample ID	Area	Analyte	Sample Date	Value	Units	Detection Limit	Lab Qualifiers	Validation Qualifiers	Sample Type
0118	Parcels 6-7-8	Trichloroethene	2/11/2013	0.16	ug/L	0.16	U		F
0118	Parcels 6-7-8	Trichloroethene	5/29/2013	0.16	ug/L	0.16	U	F	F
0118	Parcels 6-7-8	Trichloroethene	8/27/2013	0.16	ug/L	0.16	U	F	F
0118	Parcels 6-7-8	Trichloroethene	10/29/2013	0.16	ug/L	0.16	U	F	F
0118	Parcels 6-7-8	Tritium	2/11/2013	36.1	pCi/L	342	U		F
0118	Parcels 6-7-8	Tritium	8/27/2013	-129	pCi/L	327	U	F	F
0118	Parcels 6-7-8	Turbidity	2/11/2013	7.44	NTU				F
0118	Parcels 6-7-8	Turbidity	5/29/2013	4.19	NTU			F	F
0118	Parcels 6-7-8	Turbidity	8/27/2013	11.5	NTU			F	F
0118	Parcels 6-7-8	Turbidity	10/29/2013	3.73	NTU			F	F
0118	Parcels 6-7-8	Vinyl chloride	2/11/2013	0.16	ug/L	0.16	U		F
0118	Parcels 6-7-8	Vinyl chloride	5/29/2013	0.16	ug/L	0.16	U	F	F
0118	Parcels 6-7-8	Vinyl chloride	8/27/2013	0.16	ug/L	0.16	U	F	F
0118	Parcels 6-7-8	Vinyl chloride	10/29/2013	0.16	ug/L	0.16	U	F	F
0124	Parcels 6-7-8	cis-1,2-Dichloroethene	2/11/2013	0.16	ug/L	0.16	U		F
0124	Parcels 6-7-8	cis-1,2-Dichloroethene	5/29/2013	0.16	ug/L	0.16	U	F	F
0124	Parcels 6-7-8	cis-1,2-Dichloroethene	8/27/2013	0.16	ug/L	0.16	U	F	F
0124	Parcels 6-7-8	cis-1,2-Dichloroethene	10/29/2013	0.16	ug/L	0.16	U	F	F
0124	Parcels 6-7-8	Dissolved Oxygen	2/11/2013	0.33	mg/L				F
0124	Parcels 6-7-8	Dissolved Oxygen	5/29/2013	0.87	mg/L			F	F
0124	Parcels 6-7-8	Dissolved Oxygen	8/27/2013	0.26	mg/L			F	F
0124	Parcels 6-7-8	Dissolved Oxygen	10/29/2013	0.62	mg/L			F	F
0124	Parcels 6-7-8	Oxidation Reduction Potential	2/11/2013	216.5	mV				F
0124	Parcels 6-7-8	Oxidation Reduction Potential	5/29/2013	-53.7	mV			F	F
0124	Parcels 6-7-8	Oxidation Reduction Potential	8/27/2013	57.2	mV			F	F
0124	Parcels 6-7-8	Oxidation Reduction Potential	10/29/2013	87.4	mV			F	F
0124	Parcels 6-7-8	pH	2/11/2013	6.89	s.u.				F
0124	Parcels 6-7-8	pH	5/29/2013	7.11	s.u.			F	F
0124	Parcels 6-7-8	pH	8/27/2013	7.08	s.u.			F	F
0124	Parcels 6-7-8	pH	10/29/2013	6.85	s.u.			F	F
0124	Parcels 6-7-8	Specific Conductance	2/11/2013	1413	umhos/cm				F
0124	Parcels 6-7-8	Specific Conductance	5/29/2013	1336	umhos/cm			F	F
0124	Parcels 6-7-8	Specific Conductance	8/27/2013	1357	umhos/cm			F	F
0124	Parcels 6-7-8	Specific Conductance	10/29/2013	1466	umhos/cm			F	F

Sample ID	Area	Analyte	Sample Date	Value	Units	Detection Limit	Lab Qualifiers	Validation Qualifiers	Sample Type
0124	Parcels 6-7-8	Temperature	2/11/2013	13.52	C				F
0124	Parcels 6-7-8	Temperature	5/29/2013	15.75	C			F	F
0124	Parcels 6-7-8	Temperature	8/27/2013	16.24	C			F	F
0124	Parcels 6-7-8	Temperature	10/29/2013	14.4	C			F	F
0124	Parcels 6-7-8	Tetrachloroethene	2/11/2013	0.16	ug/L	0.16	U		F
0124	Parcels 6-7-8	Tetrachloroethene	5/29/2013	0.16	ug/L	0.16	U	F	F
0124	Parcels 6-7-8	Tetrachloroethene	8/27/2013	0.16	ug/L	0.16	U	F	F
0124	Parcels 6-7-8	Tetrachloroethene	10/29/2013	0.16	ug/L	0.16	U	F	F
0124	Parcels 6-7-8	trans-1,2-Dichloroethene	2/11/2013	0.16	ug/L	0.16	U		F
0124	Parcels 6-7-8	trans-1,2-Dichloroethene	5/29/2013	0.16	ug/L	0.16	U	F	F
0124	Parcels 6-7-8	trans-1,2-Dichloroethene	8/27/2013	0.16	ug/L	0.16	U	F	F
0124	Parcels 6-7-8	trans-1,2-Dichloroethene	10/29/2013	0.16	ug/L	0.16	U	F	F
0124	Parcels 6-7-8	Trichloroethene	2/11/2013	0.16	ug/L	0.16	U		F
0124	Parcels 6-7-8	Trichloroethene	5/29/2013	0.16	ug/L	0.16	U	F	F
0124	Parcels 6-7-8	Trichloroethene	8/27/2013	0.16	ug/L	0.16	U	F	F
0124	Parcels 6-7-8	Trichloroethene	10/29/2013	0.16	ug/L	0.16	U	F	F
0124	Parcels 6-7-8	Turbidity	2/11/2013	4.05	NTU				F
0124	Parcels 6-7-8	Turbidity	5/29/2013	8.43	NTU			F	F
0124	Parcels 6-7-8	Turbidity	8/27/2013	3.12	NTU			F	F
0124	Parcels 6-7-8	Turbidity	10/29/2013	3.7	NTU			F	F
0124	Parcels 6-7-8	Vinyl chloride	2/11/2013	0.16	ug/L	0.16	U		F
0124	Parcels 6-7-8	Vinyl chloride	5/29/2013	0.16	ug/L	0.16	U	F	F
0124	Parcels 6-7-8	Vinyl chloride	8/27/2013	0.16	ug/L	0.16	U	F	F
0124	Parcels 6-7-8	Vinyl chloride	10/29/2013	0.16	ug/L	0.16	U	F	F
0126	Parcels 6-7-8	cis-1,2-Dichloroethene	2/11/2013	0.16	ug/L	0.16	U		F
0126	Parcels 6-7-8	cis-1,2-Dichloroethene	5/29/2013	0.16	ug/L	0.16	U	F	F
0126	Parcels 6-7-8	cis-1,2-Dichloroethene	8/27/2013	0.16	ug/L	0.16	U	F	F
0126	Parcels 6-7-8	cis-1,2-Dichloroethene	10/29/2013	0.16	ug/L	0.16	U	F	F
0126	Parcels 6-7-8	Dissolved Oxygen	2/11/2013	0.61	mg/L				F
0126	Parcels 6-7-8	Dissolved Oxygen	5/29/2013	0.5	mg/L			F	F
0126	Parcels 6-7-8	Dissolved Oxygen	8/27/2013	0.3	mg/L			F	F
0126	Parcels 6-7-8	Dissolved Oxygen	10/29/2013	0.43	mg/L			F	F

Sample ID	Area	Analyte	Sample Date	Value	Units	Detection Limit	Lab Qualifiers	Validation Qualifiers	Sample Type
0126	Parcels 6-7-8	Oxidation Reduction Potential	2/11/2013	226.6	mV				F
0126	Parcels 6-7-8	Oxidation Reduction Potential	5/29/2013	-55.3	mV			F	F
0126	Parcels 6-7-8	Oxidation Reduction Potential	8/27/2013	38.3	mV			F	F
0126	Parcels 6-7-8	Oxidation Reduction Potential	10/29/2013	97.1	mV			F	F
0126	Parcels 6-7-8	pH	2/11/2013	6.85	s.u.				F
0126	Parcels 6-7-8	pH	5/29/2013	7.11	s.u.			F	F
0126	Parcels 6-7-8	pH	8/27/2013	7.07	s.u.			F	F
0126	Parcels 6-7-8	pH	10/29/2013	6.82	s.u.			F	F
0126	Parcels 6-7-8	Specific Conductance	2/11/2013	1346	umhos/cm				F
0126	Parcels 6-7-8	Specific Conductance	5/29/2013	1315	umhos/cm			F	F
0126	Parcels 6-7-8	Specific Conductance	8/27/2013	1299	umhos/cm			F	F
0126	Parcels 6-7-8	Specific Conductance	10/29/2013	1364	umhos/cm			F	F
0126	Parcels 6-7-8	Temperature	2/11/2013	13.34	C				F
0126	Parcels 6-7-8	Temperature	5/29/2013	15.86	C			F	F
0126	Parcels 6-7-8	Temperature	8/27/2013	16.21	C			F	F
0126	Parcels 6-7-8	Temperature	10/29/2013	13.98	C			F	F
0126	Parcels 6-7-8	Tetrachloroethene	2/11/2013	0.92	ug/L	0.16	J		F
0126	Parcels 6-7-8	Tetrachloroethene	5/29/2013	0.92	ug/L	0.16	J	F	F
0126	Parcels 6-7-8	Tetrachloroethene	8/27/2013	0.95	ug/L	0.16	J	F	F
0126	Parcels 6-7-8	Tetrachloroethene	10/29/2013	0.88	ug/L	0.16	J	F	F
0126	Parcels 6-7-8	trans-1,2-Dichloroethene	2/11/2013	0.16	ug/L	0.16	U		F
0126	Parcels 6-7-8	trans-1,2-Dichloroethene	5/29/2013	0.16	ug/L	0.16	U	F	F
0126	Parcels 6-7-8	trans-1,2-Dichloroethene	8/27/2013	0.16	ug/L	0.16	U	F	F
0126	Parcels 6-7-8	trans-1,2-Dichloroethene	10/29/2013	0.16	ug/L	0.16	U	F	F
0126	Parcels 6-7-8	Trichloroethene	2/11/2013	0.16	ug/L	0.16	U		F
0126	Parcels 6-7-8	Trichloroethene	5/29/2013	0.16	ug/L	0.16	U	F	F
0126	Parcels 6-7-8	Trichloroethene	8/27/2013	0.16	ug/L	0.16	U	F	F
0126	Parcels 6-7-8	Trichloroethene	10/29/2013	0.16	ug/L	0.16	U	F	F
0126	Parcels 6-7-8	Turbidity	2/11/2013	4.11	NTU				F
0126	Parcels 6-7-8	Turbidity	5/29/2013	1.85	NTU			F	F
0126	Parcels 6-7-8	Turbidity	8/27/2013	2.6	NTU			F	F
0126	Parcels 6-7-8	Turbidity	10/29/2013	1.77	NTU			F	F

Sample ID	Area	Analyte	Sample Date	Value	Units	Detection Limit	Lab Qualifiers	Validation Qualifiers	Sample Type
0126	Parcels 6-7-8	Vinyl chloride	2/11/2013	0.16	ug/L	0.16	U		F
0126	Parcels 6-7-8	Vinyl chloride	5/29/2013	0.16	ug/L	0.16	U	F	F
0126	Parcels 6-7-8	Vinyl chloride	8/27/2013	0.16	ug/L	0.16	U	F	F
0126	Parcels 6-7-8	Vinyl chloride	10/29/2013	0.16	ug/L	0.16	U	F	F
0138	Parcels 6-7-8	cis-1,2-Dichloroethene	2/11/2013	0.16	ug/L	0.16	U		F
0138	Parcels 6-7-8	cis-1,2-Dichloroethene	5/29/2013	0.16	ug/L	0.16	U	F	F
0138	Parcels 6-7-8	cis-1,2-Dichloroethene	8/27/2013	0.16	ug/L	0.16	U	F	F
0138	Parcels 6-7-8	cis-1,2-Dichloroethene	10/29/2013	0.16	ug/L	0.16	U	F	F
0138	Parcels 6-7-8	Dissolved Oxygen	2/11/2013	3.46	mg/L				F
0138	Parcels 6-7-8	Dissolved Oxygen	5/29/2013	3.59	mg/L			F	F
0138	Parcels 6-7-8	Dissolved Oxygen	8/27/2013	3.55	mg/L			F	F
0138	Parcels 6-7-8	Dissolved Oxygen	10/29/2013	3.59	mg/L			F	F
0138	Parcels 6-7-8	Oxidation Reduction Potential	2/11/2013	186.6	mV				F
0138	Parcels 6-7-8	Oxidation Reduction Potential	5/29/2013	-55.8	mV			F	F
0138	Parcels 6-7-8	Oxidation Reduction Potential	8/27/2013	95.8	mV			F	F
0138	Parcels 6-7-8	Oxidation Reduction Potential	10/29/2013	55.5	mV			F	F
0138	Parcels 6-7-8	pH	2/11/2013	7.05	s.u.				F
0138	Parcels 6-7-8	pH	5/29/2013	7.19	s.u.			F	F
0138	Parcels 6-7-8	pH	8/27/2013	7.19	s.u.			F	F
0138	Parcels 6-7-8	pH	10/29/2013	7.01	s.u.			F	F
0138	Parcels 6-7-8	Specific Conductance	2/11/2013	1183	umhos/cm				F
0138	Parcels 6-7-8	Specific Conductance	5/29/2013	1277	umhos/cm			F	F
0138	Parcels 6-7-8	Specific Conductance	8/27/2013	1249	umhos/cm			F	F
0138	Parcels 6-7-8	Specific Conductance	10/29/2013	1277	umhos/cm			F	F
0138	Parcels 6-7-8	Temperature	2/11/2013	12.27	C				F
0138	Parcels 6-7-8	Temperature	5/29/2013	13.84	C			F	F
0138	Parcels 6-7-8	Temperature	8/27/2013	14.4	C			F	F
0138	Parcels 6-7-8	Temperature	10/29/2013	12.98	C			F	F
0138	Parcels 6-7-8	Tetrachloroethene	2/11/2013	0.16	ug/L	0.16	U		F
0138	Parcels 6-7-8	Tetrachloroethene	5/29/2013	0.16	ug/L	0.16	U	F	F
0138	Parcels 6-7-8	Tetrachloroethene	8/27/2013	0.16	ug/L	0.16	U	F	F
0138	Parcels 6-7-8	Tetrachloroethene	10/29/2013	0.16	ug/L	0.16	U	F	F

Sample ID	Area	Analyte	Sample Date	Value	Units	Detection Limit	Lab Qualifiers	Validation Qualifiers	Sample Type
0138	Parcels 6-7-8	trans-1,2-Dichloroethene	2/11/2013	0.16	ug/L	0.16	U		F
0138	Parcels 6-7-8	trans-1,2-Dichloroethene	5/29/2013	0.16	ug/L	0.16	U	F	F
0138	Parcels 6-7-8	trans-1,2-Dichloroethene	8/27/2013	0.16	ug/L	0.16	U	F	F
0138	Parcels 6-7-8	trans-1,2-Dichloroethene	10/29/2013	0.16	ug/L	0.16	U	F	F
0138	Parcels 6-7-8	Trichloroethene	2/11/2013	0.16	ug/L	0.16	U		F
0138	Parcels 6-7-8	Trichloroethene	5/29/2013	0.16	ug/L	0.16	U	F	F
0138	Parcels 6-7-8	Trichloroethene	8/27/2013	0.16	ug/L	0.16	U	F	F
0138	Parcels 6-7-8	Trichloroethene	10/29/2013	0.16	ug/L	0.16	U	F	F
0138	Parcels 6-7-8	Tritium	2/11/2013	281	pCi/L	323	U		F
0138	Parcels 6-7-8	Tritium	8/27/2013	1190	pCi/L	331		F	F
0138	Parcels 6-7-8	Turbidity	2/11/2013	21.3	NTU				F
0138	Parcels 6-7-8	Turbidity	5/29/2013	12.3	NTU			F	F
0138	Parcels 6-7-8	Turbidity	8/27/2013	31.1	NTU			F	F
0138	Parcels 6-7-8	Turbidity	10/29/2013	14.1	NTU			F	F
0138	Parcels 6-7-8	Vinyl chloride	2/11/2013	0.16	ug/L	0.16	U		F
0138	Parcels 6-7-8	Vinyl chloride	5/29/2013	0.16	ug/L	0.16	U	F	F
0138	Parcels 6-7-8	Vinyl chloride	8/27/2013	0.16	ug/L	0.16	U	F	F
0138	Parcels 6-7-8	Vinyl chloride	10/29/2013	0.16	ug/L	0.16	U	F	F
0301	Parcels 6-7-8	cis-1,2-Dichloroethene	2/11/2013	0.16	ug/L	0.16	U		F
0301	Parcels 6-7-8	cis-1,2-Dichloroethene	5/29/2013	0.16	ug/L	0.16	U	F	F
0301	Parcels 6-7-8	cis-1,2-Dichloroethene	8/27/2013	0.16	ug/L	0.16	U	F	F
0301	Parcels 6-7-8	cis-1,2-Dichloroethene	10/29/2013	0.16	ug/L	0.16	U	F	F
0301	Parcels 6-7-8	Dissolved Oxygen	2/11/2013	1.09	mg/L				F
0301	Parcels 6-7-8	Dissolved Oxygen	5/29/2013	0.4	mg/L			F	F
0301	Parcels 6-7-8	Dissolved Oxygen	8/27/2013	0.24	mg/L			F	F
0301	Parcels 6-7-8	Dissolved Oxygen	10/29/2013	1.5	mg/L			F	F
0301	Parcels 6-7-8	Oxidation Reduction Potential	2/11/2013	179.2	mV				F
0301	Parcels 6-7-8	Oxidation Reduction Potential	5/29/2013	-77.9	mV			F	F
0301	Parcels 6-7-8	Oxidation Reduction Potential	8/27/2013	-169.9	mV			F	F
0301	Parcels 6-7-8	Oxidation Reduction Potential	10/29/2013	16.1	mV			F	F
0301	Parcels 6-7-8	pH	2/11/2013	9.68	s.u.				F
0301	Parcels 6-7-8	pH	5/29/2013	7.8	s.u.			F	F
0301	Parcels 6-7-8	pH	8/27/2013	8.02	s.u.			F	F
0301	Parcels 6-7-8	pH	10/29/2013	9.76	s.u.			F	F

Sample ID	Area	Analyte	Sample Date	Value	Units	Detection Limit	Lab Qualifiers	Validation Qualifiers	Sample Type
0301	Parcels 6-7-8	Specific Conductance	2/11/2013	990	umhos/cm				F
0301	Parcels 6-7-8	Specific Conductance	5/29/2013	1039	umhos/cm			F	F
0301	Parcels 6-7-8	Specific Conductance	8/27/2013	1005	umhos/cm			F	F
0301	Parcels 6-7-8	Specific Conductance	10/29/2013	1023	umhos/cm			F	F
0301	Parcels 6-7-8	Temperature	2/11/2013	13.04	C				F
0301	Parcels 6-7-8	Temperature	5/29/2013	17.27	C			F	F
0301	Parcels 6-7-8	Temperature	8/27/2013	17.39	C			F	F
0301	Parcels 6-7-8	Temperature	10/29/2013	15.72	C			F	F
0301	Parcels 6-7-8	Tetrachloroethene	2/11/2013	0.16	ug/L	0.16	U		F
0301	Parcels 6-7-8	Tetrachloroethene	5/29/2013	0.16	ug/L	0.16	U	F	F
0301	Parcels 6-7-8	Tetrachloroethene	8/27/2013	0.16	ug/L	0.16	U	F	F
0301	Parcels 6-7-8	Tetrachloroethene	10/29/2013	0.16	ug/L	0.16	U	F	F
0301	Parcels 6-7-8	trans-1,2-Dichloroethene	2/11/2013	0.16	ug/L	0.16	U		F
0301	Parcels 6-7-8	trans-1,2-Dichloroethene	5/29/2013	0.16	ug/L	0.16	U	F	F
0301	Parcels 6-7-8	trans-1,2-Dichloroethene	8/27/2013	0.16	ug/L	0.16	U	F	F
0301	Parcels 6-7-8	trans-1,2-Dichloroethene	10/29/2013	0.16	ug/L	0.16	U	F	F
0301	Parcels 6-7-8	Trichloroethene	2/11/2013	0.16	ug/L	0.16	U		F
0301	Parcels 6-7-8	Trichloroethene	5/29/2013	0.16	ug/L	0.16	U	F	F
0301	Parcels 6-7-8	Trichloroethene	8/27/2013	0.16	ug/L	0.16	U	F	F
0301	Parcels 6-7-8	Trichloroethene	10/29/2013	0.16	ug/L	0.16	U	F	F
0301	Parcels 6-7-8	Tritium	2/11/2013	108	pCi/L	332	U		F
0301	Parcels 6-7-8	Tritium	8/27/2013	-103	pCi/L	322	U	F	F
0301	Parcels 6-7-8	Turbidity	2/11/2013	3.83	NTU				F
0301	Parcels 6-7-8	Turbidity	5/29/2013	1.54	NTU			F	F
0301	Parcels 6-7-8	Turbidity	8/27/2013	1.53	NTU			F	F
0301	Parcels 6-7-8	Turbidity	10/29/2013	1.56	NTU			F	F
0301	Parcels 6-7-8	Vinyl chloride	2/11/2013	0.16	ug/L	0.16	U		F
0301	Parcels 6-7-8	Vinyl chloride	5/29/2013	0.16	ug/L	0.16	U	F	F
0301	Parcels 6-7-8	Vinyl chloride	8/27/2013	0.16	ug/L	0.16	U	F	F
0301	Parcels 6-7-8	Vinyl chloride	10/29/2013	0.16	ug/L	0.16	U	F	F
0311	Parcels 6-7-8	cis-1,2-Dichloroethene	2/11/2013	0.16	ug/L	0.16	U		F
0311	Parcels 6-7-8	cis-1,2-Dichloroethene	5/29/2013	0.16	ug/L	0.16	U	F	F
0311	Parcels 6-7-8	cis-1,2-Dichloroethene	8/27/2013	0.16	ug/L	0.16	U	F	F
0311	Parcels 6-7-8	cis-1,2-Dichloroethene	10/29/2013	0.16	ug/L	0.16	U	F	F

Sample ID	Area	Analyte	Sample Date	Value	Units	Detection Limit	Lab Qualifiers	Validation Qualifiers	Sample Type
0311	Parcels 6-7-8	Dissolved Oxygen	2/11/2013	1.84	mg/L				F
0311	Parcels 6-7-8	Dissolved Oxygen	5/29/2013	1.46	mg/L			F	F
0311	Parcels 6-7-8	Dissolved Oxygen	8/27/2013	2.96	mg/L			F	F
0311	Parcels 6-7-8	Dissolved Oxygen	10/29/2013	4.16	mg/L			F	F
0311	Parcels 6-7-8	Oxidation Reduction Potential	2/11/2013	184.2	mV				F
0311	Parcels 6-7-8	Oxidation Reduction Potential	5/29/2013	-57.7	mV			F	F
0311	Parcels 6-7-8	Oxidation Reduction Potential	8/27/2013	-0.02	mV			F	F
0311	Parcels 6-7-8	Oxidation Reduction Potential	10/29/2013	67.6	mV			F	F
0311	Parcels 6-7-8	pH	2/11/2013	7.08	s.u.				F
0311	Parcels 6-7-8	pH	5/29/2013	7.19	s.u.			F	F
0311	Parcels 6-7-8	pH	8/27/2013	7.39	s.u.			F	F
0311	Parcels 6-7-8	pH	10/29/2013	7.11	s.u.			F	F
0311	Parcels 6-7-8	Specific Conductance	2/11/2013	1096	umhos/cm				F
0311	Parcels 6-7-8	Specific Conductance	5/29/2013	1105	umhos/cm			F	F
0311	Parcels 6-7-8	Specific Conductance	8/27/2013	1028	umhos/cm			F	F
0311	Parcels 6-7-8	Specific Conductance	10/29/2013	1085	umhos/cm			F	F
0311	Parcels 6-7-8	Temperature	2/11/2013	14.65	C				F
0311	Parcels 6-7-8	Temperature	5/29/2013	15.23	C			F	F
0311	Parcels 6-7-8	Temperature	8/27/2013	17.45	C			F	F
0311	Parcels 6-7-8	Temperature	10/29/2013	16.36	C			F	F
0311	Parcels 6-7-8	Tetrachloroethene	2/11/2013	0.25	ug/L	0.16	J		F
0311	Parcels 6-7-8	Tetrachloroethene	5/29/2013	0.21	ug/L	0.16	J	F	F
0311	Parcels 6-7-8	Tetrachloroethene	8/27/2013	0.25	ug/L	0.16	J	F	F
0311	Parcels 6-7-8	Tetrachloroethene	10/29/2013	0.2	ug/L	0.16	J	F	F
0311	Parcels 6-7-8	trans-1,2-Dichloroethene	2/11/2013	0.16	ug/L	0.16	U		F
0311	Parcels 6-7-8	trans-1,2-Dichloroethene	5/29/2013	0.16	ug/L	0.16	U	F	F
0311	Parcels 6-7-8	trans-1,2-Dichloroethene	8/27/2013	0.16	ug/L	0.16	U	F	F
0311	Parcels 6-7-8	trans-1,2-Dichloroethene	10/29/2013	0.16	ug/L	0.16	U	F	F
0311	Parcels 6-7-8	Trichloroethene	2/11/2013	0.16	ug/L	0.16	U		F
0311	Parcels 6-7-8	Trichloroethene	5/29/2013	0.16	ug/L	0.16	U	F	F
0311	Parcels 6-7-8	Trichloroethene	8/27/2013	0.16	ug/L	0.16	U	F	F
0311	Parcels 6-7-8	Trichloroethene	10/29/2013	0.16	ug/L	0.16	U	F	F

Sample ID	Area	Analyte	Sample Date	Value	Units	Detection Limit	Lab Qualifiers	Validation Qualifiers	Sample Type
0311	Parcels 6-7-8	Tritium	2/11/2013	613	pCi/L	230		J	F
0311	Parcels 6-7-8	Tritium	8/27/2013	161	pCi/L	324	U	F	F
0311	Parcels 6-7-8	Turbidity	2/11/2013	6.56	NTU				F
0311	Parcels 6-7-8	Turbidity	5/29/2013	25.2	NTU			F	F
0311	Parcels 6-7-8	Turbidity	8/27/2013	15	NTU			F	F
0311	Parcels 6-7-8	Turbidity	10/29/2013	5.7	NTU			F	F
0311	Parcels 6-7-8	Vinyl chloride	2/11/2013	0.16	ug/L	0.16	U		F
0311	Parcels 6-7-8	Vinyl chloride	5/29/2013	0.16	ug/L	0.16	U	F	F
0311	Parcels 6-7-8	Vinyl chloride	8/27/2013	0.16	ug/L	0.16	U	F	F
0311	Parcels 6-7-8	Vinyl chloride	10/29/2013	0.16	ug/L	0.16	U	F	F
0315	Parcels 6-7-8	cis-1,2-Dichloroethene	2/12/2013	0.16	ug/L	0.16	U		F
0315	Parcels 6-7-8	cis-1,2-Dichloroethene	5/28/2013	0.16	ug/L	0.16	U	F	F
0315	Parcels 6-7-8	cis-1,2-Dichloroethene	8/26/2013	0.16	ug/L	0.16	U	FJ	F
0315	Parcels 6-7-8	cis-1,2-Dichloroethene	10/28/2013	0.16	ug/L	0.16	U	F	F
0315	Parcels 6-7-8	Dissolved Oxygen	2/12/2013	0.62	mg/L				F
0315	Parcels 6-7-8	Dissolved Oxygen	5/28/2013	0.55	mg/L			F	F
0315	Parcels 6-7-8	Dissolved Oxygen	8/26/2013	0.85	mg/L			FJ	F
0315	Parcels 6-7-8	Dissolved Oxygen	10/28/2013	0.85	mg/L			F	F
0315	Parcels 6-7-8	Oxidation Reduction Potential	2/12/2013	65.6	mV				F
0315	Parcels 6-7-8	Oxidation Reduction Potential	5/28/2013	-46.7	mV			F	F
0315	Parcels 6-7-8	Oxidation Reduction Potential	8/26/2013	-1.7	mV			FJ	F
0315	Parcels 6-7-8	Oxidation Reduction Potential	10/28/2013	46.9	mV			F	F
0315	Parcels 6-7-8	pH	2/12/2013	7.02	s.u.				F
0315	Parcels 6-7-8	pH	5/28/2013	7	s.u.			F	F
0315	Parcels 6-7-8	pH	8/26/2013	7.2	s.u.			FJ	F
0315	Parcels 6-7-8	pH	10/28/2013	7.12	s.u.			F	F
0315	Parcels 6-7-8	Specific Conductance	2/12/2013	1500	umhos/cm				F
0315	Parcels 6-7-8	Specific Conductance	5/28/2013	1734	umhos/cm			F	F
0315	Parcels 6-7-8	Specific Conductance	8/26/2013	1652	umhos/cm			FJ	F
0315	Parcels 6-7-8	Specific Conductance	10/28/2013	1538	umhos/cm			F	F
0315	Parcels 6-7-8	Temperature	2/12/2013	13	C				F
0315	Parcels 6-7-8	Temperature	5/28/2013	15.63	C			F	F
0315	Parcels 6-7-8	Temperature	8/26/2013	16.3	C			FJ	F
0315	Parcels 6-7-8	Temperature	10/28/2013	14.4	C			F	F

Sample ID	Area	Analyte	Sample Date	Value	Units	Detection Limit	Lab Qualifiers	Validation Qualifiers	Sample Type
0315	Parcels 6-7-8	Tetrachloroethene	2/12/2013	0.16	ug/L	0.16	U		F
0315	Parcels 6-7-8	Tetrachloroethene	5/28/2013	0.16	ug/L	0.16	U	F	F
0315	Parcels 6-7-8	Tetrachloroethene	8/26/2013	0.16	ug/L	0.16	U	FJ	F
0315	Parcels 6-7-8	Tetrachloroethene	10/28/2013	0.16	ug/L	0.16	U	F	F
0315	Parcels 6-7-8	trans-1,2-Dichloroethene	2/12/2013	0.16	ug/L	0.16	U		F
0315	Parcels 6-7-8	trans-1,2-Dichloroethene	5/28/2013	0.16	ug/L	0.16	U	F	F
0315	Parcels 6-7-8	trans-1,2-Dichloroethene	8/26/2013	0.16	ug/L	0.16	U	FJ	F
0315	Parcels 6-7-8	trans-1,2-Dichloroethene	10/28/2013	0.16	ug/L	0.16	U	F	F
0315	Parcels 6-7-8	Trichloroethene	2/12/2013	12.5	ug/L	0.16			F
0315	Parcels 6-7-8	Trichloroethene	5/28/2013	7.23	ug/L	0.16		F	F
0315	Parcels 6-7-8	Trichloroethene	8/26/2013	10.1	ug/L	0.16		FJ	F
0315	Parcels 6-7-8	Trichloroethene	10/28/2013	12.9	ug/L	0.16		F	F
0315	Parcels 6-7-8	Turbidity	2/12/2013	47.7	NTU				F
0315	Parcels 6-7-8	Turbidity	5/28/2013	47	NTU			F	F
0315	Parcels 6-7-8	Turbidity	8/26/2013	78.9	NTU			FJ	F
0315	Parcels 6-7-8	Turbidity	10/28/2013	49.1	NTU			F	F
0315	Parcels 6-7-8	Vinyl chloride	2/12/2013	0.16	ug/L	0.16	U		F
0315	Parcels 6-7-8	Vinyl chloride	5/28/2013	0.16	ug/L	0.16	U	F	F
0315	Parcels 6-7-8	Vinyl chloride	8/26/2013	0.16	ug/L	0.16	U	FJ	F
0315	Parcels 6-7-8	Vinyl chloride	10/28/2013	0.16	ug/L	0.16	U	F	F
0346	Parcels 6-7-8	cis-1,2-Dichloroethene	2/12/2013	0.16	ug/L	0.16	U		F
0346	Parcels 6-7-8	cis-1,2-Dichloroethene	5/28/2013	0.16	ug/L	0.16	U	F	F
0346	Parcels 6-7-8	cis-1,2-Dichloroethene	8/26/2013	0.16	ug/L	0.16	U	FJ	F
0346	Parcels 6-7-8	cis-1,2-Dichloroethene	10/29/2013	0.16	ug/L	0.16	U	F	F
0346	Parcels 6-7-8	Dissolved Oxygen	2/12/2013	5.35	mg/L				F
0346	Parcels 6-7-8	Dissolved Oxygen	5/28/2013	0.3	mg/L			F	F
0346	Parcels 6-7-8	Dissolved Oxygen	8/26/2013	0.22	mg/L			FJ	F
0346	Parcels 6-7-8	Dissolved Oxygen	10/29/2013	0.47	mg/L			F	F
0346	Parcels 6-7-8	Oxidation Reduction Potential	2/12/2013	115.2	mV				F
0346	Parcels 6-7-8	Oxidation Reduction Potential	5/28/2013	-68.7	mV			F	F
0346	Parcels 6-7-8	Oxidation Reduction Potential	8/26/2013	-45.9	mV			FJ	F
0346	Parcels 6-7-8	Oxidation Reduction Potential	10/29/2013	-34	mV			F	F

Sample ID	Area	Analyte	Sample Date	Value	Units	Detection Limit	Lab Qualifiers	Validation Qualifiers	Sample Type
0346	Parcels 6-7-8	pH	2/12/2013	7.5	s.u.				F
0346	Parcels 6-7-8	pH	5/28/2013	7	s.u.			F	F
0346	Parcels 6-7-8	pH	8/26/2013	7.21	s.u.			FJ	F
0346	Parcels 6-7-8	pH	10/29/2013	6.88	s.u.			F	F
0346	Parcels 6-7-8	Specific Conductance	2/12/2013	765	umhos/cm				F
0346	Parcels 6-7-8	Specific Conductance	5/28/2013	1678	umhos/cm			F	F
0346	Parcels 6-7-8	Specific Conductance	8/26/2013	1612	umhos/cm			FJ	F
0346	Parcels 6-7-8	Specific Conductance	10/29/2013	1629	umhos/cm			F	F
0346	Parcels 6-7-8	Temperature	2/12/2013	13.57	C				F
0346	Parcels 6-7-8	Temperature	5/28/2013	15.59	C			F	F
0346	Parcels 6-7-8	Temperature	8/26/2013	15.96	C			FJ	F
0346	Parcels 6-7-8	Temperature	10/29/2013	13.78	C			F	F
0346	Parcels 6-7-8	Tetrachloroethene	2/12/2013	0.16	ug/L	0.16	U		F
0346	Parcels 6-7-8	Tetrachloroethene	5/28/2013	0.16	ug/L	0.16	U	FJ	F
0346	Parcels 6-7-8	Tetrachloroethene	8/26/2013	0.16	ug/L	0.16	U	FJ	F
0346	Parcels 6-7-8	Tetrachloroethene	10/29/2013	0.16	ug/L	0.16	U	F	F
0346	Parcels 6-7-8	trans-1,2-Dichloroethene	2/12/2013	0.16	ug/L	0.16	U		F
0346	Parcels 6-7-8	trans-1,2-Dichloroethene	5/28/2013	0.16	ug/L	0.16	U	FJ	F
0346	Parcels 6-7-8	trans-1,2-Dichloroethene	8/26/2013	0.16	ug/L	0.16	U	FJ	F
0346	Parcels 6-7-8	trans-1,2-Dichloroethene	10/29/2013	0.16	ug/L	0.16	U	F	F
0346	Parcels 6-7-8	Trichloroethene	2/12/2013	0.16	ug/L	0.16	U		F
0346	Parcels 6-7-8	Trichloroethene	5/28/2013	0.16	ug/L	0.16	U	FJ	F
0346	Parcels 6-7-8	Trichloroethene	8/26/2013	0.16	ug/L	0.16	U	FJ	F
0346	Parcels 6-7-8	Trichloroethene	10/29/2013	0.16	ug/L	0.16	U	F	F
0346	Parcels 6-7-8	Tritium	2/12/2013	494	pCi/L	228		J	F
0346	Parcels 6-7-8	Tritium	8/26/2013	665	pCi/L	331		FJ	F
0346	Parcels 6-7-8	Turbidity	2/12/2013	457	NTU				F
0346	Parcels 6-7-8	Turbidity	5/28/2013	151	NTU			F	F
0346	Parcels 6-7-8	Turbidity	8/26/2013	65.8	NTU			FJ	F
0346	Parcels 6-7-8	Turbidity	10/29/2013	296	NTU			F	F
0346	Parcels 6-7-8	Vinyl chloride	2/12/2013	0.16	ug/L	0.16	U		F
0346	Parcels 6-7-8	Vinyl chloride	5/28/2013	0.16	ug/L	0.16	U	FJ	F
0346	Parcels 6-7-8	Vinyl chloride	8/26/2013	0.16	ug/L	0.16	U	FJ	F
0346	Parcels 6-7-8	Vinyl chloride	10/29/2013	0.16	ug/L	0.16	U	F	F

Sample ID	Area	Analyte	Sample Date	Value	Units	Detection Limit	Lab Qualifiers	Validation Qualifiers	Sample Type
0347	Parcels 6-7-8	cis-1,2-Dichloroethene	2/12/2013	0.16	ug/L	0.16	U		F
0347	Parcels 6-7-8	cis-1,2-Dichloroethene	2/12/2013	0.16	ug/L	0.16	U		D
0347	Parcels 6-7-8	cis-1,2-Dichloroethene	5/28/2013	0.16	ug/L	0.16	U	F	F
0347	Parcels 6-7-8	cis-1,2-Dichloroethene	8/26/2013	0.16	ug/L	0.16	U	F	F
0347	Parcels 6-7-8	cis-1,2-Dichloroethene	10/28/2013	0.16	ug/L	0.16	U	F	F
0347	Parcels 6-7-8	Dissolved Oxygen	2/12/2013	0.34	mg/L				F
0347	Parcels 6-7-8	Dissolved Oxygen	5/28/2013	0.21	mg/L			F	F
0347	Parcels 6-7-8	Dissolved Oxygen	8/26/2013	0.25	mg/L			F	F
0347	Parcels 6-7-8	Dissolved Oxygen	10/28/2013	0.34	mg/L			F	F
0347	Parcels 6-7-8	Oxidation Reduction Potential	2/12/2013	-3.8	mV				F
0347	Parcels 6-7-8	Oxidation Reduction Potential	5/28/2013	-65.6	mV			F	F
0347	Parcels 6-7-8	Oxidation Reduction Potential	8/26/2013	-34.9	mV			F	F
0347	Parcels 6-7-8	Oxidation Reduction Potential	10/28/2013	12.4	mV			F	F
0347	Parcels 6-7-8	pH	2/12/2013	6.87	s.u.				F
0347	Parcels 6-7-8	pH	5/28/2013	6.83	s.u.			F	F
0347	Parcels 6-7-8	pH	8/26/2013	7.02	s.u.			F	F
0347	Parcels 6-7-8	pH	10/28/2013	6.88	s.u.			F	F
0347	Parcels 6-7-8	Specific Conductance	2/12/2013	1473	umhos/cm				F
0347	Parcels 6-7-8	Specific Conductance	5/28/2013	1603	umhos/cm			F	F
0347	Parcels 6-7-8	Specific Conductance	8/26/2013	1572	umhos/cm			F	F
0347	Parcels 6-7-8	Specific Conductance	10/28/2013	1513	umhos/cm			F	F
0347	Parcels 6-7-8	Temperature	2/12/2013	13.32	C				F
0347	Parcels 6-7-8	Temperature	5/28/2013	15.59	C			F	F
0347	Parcels 6-7-8	Temperature	8/26/2013	15.98	C			F	F
0347	Parcels 6-7-8	Temperature	10/28/2013	14.45	C			F	F
0347	Parcels 6-7-8	Tetrachloroethene	2/12/2013	0.16	ug/L	0.16	U		F
0347	Parcels 6-7-8	Tetrachloroethene	2/12/2013	0.16	ug/L	0.16	U		D
0347	Parcels 6-7-8	Tetrachloroethene	5/28/2013	0.16	ug/L	0.16	U	F	F
0347	Parcels 6-7-8	Tetrachloroethene	8/26/2013	0.16	ug/L	0.16	U	F	F
0347	Parcels 6-7-8	Tetrachloroethene	10/28/2013	0.16	ug/L	0.16	U	F	F
0347	Parcels 6-7-8	trans-1,2-Dichloroethene	2/12/2013	0.16	ug/L	0.16	U		F
0347	Parcels 6-7-8	trans-1,2-Dichloroethene	2/12/2013	0.16	ug/L	0.16	U		D
0347	Parcels 6-7-8	trans-1,2-Dichloroethene	5/28/2013	0.16	ug/L	0.16	U	F	F
0347	Parcels 6-7-8	trans-1,2-Dichloroethene	8/26/2013	0.16	ug/L	0.16	U	F	F
0347	Parcels 6-7-8	trans-1,2-Dichloroethene	10/28/2013	0.16	ug/L	0.16	U	F	F

Sample ID	Area	Analyte	Sample Date	Value	Units	Detection Limit	Lab Qualifiers	Validation Qualifiers	Sample Type
0347	Parcels 6-7-8	Trichloroethene	2/12/2013	27.5	ug/L	0.16			F
0347	Parcels 6-7-8	Trichloroethene	2/12/2013	32.4	ug/L	0.16			D
0347	Parcels 6-7-8	Trichloroethene	5/28/2013	23.2	ug/L	0.16		F	F
0347	Parcels 6-7-8	Trichloroethene	8/26/2013	27	ug/L	0.16		F	F
0347	Parcels 6-7-8	Trichloroethene	10/28/2013	23.3	ug/L	0.16		F	F
0347	Parcels 6-7-8	Tritium	2/12/2013	3420	pCi/L	222			F
0347	Parcels 6-7-8	Tritium	2/12/2013	4720	pCi/L	240			D
0347	Parcels 6-7-8	Tritium	8/26/2013	2460	pCi/L	328		F	F
0347	Parcels 6-7-8	Turbidity	2/12/2013	19.3	NTU				F
0347	Parcels 6-7-8	Turbidity	5/28/2013	16.9	NTU			F	F
0347	Parcels 6-7-8	Turbidity	8/26/2013	16.5	NTU			F	F
0347	Parcels 6-7-8	Turbidity	10/28/2013	16	NTU			F	F
0347	Parcels 6-7-8	Vinyl chloride	2/12/2013	0.16	ug/L	0.16	U		F
0347	Parcels 6-7-8	Vinyl chloride	2/12/2013	0.16	ug/L	0.16	U		D
0347	Parcels 6-7-8	Vinyl chloride	5/28/2013	0.16	ug/L	0.16	U	F	F
0347	Parcels 6-7-8	Vinyl chloride	8/26/2013	0.16	ug/L	0.16	U	F	F
0347	Parcels 6-7-8	Vinyl chloride	10/28/2013	0.16	ug/L	0.16	U	F	F
0379	Parcels 6-7-8	cis-1,2-Dichloroethene	2/11/2013	0.16	ug/L	0.16	U		F
0379	Parcels 6-7-8	cis-1,2-Dichloroethene	5/2/2013	0.3	ug/L	0.3	U	F	F
0379	Parcels 6-7-8	cis-1,2-Dichloroethene	5/29/2013	0.16	ug/L	0.16	U	F	F
0379	Parcels 6-7-8	cis-1,2-Dichloroethene	5/29/2013	0.16	ug/L	0.16	U	F	D
0379	Parcels 6-7-8	cis-1,2-Dichloroethene	8/27/2013	0.16	ug/L	0.16	U	F	F
0379	Parcels 6-7-8	cis-1,2-Dichloroethene	8/27/2013	0.16	ug/L	0.16	U	F	D
0379	Parcels 6-7-8	cis-1,2-Dichloroethene	10/28/2013	0.16	ug/L	0.16	U	F	F
0379	Parcels 6-7-8	Dissolved Oxygen	2/11/2013	0.41	mg/L				F
0379	Parcels 6-7-8	Dissolved Oxygen	5/2/2013	0.93	mg/L			F	F
0379	Parcels 6-7-8	Dissolved Oxygen	5/29/2013	1.1	mg/L			F	F
0379	Parcels 6-7-8	Dissolved Oxygen	8/27/2013	1.79	mg/L			F	F
0379	Parcels 6-7-8	Dissolved Oxygen	10/28/2013	0.83	mg/L			F	F
0379	Parcels 6-7-8	Oxidation Reduction Potential	2/11/2013	56.4	mV				F
0379	Parcels 6-7-8	Oxidation Reduction Potential	5/2/2013	145.1	mV			F	F
0379	Parcels 6-7-8	Oxidation Reduction Potential	5/29/2013	-52.5	mV			F	F
0379	Parcels 6-7-8	Oxidation Reduction Potential	8/27/2013	116.7	mV			F	F
0379	Parcels 6-7-8	Oxidation Reduction Potential	10/28/2013	63.2	mV			F	F

Sample ID	Area	Analyte	Sample Date	Value	Units	Detection Limit	Lab Qualifiers	Validation Qualifiers	Sample Type
0379	Parcels 6-7-8	pH	2/11/2013	7.01	s.u.				F
0379	Parcels 6-7-8	pH	5/2/2013	6.94	s.u.			F	F
0379	Parcels 6-7-8	pH	5/29/2013	7.17	s.u.			F	F
0379	Parcels 6-7-8	pH	8/27/2013	7.14	s.u.			F	F
0379	Parcels 6-7-8	pH	10/28/2013	7.15	s.u.			F	F
0379	Parcels 6-7-8	Specific Conductance	2/11/2013	1949	umhos/cm				F
0379	Parcels 6-7-8	Specific Conductance	5/2/2013	1918	umhos/cm			F	F
0379	Parcels 6-7-8	Specific Conductance	5/29/2013	1930	umhos/cm			F	F
0379	Parcels 6-7-8	Specific Conductance	8/27/2013	1747	umhos/cm			F	F
0379	Parcels 6-7-8	Specific Conductance	10/28/2013	1917	umhos/cm			F	F
0379	Parcels 6-7-8	Temperature	2/11/2013	13.37	C				F
0379	Parcels 6-7-8	Temperature	5/2/2013	14.86	C			F	F
0379	Parcels 6-7-8	Temperature	5/29/2013	16.74	C			F	F
0379	Parcels 6-7-8	Temperature	8/27/2013	16.29	C			F	F
0379	Parcels 6-7-8	Temperature	10/28/2013	14.7	C			F	F
0379	Parcels 6-7-8	Tetrachloroethene	2/11/2013	0.38	ug/L	0.16	J		F
0379	Parcels 6-7-8	Tetrachloroethene	5/2/2013	0.35	ug/L	0.3	J	F	F
0379	Parcels 6-7-8	Tetrachloroethene	5/29/2013	0.32	ug/L	0.16	J	F	F
0379	Parcels 6-7-8	Tetrachloroethene	5/29/2013	0.31	ug/L	0.16	J	F	D
0379	Parcels 6-7-8	Tetrachloroethene	8/27/2013	0.32	ug/L	0.16	J	F	F
0379	Parcels 6-7-8	Tetrachloroethene	8/27/2013	0.33	ug/L	0.16	J	F	D
0379	Parcels 6-7-8	Tetrachloroethene	10/28/2013	0.36	ug/L	0.16	J	F	F
0379	Parcels 6-7-8	trans-1,2-Dichloroethene	2/11/2013	0.16	ug/L	0.16	U		F
0379	Parcels 6-7-8	trans-1,2-Dichloroethene	5/2/2013	0.3	ug/L	0.3	U	F	F
0379	Parcels 6-7-8	trans-1,2-Dichloroethene	5/29/2013	0.16	ug/L	0.16	U	F	F
0379	Parcels 6-7-8	trans-1,2-Dichloroethene	5/29/2013	0.16	ug/L	0.16	U	F	D
0379	Parcels 6-7-8	trans-1,2-Dichloroethene	8/27/2013	0.16	ug/L	0.16	U	F	F
0379	Parcels 6-7-8	trans-1,2-Dichloroethene	8/27/2013	0.16	ug/L	0.16	U	F	D
0379	Parcels 6-7-8	trans-1,2-Dichloroethene	10/28/2013	0.16	ug/L	0.16	U	F	F

Sample ID	Area	Analyte	Sample Date	Value	Units	Detection Limit	Lab Qualifiers	Validation Qualifiers	Sample Type
0379	Parcels 6-7-8	Trichloroethene	2/11/2013	1.89	ug/L	0.16			F
0379	Parcels 6-7-8	Trichloroethene	5/2/2013	1.99	ug/L	0.3		F	F
0379	Parcels 6-7-8	Trichloroethene	5/29/2013	1.83	ug/L	0.16		F	F
0379	Parcels 6-7-8	Trichloroethene	5/29/2013	1.76	ug/L	0.16		F	D
0379	Parcels 6-7-8	Trichloroethene	8/27/2013	2.47	ug/L	0.16		F	F
0379	Parcels 6-7-8	Trichloroethene	8/27/2013	2.49	ug/L	0.16		F	D
0379	Parcels 6-7-8	Trichloroethene	10/28/2013	1.64	ug/L	0.16		F	F
0379	Parcels 6-7-8	Tritium	2/11/2013	1210	pCi/L	225			F
0379	Parcels 6-7-8	Tritium	8/27/2013	852	pCi/L	329		F	F
0379	Parcels 6-7-8	Tritium	8/27/2013	750	pCi/L	334		F	D
0379	Parcels 6-7-8	Turbidity	2/11/2013	8.74	NTU				F
0379	Parcels 6-7-8	Turbidity	5/2/2013	16.4	NTU			F	F
0379	Parcels 6-7-8	Turbidity	5/29/2013	17.8	NTU			F	F
0379	Parcels 6-7-8	Turbidity	8/27/2013	14.7	NTU			F	F
0379	Parcels 6-7-8	Turbidity	10/28/2013	9.17	NTU			F	F
0379	Parcels 6-7-8	Vinyl chloride	2/11/2013	0.16	ug/L	0.16	U		F
0379	Parcels 6-7-8	Vinyl chloride	5/2/2013	0.3	ug/L	0.3	U	F	F
0379	Parcels 6-7-8	Vinyl chloride	5/29/2013	0.16	ug/L	0.16	U	F	F
0379	Parcels 6-7-8	Vinyl chloride	5/29/2013	0.16	ug/L	0.16	U	F	D
0379	Parcels 6-7-8	Vinyl chloride	8/27/2013	0.16	ug/L	0.16	U	F	F
0379	Parcels 6-7-8	Vinyl chloride	8/27/2013	0.16	ug/L	0.16	U	F	D
0379	Parcels 6-7-8	Vinyl chloride	10/28/2013	0.16	ug/L	0.16	U	F	F
0386	Parcels 6-7-8	cis-1,2-Dichloroethene	2/12/2013	0.16	ug/L	0.16	U		F
0386	Parcels 6-7-8	cis-1,2-Dichloroethene	5/28/2013	0.16	ug/L	0.16	U	F	F
0386	Parcels 6-7-8	cis-1,2-Dichloroethene	8/26/2013	0.16	ug/L	0.16	U	F	F
0386	Parcels 6-7-8	cis-1,2-Dichloroethene	10/28/2013	0.16	ug/L	0.16	U	F	F
0386	Parcels 6-7-8	Dissolved Oxygen	2/12/2013	2.53	mg/L				F
0386	Parcels 6-7-8	Dissolved Oxygen	5/28/2013	3.95	mg/L			F	F
0386	Parcels 6-7-8	Dissolved Oxygen	8/26/2013	3.48	mg/L			F	F
0386	Parcels 6-7-8	Dissolved Oxygen	10/28/2013	4.85	mg/L			F	F
0386	Parcels 6-7-8	Oxidation Reduction Potential	2/12/2013	118	mV				F
0386	Parcels 6-7-8	Oxidation Reduction Potential	5/28/2013	-34.1	mV			F	F
0386	Parcels 6-7-8	Oxidation Reduction Potential	8/26/2013	76.9	mV			F	F
0386	Parcels 6-7-8	Oxidation Reduction Potential	10/28/2013	195.1	mV			F	F

Sample ID	Area	Analyte	Sample Date	Value	Units	Detection Limit	Lab Qualifiers	Validation Qualifiers	Sample Type
0386	Parcels 6-7-8	pH	2/12/2013	6.88	s.u.				F
0386	Parcels 6-7-8	pH	5/28/2013	6.95	s.u.			F	F
0386	Parcels 6-7-8	pH	8/26/2013	7.03	s.u.			F	F
0386	Parcels 6-7-8	pH	10/28/2013	6.92	s.u.			F	F
0386	Parcels 6-7-8	Specific Conductance	2/12/2013	1140	umhos/cm				F
0386	Parcels 6-7-8	Specific Conductance	5/28/2013	1223	umhos/cm			F	F
0386	Parcels 6-7-8	Specific Conductance	8/26/2013	1133	umhos/cm			F	F
0386	Parcels 6-7-8	Specific Conductance	10/28/2013	1136	umhos/cm			F	F
0386	Parcels 6-7-8	Temperature	2/12/2013	12.34	C				F
0386	Parcels 6-7-8	Temperature	5/28/2013	14.43	C			F	F
0386	Parcels 6-7-8	Temperature	8/26/2013	14.73	C			F	F
0386	Parcels 6-7-8	Temperature	10/28/2013	12.59	C			F	F
0386	Parcels 6-7-8	Tetrachloroethene	2/12/2013	0.16	ug/L	0.16	J		F
0386	Parcels 6-7-8	Tetrachloroethene	5/28/2013	0.16	ug/L	0.16	U	F	F
0386	Parcels 6-7-8	Tetrachloroethene	8/26/2013	0.16	ug/L	0.16	U	F	F
0386	Parcels 6-7-8	Tetrachloroethene	10/28/2013	0.19	ug/L	0.16	J	F	F
0386	Parcels 6-7-8	trans-1,2-Dichloroethene	2/12/2013	0.16	ug/L	0.16	U		F
0386	Parcels 6-7-8	trans-1,2-Dichloroethene	5/28/2013	0.16	ug/L	0.16	U	F	F
0386	Parcels 6-7-8	trans-1,2-Dichloroethene	8/26/2013	0.16	ug/L	0.16	U	F	F
0386	Parcels 6-7-8	trans-1,2-Dichloroethene	10/28/2013	0.16	ug/L	0.16	U	F	F
0386	Parcels 6-7-8	Trichloroethene	2/12/2013	2.82	ug/L	0.16			F
0386	Parcels 6-7-8	Trichloroethene	5/28/2013	2.35	ug/L	0.16		F	F
0386	Parcels 6-7-8	Trichloroethene	8/26/2013	2.99	ug/L	0.16		F	F
0386	Parcels 6-7-8	Trichloroethene	10/28/2013	2.56	ug/L	0.16		F	F
0386	Parcels 6-7-8	Turbidity	2/12/2013	8.13	NTU				F
0386	Parcels 6-7-8	Turbidity	5/28/2013	8.47	NTU			F	F
0386	Parcels 6-7-8	Turbidity	8/26/2013	8.29	NTU			F	F
0386	Parcels 6-7-8	Turbidity	10/28/2013	6.37	NTU			F	F
0386	Parcels 6-7-8	Vinyl chloride	2/12/2013	0.16	ug/L	0.16	U		F
0386	Parcels 6-7-8	Vinyl chloride	5/28/2013	0.16	ug/L	0.16	U	F	F
0386	Parcels 6-7-8	Vinyl chloride	8/26/2013	0.16	ug/L	0.16	U	F	F
0386	Parcels 6-7-8	Vinyl chloride	10/28/2013	0.16	ug/L	0.16	U	F	F

Sample ID	Area	Analyte	Sample Date	Value	Units	Detection Limit	Lab Qualifiers	Validation Qualifiers	Sample Type
0387	Parcels 6-7-8	cis-1,2-Dichloroethene	2/12/2013	0.16	ug/L	0.16	U		F
0387	Parcels 6-7-8	cis-1,2-Dichloroethene	5/28/2013	0.16	ug/L	0.16	U	F	F
0387	Parcels 6-7-8	cis-1,2-Dichloroethene	8/26/2013	0.16	ug/L	0.16	U	F	F
0387	Parcels 6-7-8	cis-1,2-Dichloroethene	10/28/2013	0.16	ug/L	0.16	U	F	F
0387	Parcels 6-7-8	Dissolved Oxygen	2/13/2013	0.25	mg/L				F
0387	Parcels 6-7-8	Dissolved Oxygen	5/28/2013	0.28	mg/L			F	F
0387	Parcels 6-7-8	Dissolved Oxygen	8/26/2013	0.5	mg/L			F	F
0387	Parcels 6-7-8	Dissolved Oxygen	10/28/2013	0.41	mg/L			F	F
0387	Parcels 6-7-8	Oxidation Reduction Potential	2/13/2013	52.8	mV				F
0387	Parcels 6-7-8	Oxidation Reduction Potential	5/28/2013	-23.6	mV			F	F
0387	Parcels 6-7-8	Oxidation Reduction Potential	8/26/2013	51.9	mV			F	F
0387	Parcels 6-7-8	Oxidation Reduction Potential	10/28/2013	88.9	mV			F	F
0387	Parcels 6-7-8	pH	2/13/2013	6.87	s.u.				F
0387	Parcels 6-7-8	pH	5/28/2013	6.82	s.u.			F	F
0387	Parcels 6-7-8	pH	8/26/2013	7.02	s.u.			F	F
0387	Parcels 6-7-8	pH	10/28/2013	6.99	s.u.			F	F
0387	Parcels 6-7-8	Specific Conductance	2/13/2013	1287	umhos/cm				F
0387	Parcels 6-7-8	Specific Conductance	5/28/2013	1327	umhos/cm			F	F
0387	Parcels 6-7-8	Specific Conductance	8/26/2013	1287	umhos/cm			F	F
0387	Parcels 6-7-8	Specific Conductance	10/28/2013	1292	umhos/cm			F	F
0387	Parcels 6-7-8	Temperature	2/13/2013	13.45	C				F
0387	Parcels 6-7-8	Temperature	5/28/2013	14.36	C			F	F
0387	Parcels 6-7-8	Temperature	8/26/2013	14.66	C			F	F
0387	Parcels 6-7-8	Temperature	10/28/2013	13.76	C			F	F
0387	Parcels 6-7-8	Tetrachloroethene	2/12/2013	0.26	ug/L	0.16	J		F
0387	Parcels 6-7-8	Tetrachloroethene	5/28/2013	0.19	ug/L	0.16	J	F	F
0387	Parcels 6-7-8	Tetrachloroethene	8/26/2013	0.22	ug/L	0.16	J	F	F
0387	Parcels 6-7-8	Tetrachloroethene	10/28/2013	0.25	ug/L	0.16	J	F	F
0387	Parcels 6-7-8	trans-1,2-Dichloroethene	2/12/2013	0.16	ug/L	0.16	U		F
0387	Parcels 6-7-8	trans-1,2-Dichloroethene	5/28/2013	0.16	ug/L	0.16	U	F	F
0387	Parcels 6-7-8	trans-1,2-Dichloroethene	8/26/2013	0.16	ug/L	0.16	U	F	F
0387	Parcels 6-7-8	trans-1,2-Dichloroethene	10/28/2013	0.16	ug/L	0.16	U	F	F

Sample ID	Area	Analyte	Sample Date	Value	Units	Detection Limit	Lab Qualifiers	Validation Qualifiers	Sample Type
0387	Parcels 6-7-8	Trichloroethene	2/12/2013	0.16	ug/L	0.16	U		F
0387	Parcels 6-7-8	Trichloroethene	5/28/2013	0.16	ug/L	0.16	U	F	F
0387	Parcels 6-7-8	Trichloroethene	8/26/2013	0.16	ug/L	0.16	U	F	F
0387	Parcels 6-7-8	Trichloroethene	10/28/2013	0.16	ug/L	0.16	U	F	F
0387	Parcels 6-7-8	Turbidity	2/13/2013	4.76	NTU				F
0387	Parcels 6-7-8	Turbidity	5/28/2013	3.07	NTU			F	F
0387	Parcels 6-7-8	Turbidity	10/28/2013	2.47	NTU			F	F
0387	Parcels 6-7-8	Vinyl chloride	2/12/2013	0.16	ug/L	0.16	U		F
0387	Parcels 6-7-8	Vinyl chloride	5/28/2013	0.16	ug/L	0.16	U	F	F
0387	Parcels 6-7-8	Vinyl chloride	8/26/2013	0.16	ug/L	0.16	U	F	F
0387	Parcels 6-7-8	Vinyl chloride	10/28/2013	0.16	ug/L	0.16	U	F	F
0389	Parcels 6-7-8	cis-1,2-Dichloroethene	2/12/2013	0.16	ug/L	0.16	U		F
0389	Parcels 6-7-8	cis-1,2-Dichloroethene	5/28/2013	0.16	ug/L	0.16	U	F	F
0389	Parcels 6-7-8	cis-1,2-Dichloroethene	8/26/2013	0.16	ug/L	0.16	U	FJ	F
0389	Parcels 6-7-8	cis-1,2-Dichloroethene	10/28/2013	0.16	ug/L	0.16	U	F	F
0389	Parcels 6-7-8	Dissolved Oxygen	2/12/2013	0.49	mg/L				F
0389	Parcels 6-7-8	Dissolved Oxygen	5/28/2013	2.26	mg/L			F	F
0389	Parcels 6-7-8	Dissolved Oxygen	8/26/2013	3.63	mg/L			FJ	F
0389	Parcels 6-7-8	Dissolved Oxygen	10/28/2013	4.35	mg/L			F	F
0389	Parcels 6-7-8	Oxidation Reduction Potential	2/12/2013	131.9	mV				F
0389	Parcels 6-7-8	Oxidation Reduction Potential	5/28/2013	-21.2	mV			F	F
0389	Parcels 6-7-8	Oxidation Reduction Potential	8/26/2013	72.8	mV			FJ	F
0389	Parcels 6-7-8	Oxidation Reduction Potential	10/28/2013	204.1	mV			F	F
0389	Parcels 6-7-8	pH	2/12/2013	6.92	s.u.				F
0389	Parcels 6-7-8	pH	5/28/2013	6.82	s.u.			F	F
0389	Parcels 6-7-8	pH	8/26/2013	7.02	s.u.			FJ	F
0389	Parcels 6-7-8	pH	10/28/2013	7	s.u.			F	F
0389	Parcels 6-7-8	Specific Conductance	2/12/2013	1239	umhos/cm				F
0389	Parcels 6-7-8	Specific Conductance	5/28/2013	1366	umhos/cm			F	F
0389	Parcels 6-7-8	Specific Conductance	8/26/2013	1339	umhos/cm			FJ	F
0389	Parcels 6-7-8	Specific Conductance	10/28/2013	1091	umhos/cm			F	F
0389	Parcels 6-7-8	Temperature	2/12/2013	12.41	C				F
0389	Parcels 6-7-8	Temperature	5/28/2013	14.68	C			F	F
0389	Parcels 6-7-8	Temperature	8/26/2013	15.44	C			FJ	F
0389	Parcels 6-7-8	Temperature	10/28/2013	12.41	C			F	F

Sample ID	Area	Analyte	Sample Date	Value	Units	Detection Limit	Lab Qualifiers	Validation Qualifiers	Sample Type
0389	Parcels 6-7-8	Tetrachloroethene	2/12/2013	0.26	ug/L	0.16	J		F
0389	Parcels 6-7-8	Tetrachloroethene	5/28/2013	0.16	ug/L	0.16	U	FJ	F
0389	Parcels 6-7-8	Tetrachloroethene	8/26/2013	0.16	ug/L	0.16	U	FJ	F
0389	Parcels 6-7-8	Tetrachloroethene	10/28/2013	0.31	ug/L	0.16	J	F	F
0389	Parcels 6-7-8	trans-1,2-Dichloroethene	2/12/2013	0.16	ug/L	0.16	U		F
0389	Parcels 6-7-8	trans-1,2-Dichloroethene	5/28/2013	0.16	ug/L	0.16	U	FJ	F
0389	Parcels 6-7-8	trans-1,2-Dichloroethene	8/26/2013	0.16	ug/L	0.16	U	FJ	F
0389	Parcels 6-7-8	trans-1,2-Dichloroethene	10/28/2013	0.16	ug/L	0.16	U	F	F
0389	Parcels 6-7-8	Trichloroethene	2/12/2013	0.53	ug/L	0.16	J		F
0389	Parcels 6-7-8	Trichloroethene	5/28/2013	0.16	ug/L	0.16	U	FJ	F
0389	Parcels 6-7-8	Trichloroethene	8/26/2013	0.16	ug/L	0.16	U	FJ	F
0389	Parcels 6-7-8	Trichloroethene	10/28/2013	0.55	ug/L	0.16	J	F	F
0389	Parcels 6-7-8	Turbidity	2/12/2013	29.4	NTU				F
0389	Parcels 6-7-8	Turbidity	5/28/2013	61.1	NTU			F	F
0389	Parcels 6-7-8	Turbidity	8/26/2013	65.1	NTU			FJ	F
0389	Parcels 6-7-8	Turbidity	10/28/2013	28.9	NTU			F	F
0389	Parcels 6-7-8	Vinyl chloride	2/12/2013	0.16	ug/L	0.16	U		F
0389	Parcels 6-7-8	Vinyl chloride	5/28/2013	0.16	ug/L	0.16	U	FJ	F
0389	Parcels 6-7-8	Vinyl chloride	8/26/2013	0.16	ug/L	0.16	U	FJ	F
0389	Parcels 6-7-8	Vinyl chloride	10/28/2013	0.16	ug/L	0.16	U	F	F
0392	Parcels 6-7-8	cis-1,2-Dichloroethene	2/12/2013	0.16	ug/L	0.16	U		F
0392	Parcels 6-7-8	cis-1,2-Dichloroethene	5/28/2013	0.16	ug/L	0.16	U	F	F
0392	Parcels 6-7-8	cis-1,2-Dichloroethene	8/26/2013	0.16	ug/L	0.16	U	F	F
0392	Parcels 6-7-8	cis-1,2-Dichloroethene	10/28/2013	0.16	ug/L	0.16	U	F	F
0392	Parcels 6-7-8	Dissolved Oxygen	2/12/2013	2.68	mg/L				F
0392	Parcels 6-7-8	Dissolved Oxygen	5/28/2013	3.48	mg/L			F	F
0392	Parcels 6-7-8	Dissolved Oxygen	8/26/2013	3.27	mg/L			F	F
0392	Parcels 6-7-8	Dissolved Oxygen	10/28/2013	5.01	mg/L			F	F
0392	Parcels 6-7-8	Oxidation Reduction Potential	2/12/2013	140.7	mV				F
0392	Parcels 6-7-8	Oxidation Reduction Potential	5/28/2013	17.2	mV			F	F
0392	Parcels 6-7-8	Oxidation Reduction Potential	8/26/2013	124.7	mV			F	F
0392	Parcels 6-7-8	Oxidation Reduction Potential	10/28/2013	200.9	mV			F	F

Sample ID	Area	Analyte	Sample Date	Value	Units	Detection Limit	Lab Qualifiers	Validation Qualifiers	Sample Type
0392	Parcels 6-7-8	pH	2/12/2013	6.81	s.u.				F
0392	Parcels 6-7-8	pH	5/28/2013	6.88	s.u.			F	F
0392	Parcels 6-7-8	pH	8/26/2013	6.9	s.u.			F	F
0392	Parcels 6-7-8	pH	10/28/2013	6.9	s.u.			F	F
0392	Parcels 6-7-8	Specific Conductance	2/12/2013	1205	umhos/cm				F
0392	Parcels 6-7-8	Specific Conductance	5/28/2013	1237	umhos/cm			F	F
0392	Parcels 6-7-8	Specific Conductance	8/26/2013	1166	umhos/cm			F	F
0392	Parcels 6-7-8	Specific Conductance	10/28/2013	1137	umhos/cm			F	F
0392	Parcels 6-7-8	Temperature	2/12/2013	13.06	C				F
0392	Parcels 6-7-8	Temperature	5/28/2013	15.01	C			F	F
0392	Parcels 6-7-8	Temperature	8/26/2013	15.02	C			F	F
0392	Parcels 6-7-8	Temperature	10/28/2013	13.63	C			F	F
0392	Parcels 6-7-8	Tetrachloroethene	2/12/2013	0.31	ug/L	0.16	J		F
0392	Parcels 6-7-8	Tetrachloroethene	5/28/2013	0.27	ug/L	0.16	J	F	F
0392	Parcels 6-7-8	Tetrachloroethene	8/26/2013	0.32	ug/L	0.16	J	F	F
0392	Parcels 6-7-8	Tetrachloroethene	10/28/2013	0.33	ug/L	0.16	J	F	F
0392	Parcels 6-7-8	trans-1,2-Dichloroethene	2/12/2013	0.16	ug/L	0.16	U		F
0392	Parcels 6-7-8	trans-1,2-Dichloroethene	5/28/2013	0.16	ug/L	0.16	U	F	F
0392	Parcels 6-7-8	trans-1,2-Dichloroethene	8/26/2013	0.16	ug/L	0.16	U	F	F
0392	Parcels 6-7-8	trans-1,2-Dichloroethene	10/28/2013	0.16	ug/L	0.16	U	F	F
0392	Parcels 6-7-8	Trichloroethene	2/12/2013	0.16	ug/L	0.16	U		F
0392	Parcels 6-7-8	Trichloroethene	5/28/2013	0.16	ug/L	0.16	U	F	F
0392	Parcels 6-7-8	Trichloroethene	8/26/2013	0.16	ug/L	0.16	U	F	F
0392	Parcels 6-7-8	Trichloroethene	10/28/2013	0.16	ug/L	0.16	U	F	F
0392	Parcels 6-7-8	Turbidity	2/12/2013	2.92	NTU				F
0392	Parcels 6-7-8	Turbidity	5/28/2013	3.8	NTU			F	F
0392	Parcels 6-7-8	Turbidity	8/26/2013	2.7	NTU			F	F
0392	Parcels 6-7-8	Turbidity	10/28/2013	1.28	NTU			F	F
0392	Parcels 6-7-8	Vinyl chloride	2/12/2013	0.16	ug/L	0.16	U		F
0392	Parcels 6-7-8	Vinyl chloride	5/28/2013	0.16	ug/L	0.16	U	F	F
0392	Parcels 6-7-8	Vinyl chloride	8/26/2013	0.16	ug/L	0.16	U	F	F
0392	Parcels 6-7-8	Vinyl chloride	10/28/2013	0.16	ug/L	0.16	U	F	F

Sample ID	Area	Analyte	Sample Date	Value	Units	Detection Limit	Lab Qualifiers	Validation Qualifiers	Sample Type
0601	Parcels 6-7-8	cis-1,2-Dichloroethene	2/11/2013	0.65	ug/L	0.16	J		F
0601	Parcels 6-7-8	cis-1,2-Dichloroethene	5/30/2013	0.53	ug/L	0.16	J		F
0601	Parcels 6-7-8	cis-1,2-Dichloroethene	8/27/2013	0.59	ug/L	0.16	J		F
0601	Parcels 6-7-8	cis-1,2-Dichloroethene	10/28/2013	0.78	ug/L	0.16	J		F
0601	Parcels 6-7-8	Dissolved Oxygen	2/11/2013	5.53	mg/L				F
0601	Parcels 6-7-8	Dissolved Oxygen	5/30/2013	8.79	mg/L				F
0601	Parcels 6-7-8	Dissolved Oxygen	8/27/2013	4.59	mg/L				F
0601	Parcels 6-7-8	Dissolved Oxygen	10/28/2013	7.32	mg/L				F
0601	Parcels 6-7-8	Oxidation Reduction Potential	2/11/2013	52	mV				F
0601	Parcels 6-7-8	Oxidation Reduction Potential	5/30/2013	230.1	mV				F
0601	Parcels 6-7-8	Oxidation Reduction Potential	8/27/2013	-31	mV				F
0601	Parcels 6-7-8	Oxidation Reduction Potential	10/28/2013	105.1	mV				F
0601	Parcels 6-7-8	pH	2/11/2013	6.99	s.u.				F
0601	Parcels 6-7-8	pH	5/30/2013	7.14	s.u.				F
0601	Parcels 6-7-8	pH	8/27/2013	7.33	s.u.				F
0601	Parcels 6-7-8	pH	10/28/2013	8.62	s.u.				F
0601	Parcels 6-7-8	Specific Conductance	2/11/2013	1431	umhos/cm				F
0601	Parcels 6-7-8	Specific Conductance	5/30/2013	1744	umhos/cm				F
0601	Parcels 6-7-8	Specific Conductance	8/27/2013	1261	umhos/cm				F
0601	Parcels 6-7-8	Specific Conductance	10/28/2013	1438	umhos/cm				F
0601	Parcels 6-7-8	Temperature	2/11/2013	13.6	C				F
0601	Parcels 6-7-8	Temperature	5/30/2013	13.83	C				F
0601	Parcels 6-7-8	Temperature	8/27/2013	15.98	C				F
0601	Parcels 6-7-8	Temperature	10/28/2013	14.67	C				F
0601	Parcels 6-7-8	Tetrachloroethene	2/11/2013	7.88	ug/L	0.16			F
0601	Parcels 6-7-8	Tetrachloroethene	5/30/2013	8.49	ug/L	0.16			F
0601	Parcels 6-7-8	Tetrachloroethene	8/27/2013	7.59	ug/L	0.16			F
0601	Parcels 6-7-8	Tetrachloroethene	10/28/2013	6.26	ug/L	0.16			F
0601	Parcels 6-7-8	trans-1,2-Dichloroethene	2/11/2013	0.16	ug/L	0.16	U		F
0601	Parcels 6-7-8	trans-1,2-Dichloroethene	5/30/2013	0.16	ug/L	0.16	U		F
0601	Parcels 6-7-8	trans-1,2-Dichloroethene	8/27/2013	0.16	ug/L	0.16	U		F
0601	Parcels 6-7-8	trans-1,2-Dichloroethene	10/28/2013	0.16	ug/L	0.16	U		F

Sample ID	Area	Analyte	Sample Date	Value	Units	Detection Limit	Lab Qualifiers	Validation Qualifiers	Sample Type
0601	Parcels 6-7-8	Trichloroethene	2/11/2013	6.3	ug/L	0.16			F
0601	Parcels 6-7-8	Trichloroethene	5/30/2013	6.1	ug/L	0.16			F
0601	Parcels 6-7-8	Trichloroethene	8/27/2013	6.52	ug/L	0.16			F
0601	Parcels 6-7-8	Trichloroethene	10/28/2013	7.34	ug/L	0.16			F
0601	Parcels 6-7-8	Tritium	2/11/2013	26300	pCi/L	221			F
0601	Parcels 6-7-8	Tritium	8/27/2013	46900	pCi/L	332			F
0601	Parcels 6-7-8	Turbidity	2/11/2013	23.9	NTU				F
0601	Parcels 6-7-8	Turbidity	5/30/2013	34.7	NTU				F
0601	Parcels 6-7-8	Turbidity	8/27/2013	612	NTU				F
0601	Parcels 6-7-8	Turbidity	10/28/2013	6.95	NTU				F
0601	Parcels 6-7-8	Vinyl chloride	2/11/2013	0.16	ug/L	0.16	U		F
0601	Parcels 6-7-8	Vinyl chloride	5/30/2013	0.16	ug/L	0.16	U		F
0601	Parcels 6-7-8	Vinyl chloride	8/27/2013	0.16	ug/L	0.16	U		F
0601	Parcels 6-7-8	Vinyl chloride	10/28/2013	0.16	ug/L	0.16	U		F
0602	Parcels 6-7-8	cis-1,2-Dichloroethene	2/11/2013	42.3	ug/L	0.16			F
0602	Parcels 6-7-8	cis-1,2-Dichloroethene	10/28/2013	12.2	ug/L	0.16			F
0602	Parcels 6-7-8	Dissolved Oxygen	2/11/2013	4.75	mg/L				F
0602	Parcels 6-7-8	Dissolved Oxygen	10/28/2013	7.49	mg/L				F
0602	Parcels 6-7-8	Oxidation Reduction Potential	2/11/2013	-95	mV				F
0602	Parcels 6-7-8	Oxidation Reduction Potential	10/28/2013	230.1	mV				F
0602	Parcels 6-7-8	pH	2/11/2013	7.1	s.u.				F
0602	Parcels 6-7-8	pH	10/28/2013	7.91	s.u.				F
0602	Parcels 6-7-8	Specific Conductance	2/11/2013	2106	umhos/cm				F
0602	Parcels 6-7-8	Specific Conductance	10/28/2013	1706	umhos/cm				F
0602	Parcels 6-7-8	Temperature	2/11/2013	7.17	C				F
0602	Parcels 6-7-8	Temperature	10/28/2013	8.1	C				F
0602	Parcels 6-7-8	Tetrachloroethene	2/11/2013	0.16	ug/L	0.16	U		F
0602	Parcels 6-7-8	Tetrachloroethene	10/28/2013	0.16	ug/L	0.16	U		F
0602	Parcels 6-7-8	trans-1,2-Dichloroethene	2/11/2013	0.72	ug/L	0.16	J		F
0602	Parcels 6-7-8	trans-1,2-Dichloroethene	10/28/2013	0.2	ug/L	0.16	J		F
0602	Parcels 6-7-8	Trichloroethene	2/11/2013	32.6	ug/L	0.16			F
0602	Parcels 6-7-8	Trichloroethene	10/28/2013	4.58	ug/L	0.16			F
0602	Parcels 6-7-8	Tritium	2/11/2013	8810	pCi/L	234			F

Sample ID	Area	Analyte	Sample Date	Value	Units	Detection Limit	Lab Qualifiers	Validation Qualifiers	Sample Type
0602	Parcels 6-7-8	Turbidity	2/11/2013	307	NTU				F
0602	Parcels 6-7-8	Turbidity	10/28/2013	94.4	NTU				F
0602	Parcels 6-7-8	Vinyl chloride	2/11/2013	0.16	ug/L	0.16	U		F
0602	Parcels 6-7-8	Vinyl chloride	10/28/2013	0.16	ug/L	0.16	U		F
0605	Parcels 6-7-8	cis-1,2-Dichloroethene	2/11/2013	3.02	ug/L	0.16			F
0605	Parcels 6-7-8	cis-1,2-Dichloroethene	5/30/2013	1.98	ug/L	0.16			F
0605	Parcels 6-7-8	cis-1,2-Dichloroethene	8/27/2013	1.49	ug/L	0.16			F
0605	Parcels 6-7-8	cis-1,2-Dichloroethene	10/28/2013	1.34	ug/L	0.16			F
0605	Parcels 6-7-8	cis-1,2-Dichloroethene	10/28/2013	1.27	ug/L	0.16			D
0605	Parcels 6-7-8	Dissolved Oxygen	2/11/2013	7.65	mg/L				F
0605	Parcels 6-7-8	Dissolved Oxygen	5/30/2013	7.16	mg/L				F
0605	Parcels 6-7-8	Dissolved Oxygen	8/27/2013	7.04	mg/L				F
0605	Parcels 6-7-8	Dissolved Oxygen	10/28/2013	9.42	mg/L				F
0605	Parcels 6-7-8	Oxidation Reduction Potential	2/11/2013	51	mV				F
0605	Parcels 6-7-8	Oxidation Reduction Potential	5/30/2013	199.5	mV				F
0605	Parcels 6-7-8	Oxidation Reduction Potential	8/27/2013	175	mV				F
0605	Parcels 6-7-8	Oxidation Reduction Potential	10/28/2013	88.1	mV				F
0605	Parcels 6-7-8	pH	2/11/2013	6.38	s.u.				F
0605	Parcels 6-7-8	pH	5/30/2013	7.08	s.u.				F
0605	Parcels 6-7-8	pH	8/27/2013	7.08	s.u.				F
0605	Parcels 6-7-8	pH	10/28/2013	9.49	s.u.				F
0605	Parcels 6-7-8	Specific Conductance	2/11/2013	2392	umhos/cm				F
0605	Parcels 6-7-8	Specific Conductance	5/30/2013	2316	umhos/cm				F
0605	Parcels 6-7-8	Specific Conductance	8/27/2013	1863	umhos/cm				F
0605	Parcels 6-7-8	Specific Conductance	10/28/2013	1828	umhos/cm				F
0605	Parcels 6-7-8	Temperature	2/11/2013	7.88	C				F
0605	Parcels 6-7-8	Temperature	5/30/2013	13.98	C				F
0605	Parcels 6-7-8	Temperature	8/27/2013	19.62	C				F
0605	Parcels 6-7-8	Temperature	10/28/2013	10.64	C				F
0605	Parcels 6-7-8	Tetrachloroethene	2/11/2013	0.16	ug/L	0.16	U		F
0605	Parcels 6-7-8	Tetrachloroethene	5/30/2013	0.18	ug/L	0.16	J		F
0605	Parcels 6-7-8	Tetrachloroethene	8/27/2013	0.16	ug/L	0.16	U		F
0605	Parcels 6-7-8	Tetrachloroethene	10/28/2013	0.2	ug/L	0.16	J		F
0605	Parcels 6-7-8	Tetrachloroethene	10/28/2013	0.18	ug/L	0.16	J		D

Sample ID	Area	Analyte	Sample Date	Value	Units	Detection Limit	Lab Qualifiers	Validation Qualifiers	Sample Type
0605	Parcels 6-7-8	trans-1,2-Dichloroethene	2/11/2013	0.36	ug/L	0.16	J		F
0605	Parcels 6-7-8	trans-1,2-Dichloroethene	5/30/2013	0.27	ug/L	0.16	J		F
0605	Parcels 6-7-8	trans-1,2-Dichloroethene	8/27/2013	0.24	ug/L	0.16	J		F
0605	Parcels 6-7-8	trans-1,2-Dichloroethene	10/28/2013	0.3	ug/L	0.16	J		F
0605	Parcels 6-7-8	trans-1,2-Dichloroethene	10/28/2013	0.27	ug/L	0.16	J		D
0605	Parcels 6-7-8	Trichloroethene	2/11/2013	13.9	ug/L	0.16			F
0605	Parcels 6-7-8	Trichloroethene	5/30/2013	14.7	ug/L	0.16			F
0605	Parcels 6-7-8	Trichloroethene	8/27/2013	11	ug/L	0.16			F
0605	Parcels 6-7-8	Trichloroethene	10/28/2013	13.5	ug/L	0.16			F
0605	Parcels 6-7-8	Trichloroethene	10/28/2013	13	ug/L	0.16			D
0605	Parcels 6-7-8	Tritium	2/11/2013	10700	pCi/L	232			F
0605	Parcels 6-7-8	Tritium	8/27/2013	9610	pCi/L	326			F
0605	Parcels 6-7-8	Turbidity	2/11/2013	302	NTU				F
0605	Parcels 6-7-8	Turbidity	5/30/2013	256	NTU				F
0605	Parcels 6-7-8	Turbidity	8/27/2013	353	NTU				F
0605	Parcels 6-7-8	Turbidity	10/28/2013	339	NTU				F
0605	Parcels 6-7-8	Vinyl chloride	2/11/2013	0.16	ug/L	0.16	U		F
0605	Parcels 6-7-8	Vinyl chloride	5/30/2013	0.16	ug/L	0.16	U		F
0605	Parcels 6-7-8	Vinyl chloride	8/27/2013	0.16	ug/L	0.16	U		F
0605	Parcels 6-7-8	Vinyl chloride	10/28/2013	0.16	ug/L	0.16	U	J	F
0605	Parcels 6-7-8	Vinyl chloride	10/28/2013	0.16	ug/L	0.16	U		D
0606	Parcels 6-7-8	cis-1,2-Dichloroethene	2/11/2013	0.27	ug/L	0.16	J		F
0606	Parcels 6-7-8	cis-1,2-Dichloroethene	5/30/2013	0.81	ug/L	0.16	J		F
0606	Parcels 6-7-8	cis-1,2-Dichloroethene	8/27/2013	0.64	ug/L	0.16	J		F
0606	Parcels 6-7-8	cis-1,2-Dichloroethene	10/28/2013	0.85	ug/L	0.16	J		F
0606	Parcels 6-7-8	Dissolved Oxygen	2/11/2013	8.57	mg/L				F
0606	Parcels 6-7-8	Dissolved Oxygen	5/30/2013	7.06	mg/L				F
0606	Parcels 6-7-8	Dissolved Oxygen	8/27/2013	5.24	mg/L				F
0606	Parcels 6-7-8	Dissolved Oxygen	10/28/2013	8.12	mg/L				F
0606	Parcels 6-7-8	Oxidation Reduction Potential	2/11/2013	33	mV				F
0606	Parcels 6-7-8	Oxidation Reduction Potential	5/30/2013	161.7	mV				F
0606	Parcels 6-7-8	Oxidation Reduction Potential	8/27/2013	22	mV				F
0606	Parcels 6-7-8	Oxidation Reduction Potential	10/28/2013	157	mV				F

Sample ID	Area	Analyte	Sample Date	Value	Units	Detection Limit	Lab Qualifiers	Validation Qualifiers	Sample Type
0606	Parcels 6-7-8	pH	2/11/2013	6.66	s.u.				F
0606	Parcels 6-7-8	pH	5/30/2013	7.18	s.u.				F
0606	Parcels 6-7-8	pH	8/27/2013	7.47	s.u.				F
0606	Parcels 6-7-8	pH	10/28/2013	10.84	s.u.				F
0606	Parcels 6-7-8	Specific Conductance	2/11/2013	1484	umhos/cm				F
0606	Parcels 6-7-8	Specific Conductance	5/30/2013	2103	umhos/cm				F
0606	Parcels 6-7-8	Specific Conductance	8/27/2013	2101	umhos/cm				F
0606	Parcels 6-7-8	Specific Conductance	10/28/2013	1750	umhos/cm				F
0606	Parcels 6-7-8	Temperature	2/11/2013	5.23	C				F
0606	Parcels 6-7-8	Temperature	5/30/2013	15.35	C				F
0606	Parcels 6-7-8	Temperature	8/27/2013	20.38	C				F
0606	Parcels 6-7-8	Temperature	10/28/2013	9.92	C				F
0606	Parcels 6-7-8	Tetrachloroethene	2/11/2013	0.16	ug/L	0.16	U		F
0606	Parcels 6-7-8	Tetrachloroethene	5/30/2013	0.16	ug/L	0.16	U		F
0606	Parcels 6-7-8	Tetrachloroethene	8/27/2013	0.16	ug/L	0.16	U		F
0606	Parcels 6-7-8	Tetrachloroethene	10/28/2013	0.16	ug/L	0.16	U		F
0606	Parcels 6-7-8	trans-1,2-Dichloroethene	2/11/2013	0.16	ug/L	0.16	U		F
0606	Parcels 6-7-8	trans-1,2-Dichloroethene	5/30/2013	0.16	ug/L	0.16	U		F
0606	Parcels 6-7-8	trans-1,2-Dichloroethene	8/27/2013	0.16	ug/L	0.16	U		F
0606	Parcels 6-7-8	trans-1,2-Dichloroethene	10/28/2013	0.16	ug/L	0.16	U		F
0606	Parcels 6-7-8	Trichloroethene	2/11/2013	2.19	ug/L	0.16			F
0606	Parcels 6-7-8	Trichloroethene	5/30/2013	6.66	ug/L	0.16			F
0606	Parcels 6-7-8	Trichloroethene	8/27/2013	5	ug/L	0.16			F
0606	Parcels 6-7-8	Trichloroethene	10/28/2013	7.72	ug/L	0.16			F
0606	Parcels 6-7-8	Tritium	2/11/2013	3020	pCi/L	220			F
0606	Parcels 6-7-8	Tritium	8/27/2013	7370	pCi/L	325			F
0606	Parcels 6-7-8	Turbidity	2/11/2013	197	NTU				F
0606	Parcels 6-7-8	Turbidity	5/30/2013	272	NTU				F
0606	Parcels 6-7-8	Turbidity	8/27/2013	1000	NTU				F
0606	Parcels 6-7-8	Turbidity	10/28/2013	902	NTU				F
0606	Parcels 6-7-8	Vinyl chloride	2/11/2013	0.16	ug/L	0.16	U		F
0606	Parcels 6-7-8	Vinyl chloride	5/30/2013	0.16	ug/L	0.16	U		F
0606	Parcels 6-7-8	Vinyl chloride	8/27/2013	0.16	ug/L	0.16	U		F
0606	Parcels 6-7-8	Vinyl chloride	10/28/2013	0.16	ug/L	0.16	U		F

Sample ID	Area	Analyte	Sample Date	Value	Units	Detection Limit	Lab Qualifiers	Validation Qualifiers	Sample Type
0607	Parcels 6-7-8	cis-1,2-Dichloroethene	2/11/2013	0.86	ug/L	0.16	J		F
0607	Parcels 6-7-8	cis-1,2-Dichloroethene	5/30/2013	1.24	ug/L	0.16			F
0607	Parcels 6-7-8	cis-1,2-Dichloroethene	8/27/2013	0.71	ug/L	0.16	J		F
0607	Parcels 6-7-8	cis-1,2-Dichloroethene	10/28/2013	0.7	ug/L	0.16	J		F
0607	Parcels 6-7-8	Dissolved Oxygen	2/11/2013	7.48	mg/L				F
0607	Parcels 6-7-8	Dissolved Oxygen	5/30/2013	8.32	mg/L				F
0607	Parcels 6-7-8	Dissolved Oxygen	8/27/2013	9.1	mg/L				F
0607	Parcels 6-7-8	Dissolved Oxygen	10/28/2013	9.43	mg/L				F
0607	Parcels 6-7-8	Oxidation Reduction Potential	2/11/2013	54	mV				F
0607	Parcels 6-7-8	Oxidation Reduction Potential	5/30/2013	162.1	mV				F
0607	Parcels 6-7-8	Oxidation Reduction Potential	8/27/2013	110	mV				F
0607	Parcels 6-7-8	Oxidation Reduction Potential	10/28/2013	148.6	mV				F
0607	Parcels 6-7-8	pH	2/11/2013	7.15	s.u.				F
0607	Parcels 6-7-8	pH	5/30/2013	7.1	s.u.				F
0607	Parcels 6-7-8	pH	8/27/2013	6.79	s.u.				F
0607	Parcels 6-7-8	pH	10/28/2013	10.28	s.u.				F
0607	Parcels 6-7-8	Specific Conductance	2/11/2013	1531	umhos/cm				F
0607	Parcels 6-7-8	Specific Conductance	5/30/2013	1730	umhos/cm				F
0607	Parcels 6-7-8	Specific Conductance	8/27/2013	1816	umhos/cm				F
0607	Parcels 6-7-8	Specific Conductance	10/28/2013	1682	umhos/cm				F
0607	Parcels 6-7-8	Temperature	2/11/2013	11.86	C				F
0607	Parcels 6-7-8	Temperature	5/30/2013	12.44	C				F
0607	Parcels 6-7-8	Temperature	8/27/2013	15.57	C				F
0607	Parcels 6-7-8	Temperature	10/28/2013	14.4	C				F
0607	Parcels 6-7-8	Tetrachloroethene	2/11/2013	0.16	ug/L	0.16	U		F
0607	Parcels 6-7-8	Tetrachloroethene	5/30/2013	0.16	ug/L	0.16	U		F
0607	Parcels 6-7-8	Tetrachloroethene	8/27/2013	0.16	ug/L	0.16	U		F
0607	Parcels 6-7-8	Tetrachloroethene	10/28/2013	0.2	ug/L	0.16	J		F
0607	Parcels 6-7-8	trans-1,2-Dichloroethene	2/11/2013	0.16	ug/L	0.16	U		F
0607	Parcels 6-7-8	trans-1,2-Dichloroethene	5/30/2013	0.16	ug/L	0.16	U		F
0607	Parcels 6-7-8	trans-1,2-Dichloroethene	8/27/2013	0.16	ug/L	0.16	U		F
0607	Parcels 6-7-8	trans-1,2-Dichloroethene	10/28/2013	0.16	ug/L	0.16	U		F

Sample ID	Area	Analyte	Sample Date	Value	Units	Detection Limit	Lab Qualifiers	Validation Qualifiers	Sample Type
0607	Parcels 6-7-8	Trichloroethene	2/11/2013	5.61	ug/L	0.16			F
0607	Parcels 6-7-8	Trichloroethene	5/30/2013	9.04	ug/L	0.16			F
0607	Parcels 6-7-8	Trichloroethene	8/27/2013	7.75	ug/L	0.16			F
0607	Parcels 6-7-8	Trichloroethene	10/28/2013	6.41	ug/L	0.16			F
0607	Parcels 6-7-8	Tritium	2/11/2013	4510	pCi/L	225			F
0607	Parcels 6-7-8	Tritium	8/27/2013	5100	pCi/L	325			F
0607	Parcels 6-7-8	Turbidity	2/11/2013	65.4	NTU				F
0607	Parcels 6-7-8	Turbidity	5/30/2013	93.3	NTU				F
0607	Parcels 6-7-8	Turbidity	8/27/2013	215	NTU				F
0607	Parcels 6-7-8	Turbidity	10/28/2013	76.4	NTU				F
0607	Parcels 6-7-8	Vinyl chloride	2/11/2013	0.16	ug/L	0.16	U		F
0607	Parcels 6-7-8	Vinyl chloride	5/30/2013	0.16	ug/L	0.16	U		F
0607	Parcels 6-7-8	Vinyl chloride	8/27/2013	0.16	ug/L	0.16	U		F
0607	Parcels 6-7-8	Vinyl chloride	10/28/2013	0.16	ug/L	0.16	U		F
0608	Parcels 6-7-8	cis-1,2-Dichloroethene	2/11/2013	0.16	ug/L	0.16	U		F
0608	Parcels 6-7-8	cis-1,2-Dichloroethene	5/30/2013	0.16	ug/L	0.16	U		F
0608	Parcels 6-7-8	cis-1,2-Dichloroethene	8/27/2013	0.16	ug/L	0.16	U		F
0608	Parcels 6-7-8	cis-1,2-Dichloroethene	10/28/2013	0.16	ug/L	0.16	U		F
0608	Parcels 6-7-8	Dissolved Oxygen	2/11/2013	1.081	mg/L				F
0608	Parcels 6-7-8	Dissolved Oxygen	5/30/2013	7.77	mg/L				F
0608	Parcels 6-7-8	Dissolved Oxygen	8/27/2013	6.12	mg/L				F
0608	Parcels 6-7-8	Dissolved Oxygen	10/28/2013	11.35	mg/L				F
0608	Parcels 6-7-8	Oxidation Reduction Potential	2/11/2013	33	mV				F
0608	Parcels 6-7-8	Oxidation Reduction Potential	5/30/2013	168.4	mV				F
0608	Parcels 6-7-8	Oxidation Reduction Potential	8/27/2013	67	mV				F
0608	Parcels 6-7-8	Oxidation Reduction Potential	10/28/2013	145.3	mV				F
0608	Parcels 6-7-8	pH	2/11/2013	7.66	s.u.				F
0608	Parcels 6-7-8	pH	5/30/2013	7.43	s.u.				F
0608	Parcels 6-7-8	pH	8/27/2013	8.19	s.u.				F
0608	Parcels 6-7-8	pH	10/28/2013	8.69	s.u.				F
0608	Parcels 6-7-8	Specific Conductance	2/11/2013	1882	umhos/cm				F
0608	Parcels 6-7-8	Specific Conductance	5/30/2013	1947	umhos/cm				F
0608	Parcels 6-7-8	Specific Conductance	8/27/2013	1740	umhos/cm				F
0608	Parcels 6-7-8	Specific Conductance	10/28/2013	1943	umhos/cm				F

Sample ID	Area	Analyte	Sample Date	Value	Units	Detection Limit	Lab Qualifiers	Validation Qualifiers	Sample Type
0608	Parcels 6-7-8	Temperature	2/11/2013	7.05	C				F
0608	Parcels 6-7-8	Temperature	5/30/2013	18.89	C				F
0608	Parcels 6-7-8	Temperature	8/27/2013	23.06	C				F
0608	Parcels 6-7-8	Temperature	10/28/2013	8.66	C				F
0608	Parcels 6-7-8	Tetrachloroethene	2/11/2013	0.16	ug/L	0.16	U		F
0608	Parcels 6-7-8	Tetrachloroethene	5/30/2013	0.16	ug/L	0.16	U		F
0608	Parcels 6-7-8	Tetrachloroethene	8/27/2013	0.16	ug/L	0.16	U		F
0608	Parcels 6-7-8	Tetrachloroethene	10/28/2013	0.16	ug/L	0.16	U		F
0608	Parcels 6-7-8	trans-1,2-Dichloroethene	2/11/2013	0.16	ug/L	0.16	U		F
0608	Parcels 6-7-8	trans-1,2-Dichloroethene	5/30/2013	0.16	ug/L	0.16	U		F
0608	Parcels 6-7-8	trans-1,2-Dichloroethene	8/27/2013	0.16	ug/L	0.16	U		F
0608	Parcels 6-7-8	trans-1,2-Dichloroethene	10/28/2013	0.16	ug/L	0.16	U		F
0608	Parcels 6-7-8	Trichloroethene	2/11/2013	1.13	ug/L	0.16			F
0608	Parcels 6-7-8	Trichloroethene	5/30/2013	0.24	ug/L	0.16	J		F
0608	Parcels 6-7-8	Trichloroethene	8/27/2013	0.16	ug/L	0.16	J		F
0608	Parcels 6-7-8	Trichloroethene	10/28/2013	1.09	ug/L	0.16			F
0608	Parcels 6-7-8	Tritium	2/11/2013	8170	pCi/L	233			F
0608	Parcels 6-7-8	Tritium	8/27/2013	6140	pCi/L	328			F
0608	Parcels 6-7-8	Turbidity	2/11/2013	179	NTU				F
0608	Parcels 6-7-8	Turbidity	5/30/2013	311	NTU				F
0608	Parcels 6-7-8	Turbidity	8/27/2013	95.6	NTU				F
0608	Parcels 6-7-8	Turbidity	10/28/2013	300	NTU				F
0608	Parcels 6-7-8	Vinyl chloride	2/11/2013	0.16	ug/L	0.16	U		F
0608	Parcels 6-7-8	Vinyl chloride	5/30/2013	0.16	ug/L	0.16	U		F
0608	Parcels 6-7-8	Vinyl chloride	8/27/2013	0.16	ug/L	0.16	U		F
0608	Parcels 6-7-8	Vinyl chloride	10/28/2013	0.16	ug/L	0.16	U		F

Sample ID	Area	Analyte	Sample Date	Value	Units	Detection Limit	Lab Qualifiers	Validation Qualifiers	Sample Type
0353	Phase I	cis-1,2-Dichloroethene	2/13/2013	0.16	ug/L	0.16	U	F	F
0353	Phase I	cis-1,2-Dichloroethene	8/28/2013	0.16	ug/L	0.16	U	FQ	F
0353	Phase I	Dissolved Oxygen	2/13/2013	3.31	mg/L			F	F
0353	Phase I	Dissolved Oxygen	8/28/2013	2.35	mg/L			FQ	F
0353	Phase I	Oxidation Reduction Potential	2/13/2013	9.3	mV			F	F
0353	Phase I	Oxidation Reduction Potential	8/28/2013	27.3	mV			FQ	F
0353	Phase I	pH	2/13/2013	7.51	s.u.			F	F
0353	Phase I	pH	8/28/2013	7.15	s.u.			FQ	F
0353	Phase I	Specific Conductance	2/13/2013	1385	umhos/cm			F	F
0353	Phase I	Specific Conductance	8/28/2013	1399	umhos/cm			FQ	F
0353	Phase I	Temperature	2/13/2013	6.15	C			F	F
0353	Phase I	Temperature	8/28/2013	26.57	C			FQ	F
0353	Phase I	Tetrachloroethene	2/13/2013	0.16	ug/L	0.16	U	F	F
0353	Phase I	Tetrachloroethene	8/28/2013	0.16	ug/L	0.16	U	FQ	F
0353	Phase I	trans-1,2-Dichloroethene	2/13/2013	0.16	ug/L	0.16	U	F	F
0353	Phase I	trans-1,2-Dichloroethene	8/28/2013	0.16	ug/L	0.16	U	FQ	F
0353	Phase I	Trichloroethene	2/13/2013	0.16	ug/L	0.16	U	F	F
0353	Phase I	Trichloroethene	8/28/2013	0.16	ug/L	0.16	U	FQ	F
0353	Phase I	Turbidity	2/13/2013	49.9	NTU			F	F
0353	Phase I	Turbidity	8/28/2013	47.9	NTU			FQ	F
0353	Phase I	Vinyl chloride	2/13/2013	0.16	ug/L	0.16	U	F	F
0353	Phase I	Vinyl chloride	8/28/2013	0.16	ug/L	0.16	U	FQ	F
0400	Phase I	cis-1,2-Dichloroethene	2/14/2013	0.16	ug/L	0.16	U	F	F
0400	Phase I	cis-1,2-Dichloroethene	8/28/2013	0.16	ug/L	0.16	U	F	F
0400	Phase I	Dissolved Oxygen	2/14/2013	1.31	mg/L			F	F
0400	Phase I	Dissolved Oxygen	8/28/2013	2.43	mg/L			F	F
0400	Phase I	Oxidation Reduction Potential	2/14/2013	53.4	mV			F	F
0400	Phase I	Oxidation Reduction Potential	8/28/2013	47.5	mV			F	F
0400	Phase I	pH	2/14/2013	6.85	s.u.			F	F
0400	Phase I	pH	8/28/2013	7.05	s.u.			F	F
0400	Phase I	Specific Conductance	2/14/2013	1227	umhos/cm			F	F
0400	Phase I	Specific Conductance	8/28/2013	1244	umhos/cm			F	F

Sample ID	Area	Analyte	Sample Date	Value	Units	Detection Limit	Lab Qualifiers	Validation Qualifiers	Sample Type
0400	Phase I	Temperature	2/14/2013	11.11	C			F	F
0400	Phase I	Temperature	8/28/2013	15.54	C			F	F
0400	Phase I	Tetrachloroethene	2/14/2013	0.16	ug/L	0.16	U	F	F
0400	Phase I	Tetrachloroethene	8/28/2013	0.16	ug/L	0.16	U	F	F
0400	Phase I	trans-1,2-Dichloroethene	2/14/2013	0.16	ug/L	0.16	U	F	F
0400	Phase I	trans-1,2-Dichloroethene	8/28/2013	0.16	ug/L	0.16	U	F	F
0400	Phase I	Trichloroethene	2/14/2013	0.16	ug/L	0.16	U	F	F
0400	Phase I	Trichloroethene	8/28/2013	0.16	ug/L	0.16	U	F	F
0400	Phase I	Turbidity	2/14/2013	47.8	NTU			F	F
0400	Phase I	Turbidity	8/28/2013	48	NTU			F	F
0400	Phase I	Vinyl chloride	2/14/2013	0.16	ug/L	0.16	U	F	F
0400	Phase I	Vinyl chloride	8/28/2013	0.16	ug/L	0.16	U	F	F
0402	Phase I	cis-1,2-Dichloroethene	2/14/2013	0.16	ug/L	0.16	U	F	F
0402	Phase I	cis-1,2-Dichloroethene	8/28/2013	0.16	ug/L	0.16	U	F	F
0402	Phase I	Dissolved Oxygen	2/14/2013	2.18	mg/L			F	F
0402	Phase I	Dissolved Oxygen	8/28/2013	2.04	mg/L			F	F
0402	Phase I	Oxidation Reduction Potential	2/14/2013	171.5	mV			F	F
0402	Phase I	Oxidation Reduction Potential	8/28/2013	35.8	mV			F	F
0402	Phase I	pH	2/14/2013	6.89	s.u.			F	F
0402	Phase I	pH	8/28/2013	7.22	s.u.			F	F
0402	Phase I	Specific Conductance	2/14/2013	1057	umhos/cm			F	F
0402	Phase I	Specific Conductance	8/28/2013	1067	umhos/cm			F	F
0402	Phase I	Temperature	2/14/2013	11.73	C			F	F
0402	Phase I	Temperature	8/28/2013	15.49	C			F	F
0402	Phase I	Tetrachloroethene	2/14/2013	0.31	ug/L	0.16	J	F	F
0402	Phase I	Tetrachloroethene	8/28/2013	0.38	ug/L	0.16	J	F	F
0402	Phase I	trans-1,2-Dichloroethene	2/14/2013	0.16	ug/L	0.16	U	F	F
0402	Phase I	trans-1,2-Dichloroethene	8/28/2013	0.16	ug/L	0.16	U	F	F
0402	Phase I	Trichloroethene	2/14/2013	0.16	ug/L	0.16	U	F	F
0402	Phase I	Trichloroethene	8/28/2013	0.21	ug/L	0.16	J	F	F
0402	Phase I	Turbidity	2/14/2013	3.61	NTU			F	F
0402	Phase I	Turbidity	8/28/2013	1.66	NTU			F	F

Sample ID	Area	Analyte	Sample Date	Value	Units	Detection Limit	Lab Qualifiers	Validation Qualifiers	Sample Type
0402	Phase I	Vinyl chloride	2/14/2013	0.16	ug/L	0.16	U	F	F
0402	Phase I	Vinyl chloride	8/28/2013	0.16	ug/L	0.16	U	F	F
0411	Phase I	cis-1,2-Dichloroethene	2/14/2013	4.71	ug/L	0.16		F	F
0411	Phase I	cis-1,2-Dichloroethene	2/14/2013	4.62	ug/L	0.16		F	D
0411	Phase I	cis-1,2-Dichloroethene	8/28/2013	3.57	ug/L	0.16		F	F
0411	Phase I	Dissolved Oxygen	2/14/2013	0.37	mg/L			F	F
0411	Phase I	Dissolved Oxygen	8/28/2013	1.21	mg/L			F	F
0411	Phase I	Oxidation Reduction Potential	2/14/2013	-36.5	mV			F	F
0411	Phase I	Oxidation Reduction Potential	8/28/2013	10.1	mV			F	F
0411	Phase I	pH	2/14/2013	6.91	s.u.			F	F
0411	Phase I	pH	8/28/2013	7.13	s.u.			F	F
0411	Phase I	Specific Conductance	2/14/2013	1501	umhos/cm			F	F
0411	Phase I	Specific Conductance	8/28/2013	1457	umhos/cm			F	F
0411	Phase I	Temperature	2/14/2013	11.46	C			F	F
0411	Phase I	Temperature	8/28/2013	19.39	C			F	F
0411	Phase I	Tetrachloroethene	2/14/2013	0.16	ug/L	0.16	U	F	F
0411	Phase I	Tetrachloroethene	2/14/2013	0.16	ug/L	0.16	U	F	D
0411	Phase I	Tetrachloroethene	8/28/2013	0.16	ug/L	0.16	U	F	F
0411	Phase I	trans-1,2-Dichloroethene	2/14/2013	0.16	ug/L	0.16	U	F	F
0411	Phase I	trans-1,2-Dichloroethene	2/14/2013	0.16	ug/L	0.16	U	F	D
0411	Phase I	trans-1,2-Dichloroethene	8/28/2013	0.16	ug/L	0.16	U	F	F
0411	Phase I	Trichloroethene	2/14/2013	12.5	ug/L	0.16		F	F
0411	Phase I	Trichloroethene	2/14/2013	11.8	ug/L	0.16		F	D
0411	Phase I	Trichloroethene	8/28/2013	13.3	ug/L	0.16		F	F
0411	Phase I	Turbidity	2/14/2013	4.42	NTU			F	F
0411	Phase I	Turbidity	8/28/2013	2.83	NTU			F	F
0411	Phase I	Vinyl chloride	2/14/2013	0.16	ug/L	0.16	U	F	F
0411	Phase I	Vinyl chloride	2/14/2013	0.16	ug/L	0.16	U	F	D
0411	Phase I	Vinyl chloride	8/28/2013	0.16	ug/L	0.16	U	F	F
0443	Phase I	cis-1,2-Dichloroethene	2/14/2013	0.57	ug/L	0.16	J	F	F
0443	Phase I	cis-1,2-Dichloroethene	8/28/2013	0.38	ug/L	0.16	J	FQ	F
0443	Phase I	cis-1,2-Dichloroethene	8/28/2013	0.29	ug/L	0.16	J	FQ	D

Sample ID	Area	Analyte	Sample Date	Value	Units	Detection Limit	Lab Qualifiers	Validation Qualifiers	Sample Type
0443	Phase I	Dissolved Oxygen	2/14/2013	2.3	mg/L			F	F
0443	Phase I	Dissolved Oxygen	8/28/2013	7.55	mg/L			FQ	F
0443	Phase I	Oxidation Reduction Potential	2/14/2013	139	mV			F	F
0443	Phase I	Oxidation Reduction Potential	8/28/2013	121.7	mV			FQ	F
0443	Phase I	pH	2/14/2013	6.91	s.u.			F	F
0443	Phase I	pH	8/28/2013	7.13	s.u.			FQ	F
0443	Phase I	Specific Conductance	2/14/2013	1513	umhos/cm			F	F
0443	Phase I	Specific Conductance	8/28/2013	1535	umhos/cm			FQ	F
0443	Phase I	Temperature	2/14/2013	10.82	C			F	F
0443	Phase I	Temperature	8/28/2013	18.62	C			FQ	F
0443	Phase I	Tetrachloroethene	2/14/2013	0.16	ug/L	0.16	U	F	F
0443	Phase I	Tetrachloroethene	8/28/2013	0.16	ug/L	0.16	U	FQ	F
0443	Phase I	Tetrachloroethene	8/28/2013	0.16	ug/L	0.16	U	FQ	D
0443	Phase I	trans-1,2-Dichloroethene	2/14/2013	0.16	ug/L	0.16	U	F	F
0443	Phase I	trans-1,2-Dichloroethene	8/28/2013	0.16	ug/L	0.16	U	FQ	F
0443	Phase I	trans-1,2-Dichloroethene	8/28/2013	0.16	ug/L	0.16	U	FQ	D
0443	Phase I	Trichloroethene	2/14/2013	7.25	ug/L	0.16		F	F
0443	Phase I	Trichloroethene	8/28/2013	8.85	ug/L	0.16		FQJ	F
0443	Phase I	Trichloroethene	8/28/2013	6.77	ug/L	0.16		FQJ	D
0443	Phase I	Turbidity	2/14/2013	5.35	NTU			F	F
0443	Phase I	Turbidity	8/28/2013	13.2	NTU			FQ	F
0443	Phase I	Vinyl chloride	2/14/2013	0.16	ug/L	0.16	U	F	F
0443	Phase I	Vinyl chloride	8/28/2013	0.16	ug/L	0.16	U	FQ	F
0443	Phase I	Vinyl chloride	8/28/2013	0.16	ug/L	0.16	U	FQ	D
0444	Phase I	cis-1,2-Dichloroethene	2/13/2013	0.16	ug/L	0.16	U	FQ	F
0444	Phase I	cis-1,2-Dichloroethene	8/28/2013	0.16	ug/L	0.16	U	FQ	F
0444	Phase I	Dissolved Oxygen	2/13/2013	1.42	mg/L			FQ	F
0444	Phase I	Dissolved Oxygen	8/28/2013	1.14	mg/L			FQ	F
0444	Phase I	Oxidation Reduction Potential	2/13/2013	87.3	mV			FQ	F
0444	Phase I	Oxidation Reduction Potential	8/28/2013	25	mV			FQ	F
0444	Phase I	pH	2/13/2013	7.07	s.u.			FQ	F
0444	Phase I	pH	8/28/2013	7.28	s.u.			FQ	F

Sample ID	Area	Analyte	Sample Date	Value	Units	Detection Limit	Lab Qualifiers	Validation Qualifiers	Sample Type
0444	Phase I	Specific Conductance	2/13/2013	1243	umhos/cm			FQ	F
0444	Phase I	Specific Conductance	8/28/2013	1199	umhos/cm			FQ	F
0444	Phase I	Temperature	2/13/2013	9.74	C			FQ	F
0444	Phase I	Temperature	8/28/2013	21.58	C			FQ	F
0444	Phase I	Tetrachloroethene	2/13/2013	0.16	ug/L	0.16	U	FQ	F
0444	Phase I	Tetrachloroethene	8/28/2013	0.16	ug/L	0.16	U	FQ	F
0444	Phase I	trans-1,2-Dichloroethene	2/13/2013	0.16	ug/L	0.16	U	FQ	F
0444	Phase I	trans-1,2-Dichloroethene	8/28/2013	0.16	ug/L	0.16	U	FQ	F
0444	Phase I	Trichloroethene	2/13/2013	0.16	ug/L	0.16	U	FQ	F
0444	Phase I	Trichloroethene	8/28/2013	0.16	ug/L	0.16	U	FQ	F
0444	Phase I	Turbidity	2/13/2013	33.3	NTU			FQ	F
0444	Phase I	Turbidity	8/28/2013	333	NTU			FQ	F
0444	Phase I	Vinyl chloride	2/13/2013	0.16	ug/L	0.16	U	FQ	F
0444	Phase I	Vinyl chloride	8/28/2013	0.16	ug/L	0.16	U	FQ	F
0445	Phase I	cis-1,2-Dichloroethene	2/13/2013	0.16	ug/L	0.16	U	FQ	F
0445	Phase I	cis-1,2-Dichloroethene	8/28/2013	0.16	ug/L	0.16	U	FQ	F
0445	Phase I	Dissolved Oxygen	2/13/2013	0.46	mg/L			FQ	F
0445	Phase I	Dissolved Oxygen	8/28/2013	0.31	mg/L			FQ	F
0445	Phase I	Oxidation Reduction Potential	2/13/2013	-44.8	mV			FQ	F
0445	Phase I	Oxidation Reduction Potential	8/28/2013	-121.9	mV			FQ	F
0445	Phase I	pH	2/13/2013	6.77	s.u.			FQ	F
0445	Phase I	pH	8/28/2013	6.94	s.u.			FQ	F
0445	Phase I	Specific Conductance	2/13/2013	24880	umhos/cm			FQ	F
0445	Phase I	Specific Conductance	8/28/2013	22280	umhos/cm			FQ	F
0445	Phase I	Temperature	2/13/2013	9.59	C			FQ	F
0445	Phase I	Temperature	8/28/2013	19.08	C			FQ	F
0445	Phase I	Tetrachloroethene	2/13/2013	0.16	ug/L	0.16	U	FQ	F
0445	Phase I	Tetrachloroethene	8/28/2013	0.16	ug/L	0.16	U	FQ	F
0445	Phase I	trans-1,2-Dichloroethene	2/13/2013	0.16	ug/L	0.16	U	FQ	F
0445	Phase I	trans-1,2-Dichloroethene	8/28/2013	0.16	ug/L	0.16	U	FQ	F
0445	Phase I	Trichloroethene	2/13/2013	0.16	ug/L	0.16	U	FQ	F
0445	Phase I	Trichloroethene	8/28/2013	0.16	ug/L	0.16	U	FQ	F

Sample ID	Area	Analyte	Sample Date	Value	Units	Detection Limit	Lab Qualifiers	Validation Qualifiers	Sample Type
0445	Phase I	Turbidity	2/13/2013	5.21	NTU			FQ	F
0445	Phase I	Turbidity	8/28/2013	9.59	NTU			FQ	F
0445	Phase I	Vinyl chloride	2/13/2013	0.16	ug/L	0.16	U	FQ	F
0445	Phase I	Vinyl chloride	8/28/2013	0.16	ug/L	0.16	U	FQ	F
P033	Phase I	cis-1,2-Dichloroethene	2/14/2013	0.16	ug/L	0.16	U	F	F
P033	Phase I	cis-1,2-Dichloroethene	8/28/2013	0.16	ug/L	0.16	U	F	F
P033	Phase I	Dissolved Oxygen	2/14/2013	3.26	mg/L			F	F
P033	Phase I	Dissolved Oxygen	8/28/2013	1.21	mg/L			F	F
P033	Phase I	Oxidation Reduction Potential	2/14/2013	112	mV			F	F
P033	Phase I	Oxidation Reduction Potential	8/28/2013	16.2	mV			F	F
P033	Phase I	pH	2/14/2013	6.73	s.u.			F	F
P033	Phase I	pH	8/28/2013	7.01	s.u.			F	F
P033	Phase I	Specific Conductance	2/14/2013	1617	umhos/cm			F	F
P033	Phase I	Specific Conductance	8/28/2013	1328	umhos/cm			F	F
P033	Phase I	Temperature	2/14/2013	11.84	C			F	F
P033	Phase I	Temperature	8/28/2013	16.04	C			F	F
P033	Phase I	Tetrachloroethene	2/14/2013	0.16	ug/L	0.16	U	F	F
P033	Phase I	Tetrachloroethene	8/28/2013	0.16	ug/L	0.16	U	F	F
P033	Phase I	trans-1,2-Dichloroethene	2/14/2013	0.16	ug/L	0.16	U	F	F
P033	Phase I	trans-1,2-Dichloroethene	8/28/2013	0.16	ug/L	0.16	U	F	F
P033	Phase I	Trichloroethene	2/14/2013	0.16	ug/L	0.16	U	F	F
P033	Phase I	Trichloroethene	8/28/2013	0.16	ug/L	0.16	U	F	F
P033	Phase I	Turbidity	2/14/2013	4.5	NTU			F	F
P033	Phase I	Turbidity	8/28/2013	1.18	NTU			F	F
P033	Phase I	Vinyl chloride	2/14/2013	0.16	ug/L	0.16	U	F	F
P033	Phase I	Vinyl chloride	8/28/2013	0.16	ug/L	0.16	U	F	F
0617	Phase I	cis-1,2-Dichloroethene	2/11/2013	2.36	ug/L	0.16			F
0617	Phase I	cis-1,2-Dichloroethene	8/27/2013	1.59	ug/L	0.16			F
0617	Phase I	Dissolved Oxygen	2/11/2013	7.9	mg/L				F
0617	Phase I	Dissolved Oxygen	8/27/2013	7.12	mg/L				F
0617	Phase I	Oxidation Reduction Potential	2/11/2013	39	mV				F
0617	Phase I	Oxidation Reduction Potential	8/27/2013	106	mV				F

Sample ID	Area	Analyte	Sample Date	Value	Units	Detection Limit	Lab Qualifiers	Validation Qualifiers	Sample Type
0617	Phase I	pH	2/11/2013	7.06	s.u.				F
0617	Phase I	pH	8/27/2013	6.86	s.u.				F
0617	Phase I	Specific Conductance	2/11/2013	1703	umhos/cm				F
0617	Phase I	Specific Conductance	8/27/2013	1753	umhos/cm				F
0617	Phase I	Temperature	2/11/2013	8.99	C				F
0617	Phase I	Temperature	8/27/2013	20.24	C				F
0617	Phase I	Tetrachloroethene	2/11/2013	0.16	ug/L	0.16	U		F
0617	Phase I	Tetrachloroethene	8/27/2013	0.16	ug/L	0.16	U		F
0617	Phase I	trans-1,2-Dichloroethene	2/11/2013	0.16	ug/L	0.16	U		F
0617	Phase I	trans-1,2-Dichloroethene	8/27/2013	0.16	ug/L	0.16	U		F
0617	Phase I	Trichloroethene	2/11/2013	10.4	ug/L	0.16			F
0617	Phase I	Trichloroethene	8/27/2013	6.7	ug/L	0.16			F
0617	Phase I	Trichlorofluoromethane	2/11/2013	0.16	ug/L	0.16	U		F
0617	Phase I	Trichlorofluoromethane	8/27/2013	0.16	ug/L	0.16	U		F
0617	Phase I	Turbidity	2/11/2013	144	NTU				F
0617	Phase I	Turbidity	8/27/2013	58.3	NTU				F
0617	Phase I	Vinyl chloride	2/11/2013	0.16	ug/L	0.16	U		F
0617	Phase I	Vinyl chloride	8/27/2013	0.16	ug/L	0.16	U		F

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Appendix D

Data Assessment Reports

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Data Review and Validation Report

General Information

Requisition No. (RIN):	13015068
Sample Event:	February 11–12, 2013
Site(s):	Mound, Ohio; Groundwater
Laboratory:	GEL Laboratories, Charleston, South Carolina
Work Order No.:	320388
Analysis:	Radiochemistry, Volatiles
Validator:	Steve Donivan
Review Date:	March 22, 2013

This validation was performed according to the *Environmental Procedures Catalog* (LMS/PRO/S04325), *"Standard Practice for Validation of Laboratory Data."* The procedure was applied at Level 2, Data Deliverables Verification. See attached Data Validation Worksheets for supporting documentation on the data review and validation. All analyses were successfully completed. The samples were prepared and analyzed using accepted procedures based on methods specified by line item code, which are listed in Table 1.

Table 1. Analytes and Methods

Analyte	Line Item Code	Prep Method	Analytical Method
Tritium	LSC-A-001	EPA 906.0 Mod	EPA 906.0 Mod
Volatile Organics, VOA	VOA-A-007	SW-846 5030B	SW-846 8260B

Data Qualifier Summary

Analytical results were qualified as listed in Table 2. Refer to the sections below for an explanation of the data qualifiers applied.

Table 2. Data Qualifier Summary

Sample Number	Location	Analyte(s)	Flag	Reason
320388002	0386	Acetone	U	Less than 10 times the method blank
320388002	0386	Toluene	U	Less than 10 times the method blank
320388004	0389	Methylene Chloride	U	Less than 10 times the method blank

Sample Number	Location	Analyte(s)	Flag	Reason
320388005	0392	Toluene	U	Less than 10 times the method blank
320388006	0301	Acetone	U	Less than 10 times the method blank
320388006	0301	Toluene	U	Less than 10 times the method blank
320388007	0311	Methylene Chloride	U	Less than 10 times the method blank
320388007	0311	Tritium	J	Less than the determination limit
320388009	0118	Acetone	U	Less than 10 times the method blank
320388009	0118	Toluene	U	Less than 10 times the method blank
320388010	0346	Acetone	U	Less than 10 times the method blank
320388010	0346	Toluene	U	Less than 10 times the method blank
320388010	0346	Tritium	J	Less than the determination limit
320388011	0379	Methylene Chloride	U	Less than 10 times the method blank
320388012	0347	Acetone	U	Less than 10 times the method blank
320388012	0347	Methylene Chloride	U	Less than 10 times the method blank
320388012	0347	Toluene	J	Matrix spike recovery
320388013	0315	Methylene Chloride	U	Less than 10 times the method blank
320388013	0315	Toluene	U	Less than 10 times the method blank
320388014	0124	Methylene Chloride	U	Less than 10 times the method blank
320388014	0124	Toluene	U	Less than 10 times the method blank
320388015	0126	Methylene Chloride	U	Less than 10 times the method blank
320388016	0605	Acetone	U	Less than 10 times the method blank
320388016	0605	Methylene Chloride	U	Less than 10 times the method blank
320388017	0607	Acetone	U	Less than 10 times the method blank
320388017	0607	Methylene Chloride	U	Less than 10 times the method blank
320388018	0601	Methylene Chloride	U	Less than 10 times the method blank
320388019	0606	Acetone	U	Less than 10 times the method blank
320388019	0606	Methylene Chloride	U	Less than 10 times the method blank
320388020	0602	Acetone	U	Less than 10 times the method blank
320388020	0602	Methylene Chloride	U	Less than 10 times the method blank
320388021	0608	Acetone	U	Less than 10 times the method blank
320388021	0608	Methylene Chloride	U	Less than 10 times the method blank
320388022	0347 Duplicate	Methylene Chloride	U	Less than 10 times the method blank
320388022	0347 Duplicate	Toluene	J	Matrix spike recovery

Sample Shipping/Receiving

GEL Laboratories in Charleston, South Carolina, received 22 water samples on February 14, 2013, accompanied by a Chain of Custody (COC) form. The COC form was checked to confirm that all of the samples were listed with sample collection dates and times, and that signatures and dates were present indicating sample relinquishment and receipt. The COC form was complete with no errors or omissions. The air waybill number was listed on the receiving documentation.

Preservation and Holding Times

The sample shipments were received intact with the temperature inside the iced cooler of 2 °C, which complies with requirements. All samples were received in the correct container types and

had been preserved correctly for the requested analyses. Sample analysis was completed within the applicable holding times.

Detection and Quantitation Limits

The method detection limit (MDL) was reported for all organic analytes as required. The MDL, as defined in 40 CFR 136, is the minimum concentration of an analyte that can be measured and reported with 99% confidence that the analyte concentration is greater than zero. The practical quantitation limit (PQL) for these analytes is the lowest concentration that can be reliably measured, and is defined as 5 times the MDL.

For radiochemical analytes (those measured by radiometric counting) the MDL and PQL are not applicable, and these results are evaluated using the minimum detectable concentration (MDC), Decision Level Concentration (DLC), and Determination Limit (DL). The MDC is a measure of radiochemical method performance and was calculated and reported as specified in *Quality Systems for Analytical Services*. The DLC is the minimum concentration of an analyte that can be measured and reported with 99% confidence that the analyte concentration is greater than zero, and is estimated as 3 times the one-sigma total propagated uncertainty. Results that are greater than the MDC, but less than the DLC are qualified with a "U" flag (not detected). The DL for radiochemical results is the lowest concentration that can be reliably measured, and is defined as three times the MDC. Results not previously "U" qualified that are less than the DL are qualified with a "J" flag as estimated values.

The reported MDLs for all organic analytes; and MDCs for radiochemical analytes demonstrate compliance with contractual requirements.

Laboratory Instrument Calibration

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing acceptable qualitative and quantitative data for all analytes. Initial calibration demonstrates that the instrument is capable of acceptable performance in the beginning of the analytical run. Compliance requirements for continuing calibration checks are established to ensure that the instrument continues to be capable of producing acceptable qualitative and quantitative data. All laboratory instrument calibrations were performed correctly in accordance with the cited methods. All calibration and laboratory spike standards were prepared from independent sources.

Volatiles Internal Standards and Surrogates

The volatile internal standard recoveries and surrogate recoveries were within the acceptance ranges for all samples.

Method Blanks

Method blanks are analyzed to assess any contamination that may have occurred during sample preparation. The method blank results were below the practical quantitation limits. Methylene chloride was detected in a the VOA method blanks. Associated sample results that are greater

than the MDL but less than ten times the blank concentration are qualified with a “U” flag as not detected. The tritium method blank result was less than the Decision Level Concentration.

Trip Blank

A trip blank was collected to document contamination attributable to shipping and field handling procedures. This type of blank is useful in documenting contamination of volatile organic samples. Acetone and toluene were detected in the trip blank. The associated sample acetone and toluene results that are greater than the MDL but less than ten times the blank concentration are qualified with a “U” flag as not detected.

Matrix Spike Analysis

Matrix spike and matrix spike duplicate (MS/MSD) samples are used to measure method performance in the sample matrix. The MS/MSD data are not evaluated when the concentration of the unspiked sample is greater than four times the spike. The spike recoveries met the acceptance criteria for all analytes evaluated with the following exception. The spike recovery of toluene from sample 0347 did not meet the acceptance criteria. The toluene results for the associated sample and duplicate are qualified with a “J” flag as estimated values.

Laboratory Replicate Analysis

Laboratory replicate analyses are used to determine laboratory precision for each sample matrix. The relative percent difference for organic replicate results were less than the laboratory-derived control limits, demonstrating acceptable laboratory precision. The relative error ratio for radiochemical replicate results (calculated using the one-sigma total propagated uncertainty) was less than 3, indicating acceptable precision.

Laboratory Control Sample

Laboratory control samples (LCS) were analyzed at the correct frequency to provide information on the accuracy of the analytical method and the overall laboratory performance, including sample preparation. All control sample results were acceptable with the exception of the methylene chloride result. The associated sample methylene chloride results that are greater than the MDL are qualified with a “J” flag as estimated values.

Field Duplicate

Field duplicate samples are collected and analyzed as an indication of overall precision of the measurement process. The precision observed includes both field and laboratory precision and has more variability than laboratory duplicates, which measure only laboratory performance. The relative percent difference for duplicate results that are greater than five times the practical quantitation limit (PQL) should be less than 20 percent. For results that are less than five times the PQL, the range should be no greater than the PQL. A duplicate sample was collected from location 0347 (field duplicate ID 9347). The non-radiochemical duplicate results met the criteria, demonstrating acceptable overall precision. The relative error ratio for radiochemical duplicate results (calculated using the 1-sigma total propagated uncertainty) was less than 3, indicating acceptable precision.

Completeness

Results were reported in the correct units for all analytes requested using contract-required laboratory qualifiers.

Electronic Data Deliverable File

The EDD file arrived on March 15, 2013. The Sample Management System EDD validation module was used to verify that the EDD file was complete and in compliance with requirements. The module compares the contents of the file to the requested analyses to ensure all and only the requested data are delivered. The contents of the EDD were manually examined to verify that the sample results accurately reflect the data contained in the sample data package.

Outliers Report

Potential outliers are measurements that are extremely large or small relative to the rest of the data and, therefore, are suspected of misrepresenting the population from which they were collected. Potential outliers may result from transcription errors, data-coding errors, or measurement system problems. However, outliers may also represent true extreme values of a distribution and indicate more variability in the population than was expected.

Statistical outlier tests give probabilistic evidence that an extreme value does not "fit" with the distribution of the remainder of the data and is therefore a statistical outlier. These tests should only be used to identify data points that require further investigation. The tests alone cannot determine whether a statistical outlier should be discarded or corrected within a data set.

There are three steps involved in identifying extreme values or outliers:

1. Identify extreme values that may be potential outliers by generating the Outliers Report using the Sample Management System from data in the environmental database. The application compares the new data set (in standard environmental database units) with historical data and lists the new data that fall outside the historical data range. A determination is also made if the data are normally distributed using the Shapiro-Wilk Test.
2. Apply the appropriate statistical test. Dixon's Extreme Value test is used to test for statistical outliers when the sample size is less than or equal to 25. This test considers both extreme values that are much smaller than the rest of the data (case 1) and extreme values that are much larger than the rest of the data (case 2). This test is valid only if the data without the suspected outlier are normally distributed. Rosner's Test is a parametric test that is used to detect outliers for sample sizes of 25 or more. This test also assumes that the data without the suspected outliers are normally distributed.
3. Scientifically review statistical outliers and decide on their disposition. The review should include an evaluation of any notable trends in the data that may indicate the outliers represent true extreme values.

No results from this sampling event were identified as potential outliers.

Report Prepared By: _____

Stephen Donivan
Laboratory Coordinator

Data Validation Outliers Report - No Field Parameters
Comparison: All Historical Data
Laboratory: GEL Laboratories
RIN: 13015068
Report Date: 03/22/2013

					Current			**Historical Maximum**			**Historical Minimum**			**Number of Data Points**		**Statistical Outlier**
						Qualifiers			*Qualifiers*			*Qualifiers*				
Site Code	Location Code	Sample ID	Sample Date	Analyte	Result	*Lab*	*Data*	Result	*Lab*	*Data*	Result	*Lab*	*Data*	N	N Below Detect	
MND01	0138	N001	02/11/2013	Tritium	281	U		10000			479		FJ	41	0	No
MND01	0346	N001	02/12/2013	Tritium	494			4800			856		F	28	0	No
MND01	0347	N001	02/12/2013	Toluene	5.39			5	U		0.0582	J		39	37	No
MND01	0602	N001	02/11/2013	cis-1,2-Dichloroethene	42.3			38			1	U	U	20	1	No
MND01	0606	N001	02/11/2013	Tritium	3020			73594			3640			22	0	No

STATISTICAL TESTS:
The distribution of the data is tested for normality or lognormality using the Shapiro-Wilk Test
Outliers are identified using Dixon's Test when there are 25 or fewer data points.
Outliers are identified using Rosner's Test when there are 26 or more data points.
See Data Quality Assessment: Statistical Methods for Practitioners, EPA QC/G-9S, February 2006.

SAMPLE MANAGEMENT SYSTEM

General Data Validation Report

RIN: 13015068 **Lab Code:** GEN **Validator:** Stephen Donivan **Validation Date:** 03/22/2013

Project: Mound LTS&M Ground Water **Analysis Type:** ☐ Metals ☐ General Chem ☑ Rad ☑ Organics

# of Samples: 22 **Matrix:** Water **Requested Analysis Completed:** Yes

Chain of Custody

Present: OK **Signed:** OK **Dated:** OK

Sample

Integrity: OK **Preservation:** OK **Temperature:** OK

Select Quality Parameters

☑ Holding Times	All analyses were completed within the applicable holding times.
☑ Detection Limits	The reported detection limits are equal to or below contract requirements.
☑ Field/Trip Blanks	There was 1 trip/equipment blank evaluated.
☑ Field Duplicates	There was 1 duplicate evaluated.

SAMPLE MANAGEMENT SYSTEM

Validation Report: Equipment/Trip Blanks

RIN: 13015068 **Lab Code:** GEN **Project:** Mound LTS&M Ground Water **Validation Date:** 03/22/2013

Blank Data

Blank Type	Lab Sample ID	Lab Method	Analyte Name	Result	Qualifier	MDL	Units
Trip Blank	320388008	EPA 8260 Low Level	Acetone (Lab Contaminant)	1.09	J	0.500	ug/L

Sample ID	Sample Ticket	Location	Result	Dilution Factor	Lab Qualifier	Validation Qualifier
320388001	LCR 601	0138	0.500	1.00	U	
320388002	LCR 602	0386	0.950	1.00	J	U
320388003	LCR 603	0387	0.500	1.00	U	
320388004	LCR 604	0389	0.500	1.00	U	
320388005	LCR 605	0392	0.500	1.00	U	
320388006	LCR 606	0301	0.590	1.00	J	U
320388007	LCR 607	0311	0.500	1.00	U	
320388009	LCR 609	0118	0.670	1.00	J	U
320388010	LCR 610	0346	1.24	1.00	J	U
320388011	LCR 611	0379	0.500	1.00	U	
320388012	LCR 612	0347	0.750	1.00	J	U
320388013	LCR 613	0315	0.500	1.00	U	
320388014	LCR 614	0124	0.500	1.00	U	
320388015	LCR 615	0126	0.500	1.00	U	
320388016	LCR 616	0605	0.860	1.00	J	U
320388017	LCR 617	0607	1.59	1.00	J	U
320388018	LCR 618	0601	0.500	1.00	U	
320388019	LCR 619	0606	1.99	1.00	J	U
320388020	LCR 620	0602	2.31	1.00	J	U
320388021	LCR 621	0608	1.15	1.00	J	U
320388022	LCR 622	9347	0.500	1.00	U	

Blank Data

Blank Type	Lab Sample ID	Lab Method	Analyte Name	Result	Qualifier	MDL	Units
Trip Blank	320388008	EPA 8260 Low Level	Toluene (Lab Contaminant)	0.280	J	0.160	ug/L

Sample ID	Sample Ticket	Location	Result	Dilution Factor	Lab Qualifier	Validation Qualifier
320388001	LCR 601	0138	0.160	1.00	U	
320388002	LCR 602	0386	0.370	1.00	J	U
320388003	LCR 603	0387	0.160	1.00	U	
320388004	LCR 604	0389	0.160	1.00	U	
320388005	LCR 605	0392	1.72	1.00		U

SAMPLE MANAGEMENT SYSTEM

Validation Report: Equipment/Trip Blanks

RIN: 13015068 **Lab Code:** GEN **Project:** Mound LTS&M Ground Water **Validation Date:** 03/22/2013

Blank Data

Blank Type	Lab Sample ID	Lab Method	Analyte Name	Result	Qualifier	MDL	Units
Trip Blank	320388008		Toluene (Lab Contaminant)				

Sample ID	Sample Ticket	Location	Result	Dilution Factor	Lab Qualifier	Validation Qualifier
320388006	LCR 606	0301	0.320	1.00	J	U
320388007	LCR 607	0311	0.160	1.00	U	
320388009	LCR 609	0118	0.350	1.00	J	U
320388010	LCR 610	0346	0.350	1.00	J	U
320388011	LCR 611	0379	0.160	1.00	U	
320388012	LCR 612	0347	5.39	1.00		
320388013	LCR 613	0315	1.20	1.00		U
320388014	LCR 614	0124	0.180	1.00	J	U
320388015	LCR 615	0126	0.160	1.00	U	
320388016	LCR 616	0605	0.160	1.00	U	
320388017	LCR 617	0607	0.160	1.00	U	
320388018	LCR 618	0601	0.160	1.00	U	
320388019	LCR 619	0606	0.160	1.00	U	
320388020	LCR 620	0602	0.160	1.00	U	
320388021	LCR 621	0608	0.160	1.00	U	
320388022	LCR 622	9347	0.160	1.00	U	

SAMPLE MANAGEMENT SYSTEM

Validation Report: Field Duplicates

RIN: 13015068 **Lab Code:** GEN **Project:** Mound LTS&M Ground Water **Validation Date:** 03/22/2013

Duplicate: 9347 **Sample:** 0347

Analyte	Sample Result	Sample Flag	Sample Error	Sample Dilution	Duplicate Result	Duplicate Flag	Duplicate Error	Duplicate Dilution	RPD	RER	Units
1,1,1,2-Tetrachloroethane	0.160	U		1.00	0.160	U		1.00			ug/L
1,1,1-Trichloroethane	0.160	U		1.00	0.160	U		1.00			ug/L
1,1,2,2-Tetrachloroethane	0.160	U		1.00	0.160	U		1.00			ug/L
1,1,2-Trichloro-1,2,2-trifluoroethane	1.50	U		1.00	1.50	U		1.00			ug/L
1,1,2-Trichloroethane	0.160	U		1.00	0.160	U		1.00			ug/L
1,1-Dichloroethane	0.160	U		1.00	0.160	U		1.00			ug/L
1,1-Dichloroethene	0.160	U		1.00	0.160	U		1.00			ug/L
1,1-Dichloropropene	0.160	U		1.00	0.160	U		1.00			ug/L
1,2,3-Trichlorobenzene	0.200	U		1.00	0.200	U		1.00			ug/L
1,2,3-Trichloropropane	0.160	U		1.00	0.160	U		1.00			ug/L
1,2,4-Trichlorobenzene	0.160	U		1.00	0.160	U		1.00			ug/L
1,2,4-Trimethylbenzene	0.160	U		1.00	0.160	U		1.00			ug/L
1,2-Dibromo-3-chloropropane	0.160	U		1.00	0.160	U		1.00			ug/L
1,2-Dibromoethane	0.160	U		1.00	0.160	U		1.00			ug/L
1,2-Dichlorobenzene	0.160	U		1.00	0.160	U		1.00			ug/L
1,2-Dichloroethane	0.160	U		1.00	0.160	U		1.00			ug/L
1,2-Dichloropropane	0.160	U		1.00	0.160	U		1.00			ug/L
1,3,5-Trimethylbenzene	0.160	U		1.00	0.160	U		1.00			ug/L
1,3-Dichlorobenzene	0.160	U		1.00	0.160	U		1.00			ug/L
1,3-Dichloropropane	0.160	U		1.00	0.160	U		1.00			ug/L
1,4-Dichlorobenzene	0.160	U		1.00	0.160	U		1.00			ug/L
2,2-Dichloropropane	0.160	U		1.00	0.160	U		1.00			ug/L
2-Butanone	0.500	U		1.00	0.500	U		1.00			ug/L
2-Chlorotoluene	0.160	U		1.00	0.160	U		1.00			ug/L
2-Hexanone	0.500	U		1.00	0.500	U		1.00			ug/L
4-Chlorotoluene	0.160	U		1.00	0.160	U		1.00			ug/L
4-Isopropyltoluene	0.160	U		1.00	0.160	U		1.00			ug/L
4-Methyl-2-pentanone	0.500	U		1.00	0.500	U		1.00			ug/L
Acetone	0.750	J		1.00	0.500	U		1.00			ug/L
Benzene	0.160	U		1.00	0.160	U		1.00			ug/L
Bromobenzene	0.160	U		1.00	0.160	U		1.00			ug/L
Bromochloromethane	0.160	U		1.00	0.160	U		1.00			ug/L
Bromodichloromethane	0.160	U		1.00	0.160	U		1.00			ug/L
Bromoform	0.160	U		1.00	0.160	U		1.00			ug/L
Bromomethane	0.160	U		1.00	0.160	U		1.00			ug/L
Carbon Disulfide	0.500	U		1.00	0.500	U		1.00			ug/L
Carbon Tetrachloride	2.73			1.00	3.16			1.00	14.60		ug/L
Chlorobenzene	0.160	U		1.00	0.160	U		1.00			ug/L
Chloroethane	0.160	U		1.00	0.160	U		1.00			ug/L
Chloroform	0.740	J		1.00	0.810	J		1.00			ug/L

SAMPLE MANAGEMENT SYSTEM

Validation Report: Field Duplicates

RIN: 13015068 **Lab Code:** GEN **Project:** Mound LTS&M Ground Water **Validation Date:** 03/22/2013

Duplicate: 9347 **Sample:** 0347

Analyte	Sample Result	Sample Flag	Sample Error	Sample Dilution	Duplicate Result	Duplicate Flag	Duplicate Error	Duplicate Dilution	RPD	RER	Units
Chloromethane	0.160	U		1.00	0.160	U		1.00			ug/L
cis-1,2-Dichloroethene	0.160	U		1.00	0.160	U		1.00			ug/L
cis-1,3-Dichloropropene	0.160	U		1.00	0.160	U		1.00			ug/L
Dibromochloromethane	0.160	U		1.00	0.160	U		1.00			ug/L
Dibromomethane	0.160	U		1.00	0.160	U		1.00			ug/L
Dichlorodifluoromethane	0.160	U		1.00	0.160	U		1.00			ug/L
Ethylbenzene	0.160	U		1.00	0.160	U		1.00			ug/L
Hexachlorobutadiene	0.160	U		1.00	0.160	U		1.00			ug/L
Isopropylbenzene	0.160	U		1.00	0.160	U		1.00			ug/L
Methylene Chloride	0.430	BJ		1.00	1.16	BJ		1.00			ug/L
Naphthalene	0.160	U		1.00	0.160	U		1.00			ug/L
n-Butylbenzene	0.160	U		1.00	0.160	U		1.00			ug/L
n-Propylbenzene	0.160	U		1.00	0.160	U		1.00			ug/L
sec-Butylbenzene	0.160	U		1.00	0.160	U		1.00			ug/L
Styrene	0.160	U		1.00	0.160	U		1.00			ug/L
tert-Butylbenzene	0.160	U		1.00	0.160	U		1.00			ug/L
Tetrachloroethene	0.160	U		1.00	0.160	U		1.00			ug/L
Toluene	5.39			1.00	0.160	U		1.00			ug/L
Total Xylenes	0.160	U		1.00	0.160	U		1.00			ug/L
trans-1,2-Dichloroethene	0.160	U		1.00	0.160	U		1.00			ug/L
trans-1,3-Dichloropropene	0.160	U		1.00	0.160	U		1.00			ug/L
Trichloroethene	27.5			1.00	32.4			1.00	16.36		ug/L
Trichlorofluoromethane	0.160	U		1.00	0.160	U		1.00			ug/L
Tritium	3420		828	1.00	4720		1100	1.00	31.94	1.9	pCi/L
Vinyl Chloride	0.160	U		1.00	0.160	U		1.00			ug/L

SAMPLE MANAGEMENT SYSTEM
Organics Data Validation Summary

RIN: 13015068 **Project:** Mound LTS&M Ground Water **Lab Code:** GEN **Validation Date:** 03/22/2013

LCS Recovery: All LCS recoveries were within the laboratory acceptance limits.

Method Blank(s): There were 3 method blank results above the MDL.

MS/MSD Recovery: There were 2 MS/MSD failures.

Surrogate Recovery: All surrogate recoveries were within the laboratory acceptance limits.

SAMPLE MANAGEMENT SYSTEM

Non-Compliance Report: MS/MSD Performance

RIN: 13015068 **Lab Code:** GEN

Project: Mound LTS&M Ground Water

Validation Date: 03/22/2013

MS/MSD	Date Analyzed	Method	Analyte	Recovery MS	Recovery MSD	Lower Limit	Upper Limit	MSD RPD	RPD Limit
LCR 612	02/20/2013	EPA 8260 Low Level	Toluene	59.9	64.3	79.0	120.0	5.00	30.0

SAMPLE MANAGEMENT SYSTEM

Non-Compliance Report: Method Blanks

RIN: 13015068 **Lab Code:** GEN

Project: Mound LTS&M Ground Water

Validation Date: 03/22/2013

Method Blank	Date Analyzed	Method	Analyte	Result	Flag(s)	MDL
1202830569	02/19/2013	EPA 8260 Low Level	Methylene Chloride	0.35	J	0.16
1202832494	02/19/2013	EPA 8260 Low Level	Methylene Chloride	0.35	J	0.16
1202835215	02/20/2013	EPA 8260 Low Level	Methylene Chloride	0.42	J	0.16

SAMPLE MANAGEMENT SYSTEM
Radiochemistry Data Validation Worksheet

RIN: 13015068 **Lab Code:** GEN **Date Due:** 03/14/2013

Matrix: Water **Site Code:** MND03 **Date Completed:** 03/14/2013

Sample	Analyte	Date Analyzed	Result	Flag	Tracer %R	LCS %R	MS %R	Duplicate
Blank_Spike	Tritium	02/26/2013				104.00		
Blank	Tritium	02/26/2013	37.8000	U				
0347	Tritium	02/27/2013						1.37
0347	Tritium	02/27/2013					122.0	

Data Review and Validation Report

General Information

Requisition No. (RIN):	13015069
Sample Event:	February 11–14, 2013
Site(s):	Mound, Ohio; Groundwater
Laboratory:	GEL Laboratories, Charleston, South Carolina
Work Order No.:	320465
Analysis:	Volatiles
Validator:	Steve Donivan
Review Date:	March 27, 2013

This validation was performed according to the *Environmental Procedures Catalog* (LMS/PRO/S04325), *"Standard Practice for Validation of Laboratory Data."* The procedure was applied at Level 2, Data Deliverables Verification. See attached Data Validation Worksheets for supporting documentation on the data review and validation. All analyses were successfully completed. The samples were prepared and analyzed using accepted procedures based on methods specified by line item code, which are listed in Table 1.

Table 1. Analytes and Methods

Analyte	Line Item Code	Prep Method	Analytical Method
Volatile Organics, VOA	VOA-A-007	SW-846 5030B	SW-846 8260B

Data Qualifier Summary

Analytical results were qualified as listed in Table 2. Refer to the sections below for an explanation of the data qualifiers applied.

Table 2. Data Qualifier Summary

Sample Number	Location	Analyte(s)	Flag	Reason
All	All	Methylene Chloride	U	Less than 10 times the method blank
320465001	0353	Acetone	U	Less than 10 times the method blank
320465002	0400	Acetone	U	Less than 10 times the method blank
320465004	0411	Acetone	U	Less than 10 times the method blank

Sample Shipping/Receiving

GEL Laboratories in Charleston, South Carolina, received 11 water samples on February 15, 2013, accompanied by a Chain of Custody (COC) form. The COC form was checked to confirm that all of the samples were listed with sample collection dates and times, and that signatures and dates were present indicating sample relinquishment and receipt. The COC form was complete with no errors or omissions. The air waybill number was listed on the receiving documentation.

Preservation and Holding Times

The sample shipments were received intact with the temperature inside the iced cooler of 2 °C, which complies with requirements. All samples were received in the correct container types and had been preserved correctly for the requested analyses. Sample analysis was completed within the applicable holding times.

Detection and Quantitation Limits

The method detection limit (MDL) was reported for all organic analytes as required. The MDL, as defined in 40 CFR 136, is the minimum concentration of an analyte that can be measured and reported with 99% confidence that the analyte concentration is greater than zero. The practical quantitation limit (PQL) for these analytes is the lowest concentration that can be reliably measured, and is defined as 5 times the MDL.

The reported MDLs for all organic analytes demonstrate compliance with contractual requirements.

Laboratory Instrument Calibration

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing acceptable qualitative and quantitative data for all analytes. Initial calibration demonstrates that the instrument is capable of acceptable performance in the beginning of the analytical run. Compliance requirements for continuing calibration checks are established to ensure that the instrument continues to be capable of producing acceptable qualitative and quantitative data. All laboratory instrument calibrations were performed correctly in accordance with the cited methods. All calibration and laboratory spike standards were prepared from independent sources.

Volatiles Internal Standards and Surrogates

The volatile internal standard recoveries and surrogate recoveries were within the acceptance ranges for all samples.

Method Blanks

Method blanks are analyzed to assess any contamination that may have occurred during sample preparation. The method blank results were below the practical quantitation limits. Methylene chloride was detected in a the VOA method blanks. Associated sample results that are greater

than the MDL but less than ten times the blank concentration are qualified with a “U” flag as not detected.

Trip Blank

A trip blank was collected to document contamination attributable to shipping and field handling procedures. This type of blank is useful in documenting contamination of volatile organic samples. Acetone and chloroform were detected in the trip blank. Chloroform was not detected in any of the associated samples. The associated sample acetone results that are greater than the MDL but less than ten times the blank concentration are qualified with a “U” flag as not detected.

Matrix Spike Analysis

Matrix spike and matrix spike duplicate (MS/MSD) samples are used to measure method performance in the sample matrix. The MS/MSD data are not evaluated when the concentration of the unspiked sample is greater than four times the spike. The spike recoveries met the acceptance criteria for all analytes evaluated with the following exception. The spike recovery of 1,2-dichloroethane from sample 0411 did not meet the acceptance criteria. 1,2-Dichloroethane was not detected in the associated sample or duplicate.

Laboratory Replicate Analysis

Laboratory replicate analyses are used to determine laboratory precision for each sample matrix. The relative percent difference for organic replicate results were less than the laboratory-derived control limits, demonstrating acceptable laboratory precision.

Laboratory Control Sample

Laboratory control samples (LCS) were analyzed at the correct frequency to provide information on the accuracy of the analytical method and the overall laboratory performance, including sample preparation. All control sample results were acceptable with the exception of the methylene chloride result. The associated sample methylene chloride results that are greater than the MDL are qualified with a “J” flag as estimated values.

Field Duplicate

Field duplicate samples are collected and analyzed as an indication of overall precision of the measurement process. The precision observed includes both field and laboratory precision and has more variability than laboratory duplicates, which measure only laboratory performance. The relative percent difference for duplicate results that are greater than five times the practical quantitation limit (PQL) should be less than 20 percent. For results that are less than five times the PQL, the range should be no greater than the PQL. A duplicate sample was collected from location 0411 (field duplicate ID 9411). The duplicate results met the criteria, demonstrating acceptable overall precision.

Completeness

Results were reported in the correct units for all analytes requested using contract-required laboratory qualifiers.

Electronic Data Deliverable File

The EDD file arrived on March 18, 2013. The Sample Management System EDD validation module was used to verify that the EDD file was complete and in compliance with requirements. The module compares the contents of the file to the requested analyses to ensure all and only the requested data are delivered. The contents of the EDD were manually examined to verify that the sample results accurately reflect the data contained in the sample data package.

Sampling Protocol

Sample results for all monitoring wells were the Category I low-flow sampling criteria was documented and were qualified with an “F” flag in the database, indicating the wells were purged and sampled using the low-flow sampling method. Sample results form well 0444 and 0445 were further qualified with a “Q” flag because these were Category II wells.

Outliers Report

Potential outliers are measurements that are extremely large or small relative to the rest of the data and, therefore, are suspected of misrepresenting the population from which they were collected. Potential outliers may result from transcription errors, data-coding errors, or measurement system problems. However, outliers may also represent true extreme values of a distribution and indicate more variability in the population than was expected.

Statistical outlier tests give probabilistic evidence that an extreme value does not "fit" with the distribution of the remainder of the data and is therefore a statistical outlier. These tests should only be used to identify data points that require further investigation. The tests alone cannot determine whether a statistical outlier should be discarded or corrected within a data set.

There are three steps involved in identifying extreme values or outliers:

1. Identify extreme values that may be potential outliers by generating the Outliers Report using the Sample Management System from data in the environmental database. The application compares the new data set (in standard environmental database units) with historical data and lists the new data that fall outside the historical data range. A determination is also made if the data are normally distributed using the Shapiro-Wilk Test.
2. Apply the appropriate statistical test. Dixon's Extreme Value test is used to test for statistical outliers when the sample size is less than or equal to 25. This test considers both extreme values that are much smaller than the rest of the data (case 1) and extreme values that are much larger than the rest of the data (case 2). This test is valid only if the data without the suspected outlier are normally distributed. Rosner's Test is a parametric test that is used to detect outliers for sample sizes of 25 or more. This test also assumes that the data without the suspected outliers are normally distributed.

3. Scientifically review statistical outliers and decide on their disposition. The review should include an evaluation of any notable trends in the data that may indicate the outliers represent true extreme values.

The cis-1,2-dichloroethene result form location 0411 was identified as a potential outlier. There were not errors noted during the further review of the data for this sample. Additionally, location 0411 was sampled and analyzed in duplicate with comparable results. The data from this event are acceptable as qualified.

Report Prepared By: _____

Stephen Donivan
Laboratory Coordinator

Data Validation Outliers Report - No Field Parameters
Comparison: All Historical Data
Laboratory: GEL Laboratories
RIN: 13015069
Report Date: 03/27/2013

					Current			**Historical Maximum**			**Historical Minimum**			**Number of Data Points**		**Statistical Outlier**
						Qualifiers			*Qualifiers*			*Qualifiers*				
Site Code	Location Code	Sample ID	Sample Date	Analyte	Result	*Lab*	*Data*	Result	*Lab*	*Data*	Result	*Lab*	*Data*	N	N Below Detect	
MND01	0353	N001	02/13/2013	Toluene	5.14			5	U		0.056	U		19	18	No
MND01	0411	N001	02/14/2013	cis-1,2-Dichloroethene	4.71			3.97		FQ	1.33			16	0	Yes

STATISTICAL TESTS:
The distribution of the data is tested for normality or lognormality using the Shapiro-Wilk Test
Outliers are identified using Dixon's Test when there are 25 or fewer data points.
Outliers are identified using Rosner's Test when there are 26 or more data points.
See Data Quality Assessment: Statistical Methods for Practitioners, EPA QC/G-9S, February 2006.

SAMPLE MANAGEMENT SYSTEM

General Data Validation Report

RIN: 13015069 **Lab Code:** GEN **Validator:** Stephen Donivan **Validation Date:** 03/27/2013

Project: Mound LTS&M Ground Water **Analysis Type:** ☐ Metals ☐ General Chem ☐ Rad ☑ Organics

# of Samples: 11 **Matrix:** Water **Requested Analysis Completed:** Yes

Chain of Custody

Present: OK **Signed:** OK **Dated:** OK

Sample

Integrity: OK **Preservation:** OK **Temperature:** OK

Select Quality Parameters

☑ Holding Times	All analyses were completed within the applicable holding times.
☑ Detection Limits	The reported detection limits are equal to or below contract requirements.
☑ Field/Trip Blanks	There was 1 trip/equipment blank evaluated.
☑ Field Duplicates	There was 1 duplicate evaluated.

SAMPLE MANAGEMENT SYSTEM

Validation Report: Equipment/Trip Blanks

RIN: 13015069 **Lab Code:** GEN **Project:** Mound LTS&M Ground Water **Validation Date:** 03/27/2013

Blank Data

Blank Type	Lab Sample ID	Lab Method	Analyte Name	Result	Qualifier	MDL	Units
Trip Blank	320465011	EPA 8260 Low Level	Acetone (Lab Contaminant)	0.520	J	0.500	ug/L

Sample ID	Sample Ticket	Location	Result	Dilution Factor	Lab Qualifier	Validation Qualifier
320465001	LCR 623	0353	0.920	1.00	J	U
320465002	LCR 624	0400	0.650	1.00	J	U
320465003	LCR 625	0402	0.500	1.00	U	
320465004	LCR 626	0411	0.750	1.00	J	U
320465005	LCR 627	0443	0.500	1.00	U	
320465006	LCR 628	0444	0.500	1.00	U	
320465007	LCR 629	0445	0.500	1.00	U	
320465008	LCR 630	0617	0.500	1.00	U	
320465009	LCR 631	9411	0.500	1.00	U	
320465010	LCR 632	P033	0.500	1.00	U	

Blank Data

Blank Type	Lab Sample ID	Lab Method	Analyte Name	Result	Qualifier	MDL	Units
Trip Blank	320465011	EPA 8260 Low Level	Chloroform	0.200	J	0.160	ug/L

Sample ID	Sample Ticket	Location	Result	Dilution Factor	Lab Qualifier	Validation Qualifier
320465001	LCR 623	0353	0.160	1.00	U	
320465002	LCR 624	0400	0.160	1.00	U	
320465003	LCR 625	0402	0.160	1.00	U	
320465004	LCR 626	0411	0.160	1.00	U	
320465005	LCR 627	0443	0.160	1.00	U	
320465006	LCR 628	0444	0.160	1.00	U	
320465007	LCR 629	0445	0.160	1.00	U	
320465008	LCR 630	0617	0.160	1.00	U	
320465009	LCR 631	9411	0.160	1.00	U	
320465010	LCR 632	P033	0.160	1.00	U	

SAMPLE MANAGEMENT SYSTEM

Validation Report: Field Duplicates

RIN: 13015069 **Lab Code:** GEN **Project:** Mound LTS&M Ground Water **Validation Date:** 03/27/2013

Duplicate: 9411 **Sample:** 0411

Analyte	Sample Result	Sample Flag	Sample Error	Sample Dilution	Duplicate Result	Duplicate Flag	Duplicate Error	Duplicate Dilution	RPD	RER	Units
1,1,1,2-Tetrachloroethane	0.160	U		1.00	0.160	U		1.00			ug/L
1,1,1-Trichloroethane	0.160	U		1.00	0.160	U		1.00			ug/L
1,1,2,2-Tetrachloroethane	0.160	U		1.00	0.160	U		1.00			ug/L
1,1,2-Trichloro-1,2,2-trifluoroethane	1.50	U		1.00	1.50	U		1.00			ug/L
1,1,2-Trichloroethane	0.160	U		1.00	0.160	U		1.00			ug/L
1,1-Dichloroethane	0.160	U		1.00	0.160	U		1.00			ug/L
1,1-Dichloroethene	0.160	U		1.00	0.160	U		1.00			ug/L
1,1-Dichloropropene	0.160	U		1.00	0.160	U		1.00			ug/L
1,2,3-Trichlorobenzene	0.200	U		1.00	0.200	U		1.00			ug/L
1,2,3-Trichloropropane	0.160	U		1.00	0.160	U		1.00			ug/L
1,2,4-Trichlorobenzene	0.160	U		1.00	0.160	U		1.00			ug/L
1,2,4-Trimethylbenzene	0.160	U		1.00	0.160	U		1.00			ug/L
1,2-Dibromo-3-chloropropane	0.160	U		1.00	0.160	U		1.00			ug/L
1,2-Dibromoethane	0.160	U		1.00	0.160	U		1.00			ug/L
1,2-Dichlorobenzene	0.160	U		1.00	0.160	U		1.00			ug/L
1,2-Dichloroethane	0.160	U		1.00	0.160	U		1.00			ug/L
1,2-Dichloropropane	0.160	U		1.00	0.160	U		1.00			ug/L
1,3,5-Trimethylbenzene	0.160	U		1.00	0.160	U		1.00			ug/L
1,3-Dichlorobenzene	0.160	U		1.00	0.160	U		1.00			ug/L
1,3-Dichloropropane	0.160	U		1.00	0.160	U		1.00			ug/L
1,4-Dichlorobenzene	0.160	U		1.00	0.160	U		1.00			ug/L
2,2-Dichloropropane	0.160	U		1.00	0.160	U		1.00			ug/L
2-Butanone	0.500	U		1.00	0.500	U		1.00			ug/L
2-Chlorotoluene	0.160	U		1.00	0.160	U		1.00			ug/L
2-Hexanone	0.500	U		1.00	0.500	U		1.00			ug/L
4-Chlorotoluene	0.160	U		1.00	0.160	U		1.00			ug/L
4-Isopropyltoluene	0.160	U		1.00	0.160	U		1.00			ug/L
4-Methyl-2-pentanone	0.500	U		1.00	0.500	U		1.00			ug/L
Acetone	0.500	J		1.00	0.500	U		1.00			ug/L
Benzene	0.160	U		1.00	0.160	U		1.00			ug/L
Bromobenzene	0.160	U		1.00	0.160	U		1.00			ug/L
Bromochloromethane	0.160	U		1.00	0.160	U		1.00			ug/L
Bromodichloromethane	0.160	U		1.00	0.160	U		1.00			ug/L
Bromoform	0.160	U		1.00	0.160	U		1.00			ug/L
Bromomethane	0.160	U		1.00	0.160	U		1.00			ug/L
Carbon Disulfide	0.500	U		1.00	0.500	U		1.00			ug/L
Carbon Tetrachloride	0.160	U		1.00	0.160	U		1.00			ug/L
Chlorobenzene	0.160	U		1.00	0.160	U		1.00			ug/L
Chloroethane	0.160	U		1.00	0.160	U		1.00			ug/L
Chloroform	0.160	U		1.00	0.160	U		1.00			ug/L

SAMPLE MANAGEMENT SYSTEM

Validation Report: Field Duplicates

RIN: 13015069 **Lab Code:** GEN **Project:** Mound LTS&M Ground Water **Validation Date:** 03/27/2013

Duplicate: 9411 **Sample:** 0411

Analyte	Sample Result	Sample Flag	Sample Error	Sample Dilution	Duplicate Result	Duplicate Flag	Duplicate Error	Duplicate Dilution	RPD	RER	Units
Chloromethane	0.160	U		1.00	0.160	U		1.00			ug/L
cis-1,2-Dichloroethene	4.71			1.00	4.62			1.00	1.93		ug/L
cis-1,3-Dichloropropene	0.160	U		1.00	0.160	U		1.00			ug/L
Dibromochloromethane	0.160	U		1.00	0.160	U		1.00			ug/L
Dibromomethane	0.160	U		1.00	0.160	U		1.00			ug/L
Dichlorodifluoromethane	0.160	U		1.00	0.160	U		1.00			ug/L
Ethylbenzene	0.160	U		1.00	0.160	U		1.00			ug/L
Hexachlorobutadiene	0.160	U		1.00	0.160	U		1.00			ug/L
Isopropylbenzene	0.160	U		1.00	0.160	U		1.00			ug/L
Methylene Chloride	0.160	U		1.00	0.160	U		1.00			ug/L
Naphthalene	0.160	U		1.00	0.160	U		1.00			ug/L
n-Butylbenzene	0.160	U		1.00	0.160	U		1.00			ug/L
n-Propylbenzene	0.160	U		1.00	0.160	U		1.00			ug/L
sec-Butylbenzene	0.160	U		1.00	0.160	U		1.00			ug/L
Styrene	0.160	U		1.00	0.160	U		1.00			ug/L
tert-Butylbenzene	0.160	U		1.00	0.160	U		1.00			ug/L
Tetrachloroethene	0.160	U		1.00	0.160	U		1.00			ug/L
Toluene	0.740	J		1.00	0.230	J		1.00			ug/L
Total Xylenes	0.160	U		1.00	0.160	U		1.00			ug/L
trans-1,2-Dichloroethene	0.160	U		1.00	0.160	U		1.00			ug/L
trans-1,3-Dichloropropene	0.160	U		1.00	0.160	U		1.00			ug/L
Trichloroethene	12.5			1.00	11.8			1.00	5.76		ug/L
Trichlorofluoromethane	0.160	U		1.00	0.160	U		1.00			ug/L
Vinyl Chloride	0.160	U		1.00	0.160	U		1.00			ug/L

SAMPLE MANAGEMENT SYSTEM
Organics Data Validation Summary

RIN: 13015069 **Project:** Mound LTS&M Ground Water **Lab Code:** GEN **Validation Date:** 03/27/2013

LCS Recovery: All LCS recoveries were within the laboratory acceptance limits.

Method Blank(s): There were 2 method blank results above the MDL.

MS/MSD Recovery: There was 1 MS/MSD failure.

Surrogate Recovery: All surrogate recoveries were within the laboratory acceptance limits.

SAMPLE MANAGEMENT SYSTEM

Non-Compliance Report: MS/MSD Performance

RIN: 13015069 **Lab Code:** GEN

Project: Mound LTS&M Ground Water

Validation Date: 03/27/2013

MS/MSD	Date Analyzed	Method	Analyte	Recovery MS	Recovery MSD	Lower Limit	Upper Limit	MSD RPD	RPD Limit
LCR 626	02/20/2013	EPA 8260 Low Level	1,2-Dichloroethane	114.0	125.0	76.0	121.0	9.00	30.0

SAMPLE MANAGEMENT SYSTEM

Non-Compliance Report: Method Blanks

RIN: 13015069 **Lab Code:** GEN

Project: Mound LTS&M Ground Water

Validation Date: 03/27/2013

Method Blank	Date Analyzed	Method	Analyte	Result	Flag(s)	MDL
1202835215	02/20/2013	EPA 8260 Low Level	Methylene Chloride	0.42	J	0.16
1202835216	02/22/2013	EPA 8260 Low Level	Methylene Chloride	0.41	J	0.16

Data Review and Validation Report

General Information

Requisition No. (RIN):	13055358
Sample Event:	May 28–30, 2013
Site(s):	Mound, Ohio; Groundwater
Laboratory:	GEL Laboratories, Charleston, South Carolina
Work Order No.:	326762
Analysis:	Volatiles
Validator:	Stephen Donivan
Review Date:	August 6, 2013

This validation was performed according to the *Environmental Procedures Catalog* (LMS/POL/S04325), *"Standard Practice for Validation of Environmental Data."* The procedure was applied at Level 2, Data Deliverables Verification. See attached Data Validation Worksheets for supporting documentation on the data review and validation. All analyses were successfully completed. The samples were prepared and analyzed using accepted procedures based on methods specified by line item code, which are listed in Table 1.

Table 1. Analytes and Methods

Analyte	Line Item Code	Prep Method	Analytical Method
Volatile Organics, VOA	VOA-A-007	SW-846 5030B	SW-846 8260B

Data Qualifier Summary

Analytical results were qualified as listed in Table 2. Refer to the sections below for an explanation of the data qualifiers applied.

Table 2. Data Qualifier Summary

Sample Number	Location	Analyte(s)	Flag	Reason
326762001	0138	Methylene Chloride	U	Less than 10 times the method blank
326762002	0386	Methylene Chloride	U	Less than 10 times the method blank
326762003	0387	Methylene Chloride	U	Less than 10 times the method blank
326762004	0389	All	J	Turbidity requirement

Sample Number	Location	Analyte(s)	Flag	Reason
326762004	0389	Methylene Chloride	U	Less than 10 times the method blank
326762005	0392	Methylene Chloride	U	Less than 10 times the method blank
326762006	0301	Methylene Chloride	U	Less than 10 times the method blank
326762007	0311	Methylene Chloride	U	Less than 10 times the method blank
326762009	0118	Methylene Chloride	U	Less than 10 times the method blank
326762010	0346	All	J	Turbidity requirement
326762019	0606	Acetone	U	Less than 10 times the method blank

Sample Shipping/Receiving

GEL Laboratories in Charleston, South Carolina, received 11 water samples on February 15, 2013, accompanied by a Chain of Custody (COC) form. The COC form was checked to confirm that all of the samples were listed with sample collection dates and times, and that signatures and dates were present indicating sample relinquishment and receipt. The COC form was complete with no errors or omissions with the following exception. On the COC, ticket number LGU 834 was associated with location 0602, but it should have been 0601. A revised COC was sent to the laboratory. The air waybill number was listed on the receiving documentation.

Preservation and Holding Times

The sample shipments were received intact with the temperature inside the iced cooler of 4 °C, which complies with requirements. One vial each for samples 0138 and 0379 was received broken, but there was sufficient remaining volume for analysis. All samples were received in the correct container types and had been preserved correctly for the requested analyses. Sample analysis was completed within the applicable holding times.

Detection and Quantitation Limits

The method detection limit (MDL) was reported for all organic analytes as required. The MDL, as defined in 40 CFR 136, is the minimum concentration of an analyte that can be measured and reported with 99% confidence that the analyte concentration is greater than zero. The practical quantitation limit (PQL) for these analytes is the lowest concentration that can be reliably measured, and is defined as 5 times the MDL.

The reported MDLs for all organic analytes demonstrate compliance with contractual requirements.

Laboratory Instrument Calibration

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing acceptable qualitative and quantitative data for all analytes. Initial calibration demonstrates that the instrument is capable of acceptable performance in the beginning of the analytical run. Compliance requirements for continuing calibration checks are established to ensure that the instrument continues to be capable of producing acceptable qualitative and quantitative data. All laboratory instrument calibrations were performed correctly

in accordance with the cited methods. All calibration and laboratory spike standards were prepared from independent sources.

Volatiles Internal Standards and Surrogates

The volatile internal standard recoveries and surrogate recoveries were within the acceptance ranges for all samples.

Method Blanks

Method blanks are analyzed to assess any contamination that may have occurred during sample preparation. The method blank results were below the MDLs.

Trip Blank

A trip blank was collected to document contamination attributable to shipping and field handling procedures. This type of blank is useful in documenting contamination of volatile organic samples. Acetone, 2-butanone, and methylene chloride were detected in the trip blank. The associated sample results for these analytes that are greater than the MDL but less than ten times the blank concentration are qualified with a "U" flag as not detected.

Matrix Spike Analysis

Matrix spike and matrix spike duplicate (MS/MSD) samples are used to measure method performance in the sample matrix. The MS/MSD data are not evaluated when the concentration of the unspiked sample is greater than four times the spike. The spike recoveries met the acceptance criteria for all analytes evaluated.

Laboratory Replicate Analysis

Laboratory replicate analyses are used to determine laboratory precision for each sample matrix. The relative percent difference for organic replicate results were less than the laboratory-derived control limits, demonstrating acceptable laboratory precision.

Laboratory Control Sample

Laboratory control samples (LCS) were analyzed at the correct frequency to provide information on the accuracy of the analytical method and the overall laboratory performance, including sample preparation. All control sample results were acceptable.

Field Duplicate

Field duplicate samples are collected and analyzed as an indication of overall precision of the measurement process. The precision observed includes both field and laboratory precision and has more variability than laboratory duplicates, which measure only laboratory performance. The relative percent difference for duplicate results that are greater than five times the practical quantitation limit (PQL) should be less than 20 percent. For results that are less than five times the PQL, the range should be no greater than the PQL. A duplicate sample was collected from

location 0379 (field duplicate ID 9379). The duplicate results met the criteria, demonstrating acceptable overall precision.

Completeness

Results were reported in the correct units for all analytes requested using contract-required laboratory qualifiers.

Electronic Data Deliverable File

The EDD file arrived on July 1, 2013. The Sample Management System EDD validation module was used to verify that the EDD file was complete and in compliance with requirements. The module compares the contents of the file to the requested analyses to ensure all and only the requested data are delivered. The contents of the EDD were manually examined to verify that the sample results accurately reflect the data contained in the sample data package.

Sampling Protocol

Sample results for all monitoring wells were the Category I low-flow sampling criteria was documented and were qualified with an “F” flag in the database, indicating the wells were purged and sampled using the low-flow sampling method. The turbidity criterion was not met for wells 0346 and 0389. The field data and laboratory results are further qualified with a “J” flag because the Category I purging criteria from Program Directive MND-2013-01 were not met.

Outliers Report

Potential outliers are measurements that are extremely large or small relative to the rest of the data and, therefore, are suspected of misrepresenting the population from which they were collected. Potential outliers may result from transcription errors, data-coding errors, or measurement system problems. However, outliers may also represent true extreme values of a distribution and indicate more variability in the population than was expected.

Statistical outlier tests give probabilistic evidence that an extreme value does not "fit" with the distribution of the remainder of the data and is therefore a statistical outlier. These tests should only be used to identify data points that require further investigation. The tests alone cannot determine whether a statistical outlier should be discarded or corrected within a data set.

There are three steps involved in identifying extreme values or outliers:

1. Identify extreme values that may be potential outliers by generating the Outliers Report using the Sample Management System from data in the environmental database. The application compares the new data set (in standard environmental database units) with historical data and lists the new data that fall outside the historical data range. A determination is also made if the data are normally distributed using the Shapiro-Wilk Test.
2. Apply the appropriate statistical test. Dixon's Extreme Value test is used to test for statistical outliers when the sample size is less than or equal to 25. This test considers both extreme values that are much smaller than the rest of the data (case 1) and extreme

values that are much larger than the rest of the data (case 2). This test is valid only if the data without the suspected outlier are normally distributed. Rosner's Test is a parametric test that is used to detect outliers for sample sizes of 25 or more. This test also assumes that the data without the suspected outliers are normally distributed.

3. Scientifically review statistical outliers and decide on their disposition. The review should include an evaluation of any notable trends in the data that may indicate the outliers represent true extreme values.

There were no data identified as a potential outliers.

Report Prepared By: _____

Stephen Donivan
Laboratory Coordinator

Data Validation Outliers Report - No Field Parameters
Comparison: All historical Data Beginning 01/01/2003
Laboratory: GEL Laboratories
RIN: 13055358
Report Date: 08/06/2013

					Current			**Historical Maximum**			**Historical Minimum**			**Number of Data Points**		**Statistical Outlier**
						Qualifiers			*Qualifiers*			*Qualifiers*				
Site Code	Location Code	Sample ID	Sample Date	Analyte	Result	*Lab*	*Data*	Result	*Lab*	*Data*	Result	*Lab*	*Data*	N	N Below Detect	
MND01	0606	N001	05/30/2013	Toluene	0.24	J		0.2	J	U	0.1	U		13	13	NA

STATISTICAL TESTS:
The distribution of the data is tested for normality or lognormality using the Shapiro-Wilk Test
Outliers are identified using Dixon's Test when there are 25 or fewer data points.
Outliers are identified using Rosner's Test when there are 26 or more data points.
See Data Quality Assessment: Statistical Methods for Practitioners, EPA QC/G-9S, February 2006.

SAMPLE MANAGEMENT SYSTEM

General Data Validation Report

RIN: 13055358 **Lab Code:** GEN **Validator:** Stephen Donivan **Validation Date:** 08/06/2013

Project: Mound LTS&M Ground Water **Analysis Type:** ☐ Metals ☐ General Chem ☐ Rad ☑ Organics

# of Samples: 21 **Matrix:** Water **Requested Analysis Completed:** Yes

Chain of Custody

Present: OK **Signed:** OK **Dated:** OK

Sample

Integrity: OK **Preservation:** OK **Temperature:** OK

Select Quality Parameters

☑ Holding Times	All analyses were completed within the applicable holding times.
☑ Detection Limits	The reported detection limits are equal to or below contract requirements.
☑ Field/Trip Blanks	There was 1 trip/equipment blank evaluated.
☑ Field Duplicates	There was 1 duplicate evaluated.

SAMPLE MANAGEMENT SYSTEM

Validation Report: Equipment/Trip Blanks

RIN: 13055358 **Lab Code:** GEN **Project:** Mound LTS&M Ground Water **Validation Date:** 08/06/2013

Blank Data

Blank Type	Lab Sample ID	Lab Method	Analyte Name	Result	Qualifier	MDL	Units
Trip Blank	326762008	EPA 8260 Low Level	2-Butanone (Lab Contaminant)	1.86	J	0.500	ug/L

Sample ID	Sample Ticket	Location	Result	Dilution Factor	Lab Qualifier	Validation Qualifier
326762001	LGU 817	0138	0.500	1.00	U	
326762002	LGU 818	0386	0.500	1.00	U	
326762003	LGU 819	0387	0.500	1.00	U	
326762004	LGU 820	0389	0.500	1.00	U	
326762005	LGU 821	0392	0.500	1.00	U	
326762006	LGU 822	0301	0.500	1.00	U	
326762007	LGU 823	0311	0.500	1.00	U	
326762009	LGU 825	0118	0.500	1.00	U	
326762010	LGU 826	0346	0.500	1.00	U	
326762011	LGU 827	0379	0.500	1.00	U	
326762012	LGU 828	0347	0.500	1.00	U	
326762013	LGU 829	0315	0.500	1.00	U	
326762014	LGU 830	0124	0.500	1.00	U	
326762015	LGU 831	0126	0.500	1.00	U	
326762016	LGU 832	0605	0.500	1.00	U	
326762017	LGU 833	0607	0.500	1.00	U	
326762018	LGU 834	0601	0.500	1.00	U	
326762019	LGU 835	0606	0.500	1.00	U	
326762020	LGU 837	0608	0.500	1.00	U	
326762021	LGU 838	9379	0.500	1.00	U	

Blank Data

Blank Type	Lab Sample ID	Lab Method	Analyte Name	Result	Qualifier	MDL	Units
Trip Blank	326762008	EPA 8260 Low Level	Acetone (Lab Contaminant)	8.18	J	0.500	ug/L

Sample ID	Sample Ticket	Location	Result	Dilution Factor	Lab Qualifier	Validation Qualifier
326762001	LGU 817	0138	0.500	1.00	U	
326762002	LGU 818	0386	0.500	1.00	U	
326762003	LGU 819	0387	0.500	1.00	U	
326762004	LGU 820	0389	0.500	1.00	U	
326762005	LGU 821	0392	0.500	1.00	U	
326762006	LGU 822	0301	0.500	1.00	U	

SAMPLE MANAGEMENT SYSTEM

Validation Report: Equipment/Trip Blanks

RIN: 13055358 **Lab Code:** GEN **Project:** Mound LTS&M Ground Water **Validation Date:** 08/06/2013

Blank Data

Blank Type	Lab Sample ID	Lab Method	Analyte Name	Result	Qualifier	MDL	Units
Trip Blank	326762008		Acetone (Lab Contaminant)				

Sample ID	Sample Ticket	Location	Result	Dilution Factor	Lab Qualifier	Validation Qualifier
326762007	LGU 823	0311	0.500	1.00	U	
326762009	LGU 825	0118	0.500	1.00	U	
326762010	LGU 826	0346	0.500	1.00	U	
326762011	LGU 827	0379	0.500	1.00	U	
326762012	LGU 828	0347	0.500	1.00	U	
326762013	LGU 829	0315	0.500	1.00	U	
326762014	LGU 830	0124	0.500	1.00	U	
326762015	LGU 831	0126	0.500	1.00	U	
326762016	LGU 832	0605	0.500	1.00	U	
326762017	LGU 833	0607	0.500	1.00	U	
326762018	LGU 834	0601	0.500	1.00	U	
326762019	LGU 835	0606	0.550	1.00	J	U
326762020	LGU 837	0608	0.500	1.00	U	
326762021	LGU 838	9379	0.500	1.00	U	

Blank Data

Blank Type	Lab Sample ID	Lab Method	Analyte Name	Result	Qualifier	MDL	Units
Trip Blank	326762008	EPA 8260 Low Level	Methylene Chloride (Lab Contaminant)	1.14	J	0.160	ug/L

Sample ID	Sample Ticket	Location	Result	Dilution Factor	Lab Qualifier	Validation Qualifier
326762001	LGU 817	0138	0.270	1.00	J	U
326762002	LGU 818	0386	0.200	1.00	J	U
326762003	LGU 819	0387	0.420	1.00	J	U
326762004	LGU 820	0389	0.430	1.00	J	U
326762005	LGU 821	0392	0.540	1.00	J	U
326762006	LGU 822	0301	0.640	1.00	J	U
326762007	LGU 823	0311	0.760	1.00	J	U
326762009	LGU 825	0118	0.860	1.00	J	U
326762010	LGU 826	0346	0.160	1.00	U	
326762011	LGU 827	0379	0.160	1.00	U	
326762012	LGU 828	0347	0.160	1.00	U	
326762013	LGU 829	0315	0.160	1.00	U	

SAMPLE MANAGEMENT SYSTEM

Validation Report: Equipment/Trip Blanks

RIN: 13055358 **Lab Code:** GEN **Project:** Mound LTS&M Ground Water **Validation Date:** 08/06/2013

Blank Data

Blank Type	Lab Sample ID	Lab Method	Analyte Name	Result	Qualifier	MDL	Units
Trip Blank	326762008		Methylene Chloride (Lab Contaminant)				

Sample ID	Sample Ticket	Location	Result	Dilution Factor	Lab Qualifier	Validation Qualifier
326762014	LGU 830	0124	0.160	1.00	U	
326762015	LGU 831	0126	0.160	1.00	U	
326762016	LGU 832	0605	0.160	1.00	U	
326762017	LGU 833	0607	0.160	1.00	U	
326762018	LGU 834	0601	0.160	1.00	U	
326762019	LGU 835	0606	0.160	1.00	U	
326762020	LGU 837	0608	0.160	1.00	U	
326762021	LGU 838	9379	0.160	1.00	U	

SAMPLE MANAGEMENT SYSTEM

Validation Report: Field Duplicates

RIN: 13055358 **Lab Code:** GEN **Project:** Mound LTS&M Ground Water **Validation Date:** 08/06/2013

Duplicate: 9379 **Sample:** 0379

Analyte	Sample Result	Sample Flag	Sample Error	Sample Dilution	Duplicate Result	Duplicate Flag	Duplicate Error	Duplicate Dilution	RPD	RER	Units
1,1,1,2-Tetrachloroethane	0.160	U		1.00	0.160	U		1.00			ug/L
1,1,1-Trichloroethane	0.160	U		1.00	0.160	U		1.00			ug/L
1,1,2,2-Tetrachloroethane	0.160	U		1.00	0.160	U		1.00			ug/L
1,1,2-Trichloro-1,2,2-trifluoroethane	1.50	U		1.00	1.50	U		1.00			ug/L
1,1,2-Trichloroethane	0.160	U		1.00	0.160	U		1.00			ug/L
1,1-Dichloroethane	0.160	U		1.00	0.160	U		1.00			ug/L
1,1-Dichloroethene	0.160	U		1.00	0.160	U		1.00			ug/L
1,1-Dichloropropene	0.160	U		1.00	0.160	U		1.00			ug/L
1,2,3-Trichlorobenzene	0.200	U		1.00	0.200	U		1.00			ug/L
1,2,3-Trichloropropane	0.160	U		1.00	0.160	U		1.00			ug/L
1,2,4-Trichlorobenzene	0.160	U		1.00	0.160	U		1.00			ug/L
1,2,4-Trimethylbenzene	0.160	U		1.00	0.160	U		1.00			ug/L
1,2-Dibromo-3-chloropropane	0.160	U		1.00	0.160	U		1.00			ug/L
1,2-Dibromoethane	0.160	U		1.00	0.160	U		1.00			ug/L
1,2-Dichlorobenzene	0.160	U		1.00	0.160	U		1.00			ug/L
1,2-Dichloroethane	0.160	U		1.00	0.160	U		1.00			ug/L
1,2-Dichloropropane	0.160	U		1.00	0.160	U		1.00			ug/L
1,3,5-Trimethylbenzene	0.160	U		1.00	0.160	U		1.00			ug/L
1,3-Dichlorobenzene	0.160	U		1.00	0.160	U		1.00			ug/L
1,3-Dichloropropane	0.160	U		1.00	0.160	U		1.00			ug/L
1,4-Dichlorobenzene	0.160	U		1.00	0.160	U		1.00			ug/L
2,2-Dichloropropane	0.160	U		1.00	0.160	U		1.00			ug/L
2-Butanone	0.500	U		1.00	0.500	U		1.00			ug/L
2-Chlorotoluene	0.160	U		1.00	0.160	U		1.00			ug/L
2-Hexanone	0.500	U		1.00	0.500	U		1.00			ug/L
4-Chlorotoluene	0.160	U		1.00	0.160	U		1.00			ug/L
4-Isopropyltoluene	0.160	U		1.00	0.160	U		1.00			ug/L
4-Methyl-2-pentanone	0.500	U		1.00	0.500	U		1.00			ug/L
Acetone	0.500	U		1.00	0.500	U		1.00			ug/L
Benzene	0.160	U		1.00	0.160	U		1.00			ug/L
Bromobenzene	0.160	U		1.00	0.160	U		1.00			ug/L
Bromochloromethane	0.160	U		1.00	0.160	U		1.00			ug/L
Bromodichloromethane	0.160	U		1.00	0.160	U		1.00			ug/L
Bromoform	0.160	U		1.00	0.160	U		1.00			ug/L
Bromomethane	0.160	U		1.00	0.160	U		1.00			ug/L
Carbon Disulfide	0.500	U		1.00	0.500	U		1.00			ug/L
Carbon Tetrachloride	0.720	J		1.00	0.710	J		1.00			ug/L
Chlorobenzene	0.160	U		1.00	0.160	U		1.00			ug/L
Chloroethane	0.160	U		1.00	0.160	U		1.00			ug/L
Chloroform	0.160	U		1.00	0.160	U		1.00			ug/L

SAMPLE MANAGEMENT SYSTEM

Validation Report: Field Duplicates

RIN: 13055358 **Lab Code:** GEN **Project:** Mound LTS&M Ground Water **Validation Date:** 08/06/2013

Duplicate: 9379 **Sample:** 0379

Analyte	Sample Result	Sample Flag	Sample Error	Sample Dilution	Duplicate Result	Duplicate Flag	Duplicate Error	Duplicate Dilution	RPD	RER	Units
Chloromethane	0.160	U		1.00	0.160	U		1.00			ug/L
cis-1,2-Dichloroethene	0.160	U		1.00	0.160	U		1.00			ug/L
cis-1,3-Dichloropropene	0.160	U		1.00	0.160	U		1.00			ug/L
Dibromochloromethane	0.160	U		1.00	0.160	U		1.00			ug/L
Dibromomethane	0.160	U		1.00	0.160	U		1.00			ug/L
Dichlorodifluoromethane	0.160	U		1.00	0.160	U		1.00			ug/L
Ethylbenzene	0.160	U		1.00	0.160	U		1.00			ug/L
Hexachlorobutadiene	0.160	U		1.00	0.160	U		1.00			ug/L
Isopropylbenzene	0.160	U		1.00	0.160	U		1.00			ug/L
Methylene Chloride	0.160	U		1.00	0.160	U		1.00			ug/L
Naphthalene	0.160	U		1.00	0.160	U		1.00			ug/L
n-Butylbenzene	0.160	U		1.00	0.160	U		1.00			ug/L
n-Propylbenzene	0.160	U		1.00	0.160	U		1.00			ug/L
sec-Butylbenzene	0.160	U		1.00	0.160	U		1.00			ug/L
Styrene	0.160	U		1.00	0.160	U		1.00			ug/L
tert-Butylbenzene	0.160	U		1.00	0.160	U		1.00			ug/L
Tetrachloroethene	0.320	J		1.00	0.310	J		1.00			ug/L
Toluene	0.720	J		1.00	0.160	U		1.00			ug/L
Total Xylenes	0.160	U		1.00	0.160	U		1.00			ug/L
trans-1,2-Dichloroethene	0.160	U		1.00	0.160	U		1.00			ug/L
trans-1,3-Dichloropropene	0.160	U		1.00	0.160	U		1.00			ug/L
Trichloroethene	1.83			1.00	1.76			1.00	3.90		ug/L
Trichlorofluoromethane	0.160	U		1.00	0.160	U		1.00			ug/L
Vinyl Chloride	0.160	U		1.00	0.160	U		1.00			ug/L

SAMPLE MANAGEMENT SYSTEM

Mound Field Data Non-Conformance Report

Report Date: 08/06/2013

Mound Category I Criteria

- [x] Purge Volume > pump/tubing volume
- [x] Flowrate > 100 mL/min and < 500 mL/min
- [x] Water level < 0.05 ft. drop
- [x] DO ± 10%, last 3 measurements
- [x] pH ± 0.2 pH units
- [x] Specific conductance ± 10 percent
- [x] Turbidity < 50 NTUs

Category II Criteria

- [ ] Purge Volume > pump/tubing volume
- [ ] Flowrate < 500 mL/min

Field Data Errors: 2

Site	Location	Type	Category	Error Description
MND01	0346	Well	1	The tubidity did not meet criteria.
MND01	0389	Well	1	The tubidity did not meet criteria.

SAMPLE MANAGEMENT SYSTEM
Organics Data Validation Summary

RIN: 13055358 **Project:** Mound LTS&M Ground Water **Lab Code:** GEN **Validation Date:** 08/06/2013

LCS Recovery: All LCS recoveries were within the laboratory acceptance limits.

Method Blank(s): All method blanks results were below the method detection limit.

MS/MSD Recovery: All MS/MSD recoveries were within the laboratory acceptance limits.

Surrogate Recovery: All surrogate recoveries were within the laboratory acceptance limits.

Data Review and Validation Report

General Information

Requisition No. (RIN):	13085558
Sample Event:	August 26–27, 2013
Site(s):	Mound, Ohio; Groundwater
Laboratory:	GEL Laboratories, Charleston, South Carolina
Work Order No.:	332597
Analysis:	Radiochemistry, Volatiles
Validator:	Stephen Donivan
Review Date:	October 9, 2013

This validation was performed according to the *Environmental Procedures Catalog* (LMS/POL/S04325), *"Standard Practice for Validation of Environmental Data."* The procedure was applied at Level 2, Data Deliverables Verification. See attached Data Validation Worksheets for supporting documentation on the data review and validation. All analyses were successfully completed. The samples were prepared and analyzed using accepted procedures based on methods specified by line item code, which are listed in Table 1.

Table 1. Analytes and Methods

Analyte	Line Item Code	Prep Method	Analytical Method
Tritium	LSC-A-001	EPA 906.0 Mod	EPA 906.0 Mod
Volatile Organics, VOA	VOA-A-007	SW-846 5030B	SW-846 8260B

Data Qualifier Summary

Analytical results were qualified as listed in Table 2. Refer to the sections below for an explanation of the data qualifiers applied.

Table 2. Data Qualifier Summary

Sample Number	Location	Analyte(s)	Flag	Reason
332597001	0315	All	J	Pre-sampling purge criteria no met
332597001	0315	Methylene Chloride	U	Less than 10 times the method blank
332597001	0315	Toluene	U	Less than 10 times the method blank

Sample Number	Location	Analyte(s)	Flag	Reason
332597002	0346	All	J	Pre-sampling purge criteria no met
332597002	0346	Toluene	U	Less than 10 times the method blank
332597002	0346	Tritium	J	Less than the determination limit
332597005	0387	Toluene	U	Less than 10 times the method blank
332597006	0389	All	J	Pre-sampling purge criteria no met
332597007	0392	Methylene Chloride	U	Less than 10 times the method blank
332597008	Trip Blank	Methylene Chloride	U	Less than 10 times the method blank
332597010	0605	Methylene Chloride	U	Less than 10 times the method blank
332597011	0606	Acetone	U	Less than 10 times the method blank
332597011	0606	Methylene Chloride	U	Less than 10 times the method blank
332597012	0607	Methylene Chloride	U	Less than 10 times the method blank
332597013	0608	Acetone	U	Less than 10 times the method blank
332597013	0608	Methylene Chloride	U	Less than 10 times the method blank
332597014	0118	Methylene Chloride	U	Less than 10 times the method blank
332597015	0124	Methylene Chloride	U	Less than 10 times the method blank
332597016	0126	Methylene Chloride	U	Less than 10 times the method blank
332597017	0138	Methylene Chloride	U	Less than 10 times the method blank
332597018	0301	Methylene Chloride	U	Less than 10 times the method blank
332597018	0301	Toluene	U	Less than 10 times the method blank
332597019	0311	Methylene Chloride	U	Less than 10 times the method blank
332597020	0379	Tritium	J	Less than the determination limit
332597021	0379 Duplicate	Methylene Chloride	U	Less than 10 times the method blank
332597021	0379 Duplicate	Tritium	J	Less than the determination limit

Sample Shipping/Receiving

GEL Laboratories in Charleston, South Carolina, received 21 water samples on August 30, 2013, accompanied by a Chain of Custody (COC) form. The COC form was checked to confirm that all of the samples were listed with sample collection dates and times, and that signatures and dates were present indicating sample relinquishment and receipt. The COC form was complete with no errors or omissions. The air waybill number was listed on the receiving documentation.

Preservation and Holding Times

The sample shipments were received intact with the temperature inside the iced cooler of 6 °C, which complies with requirements. All samples were received in the correct container types and had been preserved correctly for the requested analyses. Sample analysis was completed within the applicable holding times.

Detection and Quantitation Limits

The method detection limit (MDL) was reported for all organic analytes as required. The MDL, as defined in 40 CFR 136, is the minimum concentration of an analyte that can be measured and reported with 99% confidence that the analyte concentration is greater than zero. The practical quantitation limit (PQL) for these analytes is the lowest concentration that can be reliably measured, and is defined as 5 times the MDL.

For radiochemical analytes (those measured by radiometric counting) the MDL and PQL are not applicable, and these results are evaluated using the minimum detectable concentration (MDC), Decision Level Concentration (DLC), and Determination Limit (DL). The MDC is a measure of radiochemical method performance and was calculated and reported as specified in *Quality Systems for Analytical Services*. The DLC is the minimum concentration of an analyte that can be measured and reported with 99% confidence that the analyte concentration is greater than zero, and is estimated as 3 times the one-sigma total propagated uncertainty. Results that are greater than the MDC, but less than the DLC are qualified with a "U" flag (not detected). The DL for radiochemical results is the lowest concentration that can be reliably measured, and is defined as three times the MDC. Results not previously "U" qualified that are less than the DL are qualified with a "J" flag as estimated values.

The reported MDLs for all organic analytes; and MDCs for radiochemical analytes demonstrate compliance with contractual requirements.

Laboratory Instrument Calibration

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing acceptable qualitative and quantitative data for all analytes. Initial calibration demonstrates that the instrument is capable of acceptable performance in the beginning of the analytical run. Compliance requirements for continuing calibration checks are established to ensure that the instrument continues to be capable of producing acceptable qualitative and quantitative data. All laboratory instrument calibrations were performed correctly in accordance with the cited methods. All calibration and laboratory spike standards were prepared from independent sources.

Volatiles Internal Standards and Surrogates

The volatile internal standard recoveries and surrogate recoveries were within the acceptance ranges for all samples.

Method Blanks

Method blanks are analyzed to assess any contamination that may have occurred during sample preparation. The method blank results were below the practical quantitation limits. Methylene chloride was detected in the VOA method blanks. Associated sample results that are greater than the MDL but less than ten times the blank concentration are qualified with a "U" flag as not detected. The tritium method blank result was less than the Decision Level Concentration.

Trip Blank

A trip blank was collected to document contamination attributable to shipping and field handling procedures. This type of blank is useful in documenting contamination of volatile organic samples. 2-Butanone, acetone and toluene were detected in the trip blank. The associated sample results for these compounds that are greater than the MDL but less than ten times the blank concentration are qualified with a "U" flag as not detected.

Matrix Spike Analysis

Matrix spike and matrix spike duplicate (MS/MSD) samples are used to measure method performance in the sample matrix. The MS/MSD data are not evaluated when the concentration of the unspiked sample is greater than four times the spike. The spike recoveries met the acceptance criteria for all analytes evaluated with the following exception. The spike recovery of 1,2,4-trimethylbenzene, hexachlorobutadiene, n-butylbenzene, and 1,1,2-trichloro-1,2,2-trifluoroethane from sample 0379 did not meet the acceptance criteria. These compounds were not detected in the associated sample.

Laboratory Replicate Analysis

Laboratory replicate analyses are used to determine laboratory precision for each sample matrix. The relative percent difference for organic replicate results were less than the laboratory-derived control limits, demonstrating acceptable laboratory precision. The relative error ratio for radiochemical replicate results (calculated using the one-sigma total propagated uncertainty) was less than 3, indicating acceptable precision.

Laboratory Control Sample

Laboratory control samples (LCS) were analyzed at the correct frequency to provide information on the accuracy of the analytical method and the overall laboratory performance, including sample preparation. All control sample results were acceptable with the exception of the 1,1,2-trichloro-1,2,2-trifluoroethane and trichlorofluoromethane. These compounds were not detected in the associated samples.

Field Duplicate

Field duplicate samples are collected and analyzed as an indication of overall precision of the measurement process. The precision observed includes both field and laboratory precision and has more variability than laboratory duplicates, which measure only laboratory performance. The relative percent difference for duplicate results that are greater than five times the practical quantitation limit (PQL) should be less than 20 percent. For results that are less than five times the PQL, the range should be no greater than the PQL. A duplicate sample was collected from location 0379 (field duplicate ID 9379). The non-radiochemical duplicate results met the criteria, demonstrating acceptable overall precision. The relative error ratio for radiochemical duplicate results (calculated using the 1-sigma total propagated uncertainty) was less than 3, indicating acceptable precision.

Completeness

Results were reported in the correct units for all analytes requested using contract-required laboratory qualifiers.

Electronic Data Deliverable File

The EDD file arrived on September 30, 2013. The Sample Management System EDD validation module was used to verify that the EDD file was complete and in compliance with requirements.

The module compares the contents of the file to the requested analyses to ensure all and only the requested data are delivered. The contents of the EDD were manually examined to verify that the sample results accurately reflect the data contained in the sample data package.

Sampling Protocol

Sample results for all monitoring wells were the Category I low-flow sampling criteria was documented and were qualified with an “F” flag in the database, indicating the wells were purged and sampled using the low-flow sampling method. The turbidity criterion was not met for wells 0315, 0346 and 0389; and the dissolved oxygen criterion was not met for well 0387. The field data and laboratory results are further qualified with a “J” flag because the Category I purging criteria from Program Directive MND-2013-01 were not met.

Outliers Report

Potential outliers are measurements that are extremely large or small relative to the rest of the data and, therefore, are suspected of misrepresenting the population from which they were collected. Potential outliers may result from transcription errors, data-coding errors, or measurement system problems. However, outliers may also represent true extreme values of a distribution and indicate more variability in the population than was expected.

Statistical outlier tests give probabilistic evidence that an extreme value does not "fit" with the distribution of the remainder of the data and is therefore a statistical outlier. These tests should only be used to identify data points that require further investigation. The tests alone cannot determine whether a statistical outlier should be discarded or corrected within a data set.

There are three steps involved in identifying extreme values or outliers:

1. Identify extreme values that may be potential outliers by generating the Outliers Report using the Sample Management System from data in the environmental database. The application compares the new data set (in standard environmental database units) with historical data and lists the new data that fall outside the historical data range. A determination is also made if the data are normally distributed using the Shapiro-Wilk Test.
2. Apply the appropriate statistical test. Dixon's Extreme Value test is used to test for statistical outliers when the sample size is less than or equal to 25. This test considers both extreme values that are much smaller than the rest of the data (case 1) and extreme values that are much larger than the rest of the data (case 2). This test is valid only if the data without the suspected outlier are normally distributed. Rosner's Test is a parametric test that is used to detect outliers for sample sizes of 25 or more. This test also assumes that the data without the suspected outliers are normally distributed.
3. Scientifically review statistical outliers and decide on their disposition. The review should include an evaluation of any notable trends in the data that may indicate the outliers represent true extreme values.

No results from this sampling event were identified as potential outliers.

Report Prepared By: _____

Stephen Donivan
Laboratory Coordinator

SAMPLE MANAGEMENT SYSTEM

General Data Validation Report

RIN: 13085558 **Lab Code:** GEN **Validator:** Stephen Donivan **Validation Date:** 10/09/2013

Project: Mound LTS&M Ground Water **Analysis Type:** ☐ Metals ☐ General Chem ☑ Rad ☑ Organics

# of Samples: 21 **Matrix:** Water **Requested Analysis Completed:** Yes

Chain of Custody

Present: OK **Signed:** OK **Dated:** OK

Sample

Integrity: OK **Preservation:** OK **Temperature:** OK

Select Quality Parameters

☑ Holding Times	All analyses were completed within the applicable holding times.
☑ Detection Limits	The reported detection limits are equal to or below contract requirements.
☑ Field/Trip Blanks	There was 1 trip/equipment blank evaluated.
☑ Field Duplicates	There was 1 duplicate evaluated.

SAMPLE MANAGEMENT SYSTEM

Validation Report: Equipment/Trip Blanks

RIN: 13085558 **Lab Code:** GEN **Project:** Mound LTS&M Ground Water **Validation Date:** 10/09/2013

Blank Data

Blank Type	Lab Sample ID	Lab Method	Analyte Name	Result	Qualifier	MDL	Units
Trip Blank	332597008	EPA 8260 Low Level	2-Butanone (Lab Contaminant)	0.720	J	0.500	ug/L

Sample ID	Sample Ticket	Location	Result	Dilution Factor	Lab Qualifier	Validation Qualifier
332597001	LJU 359	0315	0.500	1.00	U	
332597002	LJU 356	0346	0.500	1.00	U	
332597003	LJU 358	0347	0.500	1.00	U	
332597004	LJU 348	0386	0.500	1.00	U	
332597005	LJU 349	0387	0.500	1.00	U	
332597006	LJU 350	0389	0.500	1.00	U	
332597007	LJU 351	0392	0.500	1.00	U	
332597009	LJU 364	0601	0.500	1.00	U	
332597010	LJU 362	0605	0.500	1.00	U	
332597011	LJU 365	0606	0.500	1.00	U	
332597012	LJU 363	0607	0.500	1.00	U	
332597013	LJU 367	0608	0.500	1.00	U	
332597014	LJU 355	0118	0.500	1.00	U	
332597015	LJU 360	0124	0.500	1.00	U	
332597016	LJU 361	0126	0.500	1.00	U	
332597017	LJU 347	0138	0.500	1.00	U	
332597018	LJU 352	0301	0.500	1.00	U	
332597019	LJU 353	0311	0.500	1.00	U	
332597020	LJU 357	0379	0.500	1.00	U	
332597021	LJU 368	9379	0.500	1.00	U	

Blank Data

Blank Type	Lab Sample ID	Lab Method	Analyte Name	Result	Qualifier	MDL	Units
Trip Blank	332597008	EPA 8260 Low Level	Acetone (Lab Contaminant)	2.06	J	0.500	ug/L

Sample ID	Sample Ticket	Location	Result	Dilution Factor	Lab Qualifier	Validation Qualifier
332597001	LJU 359	0315	0.500	1.00	U	
332597002	LJU 356	0346	0.500	1.00	U	
332597003	LJU 358	0347	0.500	1.00	U	
332597004	LJU 348	0386	0.500	1.00	U	
332597005	LJU 349	0387	0.500	1.00	U	
332597006	LJU 350	0389	0.500	1.00	U	

SAMPLE MANAGEMENT SYSTEM

Validation Report: Equipment/Trip Blanks

RIN: 13085558 **Lab Code:** GEN **Project:** Mound LTS&M Ground Water **Validation Date:** 10/09/2013

Blank Data

Blank Type	Lab Sample ID	Lab Method	Analyte Name	Result	Qualifier	MDL	Units
Trip Blank	332597008		Acetone (Lab Contaminant)				

Sample ID	Sample Ticket	Location	Result	Dilution Factor	Lab Qualifier	Validation Qualifier
332597007	LJU 351	0392	0.500	1.00	U	
332597009	LJU 364	0601	0.500	1.00	U	
332597010	LJU 362	0605	0.500	1.00	U	
332597011	LJU 365	0606	0.770	1.00	J	U
332597012	LJU 363	0607	0.500	1.00	U	
332597013	LJU 367	0608	2.27	1.00	J	U
332597014	LJU 355	0118	0.500	1.00	U	
332597015	LJU 360	0124	0.500	1.00	U	
332597016	LJU 361	0126	0.500	1.00	U	
332597017	LJU 347	0138	0.500	1.00	U	
332597018	LJU 352	0301	0.500	1.00	U	
332597019	LJU 353	0311	0.500	1.00	U	
332597020	LJU 357	0379	0.500	1.00	U	
332597021	LJU 368	9379	0.500	1.00	U	

Blank Data

Blank Type	Lab Sample ID	Lab Method	Analyte Name	Result	Qualifier	MDL	Units
Trip Blank	332597008	EPA 8260 Low Level	Toluene (Lab Contaminant)	0.220	J	0.160	ug/L

Sample ID	Sample Ticket	Location	Result	Dilution Factor	Lab Qualifier	Validation Qualifier
332597001	LJU 359	0315	0.210	1.00	J	U
332597002	LJU 356	0346	0.250	1.00	J	U
332597003	LJU 358	0347	0.160	1.00	U	
332597004	LJU 348	0386	0.160	1.00	U	
332597005	LJU 349	0387	0.200	1.00	J	U
332597006	LJU 350	0389	0.160	1.00	U	
332597007	LJU 351	0392	0.160	1.00	U	
332597009	LJU 364	0601	0.160	1.00	U	
332597010	LJU 362	0605	0.160	1.00	U	
332597011	LJU 365	0606	0.160	1.00	U	
332597012	LJU 363	0607	0.160	1.00	U	
332597013	LJU 367	0608	0.160	1.00	U	

SAMPLE MANAGEMENT SYSTEM

Validation Report: Equipment/Trip Blanks

RIN: 13085558 **Lab Code:** GEN **Project:** Mound LTS&M Ground Water **Validation Date:** 10/09/2013

Blank Data

Blank Type	Lab Sample ID	Lab Method	Analyte Name	Result	Qualifier	MDL	Units
Trip Blank	332597008		Toluene (Lab Contaminant)				

Sample ID	Sample Ticket	Location	Result	Dilution Factor	Lab Qualifier	Validation Qualifier
332597014	LJU 355	0118	0.160	1.00	U	
332597015	LJU 360	0124	0.160	1.00	U	
332597016	LJU 361	0126	0.160	1.00	U	
332597017	LJU 347	0138	0.160	1.00	U	
332597018	LJU 352	0301	0.300	1.00	J	U
332597019	LJU 353	0311	0.160	1.00	U	
332597020	LJU 357	0379	0.160	1.00	U	
332597021	LJU 368	9379	0.160	1.00	U	

SAMPLE MANAGEMENT SYSTEM

Validation Report: Field Duplicates

RIN: 13085558 **Lab Code:** GEN **Project:** Mound LTS&M Ground Water **Validation Date:** 10/09/2013

Duplicate: 9379 **Sample:** 0379

Analyte	Sample Result	Sample Flag	Sample Error	Sample Dilution	Duplicate Result	Duplicate Flag	Duplicate Error	Duplicate Dilution	RPD	RER	Units
1,1,1,2-Tetrachloroethane	0.160	U		1.00	0.160	U		1.00			ug/L
1,1,1-Trichloroethane	0.160	U		1.00	0.160	U		1.00			ug/L
1,1,2,2-Tetrachloroethane	0.160	U		1.00	0.160	U		1.00			ug/L
1,1,2-Trichloro-1,2,2-trifluoroethane	1.50	U		1.00	1.50	U		1.00			ug/L
1,1,2-Trichloroethane	0.160	U		1.00	0.160	U		1.00			ug/L
1,1-Dichloroethane	0.160	U		1.00	0.160	U		1.00			ug/L
1,1-Dichloroethene	0.160	U		1.00	0.160	U		1.00			ug/L
1,1-Dichloropropene	0.160	U		1.00	0.160	U		1.00			ug/L
1,2,3-Trichlorobenzene	0.200	U		1.00	0.200	U		1.00			ug/L
1,2,3-Trichloropropane	0.160	U		1.00	0.160	U		1.00			ug/L
1,2,4-Trichlorobenzene	0.160	U		1.00	0.160	U		1.00			ug/L
1,2,4-Trimethylbenzene	0.160	U		1.00	0.160	U		1.00			ug/L
1,2-Dibromo-3-chloropropane	0.160	U		1.00	0.160	U		1.00			ug/L
1,2-Dibromoethane	0.160	U		1.00	0.160	U		1.00			ug/L
1,2-Dichlorobenzene	0.160	U		1.00	0.160	U		1.00			ug/L
1,2-Dichloroethane	0.160	U		1.00	0.160	U		1.00			ug/L
1,2-Dichloropropane	0.160	U		1.00	0.160	U		1.00			ug/L
1,3,5-Trimethylbenzene	0.160	U		1.00	0.160	U		1.00			ug/L
1,3-Dichlorobenzene	0.160	U		1.00	0.160	U		1.00			ug/L
1,3-Dichloropropane	0.160	U		1.00	0.160	U		1.00			ug/L
1,4-Dichlorobenzene	0.160	U		1.00	0.160	U		1.00			ug/L
2,2-Dichloropropane	0.160	U		1.00	0.160	U		1.00			ug/L
2-Butanone	0.500	U		1.00	0.500	U		1.00			ug/L
2-Chlorotoluene	0.160	U		1.00	0.160	U		1.00			ug/L
2-Hexanone	0.500	U		1.00	0.500	U		1.00			ug/L
4-Chlorotoluene	0.160	U		1.00	0.160	U		1.00			ug/L
4-Isopropyltoluene	0.160	U		1.00	0.160	U		1.00			ug/L
4-Methyl-2-pentanone	0.500	U		1.00	0.500	U		1.00			ug/L
Acetone	0.500	U		1.00	0.500	U		1.00			ug/L
Benzene	0.160	U		1.00	0.160	U		1.00			ug/L
Bromobenzene	0.160	U		1.00	0.160	U		1.00			ug/L
Bromochloromethane	0.160	U		1.00	0.160	U		1.00			ug/L
Bromodichloromethane	0.160	U		1.00	0.160	U		1.00			ug/L
Bromoform	0.160	U		1.00	0.160	U		1.00			ug/L
Bromomethane	0.160	U		1.00	0.160	U		1.00			ug/L
Carbon Disulfide	0.500	U		1.00	0.500	U		1.00			ug/L
Carbon Tetrachloride	0.990	J		1.00	1.06			1.00	6.83		ug/L
Chlorobenzene	0.160	U		1.00	0.160	U		1.00			ug/L
Chloroethane	0.160	U		1.00	0.160	U		1.00			ug/L
Chloroform	0.160	U		1.00	0.160	U		1.00			ug/L

SAMPLE MANAGEMENT SYSTEM

Validation Report: Field Duplicates

RIN: 13085558 **Lab Code:** GEN **Project:** Mound LTS&M Ground Water **Validation Date:** 10/09/2013

Duplicate: 9379 **Sample:** 0379

Analyte	Sample Result	Sample Flag	Sample Error	Sample Dilution	Duplicate Result	Duplicate Flag	Duplicate Error	Duplicate Dilution	RPD	RER	Units
Chloromethane	0.160	U		1.00	0.160	U		1.00			ug/L
cis-1,2-Dichloroethene	0.160	U		1.00	0.160	U		1.00			ug/L
cis-1,3-Dichloropropene	0.160	U		1.00	0.160	U		1.00			ug/L
Dibromochloromethane	0.160	U		1.00	0.160	U		1.00			ug/L
Dibromomethane	0.160	U		1.00	0.160	U		1.00			ug/L
Dichlorodifluoromethane	0.160	U		1.00	0.160	U		1.00			ug/L
Ethylbenzene	0.160	U		1.00	0.160	U		1.00			ug/L
Hexachlorobutadiene	0.160	U		1.00	0.160	U		1.00			ug/L
Isopropylbenzene	0.160	U		1.00	0.160	U		1.00			ug/L
Methylene Chloride	0.160	U		1.00	1.07	BJ		1.00			ug/L
Naphthalene	0.160	U		1.00	0.160	U		1.00			ug/L
n-Butylbenzene	0.160	U		1.00	0.160	U		1.00			ug/L
n-Propylbenzene	0.160	U		1.00	0.160	U		1.00			ug/L
sec-Butylbenzene	0.160	U		1.00	0.160	U		1.00			ug/L
Styrene	0.160	U		1.00	0.160	U		1.00			ug/L
tert-Butylbenzene	0.160	U		1.00	0.160	U		1.00			ug/L
Tetrachloroethene	0.320	J		1.00	0.330	J		1.00			ug/L
Toluene	0.160	U		1.00	0.160	U		1.00			ug/L
Total Xylenes	0.160	U		1.00	0.160	U		1.00			ug/L
trans-1,2-Dichloroethene	0.160	U		1.00	0.160	U		1.00			ug/L
trans-1,3-Dichloropropene	0.160	U		1.00	0.160	U		1.00			ug/L
Trichloroethene	2.47			1.00	2.49			1.00	0.81		ug/L
Trichlorofluoromethane	0.160	U		1.00	0.160	U		1.00			ug/L
Tritium	852		284	1.00	750		271	1.00		0.5	pCi/L
Vinyl Chloride	0.160	U		1.00	0.160	U		1.00			ug/L

SAMPLE MANAGEMENT SYSTEM
Organics Data Validation Summary

RIN: 13085558 **Project:** Mound LTS&M Ground Water **Lab Code:** GEN **Validation Date:** 10/09/2013

LCS Recovery: There were 3 LCS failures.

Method Blank(s): There were 4 method blank results above the MDL.

MS/MSD Recovery: There were 5 MS/MSD failures.

Surrogate Recovery: All surrogate recoveries were within the laboratory acceptance limits.

SAMPLE MANAGEMENT SYSTEM

Non-Compliance Report: Method Blanks

RIN: 13085558 **Lab Code:** GEN

Project: Mound LTS&M Ground Water

Validation Date: 10/09/2013

Method Blank	Date Analyzed	Method	Analyte	Result	Flag(s)	MDL
1202942377	09/05/2013	EPA 8260 Low Level	Methylene Chloride	0.91	J	0.16
1202943018	09/07/2013	EPA 8260 Low Level	Methylene Chloride	1.20	J	0.16
1202942378	09/07/2013	EPA 8260 Low Level	Methylene Chloride	1.20	J	0.16
1202955001	09/11/2013	EPA 8260 Low Level	Methylene Chloride	1.48	J	0.16

SAMPLE MANAGEMENT SYSTEM

Non-Compliance Report: LCS Recovery

RIN: 13085558 **Lab Code:** GEN

Project: Mound LTS&M Ground Water

Validation Date: 10/09/2013

LCS/LCSD	Date Analyzed	Method	Analyte	Recovery	Lower Limit	Upper Limit
LCS	09/05/2013	EPA 8260 Low Level	1,1,2-Trichloro-1,2,2-trifluoroethane	138.0	70.0	130.0
LCS	09/07/2013	EPA 8260 Low Level	1,1,2-Trichloro-1,2,2-trifluoroethane	145.0	70.0	130.0
LCS	09/07/2013	EPA 8260 Low Level	Trichlorofluoromethane	121.0	76.0	120.0

SAMPLE MANAGEMENT SYSTEM

Non-Compliance Report: MS/MSD Performance

RIN: 13085558 **Lab Code:** GEN

Project: Mound LTS&M Ground Water

Validation Date: 10/09/2013

MS/MSD	Date Analyzed	Method	Analyte	Recovery MS	Recovery MSD	Lower Limit	Upper Limit	MSD RPD	RPD Limit
LJU 357	09/06/2013	EPA 8260 Low Level	1,2,4-Trimethylbenzene	75.8	79.3	78.0	120.0		
LJU 357	09/06/2013	EPA 8260 Low Level	Hexachlorobutadiene	76.6	85.2	79.0	123.0		
LJU 357	09/06/2013	EPA 8260 Low Level	n-Butylbenzene	75.3	82.1	77.0	124.0		
LJU 357	09/07/2013	EPA 8260 Low Level	1,1,2-Trichloro-1,2,2-trifluoroethane	153.0	144.0	70.0	130.0	6.00	20.0

SAMPLE MANAGEMENT SYSTEM
Radiochemistry Data Validation Worksheet

RIN: 13085558 **Lab Code:** GEN **Date Due:** 09/27/2013

Matrix: Water **Site Code:** MND03 **Date Completed:** 09/27/2013

Sample	Analyte	Date Analyzed	Result	Flag	Tracer %R	LCS %R	MS %R	Duplicate
0379	Tritium	09/18/2013						0.27
Blank	Tritium	09/18/2013	-144.0000	U				
0379	Tritium	09/18/2013					91.2	
Blank_Spike	Tritium	09/18/2013				86.20		

Data Review and Validation Report

General Information

Requisition No. (RIN):	13085559
Sample Event:	August 27–28, 2013
Site(s):	Mound, Ohio; Groundwater
Laboratory:	GEL Laboratories, Charleston, South Carolina
Work Order No.:	332594
Analysis:	Volatiles
Validator:	Stephen Donivan
Review Date:	October 9, 2013

This validation was performed according to the *Environmental Procedures Catalog* (LMS/POL/S04325), *"Standard Practice for Validation of Environmental Data."* The procedure was applied at Level 2, Data Deliverables Verification. See attached Data Validation Worksheets for supporting documentation on the data review and validation. All analyses were successfully completed. The samples were prepared and analyzed using accepted procedures based on methods specified by line item code, which are listed in Table 1.

Table 1. Analytes and Methods

Analyte	Line Item Code	Prep Method	Analytical Method
Volatile Organics, VOA	VOA-A-007	SW-846 5030B	SW-846 8260B

Data Qualifier Summary

Analytical results were qualified as listed in Table 2. Refer to the sections below for an explanation of the data qualifiers applied.

Table 2. Data Qualifier Summary

Sample Number	Location	Analyte(s)	Flag	Reason
332594001	0353	Methylene Chloride	U	Less than 10 times the method blank
332594002	0400	Methylene Chloride	U	Less than 10 times the method blank
332594003	0402	Methylene Chloride	U	Less than 10 times the method blank
332594003	0402	Toluene	U	Less than 10 times the trip blank

Sample Number	Location	Analyte(s)	Flag	Reason
332594004	0411	Methylene Chloride	U	Less than 10 times the method blank
332594004	0411	Toluene	U	Less than 10 times the trip blank
332594005	0443	Methylene Chloride	U	Less than 10 times the method blank
332594005	0443	Trichloroethene	J	Field duplicate precision
332594006	0444	Methylene Chloride	U	Less than 10 times the method blank
332594007	0445	Toluene	U	Less than 10 times the trip blank
332594009	0443 Duplicate	Trichloroethene	J	Field duplicate precision
332594010	P033	Toluene	U	Less than 10 times the trip blank

Sample Shipping/Receiving

GEL Laboratories in Charleston, South Carolina, received 11 water samples on August 30, 2013, accompanied by a Chain of Custody (COC) form. The COC form was checked to confirm that all of the samples were listed with sample collection dates and times, and that signatures and dates were present indicating sample relinquishment and receipt. The COC form was complete with no errors or omissions. The air waybill number was listed on the receiving documentation.

Preservation and Holding Times

The sample shipments were received intact with the temperature inside the iced cooler of 6 °C, which complies with requirements. All samples were received in the correct container types and had been preserved correctly for the requested analyses. Sample analysis was completed within the applicable holding times.

Detection and Quantitation Limits

The method detection limit (MDL) was reported for all organic analytes as required. The MDL, as defined in 40 CFR 136, is the minimum concentration of an analyte that can be measured and reported with 99% confidence that the analyte concentration is greater than zero. The practical quantitation limit (PQL) for these analytes is the lowest concentration that can be reliably measured, and is defined as 5 times the MDL.

The reported MDLs for all organic analytes demonstrate compliance with contractual requirements.

Laboratory Instrument Calibration

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing acceptable qualitative and quantitative data for all analytes. Initial calibration demonstrates that the instrument is capable of acceptable performance in the beginning of the analytical run. Compliance requirements for continuing calibration checks are established to ensure that the instrument continues to be capable of producing acceptable qualitative and quantitative data. All laboratory instrument calibrations were performed correctly in accordance with the cited methods. All calibration and laboratory spike standards were prepared from independent sources.

Volatiles Internal Standards and Surrogates

The volatile internal standard recoveries and surrogate recoveries were within the acceptance ranges for all samples.

Method Blanks

Method blanks are analyzed to assess any contamination that may have occurred during sample preparation. The method blank results were below the practical quantitation limits. Methylene chloride was detected in the method blank. Associated sample results that are greater than the MDL but less than ten times the blank concentration are qualified with a "U" flag as not detected.

Trip Blank

A trip blank was collected to document contamination attributable to shipping and field handling procedures. This type of blank is useful in documenting contamination of volatile organic samples. Toluene was detected in the trip blank. The associated sample results for toluene that are greater than the MDL but less than ten times the blank concentration are qualified with a "U" flag as not detected.

Matrix Spike Analysis

Matrix spike and matrix spike duplicate (MS/MSD) samples are used to measure method performance in the sample matrix. The MS/MSD data are not evaluated when the concentration of the unspiked sample is greater than four times the spike. The spike recoveries met the acceptance criteria for all analytes evaluated.

Laboratory Replicate Analysis

Laboratory replicate analyses are used to determine laboratory precision for each sample matrix. The relative percent difference for organic replicate results were less than the laboratory-derived control limits.

Laboratory Control Sample

Laboratory control samples (LCS) were analyzed at the correct frequency to provide information on the accuracy of the analytical method and the overall laboratory performance, including sample preparation. All control sample results were acceptable with the exception of the 1,1,2-trichloro-1,2,2-trifluoroethane and trichlorofluoromethane. These compounds were not detected in the associated samples.

Field Duplicate

Field duplicate samples are collected and analyzed as an indication of overall precision of the measurement process. The precision observed includes both field and laboratory precision and has more variability than laboratory duplicates, which measure only laboratory performance. The

relative percent difference for duplicate results that are greater than five times the practical quantitation limit (PQL) should be less than 20 percent. For results that are less than five times the PQL, the range should be no greater than the PQL. A duplicate sample was collected from location 0443 (field duplicate ID 9443). The duplicate results met the criteria for all compounds except trichloroethene. The sample and duplicate trichloroethene results are qualified with a “J” flag as estimated values.

Completeness

Results were reported in the correct units for all analytes requested using contract-required laboratory qualifiers.

Electronic Data Deliverable File

The EDD file arrived on September 30, 2013. The Sample Management System EDD validation module was used to verify that the EDD file was complete and in compliance with requirements. The module compares the contents of the file to the requested analyses to ensure all and only the requested data are delivered. The contents of the EDD were manually examined to verify that the sample results accurately reflect the data contained in the sample data package.

Sampling Protocol

Sample results for all monitoring wells were the Category I or II low-flow sampling criteria was documented and were qualified with an “F” flag in the database, indicating the wells were purged and sampled using the low-flow sampling method. The data for wells 0353, 0443, 0444, and 0445 were further qualified with a “Q” flag because these are Category II wells.

Outliers Report

Potential outliers are measurements that are extremely large or small relative to the rest of the data and, therefore, are suspected of misrepresenting the population from which they were collected. Potential outliers may result from transcription errors, data-coding errors, or measurement system problems. However, outliers may also represent true extreme values of a distribution and indicate more variability in the population than was expected.

Statistical outlier tests give probabilistic evidence that an extreme value does not "fit" with the distribution of the remainder of the data and is therefore a statistical outlier. These tests should only be used to identify data points that require further investigation. The tests alone cannot determine whether a statistical outlier should be discarded or corrected within a data set.

There are three steps involved in identifying extreme values or outliers:

1. Identify extreme values that may be potential outliers by generating the Outliers Report using the Sample Management System from data in the environmental database. The application compares the new data set (in standard environmental database units) with historical data and lists the new data that fall outside the historical data range. A determination is also made if the data are normally distributed using the Shapiro-Wilk Test.

2. Apply the appropriate statistical test. Dixon's Extreme Value test is used to test for statistical outliers when the sample size is less than or equal to 25. This test considers both extreme values that are much smaller than the rest of the data (case 1) and extreme values that are much larger than the rest of the data (case 2). This test is valid only if the data without the suspected outlier are normally distributed. Rosner's Test is a parametric test that is used to detect outliers for sample sizes of 25 or more. This test also assumes that the data without the suspected outliers are normally distributed.
3. Scientifically review statistical outliers and decide on their disposition. The review should include an evaluation of any notable trends in the data that may indicate the outliers represent true extreme values.

No results from this sampling event were identified as potential outliers.

Report Prepared By: _____

Stephen Donivan
Laboratory Coordinator

SAMPLE MANAGEMENT SYSTEM

General Data Validation Report

RIN: 13085559 **Lab Code:** GEN **Validator:** Stephen Donivan **Validation Date:** 10/09/2013

Project: Mound LTS&M Ground Water **Analysis Type:** ☐ Metals ☐ General Chem ☐ Rad ☑ Organics

# of Samples: 11 **Matrix:** Water **Requested Analysis Completed:** Yes

Chain of Custody

Present: OK **Signed:** OK **Dated:** OK

Sample

Integrity: OK **Preservation:** OK **Temperature:** OK

Select Quality Parameters

☑ Holding Times	All analyses were completed within the applicable holding times.
☑ Detection Limits	The reported detection limits are equal to or below contract requirements.
☑ Field/Trip Blanks	There was 1 trip/equipment blank evaluated.
☑ Field Duplicates	There was 1 duplicate evaluated.

SAMPLE MANAGEMENT SYSTEM

Validation Report: Equipment/Trip Blanks

RIN: 13085559 **Lab Code:** GEN **Project:** Mound LTS&M Ground Water **Validation Date:** 10/09/2013

Blank Data

Blank Type	Lab Sample ID	Lab Method	Analyte Name	Result	Qualifier	MDL	Units
Trip Blank	332594008	EPA 8260 Low Level	Toluene (Lab Contaminant)	0.170	J	0.160	ug/L

Sample ID	Sample Ticket	Location	Result	Dilution Factor	Lab Qualifier	Validation Qualifier
332594001	LJU 369	0353	0.160	1.00	U	
332594002	LJU 370	0400	0.160	1.00	U	
332594003	LJU 371	0402	0.910	1.00	J	U
332594004	LJU 372	0411	0.340	1.00	J	U
332594005	LJU 373	0443	0.160	1.00	U	
332594006	LJU 374	0444	0.160	1.00	U	
332594007	LJU 375	0445	0.270	1.00	J	U
332594009	LJU 377	9443	0.160	1.00	U	
332594010	LJU 378	P033	0.600	1.00	J	U
332594011	LJU 376	0617	0.160	1.00	U	

SAMPLE MANAGEMENT SYSTEM

Validation Report: Field Duplicates

RIN: 13085559 **Lab Code:** GEN **Project:** Mound LTS&M Ground Water **Validation Date:** 10/09/2013

Duplicate: 9443 **Sample:** 0443

Analyte	Sample Result	Sample Flag	Sample Error	Sample Dilution	Duplicate Result	Duplicate Flag	Duplicate Error	Duplicate Dilution	RPD	RER	Units
1,1,1,2-Tetrachloroethane	0.160	U		1.00	0.160	U		1.00			ug/L
1,1,1-Trichloroethane	0.160	U		1.00	0.160	U		1.00			ug/L
1,1,2,2-Tetrachloroethane	0.160	U		1.00	0.160	U		1.00			ug/L
1,1,2-Trichloro-1,2,2-trifluoroethane	1.50	U		1.00	1.50	U		1.00			ug/L
1,1,2-Trichloroethane	0.160	U		1.00	0.160	U		1.00			ug/L
1,1-Dichloroethane	0.160	U		1.00	0.160	U		1.00			ug/L
1,1-Dichloroethene	0.160	U		1.00	0.160	U		1.00			ug/L
1,1-Dichloropropene	0.160	U		1.00	0.160	U		1.00			ug/L
1,2,3-Trichlorobenzene	0.200	U		1.00	0.200	U		1.00			ug/L
1,2,3-Trichloropropane	0.160	U		1.00	0.160	U		1.00			ug/L
1,2,4-Trichlorobenzene	0.160	U		1.00	0.160	U		1.00			ug/L
1,2,4-Trimethylbenzene	0.160	U		1.00	0.160	U		1.00			ug/L
1,2-Dibromo-3-chloropropane	0.160	U		1.00	0.160	U		1.00			ug/L
1,2-Dibromoethane	0.160	U		1.00	0.160	U		1.00			ug/L
1,2-Dichlorobenzene	0.160	U		1.00	0.160	U		1.00			ug/L
1,2-Dichloroethane	0.160	U		1.00	0.160	U		1.00			ug/L
1,2-Dichloropropane	0.160	U		1.00	0.160	U		1.00			ug/L
1,3,5-Trimethylbenzene	0.160	U		1.00	0.160	U		1.00			ug/L
1,3-Dichlorobenzene	0.160	U		1.00	0.160	U		1.00			ug/L
1,3-Dichloropropane	0.160	U		1.00	0.160	U		1.00			ug/L
1,4-Dichlorobenzene	0.160	U		1.00	0.160	U		1.00			ug/L
2,2-Dichloropropane	0.160	U		1.00	0.160	U		1.00			ug/L
2-Butanone	0.500	U		1.00	0.500	U		1.00			ug/L
2-Chlorotoluene	0.160	U		1.00	0.160	U		1.00			ug/L
2-Hexanone	0.500	U		1.00	0.500	U		1.00			ug/L
4-Chlorotoluene	0.160	U		1.00	0.160	U		1.00			ug/L
4-Isopropyltoluene	0.160	U		1.00	0.160	U		1.00			ug/L
4-Methyl-2-pentanone	0.500	U		1.00	0.500	U		1.00			ug/L
Acetone	0.500	U		1.00	0.500	U		1.00			ug/L
Benzene	0.160	U		1.00	0.160	U		1.00			ug/L
Bromobenzene	0.160	U		1.00	0.160	U		1.00			ug/L
Bromochloromethane	0.160	U		1.00	0.160	U		1.00			ug/L
Bromodichloromethane	0.160	U		1.00	0.160	U		1.00			ug/L
Bromoform	0.160	U		1.00	0.160	U		1.00			ug/L
Bromomethane	0.160	U		1.00	0.160	U		1.00			ug/L
Carbon Disulfide	0.500	U		1.00	0.500	U		1.00			ug/L
Carbon Tetrachloride	0.160	U		1.00	0.160	U		1.00			ug/L
Chlorobenzene	0.160	U		1.00	0.160	U		1.00			ug/L
Chloroethane	0.160	U		1.00	0.160	U		1.00			ug/L
Chloroform	0.160	U		1.00	0.160	U		1.00			ug/L

SAMPLE MANAGEMENT SYSTEM

Validation Report: Field Duplicates

RIN: 13085559 **Lab Code:** GEN **Project:** Mound LTS&M Ground Water **Validation Date:** 10/09/2013

Duplicate: 9443 **Sample:** 0443

Analyte	Sample Result	Sample Flag	Sample Error	Sample Dilution	Duplicate Result	Duplicate Flag	Duplicate Error	Duplicate Dilution	RPD	RER	Units
Chloromethane	0.160	U		1.00	0.160	U		1.00			ug/L
cis-1,2-Dichloroethene	0.380	J		1.00	0.290	J		1.00			ug/L
cis-1,3-Dichloropropene	0.160	U		1.00	0.160	U		1.00			ug/L
Dibromochloromethane	0.160	U		1.00	0.160	U		1.00			ug/L
Dibromomethane	0.160	U		1.00	0.160	U		1.00			ug/L
Dichlorodifluoromethane	0.160	U		1.00	0.160	U		1.00			ug/L
Ethylbenzene	0.160	U		1.00	0.160	U		1.00			ug/L
Hexachlorobutadiene	0.160	U		1.00	0.160	U		1.00			ug/L
Isopropylbenzene	0.160	U		1.00	0.160	U		1.00			ug/L
Methylene Chloride	1.06	BJ		1.00	0.160	U		1.00			ug/L
Naphthalene	0.160	U		1.00	0.160	U		1.00			ug/L
n-Butylbenzene	0.160	U		1.00	0.160	U		1.00			ug/L
n-Propylbenzene	0.160	U		1.00	0.160	U		1.00			ug/L
sec-Butylbenzene	0.160	U		1.00	0.160	U		1.00			ug/L
Styrene	0.160	U		1.00	0.160	U		1.00			ug/L
tert-Butylbenzene	0.160	U		1.00	0.160	U		1.00			ug/L
Tetrachloroethene	0.160	U		1.00	0.160	U		1.00			ug/L
Toluene	0.160	U		1.00	0.160	U		1.00			ug/L
Total Xylenes	0.160	U		1.00	0.160	U		1.00			ug/L
trans-1,2-Dichloroethene	0.160	U		1.00	0.160	U		1.00			ug/L
trans-1,3-Dichloropropene	0.160	U		1.00	0.160	U		1.00			ug/L
Trichloroethene	8.85			1.00	6.77			1.00	26.63		ug/L
Trichlorofluoromethane	0.160	U		1.00	0.160	U		1.00			ug/L
Vinyl Chloride	0.160	U		1.00	0.160	U		1.00			ug/L

SAMPLE MANAGEMENT SYSTEM

Non-Compliance Report: Method Blanks

RIN: 13085559 **Lab Code:** GEN

Project: Mound LTS&M Ground Water

Validation Date: 10/09/2013

Method Blank	Date Analyzed	Method	Analyte	Result	Flag(s)	MDL
1202943018	09/07/2013	EPA 8260 Low Level	Methylene Chloride	1.20	J	0.16
1202955001	09/11/2013	EPA 8260 Low Level	Methylene Chloride	1.48	J	0.16

SAMPLE MANAGEMENT SYSTEM

Non-Compliance Report: LCS Recovery

RIN: 13085559 **Lab Code:** GEN

Project: Mound LTS&M Ground Water

Validation Date: 10/09/2013

LCS/LCSD	Date Analyzed	Method	Analyte	Recovery	Lower Limit	Upper Limit
LCS	09/07/2013	EPA 8260 Low Level	1,1,2-Trichloro-1,2,2-trifluoroethane	145.0	70.0	130.0
LCS	09/07/2013	EPA 8260 Low Level	Trichlorofluoromethane	121.0	76.0	120.0

SAMPLE MANAGEMENT SYSTEM
Organics Data Validation Summary

RIN: 13085559 **Project:** Mound LTS&M Ground Water **Lab Code:** GEN **Validation Date:** 10/09/2013

LCS Recovery: There were 2 LCS failures.

Method Blank(s): There were 2 method blank results above the MDL.

MS/MSD Recovery: All MS/MSD recoveries were within the laboratory acceptance limits.

Surrogate Recovery: All surrogate recoveries were within the laboratory acceptance limits.

Data Review and Validation Report

General Information

Requisition No. (RIN):	13105700
Sample Event:	October 28–29, 2013
Site(s):	Mound, Ohio; Groundwater
Laboratory:	GEL Laboratories, Charleston, South Carolina
Work Order No.:	336596
Analysis:	Volatiles
Validator:	Stephen Donivan
Review Date:	January 13, 2014

This validation was performed according to the *Environmental Procedures Catalog* (LMS/POL/S04325), *"Standard Practice for Validation of Environmental Data."* The procedure was applied at Level 2, Data Deliverables Verification. See attached Data Validation Worksheets for supporting documentation on the data review and validation. All analyses were successfully completed. The samples were prepared and analyzed using accepted procedures based on methods specified by line item code, which are listed in Table 1.

Table 1. Analytes and Methods

Analyte	Line Item Code	Prep Method	Analytical Method
Volatile Organics, VOA	VOA-A-007	SW-846 5030B	SW-846 8260B

Data Qualifier Summary

Analytical results were qualified as listed in Table 2. Refer to the sections below for an explanation of the data qualifiers applied.

Table 2. Data Qualifier Summary

Sample Number	Location	Analyte(s)	Flag	Reason
336596001	0118	1,2,4-Trimethylbenzene	J	Matrix spike recovery
336596001	0118	4-Chlorotoluene	J	Matrix spike recovery
336596001	0118	Chlorobenzene	J	Matrix spike recovery
336596001	0118	Ethylbenzene	J	Matrix spike recovery

Sample Number	Location	Analyte(s)	Flag	Reason
336596007	0315	Methylene Chloride	U	Less than 10 times the method blank
336596009	0347	Methylene Chloride	U	Less than 10 times the method blank
336596010	0379	Methylene Chloride	U	Less than 10 times the method blank
336596011	0386	Methylene Chloride	U	Less than 10 times the method blank
336596012	0387	Methylene Chloride	U	Less than 10 times the method blank
336596013	0389	Methylene Chloride	U	Less than 10 times the method blank
336596014	0392	Methylene Chloride	U	Less than 10 times the method blank
336596017	0605	1,2,3-Trichloropropane	J	Matrix spike recovery
336596017	0605	Bromomethane	J	Matrix spike recovery
336596017	0605	Chloroethane	J	Matrix spike recovery
336596017	0605	Trichlorofluoromethane	J	Matrix spike recovery
336596017	0605	Vinyl Chloride	J	Matrix spike recovery

Sample Shipping/Receiving

GEL Laboratories in Charleston, South Carolina, received 22 water samples on October 31, 2013, accompanied by a Chain of Custody (COC) form. The COC form was checked to confirm that all of the samples were listed with sample collection dates and times, and that signatures and dates were present indicating sample relinquishment and receipt. The COC form was complete with no errors or omissions. The air waybill number was listed on the receiving documentation.

Preservation and Holding Times

The sample shipments were received intact with the temperature inside the iced cooler of 2 °C, which complies with requirements. All samples were received in the correct container types and had been preserved correctly for the requested analyses. Sample analysis was completed within the applicable holding times.

Detection and Quantitation Limits

The method detection limit (MDL) was reported for all organic analytes as required. The MDL, as defined in 40 CFR 136, is the minimum concentration of an analyte that can be measured and reported with 99% confidence that the analyte concentration is greater than zero. The practical quantitation limit (PQL) for these analytes is the lowest concentration that can be reliably measured, and is defined as 5 times the MDL.

The reported MDLs for all organic analytes demonstrate compliance with contractual requirements.

Laboratory Instrument Calibration

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing acceptable qualitative and quantitative data for all analytes. Initial calibration demonstrates that the instrument is capable of acceptable performance in the beginning of the analytical run. Compliance requirements for continuing calibration checks are established to ensure that the instrument continues to be capable of producing acceptable

qualitative and quantitative data. All laboratory instrument calibrations were performed correctly in accordance with the cited methods. All calibration and laboratory spike standards were prepared from independent sources.

Volatiles Internal Standards and Surrogates

The volatile internal standard recoveries and surrogate recoveries were within the acceptance ranges for all samples.

Method Blanks

Method blanks are analyzed to assess any contamination that may have occurred during sample preparation. The method blank results were below the practical quantitation limits. Methylene chloride and naphthalene were detected in the method blank. Associated sample results that are greater than the MDL but less than ten times the blank concentration are qualified with a "U" flag as not detected.

Trip Blank

A trip blank was collected to document contamination attributable to shipping and field handling procedures. This type of blank is useful in documenting contamination of volatile organic samples. There were no analytes detected in the trip blank.

Matrix Spike Analysis

Matrix spike and matrix spike duplicate (MS/MSD) samples are used to measure method performance in the sample matrix. The MS/MSD data are not evaluated when the concentration of the unspiked sample is greater than four times the spike. The spike recoveries met the acceptance criteria for all analytes evaluated with the following exceptions.

The MS recoveries from sample 0118 for four analytes were below the acceptance range. The associated sample results for these analytes are qualified with a "J" flag as estimated values

The MS recoveries from sample 0605 for five analytes were below the acceptance range. The associated sample results for these analytes are qualified with a "J" flag as estimated values.

Laboratory Replicate Analysis

Laboratory replicate analyses are used to determine laboratory precision for each sample matrix. The relative percent difference for organic replicate results were less than the laboratory-derived control limits with the following exception. The MS/MSD results for five analytes did not meet the laboratory precision criteria. None of the analytes were detected in the associated samples, requiring no qualification.

Laboratory Control Sample

Laboratory control samples (LCS) were analyzed at the correct frequency to provide information on the accuracy of the analytical method and the overall laboratory performance, including sample preparation. All control sample results were acceptable.

Field Duplicate

Field duplicate samples are collected and analyzed as an indication of overall precision of the measurement process. The precision observed includes both field and laboratory precision and has more variability than laboratory duplicates, which measure only laboratory performance. The relative percent difference for duplicate results that are greater than five times the practical quantitation limit (PQL) should be less than 20 percent. For results that are less than five times the PQL, the range should be no greater than the PQL. A duplicate sample was collected from location 0605 (field duplicate ID 9605). The duplicate results met the criteria for all compounds.

Completeness

Results were reported in the correct units for all analytes requested using contract-required laboratory qualifiers.

Electronic Data Deliverable File

The EDD file arrived on December 2, 2013. The Sample Management System EDD validation module was used to verify that the EDD file was complete and in compliance with requirements. The module compares the contents of the file to the requested analyses to ensure all and only the requested data are delivered. The contents of the EDD were manually examined to verify that the sample results accurately reflect the data contained in the sample data package.

Sampling Protocol

Sample results for all monitoring wells were the Category I or II low-flow sampling criteria was documented and were qualified with an “F” flag in the database, indicating the wells were purged and sampled using the low-flow sampling method.

The turbidity criterion was not met for well 0346. The field data and laboratory results from this well are further qualified with a “J” flag because the Category I purging criteria from Program Directive MND-2013-01 were not met.

Outliers Report

Potential outliers are measurements that are extremely large or small relative to the rest of the data and, therefore, are suspected of misrepresenting the population from which they were collected. Potential outliers may result from transcription errors, data-coding errors, or measurement system problems. However, outliers may also represent true extreme values of a distribution and indicate more variability in the population than was expected.

Statistical outlier tests give probabilistic evidence that an extreme value does not "fit" with the distribution of the remainder of the data and is therefore a statistical outlier. These tests should only be used to identify data points that require further investigation. The tests alone cannot determine whether a statistical outlier should be discarded or corrected within a data set.

There are three steps involved in identifying extreme values or outliers:

1. Identify extreme values that may be potential outliers by generating the Outliers Report using the Sample Management System from data in the environmental database. The application compares the new data set (in standard environmental database units) with historical data and lists the new data that fall outside the historical data range. A determination is also made if the data are normally distributed using the Shapiro-Wilk Test.
2. Apply the appropriate statistical test. Dixon's Extreme Value test is used to test for statistical outliers when the sample size is less than or equal to 25. This test considers both extreme values that are much smaller than the rest of the data (case 1) and extreme values that are much larger than the rest of the data (case 2). This test is valid only if the data without the suspected outlier are normally distributed. Rosner's Test is a parametric test that is used to detect outliers for sample sizes of 25 or more. This test also assumes that the data without the suspected outliers are normally distributed.
3. Scientifically review statistical outliers and decide on their disposition. The review should include an evaluation of any notable trends in the data that may indicate the outliers represent true extreme values.

No results from this sampling event were identified as potential outliers.

Report Prepared By: _____

Stephen Donivan
Laboratory Coordinator

SAMPLE MANAGEMENT SYSTEM

General Data Validation Report

RIN: 13105700 **Lab Code:** GEN **Validator:** Stephen Donivan **Validation Date:** 01/13/2014

Project: Mound LTS&M Ground Water **Analysis Type:** ☐ Metals ☐ General Chem ☐ Rad ☑ Organics

# of Samples: 22 **Matrix:** Water **Requested Analysis Completed:** Yes

Chain of Custody

Present: OK **Signed:** OK **Dated:** OK

Sample

Integrity: OK **Preservation:** OK **Temperature:** OK

Select Quality Parameters

☑ Holding Times	All analyses were completed within the applicable holding times.
☑ Detection Limits	The reported detection limits are equal to or below contract requirements.
☑ Field/Trip Blanks	There was 1 trip/equipment blank evaluated.
☑ Field Duplicates	There was 1 duplicate evaluated.

SAMPLE MANAGEMENT SYSTEM

Validation Report: Field Duplicates

RIN: 13105700 **Lab Code:** GEN **Project:** Mound LTS&M Ground Water **Validation Date:** 01/13/2014

Duplicate: 9605 **Sample:** 0605

Analyte	Sample Result	Sample Flag	Sample Error	Sample Dilution	Duplicate Result	Duplicate Flag	Duplicate Error	Duplicate Dilution	RPD	RER	Units
1,1,1,2-Tetrachloroethane	0.160	U		1.00	0.160	U		1.00			ug/L
1,1,1-Trichloroethane	0.160	U		1.00	0.160	U		1.00			ug/L
1,1,2,2-Tetrachloroethane	0.160	U		1.00	0.160	U		1.00			ug/L
1,1,2-Trichloro-1,2,2-trifluoroethane	1.50	U		1.00	1.50	U		1.00			ug/L
1,1,2-Trichloroethane	0.160	U		1.00	0.160	U		1.00			ug/L
1,1-Dichloroethane	0.160	U		1.00	0.160	U		1.00			ug/L
1,1-Dichloroethene	0.160	U		1.00	0.160	U		1.00			ug/L
1,1-Dichloropropene	0.160	U		1.00	0.160	U		1.00			ug/L
1,2,3-Trichlorobenzene	0.200	U		1.00	0.200	U		1.00			ug/L
1,2,3-Trichloropropane	0.160	U		1.00	0.160	U		1.00			ug/L
1,2,4-Trichlorobenzene	0.160	U		1.00	0.160	U		1.00			ug/L
1,2,4-Trimethylbenzene	0.160	U		1.00	0.160	U		1.00			ug/L
1,2-Dibromo-3-chloropropane	0.160	U		1.00	0.160	U		1.00			ug/L
1,2-Dibromoethane	0.160	U		1.00	0.160	U		1.00			ug/L
1,2-Dichlorobenzene	0.160	U		1.00	0.160	U		1.00			ug/L
1,2-Dichloroethane	0.160	U		1.00	0.160	U		1.00			ug/L
1,2-Dichloropropane	0.160	U		1.00	0.160	U		1.00			ug/L
1,3,5-Trimethylbenzene	0.160	U		1.00	0.160	U		1.00			ug/L
1,3-Dichlorobenzene	0.160	U		1.00	0.160	U		1.00			ug/L
1,3-Dichloropropane	0.160	U		1.00	0.160	U		1.00			ug/L
1,4-Dichlorobenzene	0.160	U		1.00	0.160	U		1.00			ug/L
2,2-Dichloropropane	0.160	U		1.00	0.160	U		1.00			ug/L
2-Butanone	0.500	U		1.00	0.500	U		1.00			ug/L
2-Chlorotoluene	0.160	U		1.00	0.160	U		1.00			ug/L
2-Hexanone	0.500	U		1.00	0.500	U		1.00			ug/L
4-Chlorotoluene	0.160	U		1.00	0.160	U		1.00			ug/L
4-Isopropyltoluene	0.160	U		1.00	0.160	U		1.00			ug/L
4-Methyl-2-pentanone	0.500	U		1.00	0.500	U		1.00			ug/L
Acetone	0.500	U		1.00	0.500	U		1.00			ug/L
Benzene	0.160	U		1.00	0.160	U		1.00			ug/L
Bromobenzene	0.160	U		1.00	0.160	U		1.00			ug/L
Bromochloromethane	0.160	U		1.00	0.160	U		1.00			ug/L
Bromodichloromethane	0.160	U		1.00	0.160	U		1.00			ug/L
Bromoform	0.160	U		1.00	0.160	U		1.00			ug/L
Bromomethane	0.160	U		1.00	0.160	U		1.00			ug/L
Carbon Disulfide	0.500	U		1.00	0.500	U		1.00			ug/L
Carbon Tetrachloride	0.160	U		1.00	0.160	U		1.00			ug/L
Chlorobenzene	0.160	U		1.00	0.160	U		1.00			ug/L
Chloroethane	0.160	U		1.00	0.160	U		1.00			ug/L
Chloroform	0.590	J		1.00	0.590	J		1.00			ug/L

SAMPLE MANAGEMENT SYSTEM

Validation Report: Field Duplicates

RIN: 13105700 **Lab Code:** GEN **Project:** Mound LTS&M Ground Water **Validation Date:** 01/13/2014

Duplicate: 9605 **Sample:** 0605

Analyte	Sample Result	Sample Flag	Sample Error	Sample Dilution	Duplicate Result	Duplicate Flag	Duplicate Error	Duplicate Dilution	RPD	RER	Units
Chloromethane	0.160	U		1.00	0.160	U		1.00			ug/L
cis-1,2-Dichloroethene	1.34			1.00	1.27			1.00	5.36		ug/L
cis-1,3-Dichloropropene	0.160	U		1.00	0.160	U		1.00			ug/L
Dibromochloromethane	0.160	U		1.00	0.160	U		1.00			ug/L
Dibromomethane	0.160	U		1.00	0.160	U		1.00			ug/L
Dichlorodifluoromethane	0.160	U		1.00	0.160	U		1.00			ug/L
Ethylbenzene	0.160	U		1.00	0.160	U		1.00			ug/L
Hexachlorobutadiene	0.160	U		1.00	0.160	U		1.00			ug/L
Isopropylbenzene	0.160	U		1.00	0.160	U		1.00			ug/L
Methylene Chloride	0.160	U		1.00	0.160	U		1.00			ug/L
Naphthalene	0.160	U		1.00	0.160	U		1.00			ug/L
n-Butylbenzene	0.160	U		1.00	0.160	U		1.00			ug/L
n-Propylbenzene	0.160	U		1.00	0.160	U		1.00			ug/L
sec-Butylbenzene	0.160	U		1.00	0.160	U		1.00			ug/L
Styrene	0.160	U		1.00	0.160	U		1.00			ug/L
tert-Butylbenzene	0.160	U		1.00	0.160	U		1.00			ug/L
Tetrachloroethene	0.200	J		1.00	0.180	J		1.00			ug/L
Toluene	0.310	J		1.00	0.670	J		1.00			ug/L
Total Xylenes	0.160	U		1.00	0.160	U		1.00			ug/L
trans-1,2-Dichloroethene	0.300	J		1.00	0.270	J		1.00			ug/L
trans-1,3-Dichloropropene	0.160	U		1.00	0.160	U		1.00			ug/L
Trichloroethene	13.5			1.00	13.0			1.00	3.77		ug/L
Trichlorofluoromethane	0.160	U		1.00	0.160	U		1.00			ug/L
Vinyl Chloride	0.160	U		1.00	0.160	U		1.00			ug/L

SAMPLE MANAGEMENT SYSTEM
Organics Data Validation Summary

RIN: 13105700 **Project:** Mound LTS&M Ground Water **Lab Code:** GEN **Validation Date:** 01/13/2014

LCS Recovery: All LCS recoveries were within the laboratory acceptance limits.

Method Blank(s): There were 2 method blank results above the MDL.

MS/MSD Recovery: There were 15 MS/MSD failures.

Surrogate Recovery: All surrogate recoveries were within the laboratory acceptance limits.

SAMPLE MANAGEMENT SYSTEM

Non-Compliance Report: Method Blanks

RIN: 13105700 **Lab Code:** GEN

Project: Mound LTS&M Ground Water

Validation Date: 01/13/2014

Method Blank	Date Analyzed	Method	Analyte	Result	Flag(s)	MDL
1202982777	11/08/2013	EPA 8260 Low Level	Methylene Chloride	0.50	J	0.16
1202982777	11/08/2013	EPA 8260 Low Level	Naphthalene	0.34	J	0.16

SAMPLE MANAGEMENT SYSTEM

Non-Compliance Report: MS/MSD Performance

RIN: 13105700 **Lab Code:** GEN

Project: Mound LTS&M Ground Water

Validation Date: 01/13/2014

MS/MSD	Date Analyzed	Method	Analyte	Recovery MS	Recovery MSD	Lower Limit	Upper Limit	MSD RPD	RPD Limit
LLR 248	11/09/2013	EPA 8260 Low Level	1,1,2,2-Tetrachloroethane	113.0	90.7	76.0	116.0	22.00	20.0
LLR 248	11/09/2013	EPA 8260 Low Level	1,2,3-Trichloropropane	117.0	90.9	74.0	114.0	25.00	20.0
LLR 248	11/09/2013	EPA 8260 Low Level	1,2-Dibromo-3-chloropropane	91.9	74.5	64.0	117.0	21.00	20.0
LLR 248	11/09/2013	EPA 8260 Low Level	2-Butanone	80.9	63.4	47.0	162.0	24.00	20.0
LLR 248	11/09/2013	EPA 8260 Low Level	2-Hexanone	94.4	72.3	57.0	150.0	27.00	20.0
LLR 248	11/09/2013	EPA 8260 Low Level	4-Methyl-2-pentanone	105.0	84.7	77.0	120.0	22.00	20.0
LLR 248	11/09/2013	EPA 8260 Low Level	Bromomethane	69.2	84.1	75.0	120.0		
LLR 248	11/09/2013	EPA 8260 Low Level	Chloroethane	63.0	74.3	74.0	120.0		
LLR 248	11/09/2013	EPA 8260 Low Level	Trichlorofluoromethane	67.8	78.2	76.0	120.0		
LLR 248	11/09/2013	EPA 8260 Low Level	Vinyl Chloride	65.0	79.7	66.0	116.0		
LLR 232	11/11/2013	EPA 8260 Low Level	1,2,4-Trimethylbenzene	77.7	88.8	78.0	120.0		
LLR 232	11/11/2013	EPA 8260 Low Level	4-Chlorotoluene	77.0	89.6	78.0	120.0		
LLR 232	11/11/2013	EPA 8260 Low Level	Chlorobenzene	77.8	89.0	80.0	108.0		
LLR 232	11/11/2013	EPA 8260 Low Level	Ethylbenzene	79.7	91.2	80.0	120.0		