DRAFT

OPERABLE UNIT THREE
MONITORING PROGRAM REPORT, 2013

W.R. GRACE SUPERFUND SITE
ACTON, MASSACHUSETTS

PREPARED FOR:

W.R. GRACE & CO. – CONN.
62 WHITTEMORE AVENUE
CAMBRIDGE, MASSACHUSETTS 02140

PREPARED BY:

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ONE MONARCH DRIVE
LITTLETON, MASSACHUSETTS 01460

TETRA TECH PROJECT NO. 117-3008084-26

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1,2-DCA	1,2-dichloroethane
AWD	Acton Water District
cfs	cubic feet per second
DO	Dissolved Oxygen
EPH	Extractable Petroleum Hydrocarbons
FS	Feasibility Study
FSP	Field Sampling Plan
Gpm	gallons per minute
Grace	W.R. Grace & Co. - Conn.
IGCL	Interim Groundwater Cleanup Level
MNA	Monitored Natural Attenuation
OU-3	Operable Unit 3
ORP	Oxidation-Reduction Potential
ORSG	Office of Research and Standards Guideline
PCE	tetrachloroethene
PDB	Passive Diffusion Bag
POP	Project Operations Plan
QAPP	Quality Assurance Project Plan
RD/RA	Remedial Design/Remedial Action
RI	Remedial Investigation
ROD	Record of Decision
Site	W.R. Grace & Co. - Conn. Acton Superfund Site
TCA	1,1,1-trichloroethane
TCE	trichloroethene
trend test	Mann-Kendall trend test for small sample sizes
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
VDC	1,1-dichloroethene or vinylidene chloride
VOC	Volatile Organic Compound
VPH	Volatile Petroleum Hydrocarbons

1 INTRODUCTION

This report presents the results of the Operable Unit Three (OU-3) groundwater monitoring done at the W.R. Grace & Co. - Conn. (Grace) Superfund Site in Acton, Massachusetts (the "Site") between November 1, 2012 and October 31, 2013. The current OU-3 monitoring program was defined in the Groundwater Monitoring Plan (GeoTrans, 2006) and modified by the letter Re: *Response to Comments on the September 12, 2006 Draft RD/RA Groundwater Monitoring Plan* (GeoTrans, 2007b) as well as by subsequent minor changes approved by the United States Environmental Protection Agency (USEPA).

The goals of the Site groundwater monitoring program evolved as the remedial actions at the Site have been implemented. There is active remediation in two areas of the Site, the Southeast and Southwest Landfill Areas where five active groundwater extraction wells are located (MLF, SELF-1, SELF-2, SWLF-2 and WLF). An additional extraction well (NE-1) and two injection wells (RE-1 and RE-2) were in operation in the Northeast Area of the Site through September 24, 2013. These wells were shut down in accordance with the conditional approval granted by USEPA on September 20, 2013 (USEPA, 2013). With the shutdown of the Northeast Area groundwater extraction/injection and treatment system, four geographic areas of the Site, the Former Lagoon Area, the Northeast Area, the Southwest Area, and the Assabet River Area, are being remediated through monitored natural attenuation (MNA) processes. Figure 1-1 is a Site map showing the locations of the extraction wells in the Industrial Landfill Area and the now shut down extraction and injection wells in the Northeast Area.

The goals of the Site-wide monitoring program during this reporting period include:

- Groundwater level monitoring to confirm that the Landfill Area groundwater capture zone is being achieved;
- Groundwater quality monitoring within the Landfill Area groundwater capture zone to assess changes in groundwater quality within the capture zone;
- Water quality monitoring of the Northeast Area extraction system to assess the effectiveness of the remedial system at removing contaminant mass; and
- Groundwater quality monitoring outside of the Landfill Area groundwater capture zones and the Northeast Area targeted remediation area to assess the natural attenuation of contaminant concentrations in groundwater not being actively captured and treated.

The OU-3 groundwater monitoring program does not include treatment system monitoring. Treatment system monitoring was done in accordance with the Northeast Area Groundwater Operation and Maintenance Plan (O&M and GeoTrans, 2010) and the Landfill Area Groundwater Operation and Maintenance Plan (O&M and Tetra Tech GEO, 2012). Information related to operation of the two treatment systems, including mass removal information, will be included in the Groundwater Extraction Systems Operations Report, January 2013 through December 2013, to be submitted in early 2014.

2 WATER LEVEL MONITORING

A Site-wide water level measurement round was performed on September 9 and 10, 2013. Four of the five Acton Water District (AWD) public water supply wells located within the Site boundaries, the five Landfill Area extraction wells (MLF, SELF-1, SELF-2, SWLF-2, and WLF), the one Northeast Area extraction well (NE-1), and both Northeast Area reinjection wells (RE-1 and RE-2) were operational at the time the measurements were collected. The AWD Christofferson well was not operational at the time of the water level measurements. Table 2-1 summarizes the water levels measured on September 9 and 10, 2013 and Table 2-2 summarizes the pumping rates of the public water supply wells and extraction wells September 9 through 10, 2013. On average, September 2013 water levels were approximately 0.5 feet lower than September 2012 water levels. Figures 2-1 and 2-2 illustrate the September 2013 water levels measured in the wells open to the unconsolidated deposits and bedrock, respectively. Figures 2-1 and 2-2 show that general directions of groundwater flow are to the south and southeast toward the Assabet River and to the north and northwest toward Fort Pond Brook. Some of the Site groundwater is captured by the operating extraction wells. The following sections further describe groundwater flow within the Site.

2.1 NORTHEAST OF GRACE PROPERTY

As indicated in Table 2-2, extraction well NE-1 was pumping at approximately 19.7 gallons per minute (gpm) during the water level monitoring event. Following treatment, the extracted groundwater was reinjected into the ground using injection wells RE-1 and RE-2.

Figures 2-1 and 2-2 show that a water table and bedrock potentiometric level high extends from the northeastern edge of the Grace property onto the Linde (formerly BOC Gases) property to the northeast. Groundwater from the area of higher water table and potentiometric elevation flows to the northwest and north toward Fort Pond Brook and northeast toward the School Street well field. There is a localized groundwater mound on the unconsolidated deposits potentiometric map around reinjection wells RE-1 and RE-2 due to reinjection of groundwater at these locations.

The bedrock potentiometric map shows a small depression in the potentiometric surface around extraction well NE-1, due to pumping from that well. The limited areal extent of the

hydraulic impact of extraction/reinjection in this area is consistent with the observations made during installation and start-up of the Northeast Area extraction system as summarized in the Interim Northeast Area Groundwater Remedial Action Report (GeoTrans and O&M, 2011).

Water level data from monitoring well clusters located northeast of the Grace property, and east of the AWD School Street wellfield, clearly illustrate a northwesterly hydraulic gradient in the unconsolidated deposits from wells AR-33D and AR-34D toward the AWD public water supply wells and Fort Pond Brook (Figure 2-1). The bedrock water level data also indicate a northwesterly hydraulic gradient from the AR-34 cluster toward the AWD public water supply wells and Fort Pond Brook (Figure 2-2). The water level data indicate that east of the School Street wellfield, groundwater in the unconsolidated deposits and bedrock flows northwesterly toward the public water supply wells and Fort Pond Brook. The data indicate that the impacted groundwater from the Grace property does not migrate beyond the public water supply wells. Impacted water from the Grace property either 1) is captured by the public water supply wells and treated or 2) discharges to Fort Pond Brook.

2.2 LANDFILL AREA

The Landfill Area extraction wells were pumping at a total average rate of approximately 55.8 gpm during the water level round. Table 2-2 indicates the pumping rate of each of the five Landfill Area extraction wells during the water level round. Figures 2-1 and 2-2 show shallow unconsolidated deposits and bedrock potentiometric contours for the entire Site. Figure 2-3 is a potentiometric contour map of the deep unconsolidated deposits in the Landfill Area.

Figures 2-1 and 2-3 show that the capture zone in the unconsolidated deposits extends from the area west of extraction wells SWLF-2 and WLF to the east, beyond extraction wells SELF-1 and SELF-2. The deep unconsolidated deposits capture zone extends further to the south in the southwestern and south-central portions of the landfill than does the shallow unconsolidated deposits capture zone.

The capture zone in bedrock, shown on Figure 2-2, extends from the area west of extraction well SWLF-2 to the east, beyond extraction well MLF and east of extraction wells SELF-1 and SELF-2. The bedrock capture zone is more extensive than the deep unconsolidated deposits capture zone in the area southwest of the Industrial Landfill, but less extensive in the

area southeast of the Landfill. Figure 2-4 shows that, downgradient of the western portion of the Industrial Landfill, along Section A-A', the capture zone extends through the deep unconsolidated deposits and into the bedrock. Downgradient of the eastern portion of the Industrial Landfill, along Section B-B' (Figure 2-5), the capture zone extends through the unconsolidated deposits and into the uppermost bedrock and extends to the southeast to beyond monitoring well cluster LF-22. The section locations are shown on Figure 1-1.

2.3 VERTICAL HYDRAULIC GRADIENTS

Vertical hydraulic gradients are downward between the unconsolidated deposits and bedrock across most of the Site. Near the Assabet River and Fort Pond Brook, however, vertical hydraulic gradients are generally upward, indicating that the river and brook are groundwater discharge locations for bedrock and unconsolidated deposits groundwater. In proximity to pumping wells, observed hydraulic gradients can be upward or downward depending upon the relative position of the monitoring well screened interval and the open interval of the pumping well.

3 GROUNDWATER QUALITY SAMPLING

Groundwater samples for the annual groundwater sampling round were collected between August 21, 2013 and September 19, 2013. Groundwater samples were analyzed for volatile organic compounds (VOCs), inorganic compounds, geochemical parameters and 1,4-dioxane. In addition, groundwater samples were collected from several locations in the Northeast Area to be analyzed for extractable petroleum hydrocarbons (EPH) and volatile petroleum hydrocarbons (VPH).

Tetra Tech performed a Tier 1 validation of the VOC, inorganic compound, and 1,4-dioxane results. The data were checked for completeness and the lab narrative was reviewed. The data were qualified by the lab based on quality control results, holding times, and preservation.

The groundwater sampling results are summarized below.

3.1 SAMPLING FOR VOC ANALYSIS

Groundwater samples were collected for VOC analysis from monitoring and extraction wells and from beneath the Assabet River. These results are described in the following sections.

3.1.1 MONITORING AND EXTRACTION WELL SAMPLING

Groundwater sampling was conducted between August 21, 2013 and September 19, 2013. Samples were collected from 70 wells for VOC analysis. Groundwater sampling was done according to the procedures outlined in the Field Sampling Plan (FSP) (HSI GeoTrans, 2000a) and the Project Operations Plan Addendum (POP) (GeoTrans 2007a). Groundwater samples from 34 locations were collected using passive diffusion bag (PDB) samplers. The results of the VOC analyses are included in Table A-1 of Attachment A.

3.1.2 SUB-RIVER GROUNDWATER SAMPLING

In addition to the groundwater samples collected from wells, two groundwater samples were collected from beneath the Assabet River at transect ASBRV-T6 using PDB samplers. These sub-river groundwater samples were collected to evaluate the VOC concentrations in groundwater that discharges to the river. The diffusion bag sampling was done during low river flow conditions to maximize the potential that the samples would be representative of discharging groundwater and not of recharging surface water. The location of sub-river sampling transect ASBRV-T6 is shown on Figure 2-1.

Two water-filled diffusion bag samplers were deployed beneath the Assabet River at transect ASBRV-T6 on August 7, 2013. The samplers consisted of low-density polyethylene bags filled with laboratory water. The sample location naming convention was as follows: location 'A' was one-quarter of the distance across the river from the bank closest to the Grace Site and location 'B' was one-third of the distance across the river. The samplers were placed approximately six-inches beneath the riverbed at each location and marked with flagging tape. The samplers were removed from the river on September 6, 2013. The results of the sub-river groundwater analyses are included in Table A-1 of Attachment A and discussed in Section 3.1.3.

A temporary piezometer was installed at transect ASBRV-T6 to determine the direction of the vertical hydraulic gradient between the groundwater and the Assabet River. The groundwater level and the river water level were measured during installation and upon retrieval of the diffusion bag samplers on August 7, 2013, and September 6, 2013, respectively. Water level measurements collected from the piezometer are included on the diffusion bag sub-river sampling form included as Attachment B. Upward vertical hydraulic gradients of 0.11 and 0.02 were calculated from water level measurements made during diffusion bag sampler installation and retrieval.

Daily average flow in the Assabet River, as measured at the United States Geological Survey (USGS) gauging station located approximately 1.5 miles upstream of the Site in Maynard, ranged between 24 and 190 cubic feet per second (cfs) during the time period the diffusion bag samplers were in the river. Figure 3-1 is a graph showing the daily average flow rate in the river during 2013. As can be seen on Figure 3-1, flow in the Assabet River was low during the time the diffusion bag samplers were deployed. Historical hydraulic gradient and river flow measurements indicate that upward hydraulic gradients are present when river flow rates are less than 400 cfs. The Assabet River daily average flow was below 200 cfs for the entire period that the PDBs were in the river.

3.1.3 DISTRIBUTION OF VOCS WITH INTERIM GROUNDWATER CLEANUP LEVELS (IGCLS)

This section describes the current distribution of VOCs detected in groundwater. Table 3-1 compares the VOC results from groundwater samples collected between August 21, 2013 and September 19, 2013 to the Interim Groundwater Cleanup Level (IGCL) for each compound. The IGCLs for groundwater at the Site are defined in the Record of Decision (ROD) (USEPA, 2005). The following information is listed in Table 3-1 for each compound:

- The IGCL;
- The number of locations at which the compound was detected at a concentration greater than the IGCL;
- The total number of locations for which the compound was analyzed;
- The number of samples in which the compound was detected at concentrations greater than the IGCL;
- The total number of samples for which the compound was analyzed;
- The number of samples in which the compound was detected; and
- The maximum detected concentration.

Compounds detected above the IGCL in at least one sample are marked with an asterisk on the right side of the table.

As indicated in Table 3-1, 79 samples for VOC analysis were collected from a total of 72 locations (70 wells plus two locations at sub-river transect ASBRV-T6). Six of the eight VOCs were detected in at least one of the 72 sampling locations at a concentration greater than their IGCL (see Table 3-1). The three compounds detected most frequently at a concentration greater than their IGCL were 1,1-dichloroethene (VDC), vinyl chloride, and benzene. They were detected at a concentration greater than their IGCL at 27, 31, and 15 locations, respectively. These compounds were the most widespread in their occurrence. The other three VOCs which were detected at a concentration above their IGCL in a sample from at least one location were 1,2-dichloroethane (1,2-DCA), 1,2-dichloropropane, and trichloroethene (TCE). These three compounds were only detected at a concentration greater than their IGCL at six, three, and one locations, respectively. The following sections describe the distribution of the six compounds that were detected above their IGCL in at least one sampling location.

Figures 3-2 and 3-3 show the VDC, vinyl chloride, and benzene concentrations in groundwater samples collected from wells open to the unconsolidated deposits and bedrock, respectively. Also shown on Figure 3-2 are results of the analyses from groundwater samples collected beneath the Assabet River at transect ASBRV-T6.

3.1.3.1 VDC DISTRIBUTION

VDC was detected above the IGCL of 7 µg/L at 27 of 72 locations, and in 34 of 79 samples. The maximum VDC concentration (310 µg/L) was detected in a sample from well cluster LF-02, which is located near the Industrial Landfill. Figure 3-4 shows the maximum VDC

concentration, regardless of depth, detected in groundwater samples collected between August 21, 2013 and September 19, 2013, the most recent Site-wide sampling round. The IGCL of 7 µg/L was used as the minimum isoconcentration line on Figure 3-4. The highest concentrations of VDC, 200 µg/L or greater, were detected in the deep unconsolidated deposits and shallow bedrock groundwater adjacent to the southwestern edge of the Industrial Landfill, in monitoring well clusters LF-02 and LF-10 and in former extraction well SWLF-1.

3.1.3.2 VINYL CHLORIDE DISTRIBUTION

Vinyl chloride was detected above the IGCL of 2 µg/L at 31 of 72 locations, and in 35 of 79 samples. The maximum vinyl chloride concentration (130 µg/L) was detected in a sample from well cluster LF-02, which is located near the Industrial Landfill. Figure 3-5 shows the maximum vinyl chloride concentration, regardless of depth, detected in groundwater samples collected between August 21, 2013 and September 19, 2013, the most recent Site-wide sampling round. The IGCL of 2 µg/L was used as the minimum isoconcentration contour on Figure 3-5. The highest concentrations of vinyl chloride, greater than 100 µg/L, were detected in the shallow bedrock groundwater adjacent to the southern edge of the Industrial Landfill, in monitoring well cluster LF-02.

A comparison of Figure 3-4 to Figure 3-5 shows that the vinyl chloride is generally found in the same areas as VDC. The vinyl chloride concentrations are usually lower than the VDC concentrations. The similarity in the distribution of these two compounds reflects the fact that vinyl chloride is a breakdown product of, and was also a possible impurity (less than 0.5 parts per million) in VDC that was used by Grace.

3.1.3.3 BENZENE DISTRIBUTION

Benzene was detected above the IGCL of 5 µg/L at 15 of 72 locations and in 18 of 79 samples. Figure 3-6 shows the maximum benzene concentration, regardless of depth, detected in samples collected between August 21, 2013 and September 19, 2013, the most recent Site-wide sampling round. The IGCL of 5 µg/L was used as the minimum isoconcentration contour on Figure 3-6. Elevated concentrations of benzene are limited mainly to the area of the Industrial Landfill. The highest concentrations of benzene were detected in deep unconsolidated deposits groundwater adjacent to the southeastern edge of the Industrial Landfill, in extraction wells SELF-1 and SELF-2 and the LF-06 monitoring well cluster. The maximum benzene

concentration detected was 270 µg/L. A comparison of Figure 3-6 to Figures 3-4 and 3-5 shows that benzene is less widely distributed across the site than VDC and vinyl chloride.

3.1.3.4 DISTRIBUTION OF OTHER VOCS DETECTED ABOVE IGCLS

As indicated in Table 3-1, three other VOCs were detected above their IGCL in at least one sample. These three compounds were detected above their IGCL at six or fewer locations and were not widely distributed.

The compounds 1,2-DCA, and 1,2-dichloropropane were detected above their IGCL of 5 µg/L at six and three locations, respectively. Concentrations in excess of the IGCL for these two compounds are limited to the area downgradient of the Industrial Landfill. 1,2-DCA was detected above its IGCL in extraction wells SELF-1 and SELF-2 and monitoring wells B-08B, LF-06C, LF-22S and LF-22D. 1,2-dichloropropane was detected above its IGCL in extraction well SELF-2 and in monitoring wells LF-22S and LF-22D.

TCE was detected above its IGCL of 5 µg/L at one location. TCE was detected in a sample from one well of the PT-11 cluster, at a concentration of 7.2 µg/L. The PT-11 well cluster is located approximately 300 feet southeast of the southern edge of Turtle Pond and on the opposite side of the Assabet River from the Grace property. A review of groundwater quality data south of the Assabet River, included in Section 5.4 of the Phase 1 Data Report Addendum (GeoTrans, 2002), indicates that TCE is likely emanating from VOC sources located south of the Assabet River, and the concentrations detected in groundwater samples from the PT-11 cluster are from VOC sources that are unrelated to the Grace Site.

A table listing all the detections of 1,1,1-trichloroethane (TCA), tetrachloroethene (PCE), and TCE at the Site in 2013 is included as Table 3-2. This table lists the detections of TCA, PCE, and TCE from all samples collected in 2013 and indicates the area in which the well is located. No IGCLs were established for the Site for TCA and PCE. TCA and PCE are not detected above federal drinking water standards of 200 and 5 µg/L, respectively. TCE was detected above the IGCL at one location, as described above.

3.2 INORGANIC COMPOUND SAMPLING

Groundwater samples collected from 27 locations were analyzed for inorganic compounds for various reasons.

- Samples from nine locations were analyzed for total concentrations of the following inorganic compounds: antimony, arsenic, beryllium, chromium, iron, lead, manganese and nickel.
    - Seven monitoring wells (AR-29SBR, AR-30D, AR-31D, B-05B3, B-09B4, PS-22B, and PS-29B) located between the former source areas and the Assabet and School Street wellfields. These samples were collected from sampling locations recommended by the AWD to provide information regarding the total concentrations of inorganic compounds in groundwater upgradient of the two wellfields.
    - Two monitoring wells (RE-1OBS and RE-2OBS) to evaluate the inorganic compound concentrations in the aquifer adjacent to the reinjection wells in the Northeast Area.
- Samples from six locations were analyzed for total concentrations of the following inorganic compounds: arsenic, iron and manganese.
    - Five Landfill Area extraction wells (MLF, SELF-1, SELF-2, SWLF-2, and WLF) to monitor concentrations of inorganic compounds in groundwater influent to the Landfill Area treatment system.
    - Northeast Area extraction well NE-1 to monitoring concentrations of inorganic compounds in groundwater influent to the Northeast Area treatment system.
- Samples from 12 locations analyzed for dissolved concentrations of the following inorganic compounds: arsenic, iron and manganese.
    - Six locations near and downgradient of the Former Lagoon Area (OSA-01B, OSA-05A, OSA-06BR, OSA-07A, OSA-09B, OSA-11B) to monitor arsenic and manganese concentrations as well as geochemical conditions.
    - Six locations near and downgradient of the Industrial Landfill (AR-21, B-08C, B-08D, LF-06C, LF-12, LF-15,) to monitor arsenic and manganese concentrations as well as geochemical conditions.

Groundwater sampling was done according to the procedures outlined in the FSP (HSI GeoTrans, 2000a). The results of the inorganic compound analyses are included in Table A-2 of Attachment A.

Table 3-3 compares the concentration of arsenic, iron and manganese detected in groundwater samples collected from the 27 monitoring wells between August 21, 2013 and September 19, 2013, to the IGCL for each compound. Table 3-3 also compares the concentrations of nickel, lead, chromium, antimony and beryllium detected in groundwater samples collected from 9 monitoring wells during that same period to the IGCL for those compounds. Iron is not included in Table 3-3 because there is no IGCL for iron. The IGCLs for

groundwater are defined in the ROD (USEPA, 2005). The following information is listed in the table for each compound:

- The IGCL;
- The number of locations at which the compound was detected at concentrations greater than the IGCL;
- The total number of locations for which the compound was analyzed;
- The number of samples in which the compound was detected at concentrations greater than the IGCL;
- The total number of samples for which the compound was analyzed;
- The number of samples in which the compound was detected; and
- The maximum detected concentration.

Compounds that were detected at concentrations greater than their IGCL in at least one sample are marked with an asterisk on the right side of Table 3-3. As indicated in Table 3-3, of the seven inorganic compounds that have an IGCL, six were detected at a concentration greater than its IGCL in at least one sample. Beryllium was not detected at any of the nine locations where a sample was collected for beryllium analysis.

As shown in Table 3-3, manganese and arsenic are the inorganic compounds most commonly detected at concentrations greater than their IGCLs. As indicated in Section 3.5.3 of the Public Review Draft Remedial Investigation (RI) Report (GeoTrans, 2005a), Site data suggest that local geochemical conditions associated with Site activities in the area downgradient of the Industrial Landfill and near the former source areas have resulted in increased solubility of naturally occurring manganese and arsenic.

Manganese was detected above its IGCL of 300 µg/L at 15 of the 27 locations. The IGCL defined for manganese in the ROD is 300 µg/L. However, as indicated in the ROD, this IGCL value may be revised in the future due to the presence of elevated background concentrations of manganese. In a letter dated, September 30, 2009, Grace proposed an IGCL of 722 µg/L based on a statistical evaluation of background manganese concentrations (GeoTrans, 2009). Maps showing manganese concentrations in unconsolidated deposits and bedrock groundwater are included as Figures 3-7 and 3-8, respectively. The highest manganese concentrations, greater than 3,000 µg/L, are detected in groundwater located downgradient of the Industrial Landfill. Elevated manganese concentrations are also found in groundwater in and downgradient of the

Former Lagoon Area and in several locations between the former source areas and the public water supply wells. Manganese concentrations detected in 2013 at most locations were similar to concentrations observed in previous samples. The manganese concentration detected in AR-30D, located near the Christofferson public water supply well, was higher than detected in previous years, with a concentration of 2,600 µg/L versus the previous maximum manganese concentration of 649 µg/L. This is likely an anomalous result, as other manganese concentrations in this area were not detected at similar concentrations.

Arsenic was detected above its IGCL of 10 µg/L at ten of the 27 locations. Maps showing arsenic concentrations in unconsolidated deposits and bedrock groundwater are included as Figures 3-9 and 3-10, respectively. As shown on Figures 3-9 and 3-10, arsenic concentrations in excess of the IGCL are limited to the area downgradient of the Industrial Landfill, and in and downgradient of the Former Lagoon Area. Arsenic concentrations from locations between the former source areas and the public water supply wells were all below the IGCL of 10 µg/L.

The inorganic compounds nickel, lead, chromium and antimony were each detected above their IGCLs in only one of the nine locations from which a sample was collected. They were all detected in the sample from monitoring well AR-29SBR, a shallow bedrock well located near the Lawsbrook public water supply well. Anomalous concentrations of inorganic compounds, mainly chromium, have been detected in this well in the past. The chromium is believed to be leaching from the packers used in the construction of this monitoring well, and it is likely that leaching from the packers is also the source of the other parameters.

To summarize, groundwater with arsenic concentrations greater than the IGCL and groundwater with the highest manganese concentrations is found on the Grace property in and downgradient of the Industrial Landfill and Former Lagoon areas. The elevated arsenic and manganese concentrations are consistent with the Site conceptual model that local geochemical conditions associated with Site activities in the area downgradient of the Industrial Landfill and near the former source areas have resulted in increased solubility of naturally occurring manganese and arsenic.

With the exception of manganese in monitoring well AR-30D, the sampling results indicate that inorganic compound concentrations in groundwater near the Assabet and School Street wellfields are similar to concentrations detected in previous sampling events. There is no

indication that a plume of inorganic compound-contaminated groundwater is migrating toward the wellfields, as inorganic compound detections in excess of IGCLs are isolated. In addition, the water quality data from monitoring wells RE-1OBS and RE-2OBS, show that inorganic compound concentrations in the vicinity of the reinjection wells are below IGCLs.

3.3 GEOCHEMICAL SAMPLING

Groundwater sampling was done to monitor arsenic and manganese concentrations as well as geochemical conditions in two areas of the Site; near the Industrial Landfill and the Former Lagoon Area. Twelve locations were selected to include wells near and downgradient of the source areas that cover a range of VOC concentrations, arsenic concentrations, geochemical conditions, and lithologic units. Figure 3-11 shows the location of the 12 geochemical sampling locations. Four locations are near the Industrial Landfill, two locations are downgradient of the Industrial Landfill, three locations are near the Former Lagoons and three locations are downgradient of the Former Lagoons toward the North Lagoon Wetland. Samples from the twelve monitoring wells were analyzed for dissolved concentrations of arsenic, manganese, and iron, and for dissolved oxygen (DO), oxidation-reduction potential (ORP), and pH. The results are presented in Table 3-4. A more detailed discussion of the geochemical controls on the occurrence and distribution of arsenic and manganese in Site groundwater is provided in Section 3.5 of the Public Review Draft RI Report (GeoTrans, 2005a) and Section 1.3.1.1.3 of the Public Review Draft Feasibility Study (FS) (GeoTrans, 2005b)

The results indicate that elevated arsenic and manganese concentrations are generally associated with low ORP values (negative values), high pH values (greater than 6), and low DO values (less than 1). This is consistent with the interpretation that the degradation of organic contaminants has created reducing conditions which favor the dissolution of naturally occurring iron and manganese oxides in the aquifer. The dissolution of iron and manganese oxides results in an increase in dissolved concentrations of iron and manganese as well as arsenic, which tends to adsorb to and be co-precipitated with the iron and manganese oxides. It is expected that with continued reduction of VOC concentrations and consequent reduction in the rate of VOC degradation, less-reducing conditions will be re-established in the aquifer, and the iron and manganese oxides will precipitate, thus lowering the concentrations of iron, manganese and arsenic in groundwater.

Time-concentration plots for each of the 12 locations monitored for geochemistry are included in Attachment C. Included on the graphs for each location are: the sum of VDC, vinyl chloride and benzene, arsenic, manganese, iron, pH, ORP and dissolved oxygen. In addition, to better show trends in arsenic concentrations, separate plots showing arsenic concentrations over time for each location are included in Attachment C. Concentrations of both total and dissolved arsenic, manganese and iron are graphed; open and closed symbols are used to distinguish between dissolved and total concentrations. A trend line is included for each parameter on each graph; for arsenic, manganese and iron, the trend lines are for dissolved concentrations. The graphs show that at most locations concentrations of VOCs, arsenic, manganese and iron are decreasing as pH, dissolved oxygen and ORP are increasing.

3.4 1,4-DIOXANE SAMPLING

The compound 1,4-dioxane has historically been used throughout the United States for a variety of purposes, including use as a solvent stabilizer. Solvent stabilizers are chemicals added to chlorinated solvents such as TCE, TCA, and PCE to inhibit reactions that lead to the deterioration and ultimate breakdown of the solvents. There is currently no federal drinking water standard for 1,4-dioxane. Massachusetts has a GW-1 standard of 3 µg/L for 1,4-dioxane and the Massachusetts Office of Research and Standards Guideline (ORSG) recently reduced the guideline for 1,4-dioxane from 3 µg/L to 0.3 µg/L. Samples collected for 1,4-dioxane analysis were analyzed using EPA Method 522 according to the Quality Assurance Project Plan (QAPP) (Tetra Tech GEO, 2011).

Groundwater samples from 33 locations across the Site were analyzed for 1,4-dioxane between November 1, 2012 and October 31, 2013. Table 3-5 lists the 1,4-dioxane results from these samples and indicates the area of the Site in which the well is located. Figure 3-12 shows the maximum 1,4-dioxane concentration detected in groundwater at each location sampled between November 1, 2012 and October 31, 2013 and shows the areas of the Site.

As indicated in Table 3-5, the highest 1,4-dioxane concentrations are found downgradient of the Industrial Landfill. The maximum concentration of 34 µg/L was detected in unconsolidated deposits extraction well SELF-2.

A total of 20 wells were sampled in the Northeast Area; 18 near the School Street well field public water supply wells and two near the Northeast Area groundwater extraction and

treatment system. As shown on Figure 3-12, 1,4-dioxane concentrations near the Christofferson, Lawsbrook and Scribner public water supply wells ranged from 0.17 J µg/L to 1.2 µg/L. Concentrations in the public water supply wells themselves ranged from ND (0.2) µg/L in the Scribner 3 well to 0.43 µg/L in the Scribner 2 well.

In the area of the Northeast Area groundwater extraction and treatment system, which is located upgradient of the School Street well field, the data show that 1,4-dioxane concentrations being extracted from the bedrock groundwater range from approximately 1.7 to 2.1 µg/L, with an average concentration of approximately 1.9 µg/L. This includes concentrations shown in Table 3-5 for NE-EFF (the northeast area treatment system effluent), which, since the treatment system does not treat 1,4-dioxane, represents the concentrations being extracted from NE-1. The data from monitoring well MW-06S indicate that the unconsolidated deposits groundwater in the vicinity of the groundwater reinjected from the Northeast Area treatment system has 1,4-dioxane concentrations of approximately 2 µg/L. Groundwater samples collected between 2006 and 2009 indicate that, prior to reinjection, the 1,4-dioxane concentrations in the unconsolidated deposits from this area were approximately 0.2 µg/L.

The groundwater quality data indicate that the extraction/reinjection system is moving the 1,4-dioxane from the bedrock groundwater to the unconsolidated deposits groundwater. However, the extraction/reinjection system is not changing the ultimate discharge point of groundwater that flows beneath the Linde property. Bedrock and unconsolidated deposits groundwater beneath the Linde property flows toward either Fort Pond Brook or the School Street Public Water Supply wells. Extracting groundwater from the bedrock and reinjecting into the unconsolidated deposits beneath the Linde property does not cause groundwater to discharge to a location different from either Fort Pond Brook or the School Street Public Water Supply wells. Concentrations of 1,4-dioxane in groundwater in the School Street well field have historically been detected as high as 4 µg/L (AR-30D in 2007) and the extraction/reinjection system discharging approximately 2 µg/L into the unconsolidated deposits will not cause concentrations in the well field groundwater to increase above what has already been detected there. It is expected, with the shutdown of the NE-1 at the end of September 2013, that 1,4-dioxane concentrations in the unconsolidated deposits will return to the pre-pumping concentration of approximately 0.2 µg/L.

Six locations were sampled to evaluate the 1,4-dioxane concentrations in the vicinity of the Assabet well field. As shown on Figure 3-12, 1,4-dioxane concentrations in monitoring wells in the Southwest Area ranged from 0.99 J µg/L to 2.9 µg/L. Concentrations in the public water supply wells themselves ranged from 0.16 J in Assabet-2A to 0.32 µg/L in Assabet-1A.

These data indicate that 1,4-dioxane concentrations between 0.3 µg/L and approximately 3 µg/L are found throughout the Site, and the higher 1,4-dioxane concentrations, greater than 3 µg/L, are limited to the area of the Industrial Landfill.

3.5 EPH AND VPH SAMPLING

The Linde property is a source of LNAPL and LNAPL-related contamination that is unrelated to the Grace Site. The Linde-related contamination consists of Number 2 fuel oil and associated dissolved-phase EPH and VPH contamination. Figure 3-13 shows the approximate extent of LNAPL-related groundwater contamination based on groundwater quality samples collected between 2001 and 2013 (ENSR/AECOM, various monitoring reports) as well as the area where separate-phase LNAPL has been observed on at least one occasion since 1996.

Groundwater quality samples were collected from several locations and analyzed for EPH and VPH to evaluate whether the Linde LNAPL-related contamination is migrating to the north toward the Grace extraction and reinjection wells. Samples were collected from monitoring well MW-49, which is completed across the water table; MW-06D1, which is completed in the shallow till; and MW-06D2, which is completed in the deep till. These three monitoring wells are located between the Linde LNAPL-related contamination and the area where bedrock groundwater extraction is occurring (Figure 3-13). EPH and VPH samples are also collected monthly from extraction well NE-1. As shown in Table A-3 in Attachment A, low concentrations of several parameters including naphthalene and phenanthrene were estimated to be present in several samples. These concentrations may be related to migration of the Linde-related contamination. However, the magnitude of the detected concentrations suggests that impacts are minimal.

4 EVALUATION OF VDC, VINYL CHLORIDE AND BENZENE CONCENTRATION TRENDS AND DISTRIBUTION

This section provides an evaluation of the concentration trends and distribution of the three main Site groundwater contaminants, VDC, vinyl chloride and benzene. Section 4.1 provides a statistical evaluation of long-term groundwater concentration trends for VDC, vinyl chloride and benzene. Section 4.2 provides a discussion of the recent changes in the spatial distribution and the statistically significant concentration trends for the six geographic areas of the Site. Section 4.3 provides a comparison of the current VDC distribution to the pre-1984 VDC distribution.

4.1 TREND TEST

A statistical evaluation of recent groundwater concentration trends was done using the Mann-Kendall Trend Test for Small Sample Sizes ("Trend Test"). The Trend Test for small sample sizes is described in "Guidance for Data Quality Assessment, Practical Methods for Data Analysis" (USEPA, 2000). The Trend Test was done for the three most prevalent compounds at the Site - VDC, vinyl chloride, and benzene - using data collected from 2005 through 2013.

The Trend Test was used to identify, for the time period between 2005 and 2013, whether there is a statistically significant increasing concentration trend or decreasing concentration trend at a 95 percent confidence level. The trend in concentration is determined by computing the difference between successive concentrations of a particular compound detected in samples from a well. The number of positive differences minus the number of negative differences is the statistic "S". The value of S is compared to a table of values (in this case Table A-11) in the USEPA Guidance Document (USEPA, 2000), to determine if there is a statistically significant increasing trend, decreasing trend, or no statistically significant trend in the data set. The Trend Test evaluation requires that samples be collected at regularly-spaced time intervals, with no duplicate samples included and no missed sampling events. The analysis was done on wells that have been sampled annually since 2005 with two or fewer non-detect results. Wells that have not been sampled annually since 2005 or had more than two non-detect results were not evaluated using the Trend Test method because they did not meet the requirements of the trend test method. A concentration of one-half the detection limit for the relevant compound was assumed for all non-detect results.

Table 4-1 summarizes the results of the Trend Test. For the 54 wells in which the data were sufficient to perform the statistical analysis, the table indicates whether there has been a statistically significant trend in the VDC, vinyl chloride, or benzene concentration since 2005. Table 4-1 indicates, with "<=IGCL (#)", locations from which concentrations from all samples collected over the nine-year time period were less than the IGCL of "#" and, with "ND", wells for which not all sample results were less than or equal to the IGCL, but the reported concentrations from two or more years were less than detection limits. For wells in which a trend was identified, the range of concentration change is indicated, with the first number indicating the concentration detected in 2005 and the second number indicating the concentration detected in 2013.

In addition to the trend test, graphs showing the temporal change in VDC, vinyl chloride, and benzene concentrations in groundwater for all locations currently sampled are included as Attachment D.

4.1.1 VDC CONCENTRATION TREND TEST

The Trend Test for VDC concentrations was done using data from 38 wells. The Trend Test was not done for 16 wells because VDC concentrations were below the IGCL of 7 µg/L in all the samples collected since 2005 from 14 wells, and because VDC was not detected for two or more years in two wells. Twenty-five of the 38 wells were identified as having a decreasing VDC concentration trend and one of the 38 wells was identified as having an increasing VDC concentration trend. The remaining 12 wells had no statistically significant VDC concentration trend.

4.1.2 VINYL CHLORIDE CONCENTRATION TREND TEST

The Trend Test for vinyl chloride concentrations was done using data from 29 wells. The Trend Test was not done for 25 wells because vinyl chloride concentrations were below the IGCL of 2 µg/L in all of the samples collected since 2005 from 22 wells, and vinyl chloride was not detected for two or more years in three wells. Fourteen wells were identified as having a decreasing vinyl chloride concentration trend and three wells were identified as having an increasing vinyl chloride concentration trend. The remaining twelve wells had no statistically significant vinyl chloride concentration trend.

4.1.3 BENZENE CONCENTRATION TREND TEST

The Trend Test for benzene concentrations was done using data from 17 wells. The Trend Test was not done for 37 wells because benzene concentrations were below the IGCL of 5 µg/L in all the samples collected since 2005 from 35 wells and benzene was not detected for two or more years in two wells. Nine wells were identified as having a decreasing benzene concentration trend and one well was identified as having an increasing concentration trend. The remaining seven wells had no statistically significant benzene concentration trend.

4.2 SITE EVALUATION

The following describes the changes in spatial distribution and statistically significant concentration trends of the three main groundwater contaminants, VDC, vinyl chloride and benzene for the six geographic areas of the Site. The geographic areas had previously been defined on the basis of groundwater flow directions, as well as the nature and extent of groundwater contamination (GeoTrans, 2005b). The six areas are:

- Former Lagoon Area;
- Northeast Area;
- Southwest Area;
- Assabet River Area;
- Southwest Landfill Area; and
- Southeast Landfill Area.

Figures 1-1 shows the location of each of these six areas. The following sections provide a brief description of the nature and extent of Site groundwater contamination for each of these geographic areas, focusing on changes in the distribution of, and statistically significant concentration trends noted for the three main contaminants, VDC, vinyl chloride, benzene. For each of the three main contaminants, the subsections first describe any statistically significant concentration trends observed over the 2005 to 2013 time period, followed by a discussion of the changes, if any, in the mapped distribution between the 2013 annual sampling results shown in this report and the 2012 annual sampling results reported in the Operable Unit Three Monitoring Program Report, 2012 (Tetra Tech GEO, 2012).

4.2.1 FORMER LAGOON AREA

The Former Lagoon Area corresponds to groundwater located beneath most of the former wastewater lagoons, including the former Primary Lagoon, former Emergency Lagoon, former Blowdown Pit, former Tank Car Area, and former North Lagoon, as well as groundwater located downgradient of the former North Lagoon. Historically five groundwater extraction wells operated in this area over the following time periods:

- NLGP – 3/85 to 1/09;
- NLBR and its replacement well NLBR-R – 3/85 to 1/09;
- NMGP – 1/88 to 12/02;
- SLGP and its replacement well SLGP-R - 3/85 to 11/08; and
- SLBR 3/85 to 12/08.

Operation of extraction well NMGP, located near the former North Lagoon, was discontinued in December 2002 because of a defective water discharge line. Operation of the remaining wells was discontinued in late 2008-early 2009 because they were not part of the final remedy for groundwater at the Site. The ROD (USEPA, 2005) selected MNA for this portion of the Site.

4.2.1.1 VDC

As indicated in Table 4-1, statistically significant decreasing VDC concentration trends were identified in six locations in the Former Lagoon Area over the 2005 to 2013 time period. Among them are unconsolidated deposits monitoring wells OSA-01A (19 to 3.7 µg/L), OSA-05B (25 to 3.8 µg/L) and OSA-11B (11 to 4 µg/L) and bedrock monitoring well OSA-06BR (96 to 0.79 J µg/L). No increasing VDC concentration trends were identified in the Former Lagoon Area.

There is one notable change in VDC concentration in the Former Lagoon Area that is not captured by the trend evaluation. The VDC concentration in monitoring well OSA-13B, located near the former Primary Lagoon, just north of Sinking Pond, had increased to 900 µg/L in 2012 from not detected in 2009. In 2013, the VDC concentration detected in OSA-13B decreased to 23 µg/L. VDC concentrations in OSA-13A and OSA-13C were 1.1 J µg/L and 4.4 µg/L, respectively. VDC was not detected downgradient of the OSA-13 cluster in the B-04 well cluster, as VDC results from samples collected from B-04B3, B-04B4, and B-04B5 were all non-detect.

There are two changes in the mapped distribution of VDC between the 2013 annual sampling results shown on Figure 3-4 and the 2012 annual sampling results reported in the Operable Unit Three Monitoring Program Report, 2012 (Tetra Tech GEO, 2012). One change was to remove all but the greater than 7 to 30 µg/L contour around the OSA-13 cluster due to the significant decrease (900 µg/L to 23 µg/L) in VDC concentration in OSA-13B from 2012 to 2013. The second was to remove the greater than 30 to 60 µg/L contour around OSA-3BR due to a decrease in VDC concentration from 31µg/L to 23 µg/L.

4.2.1.2 VINYL CHLORIDE

In the Former Lagoon Area, a statistically significant decreasing vinyl chloride concentration trend was identified in bedrock monitoring wells AR-16ADP (2.4 µg/L to 1.4 µg/L) and OSA-06BR (5.9 µg/L to 2.3 µg/L), and former unconsolidated deposits bedrock extraction well SLGP-R (1.3 µg/L to not detected) between 2005 and 2013.

There is a change in the mapped distribution of vinyl chloride between the 2013 annual sampling results shown on Figure 3-5 and the 2012 annual sampling results reported in the Operable Unit Three Monitoring Program Report, 2012 (Tetra Tech GEO, 2012). The vinyl chloride concentration in OSA-13B decreased from 140 µg/L in 2012 to not detected in 2013. As a result, the greater than 30 µg/L to 100 µg/L and greater than 100 µg/L to 130 µg/L vinyl chloride contours were removed and the extent of the greater than 2 µg/L to 30 µg/L contour was reduced.

4.2.1.3 BENZENE

As indicated in Table 4-1, over the 2005 to 2013 time period, no statistically significant benzene trends were observed in the Former Lagoon Area. There is one change in the mapped distribution of benzene between the 2013 results shown in Figure 3-6 and the 2012 results reported in the Operable Unit Three Monitoring Program Report, 2012 (Tetra Tech GEO, 2012). The benzene concentration in OSA-13B decreased from 110 µg/L in 2012 to 77 µg/L in 2013. The greater than 100 µg/L contour was therefore removed from the area around the OSA-13 cluster.

4.2.1.4 FORMER LAGOON AREA SUMMARY

As previously indicated, groundwater extraction from the northern portion of the Former Lagoon Area ceased in late 2002 when pumping from extraction well NMGP was discontinued. As can be seen by reviewing the VDC, vinyl chloride and benzene concentration versus time graphs, included in Attachment D, for former extraction well NMGP and monitoring wells AR-16ADP, OSA-05B, and OSA-06BR, VDC, vinyl chloride and benzene concentrations have not increased in the northern portion of the Former Lagoon Area since NMGP went off-line in 2002. Statistically significant downward VDC and vinyl chloride concentration trends were identified in monitoring well OSA-06BR. A statistically significant downward VDC concentration trend was identified in former extraction well NMGP and a statistically significant downward vinyl chloride concentration trend was identified in bedrock monitoring well AR-16ADP. The data indicate that leaving well NMGP off-line has not had a negative effect on groundwater quality in the area of the former North Lagoon.

Groundwater extraction from the rest of the Former Lagoon Area ceased in late-2008 / early-2009 when pumping from the other four extraction wells was discontinued. Overall, VDC, vinyl chloride and benzene concentrations continue to decline. One exception to this is in the area of unconsolidated deposits monitoring well OSA-13B, located near the former Primary Lagoon, just north of Sinking Pond. In 2010, nearly two years after the Former Lagoon Area extraction wells were shut down, VDC and vinyl chloride concentrations began increasing in OSA-13B. VDC concentrations increased from not detected in 2009 to 120 µg/L in 2010, 110 µg/L in 2011 and 900 µg/L in 2012. Vinyl chloride concentrations increased from not detected in 2009 to 4.4 µg/L in 2010, 3.4 µg/L in 2011 and 140 µg/L in 2012. Vinyl chloride concentrations declined to not detected in 2013. Elevated concentrations were not found in nearby monitoring wells (OSA-13A, OSA,13C, B-04B3, B-04B4, and B-04B5) indicating that the VDC and vinyl chloride concentrations detected in OSA-13B likely represent a small amount of contaminant mass affecting a small geographic area. The water quality data from OSA-13B is consistent with the theory that contaminated groundwater, previously within a stagnation zone, migrated in the direction of the OSA-13 cluster. Shutting down the former Lagoon Area extraction wells caused groundwater flow directions to change and this likely allowed groundwater with elevated contaminant concentrations that was caught in stagnation zones to begin to migrate. The fact that elevated concentrations of VDC and vinyl chloride are not found in nearby monitoring wells

and that VDC and vinyl chloride concentrations have decreased considerably in monitoring well OSA-13B is an indication that these concentrations likely represent a small amount of contaminant mass affecting a small geographic area.

4.2.2 NORTHEAST AREA

The Northeast Area includes groundwater located northeast of the former wastewater lagoons. Groundwater contamination, consisting mainly of VDC and vinyl chloride, extends from the Grace property to the northeast beneath the Linde property and to the AWD property. The former Blowdown Pit was the likely source of groundwater contamination from the Grace property in the northeastern part of the Site. In addition to the Grace property-related VDC and vinyl chloride contamination, the Linde property is a source of LNAPL and LNAPL-related contamination that is unrelated to the Grace Site. The Linde property-related contamination consists of Number 2 fuel oil and associated dissolved-phase EPH and VPH contamination. Benzene was not detected above the IGCL of 5 µg/L in the Northeast Area.

The ROD-required groundwater remedy for the Northeast Area began operating in April 2010 and stopped operating, with EPA approval, on September 24, 2013. Groundwater was pumped from bedrock extraction well NE-1, treated for VOCs, and then injected into the shallow unconsolidated deposits using reinjection well RE-1 and/or RE-2. The ROD does not require that a specific capture zone be attained by the Northeast Area extraction system, but focuses instead on groundwater extraction from the geographic area which had the highest residual VOC concentrations in 2001. The ROD goal was to attain a reduction in the areal extent of contaminated groundwater by extracting groundwater from the area with the highest residual VOC concentrations. As stated in the ROD (USEPA, 2005, p. 69), USEPA assumed that the Northeast Area Remedial Action would continue for approximately three years. The EPA granted conditional approval to shut down the Northeast Area extraction system on September 20, 2013 (USEPA, 2013).

4.2.2.1 VDC

As indicated in Table 4-1, statistically significant decreasing VDC concentration trends were identified over the 2005 to 2013 time period in ten locations. Among the wells with a decreasing trend were unconsolidated deposits monitoring wells AR-27D (30 µg/L to 0.74 J µg/L) and AR-09A (9.2 µg/L to 0.52 J µg/L), and bedrock monitoring wells MW-06B (170 µg/L

to 20 µg/L) and MW-07B (76 µg/L to 13 µg/L). There were no statistically significant increasing VDC trends in the Northeast Area.

There is a change in the mapped distribution of VDC between the 2013 annual sampling results shown on Figure 3-4 and the 2012 annual sampling results reported in the Operable Unit Three Monitoring Program Report, 2012 (Tetra Tech GEO, 2012). The greater than 30 to 60 µg/L contour interval contracted in the School Street well field because the maximum VDC concentration decreased between the 2012 and 2013 time frame in monitoring well PS-22B (27 µg/L to 17 µg/L). In addition, the greater than 30 to 60 µg/L contour interval near extraction well NE-1 was removed because VDC concentrations decreased between the 2012 and 2013 time frame in monitoring wells AR-35MBR (30 µg/L to 23 µg/L) and extraction well NE-1 (39 µg/L to 28 µg/L).

Figure 4-1, cross-section C-C', shows that Grace-related contaminated groundwater is found in the shallow bedrock, but not the unconsolidated deposits, in the area northeast of the former Blowdown Pit and beneath the Linde property. The location of cross-section C-C' is shown on Figure 1-1. Further downgradient, beneath the AWD property, contaminated groundwater is found in the unconsolidated deposits.

4.2.2.2 VINYL CHLORIDE

Statistically significant decreasing vinyl chloride concentration trends were identified at two locations (Table 4-1) over the 2005 to 2013 time period. The vinyl chloride concentrations in bedrock monitoring wells MW-13B and PS-22B decreased from 11 µg/L to 4.5 µg/L and 2 µg/L to not detected, respectively. A statistically significant increasing trend was identified at one location. In bedrock monitoring well MW-04B, vinyl chloride concentrations increased slightly, from 1.4 µg/L to 2 µg/L.

There are no significant changes in the mapped distribution of vinyl chloride between the 2013 annual sampling results shown on Figure 3-5 and the 2012 annual sampling results reported in the Operable Unit Three Monitoring Program Report, 2012 (Tetra Tech GEO, 2012).

4.2.2.3 NORTHEAST AREA SUMMARY

Overall, VDC and vinyl chloride concentrations continued to decrease in the Northeast Area. The area with VDC concentrations greater than 60 µg/L shrank considerably. These results

demonstrate that pumping from bedrock extraction well NE-1, which began in April 2010, met the ROD-stated objective of removing VOC mass and thereby reduced VOC concentrations within the previously identified area of higher residual VOC concentrations.

4.2.3 SOUTHWEST AREA

The Southwest Area extends southwesterly from the area of Sinking Pond past the Assabet Public Water Supply wells to the Assabet River. The former Primary and Emergency Lagoons are the likely sources of groundwater contamination in the Southwest Area. Historically groundwater extraction occurred in this area from extraction wells RP-1 (10/86-11/02), WRG-1 (4/91-11/02) and WRG-3 (3/85-11/89). The ROD (USEPA, 2005) selected MNA for this area of the Site. As indicated in Table 4-1, VDC, vinyl chloride and benzene concentrations within this area are below IGCLs.

4.2.4 ASSABET RIVER AREA

As shown on Figure 1-1, the Assabet River Area extends from the area south of the Former Lagoon Area to the Assabet River. Groundwater in the Assabet River Area may have been impacted by several different sources, including the former Primary Lagoon, the former Emergency Lagoon, and the former Blowdown Pit. The ROD (USEPA, 2005) selected MNA for this area of the Site.

As indicated in Table 4-1, statistically significant decreasing concentration trends were identified in unconsolidated deposits monitoring well LF-20D, where VDC concentrations decreased from 39 µg/L in 2005 to 7.5 µg/L in 2013 and vinyl chloride concentrations decreased from 28 µg/L in 2005 to 6.9 µg/L in 2013. Statistically significant decreasing concentration trends were also identified in unconsolidated deposits monitoring well LF-18D, where VDC, vinyl chloride and benzene concentrations decreased from 120 µg/L to 44 µg/L, 48 µg/L to 20 µg/L and 7.8 µg/L to 4.3 µg/L, respectively. There are two changes in the mapped distribution of VDC between the 2013 annual sampling results shown on Figure 3-4 and the 2012 annual sampling results reported in the Operable Unit Three Monitoring Program Report, 2012 (Tetra Tech GEO, 2012). The greater than 60 µg/L to 100 µg/L contour was removed due to the VDC concentration in LF-18D decreasing from 74 µg/L to 44 µg/L from 2012 to 2013. Also, the area of VDC concentrations greater than 7 µg/L was increased slightly towards the Assabet River to reflect a small increase in concentrations of VDC detected beneath the Assabet River, 5.6 µg/L

in 2012 and 9.7 µg/L in 2013. Overall, VDC, vinyl chloride and benzene concentrations continue to decrease in the Assabet River Area.

4.2.5 SOUTHWEST LANDFILL AREA

The Southwest Landfill Area extends from the western portion of the former Secondary Lagoon, beneath the western half of the Industrial Landfill to the south to the Assabet River. The source of groundwater contamination in the Southwest Landfill Area was likely the Industrial Landfill. The main contaminants in the Southwest Landfill Area are VDC and vinyl chloride. The highest concentrations of VDC and vinyl chloride are found in the deep unconsolidated deposits and shallow bedrock in the vicinity of the LF-10, LF-02 and LF-19 monitoring well clusters. The ROD (USEPA, 2005) selected groundwater extraction designed to capture groundwater generally in the area described as the "ROD Capture Zone" on Figures 3-4 through 3-6, combined with MNA, to remediate groundwater contamination that was present beyond the boundary of the Capture Zone. Groundwater extraction from this portion of the Site has been ongoing, with pumping from deep unconsolidated deposits extraction wells MLF (1/93 to present) and WLF (3/85 to present), and bedrock extraction well SWLF-1/SWLF-2 (SWLF-1 9/08 to1/11; SWLF-2 4/11 to present).

Extraction well SWLF-1 was replaced by extraction well SWLF-2 in April 2011. The monitoring data show that VDC concentrations were higher in groundwater extracted by extraction well SWLF-1 than in groundwater extracted by extraction well SWLF-2. Extraction well SWLF-2, however, pumps at a higher rate than extraction well SWLF-1 and is likely pulling in groundwater from a larger area, some of which is not as contaminated. The monitoring data indicate that extraction well SWLF-2 is effective at maintaining the required capture zone. Additional evaluations related to the impact of replacing SWLF-1 with SWLF-2 are included in Section 5 of this report.

4.2.5.1 VDC

As shown in Table 4-1, statistically significant decreasing VDC concentration trends were identified in four locations over the 2005 to 2013 time period. The VDC concentrations in unconsolidated deposits monitoring wells B-03B3, LF-10, and LF-13A decreased from 34 µg/L to 0.58 J µg/L, 470 µg/L to 200 µg/L, and 21 µg/L to 12 µg/L, respectively. The VDC concentration in extraction well MLF decreased from 64 µg/L to 4.1 µg/L. There is one notable

change in the mapped distribution of VDC between the 2013 annual sampling results shown on Figure 3-4 and the 2012 results reported in Operable Unit Three Monitoring Program Report, 2012 (Tetra Tech GEO, 2012). Former extraction well SWLF-1, which was not sampled in 2012, had a VDC concentration result of 200 µg/L in 2013. As a result, the greater than 200 µg/L contour interval was expanded to include SWLF-1.

4.2.5.2 VINYL CHLORIDE

As shown in Table 4-1, statistically significant decreasing vinyl chloride concentration trends were identified in four locations and a statistically significant increasing vinyl chloride concentration trend was identified in one location over the 2005 to 2013 time period. Among the wells with a decreasing vinyl chloride concentration trend were unconsolidated deposits monitoring wells LF-10 (130 µg/L to 55 µg/L) and LF-19D (240 µg/L to 13 µg/L). The vinyl chloride concentrations in unconsolidated deposits monitoring well LF-13A (3.3 µg/L to 7.8 µg/L) increased slightly.

There are no notable changes in the mapped distribution of vinyl chloride between the 2013 annual sampling results shown on Figure 3-4 and the 2012 annual sampling results reported in the Operable Unit Three Monitoring Program Report, 2012 (Tetra Tech GEO, 2012).

4.2.5.3 BENZENE

As shown in Table 4-1, a statistically significant decreasing benzene concentration trend was identified in one location in the Southwest Landfill area. Over the 2005 to 2013 time period concentrations in unconsolidated deposits monitoring well LF-19D decreased from 31 µg/L to 2.3 µg/L. There is one minor change to benzene distribution in this area. The greater than 30 µg/L to 100 µg/L contour interval around unconsolidated deposits monitoring well LF-12 was removed due to a decrease in benzene concentration from 2012 to 2013 (33 µg/L to 28 µg/L).

4.2.5.4 SOUTHWEST LANDFILL AREA CAPTURE EVALUATION AND SUMMARY

The Landfill Area extraction system was designed to capture groundwater with elevated VDC concentrations generally in the area described as the "ROD Capture Zone". Figure 3-4 is a plan view map showing the distribution of VDC contamination regardless of depth from samples collected during the August-September 2013 annual sampling round. Figure 4-2 is a cross-section through the Southwest Landfill Area showing the vertical distribution of VDC

contamination for the same time period. The location of section A-A' is shown on Figure 1-1. Figures 3-4 and 4-2 also show the location of the September 2013 estimated capture zone and the plan view map (Figure 3-4) shows the "ROD Capture Zone". The September 2013 estimated capture zone on Figure 3-4 is a composite of the capture zones from Figures 2-1 through 2-3. The composite capture zone of Figure 3-4 shows the maximum extent of capture regardless of depth. As indicated by Figure 4-2, cross-section A-A', the highest VDC concentrations in groundwater southwest of the Industrial Landfill are in the deep unconsolidated deposits and shallow bedrock. Figures 3-4 and 4-2 demonstrate that groundwater with the highest VDC concentrations, both horizontally and vertically, is within the Landfill Area capture zone. Therefore, the current capture zone fulfills the requirements of the ROD (USEPA, 2005).

4.2.6 SOUTHEAST LANDFILL AREA

The Southeast Landfill Area extends from the eastern portion of the former Secondary Lagoon, beneath the eastern half of the Industrial Landfill to the south to the Assabet River. The source of groundwater contamination in the Southeast Landfill Area was likely the Industrial Landfill. The main contaminant southeast of the Industrial Landfill is benzene. The benzene contamination is generally shallow, with the highest concentrations detected in the upper portion of the aquifer. The highest concentrations are found in monitoring well LF-06C and the two extraction wells, SELF-1 and SELF-2. VDC and vinyl chloride contamination is also found southeast of the Industrial Landfill, generally in the unconsolidated deposits. The maximum VDC and vinyl chloride concentrations are in monitoring well AR-11B2 (34 µg/L and 75 µg/L, respectively).

The ROD (USEPA, 2005) selected groundwater extraction designed to maintain hydraulic control of the region of elevated benzene concentrations and highly anaerobic groundwater generally in the area described as the "ROD Capture Zone" on Figures 3-4 through 3-6, combined with MNA, to remediate groundwater contamination that was present beyond the boundary of the Capture Zone. Groundwater extraction from this portion of the Site has been ongoing, with pumping from deep unconsolidated deposits extraction wells SELF-1 (9/08 to present) and SELF-2 (6/10 to present). Historically, extraction also occurred from extraction wells ELF (3/85-1/08) and RLF (3/85-4/07). Extraction wells ELF and RLF were decommissioned in May 2010.

4.2.6.1 VDC

As shown in Table 4-1, statistically significant decreasing VDC concentration trends were identified in three locations and a statistically significant increasing VDC concentration trend was identified in one location over the 2005 to 2013 time period. The VDC concentrations in unconsolidated deposits monitoring wells LF-17D, LF-11AR and LF-05E decreased from 34 µg/L to not detected, 18 µg/L to 1.7 µg/L, and 110 µg/L to 32 µg/L, respectively. The VDC concentrations in unconsolidated deposits monitoring well AR-11B2 increased from 23 µg/L to 34 µg/L. The slight increase in VDC concentrations in monitoring well AR-11B2 may be due to changes in groundwater flow in the area as a result of the shut-down of extraction well ELF in 2008.

There are no notable changes in the mapped distribution of VDC between the 2013 annual sampling results shown on Figure 3-4 and the 2012 annual sampling results reported in the Operable Unit Three Monitoring Program Report, 2012 (Tetra Tech GEO, 2012).

4.2.6.2 VINYL CHLORIDE

Statistically significant decreasing vinyl chloride concentration trends were identified in three locations and a statistically significant increasing vinyl chloride concentration trend was identified in one location over the 2005 to 2013 time period (Table 4-1). The vinyl chloride concentrations in unconsolidated deposits monitoring wells LF-05E (78 µg/L to 26 µg/L), LF-11AR (78 µg/L to 3.2 µg/L), and G-3A (9.5 µg/L to 2.7 µg/L) decreased. The vinyl chloride concentrations in unconsolidated deposits monitoring well AR-11B2 (48 µg/L to 75 µg/L) increased. The increase in vinyl chloride concentrations in monitoring well AR-11B2 may be due to changes in groundwater flow in the area as a result of the shut-down of extraction well ELF in 2008.

4.2.6.3 BENZENE

As shown in Table 4-1, seven of the wells with statistically significant decreasing benzene concentrations trends over the 2005 to 2013 time period are located in the Southeast Landfill Area: unconsolidated deposits monitoring wells B-08B, LF-05E, LF-11AR, LF-17D and LF-06C, and bedrock monitoring wells G-3BR and LF-06N. The largest statistically significant decreasing benzene concentration trends were observed in monitoring wells located adjacent to and downgradient of the eastern edge of the Industrial Landfill. This is the area where the highest

benzene concentrations are detected at the Site. Benzene concentrations in unconsolidated deposits wells B-08B and LF-06C decreased from 100 µg/L in 2005 to 2.8 J µg/L in 2013 and from 2,800 µg/L in 2005 to 160 µg/L in 2013, respectively. Benzene concentrations in bedrock monitoring well LF-06N decreased from 130 µg/L in 2005 to not detected in 2013. There was also a statistically significant increasing benzene concentration trend in one location over the 2005 to 2013 time period (Table 4-1). Benzene concentrations in unconsolidated deposits monitoring well AR-11B2 increased slightly from 5.8 µg/L in 2005 to 7.9 µg/L in 2013.

There are two minor changes in the distribution of benzene between the 2013 annual sampling results shown on Figure 3-6 and the 2012 annual sampling results reported in the Operable Unit Three Monitoring Program Report, 2012 (Tetra Tech GEO, 2012). In 2012, the greater than 100 µg/L benzene contour was changed slightly to exclude extraction well SELF-1, as the concentration detected in SELF-1 had decreased from 160 µg/L in 2011 to 82 µg/L in 2012. For the 2013 annual sampling, the benzene concentration detected in SELF-1 increased to 270 µg/L. Therefore, the greater than 100 µg/L contour was changed to include SELF-1. In addition, the greater than 5 µg/L to 30 µg/L contour was changed slightly to exclude monitoring well cluster LF-17, as detections in LF-17D decreased from 5.8 µg/L in 2012 to 4.6 µg/L in 2013

4.2.6.4 SOUTHEAST LANDFILL AREA CAPTURE EVALUATION AND SUMMARY

The Landfill Area extraction system was designed to maintain hydraulic control of the region of elevated benzene concentrations and highly anaerobic groundwater generally in the area described as the "ROD Capture Zone". Figure 3-6 is a plan view map showing the distribution of benzene contamination regardless of depth from samples collected during the August-September 2013 annual sampling round. Figure 4-3 is a cross-section through the Southeast Landfill Area showing the vertical distribution of benzene contamination for the same time period. The location of section B-B' is shown on Figure 1-1. Figures 3-6 and 4-3 also show the location of the deep unconsolidated deposits capture zone and the plan view map (Figure 3-6) shows the "ROD Capture Zone". The deep unconsolidated deposits capture zone on Figure 3-6 is a composite of the capture zones from Figures 2-1 through 2-3. The composite capture zone of Figure 3-6 shows the maximum extent of capture regardless of depth.

As indicated by Figure 4-3, cross-section B-B, the highest benzene concentrations in groundwater southeast of the Industrial Landfill are in the unconsolidated deposits. Figures 3-4

and 4-2 demonstrate that groundwater with the highest benzene concentrations, both horizontally and vertically, is within the Landfill Area capture zone. Therefore, the current capture zone fulfills the requirements of the ROD (USEPA, 2005).

4.2.7 LONG-TERM GROUNDWATER QUALITY TRENDS

To provide a better perspective regarding the long-term groundwater quality trends at the Site, the pre-1984 distribution of VDC in groundwater is included as Figure 4-4. A comparison of Figure 4-4 to Figure 3-4 shows that VDC concentrations were considerably higher across the Site in 1984 than during the 2013 annual sampling round. The maximum VDC concentration detected in the 1984 time frame was 2,900 µg/L, while the maximum VDC concentration detected in the August-September 2013 sampling round was 310 µg/L. As shown on Figure 4-4, the area containing VDC concentrations greater than 200 µg/L was much more extensive in the 1984 time frame, extending beneath the former Blowdown Pit to the south beneath a portion of the Industrial Landfill, Sinking Pond, the Agway/Kress property and partially beneath Muskrat Pond. As shown on Figure 3-4, the area containing VDC concentrations greater than 200 µg/L in August-September 2013 is limited to a few monitoring wells located adjacent to and immediately south of the Industrial Landfill.

In addition, while there were no monitoring wells located northeast of the Grace property in the 1984 time frame, data collected by others between 1984 and 1987 indicate that VDC was likely present in groundwater in this area at concentrations greater than 200 µg/L in 1984. In August-September 2013, VDC concentrations in groundwater samples collected from wells located northeast of the Grace property were all less than 100 µg/L.

Concentrations of vinyl chloride and benzene have also decreased significantly since groundwater extraction began at the Site in 1985. In the early 1980s, vinyl chloride concentrations in excess of 100 µg/L extended from the former Lagoon Area to the southwest toward Turtle and Muskrat Ponds, to the south toward the Assabet River, and beneath and downgradient of the Industrial Landfill. The maximum vinyl chloride concentration detected was 890 µg/L in June 1982, while the maximum vinyl chloride concentration detected in the August-September 2013 sampling round was 130 µg/L. As shown on Figure 3-5, the area containing vinyl chloride concentrations greater than 100 µg/L in August-September 2013 is limited to one area located immediately southwest of the Industrial Landfill.

In the early 1980s, benzene concentrations, in excess of 500 µg/L were found in eight monitoring well clusters located southeast of the Industrial Landfill and in monitoring well B-04 located just north of Sinking Pond. In the 1982-1984 timeframe, the maximum benzene concentration detected was 17,000 µg/L in samples from the B-08 and LF-06 monitoring well clusters. The maximum benzene concentration detected in August-September 2013 was 270 µg/L in a sample collected from extraction well SELF-1, which is located southeast of the Industrial Landfill.

5 EXTRACTION WELL SWLF-2

As requested by EPA (EPA, 2013), additional data were collected in 2013 to better understand the effects of replacing extraction well SWLF-1 with extraction well SWLF-2. Extraction well SWLF-2 was installed in April 2011, after repeated efforts to redevelop extraction well SWLF-1 failed to sufficiently restore its yield. Former extraction well SWLF-1 is screened from approximately 2 to 43 feet below the bedrock surface (167 to 207 feet below ground surface). The well was designed as a screened well rather than an open bedrock well to facilitate capture of groundwater from the deep unconsolidated deposits as well as the upper bedrock. The gravel packed well eliminated the need to case off the upper bedrock, which would have been required in an open bedrock hole, and allowed for the extension of the sand pack up into the deep unconsolidated deposits. The well was not screened across the deep unconsolidated deposits because of the fine-grained nature of these silty deposits. However, despite repeated attempts to redevelop it, the extraction rate of SWLF-1 declined from approximately 4 gpm when it was first operated in September 2008, to approximately 0.9 gpm in early 2011. To minimize the likelihood of the replacement extraction well experiencing the same substantial reduction in well yield, SWLF-2 was constructed as a six-inch diameter open hole in bedrock. Well SWLF-2 is not open to the unconsolidated deposits. Extraction well SWLF-2 is open from approximately five to 60 feet below the bedrock surface. Drilling observations indicate that the more substantial water-bearing fractures in extraction well SWLF-2 are located near the bottom of the well.

In 2013, at the request of EPA, groundwater samples were collected from former extraction well SWLF-1 and hydraulic monitoring was done in the area of extraction well SWLF-2.

5.1 GROUNDWATER QUALITY

Four groundwater samples were collected for VOC analysis from former extraction well SWLF-1 in 2013, each representing ten feet of screened interval. The results, included in Table A-1, indicate that VDC concentrations decrease with depth, with VDC concentrations of 200 µg/L, 200 µg/L, 160 µg/L and 7.6 µg/L, from the uppermost ten feet to the bottom-most ten feet of screen, respectively. Extraction well SWLF-2 was not pumping during this sampling event.

During the time-period when extraction well SWLF-2 was actively pumping, VDC concentrations ranged from 290 µg/L, in August 2008 when pumping first began, to 62 µg/L, in January 2011, when the well was shut-down. VDC concentrations detected in extraction well SWLF-2 in 2013 ranged between 26 and 29 µg/L.

5.2 HYDRAULIC MONITORING

Hydraulic monitoring was done in the area of extraction well SWLF-2 to evaluate the hydraulic connection between extraction well SWLF-2, former extraction well SWLF-1, and the nearby LF-19 monitoring wells. Between October 10, 2013 and October 17, 2013, water levels were monitored continuously in monitoring wells LF-19D, LF-19SBR, LF-19MBR, LF-19DBR, former extraction well SWLF-1, and extraction well SWLF-2 using pressure transducers. A seventh well, LF-19S, was monitored with manual measurements, as a transducer was unable to be installed in this well. Manual water level measurements were also collected periodically from monitoring wells LF-19MBR and LF-19DBR, former extraction well SWLF-1, and extraction well SWLF-2. The diameters of monitoring wells LF-19SBR and LF-19D are too small to allow manual measurements to be taken while transducers are deployed.

Between October 10, 2013 and October 17, 2013, while water levels were being monitored, extraction well SWLF-2 was turned off for three days and then restarted. Prior to being shut off on October 11, 2013, and after being restarted on October 14, 2013, extraction well SWLF-2 was pumping at a rate of approximately 6.4 gpm. Hydrographs for the seven wells that were monitored are included in Attachment E. The hydrographs display the transducer data and manual measurements and include vertical lines indicating when SWLF-2 was shut off and turned back on again. The transducer data were corrected for barometric pressure changes. A graph showing barometric pressure versus time is also included in Attachment E.

The water level data were evaluated to determine the degree of hydraulic connection between extraction well SWLF-2, former extraction well SWLF-1, and the LF-19 monitoring well cluster. Table 5-1 includes estimates of the water level change in each well in response to pumping extraction well SWLF-2. The water level in extraction well SWLF-2 itself changed by approximately 8.3 feet. The largest water level response in other wells, approximately 4 feet, was observed in deep bedrock monitoring well LF-19DBR. Water level changes between 1.5 and 2 feet were observed in the other bedrock wells (SWLF-1, LF-19MBR and LF-19SBR) and no water level changes were observed in the unconsolidated deposit wells (LF-19D and LF-19S).

This data is consistent with observations made during installation of extraction well SWLF-2, which indicated that the more substantial water-bearing fractures within the well are located near the bottom of the well.

5.3 EFFECTS OF REPLACING SWLF-1

The monitoring data show that VDC concentrations detected in extraction well SWLF-1 while it was pumping, were higher than VDC concentrations detected in replacement extraction well SWLF-2. Extraction well SWLF-2, however, pumps at a higher rate than extraction well SWLF-1 and is likely pulling in groundwater from a larger area, some of which is not as contaminated.

The water level monitoring data indicate that extraction well SWLF-2 is in hydraulic connection with the nearby bedrock wells in the LF-19 cluster and former extraction well SWLF-1. A re-evaluation of the Landfill Area groundwater capture zone (GeoTrans, 2010), done in 2010, when extraction well SWLF-1 was pumping at 2.4 gpm, concluded that the ROD-required capture zone was being attained. The USEPA concurred with that conclusion (USEPA, 2010). The 2010 evaluation concluded that based on the close proximity and similarity in construction of SWLF-2 to SWLF-1, and assuming SWLF-2 was able to extract groundwater at a rate similar to that of SWLF-1, namely at least 2.4 gpm, then the ROD-required capture zone would be attained. The capture zone evaluations done as part of the annual sampling rounds subsequent to 2010, and included in the Annual Monitoring Reports for 2011, 2012, and 2013, supported this conclusion by showing that the Landfill Area extraction system has attained the ROD-required capture zone. Extraction well SWLF-2 has been in operation and pumping at a rate well in excess of 2.4 gpm since May 2011.

6 CONCLUSIONS

Evaluation of the 2013 annual monitoring data indicates that the goals of the Site-wide monitoring program continued to be met in 2013. The monitoring program goals during this reporting period include:

- Groundwater level monitoring to confirm that the Landfill Area groundwater capture zone is being achieved;
- Groundwater quality monitoring within the Landfill Area groundwater capture zone to assess changes in groundwater quality within the capture zone;
- Water quality monitoring of the Northeast Area extraction system to assess the effectiveness of the remedial system at removing contaminant mass; and
- Groundwater quality monitoring outside of the Landfill Area groundwater capture zones and the Northeast Area targeted remediation area to assess the natural attenuation of contaminant concentrations in groundwater not being actively captured and treated.

In the Former Lagoon Area, where MNA was selected as the final remedy, VDC, vinyl chloride and benzene concentrations continue to exhibit an overall decline. In the Northeast Area, the ROD-required groundwater extraction and injection remedy began operating in April 2010. Pumping from bedrock extraction well NE-1 met the ROD-stated objective of removing VOC mass, reducing VOC concentrations from the previously identified area of higher residual VOC concentrations. Extraction well NE-1 was therefore shut down on September 24, 2013 with conditional approval from the EPA (USEPA, 2013). The VOC mass removal information from the Northeast Area extraction system will be included in the Groundwater Extraction Systems Operations Report for the period January 2013 through December 2013, which will be submitted by March 2014. Overall, VDC and vinyl chloride concentrations decreased in the Northeast Area, where the maximum VDC and vinyl chloride concentrations are now 66 µg/L and 4.5 µg/L, respectively. The maximum VDC concentration in the Northeast Area prior to operation of the treatment system was approximately 200 µg/L, in extraction well NE-1.

In the Southwest Area, where MNA was selected as the final remedy, the data indicate that VDC, vinyl chloride, and benzene are below IGCLs at all locations. In the Assabet River Area, where MNA was selected as the final remedy, the data indicate that VDC, vinyl chloride, and benzene concentrations continue to decrease.

In the Southwest and Southeast Landfill Areas, the ROD (USEPA, 2005) selected groundwater extraction designed to capture groundwater generally in the area described as the "ROD Capture Zone" combined with MNA, to remediate groundwater contamination that was present beyond the boundary of the Capture Zone. The 2013 data demonstrate that groundwater with the highest VDC and benzene concentrations, both horizontally and vertically, is within the Landfill Area capture zone. Therefore, the current capture zone fulfills the requirements of the ROD (USEPA, 2005). Water quality data from both inside and outside of the Landfill Area capture zone document that, overall, VDC, vinyl chloride and benzene concentrations are decreasing.

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TABLES

Table 2-1. Water Level Measurements, September 2013.

Location	Open Interval Elevation (feet NGVD)	Date Measured	Measuring Point Elevation (feet NGVD)	Depth to Water (feet)	Water Level Elevation (feet NGVD)
73-4	48 to 58	9/10/2013	138.11	7.2	130.91
77-3	46 to 51	9/10/2013	134.26	6.75	127.51
9-78	58 to 62	9/9/2013	138.96	14	124.96
A-2E	74 to NA	9/9/2013	132.7	9.86	122.84
A5-78	88 to 93	9/9/2013	132.32	6.63	125.69
A6-78	80 to 85	9/9/2013	138.55	12	126.55
A7-78	72 to 77	9/9/2013	136.12	7.95	128.17
AR-01P	122 to 132	9/9/2013	139.91	15.05	124.86
AR-02P	120 to 130	9/9/2013	137.38	11.69	125.69
AR-03P	120 to 130	9/9/2013	153.96	19.35	134.61
AR-05	126 to 131 (BR)	9/9/2013	198.8	64.74	134.06
AR-06P	132 to 137	9/9/2013	199.67	DRY	DRY
AR-07P	138 to NA	9/9/2013	202.7	55.98	146.72
AR-08P	124 to 129	9/9/2013	141.39	10.48	130.91
AR-09A	68 to 71	9/9/2013	186.34	52.57	133.77
AR-09BR	57 to 62 (BR)	9/9/2013	188.39	54.53	133.86
AR-09P	129 to 134	9/9/2013	187.84	51.1	136.74
AR-10BR	8 to 18 (BR)	9/9/2013	190.17	59.03	131.14
AR-10P	124 to 134	9/9/2013	191.68	55.57	136.11
AR-11P	122 to 127	9/9/2013	141.48	10.3	131.18
AR-11SBR	60 to 70 (BR)	9/9/2013	140.67	13.65	127.02
AR-12	103 to 113	9/10/2013	141.68	18.05	123.63
AR-12D	74 to 84	9/10/2013	143.16	14.25	128.91
AR-12DBR	11 to 20 (BR)	9/10/2013	143.16	16.99	126.17
AR-12SBR	49 to 61 (BR)	9/10/2013	143.16	16.82	126.34
AR-13P	117 to 122	9/9/2013	142.75	13.33	129.42
AR-14P	120 to 125	9/9/2013	152.31	25.35	126.96
AR-16ADP	73 to 83 (BR)	9/9/2013	137.46	8.56	128.9
AR-16BSH	110 to 120	9/9/2013	137.41	8.65	128.76
AR-17ASH	118 to 128	9/9/2013	143.01	13.38	129.63
AR-17BDP	104 to 114 (BR)	9/9/2013	145.09	15.12	129.97
AR-18P	101 to 106	9/9/2013	185.12	50.02	135.1
AR-19ASH	122 to 127	9/9/2013	184.15	48.65	135.5
AR-19BDP	84 to 104	9/9/2013	184.92	49.52	135.4
AR-20	87 to 92 (BR)	9/9/2013	147.68	21.37	126.31
AR-20A	123 to 133	9/9/2013	147.69	17.11	130.58
AR-21	78 to 83 (BR)	9/9/2013	197.75	70.2	127.55
AR-21A	103 to 113	9/9/2013	197.55	69.83	127.72
AR-21B	131 to 136	9/9/2013	197.65	63.32	134.33

Table 2-1. (continued)

Location	Open Interval Elevation (feet NGVD)	Date Measured	Measuring Point Elevation (feet NGVD)	Depth to Water (feet)	Water Level Elevation (feet NGVD)
AR-22	106 to 116	9/9/2013	148.43	20.88	127.55
AR-23	98 to 103 (BR)	9/9/2013	165.99	32.31	133.68
AR-23A	116 to 126	9/9/2013	165.81	32.15	133.66
AR-23B	129 to 144	9/9/2013	165.53	31.72	133.81
AR-25B	52 to 57 (BR)	9/9/2013	192.82	59.48	133.34
AR-25D	89 to 99	9/9/2013	195.01	58.27	136.74
AR-25S	124 to 134	9/9/2013	193.02	56.15	136.87
AR-26D	87 to 97	9/10/2013	190.6	58.45	132.15
AR-26DBR	27 to 47 (BR)	9/10/2013	190.6	58.18	132.42
AR-26S	112 to 122	9/10/2013	190.6	52.13	138.47
AR-26SBR	53 to 70 (BR)	9/10/2013	190.6	58.34	132.26
AR-27D	104 to 114	9/10/2013	148.3	19.01	129.29
AR-27S	124 to 134	9/10/2013	148.3	12.52	135.78
AR-27SBR	82 to 91 (BR)	9/10/2013	148.3	17.21	131.09
AR-28D	85 to 95	9/9/2013	148.56	21.75	126.81
AR-28DBR	43 to 54 (BR)	9/9/2013	148.56	22.42	126.14
AR-28S	115 to 125	9/9/2013	148.56	14.29	134.27
AR-28SBR	65 to 77 (BR)	9/9/2013	148.56	22.32	126.24
AR-29D	91 to 101	9/10/2013	162.8	37.7	125.1
AR-29DBR	28 to 45 (BR)	9/10/2013	162.8	37.39	125.41
AR-29S	126 to 136	9/10/2013	162.8	31.3	131.5
AR-30D	75 to 85	9/10/2013	125.1	4.08	121.02
AR-30DBR	22 to 41 (BR)	9/10/2013	125.1	4.01	121.09
AR-30S	105 to 115	9/10/2013	125.1	3.56	121.54
AR-30SBR	47 to 61 (BR)	9/10/2013	125.1	4.1	121
AR-31D	82 to 92	9/10/2013	139.97	19.7	120.27
AR-31DBR	14 to 33 (BR)	9/10/2013	139.97	11.85	128.12
AR-31S	112 to 122	9/10/2013	139.97	20.17	119.8
AR-31SBR	51 to 67 (BR)	9/10/2013	139.97	16.24	123.73
AR-33D	117 to 133	9/10/2013	172.79	40.1	132.69
AR-34D	139 to 144	9/10/2013	184.87	34.21	150.66
AR-34DBR	55 to 75 (BR)	9/10/2013	184.85	42.4	142.45
AR-34SBR	100 to 120 (BR)	9/10/2013	184.79	40.9	143.89
AR-35DBR	-188 to -178 (BR)	9/10/2013	151.58	21.8	129.78
AR-35MBR	-88 to -78 (BR)	9/10/2013	151.48	22.05	129.43
AR-35SBR	82 to 92 (BR)	9/10/2013	151.64	23	128.64
ASBRV-D2	Surface Water	9/9/2013	139.1	21.2	117.9
ASBRV-M	Surface Water	9/9/2013	121.64	1.74	119.9
ASBRV-U	Surface Water	9/9/2013	144.18	17.15	127.03

Table 2-1. (continued)

Location	Open Interval Elevation (feet NGVD)	Date Measured	Measuring Point Elevation (feet NGVD)	Depth to Water (feet)	Water Level Elevation (feet NGVD)
ASSABET-1A	78 to 88	9/10/2013	138.89	26.55	112.34
ASSABET-2A	98 to 106	9/10/2013	134.56	18.4	116.16
B-01P	133 to 136	9/9/2013	178.28	42.6	135.68
B-03P	118 to 121	9/9/2013	166.12	31.82	134.3
B-04P	128 to 131	9/9/2013	168.06	32.09	135.97
B-06P	110 to 113	9/9/2013	139.13	15.62	123.51
B-08A	15 to 25 (BR)	9/9/2013	199.19	70	129.19
B-08B	76 to 86	9/9/2013	199.16	67.48	131.68
B-08C	108 to 118	9/9/2013	199.07	64.35	134.72
B-08D	125 to 140	9/9/2013	199.13	64.18	134.95
B-10P	128 to 131	9/9/2013	193.54	57.61	135.93
BD-2	124 to 134	9/9/2013	195.91	59.87	136.04
CHRISTOFFERSON	86 to 96	9/10/2013	126.1	5.88	120.22
CLF-101	115 to 125	9/9/2013	145.64	19.94	125.7
CLF-102	118 to 128	9/9/2013	133.06	9.6	123.46
CLF-103	117 to 128	9/9/2013	133.08	9.59	123.49
CLF-104	115 to 125	9/9/2013	133.86	10.99	122.87
CLF-105	113 to 123	9/9/2013	133.34	9.09	124.25
CLF-106	113 to 123	9/9/2013	133.85	10.85	123
CLF-109	115 to 125	9/9/2013	141.9	16.69	125.21
CLF-112	114 to 124	9/9/2013	143.49	16.81	126.68
CLF-1P	120 to 125	9/9/2013	153.99	28.71	125.28
CLF-2A	84 to 89	9/9/2013	131.65	8.52	123.13
CLF-2B	104 to 109	9/9/2013	129.81	7.16	122.65
CLF-2C	114 to 124	9/9/2013	131.78	7.89	123.89
CLF-3A	116 to 126	9/9/2013	132.1	9.46	122.64
CLF-3C	86 to 91	9/9/2013	133.86	9.47	124.39
EL-3	123 to 128	9/9/2013	169.96	34.53	135.43
ELF-OBS	97 to 102	9/9/2013	197.9	64.42	133.48
FPB	Surface Water	9/9/2013	129.36	1.75	127.61
FPB-D	Surface Water	9/10/2013	133.85	8.81	125.04
FPB-D2	Surface Water	9/9/2013	125.88	DRY	DRY
FPB-D3A	Surface Water	9/9/2013	124.87	3.8	121.07
FPB-D3B	Surface Water	9/9/2013	124.18	3	121.18
G-1	135 to 138	9/9/2013	201.75	63.3	138.45
G-2	132 to 135	9/9/2013	198.21	62.93	135.28
G-3	125 to 128	9/9/2013	192.13	56.61	135.52
G-3A	43 to 53	9/9/2013	191.82	57	134.82
G-3BR	10 to 20 (BR)	9/9/2013	192.45	58.2	134.25

Table 2-1. (continued)

Location	Open Interval Elevation (feet NGVD)	Date Measured	Measuring Point Elevation (feet NGVD)	Depth to Water (feet)	Water Level Elevation (feet NGVD)
LF-01P	126 to 131	9/9/2013	192.67	57.15	135.52
LF-02A	35 to 45 (BR)	9/9/2013	199.03	68.37	130.66
LF-02P	119 to 124	9/9/2013	198.55	66.21	132.34
LF-03A	13 to 23 (BR)	9/9/2013	199.64	69.25	130.39
LF-03P	123 to 128	9/9/2013	200.86	65.89	134.97
LF-04P	127 to 137	9/9/2013	200.27	68.15	132.12
LF-05A	125 to 135	9/9/2013	199.71	64.65	135.06
LF-05B	126 to 136	9/9/2013	198.51	63.38	135.13
LF-05C	125 to 135	9/9/2013	197.89	62.75	135.14
LF-05D	82 to 92	9/9/2013	199.38	67.29	132.09
LF-05E	96 to 106	9/9/2013	197.1	63.1	134
LF-05P	132 to 137	9/9/2013	199.56	64.5	135.06
LF-06	26 to 36 (BR)	9/9/2013	197.55	70.99	126.56
LF-06C	105 to 115	9/9/2013	198.55	68.08	130.47
LF-06N	85 to 90 (BR)	9/9/2013	198.15	71.32	126.83
LF-06S	127 to 132	9/9/2013	198.45	63.55	134.9
LF-09	80 to 95	9/9/2013	200.28	68.4	131.88
LF-09A	113 to 127	9/9/2013	200.34	68.45	131.89
LF-10	35 to 45	9/9/2013	199.42	66.99	132.43
LF-10A	56 to 71	9/9/2013	199.71	67.25	132.46
LF-10B	78 to 86	9/9/2013	199.37	66.96	132.41
LF-10C	128 to 138	9/9/2013	199.45	64.59	134.86
LF-11AR	40 to 50	9/9/2013	195.6	62.37	133.23
LF-11BR	85 to 95	9/9/2013	195.88	61.25	134.63
LF-11CR	127 to 137	9/9/2013	195.65	59.7	135.95
LF-11R	-11 to -1 (BR)	9/9/2013	195.64	66.07	129.57
LF-12	88 to 98	9/9/2013	199.64	71.14	128.5
LF-12A	127 to 137	9/9/2013	199.81	68.46	131.35
LF-13	14 to 24 (BR)	9/9/2013	129.12	4.01	125.11
LF-13A	90 to 100	9/9/2013	129.4	6.74	122.66
LF-13B	115 to 125	9/9/2013	129.22	6.51	122.71
LF-13SBR	68 to 78 (BR)	9/9/2013	129.18	4.07	125.11
LF-14	120 to 130	9/9/2013	184.12	49.52	134.6
LF-15	120 to 130	9/9/2013	199.9	64.95	134.95
LF-16	119 to 129	9/9/2013	194.68	59.71	134.97
LF-17D	83 to 93	9/10/2013	201.62	71.21	130.41
LF-17S	113 to 123	9/10/2013	201.62	65.9	135.72
LF-17SBR	56 to 62 (BR)	9/10/2013	201.62	72.41	129.21
LF-18D	53 to 63	9/9/2013	133.81	10.16	123.65

Table 2-1. (continued)

Location	Open Interval Elevation (feet NGVD)	Date Measured	Measuring Point Elevation (feet NGVD)	Depth to Water (feet)	Water Level Elevation (feet NGVD)
LF-18DBR	-15 to -5 (BR)	9/9/2013	133.75	9.24	124.51
LF-18SBR	31 to 41 (BR)	9/9/2013	133.84	9.43	124.41
LF-19D	50 to 60	9/10/2013	198.89	67.2	131.69
LF-19DBR	-48 to -33 (BR)	9/10/2013	197.53	71.85	125.68
LF-19MBR	-23 to -8 (BR)	9/10/2013	197.53	72.39	125.14
LF-19S	110 to 130	9/10/2013	198.89	64.9	133.99
LF-19SBR	11 to 23 (BR)	9/10/2013	198.89	69.51	129.38
LF-20D	34 to 44	9/9/2013	150.16	26.21	123.95
LF-20DBR	-53 to -43 (BR)	9/9/2013	150.46	25.56	124.9
LF-20SBR	-1 to 9 (BR)	9/9/2013	150.16	25.62	124.54
LF-21D	61 to 71	9/9/2013	157.05	29.04	128.01
LF-21DBR	-30 to -20 (BR)	9/9/2013	158.37	32.27	126.1
LF-21SBR	41 to 51 (BR)	9/9/2013	156.94	30.8	126.14
LF-22D	80 to 90	9/9/2013	197.71	70.61	127.1
LF-22S	100 to 110	9/9/2013	197.37	67.3	130.07
MLF	83 to 123	9/9/2013	198.81	71.58	127.23
MUSKPOND	Surface Water	9/10/2013	131.745	DRY	DRY
MW-01B	40 to 45 (BR)	9/10/2013	192.75	55.49	137.26
MW-01D	79 to 89	9/10/2013	192.52	55.34	137.18
MW-01S	134 to 149	9/10/2013	192.84	55.54	137.3
MW-02B	29 to 34 (BR)	9/10/2013	194.98	62.18	132.8
MW-03D	109 to 119	9/10/2013	191.54	58.93	132.61
MW-03S	130 to 145	9/10/2013	191.41	DRY	DRY
MW-04B	36 to 41 (BR)	9/10/2013	190.57	56.67	133.9
MW-04D	106 to 116	9/10/2013	190.74	55.62	135.12
MW-04S	132 to 147	9/10/2013	190.68	54.89	135.79
MW-06B	40 to 45 (BR)	9/10/2013	186.93	65.3	121.63
MW-06D	111 to 121	9/10/2013	187.28	50.47	136.81
MW-06D1	85 to 95	9/10/2013	187.56	52.54	135.02
MW-06D2	59 to 69	9/10/2013	187.56	55.11	132.45
MW-06S	125 to 140	9/10/2013	186.95	50.84	136.11
MW-07B	50 to 60 (BR)	9/10/2013	190.9	58.65	132.25
MW-07D	98 to 108	9/10/2013	191.13	53.3	137.83
MW-08S	128 to 143	9/10/2013	183.81	46.59	137.22
MW-10S	128 to 143	9/10/2013	194.71	55.79	138.92
MW-13B	46 to 56 (BR)	9/10/2013	185.88	53.52	132.36
MW-15S	134 to 144	9/10/2013	192.63	54.26	138.37
MW-16B	73 to 93 (BR)	9/10/2013	191.41	58.87	132.54
MW-17S	135 to 145	9/10/2013	191.37	52.72	138.65

Table 2-1. (continued)

Location	Open Interval Elevation (feet NGVD)	Date Measured	Measuring Point Elevation (feet NGVD)	Depth to Water (feet)	Water Level Elevation (feet NGVD)
MW-18S	136 to 146	9/10/2013	190.03	51.39	138.64
MW-19S	138 to 148	9/10/2013	191.2	52.45	138.75
MW-21S	134 to 144	9/10/2013	184.73	44.1	140.63
MW-40	132 to 142	9/10/2013	193.73	55.72	138.01
MW-42	136 to 146	9/10/2013	195.2	56.57	138.63
MW-43D	121 to 131	9/10/2013	193.94	55.46	138.48
MW-43S	133 to 143	9/10/2013	194.08	55.34	138.74
MW-44	132 to 142	9/10/2013	193.09	54.55	138.54
MW-45	132 to 142	9/10/2013	193.27	54.72	138.55
MW-46	131 to 141	9/10/2013	191.75	53.24	138.51
MW-48	127 to 137	9/10/2013	188.05	50.38	137.67
MW-49	128 to 138	9/10/2013	189.32	51.61	137.71
NE-1	-66 to 45 (BR)	9/10/2013	186.08	126	60.08
NLBR	76 to 86 (BR)	9/9/2013	182.76	47.83	134.93
NLBR-R	75 to 89 (BR)	9/9/2013	183.1	49.83	133.27
NLGP	93 to 108	9/9/2013	182.66	47.41	135.25
NMGP	101 to 116	9/9/2013	143.22	9.71	133.51
OSA-01A	128 to 138	9/9/2013	195.78	59.92	135.86
OSA-01B	98 to 108	9/9/2013	196.6	60.82	135.78
OSA-01BR	62 to 72 (BR)	9/9/2013	195.99	60.91	135.08
OSA-01C	80 to 90	9/9/2013	196.24	60.69	135.55
OSA-02A	130 to 140	9/9/2013	196.06	59.98	136.08
OSA-02B	104 to 114	9/9/2013	195.8	60.01	135.79
OSA-02BR	49 to 69 (BR)	9/9/2013	196.42	62.11	134.31
OSA-03A	128 to 138	9/9/2013	194.06	57.92	136.14
OSA-03B	104 to 114	9/9/2013	194.22	58.14	136.08
OSA-03BR	55 to 65 (BR)	9/9/2013	194.47	60.46	134.01
OSA-04	130 to 140	9/9/2013	196.89	60.89	136
OSA-05A	128 to 138	9/9/2013	152.89	18.65	134.24
OSA-05B	100 to 110	9/9/2013	152.94	18.82	134.12
OSA-05BR	70 to 80 (BR)	9/9/2013	152.86	18.92	133.94
OSA-06A	125 to 135	9/9/2013	141.22	8.11	133.11
OSA-06B	101 to 111	9/9/2013	141.52	8.58	132.94
OSA-06BR	51 to 61 (BR)	9/9/2013	141.29	8.42	132.87
OSA-07A	127 to 137	9/9/2013	149.58	15.75	133.83
OSA-07B	89 to 99	9/9/2013	149.4	16.44	132.96
OSA-08R	to NA	9/9/2013	153.1	18.54	134.56
OSA-09A	126 to 136	9/9/2013	188.94	53.75	135.19
OSA-09B	86 to 96	9/9/2013	189	52.93	136.07

Table 2-1. (continued)

Location	Open Interval Elevation (feet NGVD)	Date Measured	Measuring Point Elevation (feet NGVD)	Depth to Water (feet)	Water Level Elevation (feet NGVD)
OSA-10A	129 to 139	9/9/2013	183.22	47.28	135.94
OSA-10B	99 to 109	9/9/2013	183.16	48.03	135.13
OSA-11A	126 to 136	9/9/2013	183.7	48.12	135.58
OSA-11B	108 to 118	9/9/2013	184.09	48.94	135.15
OSA-11BR	78 to 88 (BR)	9/9/2013	183.5	50.02	133.48
OSA-12A	125 to 140	9/9/2013	184.4	48.71	135.69
OSA-12B	68 to 78	9/9/2013	184.45	49.21	135.24
OSA-12BR	37 to 47 (BR)	9/9/2013	184.64	49.32	135.32
OSA-13A	123 to 138	9/9/2013	177.43	41.82	135.61
OSA-13B	105 to 115	9/9/2013	176.71	41.21	135.5
OSA-13C	73 to 83	9/9/2013	177.54	42.08	135.46
OSA-14A	125 to 135	9/9/2013	175.3	39.96	135.34
OSA-14B	79 to 89	9/9/2013	175.23	40.12	135.11
OSA-15A	129 to 139	9/9/2013	180.37	44.86	135.51
OSA-15B	73 to 83	9/9/2013	181.08	45.74	135.34
OSA-16A	129 to 139	9/9/2013	188.8	53.12	135.68
OSA-16B	54 to 64	9/9/2013	188.89	55.2	133.69
OSA-16BR	7 to 17 (BR)	9/9/2013	188.32	54.96	133.36
OSA-17	128 to 138	9/9/2013	169.26	25.47	143.79
OSA-18	133 to 143	9/9/2013	165.73	27.49	138.24
OSA-19	134 to 144	9/9/2013	178.2	36.36	141.84
OSA-20	142 to 152	9/9/2013	196.27	DRY	DRY
OSA-21	135 to 145	9/9/2013	189	50.32	138.68
OSA-22	120 to 130	9/9/2013	171.58	35.31	136.27
OSA-23A	129 to 139	9/9/2013	179.07	43.36	135.71
OSA-23B	115 to 125	9/9/2013	179.22	44.27	134.95
OSA-24	74 to 89 (BR)	9/9/2013	183	49.19	133.81
OW-8	110 to 115	9/9/2013	129.1	9.44	119.66
OW-B	87 to 92	9/9/2013	142.3	24.95	117.35
OW-E	98 to 103	9/10/2013	138	20.61	117.39
PL-4P	131 to 134	9/9/2013	163.4	27.65	135.75
PS-22A	124 to 126	9/10/2013	143.2	18.2	125
PS-22B	96 to 98	9/10/2013	143.2	18.51	124.69
PS-29A	117 to 119	9/10/2013	141.69	14.27	127.42
PS-29B	86 to 91	9/10/2013	141.39	13.5	127.89
PT-03P	121 to 126	9/9/2013	138.57	17.09	121.48
PT-04P	118 to 123	9/9/2013	135.9	16.62	119.28
PT-05P	122 to 132	9/9/2013	137.25	DRY	DRY
PT-09	43 to 53	9/9/2013	134.65	11	123.65

Table 2-1. (continued)

Location	Open Interval Elevation (feet NGVD)	Date Measured	Measuring Point Elevation (feet NGVD)	Depth to Water (feet)	Water Level Elevation (feet NGVD)
PT-10	103 to 108	9/9/2013	135.23	11.59	123.64
PT-11P	114 to 124	9/9/2013	133.33	9.22	124.11
PT-12	126 to 136	9/9/2013	153.54	DRY	DRY
R-1	44 to 49 (BR)	9/9/2013	155.98	28.72	127.26
R-2	65 to 70 (BR)	9/9/2013	138.03	11.15	126.88
R-2A	86 to 91	9/9/2013	138.78	12.01	126.77
R-3P	76 to 81	9/9/2013	145.97	19.73	126.24
R-4A	to NA	9/10/2013	140.59	9.69	130.9
RE-1	124 to 164	9/10/2013	188.01	37.16	150.85
RE-1OBS	120 to 140	9/10/2013	188.1	49.96	138.14
RE-2	121 to 161	9/10/2013	188.44	28.95	159.49
RE-2OBS	120 to 140	9/10/2013	189.13	51.95	137.18
RP-1	53 to 63 (BR)	9/9/2013	138.66	10.73	127.93
RW-1	126 to 141	9/10/2013	190.56	51.7	138.86
RW-2	127 to 142	9/10/2013	191.24	52.6	138.64
RW-3	127 to 142	9/10/2013	194.34	55.7	138.64
RW-4	125 to 140	9/10/2013	194.17	55.57	138.6
RW-5	125 to 140	9/10/2013	193.76	55.19	138.57
SELF-1	95 to 113	9/9/2013	198.32	81.2	117.12
SELF-2	85 to 113	9/9/2013	198.09	80	118.09
SINKPOND 3A	Surface Water	9/9/2013	139.44	DRY	DRY
SINKPOND 3B	Surface Water	9/9/2013	138.77	DRY	DRY
SLBR	39 to 49 (BR)	9/9/2013	181.23	46.93	134.3
SLGP	70 to 90	9/9/2013	182.19	45.92	136.27
SLGP-R	66 to 83	9/9/2013	181.9	47.42	134.48
SWLF-1	-12 to 28 (BR)	9/9/2013	197.13	67.65	129.48
SWLF-2	-25 to 30 (BR)	9/9/2013	197	75.17	121.83
TCA-1	121 to 126	9/9/2013	183.62	48.62	135
TF-1	117 to NA	9/9/2013	191.32	56.08	135.24
TURTPOND	Surface Water	9/9/2013	128.1	DRY	DRY
TW-2-78	71 to 76	9/9/2013	151.61	17.95	133.66
UNA-1	111 to NA	9/9/2013	143.57	17.52	126.05
UNA-2	97 to NA	9/9/2013	138.39	10.47	127.92
UNA-3	103 to NA	9/9/2013	154.79	25.23	129.56
UNA-5	111 to NA	9/9/2013	157.75	25.11	132.64
WLF	86 to 104	9/9/2013	197.56	71.16	126.4
WLF-OBS	92 to 117	9/9/2013	199.24	66.65	132.59
WRG1-OBS	102 to NA	9/9/2013	146.18	15.18	131
WRG2-OBS	103 to NA	9/9/2013	146.83	15.98	130.85

Table 2-1. (continued)

Location	Open Interval Elevation (feet NGVD)	Date Measured	Measuring Point Elevation (feet NGVD)	Depth to Water (feet)	Water Level Elevation (feet NGVD)

Note:

(BR) - Open interval in bedrock.
NGVD - National Geodetic Vertical Datum
NA - Not Available
Water level elevation for Sinking Pond estimated to be 134.97

Table 2-2. Summary of Extraction Rates, September 9-10, 2013

Location	Extraction Rate (gpm)
Public Water Supply Wells	
Assabet 1A	328
Assabet 2A	192
Christofferson	0
Lawsbrook	148
Scribner	100
Extraction Wells	
NE-1	19.7
MLF	39.7
SELF-1	1
SELF-2	1
SWLF-2	6.3
WLF	7.8
gpm - gallons per minute	

Table 3-1. Comparison of VOCs Detected in Groundwater to Interim Groundwater Cleanup Levels, August 21 to September 19, 2013.

Compound	IGCL (ug/l)	No. Locations > IGCL / Total No. Locations	No. Samples > IGCL / Total No. Samples	No. of Detections	Maximum Concentration Detected (ug/l)	
VOCs						
Vinyl Chloride	2	31 / 72	35 / 79	39	130	*
1,1-Dichloroethene	7	27 / 72	34 / 79	60	310	*
Benzene	5	15 / 72	18 / 79	38	270	*
1,2-Dichloroethane	5	6 / 72	6 / 79	8	29	*
1,2-Dichloropropane	5	3 / 72	3 / 79	6	79	*
Trichloroethene	5	1 / 72	1 / 79	5	7.2	*
Methyl tert butyl ether	16	0 / 72	0 / 79	7	1.8	
Methylene Chloride	5	0 / 72	0 / 79	5	1.4	

Concentrations in µg/L.
IGCL – Interim Groundwater Cleanup Level as defined in Record of Decision (USEPA, 2005).
* - Compound detected above IGCL.

Table 3-2. 1,1,1-TCA, PCE, and TCE Concentrations in Groundwater, 2013.

Area	Location	Sample Date	QA Type	Result
1,1,1-Trichloroethane				
Assabet River Area	PT-11B1	9/6/2013		1.9
Tetrachloroethene				
Assabet River Area	PT-11B1	9/6/2013		1.7
Northeast Area	PS-29B	8/29/2013		0.44 J
Trichloroethene				
Assabet River Area	PT-11B1	9/6/2013		7.2
Northeast Area	AR-31D	8/29/2013		1
Northeast Area	PS-22B	8/29/2013	Dup	2.4
Northeast Area	PS-22B	8/29/2013		2.4
Northeast Area	PS-29B	8/29/2013		1.2

Notes:

Concentrations in µg/L
Dup - Duplicate Sample
J - Estimated Value
PCE - Tetrachloroethene
TCA - 1,1,1-Trichloroethane
TCE - Trichloroethene

Table 3-3. Comparison of inorganic compounds detected in groundwater to Interim Groundwater Cleanup Levels, August 21 to September 19, 2013.

Compound	IGCL (ug/l)	No. Locations > IGCL / Total No. Locations	No. Samples > IGCL / Total No. Samples	No. of Detections	Maximum Concentration Detected (ug/l)	
Metals						
Manganese (1)	300	15 / 27	15 / 28	28	4500	*
Arsenic	10	10 / 27	10 / 28	28	310	*
Nickel	100	1 / 9	1 / 10	9	200	*
Lead	15	1 / 9	1 / 10	8	39	*
Chromium	100	1 / 9	1 / 10	4	660	*
Antimony	6	1 / 9	1 / 10	1	11	*
Beryllium	4	0 / 9	0 / 10	0	0	

Concentrations in µg/L.
IGCL –Interim Groundwater Cleanup Level as defined in Record of Decision (USEPA, 2005).
* - Compound detected above IGCL.
(1) A background concentration of 722 µg/L has been proposed by Grace as the IGCL for manganese.

Table 3-4. Summary of Geochemical Results, 2013.

LOCATION	Lithologic Unit	Screen Depth	Sample Date	QA Type	Dissolved Arsenic (µg/L)	Dissolved Iron (µg/L)	Dissolved Manganese (µg/L)	DO (mg/L)	ORP (mV)	pH
Former Lagoon Area										
Close to Source										
OSA-01B	Sand & Gravel	86-96	8/23/2013		110	70 B	1300 B	0.98	-103.4	7.31
OSA-09B	Till	91-101	8/26/2013		83	93 B	3.7 B	0.2	-237	9.79
OSA-11B	Sand & Gravel	64-74	9/4/2013		0.53 J	39 J	21 B	1.67	-26.9	5.99
Downgradient toward North Lagoon Wetland										
OSA-05A	Sand & Gravel	12-22	8/26/2013		0.5 J	ND (50)	59 B	3.49	60.7	5.77
OSA-06BR	Bedrock	78-88	8/27/2013		37	3100 B	950 B	0.76	-68.2	6.96
OSA-07A	Sand & Gravel	10-20	8/21/2013		0.53 J	13000	870 ^	0.48	46.9	6.13
Industrial Landfill										
Close to Source										
B-08C	Till	80-90	8/21/2013		100	31000	4500 ^	1.34	-55.9	6.57
B-08D	Sand & Gravel	58-73	8/21/2013		0.27 J	230	3500 ^	3.8	138.3	5.84
LF-06C	Sand & Gravel	82-92	8/27/2013		310	9500 B	2800 B	0.89	-96.3	6.85
LF-15	Till	68-78	8/22/2013		3.2	3300 B	2400 B	1.01	-82.6	6.95
Downgradient toward Assabet River										
AR-21	Bedrock	113-118	8/27/2013		1.7	ND (50)	4.9 B	7.82	60.1	7.03
LF-12	Till	100-110	8/22/2013		16	ND (50)	130 B	1.56	-143	7.88

NOTES:

DUP - Duplicate Sample.
ND (10) - Compound not detected at limit indicated in parentheses.
J - Estimated Value.
B - Detected in blank.
^ - Instrument related QC exceeded the control limits.

Table 3-5. 1,4-Dioxane Concentrations in Groundwater, November 1, 2012 to October 31, 2013.

Location	Sample Date	QA Type	Result
Northeast Area			
AR-28S	8/22/2013		0.46
AR-29D	8/22/2013		0.17 J
AR-29SBR	9/4/2013		1.1
AR-30D	8/29/2013		0.93
AR-30SBR	8/29/2013		0.52
AR-31D	8/29/2013		1.2
AR-31S	8/29/2013		1
CHRISTOFFERSON	11/26/2012		0.108
CHRISTOFFERSON	3/18/2013		0.103
CHRISTOFFERSON	8/23/2013		0.2
LAWSBROOK	11/26/2012		0.202
LAWSBROOK	3/18/2013		0.234
LAWSBROOK	8/22/2013		0.33
MW-06S	8/26/2013		2
NE-EFF	11/13/2012		1.9
NE-EFF	12/7/2012		1.8
NE-EFF	1/7/2013		1.8
NE-EFF	2/6/2013		1.9
NE-EFF	3/5/2013		1.9
NE-EFF	4/16/2013		2.1
NE-EFF	5/8/2013		1.9
NE-EFF	6/6/2013		1.9 B
NE-EFF	7/23/2013		2
NE-EFF	8/16/2013		1.9
NE-EFF	9/10/2013		1.7
PS-22A	8/23/2013		0.35
PS-22B	8/29/2013	Dup	1.5
PS-22B	8/29/2013		1.6
PS-29A	8/29/2013		0.12 J
PS-29B	8/29/2013		0.34
SCRIBNER	11/26/2012		0.299
SCRIBNER	3/18/2013		0.264
SCRIBNER	8/23/2013	Dup	0.3
SCRIBNER	8/23/2013		0.25
SCRIBNER	9/19/2013		0.31
SCRIBNER	9/19/2013	Dup	0.31
SCRIBNER1	11/26/2012		0.108

Location	Sample Date	QA Type	Result
SCRIBNER1	3/18/2013		0.121
SCRIBNER1	9/19/2013		0.12 J
SCRIBNER2	11/26/2012		0.323
SCRIBNER2	3/18/2013		0.352
SCRIBNER2	9/19/2013		0.43
SCRIBNER3	11/26/2012		0.0362 J
SCRIBNER3	3/18/2013		0.0424 J
SCRIBNER3	9/19/2013		ND (0.2)
SCRIBNER4	11/26/2012		0.406
SCRIBNER4	3/18/2013		0.322
SCRIBNER4	9/19/2013		0.4
Southeast Landfill Area			
B-08B	8/27/2013		17
LF-06C	8/27/2013		8.4
SELF-1	1/14/2013		26
SELF-1	4/11/2013		29
SELF-1	9/5/2013		28
SELF-2	1/14/2013		26
SELF-2	4/11/2013		28
SELF-2	9/5/2013		34
Southwest Area			
ASSABET-1A	11/26/2012		0.263
Assabet-1A	8/23/2013		0.32
ASSABET-2A	11/26/2012		0.143
Assabet-2A	8/23/2013		0.16 J
B-06B5	8/26/2013		1.1
B-09B4	9/5/2013		1.9
PT-03B1	8/27/2013		2.9
R-2	9/4/2013		0.99
Southwest Landfill Area			
MLF	1/14/2013		1.3
MLF	4/11/2013		1.3
MLF	9/5/2013		1.2
SWLF-2	1/14/2013		4.5
SWLF-2	4/11/2013		5.4
SWLF-2	9/5/2013		5.3
WLF	1/14/2013		3.2
WLF	4/11/2013		3.8
WLF	9/5/2013		3.9

Location	Sample Date	QA Type	Result

Notes:

Concentrations in µg/L

Dup - Duplicate Sample

J - Estimated Concentration

ND (10) - Compound not detected at limit indicated in parentheses.

NE-EFF represents 1, 4 Dioxane concentrations from extraction well NE-1

Table 4-1. Statistically Significant Concentration Trends Based on Mann-Kendall Trend Test for Small Sample Size

Location	VDC Trend	VDC 2005/2013	Vinyl Chloride Trend	Vinyl Chloride 2005/2013	Benzene Trend	Benzene 2005/2013
Former Lagoon Area						
AR-16ADP	none	NA	downward	2.4/1.4	<=IGCL (5)	NA
NMGP	downward	12/3	<=IGCL (2)	NA	<=IGCL (5)	NA
OSA-01A	downward	19/3.7	<=IGCL (2)	NA	<=IGCL (5)	NA
OSA-01C	none	NA	<=IGCL (2)	NA	<=IGCL (5)	NA
OSA-02A	none	NA	<=IGCL (2)	NA	<=IGCL (5)	NA
OSA-03BR	none	NA	none	NA	<=IGCL (5)	NA
OSA-05B	downward	25/3.8	<=IGCL (2)	NA	<=IGCL (5)	NA
OSA-06BR	downward	96/0.79 J	downward	5.9/2.3	ND	NA
OSA-11B	downward	11/4	<=IGCL (2)	NA	<=IGCL (5)	NA
OSA-13B	ND	NA	ND	NA	none	NA
SLGP-R	downward	64/1.8	downward	1.3/ND(1)	<=IGCL (5)	NA
Northeast Area						
AR-09A	downward	9.2/0.52 J	ND	NA	<=IGCL (5)	NA
AR-27D	downward	30/0.74 J	<=IGCL (2)	NA	<=IGCL (5)	NA
AR-29SBR	downward	41/ND(5)	<=IGCL (2)	NA	<=IGCL (5)	NA
AR-30D	downward	9.6/0.4 J	<=IGCL (2)	NA	<=IGCL (5)	NA
AR-31D	downward	90/66	none	NA	<=IGCL (5)	NA
AR-35MBR	none	NA	<=IGCL (2)	NA	<=IGCL (5)	NA
CHRISTOFFERSON	<=IGCL (7)	NA	<=IGCL (2)	NA	<=IGCL (5)	NA
LAWSBROOK	<=IGCL (7)	NA	<=IGCL (2)	NA	<=IGCL (5)	NA
MW-04B	none	NA	upward	1.4/2	<=IGCL (5)	NA
MW-06B	downward	170/20	none	NA	<=IGCL (5)	NA
MW-07B	downward	76/13	none	NA	<=IGCL (5)	NA
MW-13B	none	NA	downward	11/4.5	<=IGCL (5)	NA
PS-22B	downward	72/17	downward	2/ND(1)	<=IGCL (5)	NA
PS-29B	downward	6.1/4	<=IGCL (2)	NA	<=IGCL (5)	NA
SCRIBNER	downward	5.5/3.1	<=IGCL (2)	NA	<=IGCL (5)	NA
Southwest Area						
ASSABET-1A	<=IGCL (7)	NA	<=IGCL (2)	NA	<=IGCL (5)	NA
ASSABET-2A	<=IGCL (7)	NA	<=IGCL (2)	NA	<=IGCL (5)	NA
B-09B4	<=IGCL (7)	NA	<=IGCL (2)	NA	<=IGCL (5)	NA
PT-11B1	none	NA	<=IGCL (2)	NA	<=IGCL (5)	NA

Table 4-1. Statistically Significant Concentration Trends Based on Mann-Kendall Trend Test for Small Sample Size

Location	VDC Trend	VDC 2005/2013	Vinyl Chloride Trend	Vinyl Chloride 2005/2013	Benzene Trend	Benzene 2005/2013
Assabet River Area						
LF-18D	downward	120/44	downward	48/20	downward	7.8/4.3
LF-20D	downward	39/7.5	downward	28/6.9	<=IGCL (5)	NA
Southwest Landfill Area						
AR-20	none	NA	none	NA	<=IGCL (5)	NA
B-03B3	downward	34/0.58 J	downward	18/0.48 J	<=IGCL (5)	NA
LF-02A	none	NA	none	NA	none	NA
LF-10	downward	470/200	downward	130/55	none	NA
LF-12	<=IGCL (7)	NA	<=IGCL (2)	NA	none	NA
LF-13A	downward	21/12	upward	3.3/7.8	<=IGCL (5)	NA
LF-19D	ND	NA	downward	240/13	downward	31/2.3
LF-19SBR	none	NA	none	NA	none	NA
MLF	downward	64/4	downward	17/2.5	<=IGCL (5)	NA
WLF	none	NA	none	NA	<=IGCL (5)	NA
Southeast Landfill Area						
AR-11B2	upward	23/34	upward	48/75	upward	5.8/7.9
AR-21	<=IGCL (7)	NA	<=IGCL (2)	NA	ND	NA
B-08B	<=IGCL (7)	NA	none	NA	downward	100/2.8 J
G-3A	<=IGCL (7)	NA	downward	9.5/2.7	<=IGCL (5)	NA
G-3BR	<=IGCL (7)	NA	<=IGCL (2)	NA	downward	7/4.4
LF-05E	downward	110/32	downward	78/26	downward	8.2/2.6
LF-06	<=IGCL (7)	NA	<=IGCL (2)	NA	none	NA
LF-06C	<=IGCL (7)	NA	ND	NA	downward	2800/160
LF-06N	<=IGCL (7)	NA	none	NA	downward	130/ND(1)
LF-11AR	downward	18/1.7	downward	78/3.2	downward	14/0.43 J
LF-17D	downward	34/ND(1)	none	NA	downward	7.2/4.6
OSA-16B	<=IGCL (7)	NA	none	NA	none	NA

Notes:

NA - Not applicable.

<=IGCL (7) - Concentrations from all samples collected over the nine year time period were less than or equal to the Interim Groundwater Cleanup Goal (value of IGCL in µg/L)

ND - Not all sample results were less than or equal to IGCL. Trend analysis could not be completed because two or more results were not detected.

J = Estimated value

Table 5-1. Hydraulic Response to Extraction Well SWLF-2

Location	Lithology	Screen Elevation (feet NGVD)	Water Level Change (feet)
SWLF-1	Bedrock	28.1 to -11.9	2
SWLF-2	Bedrock	30.1 to -24.9	8.3
LF-19S	Unconsolidated	131 to 111	None
LF-19D	Unconsolidated	61 to 51	None
LF-19SBR	Bedrock	23.5 to 11.9	1.8
LF-19MBR	Bedrock	-7.3 to -22.3	1.5
LF-19DBR	Bedrock	-32.6 to -47.6	4

Data from October 2013 hydraulic testing of extraction well SWLF-2. SWLF-2 pumping at approximately 6.4 gpm.

FIGURES

G:\WRG-ACT_2013\07-13-DATA-RPT\SECT-LOCA.DWG

NOTE: BASE MAP BY COL-EAST 1998. WELL LOCATIONS, W.R. GRACE PROPERTY LINE & MISC. SITE FEATURES COMPILED FROM INFORMATION PROVIDED BY CAMP DRESSER & McKEE. SURROUNDING PROPERTY LINE LOCATIONS ARE FROM THE TOWN OF ACTON AND CONCORD ASSESSORS MAPS.

N

Northeast Area

Former Lagoon Area

Southwest Area

Southwest Landfill Area

Southeast Landfill Area

Assabet River Area

A

A'

B

B'

C

C'

EXPLANATION

- W.R. GRACE PROPERTY BOUNDARY (APPROXIMATE)
- MONITORING WELL (SINGLE OR CLUSTER)
- W.R. GRACE EXTRACTION WELL
- W.R. GRACE INJECTION WELL
- FORMER EXTRACTION WELL
- NON-GRACE EXTRACTION WELL
- PUBLIC WATER SUPPLY WELL
- PROPOSED PUBLIC WATER SUPPLY WELL
- RIVER TRANSECT
- SURFACE WATER MEASURMENT LOCATION
- SECTION LOCATION

0 600

Scale in feet

TITLE:

SITE MAP WITH SECTION LOCATIONS

LOCATION:

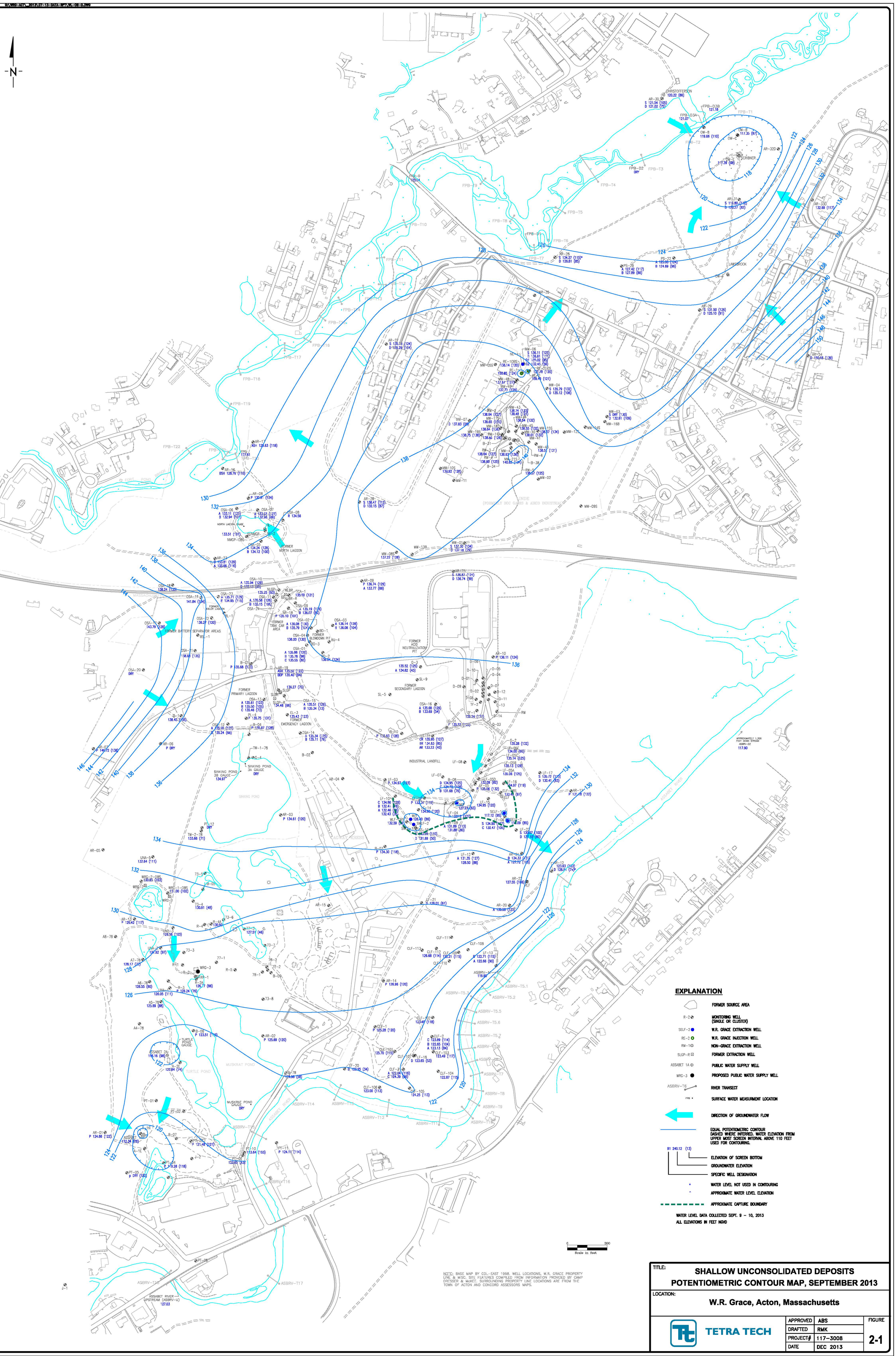
W.R. Grace, Acton, Massachusetts

TETRA TECH

APPROVED	ABS
DRAFTED	RMK
PROJECT#	117-3008
DATE	DEC. 2013

FIGURE 1-1

G:\WRG-ACT_2013\07-13-DATA-RPT\WL-08-D.DWG



EXPLANATION

- FORMER SOURCE AREA
- R-2 — MONITORING WELL (SINGLE OR CLUSTER)
- SELF-2 — W.R. GRACE EXTRACTION WELL
- RE-2 — W.R. GRACE INJECTION WELL
- RW-1 — NON-GRACE EXTRACTION WELL
- SLGP-R — FORMER EXTRACTION WELL
- ASSABET 1A — PUBLIC WATER SUPPLY WELL
- WRG-3 — PROPOSED PUBLIC WATER SUPPLY WELL
- ASBRV-T6 — RIVER TRANSECT
- FPB • — SURFACE WATER MEASURMENT LOCATION
- DIRECTION OF GROUNDWATER FLOW
- EQUAL POTENTIOMETRIC CONTOUR DASHED WHERE INFERRED. WATER ELEVATION FROM UPPER MOST SCREEN INTERVAL ABOVE 110 FEET USED FOR CONTOURING.
- B1 240.12 (13)
  - ELEVATION OF SCREEN BOTTOM
  - GROUNDWATER ELEVATION
  - SPECIFIC WELL DESIGNATION
- • WATER LEVEL NOT USED IN CONTOURING
- ^ APPROXIMATE WATER LEVEL ELEVATION
- APPROXIMATE CAPTURE BOUNDARY

WATER LEVEL DATA COLLECTED SEPT. 9 – 10, 2013
ALL ELEVATIONS IN FEET NGVD

NOTE: BASE MAP BY COL-EAST 1998. WELL LOCATIONS, W.R. GRACE PROPERTY LINE & MISC. SITE FEATURES COMPILED FROM INFORMATION PROVIDED BY CAMP DRESSER & McKEE. SURROUNDING PROPERTY LINE LOCATIONS ARE FROM THE TOWN OF ACTON AND CONCORD ASSESSORS MAPS.

TITLE:
SHALLOW UNCONSOLIDATED DEPOSITS POTENTIOMETRIC CONTOUR MAP, SEPTEMBER 2013

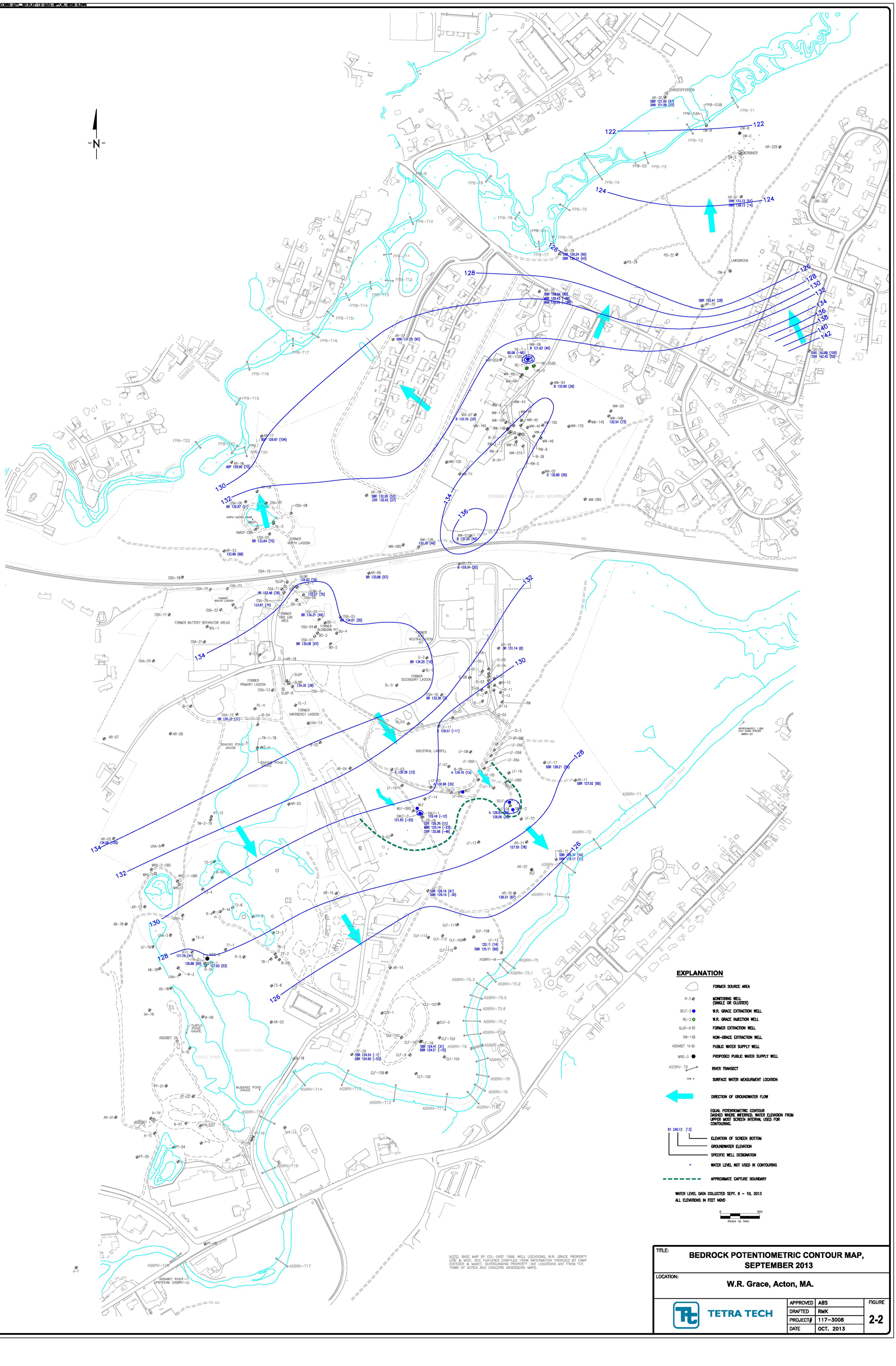
LOCATION:
W.R. Grace, Acton, Massachusetts

TETRA TECH

APPROVED	ABS
DRAFTED	RMK
PROJECT#	117-3008
DATE	DEC 2013

FIGURE 2-1

G:\WRG-ACT_2013\07-13-DATA-RPT\WL-BRDR-D.DWG



EXPLANATION

- FORMER SOURCE AREA
- R-2 — MONITORING WELL (SINGLE OR CLUSTER)
- SELF-2 — W.R. GRACE EXTRACTION WELL
- RE-2 — W.R. GRACE INJECTION WELL
- SLGP-R — FORMER EXTRACTION WELL
- RW-1 — NON-GRACE EXTRACTION WELL
- ASSABET 1A — PUBLIC WATER SUPPLY WELL
- WRG-3 — PROPOSED PUBLIC WATER SUPPLY WELL
- ASBRV-T6 — RIVER TRANSECT
- FPB • — SURFACE WATER MEASURMENT LOCATION
- DIRECTION OF GROUNDWATER FLOW
- EQUAL POTENTIOMETRIC CONTOUR DASHED WHERE INFERRED. WATER ELEVATION FROM UPPER MOST SCREEN INTERVAL USED FOR CONTOURING.
- B1 240.12 (13)
  - ELEVATION OF SCREEN BOTTOM
  - GROUNDWATER ELEVATION
  - SPECIFIC WELL DESIGNATION
- • — WATER LEVEL NOT USED IN CONTOURING
- APPROXIMATE CAPTURE BOUNDARY

WATER LEVEL DATA COLLECTED SEPT. 9 – 10, 2013
ALL ELEVATIONS IN FEET NGVD

0 300
Scale in feet

NOTE: BASE MAP BY COL-EAST 1998. WELL LOCATIONS, W.R. GRACE PROPERTY LINE & MISC. SITE FEATURES COMPILED FROM INFORMATION PROVIDED BY CAMP DRESSER & McKEE. SURROUNDING PROPERTY LINE LOCATIONS ARE FROM THE TOWN OF ACTON AND CONCORD ASSESSORS MAPS.

TITLE:

BEDROCK POTENTIOMETRIC CONTOUR MAP, SEPTEMBER 2013

LOCATION:

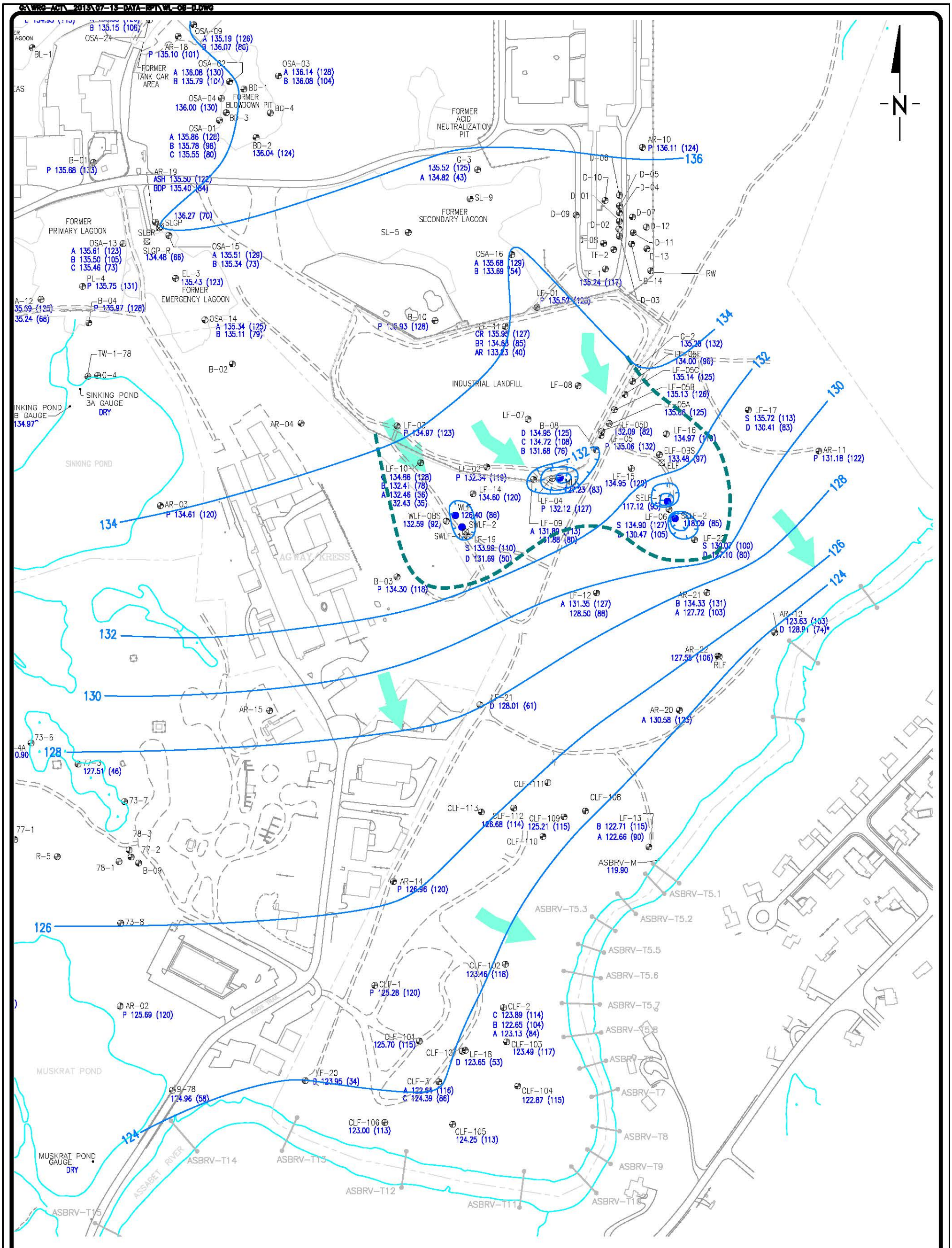
W.R. Grace, Acton, MA.

TETRA TECH

APPROVED	ABS
DRAFTED	RMK
PROJECT#	117-3008
DATE	OCT. 2013

FIGURE 2-2

G:\WRG-ACT_2013\07-13-DATA-RPT\WL-08-D.DWG



EXPLANATION

- FORMER SOURCE AREA
- R-2 — MONITORING WELL (SINGLE OR CLUSTER)
- SELF-2 — W.R. GRACE EXTRACTION WELL
- SLGP-R — FORMER EXTRACTION WELL
- ASBRV-T6 — RIVER TRANSECT
- FPB — SURFACE WATER MEASURMENT LOCATION
- EQUAL POTENTIOMETRIC CONTOUR DASHED WHERE INFERRED. WATER ELEVATION FROM WELLS WITH SCREEN BOTTOM ≤ 105'
- B1 240.12 (13) — ELEVATION OF SCREEN BOTTOM / GROUNDWATER ELEVATION / SPECIFIC WELL DESIGNATION
- * WATER LEVEL NOT USED IN CONTOURING
- APPROXIMATE CAPTURE BOUNDARY
- DIRECTION OF GROUNDWATER FLOW

WATER LEVEL DATA COLLECTED SEPT. 9 – 10, 2013
ALL ELEVATIONS IN FEET NGVD

0 300
Scale in feet

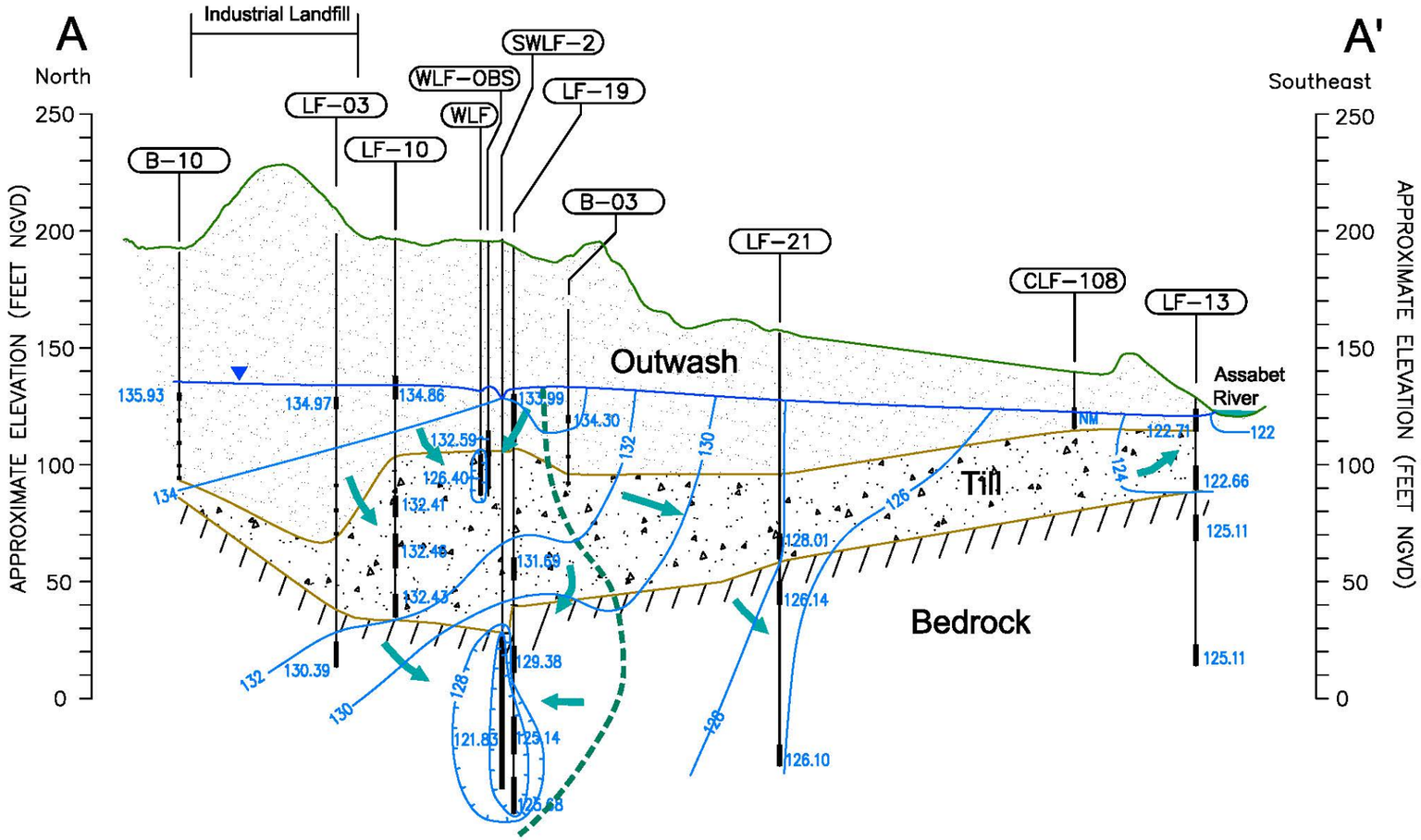
TITLE: **DEEP UNCONSOLIDATED DEPOSITS POTENTIOMETRIC CONTOUR MAP, LANDFILL AREA, SEPTEMBER 2013**

LOCATION: **W.R Grace, Acton, Massachusetts**

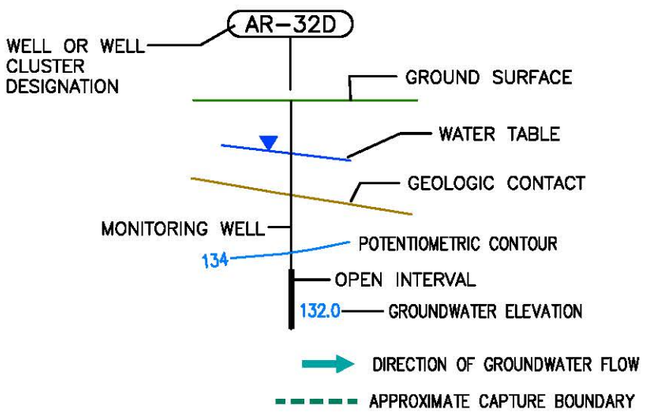
TETRA TECH

APPROVED	ABS
DRAFTED	RMK
PROJECT#	117-3008080
DATE	DEC. 2013

FIGURE 2-3

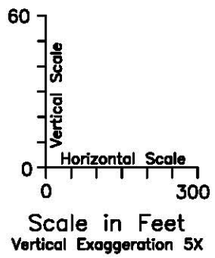


Explanation



WATER LEVEL DATA COLLECTED SEPTEMBER 9–10, 2013

ALL ELEVATIONS IN FEET NGVD



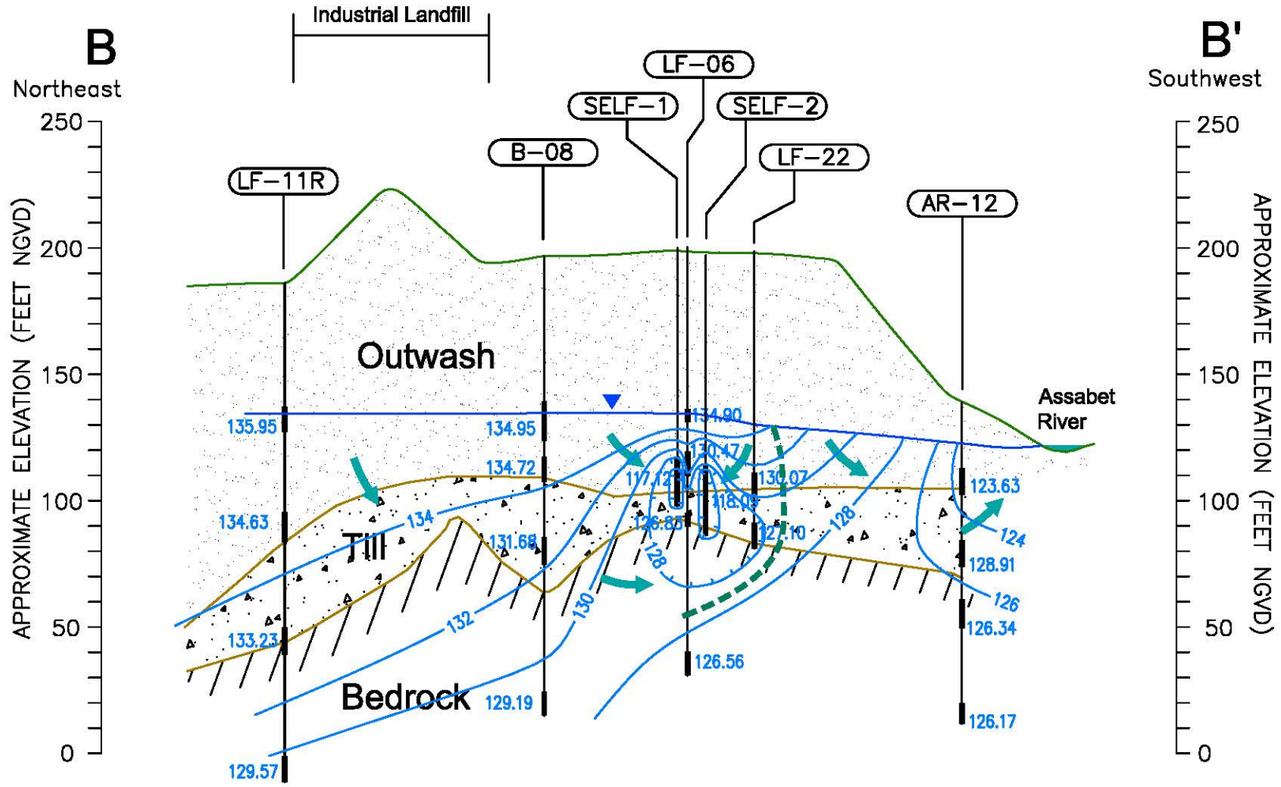
TITLE: **POTENTIOMETRIC SECTION A-A', SEPTEMBER 2013**

LOCATION: **W.R. Grace, Acton, Massachusetts**

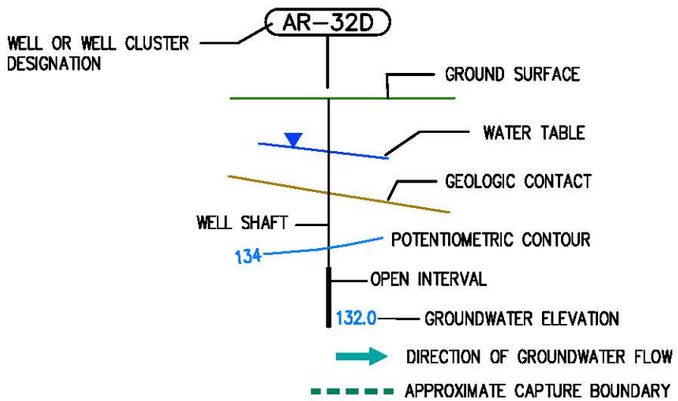
TETRA TECH

APPROVED	ABS
DRAFTED	RMK
PROJECT#	117-3008080
DATE	DEC. 2013

FIGURE **2-4**



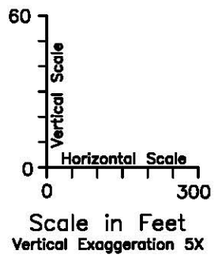
Explanation



* WATER LEVEL NOT USED IN CONTOURING

WATER LEVEL DATA COLLECTED SEPTEMBER 9-10, 2013

ALL ELEVATIONS IN FEET NGVD



TITLE: **POTENTIOMETRIC SECTION B-B', SEPTEMBER 2013**

LOCATION: **W.R. Grace, Acton, Massachusetts**

TETRA TECH

APPROVED	ABS
DRAFTED	RMK
PROJECT#	117-3008080
DATE	DEC 2013

FIGURE **2-5**

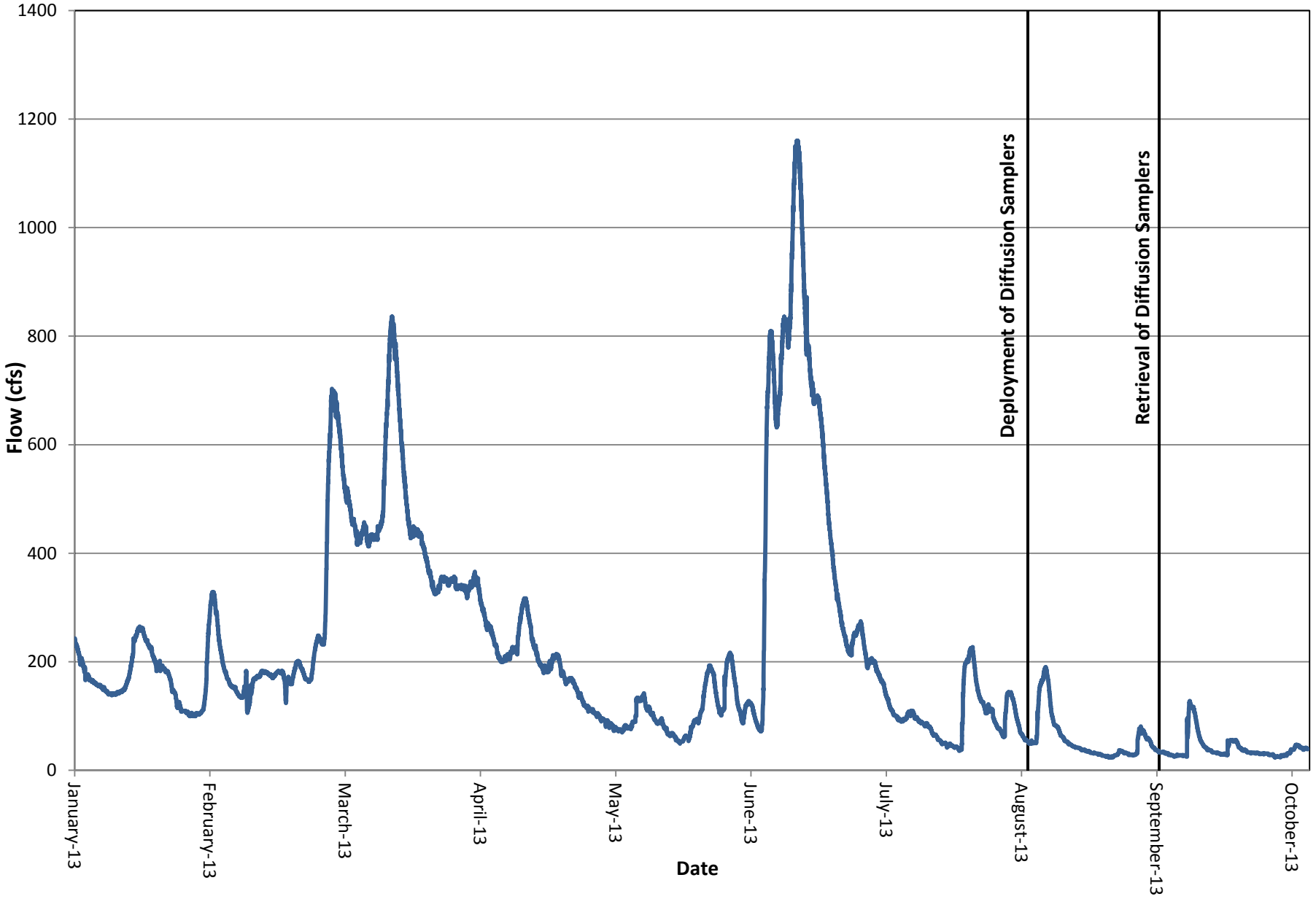
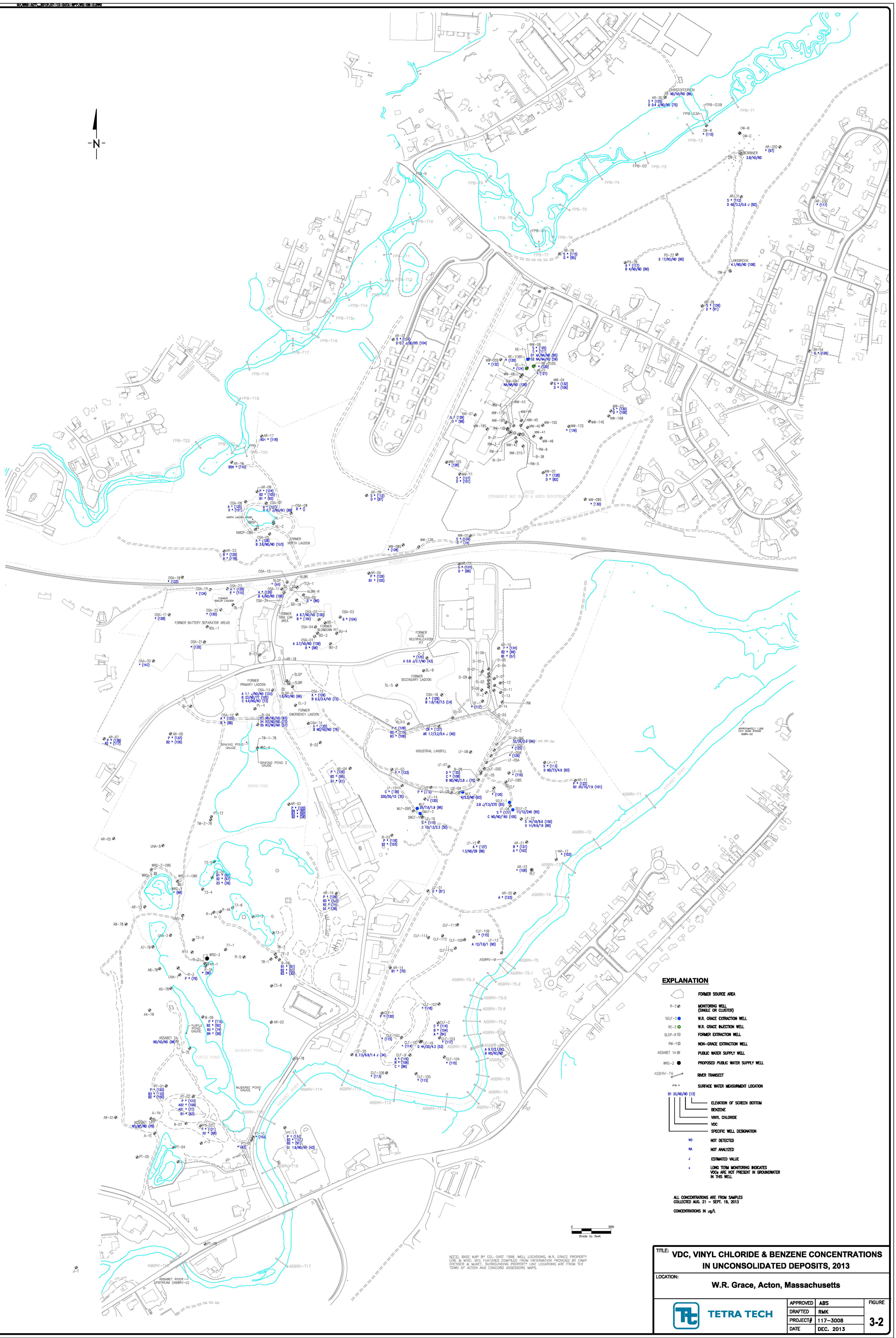


Figure 3-1. Assabet River Daily Average Flow, 2013

G:\WRG-ACT_2013\07-13-DATA-RPT\WQ-08-D.DWG



NOTE: BASE MAP BY COL-EAST 1998. WELL LOCATIONS, W.R. GRACE PROPERTY LINE & MISC. SITE FEATURES COMPILED FROM INFORMATION PROVIDED BY CAMP DRESSER & McKEE. SURROUNDING PROPERTY LINE LOCATIONS ARE FROM THE TOWN OF ACTON AND CONCORD ASSESSORS MAPS.

EXPLANATION

- FORMER SOURCE AREA
- R-2 — MONITORING WELL (SINGLE OR CLUSTER)
- SELF-2 — W.R. GRACE EXTRACTION WELL
- RE-2 — W.R. GRACE INJECTION WELL
- SLGP-R — FORMER EXTRACTION WELL
- RW-1 — NON-GRACE EXTRACTION WELL
- ASSABET 1A — PUBLIC WATER SUPPLY WELL
- WRG-3 — PROPOSED PUBLIC WATER SUPPLY WELL
- ASBRV-T6 — RIVER TRANSECT
- FPB • — SURFACE WATER MEASURMENT LOCATION

B1 20/ND/ND (13)

- 13 — ELEVATION OF SCREEN BOTTOM
- ND — BENZENE
- ND — VINYL CHLORIDE
- 20 — VDC
- B1 — SPECIFIC WELL DESIGNATION

ND NOT DETECTED

NA NOT ANALYZED

J ESTIMATED VALUE

• LONG TERM MONITORING INDICATES VOCs ARE NOT PRESENT IN GROUNDWATER IN THIS WELL

ALL CONCENTRATIONS ARE FROM SAMPLES COLLECTED AUG. 21 – SEPT. 19, 2013

CONCENTRATIONS IN µg/L

TITLE: **VDC, VINYL CHLORIDE & BENZENE CONCENTRATIONS IN UNCONSOLIDATED DEPOSITS, 2013**

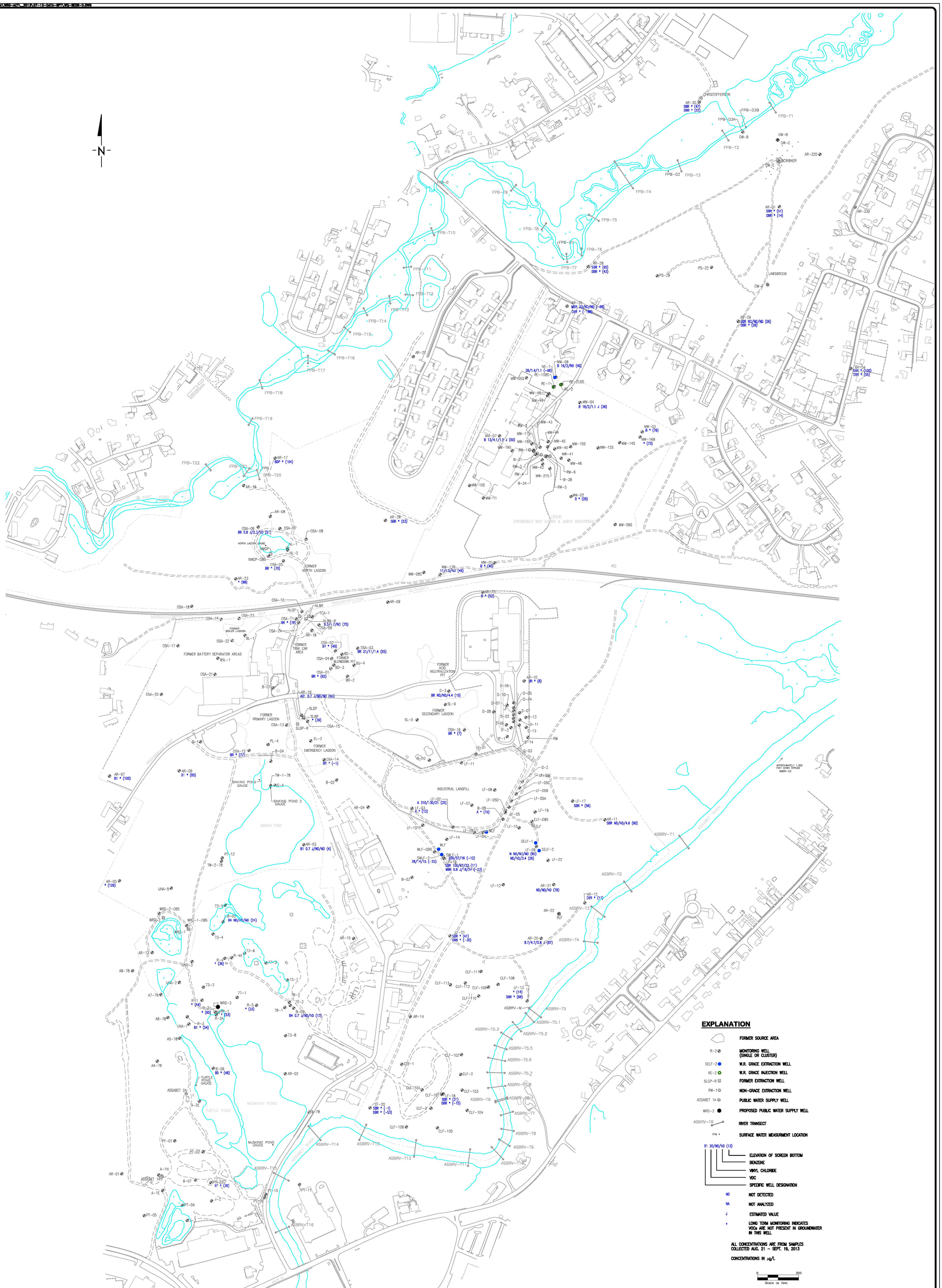
LOCATION: **W.R. Grace, Acton, Massachusetts**

TETRA TECH

APPROVED	ABS
DRAFTED	RMK
PROJECT#	117-3008
DATE	DEC. 2013

FIGURE 3-2

G:\WRG-ACT_2013\07-13-DATA-RPT\WQ-BED2-D.DWG



NOTE: BASE MAP BY COL-EAST 1998. WELL LOCATIONS, W.R. GRACE PROPERTY LINE & MISC. SITE FEATURES COMPILED FROM INFORMATION PROVIDED BY CAMP DRESSER & McKEE. SURROUNDING PROPERTY LINE LOCATIONS ARE FROM THE TOWN OF ACTON AND CONCORD ASSESSORS MAPS.

EXPLANATION

- FORMER SOURCE AREA
- R-2 — MONITORING WELL (SINGLE OR CLUSTER)
- SELF-2 — W.R. GRACE EXTRACTION WELL
- RE-2 — W.R. GRACE INJECTION WELL
- SLGP-R — FORMER EXTRACTION WELL
- RW-1 — NON-GRACE EXTRACTION WELL
- ASSABET 1A — PUBLIC WATER SUPPLY WELL
- WRG-3 — PROPOSED PUBLIC WATER SUPPLY WELL
- ASBRV-T6 — RIVER TRANSECT
- FPB • — SURFACE WATER MEASURMENT LOCATION

B1 20/ND/ND (13)

- ELEVATION OF SCREEN BOTTOM
- BENZENE
- VINYL CHLORIDE
- VDC
- SPECIFIC WELL DESIGNATION

ND — NOT DETECTED

NA — NOT ANALYZED

J — ESTIMATED VALUE

• — LONG TERM MONITORING INDICATES VOCs ARE NOT PRESENT IN GROUNDWATER IN THIS WELL

ALL CONCENTRATIONS ARE FROM SAMPLES COLLECTED AUG. 21 – SEPT. 19, 2013

CONCENTRATIONS IN µg/L

0 300
Scale in feet

TITLE: **VDC, VINYL CHLORIDE & BENZENE CONCENTRATIONS IN BEDROCK, 2013**

LOCATION: **W.R. Grace, Acton, MA.**

TETRA TECH

APPROVED	ABS
DRAFTED	RMK
PROJECT#	117-3008
DATE	NOV. 2013

FIGURE **3-3**

G:\WRG-ACT_2013\07-13-DATA-RPT\FALL13-VDC-B.DWG

NOTE: BASE MAP BY COL-EAST 1998. WELL LOCATIONS, W.R. GRACE PROPERTY LINE & MISC. SITE FEATURES COMPILED FROM INFORMATION PROVIDED BY CAMP DRESSER & McKEE. SURROUNDING PROPERTY LINE LOCATIONS ARE FROM THE TOWN OF ACTON AND CONCORD ASSESSORS MAPS.

N

LINDE
(FORMERLY BOC GASES & AIRCO INDUSTRIAL)

AGWAY/KRESS

ACTON
CONCORD

EXPLANATION

- W.R. GRACE PROPERTY BOUNDARY (APPROXIMATE)
- MONITORING WELL (SINGLE OR CLUSTER)
- WR GRACE EXTRACTION WELL
- WR GRACE INJECTION WELL
- FORMER EXTRACTION WELL
- NON-GRACE RECOVERY WELL
- PUBLIC WATER SUPPLY WELL
- PROPOSED PUBLIC WATER SUPPLY WELL
- RIVER TRANSECT

VDC CONCENTRATION 2013

- >200 – 310 ug/L VDC
- >100–200 ug/L VDC
- >60–100 ug/L VDC
- >30–60 ug/L VDC
- >7–30 ug/L VDC

ROD CAPTURE BOUNDARY

COMPOSITE CAPTURE BOUNDARY

0 600

Scale in feet

SAMPLES COLLECTED BETWEEN AUG. 21 AND SEPT. 19, 2013

VDC CONCENTRATIONS SHOWN ARE MAXIMUM REGARDLESS OF DEPTH. CONCENTRATION BOUNDARIES ARE APPROXIMATE.

VDC = VINYLIDENE CHLORIDE = 1.1-DICHLOROETHENE

TITLE:

DISTRIBUTION OF VDC IN GROUNDWATER, 2013

LOCATION:

W.R. Grace, Acton, MA.

TETRA TECH

APPROVED	ABS
DRAFTED	RMK
PROJECT#	117-3008080
DATE	DEC. 2013

FIGURE 3-4

G:\WRG-ACT_2013\07-13-DATA-RPT\FALL13-VINCLR-B.DWG

NOTE: BASE MAP BY COL-EAST 1998. WELL LOCATIONS, W.R. GRACE PROPERTY LINE & MISC. SITE FEATURES COMPILED FROM INFORMATION PROVIDED BY CAMP DRESSER & McKEE. SURROUNDING PROPERTY LINE LOCATIONS ARE FROM THE TOWN OF ACTON AND CONCORD ASSESSORS MAPS.

N

LINDE
(FORMERLY BOC GASES & AIRCO INDUSTRIAL)

EXPLANATION

- W.R. GRACE PROPERTY BOUNDARY (APPROXIMATE)
- MONITORING WELL (SINGLE OR CLUSTER)
- WR GRACE EXTRACTION WELL
- WR GRACE INJECTION WELL
- FORMER EXTRACTION WELL
- NON-GRACE RECOVERY WELL
- PUBLIC WATER SUPPLY WELL
- PROPOSED PUBLIC WATER SUPPLY WELL
- RIVER TRANSECT

VINYL CHLORIDE CONCENTRATION 2013

- >100-130 ug/L VINYL CHLORIDE
- >30-100 ug/L VINYL CHLORIDE
- >2-30 ug/L VINYL CHLORIDE

ROD CAPTURE BOUNDARY

COMPOSITE CAPTURE BOUNDARY

SAMPLES COLLECTED BETWEEN AUG. 21 AND SEPT. 19, 2013

VINYL CHLORIDE CONCENTRATIONS SHOWN ARE MAXIMUM REGARDLESS OF DEPTH. CONCENTRATION BOUNDARIES ARE APPROXIMATE.

0 600

Scale in feet

TITLE:

DISTRIBUTION OF VINYL CHLORIDE IN GROUNDWATER, 2013

LOCATION:

W.R. Grace, Acton, MA.

TETRA TECH

APPROVED	ABS
DRAFTED	RMK
PROJECT#	117-3008080
DATE	DEC 2013

FIGURE 3-5

G:\WRG-ACT_2013\07-13-DATA-RPT\FALL13-BENZ-B.DWG

NOTE: BASE MAP BY COL-EAST 1998. WELL LOCATIONS, W.R. GRACE PROPERTY LINE & MISC. SITE FEATURES COMPILED FROM INFORMATION PROVIDED BY CAMP DRESSER & McKEE. SURROUNDING PROPERTY LINE LOCATIONS ARE FROM THE TOWN OF ACTON AND CONCORD ASSESSORS MAPS.

N

LINDE
(FORMERLY BOC GASES & AIRCO INDUSTRIAL)

AGWAY/KRESS

INDUSTRIAL LANDFILL

FORMER NORTH LAGOON

FORMER BOILER LAGOON

FORMER BATTERY SEPARATOR AREAS

FORMER TANK CAR AREA

FORMER BLOWDOWN PIT

FORMER ACID NEUTRALIZATION PIT

FORMER SECONDARY LAGOON

FORMER PRIMARY LAGOON

FORMER EMERGENCY LAGOON

SINKING POND

MUSKRAT POND

TURTLE POND

FORT POND BROOK

ASSABET RIVER

LAWSBROOK

ACTON / CONCORD

MASSACHUSETTS BAY TRANSPORTATION AUTHORITY

INDEPENDENCE ROAD

ROUTE 62

MAIN STREET

EXPLANATION

- W.R. GRACE PROPERTY BOUNDARY (APPROXIMATE)
- MONITORING WELL (SINGLE OR CLUSTER)
- WR GRACE EXTRACTION WELL
- WR GRACE INJECTION WELL
- FORMER EXTRACTION WELL
- NON-GRACE RECOVERY WELL
- PUBLIC WATER SUPPLY WELL
- PROPOSED PUBLIC WATER SUPPLY WELL
- RIVER TRANSECT

BENZENE CONCENTRATION 2013

- >100-270 ug/L BENZENE
- >30-100 ug/L BENZENE
- >5-30 ug/L BENZENE

ROD CAPTURE BOUNDARY

COMPOSITE CAPTURE BOUNDARY

SAMPLES COLLECTED BETWEEN AUG 21 AND SEPT 19, 2013

BENZENE CONCENTRATIONS SHOWN ARE MAXIMUM REGARDLESS OF DEPTH. CONCENTRATION BOUNDARIES ARE APPROXIMATE.

0 600
Scale in feet

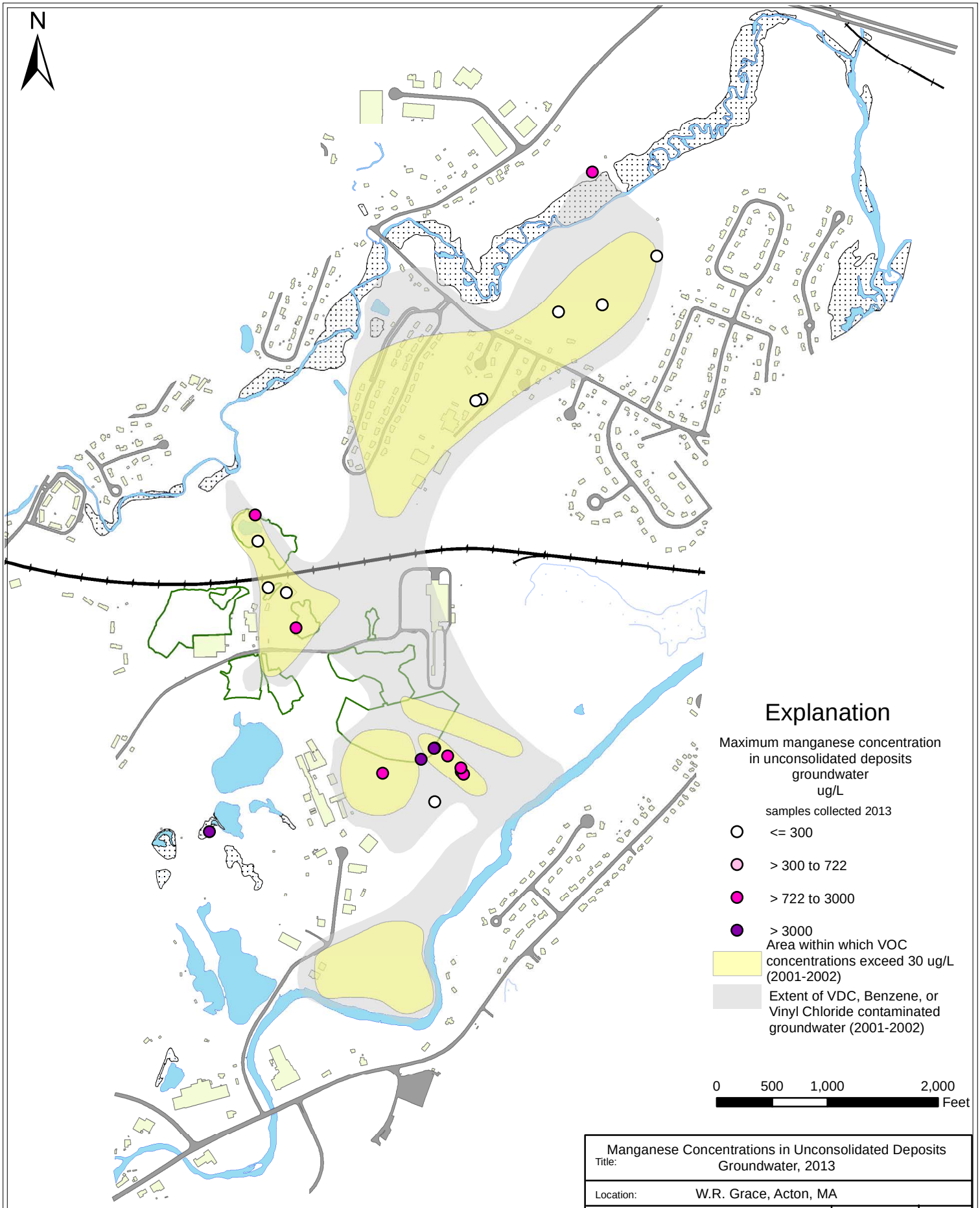
TITLE:
DISTRIBUTION OF BENZENE IN GROUNDWATER, 2013

LOCATION:
W.R. Grace, Acton, MA.

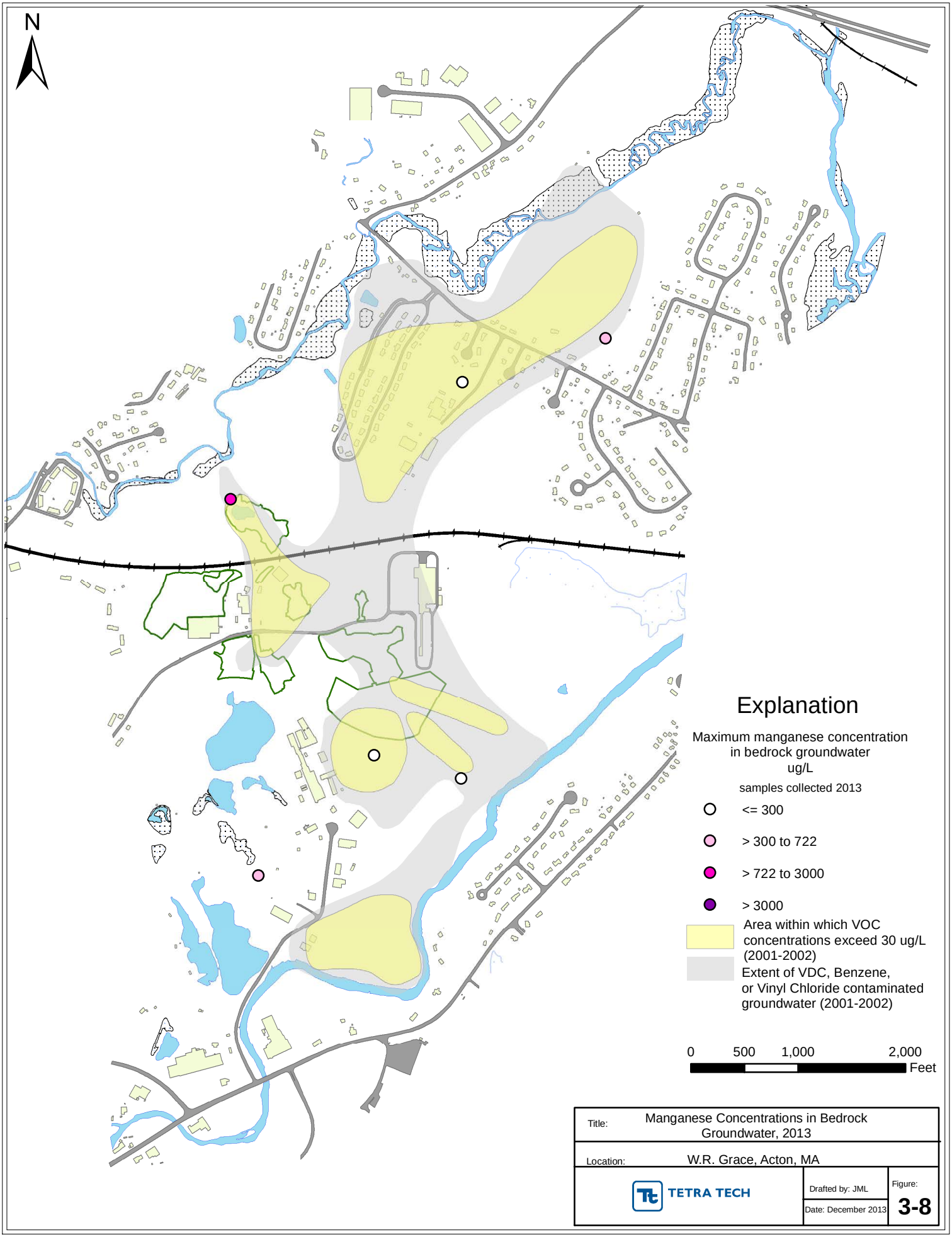
TETRA TECH

APPROVED	ABS
DRAFTED	RMK
PROJECT#	117-3008080
DATE	DEC 2013

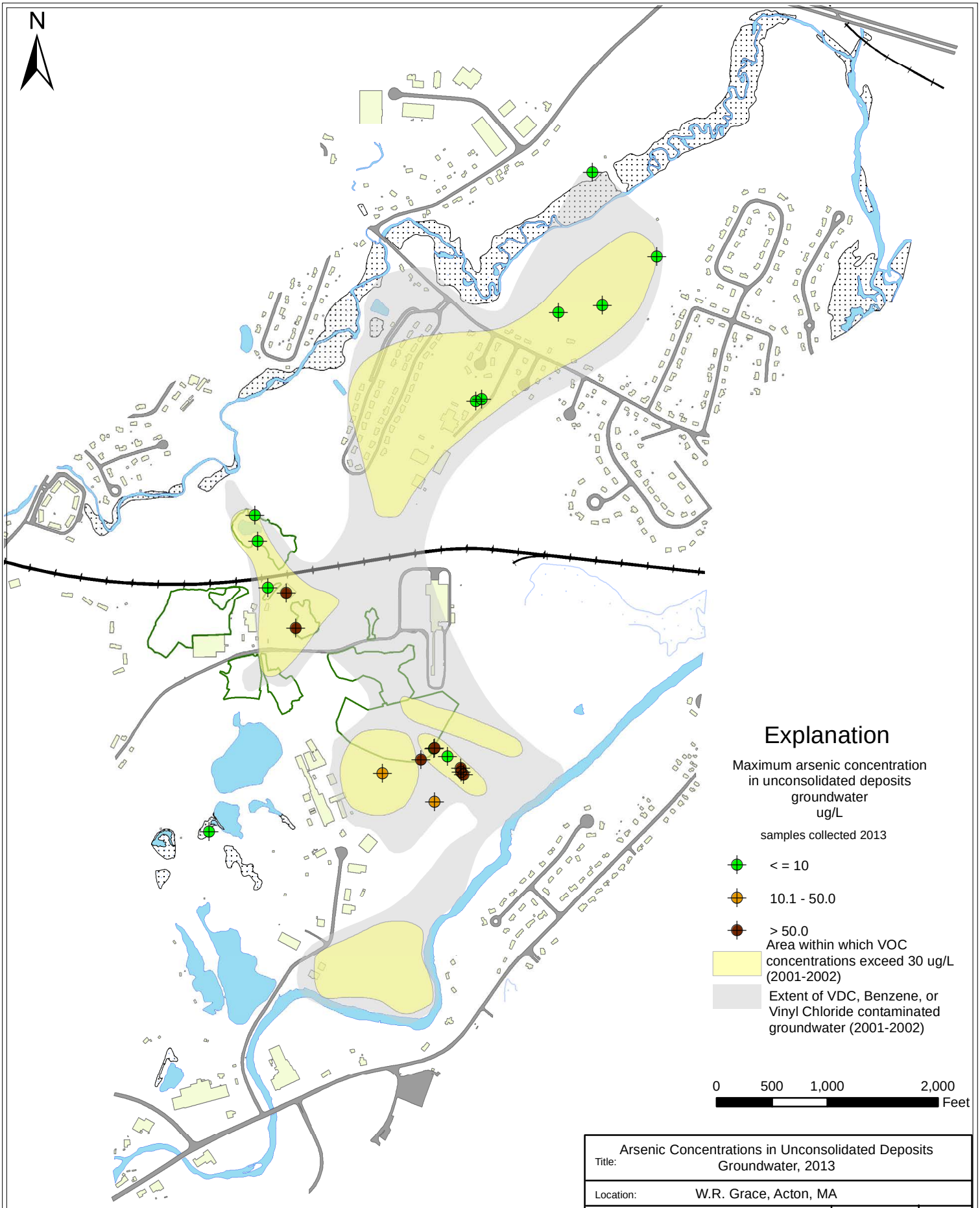
FIGURE
3-6



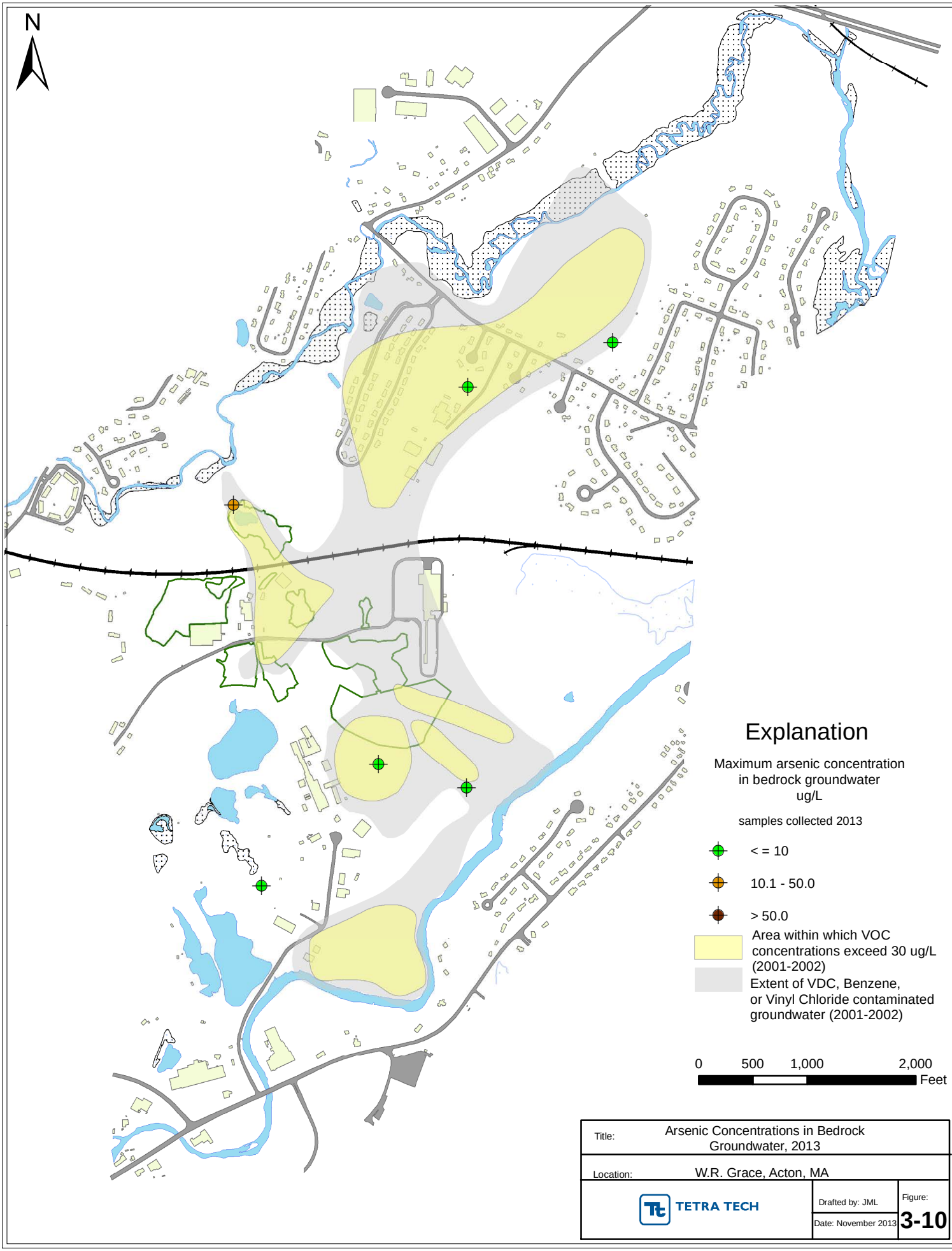
Title:	Manganese Concentrations in Unconsolidated Deposits Groundwater, 2013		
Location:	W.R. Grace, Acton, MA		
TETRA TECH		Drafted by: JML Date: November 2013	Figure: 3-7



Title:	Manganese Concentrations in Bedrock Groundwater, 2013
Location:	W.R. Grace, Acton, MA
TETRA TECH	Drafted by: JML
	Date: December 2013
	Figure: 3-8



Title:	Arsenic Concentrations in Unconsolidated Deposits Groundwater, 2013		
Location:	W.R. Grace, Acton, MA		
TETRA TECH		Drafted by: JML Date: November 2013	Figure: 3-9



Title:	Arsenic Concentrations in Bedrock Groundwater, 2013
Location:	W.R. Grace, Acton, MA
TETRA TECH	Drafted by: JML
	Date: November 2013
	Figure: 3-10

G:\WRG-ACT_2013\07-13-DATA-RPT\GEOCHEM_SAMPLOCA.DWG

NOTE: BASE MAP BY COL-EAST 1998. WELL LOCATIONS, W.R. GRACE PROPERTY LINE & MISC. SITE FEATURES COMPILED FROM INFORMATION PROVIDED BY CAMP DRESSER & McKEE. SURROUNDING PROPERTY LINE LOCATIONS ARE FROM THE TOWN OF ACTON AND CONCORD ASSESSORS MAPS.

-N-

Northeast Area

Former Lagoon Area

Southwest Area

Southwest Landfill Area

Southeast Landfill Area

Assabet River Area

OSA-06BR
OSA-07A
OSA-05A
OSA-11B
OSA-09B
OSA-01B
B-08D
B-08C
LF-06C
LF-15
LF-12
AR-21

EXPLANATION

- R-2 — MONITORING WELL (SINGLE OR CLUSTER)
- SELF-2 — W.R. GRACE EXTRACTION WELL
- RE-2 — W.R. GRACE INJECTION WELL
- SLGP-R — FORMER EXTRACTION WELL
- RW-1 — NON-GRACE EXTRACTION WELL
- ASSABET 1 — PUBLIC WATER SUPPLY WELL
- PROPOSED PUBLIC WATER SUPPLY WELL
- RIVER TRANSECT
- FPB • — SURFACE WATER MEASURMENT LOCATION
- LF-12 — GEOCHEMICAL SAMPLE LOCATION

0 500 Scale in feet

TITLE: GEOCHEMICAL SAMPLE LOCATIONS

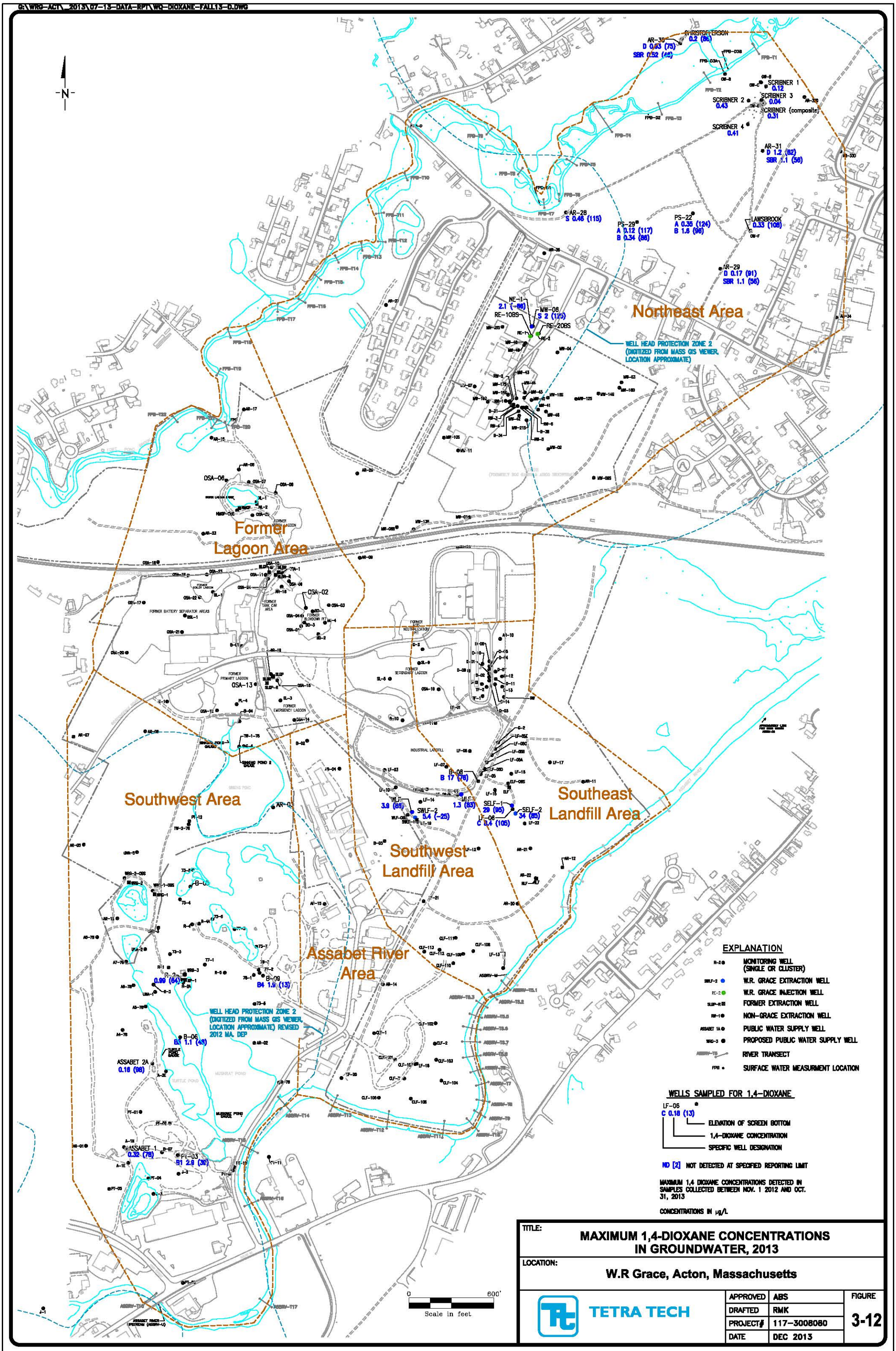
LOCATION: W.R. Grace, Acton, Massachusetts

TETRA TECH

APPROVED	ABS
DRAFTED	RMK
PROJECT#	117-3008
DATE	DEC. 2013

FIGURE 3-11

G:\WRG-ACT_2013\07-13-DATA-RPT\WQ-DIOXANE-FALL13-D.DWG



TITLE:

MAXIMUM 1,4-DIOXANE CONCENTRATIONS IN GROUNDWATER, 2013

LOCATION:

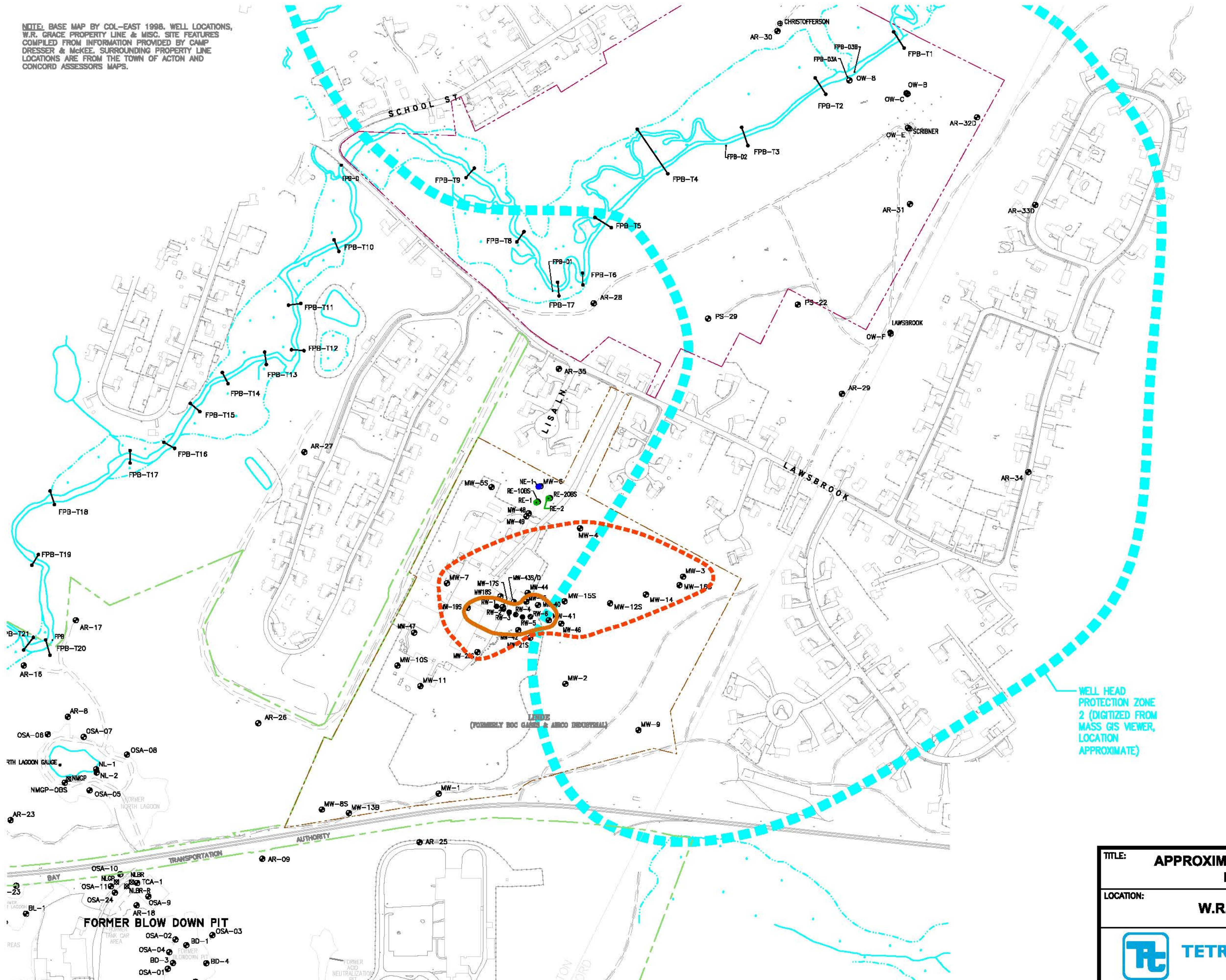
W.R Grace, Acton, Massachusetts

TETRA TECH

APPROVED	ABS
DRAFTED	RMK
PROJECT#	117-3008080
DATE	DEC 2013

FIGURE

3-12



NOTE:
EXTENT OF LNAPL-RELATED CONTAMINATION BASED ON DATA PRESENTED IN REPORTS PREPARED BY ENSR/AECOM BETWEEN 1997 - 2012

EXPLANATION

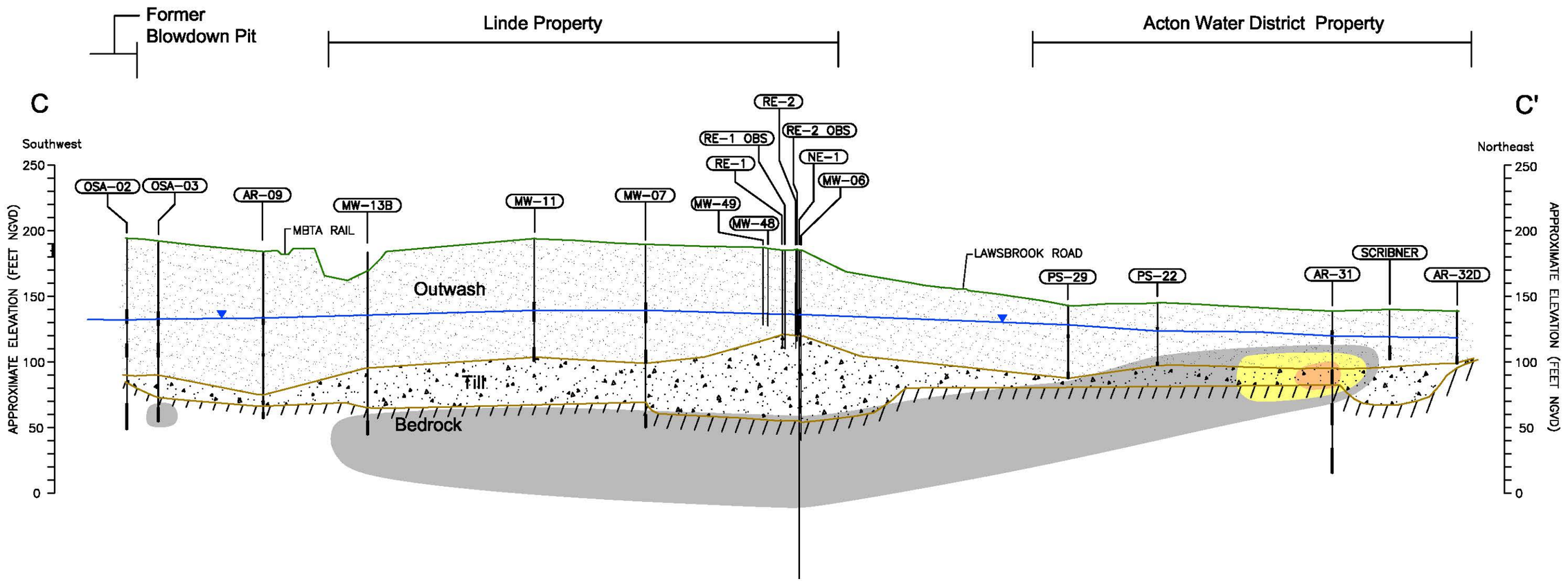
- W.R. GRACE PROPERTY BOUNDARY (APPROXIMATE)
- ACTON WATER DISTRICT PROPERTY BOUNDARY (APPROXIMATE)
- LINDE PROPERTY BOUNDARY (APPROXIMATE)
- MONITORING WELL (SINGLE OR CLUSTER)
- W.R. GRACE EXTRACTION WELL
- W.R. GRACE INJECTION WELL
- NON-GRACE EXTRACTION WELL
- FORMER EXTRACTION WELL
- PUBLIC WATER SUPPLY WELL
- RIVER TRANSECT
- APPROXIMATE EXTENT OF LINDE LNAPL RELATED CONTAMINATION
- AREA WITHIN WHICH LNAPL HAS BEEN OBSERVED

TITLE:	APPROXIMATE EXTENT OF LINDE - RELATED LNAPL CONTAMINATION
LOCATION:	W.R. Grace, Acton, Massachusetts

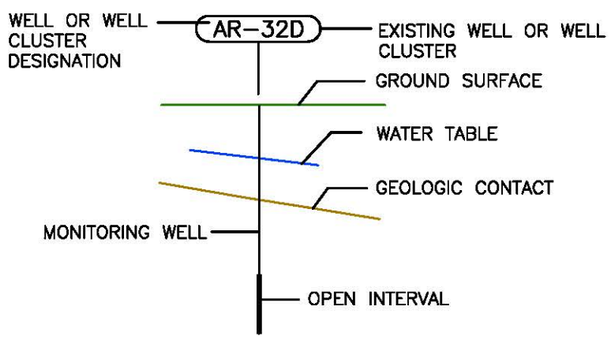
TETRA TECH

APPROVED	ABS	FIGURE
DRAFTED	RMK	3-13
PROJECT#	117-3008	
DATE	DEC 2013	

G:\WRG-ACT_2013\07-13-DATA-RPT\NEAREA-LNAPL.DWG



Explanation



VDC CONCENTRATION 2013

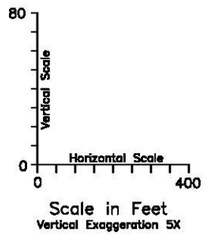
- >60–66 ug/L VDC
- >30–60 ug/L VDC
- >7–30 ug/L VDC

SAMPLES COLLECTED BETWEEN AUG 21, – SEPT. 19, 2013

CONCENTRATION BOUNDARIES ARE APPROXIMATE.

VDC = VINYLIDENE CHLORIDE = 1.1–DICHLOROETHENE

NOTE: ALL ELEVATIONS IN FEET NGVD



TITLE: **2013 VDC CONCENTRATIONS, SECTION C-C'**

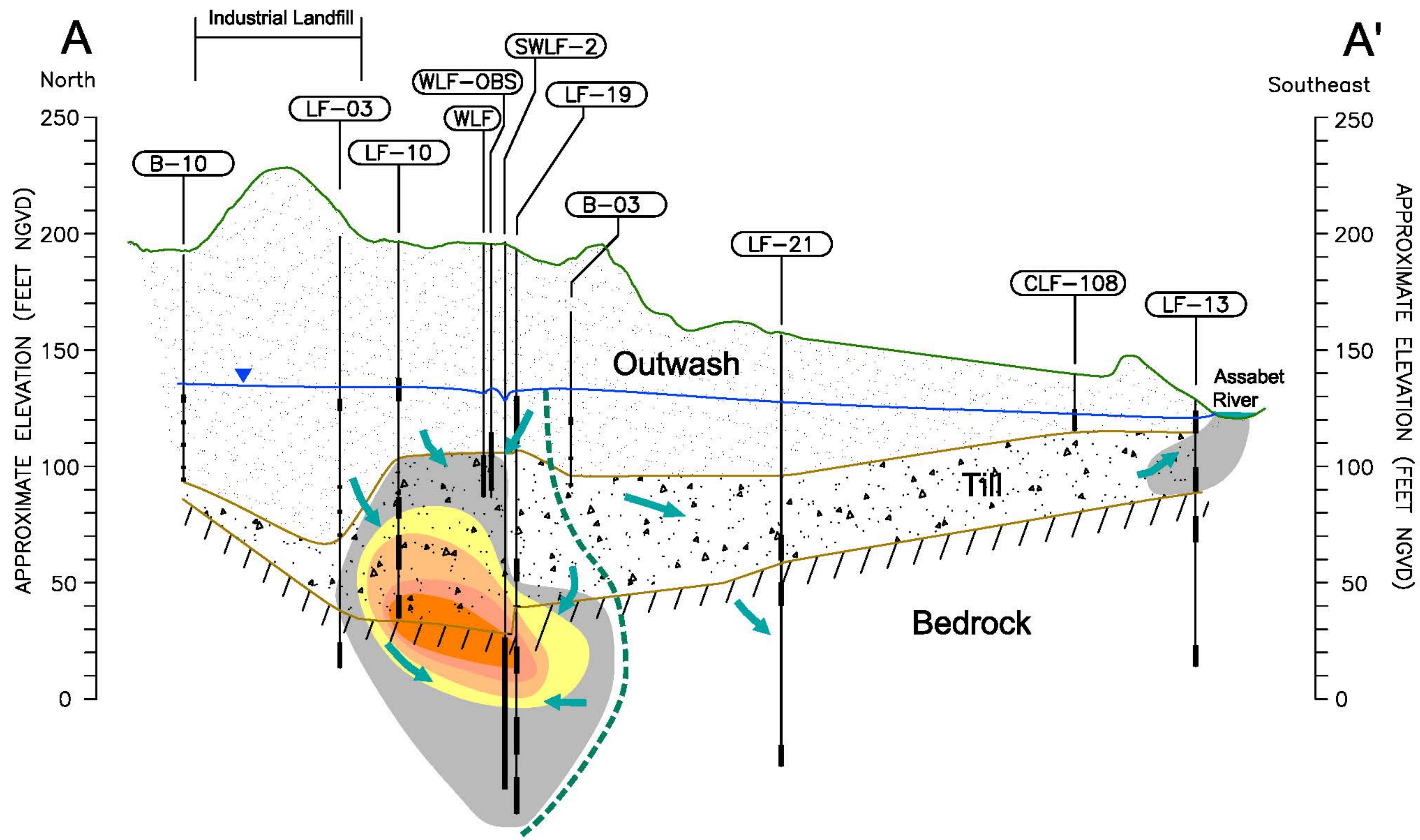
LOCATION: **W.R. Grace, Acton, Massachusetts**

TETRA TECH

APPROVED	ABS
DRAFTED	RMK
PROJECT#	117-3008
DATE	DEC 2013

FIGURE 4-1

G:\WRG-ACT\2013\07-15-DATA-REV\Sections.dwg



Explanation

WELL OR WELL CLUSTER DESIGNATION — AR-32D

GROUND SURFACE

WATER TABLE

GEOLOGIC CONTACT

MONITORING WELL

OPEN INTERVAL

DIRECTION OF GROUNDWATER FLOW

APPROXIMATE CAPTURE BOUNDARY

VDC CONCENTRATION 2013

- >200–310 ug/L VDC
- >100–200 ug/L VDC
- >60–100 ug/L VDC
- >30–60 ug/L VDC
- >7–30 ug/L VDC

SAMPLES COLLECTED BETWEEN AUG. 21 AND SEPT. 19 2013

CONCENTRATION BOUNDARIES ARE APPROXIMATE.

VDC = VINYLIDENE CHLORIDE = 1.1–DICHLOROETHENE

NOTE: ALL ELEVATIONS IN FEET NGVD

Vertical Scale: 0–60

Horizontal Scale: 0–300

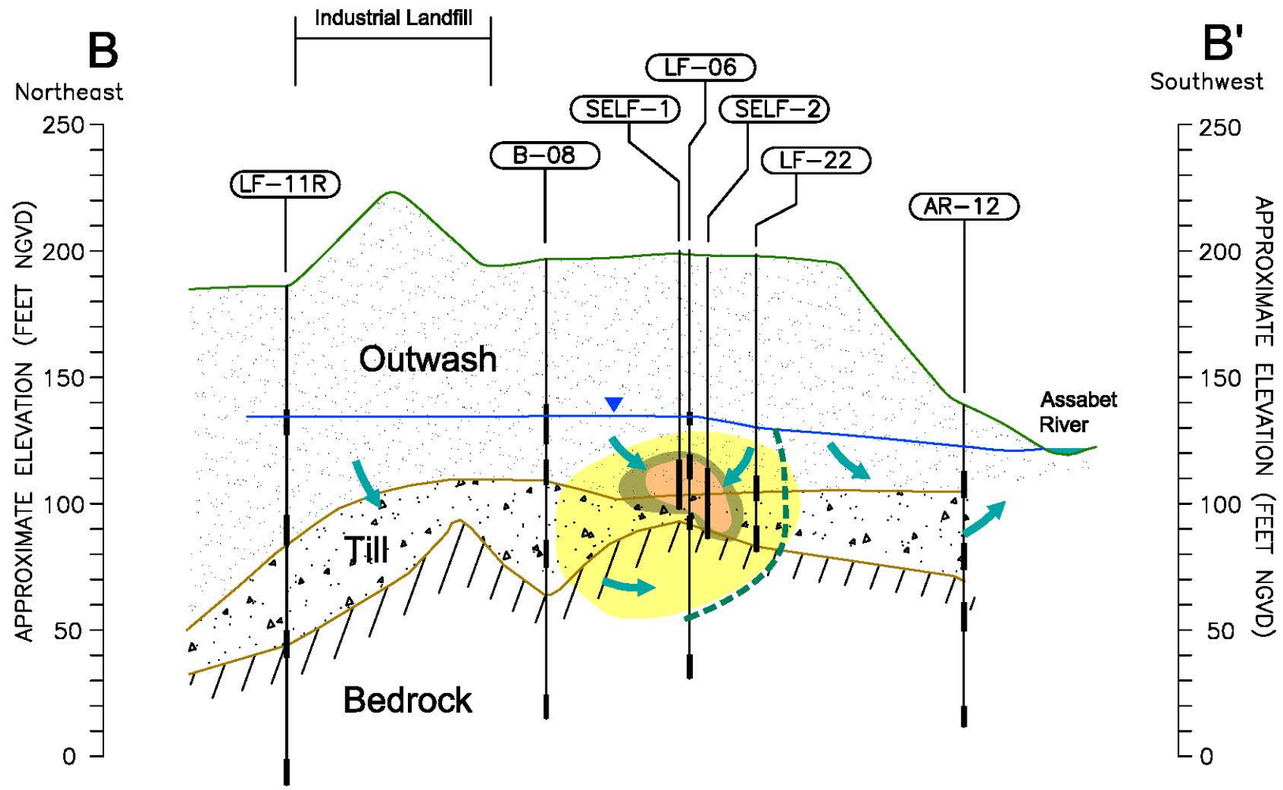
Scale in Feet

Vertical Exaggeration 5X

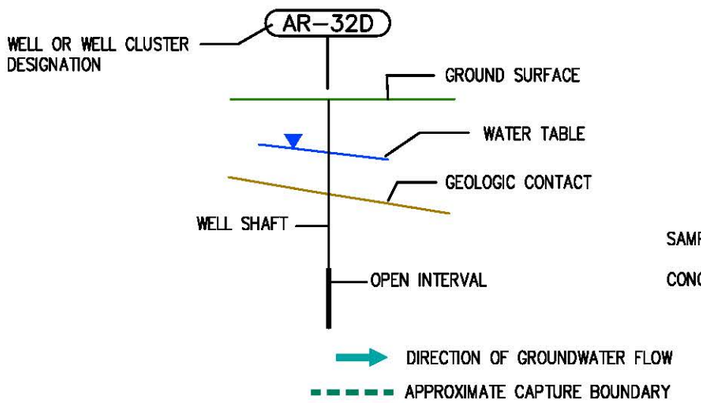
TITLE:	2013 VDC CONCENTRATIONS, SECTION A-A'
LOCATION:	W.R. Grace, Acton, Massachusetts

TETRA TECH

APPROVED	ABS	FIGURE
DRAFTED	RMK	4-2
PROJECT#	117-3006	
DATE	DEC 2013	



Explanation

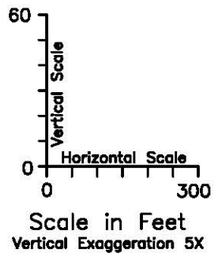


BENZENE CONCENTRATION 2013

- >100–270 ug/L BENZENE
- >30–100 ug/L BENZENE
- >5–30 ug/L BENZENE

SAMPLES COLLECTED BETWEEN AUG 21 AND SEPT 19, 2013

CONCENTRATION BOUNDARIES ARE APPROXIMATE.



TITLE: 2013 BENZENE CONCENTRATIONS, SECTION B-B'

LOCATION: W.R. Grace, Acton, Massachusetts

TETRA TECH

APPROVED	ABS
DRAFTED	RMK
PROJECT#	117–3008
DATE	DEC 2013

FIGURE 4-3

G:\WRG-ACT_2013\07-13-DATA-RPT\1984-VDC-B.DWG

NOTE: BASE MAP BY COL-EAST 1998. WELL LOCATIONS, W.R. GRACE PROPERTY LINE & MISC. SITE FEATURES COMPILED FROM INFORMATION PROVIDED BY CAMP DRESSER & McKEE. SURROUNDING PROPERTY LINE LOCATIONS ARE FROM THE TOWN OF ACTON AND CONCORD ASSESSORS MAPS.

N

CHRISTOFFERSON

SCRIBNER

LAWSBROOK

Northeast Area

Former Lagoon Area

Southwest Area

Southeast Landfill Area

Southwest Landfill Area

Assabet River Area

Groundwater Quality Data Collected By Others Between 1984 - 1987

FORT POND BROOK

BOC GASES PROPERTY (FORMERLY AIRCO INDUSTRIAL)

MASSACHUSETTS BAY TRANSPORTATION AUTHORITY

FORMER NORTH LAGOON

FORMER BOILER LAGOON

FORMER BATTERY SEPARATOR AREAS

FORMER TANK CAR AREA

FORMER BLOWDOWN PIT

FORMER ACID NEUTRALIZATION PIT

FORMER PRIMARY LAGOON

FORMER SECONDARY LAGOON

FORMER EMERGENCY LAGOON

INDUSTRIAL LANDFILL

ACTON

CONCORD

INDEPENDENCE ROAD

SINKING POND

AGWAY/KRESS

ASSABET RIVER

WRG-3

ASSABET 2

ASSABET 1

TURTLE POND

MUSKRAT POND

KNOX TRAIL

HOSP. STREET

ROUTE 62

EXPLANATION

- MONITORING WELL (SINGLE OR CLUSTER)
- PUBLIC WATER SUPPLY WELL
- PROPOSED PUBLIC WATER SUPPLY WELL
- WR GRACE PROPERTY BOUNDARY

VDC CONCENTRATION PRE-1984

- 200-2900 ug/L VDC
- 100-200 ug/L VDC
- 60-100 ug/L VDC
- 30-60 ug/L VDC
- 7-30 ug/L VDC

VDC = VINYLIDENE CHLORIDE = 1,1-DICHLOROETHENE

VDC CONCENTRATIONS SHOWN ARE MAXIMUM REGARDLESS OF DEPTH. CONCENTRATION BOUNDARIES ARE APPROXIMATE.

DRINKING WATER STANDARD FOR VDC IS 7 ug/L

WATER QUALITY DATA FROM SAMPLES COLLECTED PRIOR TO 1984.

0 600

Scale in feet

TITLE:

DISTRIBUTION OF VDC IN GROUNDWATER, PRE-1984

LOCATION:

W.R. Grace, Acton, MA.

TETRA TECH

APPROVED	ABS
DRAFTED	RMK
PROJECT#	117-3008080
DATE	DEC. 2013

FIGURE

4-4

ATTACHMENT A

TABLE A-1 VOC CONCENTRATIONS IN GROUNDWATER
TABLE A-2 INORGANIC COMPOUND CONCENTRATIONS IN GROUNDWATER
TABLE A-3 EPH AND VPH CONCENTRATIONS IN GROUNDWATER

Table A-1. VOC concentrations in groundwater.

LOCATION:	AR-03B1	AR-11B2	AR-11SBR	AR-19AB1	AR-20	AR-21	AR-27D	AR-28S
DATE SAMPLED:	8/21/13	8/21/13	9/6/13	8/21/13	9/5/13	8/27/13	8/22/13	8/22/13
OPEN INTERVAL:	4 to 5 (BR)	101 to 102	60 to 70 (BR)	60 to 61 (BR)	87 to 92 (BR)	78 to 83 (BR)	104 to 114	115 to 125
QA TYPE & DB Interval:			L2		L1			
VOCs								
1,1,1-Trichloroethane	ND (1)	ND (1)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	NA
1,1,2,2-Tetrachloroethane	ND (0.5)	ND (0.5)	ND (1)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	NA
1,1,2-Trichloroethane	ND (1)	ND (1)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	NA
1,1-Dichloroethane	ND (1)	0.93 J	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	NA
1,1-Dichloroethene	0.71 J	34	ND (2)	0.7 J	8.7	ND (1)	0.74 J	NA
1,2-Dichloroethane	ND (1)	ND (1)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	NA
1,2-Dichloropropane	ND (1)	ND (1)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	NA
1,4-Dioxane	NA	NA	NA	NA	NA	NA	NA	0.46
2-Butanone	ND (10)	ND (10)	ND (20)	ND (10)	ND (10)	ND (10)	ND (10)	NA
2-Hexanone	ND (10)	ND (10)	ND (20)	ND (10)	ND (10)	ND (10)	ND (10)	NA
4-Methyl-2-Pentanone	ND (10)	ND (10)	ND (20)	ND (10)	ND (10)	ND (10)	ND (10)	NA
Acetone	ND (50)	ND (50)	R	6.3 J	R	ND (50)	160	NA
Benzene	ND (1)	7.9	4.6	ND (1)	0.82 J	ND (1)	ND (1)	NA
Bromochloromethane	ND (1)	ND (1)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	NA
Bromodichloromethane	ND (0.5)	ND (0.5)	ND (1)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	NA
Bromoform	ND (1)	ND (1)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	NA
Bromomethane	ND (2)	ND (2)	ND (4)	ND (2)	ND (2)	ND (2)	ND (2)	NA
Carbon Disulfide	ND (10)	ND (10)	ND (20)	ND (10)	ND (10)	ND (10)	ND (10)	NA
Carbon Tetrachloride	ND (1)	ND (1)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	NA
Chlorobenzene	ND (1)	ND (1)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	NA
Chloroethane	ND (2)	ND (2)	ND (4)	ND (2)	ND (2)	ND (2)	ND (2)	NA
Chloroform	ND (1)	ND (1)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	NA
Chloromethane	ND (2)	ND (2)	ND (4)	ND (2)	ND (2)	ND (2)	ND (2)	NA
cis-1,2-Dichloroethene	ND (1)	ND (1)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	NA
cis-1,3-Dichloropropene	ND (0.4)	ND (0.4)	ND (0.8)	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)	NA
Dibromochloromethane	ND (0.5)	ND (0.5)	ND (1)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	NA
Ethylbenzene	ND (1)	ND (1)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	NA
m,p-Xylenes	ND (2)	ND (2)	ND (4)	ND (2)	ND (2)	ND (2)	ND (2)	NA
Methyl tert butyl ether	ND (1)	ND (1)	ND (2)	ND (1)	ND (1)	ND (1)	0.24 J	NA
Methylene Chloride	ND (1)	ND (1)	ND (2)	ND (1)	ND (1)	ND (1)	0.57 J	NA
o-Xylene	ND (1)	ND (1)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	NA
Styrene	ND (1)	ND (1)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	NA
Tetrachloroethene	ND (1)	ND (1)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	NA
Toluene	ND (1)	ND (1)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	NA
trans-1,2-Dichloroethene	ND (1)	ND (1)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	NA
trans-1,3-Dichloropropene	ND (0.4)	ND (0.4)	ND (0.8)	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)	NA
Trichloroethene	ND (1)	ND (1)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	NA
Trichlorofluoromethane	ND (1)	ND (1)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	NA
Vinyl Acetate	ND (10)	ND (10)	ND (20)	ND (10)	ND (10)	ND (10)	ND (10)	NA
Vinyl Chloride	ND (1)	75	ND (2)	ND (1)	4.7	ND (1)	ND (1)	NA

NOTES:

Concentrations in µg/L.
Open Interval - elevation in feet NGVD. (BR) - Open Interval in bedrock
NA - Not Applicable
* SWLF-1 DB intervals are L1=0-10 ft, L2=10-20 ft, L3=20-30 ft, L4=30-40 ft from top of screen

DUP - Duplicate Sample
ND (10) - Compound not detected at limit indicated in parentheses.
DB Interval - Diffusion Bag Interval: L1=0-5 feet, L2=5-10 feet, L3= 10-15 feet from top of screen, L4= 15-20 feet from top of screen

J - Estimated Value
D - Diluted Value
R - Rejected Result

Table A-1. VOC concentrations in groundwater.

LOCATION:	AR-29D	AR-29SBR	AR-29SBR	AR-30D	AR-30SBR	AR-31D	AR-31S	AR-35MBR
DATE SAMPLED:	8/22/13	9/4/13	9/19/13	8/29/13	8/29/13	8/29/13	8/29/13	9/6/13
OPEN INTERVAL:	91 to 101	56 to 67 (BR)	56 to 67 (BR)	75 to 85	47 to 61 (BR)	82 to 92	112 to 122	-88 to -78 (BR)
QA TYPE & DB Interval:								L1
VOCs								
1,1,1-Trichloroethane	NA	NA	ND (5)	ND (1)	NA	ND (1)	NA	ND (2)
1,1,2,2-Tetrachloroethane	NA	NA	ND (2.5)	ND (0.5)	NA	ND (0.5)	NA	ND (1)
1,1,2-Trichloroethane	NA	NA	ND (5)	ND (1)	NA	ND (1)	NA	ND (2)
1,1-Dichloroethane	NA	NA	ND (5)	ND (1)	NA	ND (1)	NA	ND (2)
1,1-Dichloroethene	NA	NA	ND (5)	0.4 J	NA	66	NA	23
1,2-Dichloroethane	NA	NA	ND (5)	ND (1)	NA	ND (1)	NA	ND (2)
1,2-Dichloropropane	NA	NA	ND (5)	ND (1)	NA	ND (1)	NA	ND (2)
1,4-Dioxane	0.17 J	1.1	NA	0.93	0.52	1.2	1	NA
2-Butanone	NA	NA	58	ND (10)	NA	ND (10)	NA	ND (20)
2-Hexanone	NA	NA	ND (50)	ND (10)	NA	ND (10)	NA	ND (20)
4-Methyl-2-Pentanone	NA	NA	ND (50)	ND (10)	NA	ND (10)	NA	ND (20)
Acetone	NA	NA	18 J	ND (50)	NA	30 J	NA	R
Benzene	NA	NA	ND (5)	ND (1)	NA	0.64 J	NA	ND (2)
Bromochloromethane	NA	NA	ND (5)	ND (1)	NA	ND (1)	NA	ND (2)
Bromodichloromethane	NA	NA	ND (2.5)	ND (0.5)	NA	ND (0.5)	NA	ND (1)
Bromoform	NA	NA	ND (5)	ND (1)	NA	ND (1)	NA	ND (2)
Bromomethane	NA	NA	ND (10)	ND (2)	NA	ND (2)	NA	ND (4)
Carbon Disulfide	NA	NA	ND (50)	ND (10)	NA	ND (10)	NA	ND (20)
Carbon Tetrachloride	NA	NA	ND (5)	ND (1)	NA	ND (1)	NA	ND (2)
Chlorobenzene	NA	NA	ND (5)	ND (1)	NA	ND (1)	NA	ND (2)
Chloroethane	NA	NA	ND (10)	ND (2)	NA	ND (2)	NA	ND (4)
Chloroform	NA	NA	ND (5)	0.35 J	NA	ND (1)	NA	ND (2)
Chloromethane	NA	NA	ND (10)	ND (2)	NA	0.36 J	NA	ND (4)
cis-1,2-Dichloroethene	NA	NA	ND (5)	ND (1)	NA	ND (1)	NA	ND (2)
cis-1,3-Dichloropropene	NA	NA	ND (2)	ND (0.4)	NA	ND (0.4)	NA	ND (0.8)
Dibromochloromethane	NA	NA	ND (2.5)	ND (0.5)	NA	ND (0.5)	NA	ND (1)
Ethylbenzene	NA	NA	ND (5)	ND (1)	NA	ND (1)	NA	ND (2)
m,p-Xylenes	NA	NA	ND (10)	ND (2)	NA	ND (2)	NA	ND (4)
Methyl tert butyl ether	NA	NA	ND (5)	ND (1)	NA	1.8	NA	ND (2)
Methylene Chloride	NA	NA	ND (5)	ND (1)	NA	0.62 J	NA	ND (2)
o-Xylene	NA	NA	ND (5)	ND (1)	NA	ND (1)	NA	ND (2)
Styrene	NA	NA	ND (5)	ND (1)	NA	ND (1)	NA	ND (2)
Tetrachloroethene	NA	NA	ND (5)	ND (1)	NA	ND (1)	NA	ND (2)
Toluene	NA	NA	ND (5)	ND (1)	NA	ND (1)	NA	ND (2)
trans-1,2-Dichloroethene	NA	NA	ND (5)	ND (1)	NA	ND (1)	NA	ND (2)
trans-1,3-Dichloropropene	NA	NA	ND (2)	ND (0.4)	NA	ND (0.4)	NA	ND (0.8)
Trichloroethene	NA	NA	ND (5)	ND (1)	NA	1	NA	ND (2)
Trichlorofluoromethane	NA	NA	ND (5)	ND (1)	NA	ND (1)	NA	ND (2)
Vinyl Acetate	NA	NA	ND (50)	ND (10)	NA	ND (10)	NA	ND (20)
Vinyl Chloride	NA	NA	ND (5)	ND (1)	NA	3.3	NA	ND (2)

NOTES:

Concentrations in µg/L.
Open Interval - elevation in feet NGVD; (BR) - Open Interval in bedrock
NA - Not Applicable
* SWLF-1 DB intervals are L1=0-10 ft, L2=10-20 ft, L3=20-30 ft, L4=30-40 ft from top of screen

DUP - Duplicate Sample.
ND (10) - Compound not detected at limit indicated in parentheses.
DB Interval - Diffusion Bag Interval. L1=0-5 feet, L2=5-10 feet, L3= 10-15 feet from top of screen, L4= 15-20 feet from top of screen

J - Estimated Value
D - Diluted Value
R - Rejected Result

Table A-1. VOC concentrations in groundwater.

LOCATION:	ASBRV-T6A	ASBRV-T6B	ASSABET-1A	ASSABET-1A	Assabet-1A	ASSABET-2A	ASSABET-2A	Assabet-2A
DATE SAMPLED:	9/6/13	9/6/13	11/26/12	8/13/13	8/23/13	11/26/12	8/13/13	8/23/13
OPEN INTERVAL:	to	to	78 to 88	78 to 88	78 to 88	98 to 106	98 to 106	98 to 106
QA TYPE & DB Interval:								
VOCs								
1,1,1-Trichloroethane	ND (2)	ND (2)	NA	ND ()	ND (1)	NA	ND ()	ND (1)
1,1,2,2-Tetrachloroethane	ND (1)	ND (1)	NA	ND ()	ND (0.5)	NA	ND ()	ND (0.5)
1,1,2-Trichloroethane	ND (2)	ND (2)	NA	ND ()	ND (1)	NA	ND ()	ND (1)
1,1-Dichloroethane	ND (2)	ND (2)	NA	ND ()	ND (1)	NA	ND ()	ND (1)
1,1-Dichloroethene	9.7	ND (2)	NA	ND ()	ND (1)	NA	ND ()	ND (1)
1,2-Dichloroethane	ND (2)	ND (2)	NA	ND ()	ND (1)	NA	ND ()	ND (1)
1,2-Dichloropropane	ND (2)	ND (2)	NA	ND ()	ND (1)	NA	ND ()	ND (1)
1,4-Dioxane	NA	NA	0.263	NA	0.32	0.143	NA	0.16 J
2-Butanone	ND (20)	ND (20)	NA	NA	ND (10)	NA	NA	ND (10)
2-Hexanone	ND (20)	ND (20)	NA	NA	ND (10)	NA	NA	ND (10)
4-Methyl-2-Pentanone	ND (20)	ND (20)	NA	NA	ND (10)	NA	NA	ND (10)
Acetone	R	R	NA	NA	ND (50)	NA	NA	ND (50)
Benzene	ND (2)	ND (2)	NA	ND ()	ND (1)	NA	ND ()	ND (1)
Bromochloromethane	ND (2)	ND (2)	NA	ND ()	ND (1)	NA	ND ()	ND (1)
Bromodichloromethane	ND (1)	ND (1)	NA	ND ()	ND (0.5)	NA	ND ()	ND (0.5)
Bromoform	ND (2)	ND (2)	NA	ND ()	ND (1)	NA	ND ()	ND (1)
Bromomethane	ND (4)	ND (4)	NA	ND ()	ND (2)	NA	ND ()	ND (2)
Carbon Disulfide	ND (20)	ND (20)	NA	NA	ND (10)	NA	NA	ND (10)
Carbon Tetrachloride	ND (2)	ND (2)	NA	ND ()	ND (1)	NA	ND ()	ND (1)
Chlorobenzene	ND (2)	ND (2)	NA	ND ()	ND (1)	NA	ND ()	ND (1)
Chloroethane	ND (4)	ND (4)	NA	ND ()	ND (2)	NA	ND ()	ND (2)
Chloroform	ND (2)	ND (2)	NA	ND ()	ND (1)	NA	ND ()	ND (1)
Chloromethane	ND (4)	ND (4)	NA	ND ()	ND (2)	NA	ND ()	ND (2)
cis-1,2-Dichloroethene	ND (2)	ND (2)	NA	ND ()	ND (1)	NA	ND ()	ND (1)
cis-1,3-Dichloropropene	ND (0.8)	ND (0.8)	NA	NA	ND (0.4)	NA	NA	ND (0.4)
Dibromochloromethane	ND (1)	ND (1)	NA	ND ()	ND (0.5)	NA	ND ()	ND (0.5)
Ethylbenzene	ND (2)	ND (2)	NA	ND ()	ND (1)	NA	ND ()	ND (1)
m,p-Xylenes	ND (4)	ND (4)	NA	NA	ND (2)	NA	NA	ND (2)
Methyl tert butyl ether	ND (2)	ND (2)	NA	0.7	0.61 J	NA	ND ()	ND (1)
Methylene Chloride	ND (2)	ND (2)	NA	ND ()	ND (1)	NA	ND ()	ND (1)
o-Xylene	ND (2)	ND (2)	NA	NA	ND (1)	NA	NA	ND (1)
Styrene	ND (2)	ND (2)	NA	ND ()	ND (1)	NA	ND ()	ND (1)
Tetrachloroethene	ND (2)	ND (2)	NA	ND ()	ND (1)	NA	ND ()	ND (1)
Toluene	ND (2)	ND (2)	NA	ND ()	ND (1)	NA	ND ()	ND (1)
trans-1,2-Dichloroethene	ND (2)	ND (2)	NA	ND ()	ND (1)	NA	ND ()	ND (1)
trans-1,3-Dichloropropene	ND (0.8)	ND (0.8)	NA	NA	ND (0.4)	NA	NA	ND (0.4)
Trichloroethene	ND (2)	ND (2)	NA	ND ()	ND (1)	NA	ND ()	ND (1)
Trichlorofluoromethane	ND (2)	ND (2)	NA	ND ()	ND (1)	NA	ND ()	ND (1)
Vinyl Acetate	ND (20)	ND (20)	NA	NA	ND (10)	NA	NA	ND (10)
Vinyl Chloride	2.1	ND (2)	NA	ND ()	ND (1)	NA	ND ()	ND (1)

NOTES:

Concentrations in µg/L
Open Interval - elevation in feet NGVD; (BR) - Open Interval in bedrock
NA - Not Applicable
* SWLF-1 DB intervals are L1=0-10 ft, L2=10-20 ft, L3=20-30 ft, L4=30-40 ft from top of screen

DUP - Duplicate Sample.
ND (10) - Compound not detected at limit indicated in parentheses.
DB Interval - Diffusion Bag Interval: L1=0-5 feet, L2=5-10 feet, L3= 10-15 feet from top of screen, L4= 15-20 feet from top of screen

J - Estimated Value
D - Diluted Value
R - Rejected Result

Table A-1. VOC concentrations in groundwater.

LOCATION:	B-04B3	B-04B4	B-04B5	B-05B4	B-06B5	B-08B	B-09B4	IRISTOFFERSC
DATE SAMPLED:	8/21/13	8/21/13	8/21/13	9/3/13	8/26/13	8/27/13	9/5/13	11/26/12
OPEN INTERVAL:	93 to 94	73 to 74	57 to 58	24 to 25 (BR)	48 to 49 (BR)	76 to 86	13 to 14 (BR)	86 to 96
QA TYPE & DB Interval:								
VOCs								
1,1,1-Trichloroethane	ND (1)	ND (1)	ND (1)	ND (1)	NA	ND (5)	ND (1)	NA
1,1,2,2-Tetrachloroethane	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	NA	ND (2.5)	ND (0.5)	NA
1,1,2-Trichloroethane	ND (1)	ND (1)	ND (1)	ND (1)	NA	ND (5)	ND (1)	NA
1,1-Dichloroethane	ND (1)	ND (1)	ND (1)	ND (1)	NA	5.9	ND (1)	NA
1,1-Dichloroethene	ND (1)	ND (1)	ND (1)	ND (1)	NA	ND (5)	0.71 J	NA
1,2-Dichloroethane	ND (1)	ND (1)	ND (1)	ND (1)	NA	9	ND (1)	NA
1,2-Dichloropropane	ND (1)	ND (1)	ND (1)	ND (1)	NA	ND (5)	ND (1)	NA
1,4-Dioxane	NA	NA	NA	NA	1.1	17	1.9	0.108
2-Butanone	ND (10)	ND (10)	ND (10)	ND (10)	NA	ND (50)	ND (10)	NA
2-Hexanone	ND (10)	ND (10)	ND (10)	ND (10)	NA	ND (50)	ND (10)	NA
4-Methyl-2-Pentanone	ND (10)	ND (10)	ND (10)	ND (10)	NA	ND (50)	ND (10)	NA
Acetone	ND (50)	ND (50)	ND (50)	16 J	NA	ND (250)	ND (50)	NA
Benzene	ND (1)	ND (1)	ND (1)	ND (1)	NA	2.8 J	ND (1)	NA
Bromochloromethane	ND (1)	ND (1)	ND (1)	ND (1)	NA	ND (5)	ND (1)	NA
Bromodichloromethane	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	NA	ND (2.5)	ND (0.5)	NA
Bromoform	ND (1)	ND (1)	ND (1)	ND (1)	NA	ND (5)	ND (1)	NA
Bromomethane	ND (2)	ND (2)	ND (2)	ND (2)	NA	ND (10)	ND (2)	NA
Carbon Disulfide	ND (10)	ND (10)	ND (10)	ND (10)	NA	ND (50)	ND (10)	NA
Carbon Tetrachloride	ND (1)	ND (1)	ND (1)	ND (1)	NA	ND (5)	ND (1)	NA
Chlorobenzene	ND (1)	ND (1)	ND (1)	ND (1)	NA	ND (5)	ND (1)	NA
Chloroethane	ND (2)	ND (2)	ND (2)	ND (2)	NA	ND (10)	ND (2)	NA
Chloroform	ND (1)	ND (1)	ND (1)	ND (1)	NA	ND (5)	ND (1)	NA
Chloromethane	ND (2)	ND (2)	ND (2)	ND (2)	NA	ND (10)	ND (2)	NA
cis-1,2-Dichloroethene	ND (1)	ND (1)	ND (1)	ND (1)	NA	ND (5)	ND (1)	NA
cis-1,3-Dichloropropene	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)	NA	ND (2)	ND (0.4)	NA
Dibromochloromethane	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	NA	ND (2.5)	ND (0.5)	NA
Ethylbenzene	ND (1)	ND (1)	ND (1)	ND (1)	NA	ND (5)	ND (1)	NA
m,p-Xylenes	ND (2)	ND (2)	ND (2)	ND (2)	NA	ND (10)	ND (2)	NA
Methyl tert butyl ether	ND (1)	ND (1)	ND (1)	ND (1)	NA	ND (5)	ND (1)	NA
Methylene Chloride	ND (1)	ND (1)	ND (1)	0.56 J	NA	ND (5)	ND (1)	NA
o-Xylene	ND (1)	ND (1)	ND (1)	ND (1)	NA	ND (5)	ND (1)	NA
Styrene	ND (1)	ND (1)	ND (1)	ND (1)	NA	ND (5)	ND (1)	NA
Tetrachloroethene	ND (1)	ND (1)	ND (1)	ND (1)	NA	ND (5)	ND (1)	NA
Toluene	ND (1)	ND (1)	ND (1)	ND (1)	NA	ND (5)	ND (1)	NA
trans-1,2-Dichloroethene	ND (1)	ND (1)	ND (1)	ND (1)	NA	ND (5)	ND (1)	NA
trans-1,3-Dichloropropene	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)	NA	ND (2)	ND (0.4)	NA
Trichloroethene	ND (1)	ND (1)	ND (1)	ND (1)	NA	ND (5)	ND (1)	NA
Trichlorofluoromethane	ND (1)	ND (1)	ND (1)	ND (1)	NA	ND (5)	ND (1)	NA
Vinyl Acetate	ND (10)	ND (10)	ND (10)	ND (10)	NA	ND (50)	ND (10)	NA
Vinyl Chloride	ND (1)	ND (1)	ND (1)	ND (1)	NA	ND (5)	ND (1)	NA

NOTES:

Concentrations in µg/L
Open Interval - elevation in feet NGVD; (BR) - Open Interval in bedrock
NA - Not Applicable
* SWLF-1 DB intervals are L1=0-10 ft, L2=10-20 ft, L3=20-30 ft, L4=30-40 ft from top of screen

DUP - Duplicate Sample
ND (10) - Compound not detected at limit indicated in parentheses
DB Interval - Diffusion Bag Interval: L1=0-5 feet, L2=5-10 feet, L3= 10-15 feet from top of screen, L4= 15-20 feet from top of screen

J - Estimated Value
D - Diluted Value
R - Rejected Result

Table A-1. VOC concentrations in groundwater.

LOCATION:	IRISTOFFERSO	IRISTOFFERSO	IRISTOFFERSO	G-3A	G-3BR	LAWSBROOK	LAWSBROOK	LAWSBROOK
DATE SAMPLED:	3/18/13	8/23/13	9/19/13	9/5/13	9/5/13	11/26/12	3/18/13	8/13/13
OPEN INTERVAL:	86 to 96	86 to 96	86 to 96	43 to 53	10 to 20 (BR)	108 to 118	108 to 118	108 to 118
QA TYPE & DB Interval:				L2	L1			
VOCs								
1,1,1-Trichloroethane	NA	ND (1)	ND ()	ND (1)	ND (1)	NA	NA	ND ()
1,1,2,2-Tetrachloroethane	NA	ND (0.5)	ND ()	ND (0.5)	ND (0.5)	NA	NA	ND ()
1,1,2-Trichloroethane	NA	ND (1)	ND ()	ND (1)	ND (1)	NA	NA	ND ()
1,1-Dichloroethane	NA	ND (1)	ND ()	ND (1)	ND (1)	NA	NA	ND ()
1,1-Dichloroethene	NA	ND (1)	ND ()	0.64 J	ND (1)	NA	NA	3.9
1,2-Dichloroethane	NA	ND (1)	ND ()	ND (1)	ND (1)	NA	NA	ND ()
1,2-Dichloropropane	NA	ND (1)	ND ()	ND (1)	ND (1)	NA	NA	ND ()
1,4-Dioxane	0.103	0.2	NA	NA	NA	0.202	0.234	NA
2-Butanone	NA	ND (10)	NA	ND (10)	ND (10)	NA	NA	NA
2-Hexanone	NA	ND (10)	NA	ND (10)	ND (10)	NA	NA	NA
4-Methyl-2-Pentanone	NA	ND (10)	NA	ND (10)	ND (10)	NA	NA	NA
Acetone	NA	ND (50)	NA	R	R	NA	NA	NA
Benzene	NA	ND (1)	ND ()	ND (1)	4.4	NA	NA	ND ()
Bromochloromethane	NA	ND (1)	ND ()	ND (1)	ND (1)	NA	NA	ND ()
Bromodichloromethane	NA	ND (0.5)	ND ()	ND (0.5)	ND (0.5)	NA	NA	ND ()
Bromoform	NA	ND (1)	ND ()	ND (1)	ND (1)	NA	NA	ND ()
Bromomethane	NA	ND (2)	ND ()	ND (2)	ND (2)	NA	NA	ND ()
Carbon Disulfide	NA	ND (10)	NA	ND (10)	ND (10)	NA	NA	NA
Carbon Tetrachloride	NA	ND (1)	ND ()	ND (1)	ND (1)	NA	NA	ND ()
Chlorobenzene	NA	ND (1)	ND ()	ND (1)	ND (1)	NA	NA	ND ()
Chloroethane	NA	ND (2)	ND ()	ND (2)	ND (2)	NA	NA	ND ()
Chloroform	NA	ND (1)	ND ()	ND (1)	ND (1)	NA	NA	ND ()
Chloromethane	NA	ND (2)	ND ()	ND (2)	ND (2)	NA	NA	ND ()
cis-1,2-Dichloroethene	NA	ND (1)	ND ()	ND (1)	ND (1)	NA	NA	ND ()
cis-1,3-Dichloropropene	NA	ND (0.4)	NA	ND (0.4)	ND (0.4)	NA	NA	NA
Dibromochloromethane	NA	ND (0.5)	ND ()	ND (0.5)	ND (0.5)	NA	NA	ND ()
Ethylbenzene	NA	ND (1)	ND ()	ND (1)	ND (1)	NA	NA	ND ()
m,p-Xylenes	NA	ND (2)	NA	ND (2)	ND (2)	NA	NA	NA
Methyl tert butyl ether	NA	ND (1)	ND ()	ND (1)	ND (1)	NA	NA	ND ()
Methylene Chloride	NA	ND (1)	ND ()	ND (1)	ND (1)	NA	NA	ND ()
o-Xylene	NA	ND (1)	NA	ND (1)	ND (1)	NA	NA	NA
Styrene	NA	ND (1)	ND ()	ND (1)	ND (1)	NA	NA	ND ()
Tetrachloroethene	NA	ND (1)	ND ()	ND (1)	ND (1)	NA	NA	ND ()
Toluene	NA	ND (1)	ND ()	ND (1)	ND (1)	NA	NA	ND ()
trans-1,2-Dichloroethene	NA	ND (1)	ND ()	ND (1)	ND (1)	NA	NA	ND ()
trans-1,3-Dichloropropene	NA	ND (0.4)	NA	ND (0.4)	ND (0.4)	NA	NA	NA
Trichloroethene	NA	ND (1)	ND ()	ND (1)	ND (1)	NA	NA	ND ()
Trichlorofluoromethane	NA	ND (1)	ND ()	ND (1)	ND (1)	NA	NA	ND ()
Vinyl Acetate	NA	ND (10)	NA	ND (10)	ND (10)	NA	NA	NA
Vinyl Chloride	NA	ND (1)	ND ()	2.7	ND (1)	NA	NA	ND ()

NOTES:

Concentrations in µg/L.
Open Interval - elevation in feet NGVD; (BR) - Open Interval in bedrock
NA - Not Applicable
* SWLF-1 DB intervals are L1=0-10 ft, L2=10-20 ft, L3=20-30 ft, L4=30-40 ft from top of screen

DUP - Duplicate Sample.
ND (10) - Compound not detected at limit indicated in parentheses.
DB Interval - Diffusion Bag Interval: L1=0-5 feet, L2=5-10 feet, L3= 10-15 feet from top of screen, L4= 15-20 feet from top of screen

J - Estimated Value
D - Diluted Value
R - Rejected Result

Table A-1. VOC concentrations in groundwater.

LOCATION:	LAWSBROOK	LF-02A	LF-05E	LF-06	LF-06C	LF-06N	LF-10	LF-11AR
DATE SAMPLED:	8/22/13	9/5/13	9/5/13	9/5/13	8/27/13	9/5/13	9/5/13	9/5/13
OPEN INTERVAL:	108 to 118	35 to 45 (BR)	96 to 106	26 to 36 (BR)	105 to 115	85 to 90 (BR)	35 to 45	40 to 50
QA TYPE & DB Interval:		L1	L2	L2		L1	L2	L2
VOCs								
1,1,1-Trichloroethane	ND (1)	ND (2)	ND (2)	ND (1)	ND (5)	ND (1)	ND (1)	ND (1)
1,1,2,2-Tetrachloroethane	ND (0.5)	ND (1)	ND (1)	ND (0.5)	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)
1,1,2-Trichloroethane	ND (1)	ND (2)	ND (2)	ND (1)	ND (5)	ND (1)	ND (1)	ND (1)
1,1-Dichloroethane	ND (1)	0.76 J	ND (2)	ND (1)	2 J	0.47 J	ND (1)	ND (1)
1,1-Dichloroethene	4.1	310	32	ND (1)	ND (5)	ND (1)	200	1.7
1,2-Dichloroethane	ND (1)	ND (2)	ND (2)	ND (1)	16	ND (1)	ND (1)	ND (1)
1,2-Dichloropropane	ND (1)	ND (2)	ND (2)	ND (1)	ND (5)	ND (1)	ND (1)	ND (1)
1,4-Dioxane	0.33	NA	NA	NA	8.4	NA	NA	NA
2-Butanone	ND (10)	ND (20)	ND (20)	3 J	ND (50)	ND (10)	3.2 J	3.1 J
2-Hexanone	ND (10)	ND (20)	ND (20)	ND (10)	ND (50)	ND (10)	ND (10)	ND (10)
4-Methyl-2-Pentanone	ND (10)	ND (20)	ND (20)	ND (10)	ND (50)	ND (10)	ND (10)	ND (10)
Acetone	ND (50)	R	R	R	ND (250)	R	R	R
Benzene	ND (1)	21	2.6	3.4	160	ND (1)	15	0.43 J
Bromochloromethane	ND (1)	ND (2)	ND (2)	ND (1)	ND (5)	ND (1)	ND (1)	ND (1)
Bromodichloromethane	ND (0.5)	ND (1)	ND (1)	ND (0.5)	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)
Bromoform	ND (1)	ND (2)	ND (2)	ND (1)	ND (5)	ND (1)	ND (1)	ND (1)
Bromomethane	ND (2)	ND (4)	ND (4)	ND (2)	ND (10)	ND (2)	ND (2)	ND (2)
Carbon Disulfide	ND (10)	ND (20)	ND (20)	ND (10)	ND (50)	ND (10)	ND (10)	ND (10)
Carbon Tetrachloride	ND (1)	ND (2)	ND (2)	ND (1)	ND (5)	ND (1)	ND (1)	ND (1)
Chlorobenzene	ND (1)	ND (2)	ND (2)	ND (1)	ND (5)	ND (1)	ND (1)	ND (1)
Chloroethane	ND (2)	ND (4)	ND (4)	ND (2)	4.8 J	ND (2)	ND (2)	ND (2)
Chloroform	ND (1)	ND (2)	ND (2)	ND (1)	ND (5)	ND (1)	ND (1)	ND (1)
Chloromethane	ND (2)	ND (4)	ND (4)	ND (2)	ND (10)	ND (2)	ND (2)	ND (2)
cis-1,2-Dichloroethene	ND (1)	ND (2)	ND (2)	ND (1)	ND (5)	ND (1)	ND (1)	ND (1)
cis-1,3-Dichloropropene	ND (0.4)	ND (0.8)	ND (0.8)	ND (0.4)	ND (2)	ND (0.4)	ND (0.4)	ND (0.4)
Dibromochloromethane	ND (0.5)	ND (1)	ND (1)	ND (0.5)	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)
Ethylbenzene	ND (1)	ND (2)	ND (2)	ND (1)	6	ND (1)	ND (1)	ND (1)
m,p-Xylenes	ND (2)	ND (4)	ND (4)	ND (2)	ND (10)	ND (2)	ND (2)	ND (2)
Methyl tert butyl ether	ND (1)	ND (2)	ND (2)	ND (1)	ND (5)	ND (1)	ND (1)	ND (1)
Methylene Chloride	ND (1)	ND (2)	ND (2)	ND (1)	ND (5)	ND (1)	ND (1)	ND (1)
o-Xylene	ND (1)	1.5 J	ND (2)	ND (1)	ND (5)	ND (1)	ND (1)	ND (1)
Styrene	ND (1)	ND (2)	ND (2)	ND (1)	ND (5)	ND (1)	ND (1)	ND (1)
Tetrachloroethene	ND (1)	ND (2)	ND (2)	ND (1)	ND (5)	ND (1)	ND (1)	ND (1)
Toluene	ND (1)	ND (2)	ND (2)	ND (1)	ND (5)	ND (1)	ND (1)	ND (1)
trans-1,2-Dichloroethene	ND (1)	ND (2)	ND (2)	ND (1)	ND (5)	ND (1)	ND (1)	ND (1)
trans-1,3-Dichloropropene	ND (0.4)	ND (0.8)	ND (0.8)	ND (0.4)	ND (2)	ND (0.4)	ND (0.4)	ND (0.4)
Trichloroethene	ND (1)	ND (2)	ND (2)	ND (1)	ND (5)	ND (1)	ND (1)	ND (1)
Trichlorofluoromethane	ND (1)	ND (2)	ND (2)	ND (1)	ND (5)	ND (1)	ND (1)	ND (1)
Vinyl Acetate	ND (10)	ND (20)	ND (20)	ND (10)	ND (50)	ND (10)	ND (10)	ND (10)
Vinyl Chloride	ND (1)	130	26	ND (1)	ND (5)	ND (1)	55	3.2

NOTES:

Concentrations in µg/L.
Open Interval - elevation in feet NGVD, (BR) - Open Interval in bedrock
NA - Not Applicable
* SWLF-I DB intervals are L1=0-10 ft, L2=10-20 ft, L3=20-30 ft, L4=30-40 ft from top of screen

DUP - Duplicate Sample
ND (10) - Compound not detected at limit indicated in parentheses.
DB Interval - Diffusion Bag Interval: L1=0-5 feet, L2=5-10 feet, L3= 10-15 feet from top of screen, L4= 15-20 feet from top of screen

J - Estimated Value
D - Diluted Value
R - Rejected Result

Table A-1. VOC concentrations in groundwater.

LOCATION:	LF-12	LF-13A	LF-17D	LF-18D	LF-18D	LF-19D	LF-19MBR	LF-19SBR
DATE SAMPLED:	8/22/13	9/5/13	8/22/13	9/5/13	9/5/13	9/4/13	9/5/13	9/4/13
OPEN INTERVAL:	88 to 98	90 to 100	83 to 93	53 to 63	53 to 63	50 to 60	-23 to -8 (BR)	11 to 23 (BR)
QA TYPE & DB Interval:		L1		L2	L2 (DUP)		L2	
VOCs								
1,1,1-Trichloroethane	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)
1,1,2,2-Tetrachloroethane	ND (0.5)	ND (0.5)	ND (0.5)	ND (1)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
1,1,2-Trichloroethane	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)
1,1-Dichloroethane	ND (1)	ND (1)	0.53 J	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)
1,1-Dichloroethene	1.3	12	ND (1)	44	42	ND (1)	0.82 J	150
1,2-Dichloroethane	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)
1,2-Dichloropropane	2.6	ND (1)	ND (1)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)
1,4-Dioxane	NA	NA	NA	NA	NA	NA	NA	NA
2-Butanone	ND (10)	ND (10)	ND (10)	ND (20)	ND (10)	ND (10)	3.6 J	ND (10)
2-Hexanone	ND (10)	ND (10)	ND (10)	ND (20)	ND (10)	ND (10)	ND (10)	ND (10)
4-Methyl-2-Pentanone	ND (10)	ND (10)	ND (10)	ND (20)	ND (10)	ND (10)	ND (10)	ND (10)
Acetone	ND (50)	R	ND (50)	R	R	ND (50)	R	ND (50)
Benzene	28	1	4.6	4.3	4.1	2.3	24	23
Bromochloromethane	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)
Bromodichloromethane	ND (0.5)	ND (0.5)	ND (0.5)	ND (1)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
Bromoform	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)
Bromomethane	ND (2)	ND (2)	ND (2)	ND (4)	ND (2)	ND (2)	ND (2)	ND (2)
Carbon Disulfide	ND (10)	ND (10)	ND (10)	ND (20)	ND (10)	ND (10)	0.31 J	ND (10)
Carbon Tetrachloride	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)
Chlorobenzene	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)
Chloroethane	ND (2)	ND (2)	ND (2)	ND (4)	ND (2)	ND (2)	ND (2)	ND (2)
Chloroform	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)
Chloromethane	ND (2)	ND (2)	ND (2)	ND (4)	ND (2)	ND (2)	ND (2)	ND (2)
cis-1,2-Dichloroethene	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (1)	ND (1)	1.4
cis-1,3-Dichloropropene	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.8)	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)
Dibromochloromethane	ND (0.5)	ND (0.5)	ND (0.5)	ND (1)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
Ethylbenzene	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (1)	0.78 J	0.81 J
m,p-Xylenes	ND (2)	ND (2)	ND (2)	ND (4)	ND (2)	ND (2)	ND (2)	ND (2)
Methyl tert butyl ether	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	0.34 J	ND (1)	ND (1)
Methylene Chloride	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)
o-Xylene	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)
Styrene	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)
Tetrachloroethene	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)
Toluene	ND (1)	ND (1)	ND (1)	ND (2)	0.91 J	ND (1)	0.73 J	ND (1)
trans-1,2-Dichloroethene	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)
trans-1,3-Dichloropropene	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.8)	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)
Trichloroethene	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)
Trichlorofluoromethane	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)
Vinyl Acetate	ND (10)	ND (10)	ND (10)	ND (20)	ND (10)	ND (10)	ND (10)	ND (10)
Vinyl Chloride	ND (1)	7.8	73	20	19	13	18	97

NOTES:

Concentrations in µg/L.
Open Interval - elevation in feet NGVD; (BR) - Open Interval in bedrock
NA - Not Applicable
* SWLF-1 DB intervals are L1=0-10 ft, L2=10-20 ft, L3=20-30 ft, L4=30-40 ft from top of screen

DUP - Duplicate Sample.
ND (10) - Compound not detected at limit indicated in parentheses
DB Interval - Diffusion Bag Interval: L1=0-5 feet, L2=5-10 feet, L3= 10-15 feet from top of screen, L4= 15-20 feet from top of screen

J - Estimated Value
D - Diluted Value
R - Rejected Result

Table A-1. VOC concentrations in groundwater.

LOCATION:	LF-20D	LF-22D	LF-22S	MLF	MLF	MLF	MW-04B	MW-06B
DATE SAMPLED:	9/5/13	9/5/13	9/5/13	1/14/13	4/11/13	9/5/13	9/6/13	9/6/13
OPEN INTERVAL:	34 to 44	80 to 90	100 to 110	83 to 123	83 to 123	83 to 123	36 to 41 (BR)	40 to 45 (BR)
QA TYPE & DB Interval:	L1	L1	L2				L1	L1
VOCs								
1,1,1-Trichloroethane	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (2)
1,1,2,2-Tetrachloroethane	ND (1)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (1)	ND (1)
1,1,2-Trichloroethane	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (2)
1,1-Dichloroethane	ND (2)	3.4	11	NA	NA	NA	ND (2)	ND (2)
1,1-Dichloroethene	7.5	14	14	4.1	3.6	4	18	19
1,2-Dichloroethane	ND (2)	7.4	28	0.68 J	ND (1)	0.5 J	ND (2)	ND (2)
1,2-Dichloropropane	ND (2)	12	79	ND (1)	ND (1)	ND (1)	ND (2)	ND (2)
1,4-Dioxane	NA	NA	NA	1.3	1.3	1.2	NA	NA
2-Butanone	ND (20)	3 J	ND (10)	ND (10)	ND (10)	ND (10)	ND (20)	ND (20)
2-Hexanone	ND (20)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (20)	ND (20)
4-Methyl-2-Pentanone	ND (20)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (20)	ND (20)
Acetone	R	R	R	ND (50)	ND (50)	6 J	R	R
Benzene	1.4 J	16	9.6	0.46 J	ND (1)	ND (1)	1.1 J	ND (2)
Bromochloromethane	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (2)
Bromodichloromethane	ND (1)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (1)	ND (1)
Bromoform	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (2)
Bromomethane	ND (4)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (4)	ND (4)
Carbon Disulfide	ND (20)	ND (10)	ND (10)	ND (10)	ND (10)	0.22 J	ND (20)	ND (20)
Carbon Tetrachloride	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (2)
Chlorobenzene	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (2)
Chloroethane	ND (4)	1.1 J	12	ND (2)	ND (2)	ND (2)	ND (4)	ND (4)
Chloroform	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (2)
Chloromethane	ND (4)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (4)	ND (4)
cis-1,2-Dichloroethene	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (2)
cis-1,3-Dichloropropene	ND (0.8)	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.8)	ND (0.8)
Dibromochloromethane	ND (1)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (1)	ND (1)
Ethylbenzene	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (2)
m,p-Xylenes	ND (4)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (4)	ND (4)
Methyl tert butyl ether	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (2)
Methylene Chloride	ND (2)	ND (1)	1.4	ND (1)	ND (1)	ND (1)	ND (2)	ND (2)
o-Xylene	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (2)
Styrene	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (2)
Tetrachloroethene	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (2)
Toluene	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (2)
trans-1,2-Dichloroethene	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (2)
trans-1,3-Dichloropropene	ND (0.8)	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.8)	ND (0.8)
Trichloroethene	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (2)
Trichlorofluoromethane	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (2)
Vinyl Acetate	ND (20)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (20)	ND (20)
Vinyl Chloride	6.9	8.9	18	2.2	1.1	2.5	2	2

NOTES:

Concentrations in µg/L.
Open Interval - elevation in feet NGVD; (BR) - Open Interval in bedrock
NA - Not Applicable
* SWLF-1 DB intervals are L1=0-10 ft, L2=10-20 ft, L3=20-30 ft, L4=30-40 ft from top of screen

DUP - Duplicate Sample
ND (10) - Compound not detected at limit indicated in parentheses.
DB Interval - Diffusion Bag Interval L1=0-5 feet, L2=5-10 feet, L3= 10-15 feet from top of screen, L4= 15-20 feet from top of screen

J - Estimated Value
D - Diluted Value
R - Rejected Result

Table A-1. VOC concentrations in groundwater.

LOCATION:	MW-06B	MW-06S	MW-07B	MW-13B	NE-1	NE-1	NE-1	NE-1
DATE SAMPLED:	9/6/13	8/26/13	9/6/13	9/6/13	11/13/12	12/7/12	1/7/13	2/6/13
OPEN INTERVAL:	40 to 45 (BR)	125 to 140	50 to 60 (BR)	46 to 56 (BR)	-66 to 45 (BR)	-66 to 45 (BR)	-66 to 45 (BR)	-66 to 45 (BR)
QA TYPE & DB Interval:	L1 (DUP)		L1	L1				
VOCs								
1,1,1-Trichloroethane	ND (2)	NA	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)
1,1,2,2-Tetrachloroethane	ND (1)	NA	ND (1)	ND (1)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
1,1,2-Trichloroethane	ND (2)	NA	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)
1,1-Dichloroethane	ND (2)	NA	ND (2)	ND (2)	NA	NA	NA	NA
1,1-Dichloroethene	20	NA	13	11	39	32	36	35
1,2-Dichloroethane	ND (2)	NA	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)
1,2-Dichloropropane	ND (2)	NA	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)
1,4-Dioxane	NA	2	NA	NA	NA	NA	NA	NA
2-Butanone	ND (20)	NA	ND (20)	ND (20)	ND (10)	ND (10)	ND (10)	ND (10)
2-Hexanone	ND (20)	NA	ND (20)	ND (20)	ND (10)	ND (10)	ND (10)	ND (10)
4-Methyl-2-Pentanone	ND (20)	NA	ND (20)	ND (20)	ND (10)	ND (10)	ND (10)	ND (10)
Acetone	R	NA	R	R	ND (50)	ND (50)	ND (50)	ND (50)
Benzene	ND (2)	NA	1.5 J	ND (2)	1.2	1.1	1.2	1.1
Bromochloromethane	ND (2)	NA	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)
Bromodichloromethane	ND (1)	NA	ND (1)	ND (1)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
Bromoform	ND (2)	NA	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)
Bromomethane	ND (4)	NA	ND (4)	ND (4)	ND (2)	ND (2)	ND (2)	ND (2)
Carbon Disulfide	ND (20)	NA	ND (20)	ND (20)	ND (10)	ND (10)	ND (10)	ND (10)
Carbon Tetrachloride	ND (2)	NA	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)
Chlorobenzene	ND (2)	NA	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)
Chloroethane	ND (4)	NA	ND (4)	ND (4)	ND (2)	0.36 J	ND (2)	ND (2)
Chloroform	ND (2)	NA	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)
Chloromethane	ND (4)	NA	ND (4)	ND (4)	ND (2)	ND (2)	ND (2)	ND (2)
cis-1,2-Dichloroethene	ND (2)	NA	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)
cis-1,3-Dichloropropene	ND (0.8)	NA	ND (0.8)	ND (0.8)	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)
Dibromochloromethane	ND (1)	NA	ND (1)	ND (1)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
Ethylbenzene	ND (2)	NA	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)
m,p-Xylenes	ND (4)	NA	ND (4)	ND (4)	ND (2)	ND (2)	ND (2)	ND (2)
Methyl tert butyl ether	ND (2)	NA	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)
Methylene Chloride	ND (2)	NA	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)
o-Xylene	ND (2)	NA	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)
Styrene	ND (2)	NA	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)
Tetrachloroethene	ND (2)	NA	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)
Toluene	ND (2)	NA	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)
trans-1,2-Dichloroethene	ND (2)	NA	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)
trans-1,3-Dichloropropene	ND (0.8)	NA	ND (0.8)	ND (0.8)	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)
Trichloroethene	ND (2)	NA	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)
Trichlorofluoromethane	ND (2)	NA	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)
Vinyl Acetate	ND (20)	NA	ND (20)	ND (20)	ND (10)	ND (10)	ND (10)	ND (10)
Vinyl Chloride	2.9	NA	4.1	4.5	1.3	1	1.4	1.2

NOTES:

Concentrations in µg/L.
Open Interval - elevation in feet NGVD, (BR) - Open Interval in bedrock
NA - Not Applicable
* SWLF-1 DB intervals are L1=0-10 ft, L2=10-20 ft, L3=20-30 ft, L4=30-40 ft from top of screen

DUP - Duplicate Sample
ND (10) - Compound not detected at limit indicated in parentheses.
DB Interval - Diffusion Bag Interval: L1=0-5 feet, L2=5-10 feet, L3= 10-15 feet from top of screen, L4= 15-20 feet from top of screen

J - Estimated Value
D - Diluted Value
R - Rejected Result

Table A-1. VOC concentrations in groundwater.

LOCATION:	NE-1	NE-1	NE-1	NE-1	NE-1	NE-1	NE-1	NLBR-R
DATE SAMPLED:	3/5/13	4/16/13	5/8/13	6/6/13	7/23/13	8/16/13	9/10/13	9/5/13
OPEN INTERVAL:	-66 to 45 (BR)	-66 to 45 (BR)	-66 to 45 (BR)	-66 to 45 (BR)	-66 to 45 (BR)	-66 to 45 (BR)	-66 to 45 (BR)	75 to 89 (BR)
QA TYPE & DB Interval:								L1
VOCs								
1,1,1-Trichloroethane	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)
1,1,2,2-Tetrachloroethane	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
1,1,2-Trichloroethane	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)
1,1-Dichloroethane	NA	NA	NA	NA	NA	NA	NA	ND (1)
1,1-Dichloroethene	33	38	32	31	30	31	28	9.3
1,2-Dichloroethane	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)
1,2-Dichloropropane	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)
1,4-Dioxane	NA	NA	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)	NA
2-Butanone	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)
2-Hexanone	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)
4-Methyl-2-Pentanone	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)
Acetone	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)	R
Benzene	1	1	1.1	1.1	1.1	1.1	1.1	ND (1)
Bromochloromethane	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)
Bromodichloromethane	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
Bromoform	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)
Bromomethane	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)
Carbon Disulfide	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)
Carbon Tetrachloride	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)
Chlorobenzene	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)
Chloroethane	ND (2)	0.68 J	0.34 J	ND (2)	0.54 J	ND (2)	0.32 J	ND (2)
Chloroform	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)
Chloromethane	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)
cis-1,2-Dichloroethene	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)
cis-1,3-Dichloropropene	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)
Dibromochloromethane	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
Ethylbenzene	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)
m,p-Xylenes	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)
Methyl tert butyl ether	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)
Methylene Chloride	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)
o-Xylene	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)
Styrene	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)
Tetrachloroethene	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)
Toluene	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)
trans-1,2-Dichloroethene	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)
trans-1,3-Dichloropropene	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)
Trichloroethene	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)
Trichlorofluoromethane	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)
Vinyl Acetate	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)
Vinyl Chloride	ND (0.5)	1.2	1.2	1.4	1.4	1.7	1.4	1.7

NOTES:

Concentrations in µg/L
Open Interval - elevation in feet NGVD, (BR) - Open Interval in bedrock
NA - Not Applicable
* SWLF-1 DB intervals are L1=0-10 ft, L2=10-20 ft, L3=20-30 ft, L4=30-40 ft from top of screen

DUP - Duplicate Sample.
ND (10) - Compound not detected at limit indicated in parentheses.
DB Interval - Diffusion Bag Interval: L1=0-5 feet, L2=5-10 feet, L3= 10-15 feet from top of screen, L4= 15-20 feet from top of screen

J - Estimated Value
D - Diluted Value
R - Rejected Result

Table A-1. VOC concentrations in groundwater.

LOCATION:	OSA-01A	OSA-02A	OSA-03BR	OSA-03BR	OSA-05B	OSA-06BR	OSA-07B	OSA-11B
DATE SAMPLED:	9/5/13	9/5/13	8/22/13	8/22/13	9/6/13	8/27/13	9/6/13	9/4/13
OPEN INTERVAL:	128 to 138	130 to 140	55 to 65 (BR)	55 to 65 (BR)	100 to 110	51 to 61 (BR)	89 to 99	108 to 118
QA TYPE & DB Interval:	L2			DUP	L2		L2	
VOCs								
1,1,1-Trichloroethane	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (2)	ND (1)
1,1,2,2-Tetrachloroethane	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (1)	ND (0.5)	ND (1)	ND (0.5)
1,1,2-Trichloroethane	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (2)	ND (1)
1,1-Dichloroethane	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (2)	ND (1)
1,1-Dichloroethene	3.7	6.7	21	23	3.8	0.79 J	0.67 J	4
1,2-Dichloroethane	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (2)	ND (1)
1,2-Dichloropropane	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (2)	ND (1)
1,4-Dioxane	NA	NA	NA	NA	NA	NA	NA	NA
2-Butanone	ND (10)	ND (10)	ND (10)	ND (10)	ND (20)	ND (10)	ND (20)	ND (10)
2-Hexanone	ND (10)	ND (10)	ND (10)	ND (10)	ND (20)	ND (10)	ND (20)	ND (10)
4-Methyl-2-Pentanone	ND (10)	ND (10)	ND (10)	ND (10)	ND (20)	ND (10)	ND (20)	ND (10)
Acetone	R	R	ND (50)	ND (50)	R	ND (50)	R	ND (50)
Benzene	ND (1)	ND (1)	1.4	1.5	ND (2)	ND (1)	ND (2)	ND (1)
Bromochloromethane	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (2)	ND (1)
Bromodichloromethane	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (1)	ND (0.5)	ND (1)	ND (0.5)
Bromoform	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (2)	ND (1)
Bromomethane	ND (2)	ND (2)	ND (2)	ND (2)	ND (4)	ND (2)	ND (4)	ND (2)
Carbon Disulfide	ND (10)	ND (10)	ND (10)	1 J	ND (20)	ND (10)	ND (20)	ND (10)
Carbon Tetrachloride	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (2)	ND (1)
Chlorobenzene	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (2)	ND (1)
Chloroethane	ND (2)	ND (2)	ND (2)	ND (2)	ND (4)	ND (2)	ND (4)	ND (2)
Chloroform	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (2)	ND (1)
Chloromethane	ND (2)	ND (2)	ND (2)	ND (2)	ND (4)	ND (2)	ND (4)	ND (2)
cis-1,2-Dichloroethene	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (2)	ND (1)
cis-1,3-Dichloropropene	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.8)	ND (0.4)	ND (0.8)	ND (0.4)
Dibromochloromethane	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (1)	ND (0.5)	ND (1)	ND (0.5)
Ethylbenzene	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (2)	ND (1)
m,p-Xylenes	ND (2)	ND (2)	ND (2)	ND (2)	ND (4)	ND (2)	ND (4)	ND (2)
Methyl tert butyl ether	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (2)	ND (1)
Methylene Chloride	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (2)	ND (1)
o-Xylene	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (2)	ND (1)
Styrene	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (2)	ND (1)
Tetrachloroethene	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (2)	ND (1)
Toluene	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (2)	ND (1)
trans-1,2-Dichloroethene	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (2)	ND (1)
trans-1,3-Dichloropropene	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.8)	ND (0.4)	ND (0.8)	ND (0.4)
Trichloroethene	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (2)	ND (1)
Trichlorofluoromethane	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (2)	ND (1)
Vinyl Acetate	ND (10)	ND (10)	ND (10)	ND (10)	ND (20)	ND (10)	ND (20)	ND (10)
Vinyl Chloride	ND (1)	ND (1)	11	12	ND (2)	2.3	ND (2)	ND (1)

NOTES:

Concentrations in µg/L.
Open Interval - elevation in feet NGVD; (BR) - Open Interval in bedrock
NA - Not Applicable
* SWLF-1 DB intervals are L1=0-10 ft, L2=10-20 ft, L3=20-30 ft, L4=30-40 ft from top of screen

DUP - Duplicate Sample.
ND (10) - Compound not detected at limit indicated in parentheses.
DB Interval - Diffusion Bag Interval. L1=0-5 feet, L2=5-10 feet, L3= 10-15 feet from top of screen, L4= 15-20 feet from top of screen

J - Estimated Value
D - Diluted Value
R - Rejected Result

Table A-1. VOC concentrations in groundwater.

LOCATION:	OSA-13A	OSA-13B	OSA-13C	OSA-14B	OSA-15B	OSA-16B	PS-22A	PS-22B
DATE SAMPLED:	9/5/13	9/5/13	9/5/13	9/5/13	9/5/13	9/5/13	8/23/13	8/29/13
OPEN INTERVAL:	123 to 138	105 to 115	73 to 83	79 to 89	73 to 83	54 to 64	124 to 126	96 to 98
QA TYPE & DB Interval:	L2	L1	L2	L1	L1	L2		
VOCs								
1,1,1-Trichloroethane	ND (2)	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	NA	ND (1)
1,1,2,2-Tetrachloroethane	ND (1)	ND (1)	ND (1)	ND (1)	ND (0.5)	ND (0.5)	NA	ND (0.5)
1,1,2-Trichloroethane	ND (2)	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	NA	ND (1)
1,1-Dichloroethane	ND (2)	0.9 J	ND (2)	ND (2)	ND (1)	0.54 J	NA	ND (1)
1,1-Dichloroethene	1.1 J	23	4.4	ND (2)	6.2	1.6	NA	17
1,2-Dichloroethane	ND (2)	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	NA	ND (1)
1,2-Dichloropropane	ND (2)	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	NA	ND (1)
1,4-Dioxane	NA	NA	NA	NA	NA	NA	0.35	1.6
2-Butanone	ND (20)	ND (20)	ND (20)	ND (20)	ND (10)	ND (10)	NA	ND (10)
2-Hexanone	ND (20)	ND (20)	ND (20)	ND (20)	ND (10)	ND (10)	NA	ND (10)
4-Methyl-2-Pentanone	ND (20)	ND (20)	ND (20)	ND (20)	ND (10)	ND (10)	NA	ND (10)
Acetone	R	R	R	R	R	R	NA	6.1 J
Benzene	ND (2)	77	ND (2)	ND (2)	ND (1)	7.5	NA	ND (1)
Bromochloromethane	ND (2)	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	NA	ND (1)
Bromodichloromethane	ND (1)	ND (1)	ND (1)	ND (1)	ND (0.5)	ND (0.5)	NA	ND (0.5)
Bromoform	ND (2)	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	NA	ND (1)
Bromomethane	ND (4)	ND (4)	ND (4)	ND (4)	ND (2)	ND (2)	NA	ND (2)
Carbon Disulfide	1.2 J	ND (20)	ND (20)	ND (20)	ND (10)	ND (10)	NA	ND (10)
Carbon Tetrachloride	ND (2)	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	NA	ND (1)
Chlorobenzene	ND (2)	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	NA	ND (1)
Chloroethane	ND (4)	ND (4)	ND (4)	ND (4)	ND (2)	ND (2)	NA	ND (2)
Chloroform	ND (2)	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	NA	ND (1)
Chloromethane	ND (4)	ND (4)	ND (4)	ND (4)	ND (2)	ND (2)	NA	ND (2)
cis-1,2-Dichloroethene	ND (2)	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	NA	ND (1)
cis-1,3-Dichloropropene	ND (0.8)	ND (0.8)	ND (0.8)	ND (0.8)	ND (0.4)	ND (0.4)	NA	ND (0.4)
Dibromochloromethane	ND (1)	ND (1)	ND (1)	ND (1)	ND (0.5)	ND (0.5)	NA	ND (0.5)
Ethylbenzene	5.8	14	ND (2)	ND (2)	ND (1)	ND (1)	NA	ND (1)
m,p-Xylenes	ND (4)	27	ND (4)	ND (4)	ND (2)	ND (2)	NA	ND (2)
Methyl tert butyl ether	ND (2)	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	NA	1
Methylene Chloride	ND (2)	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	NA	ND (1)
o-Xylene	ND (2)	3.7	ND (2)	ND (2)	ND (1)	ND (1)	NA	ND (1)
Styrene	ND (2)	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	NA	ND (1)
Tetrachloroethene	ND (2)	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	NA	ND (1)
Toluene	ND (2)	2.4	ND (2)	ND (2)	ND (1)	ND (1)	NA	ND (1)
trans-1,2-Dichloroethene	ND (2)	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	NA	ND (1)
trans-1,3-Dichloropropene	ND (0.8)	ND (0.8)	ND (0.8)	ND (0.8)	ND (0.4)	ND (0.4)	NA	ND (0.4)
Trichloroethene	ND (2)	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	NA	2.4
Trichlorofluoromethane	ND (2)	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	NA	ND (1)
Vinyl Acetate	ND (20)	ND (20)	ND (20)	ND (20)	ND (10)	ND (10)	NA	ND (10)
Vinyl Chloride	ND (2)	ND (2)	ND (2)	ND (2)	2.4	16	NA	ND (1)

NOTES:

Concentrations in µg/L.
Open Interval - elevation in feet NGVD; (BR) - Open Interval in bedrock
NA - Not Applicable
* SWLF-1 DB intervals are L1=0-10 ft, L2=10-20 ft, L3=20-30 ft, L4=30-40 ft from top of screen

DUP - Duplicate Sample
ND (10) - Compound not detected at limit indicated in parentheses.
DB Interval - Diffusion Bag Interval. L1=0-5 feet, L2=5-10 feet, L3= 10-15 feet from top of screen, L4= 15-20 feet from top of screen

J - Estimated Value
D - Diluted Value
R - Rejected Result

Table A-1. VOC concentrations in groundwater.

LOCATION:	PS-22B	PS-29A	PS-29B	PT-03B1	PT-11B1	R-2	SCRIBNER	SCRIBNER
DATE SAMPLED:	8/29/13	8/29/13	8/29/13	8/27/13	9/6/13	9/4/13	11/26/12	3/18/13
OPEN INTERVAL:	96 to 98	117 to 119	86 to 91	39 to 40 (BR)	43 to 44	65 to 70 (BR)	to	to
QA TYPE & DB Interval:	DUP							
VOCs								
1,1,1-Trichloroethane	ND (1)	NA	ND (1)	NA	1.9	NA	NA	NA
1,1,2,2-Tetrachloroethane	ND (0.5)	NA	ND (0.5)	NA	ND (0.5)	NA	NA	NA
1,1,2-Trichloroethane	ND (1)	NA	ND (1)	NA	ND (1)	NA	NA	NA
1,1-Dichloroethane	ND (1)	NA	ND (1)	NA	0.99 J	NA	NA	NA
1,1-Dichloroethene	17	NA	4	NA	1.9	NA	NA	NA
1,2-Dichloroethane	ND (1)	NA	ND (1)	NA	ND (1)	NA	NA	NA
1,2-Dichloropropane	ND (1)	NA	ND (1)	NA	ND (1)	NA	NA	NA
1,4-Dioxane	1.5	0.12 J	0.34	2.9	NA	0.99	0.299	0.264
2-Butanone	ND (10)	NA	ND (10)	NA	ND (10)	NA	NA	NA
2-Hexanone	ND (10)	NA	ND (10)	NA	ND (10)	NA	NA	NA
4-Methyl-2-Pentanone	ND (10)	NA	ND (10)	NA	ND (10)	NA	NA	NA
Acetone	6.5 J	NA	ND (50)	NA	ND (50)	NA	NA	NA
Benzene	ND (1)	NA	ND (1)	NA	ND (1)	NA	NA	NA
Bromochloromethane	ND (1)	NA	ND (1)	NA	ND (1)	NA	NA	NA
Bromodichloromethane	ND (0.5)	NA	ND (0.5)	NA	ND (0.5)	NA	NA	NA
Bromoform	ND (1)	NA	ND (1)	NA	ND (1)	NA	NA	NA
Bromomethane	ND (2)	NA	ND (2)	NA	ND (2)	NA	NA	NA
Carbon Disulfide	ND (10)	NA	ND (10)	NA	ND (10)	NA	NA	NA
Carbon Tetrachloride	ND (1)	NA	ND (1)	NA	ND (1)	NA	NA	NA
Chlorobenzene	ND (1)	NA	ND (1)	NA	ND (1)	NA	NA	NA
Chloroethane	ND (2)	NA	ND (2)	NA	ND (2)	NA	NA	NA
Chloroform	ND (1)	NA	ND (1)	NA	ND (1)	NA	NA	NA
Chloromethane	ND (2)	NA	ND (2)	NA	ND (2)	NA	NA	NA
cis-1,2-Dichloroethene	ND (1)	NA	ND (1)	NA	ND (1)	NA	NA	NA
cis-1,3-Dichloropropene	ND (0.4)	NA	ND (0.4)	NA	ND (0.4)	NA	NA	NA
Dibromochloromethane	ND (0.5)	NA	ND (0.5)	NA	ND (0.5)	NA	NA	NA
Ethylbenzene	ND (1)	NA	ND (1)	NA	ND (1)	NA	NA	NA
m,p-Xylenes	ND (2)	NA	ND (2)	NA	ND (2)	NA	NA	NA
Methyl tert butyl ether	1.1	NA	ND (1)	NA	ND (1)	NA	NA	NA
Methylene Chloride	ND (1)	NA	ND (1)	NA	ND (1)	NA	NA	NA
o-Xylene	ND (1)	NA	ND (1)	NA	ND (1)	NA	NA	NA
Styrene	ND (1)	NA	ND (1)	NA	ND (1)	NA	NA	NA
Tetrachloroethene	ND (1)	NA	0.44 J	NA	1.7	NA	NA	NA
Toluene	ND (1)	NA	ND (1)	NA	ND (1)	NA	NA	NA
trans-1,2-Dichloroethene	ND (1)	NA	ND (1)	NA	ND (1)	NA	NA	NA
trans-1,3-Dichloropropene	ND (0.4)	NA	ND (0.4)	NA	ND (0.4)	NA	NA	NA
Trichloroethene	2.4	NA	1.2	NA	7.2	NA	NA	NA
Trichlorofluoromethane	ND (1)	NA	ND (1)	NA	ND (1)	NA	NA	NA
Vinyl Acetate	ND (10)	NA	ND (10)	NA	ND (10)	NA	NA	NA
Vinyl Chloride	ND (1)	NA	ND (1)	NA	ND (1)	NA	NA	NA

NOTES:

Concentrations in µg/L.
Open Interval - elevation in feet NGVD; (BR) - Open Interval in bedrock
NA - Not Applicable
* SWLF-1 DB intervals are L1=0-10 ft, L2=10-20 ft, L3=20-30 ft, L4=30-40 ft from top of screen

DUP - Duplicate Sample
ND (10) - Compound not detected at limit indicated in parentheses
DB Interval - Diffusion Bag Interval L1=0-5 feet, L2=5-10 feet, L3= 10-15 feet from top of screen, L4= 15-20 feet from top of screen

J - Estimated Value
D - Diluted Value
R - Rejected Result

Table A-1. VOC concentrations in groundwater.

LOCATION:	SCRIBNER	SCRIBNER	SCRIBNER	SCRIBNER	SCRIBNER	SCRIBNER1	SCRIBNER1	SCRIBNER1
DATE SAMPLED:	8/13/13	8/23/13	8/23/13	9/19/13	9/19/13	11/26/12	3/18/13	9/19/13
OPEN INTERVAL:	to	to	to	to	to	to	to	to
QA TYPE & DB Interval:			DUP		DUP			
VOCs								
1,1,1-Trichloroethane	ND ()	ND (1)	NA	NA	NA	NA	NA	NA
1,1,2,2-Tetrachloroethane	ND ()	ND (0.5)	NA	NA	NA	NA	NA	NA
1,1,2-Trichloroethane	ND ()	ND (1)	NA	NA	NA	NA	NA	NA
1,1-Dichloroethane	ND ()	ND (1)	NA	NA	NA	NA	NA	NA
1,1-Dichloroethene	3.1	2.8	NA	NA	NA	NA	NA	NA
1,2-Dichloroethane	ND ()	ND (1)	NA	NA	NA	NA	NA	NA
1,2-Dichloropropane	ND ()	ND (1)	NA	NA	NA	NA	NA	NA
1,4-Dioxane	NA	0.25	0.3	0.31	0.31	0.108	0.121	0.12 J
2-Butanone	NA	ND (10)	NA	NA	NA	NA	NA	NA
2-Hexanone	NA	ND (10)	NA	NA	NA	NA	NA	NA
4-Methyl-2-Pentanone	NA	ND (10)	NA	NA	NA	NA	NA	NA
Acetone	NA	3.5 J	NA	NA	NA	NA	NA	NA
Benzene	ND ()	ND (1)	NA	NA	NA	NA	NA	NA
Bromochloromethane	ND ()	ND (1)	NA	NA	NA	NA	NA	NA
Bromodichloromethane	ND ()	ND (0.5)	NA	NA	NA	NA	NA	NA
Bromoform	ND ()	ND (1)	NA	NA	NA	NA	NA	NA
Bromomethane	ND ()	ND (2)	NA	NA	NA	NA	NA	NA
Carbon Disulfide	NA	ND (10)	NA	NA	NA	NA	NA	NA
Carbon Tetrachloride	ND ()	ND (1)	NA	NA	NA	NA	NA	NA
Chlorobenzene	ND ()	ND (1)	NA	NA	NA	NA	NA	NA
Chloroethane	ND ()	ND (2)	NA	NA	NA	NA	NA	NA
Chloroform	ND ()	ND (1)	NA	NA	NA	NA	NA	NA
Chloromethane	ND ()	ND (2)	NA	NA	NA	NA	NA	NA
cis-1,2-Dichloroethene	ND ()	ND (1)	NA	NA	NA	NA	NA	NA
cis-1,3-Dichloropropene	NA	ND (0.4)	NA	NA	NA	NA	NA	NA
Dibromochloromethane	ND ()	ND (0.5)	NA	NA	NA	NA	NA	NA
Ethylbenzene	ND ()	ND (1)	NA	NA	NA	NA	NA	NA
m,p-Xylenes	NA	ND (2)	NA	NA	NA	NA	NA	NA
Methyl tert butyl ether	ND ()	ND (1)	NA	NA	NA	NA	NA	NA
Methylene Chloride	ND ()	ND (1)	NA	NA	NA	NA	NA	NA
o-Xylene	NA	ND (1)	NA	NA	NA	NA	NA	NA
Styrene	ND ()	ND (1)	NA	NA	NA	NA	NA	NA
Tetrachloroethene	ND ()	ND (1)	NA	NA	NA	NA	NA	NA
Toluene	ND ()	ND (1)	NA	NA	NA	NA	NA	NA
trans-1,2-Dichloroethene	ND ()	ND (1)	NA	NA	NA	NA	NA	NA
trans-1,3-Dichloropropene	NA	ND (0.4)	NA	NA	NA	NA	NA	NA
Trichloroethene	ND ()	ND (1)	NA	NA	NA	NA	NA	NA
Trichlorofluoromethane	ND ()	ND (1)	NA	NA	NA	NA	NA	NA
Vinyl Acetate	NA	ND (10)	NA	NA	NA	NA	NA	NA
Vinyl Chloride	ND ()	ND (1)	NA	NA	NA	NA	NA	NA

NOTES:

Concentrations in µg/L
Open Interval - elevation in feet NGVD; (BR) - Open Interval in bedrock
NA - Not Applicable
* SWLF-1 DB intervals are L1=0-10 ft, L2=10-20 ft, L3=20-30 ft, L4=30-40 ft from top of screen

DUP - Duplicate Sample
ND (10) - Compound not detected at limit indicated in parentheses
DB Interval - Diffusion Bag Interval: L1=0-5 feet, L2=5-10 feet, L3= 10-15 feet from top of screen, L4= 15-20 feet from top of screen

J - Estimated Value
D - Diluted Value
R - Rejected Result

Table A-1. VOC concentrations in groundwater.

LOCATION:	SCRIBNER2	SCRIBNER2	SCRIBNER2	SCRIBNER3	SCRIBNER3	SCRIBNER3	SCRIBNER4	SCRIBNER4
DATE SAMPLED:	11/26/12	3/18/13	9/19/13	11/26/12	3/18/13	9/19/13	11/26/12	3/18/13
OPEN INTERVAL:	to	to	to	to	to	to	to	to
QA TYPE & DB Interval:								
VOCs								
1,1,1-Trichloroethane	NA	NA	NA	NA	NA	NA	NA	NA
1,1,2,2-Tetrachloroethane	NA	NA	NA	NA	NA	NA	NA	NA
1,1,2-Trichloroethane	NA	NA	NA	NA	NA	NA	NA	NA
1,1-Dichloroethane	NA	NA	NA	NA	NA	NA	NA	NA
1,1-Dichloroethene	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloroethane	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloropropane	NA	NA	NA	NA	NA	NA	NA	NA
1,4-Dioxane	0.323	0.352	0.43	0.0362 J	0.0424 J	ND (0.2)	0.406	0.322
2-Butanone	NA	NA	NA	NA	NA	NA	NA	NA
2-Hexanone	NA	NA	NA	NA	NA	NA	NA	NA
4-Methyl-2-Pentanone	NA	NA	NA	NA	NA	NA	NA	NA
Acetone	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	NA	NA	NA	NA	NA	NA	NA	NA
Bromochloromethane	NA	NA	NA	NA	NA	NA	NA	NA
Bromodichloromethane	NA	NA	NA	NA	NA	NA	NA	NA
Bromoform	NA	NA	NA	NA	NA	NA	NA	NA
Bromomethane	NA	NA	NA	NA	NA	NA	NA	NA
Carbon Disulfide	NA	NA	NA	NA	NA	NA	NA	NA
Carbon Tetrachloride	NA	NA	NA	NA	NA	NA	NA	NA
Chlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA
Chloroethane	NA	NA	NA	NA	NA	NA	NA	NA
Chloroform	NA	NA	NA	NA	NA	NA	NA	NA
Chloromethane	NA	NA	NA	NA	NA	NA	NA	NA
cis-1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	NA	NA
cis-1,3-Dichloropropene	NA	NA	NA	NA	NA	NA	NA	NA
Dibromochloromethane	NA	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	NA	NA	NA	NA	NA	NA	NA	NA
m,p-Xylenes	NA	NA	NA	NA	NA	NA	NA	NA
Methyl tert butyl ether	NA	NA	NA	NA	NA	NA	NA	NA
Methylene Chloride	NA	NA	NA	NA	NA	NA	NA	NA
o-Xylene	NA	NA	NA	NA	NA	NA	NA	NA
Styrene	NA	NA	NA	NA	NA	NA	NA	NA
Tetrachloroethene	NA	NA	NA	NA	NA	NA	NA	NA
Toluene	NA	NA	NA	NA	NA	NA	NA	NA
trans-1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	NA	NA
trans-1,3-Dichloropropene	NA	NA	NA	NA	NA	NA	NA	NA
Trichloroethene	NA	NA	NA	NA	NA	NA	NA	NA
Trichlorofluoromethane	NA	NA	NA	NA	NA	NA	NA	NA
Vinyl Acetate	NA	NA	NA	NA	NA	NA	NA	NA
Vinyl Chloride	NA	NA	NA	NA	NA	NA	NA	NA

NOTES:

Concentrations in µg/L
Open Interval - elevation in feet NGVD, (BR) - Open Interval in bedrock
NA - Not Applicable
* SWLF-1 DB intervals are L1=0-10 ft, L2=10-20 ft, L3=20-30 ft, L4=30-40 ft from top of screen

DUP - Duplicate Sample.
ND (10) - Compound not detected at limit indicated in parentheses.
DB Interval - Diffusion Bag Interval: L1=0-5 feet, L2=5-10 feet, L3= 10-15 feet from top of screen, L4= 15-20 feet from top of screen

J - Estimated Value
D - Diluted Value
R - Rejected Result

Table A-1. VOC concentrations in groundwater.

LOCATION:	SCRIBNER4	SELF-1	SELF-1	SELF-1	SELF-2	SELF-2	SELF-2	SLGP-R
DATE SAMPLED:	9/19/13	1/14/13	4/11/13	9/5/13	1/14/13	4/11/13	9/5/13	9/5/13
OPEN INTERVAL:	to	95 to 113	95 to 113	95 to 113	85 to 113	85 to 113	85 to 113	66 to 83
QA TYPE & DB Interval:								L3
VOCs								
1,1,1-Trichloroethane	NA	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (1)
1,1,2,2-Tetrachloroethane	NA	ND (2.5)	ND (2.5)	ND (2.5)	ND (2.5)	ND (2.5)	ND (2.5)	ND (0.5)
1,1,2-Trichloroethane	NA	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (1)
1,1-Dichloroethane	NA	NA	NA	NA	NA	NA	NA	ND (1)
1,1-Dichloroethene	NA	2.3 J	ND (5)	2.8 J	11	11	11	1.8
1,2-Dichloroethane	NA	31	30	29	19	18	15	ND (1)
1,2-Dichloropropane	NA	5	5.3	3.9 J	20	20	19	ND (1)
1,4-Dioxane	0.4	26	29	28	26	28	34	NA
2-Butanone	NA	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)	ND (10)
2-Hexanone	NA	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)	ND (10)
4-Methyl-2-Pentanone	NA	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)	ND (10)
Acetone	NA	ND (250)	ND (250)	31 J	ND (250)	ND (250)	ND (250)	R
Benzene	NA	2.7 J	80	270	230	230	240	ND (1)
Bromochloromethane	NA	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (1)
Bromodichloromethane	NA	ND (2.5)	ND (2.5)	ND (2.5)	ND (2.5)	ND (2.5)	ND (2.5)	ND (0.5)
Bromoform	NA	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (1)
Bromomethane	NA	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (2)
Carbon Disulfide	NA	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)	ND (10)
Carbon Tetrachloride	NA	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (1)
Chlorobenzene	NA	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (1)
Chloroethane	NA	8 J	6.9 J	6.9 J	ND (10)	5.3 J	5.4 J	ND (2)
Chloroform	NA	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (1)
Chloromethane	NA	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (2)
cis-1,2-Dichloroethene	NA	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (1)
cis-1,3-Dichloropropene	NA	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (0.4)
Dibromochloromethane	NA	ND (2.5)	ND (2.5)	ND (2.5)	ND (2.5)	ND (2.5)	ND (2.5)	ND (0.5)
Ethylbenzene	NA	ND (5)	6.3	16	5.3	5.5	ND (5)	ND (1)
m,p-Xylenes	NA	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (2)
Methyl tert butyl ether	NA	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (1)
Methylene Chloride	NA	3 J	ND (5)	ND (5)	2.3 J	ND (5)	ND (5)	ND (1)
o-Xylene	NA	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (1)
Styrene	NA	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (1)
Tetrachloroethene	NA	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (1)
Toluene	NA	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (1)
trans-1,2-Dichloroethene	NA	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (1)
trans-1,3-Dichloropropene	NA	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (0.4)
Trichloroethene	NA	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (1)
Trichlorofluoromethane	NA	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (1)
Vinyl Acetate	NA	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)	ND (10)
Vinyl Chloride	NA	5.8	5.9	7.5	9.8	9.2	12	ND (1)

NOTES:

Concentrations in µg/L
Open Interval - elevation in feet NGVD, (BR) - Open Interval in bedrock
NA - Not Applicable
* SWLF-1 DB intervals are L1=0-10 ft, L2=10-20 ft, L3=20-30 ft, L4=30-40 ft from top of screen

DUP - Duplicate Sample.
ND (10) - Compound not detected at limit indicated in parentheses.
DB Interval - Diffusion Bag Interval. L1=0-5 feet, L2=5-10 feet, L3= 10-15 feet from top of screen, L4= 15-20 feet from top of screen

J - Estimated Value
D - Diluted Value
R - Rejected Result

Table A-1. VOC concentrations in groundwater.

LOCATION:	SWLF-1	SWLF-1	SWLF-1	SWLF-1	SWLF-2	SWLF-2	SWLF-2	WLF
DATE SAMPLED:	9/5/13	9/5/13	9/5/13	9/5/13	1/14/13	4/11/13	9/5/13	1/14/13
OPEN INTERVAL:	-12 to 28 (BR)	-12 to 28 (BR)	-12 to 28 (BR)	-12 to 28 (BR)	-25 to 30 (BR)	-25 to 30 (BR)	-25 to 30 (BR)	86 to 104
QA TYPE & DB Interval:	L1*	L2*	L3*	L4*				
VOCs								
1,1,1-Trichloroethane	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)
1,1,2,2-Tetrachloroethane	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
1,1,2-Trichloroethane	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)
1,1-Dichloroethane	0.39 J	ND (1)	ND (1)	ND (1)	NA	NA	NA	NA
1,1-Dichloroethene	200	200	160	7.6	28	26	29	28
1,2-Dichloroethane	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	0.48 J	ND (1)
1,2-Dichloropropane	ND (1)	ND (1)	ND (1)	2.7	ND (1)	ND (1)	ND (1)	ND (1)
1,4-Dioxane	NA	NA	NA	NA	4.5	5.4	5.3	3.2
2-Butanone	3.1 J	ND (10)	13	22	ND (10)	ND (10)	ND (10)	ND (10)
2-Hexanone	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)
4-Methyl-2-Pentanone	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)
Acetone	R	R	R	R	ND (50)	ND (50)	6.2 J	ND (50)
Benzene	16	16	18	18	17	14	15	1.7
Bromochloromethane	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)
Bromodichloromethane	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
Bromoform	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)
Bromomethane	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)
Carbon Disulfide	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)
Carbon Tetrachloride	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)
Chlorobenzene	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)
Chloroethane	0.38 J	0.41 J	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)
Chloroform	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)
Chloromethane	ND (2)	ND (2)	ND (2)	2.1	ND (2)	ND (2)	ND (2)	ND (2)
cis-1,2-Dichloroethene	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)
cis-1,3-Dichloropropene	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)
Dibromochloromethane	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
Ethylbenzene	1.4	1.3	1.1	1.5	ND (1)	ND (1)	ND (1)	ND (1)
m,p-Xylenes	ND (2)	ND (2)	ND (2)	0.82 J	ND (2)	ND (2)	ND (2)	ND (2)
Methyl tert butyl ether	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	0.49 J
Methylene Chloride	ND (1)	ND (1)	ND (1)	0.62 J	ND (1)	ND (1)	ND (1)	ND (1)
o-Xylene	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)
Styrene	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)
Tetrachloroethene	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)
Toluene	ND (1)	ND (1)	3.9	2400	ND (1)	ND (1)	ND (1)	ND (1)
trans-1,2-Dichloroethene	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)
trans-1,3-Dichloropropene	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)
Trichloroethene	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)
Trichlorofluoromethane	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)
Vinyl Acetate	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)
Vinyl Chloride	57	53	48	ND (1)	11	12	14	6.1

NOTES:

Concentrations in µg/L
Open Interval - elevation in feet NGVD; (BR) - Open Interval in bedrock
NA - Not Applicable
* SWLF-1 DB intervals are L1=0-10 ft, L2=10-20 ft, L3=20-30 ft, L4=30-40 ft from top of screen

DUP - Duplicate Sample
ND (10) - Compound not detected at limit indicated in parentheses.
DB Interval - Diffusion Bag Interval: L1=0-5 feet, L2=5-10 feet, L3= 10-15 feet from top of screen, L4= 15-20 feet from top of screen

J - Estimated Value
D - Diluted Value
R - Rejected Result

Table A-1. VOC concentrations in groundwater.

LOCATION:	WLF	WLF
DATE SAMPLED:	4/11/13	9/5/13
OPEN INTERVAL:	86 to 104	86 to 104
QA TYPE & DB Interval:		
VOCs		
1,1,1-Trichloroethane	ND (1)	ND (1)
1,1,2,2-Tetrachloroethane	ND (0.5)	ND (0.5)
1,1,2-Trichloroethane	ND (1)	ND (1)
1,1-Dichloroethene	27	29
1,2-Dichloroethane	ND (1)	ND (1)
1,2-Dichloropropane	ND (1)	ND (1)
1,4-Dioxane	3.8	3.9
2-Butanone	ND (10)	ND (10)
2-Hexanone	ND (10)	ND (10)
4-Methyl-2-Pentanone	ND (10)	ND (10)
Acetone	ND (50)	5.5 J
Benzene	1.6	1.9
Bromochloromethane	ND (1)	ND (1)
Bromodichloromethane	ND (0.5)	ND (0.5)
Bromoform	ND (1)	ND (1)
Bromomethane	ND (2)	ND (2)
Carbon Disulfide	ND (10)	ND (10)
Carbon Tetrachloride	ND (1)	ND (1)
Chlorobenzene	ND (1)	ND (1)
Chloroethane	ND (2)	ND (2)
Chloroform	ND (1)	ND (1)
Chloromethane	ND (2)	ND (2)
cis-1,2-Dichloroethene	ND (1)	ND (1)
cis-1,3-Dichloropropene	ND (0.4)	ND (0.4)
Dibromochloromethane	ND (0.5)	ND (0.5)
Ethylbenzene	ND (1)	ND (1)
m,p-Xylenes	ND (2)	ND (2)
Methyl tert butyl ether	0.51 J	0.51 J
Methylene Chloride	ND (1)	ND (1)
o-Xylene	ND (1)	ND (1)
Styrene	ND (1)	ND (1)
Tetrachloroethene	ND (1)	ND (1)
Toluene	ND (1)	ND (1)
trans-1,2-Dichloroethene	ND (1)	ND (1)
trans-1,3-Dichloropropene	ND (0.4)	ND (0.4)
Trichloroethene	ND (1)	ND (1)
Trichlorofluoromethane	ND (1)	ND (1)
Vinyl Acetate	ND (10)	ND (10)
Vinyl Chloride	6.3	7.6

NOTES:

Concentrations in µg/L.
Open Interval - elevation in feet NGVD. (BR) - Open Interval in bedrock
NA - Not Applicable
* SWLF-1 DB intervals are L1=0-10 ft, L2=10-20 ft, L3=20-30 ft, L4=30-40 ft from top of screen

DUP - Duplicate Sample
ND (10) - Compound not detected at limit indicated in parentheses.
DB Interval - Diffusion Bag Interval. L1=0-5 feet, L2=5-10 feet, L3= 10-15 feet from top of screen, L4= 15-20 feet from top of screen

J - Estimated Value
D - Diluted Value
R - Rejected Result

Table A-2. Inorganic Compound Concentrations in Groundwater

LOCATION:	AR-21	AR-29SBR	AR-30D	AR-31D	B-05B3	B-08C	B-08D	B-09B4
DATE SAMPLED:	8/27/13	9/4/13	8/29/13	8/29/13	9/3/13	8/21/13	8/21/13	9/5/13
OPEN INTERVAL:	78 to 83 (BR)	56 to 67 (BR)	75 to 85	82 to 92	36 to 37	108 to 118	125 to 140	13 to 14 (BR)
QA TYPE (Analysis):	(Diss.)					(Diss.)	(Diss.)	
Metals								
Antimony	NA	11	ND (6)	ND (6)	ND (6)	NA	NA	ND (6)
Arsenic	1.7	4.6	0.32 J	4.6	0.087 J	100	0.27 J	1.9
Beryllium	NA	ND (1)	ND (1)	ND (1)	ND (1)	NA	NA	ND (1)
Chromium	NA	660	ND (5)	2.6 J	ND (5)	NA	NA	ND (5)
Iron	ND (50)	2900	34 J	11000	60	31000	230	7000
Lead	NA	39	0.18 J	ND (1)	0.37 J	NA	NA	0.72 J
Manganese	4.9 B	620 B	2600	270	4300	4500 ^	3500 ^	600 B
Nickel	NA	200	6.8 J	ND (10)	5.8 J	NA	NA	2.1 J

NOTES:

Concentrations in µg/L.
Open Interval - elevation in feet NGVD; (BR) - Open Interval in bedrock
DUP - Duplicate Sample.
ND (10) - Compound not detected at limit indicated in parentheses.
J - Estimated Value
(Diss.) - Sample filtered and analyzed for dissolved metals
^ - Instrument QC exceeded control limits
NA - Not Applicable
B - Analyte detected in blank

Table A-2. Inorganic Compound Concentrations in Groundwater

LOCATION:	LF-06C	LF-12	LF-15	MLF	MLF	MLF	NE-1	NE-1
DATE SAMPLED:	8/27/13	8/22/13	8/22/13	1/14/13	4/11/13	9/5/13	11/13/12	12/7/12
OPEN INTERVAL:	105 to 115	88 to 98	120 to 130	83 to 123	83 to 123	83 to 123	-66 to 45 (BR)	-66 to 45 (BR)
QA TYPE (Analysis):	(Diss.)	(Diss.)	(Diss.)					
Metals								
Antimony	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	310	16	3.2	54	59	57	4.4	4.6
Beryllium	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	NA	NA	NA	NA	NA	NA	NA	NA
Iron	9500 B	ND (50)	3300 B	16000	17000 B	16000	ND (50)	19 J
Lead	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	2800 B	130 B	2400 B	3800	3700	3700	63	59
Nickel	NA	NA	NA	NA	NA	NA	NA	NA

NOTES:

Concentrations in µg/L.
Open Interval - elevation in feet NGVD, (BR) - Open Interval in bedrock
DUP - Duplicate Sample.
ND (10) - Compound not detected at limit indicated in parentheses.
J - Estimated Value.
(Diss.) - Sample filtered and analyzed for dissolved metals
^ - Instrument QC exceeded control limits
NA - Not Applicable
B - Analyte detected in blank

Table A-2. Inorganic Compound Concentrations in Groundwater

LOCATION:	NE-1	NE-1	NE-1	NE-1	NE-1	NE-1	NE-1	NE-1
DATE SAMPLED:	1/7/13	2/6/13	3/5/13	4/16/13	5/8/13	6/6/13	7/23/13	8/16/13
OPEN INTERVAL:	-66 to 45 (BR)	-66 to 45 (BR)	-66 to 45 (BR)	-66 to 45 (BR)	-66 to 45 (BR)	-66 to 45 (BR)	-66 to 45 (BR)	-66 to 45 (BR)
QA TYPE (Analysis):								
Metals								
Antimony	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	4.5	4.5	4.3	4.3	4.6	4.2	4.5	4.4
Beryllium	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	NA	NA	NA	NA	NA	NA	NA	NA
Iron	ND (50)	110	22 J	27 J	29 J	ND (50)	26 J	21 J
Lead	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	65	62	67	65 B	61	68	62 B	63 ^
Nickel	NA	NA	NA	NA	NA	NA	NA	NA

NOTES:

Concentrations in µg/L
Open Interval - elevation in feet NGVD, (BR) - Open Interval in bedrock
DUP - Duplicate Sample.
ND (10) - Compound not detected at limit indicated in parentheses.
J - Estimated Value.
(Diss.) - Sample filtered and analyzed for dissolved metals
^ - Instrument QC exceeded control limits
NA - Not Applicable
B - Analyte detected in blank

Table A-2. Inorganic Compound Concentrations in Groundwater

LOCATION:	NE-1	OSA-01B	OSA-05A	OSA-06BR	OSA-07A	OSA-09B	OSA-11B	PS-22B
DATE SAMPLED:	9/10/13	8/23/13	8/26/13	8/27/13	8/21/13	8/26/13	9/4/13	8/29/13
OPEN INTERVAL:	-66 to 45 (BR)	98 to 108	128 to 138	51 to 61 (BR)	127 to 137	86 to 96	108 to 118	96 to 98
QA TYPE (Analysis):		(Diss.)	(Diss.)	(Diss.)	(Diss.)	(Diss.)	(Diss.)	
Metals								
Antimony	NA	NA	NA	NA	NA	NA	NA	ND (6)
Arsenic	4.5	110	0.5 J	37	0.53 J	83	0.53 J	0.38 J
Beryllium	NA	NA	NA	NA	NA	NA	NA	ND (1)
Chromium	NA	NA	NA	NA	NA	NA	NA	ND (5)
Iron	ND (50)	70 B	ND (50)	3100 B	13000	93 B	39 J	37 J
Lead	NA	NA	NA	NA	NA	NA	NA	0.074 J
Manganese	64	1300 B	59 B	950 B	870 ^	3.7 B	21 B	250
Nickel	NA	NA	NA	NA	NA	NA	NA	3.3 J

NOTES:

Concentrations in µg/L.
Open Interval - elevation in feet NGVD; (BR) - Open Interval in bedrock
DUP - Duplicate Sample.
ND (10) - Compound not detected at limit indicated in parentheses.
J - Estimated Value.
(Diss.) - Sample filtered and analyzed for dissolved metals
^ - Instrument QC exceeded control limits
NA - Not Applicable
B - Analyte detected in blank

Table A-2. Inorganic Compound Concentrations in Groundwater

LOCATION:	PS-22B	PS-29B	RE-1OBS	RE-2OBS	SELF-1	SELF-1	SELF-1	SELF-2
DATE SAMPLED:	8/29/13	8/29/13	8/27/13	8/27/13	1/14/13	4/11/13	9/5/13	1/14/13
OPEN INTERVAL:	96 to 98	86 to 91	120 to 140	120 to 140	95 to 113	95 to 113	95 to 113	85 to 113
QA TYPE (Analysis):	DUP							
Metals								
Antimony	ND (6)	ND (6)	ND (6)	ND (6)	NA	NA	NA	NA
Arsenic	0.32 J	0.73 J	4.7	2.4	54	51	120	98
Beryllium	ND (1)	ND (1)	ND (1)	ND (1)	NA	NA	NA	NA
Chromium	ND (5)	ND (5)	86	16	NA	NA	NA	NA
Iron	36 J	1300	1800	230	6200	8200 B	14000	12000
Lead	ND (1)	0.3 J	0.78 J	0.14 J	NA	NA	NA	NA
Manganese	250	200	22	37	1700	1600	1700	1600
Nickel	3.5 J	3.5 J	51	10	NA	NA	NA	NA

NOTES:

Concentrations in µg/L.
Open Interval - elevation in feet NGVD, (BR) - Open Interval in bedrock
DUP - Duplicate Sample
ND (10) - Compound not detected at limit indicated in parentheses.
J - Estimated Value.
(Diss) - Sample filtered and analyzed for dissolved metals
^ - Instrument QC exceeded control limits
NA - Not Applicable
B - Analyte detected in blank

Table A-2. Inorganic Compound Concentrations in Groundwater

LOCATION:	SELF-2	SELF-2	SWLF-2	SWLF-2	SWLF-2	WLF	WLF	WLF
DATE SAMPLED:	4/11/13	9/5/13	1/14/13	4/11/13	9/5/13	1/14/13	4/11/13	9/5/13
OPEN INTERVAL:	85 to 113	85 to 113	-25 to 30 (BR)	-25 to 30 (BR)	-25 to 30 (BR)	86 to 104	86 to 104	86 to 104
QA TYPE (Analysis):								
Metals								
Arsenic	110	88	1.6	1.1	1.8	27	NA	27
Iron	21000 B	8700	3300	5000 B	3000	2700	3200 B	78
Manganese	1700	1600	230	250	220	1600	1700	1600

NOTES:

Concentrations in µg/L.
Open Interval - elevation in feet NGVD, (BR) - Open Interval in bedrock
DUP - Duplicate Sample.
ND (10) - Compound not detected at limit indicated in parentheses.
J - Estimated Value.
(Diss.) - Sample filtered and analyzed for dissolved metals
^ - Instrument QC exceeded control limits
NA - Not Applicable
B - Analyte detected in blank

Table A-3. EPH and VPH Concentrations in Groundwater.

LOCATION:	MW-06D1	MW-06D2	MW-49	MW-49	NE-1	NE-1
DATE SAMPLED:	8/23/13	8/23/13	8/26/13	8/26/13	11/13/12	12/7/12
OPEN INTERVAL:	85 to 95	59 to 69	128 to 138	128 to 138	-66 to 45 (BR)	-66 to 45 (BR)
QA TYPE:				DUP		
EPH						
2-Methylnaphthalene	ND (1)	ND (0.95)	ND (0.97)	ND (1)	ND (1.9)	ND (9.6)
Acenaphthene	0.036 J	ND (0.95)	ND (0.97)	ND (1)	ND (1.9)	ND (9.6)
Acenaphthylene	ND (0.3)	ND (0.28)	ND (0.29)	ND (0.3)	2.9	ND (9.6)
Aliphatics, C19-C36	ND (50)	ND (48)	ND (48)	ND (48)	ND (97)	ND (96)
Aliphatics, C9-C18	ND (50)	ND (48)	ND (48)	ND (48)	ND (97)	ND (96)
Anthracene	ND (1)	ND (0.95)	ND (0.97)	ND (1)	ND (1.9)	ND (9.6)
Aromatics, C11-C22, adjusted	ND (50)	ND (50)	ND (50)	ND (50)	ND (100)	ND (100)
Aromatics, C11-C22, unadjusted	ND (50)	ND (48)	ND (48)	ND (48)	ND (97)	ND (96)
Benzo(a)anthracene	ND (0.3)	ND (0.28)	ND (0.29)	ND (0.3)	ND (0.58)	ND (9.6)
Benzo(a)pyrene	ND (0.2)	ND (0.19)	ND (0.19)	ND (0.2)	ND (0.39)	ND (9.6)
Benzo(b)fluoranthene	ND (0.3)	ND (0.28)	ND (0.29)	ND (0.3)	ND (0.58)	ND (9.6)
Benzo(g,h,i)Perylene	ND (0.5)	ND (0.47)	ND (0.49)	ND (0.5)	ND (0.97)	ND (9.6)
Benzo(k)fluoranthene	ND (0.3)	ND (0.28)	ND (0.29)	ND (0.3)	ND (0.58)	ND (9.6)
Chrysene	ND (1)	ND (0.95)	ND (0.97)	ND (1)	ND (1.9)	ND (9.6)
Dibenzo(a,h)anthracene	ND (0.5)	ND (0.47)	ND (0.49)	ND (0.5)	ND (0.97)	ND (9.6)
Fluoranthene	ND (1)	ND (0.95)	ND (0.97)	ND (1)	ND (1.9)	ND (9.6)
Fluorene	ND (1)	ND (0.95)	ND (0.97)	ND (1)	ND (1.9)	ND (9.6)
Indeno(1,2,3-cd)Pyrene	ND (0.5)	ND (0.47)	ND (0.49)	ND (0.5)	ND (0.97)	ND (9.6)
Naphthalene	0.11 J	ND (0.95)	0.16 J	0.072 J	7.9	ND (9.6)
Phenanthrene	0.13 J	0.087 J	0.1 J	0.14 J	ND (0.78)	ND (9.6)
Pyrene	ND (5)	ND (4.7)	ND (4.9)	ND (5)	ND (9.7)	ND (9.6)
VPH						
Aliphatics, C5-C8, adjusted	ND (5)	ND (5)	ND (5)	ND (5)	ND (10)	ND (10)
Aliphatics, C5-C8, unadjusted	ND (5)	ND (5)	ND (5)	ND (5)	ND (10)	1.5 J
Aliphatics, C9-C12, adjusted	ND (5)	ND (5)	ND (5)	ND (5)	ND (10)	2.5 J
Aliphatics, C9-C12, unadjusted	ND (5)	ND (5)	ND (5)	ND (5)	ND (10)	2.5 J
Aromatics, C9-C10	ND (5)	ND (5)	ND (5)	ND (5)	ND (10)	ND (10)
Benzene	ND (1)	ND (1)	ND (1)	ND (1)	1.1	1.1
Ethylbenzene	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)
m,p-Xylenes	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)
Methyl tert butyl ether	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)
Naphthalene	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)
o-Xylene	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)
Toluene	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)

Notes:

Concentrations in µg/L.

B - Analyte detected in blank

Open Interval - elevation in feet NGVD; (BR) - Open Interval in bedrock

NA - Not Applicable

DUP - Duplicate Sample

ND (10) - Compound not detected at limit indicated in parentheses.

J - Estimated Value

Table A-3. EPH and VPH Concentrations in Groundwater.

LOCATION:	NE-1	NE-1	NE-1	NE-1	NE-1	NE-1
DATE SAMPLED:	1/7/13	2/6/13	3/5/13	4/16/13	5/8/13	6/6/13
OPEN INTERVAL:	-66 to 45 (BR)	-66 to 45 (BR)	-66 to 45 (BR)	-66 to 45 (BR)	-66 to 45 (BR)	-66 to 45 (BR)
QA TYPE:						
EPH						
2-Methylnaphthalene	ND (9.6)	0.071 J	0.12 J	ND (0.96)	ND (0.98)	ND (0.97)
Acenaphthene	ND (9.6)	ND (0.48)	0.08 J	ND (0.96)	ND (0.98)	ND (0.97)
Acenaphthylene	ND (9.6)	ND (0.29)	ND (0.29)	ND (0.29)	ND (0.29)	ND (0.29)
Aliphatics, C19-C36	ND (96)	ND (98)	ND (100)	ND (49)	ND (48)	ND (48)
Aliphatics, C9-C18	ND (96)	ND (98)	ND (100)	ND (49)	ND (48)	ND (48)
Anthracene	ND (9.6)	ND (0.48)	0.033 J	ND (0.96)	ND (0.98)	ND (0.97)
Aromatics, C11-C22, adjusted	ND (100)	ND (100)	ND (100)	ND (50)	ND (50)	ND (50)
Aromatics, C11-C22, unadjusted	ND (96)	ND (98)	ND (100)	ND (49)	ND (48)	ND (48)
Benzo(a)anthracene	ND (9.6)	ND (0.29)	ND (0.29)	ND (0.29)	ND (0.29)	ND (0.29)
Benzo(a)pyrene	ND (9.6)	ND (0.17)	ND (0.19)	ND (0.19)	ND (0.2)	ND (0.19)
Benzo(b)fluoranthene	ND (9.6)	ND (0.29)	ND (0.29)	ND (0.29)	ND (0.29)	ND (0.29)
Benzo(g,h,i)Perylene	ND (9.6)	ND (0.48)	ND (0.48)	ND (0.48)	ND (0.49)	ND (0.48)
Benzo(k)fluoranthene	ND (9.6)	ND (0.29)	ND (0.29)	ND (0.29)	ND (0.29)	ND (0.29)
Chrysene	ND (9.6)	ND (0.48)	ND (0.96)	ND (0.96)	ND (0.98)	ND (0.97)
Dibenzo(a,h)anthracene	ND (9.6)	ND (0.48)	ND (0.48)	ND (0.48)	ND (0.49)	ND (0.48)
Fluoranthene	ND (9.6)	ND (0.48)	0.087 J	ND (0.96)	ND (0.98)	ND (0.97)
Fluorene	ND (9.6)	ND (0.48)	0.099 J	ND (0.96)	ND (0.98)	ND (0.97)
Indeno(1,2,3-cd)Pyrene	ND (9.6)	ND (0.48)	ND (0.48)	ND (0.48)	ND (0.49)	ND (0.48)
Naphthalene	ND (9.6)	0.11 J B	0.24 J	ND (0.96)	0.068 J	0.068 J
Phenanthrene	ND (9.6)	0.062 J B	0.26 J	0.27 J B	0.11 J B	0.11 J B
Pyrene	ND (9.6)	ND (0.48)	ND (4.8)	ND (4.8)	ND (4.9)	ND (4.8)
VPH						
Aliphatics, C5-C8, adjusted	ND (10)	ND (100)	ND (100)	ND (5)	1.5 J	ND (5)
Aliphatics, C5-C8, unadjusted	2.3 J	1.8 J	1.6 J	2.2 J	2.6 J	2 J
Aliphatics, C9-C12, adjusted	3.1 J	2.7 J	2.8 J	2.9 J	2.9 J	3.7 J
Aliphatics, C9-C12, unadjusted	3.1 J	2.7 J	2.8 J	2.9 J	2.9 J	3.7 J
Aromatics, C9-C10	ND (10)	ND (100)	ND (100)	ND (5)	ND (5)	ND (5)
Benzene	1.2	1.1	1	1	1	1
Ethylbenzene	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)
m,p-Xylenes	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)
Methyl tert butyl ether	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)
Naphthalene	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)
o-Xylene	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)
Toluene	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)

Notes:

Concentrations in µg/L.

Open Interval - elevation in feet NGVD; (BR) - Open Interval in bedrock

NA - Not Applicable

DUP - Duplicate Sample

ND (10) - Compound not detected at limit indicated in parentheses.

J - Estimated Value

B - Analyte detected in blank

Table A-3. EPH and VPH Concentrations in Groundwater.

LOCATION:	NE-1	NE-1	NE-1
DATE SAMPLED:	7/23/13	8/16/13	9/10/13
OPEN INTERVAL:	-66 to 45 (BR)	-66 to 45 (BR)	-66 to 45 (BR)
QA TYPE:			
EPH			
2-Methylnaphthalene	ND (0.96)	ND (0.96)	ND (0.97)
Acenaphthene	ND (0.96)	ND (0.96)	ND (0.97)
Acenaphthylene	ND (0.29)	ND (0.29)	ND (0.29)
Aliphatics, C19-C36	ND (48)	ND (48)	ND (48)
Aliphatics, C9-C18	ND (48)	ND (48)	ND (48)
Anthracene	ND (0.96)	ND (0.96)	ND (0.97)
Aromatics, C11-C22, adjusted	ND (50)	ND (50)	ND (50)
Aromatics, C11-C22, unadjusted	ND (48)	ND (48)	ND (48)
Benzo(a)anthracene	ND (0.29)	ND (0.29)	ND (0.29)
Benzo(a)pyrene	ND (0.19)	ND (0.19)	ND (0.19)
Benzo(b)fluoranthene	ND (0.29)	ND (0.29)	ND (0.29)
Benzo(g,h,i)Perylene	ND (0.48)	ND (0.48)	ND (0.48)
Benzo(k)fluoranthene	ND (0.29)	ND (0.29)	ND (0.29)
Chrysene	ND (0.96)	ND (0.96)	ND (0.97)
Dibenzo(a,h)anthracene	ND (0.48)	ND (0.48)	ND (0.48)
Fluoranthene	ND (0.96)	ND (0.96)	ND (0.97)
Fluorene	ND (0.96)	ND (0.96)	ND (0.97)
Indeno(1,2,3-cd)Pyrene	ND (0.48)	ND (0.48)	ND (0.48)
Naphthalene	ND (0.96)	0.09 J	0.1 JB
Phenanthrene	0.13 J B	0.082 J	ND (0.39)
Pyrene	ND (4.8)	ND (4.8)	ND (4.8)
VPH			
Aliphatics, C5-C8, adjusted	ND (5)	1.6 J	ND (5)
Aliphatics, C5-C8, unadjusted	2.5 J	2.7 J	2 J
Aliphatics, C9-C12, adjusted	2.9 J	2.9 J	2.8 J
Aliphatics, C9-C12, unadjusted	2.9 J	2.9 J	2.8 J
Aromatics, C9-C10	ND (5)	ND (5)	ND (5)
Benzene	1.1	1.1	1.1
Ethylbenzene	ND (1)	ND (1)	ND (1)
m,p-Xylenes	ND (2)	ND (2)	ND (2)
Methyl tert butyl ether	ND (1)	ND (1)	ND (1)
Naphthalene	ND (1)	ND (1)	ND (1)
o-Xylene	ND (1)	ND (1)	ND (1)
Toluene	ND (1)	ND (1)	ND (1)

Notes:

Concentrations in µg/L.

B - Analyte detected in blank

Open Interval - elevation in feet NGVD; (BR) - Open Interval in bedrock

NA - Not Applicable

DUP - Duplicate Sample

ND (10) - Compound not detected at limit indicated in parentheses.

J - Estimated Value

ATTACHMENT B

DIFFUSIVE SUB-RIVER SAMPLING FORM

Diffusive Sub-River Sampling

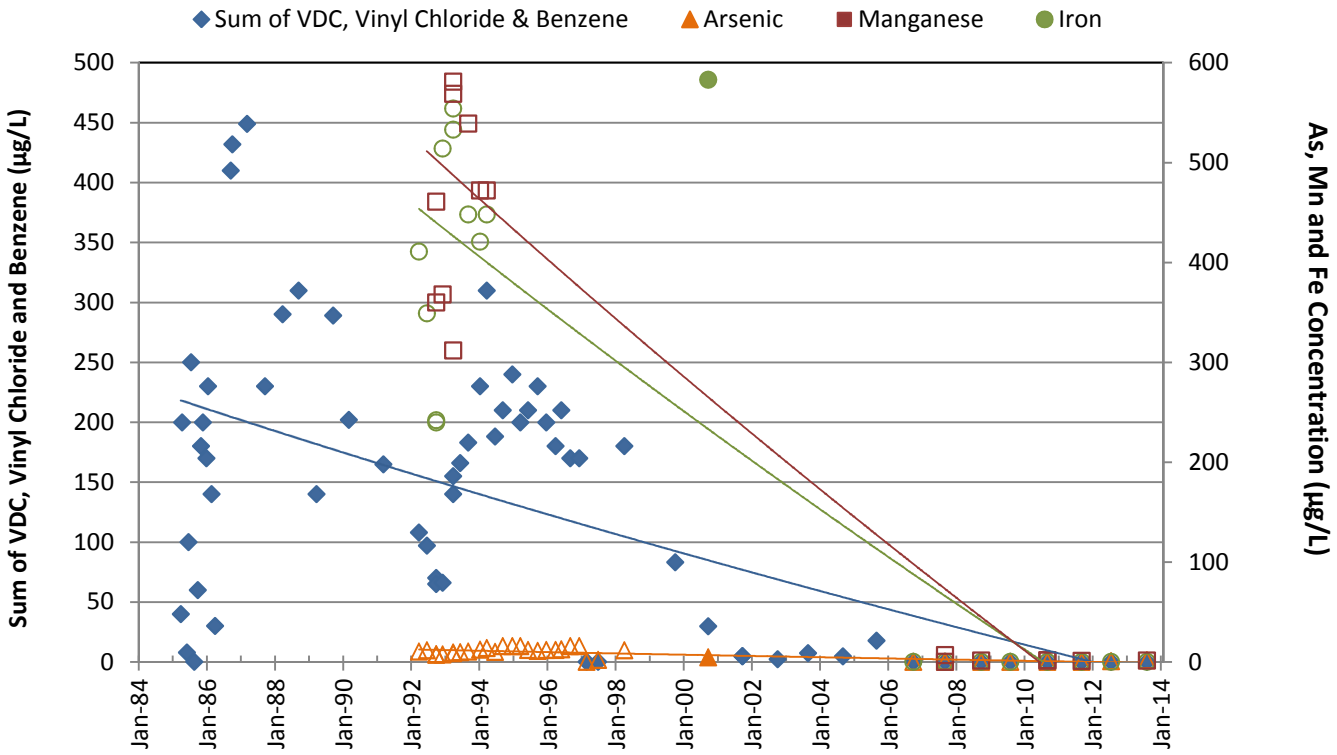
Transect # **ASBRV-T6**	Description of Transect Location: Located between a 90-degree bend in river to west (upstream) and gentle curve to northeast (downstream). Site (west) end of T-6 is in grassy, marshy area. House on opposite bank.
Width of River (ft): 68.30	Depth of Piezometer Screen Bottom in Riverbed: 1.91

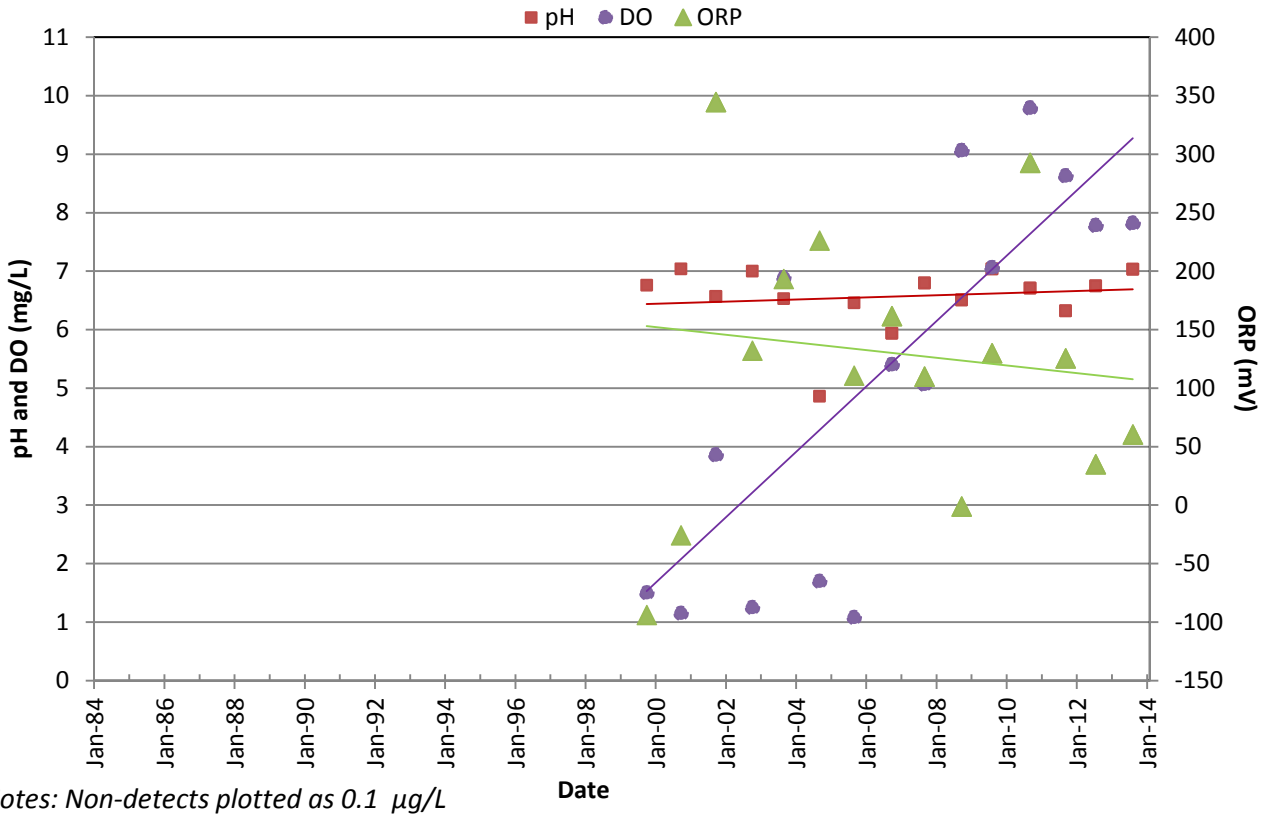
Installation	Date: 8/7/2013	Flow	**Removal**	Date: 9/6/2013	Flow	**Add'l measurement:**	Date NA	Flow
DTW inside Piezometer	1.8	Rate	DTW inside Piezometer	2.24	Rate	DTW inside Piezometer	NA	Rate
DTW outside Piezometer	2.08	38 cfs	DTW outside Piezometer	2.3	35 cfs	DTW outside Piezometer	NA	cfs

Sample Number	Time of Placement	Time of Removal	Distance from West Riverbank (ft)	Water Depth (ft) on	Water Depth (ft) on	Sediment Description	Notes
TR-6A	10:58	8:45	17.00	1.45	1.10	sand, cobbles	1/4 across transect
TR-6B	11:02	8:50	22.50	1.35	1.18	sand, cobbles	1/3 across transect
TR-6C	NA	NA	NA	NA	NA	NA	1/2 across transect
TR-6D	NA	NA	NA	NA	NA	NA	2/3 across transect

ATTACHMENT C

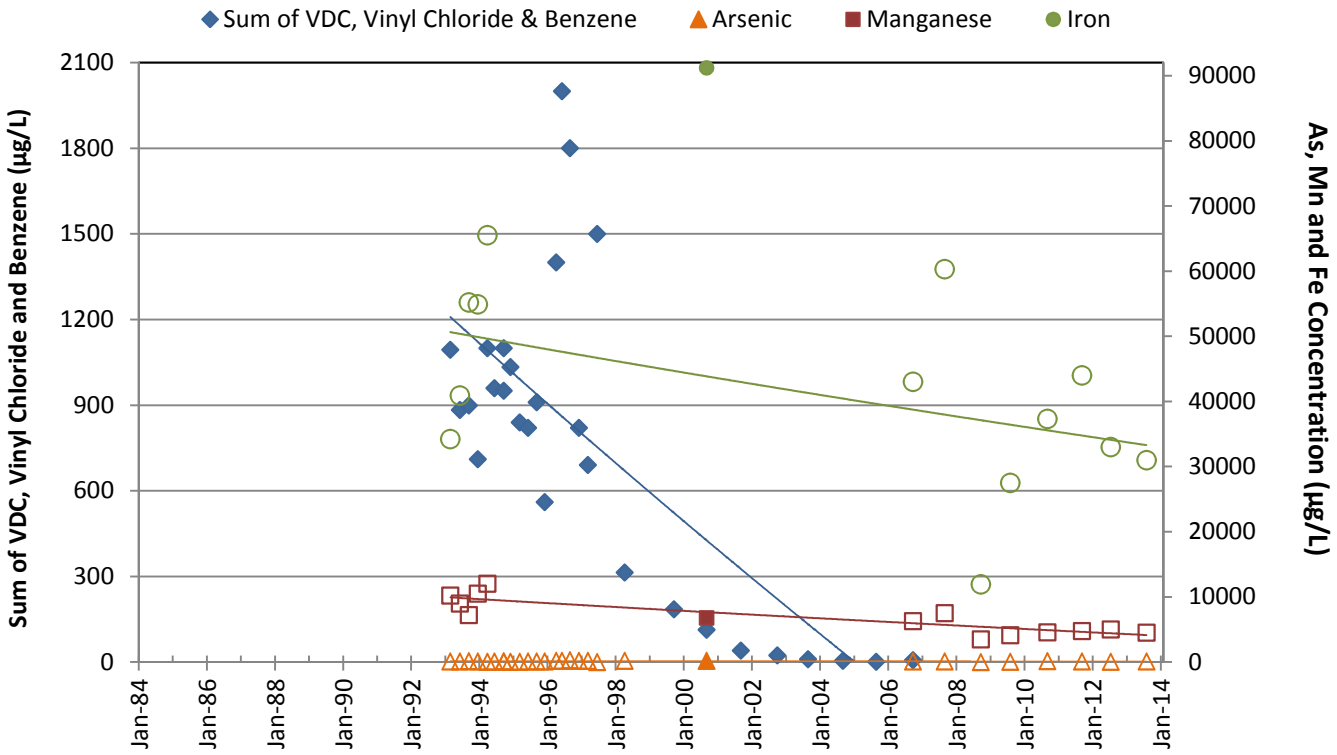
GEOCHEMISTRY VERSUS TIME GRAPHS

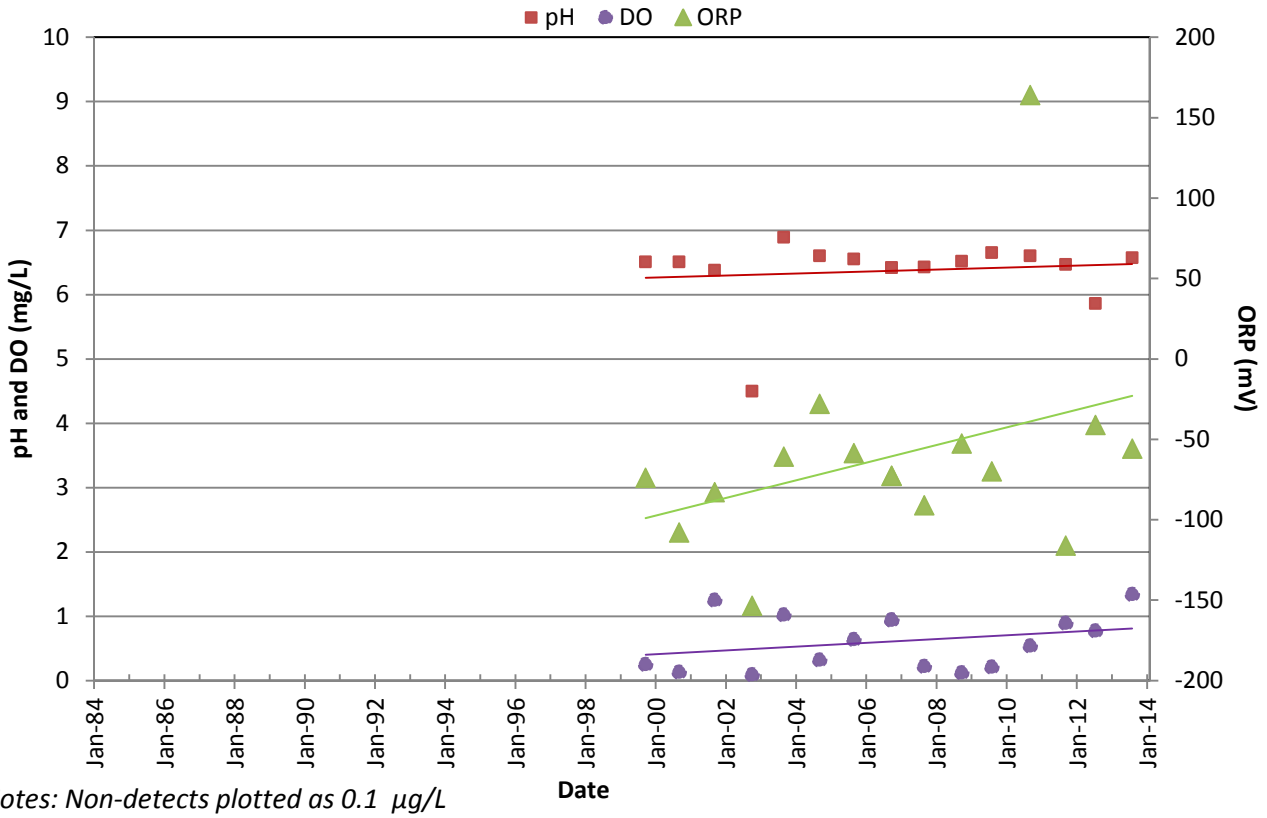




Notes: Non-detects plotted as 0.1 µg/L
Open symbols are dissolved concentrations; solid symbols are total concentrations.

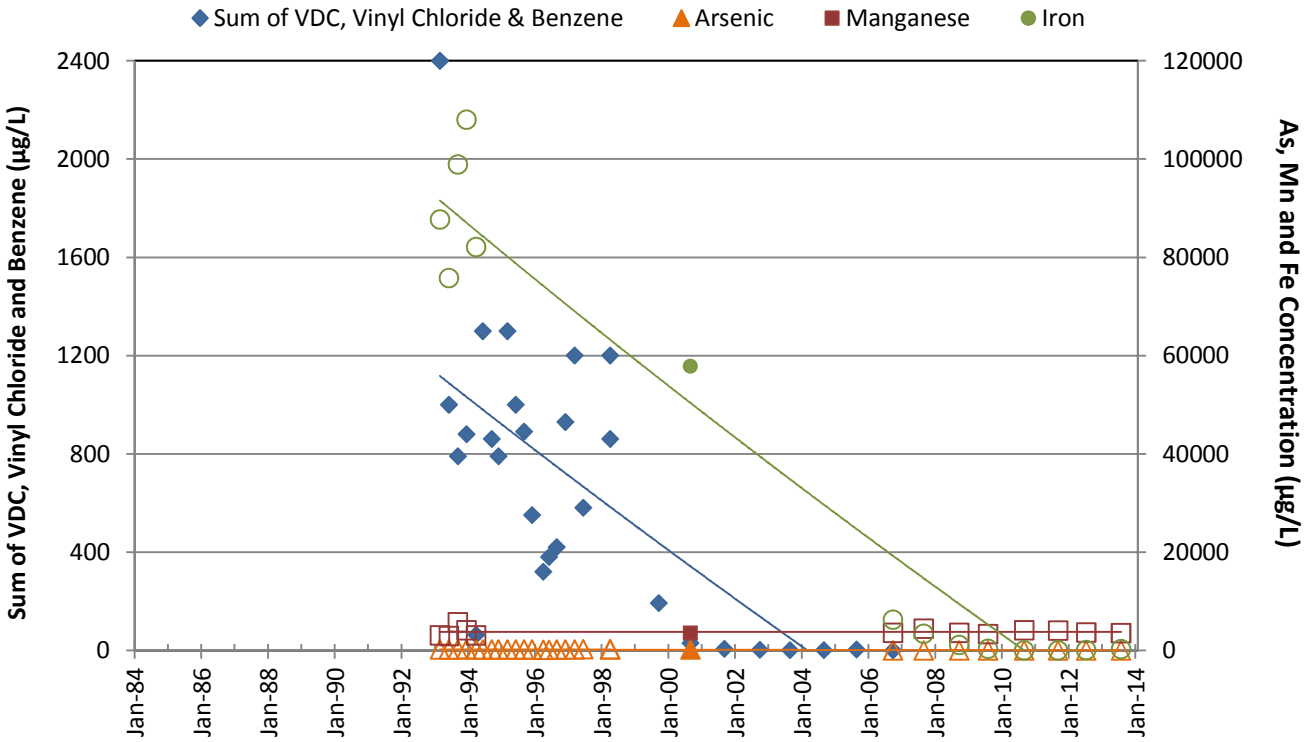
AR-21

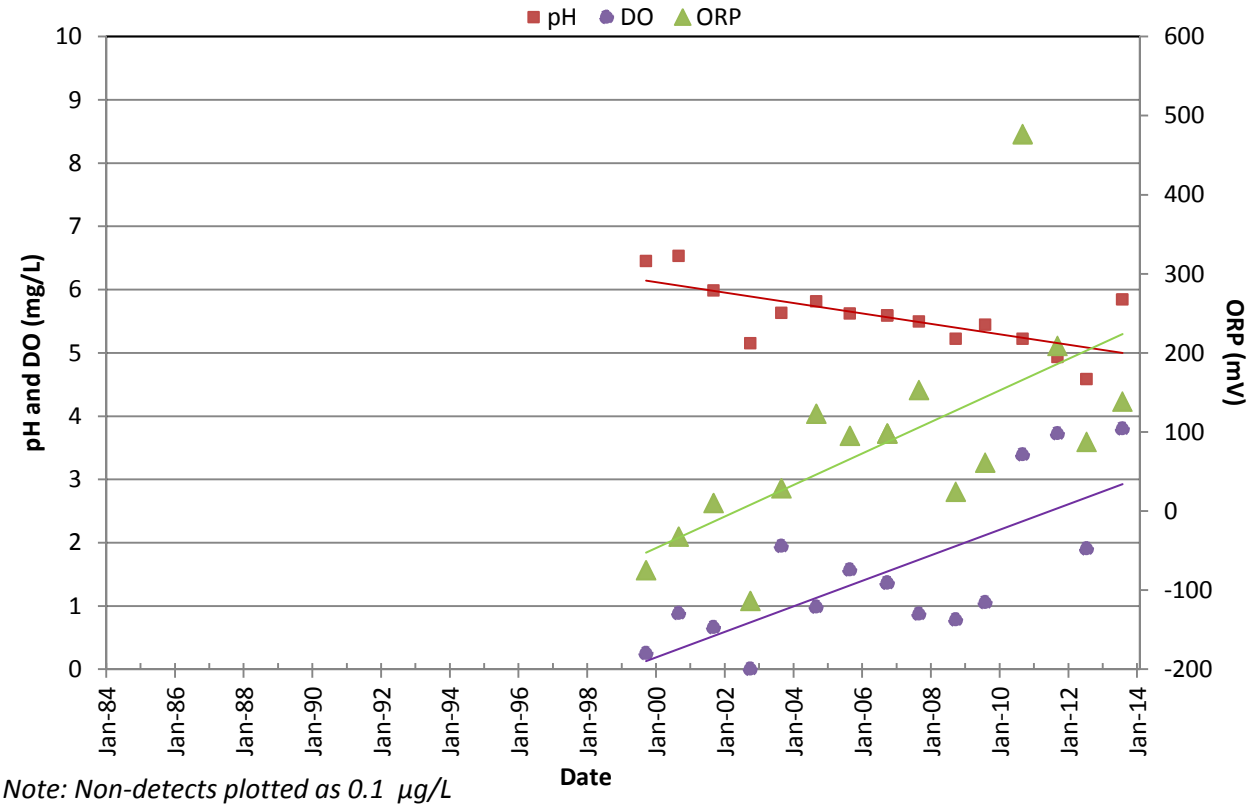




Notes: Non-detects plotted as 0.1 µg/L
Open symbols are dissolved concentrations; solid symbols are total concentrations.

B-08C

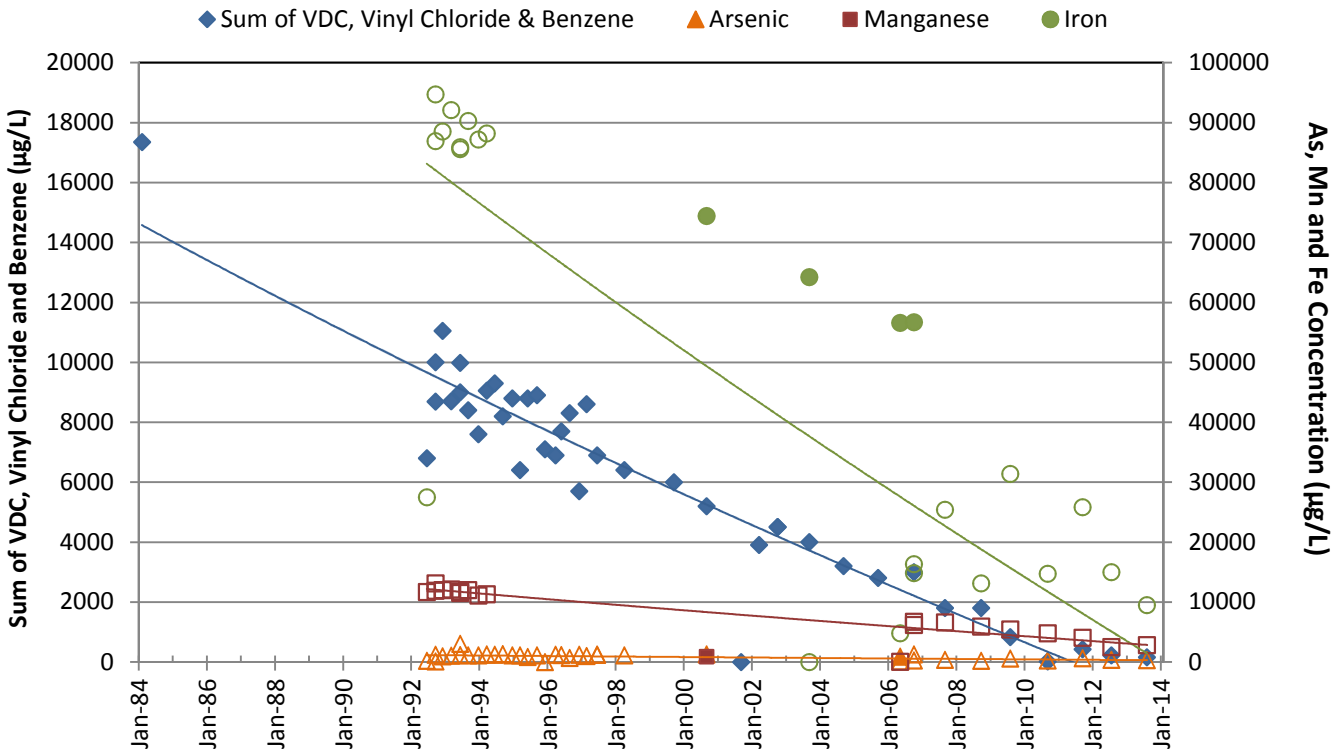


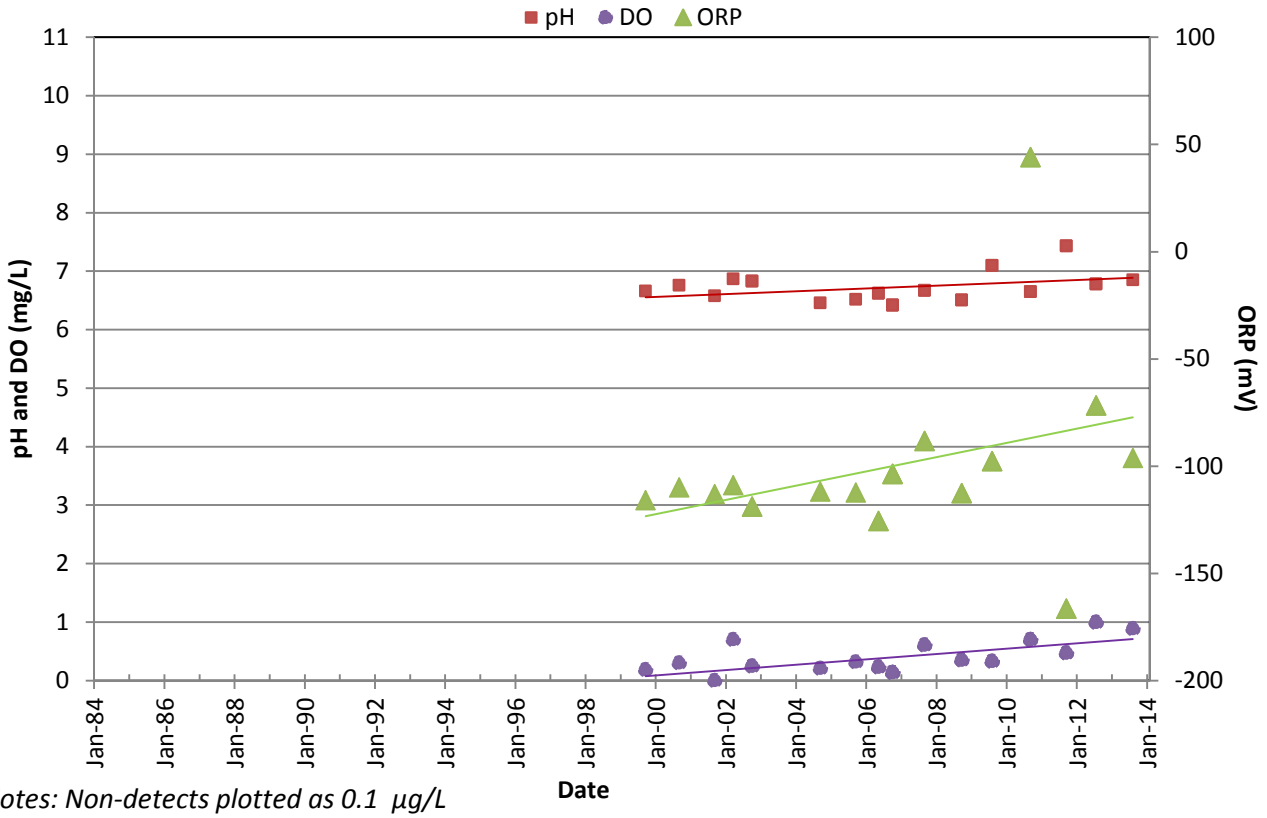


Note: Non-detects plotted as 0.1 µg/L

Open symbols are dissolved concentrations; solid symbols are total concentrations.

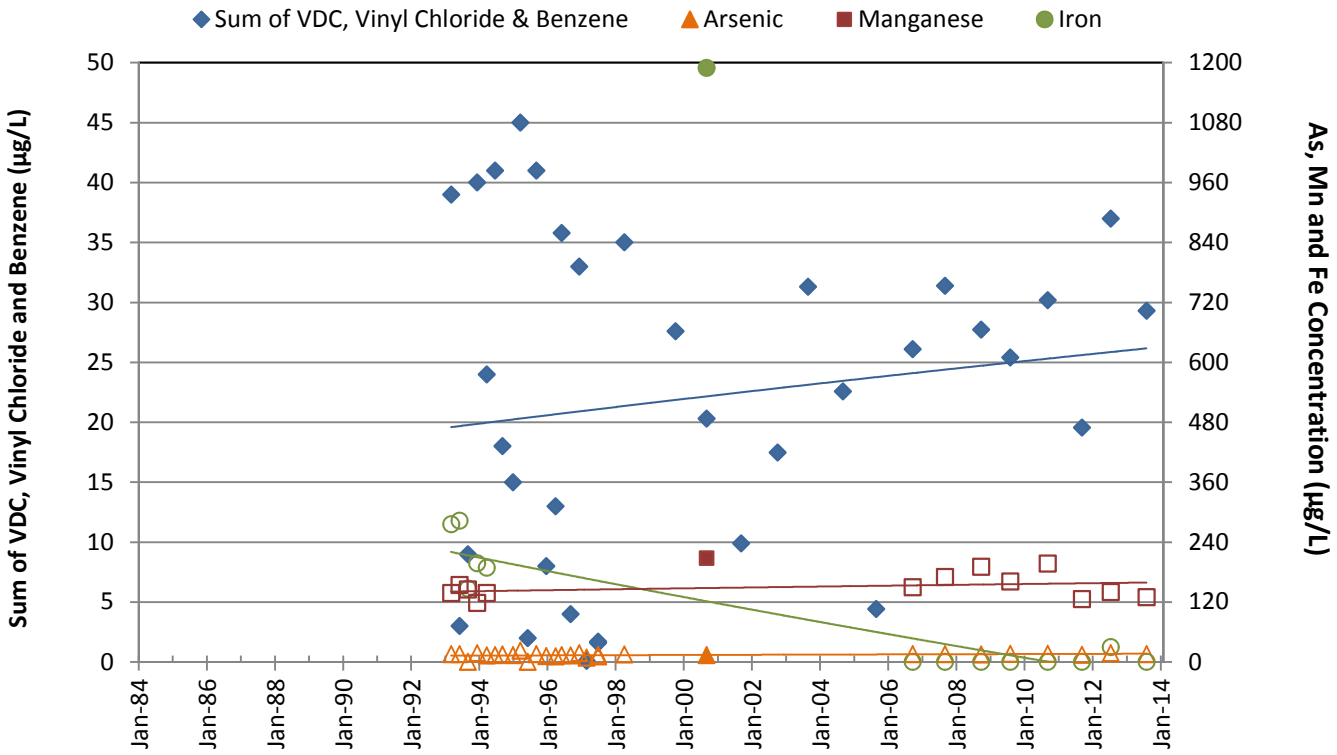
B-08D

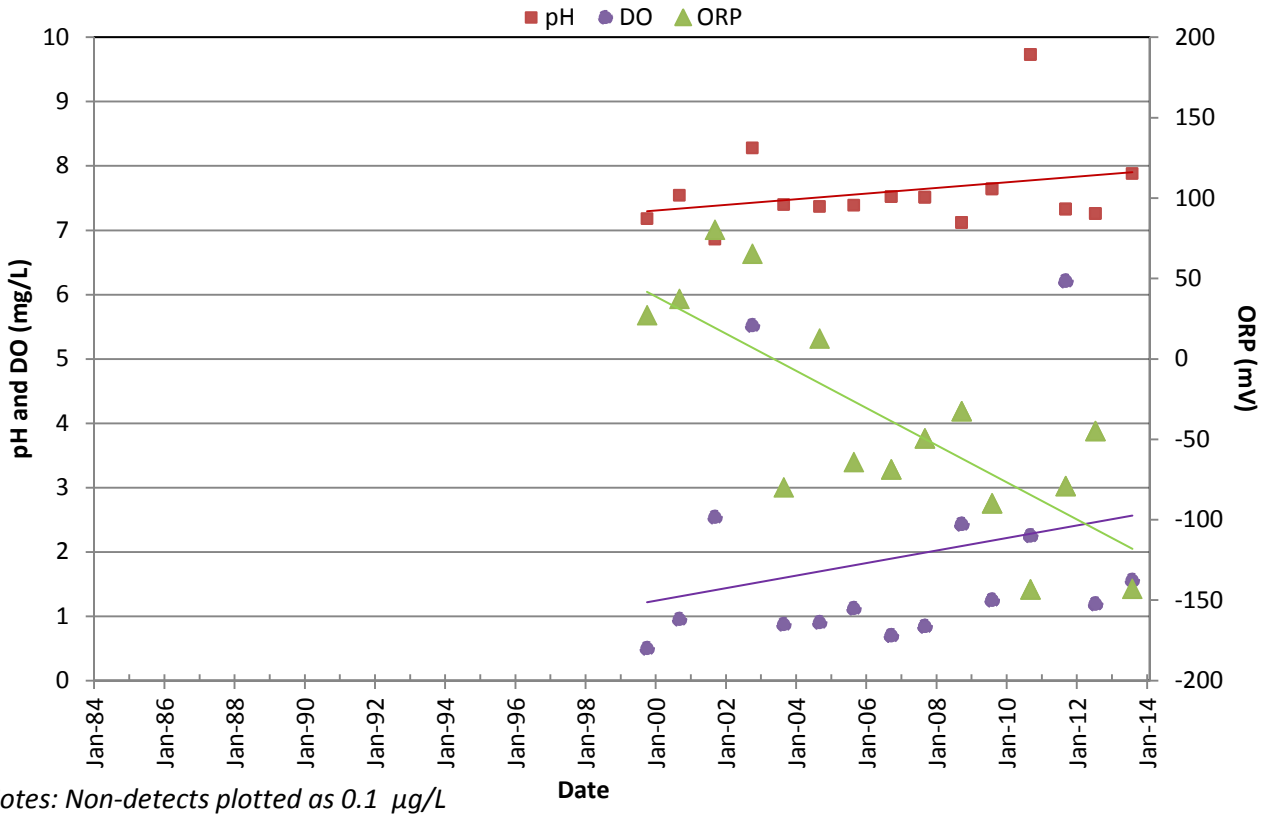




Notes: Non-detects plotted as 0.1 µg/L
Open symbols are dissolved concentrations; solid symbols are total concentrations.

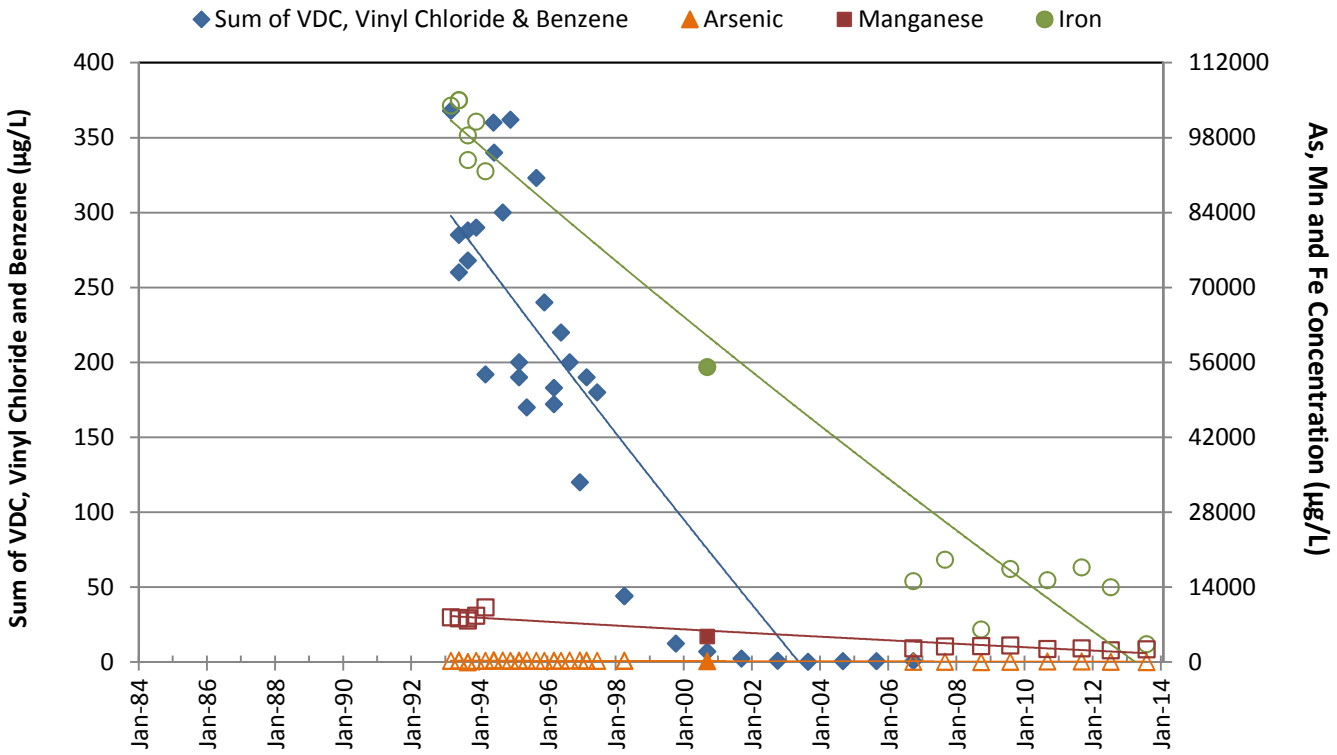
LF-06C

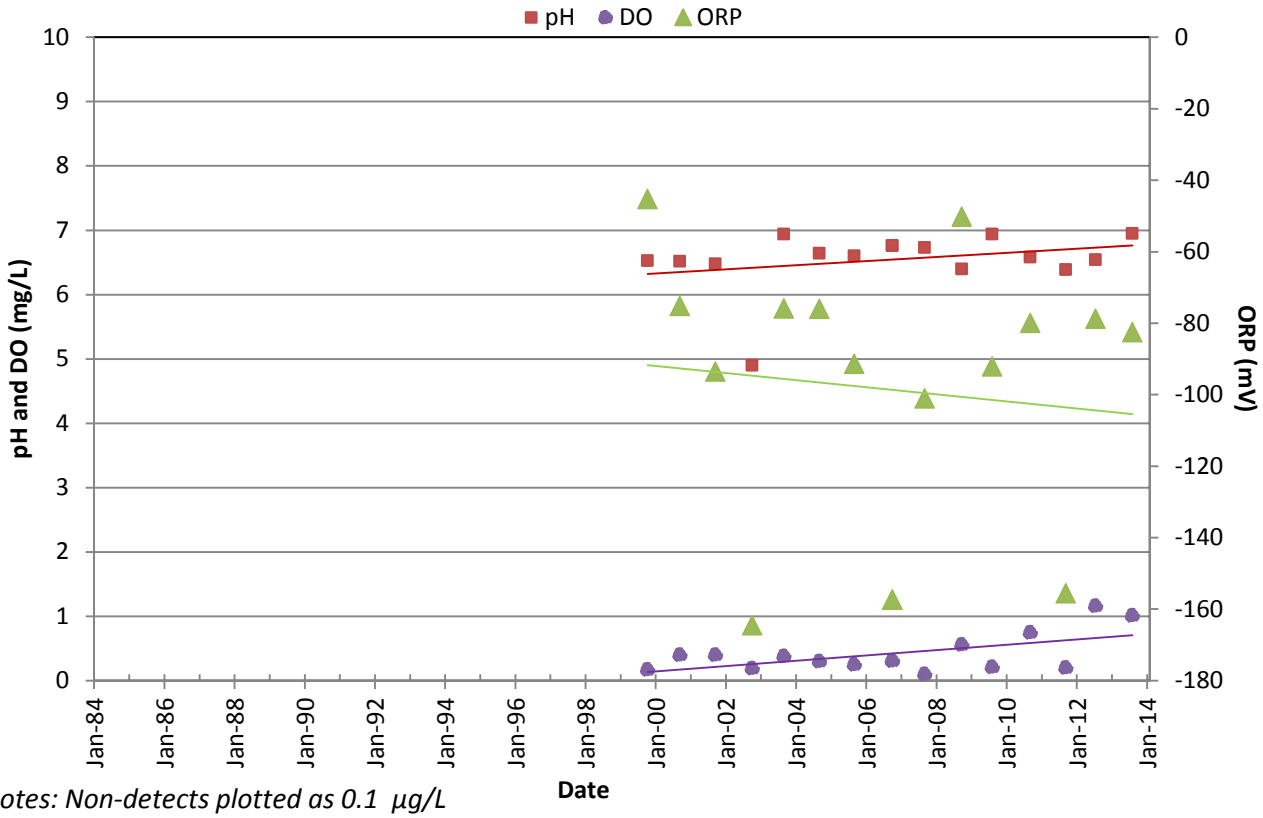




Notes: Non-detects plotted as 0.1 µg/L
Open symbols are dissolved concentrations; solid symbols are total concentrations.

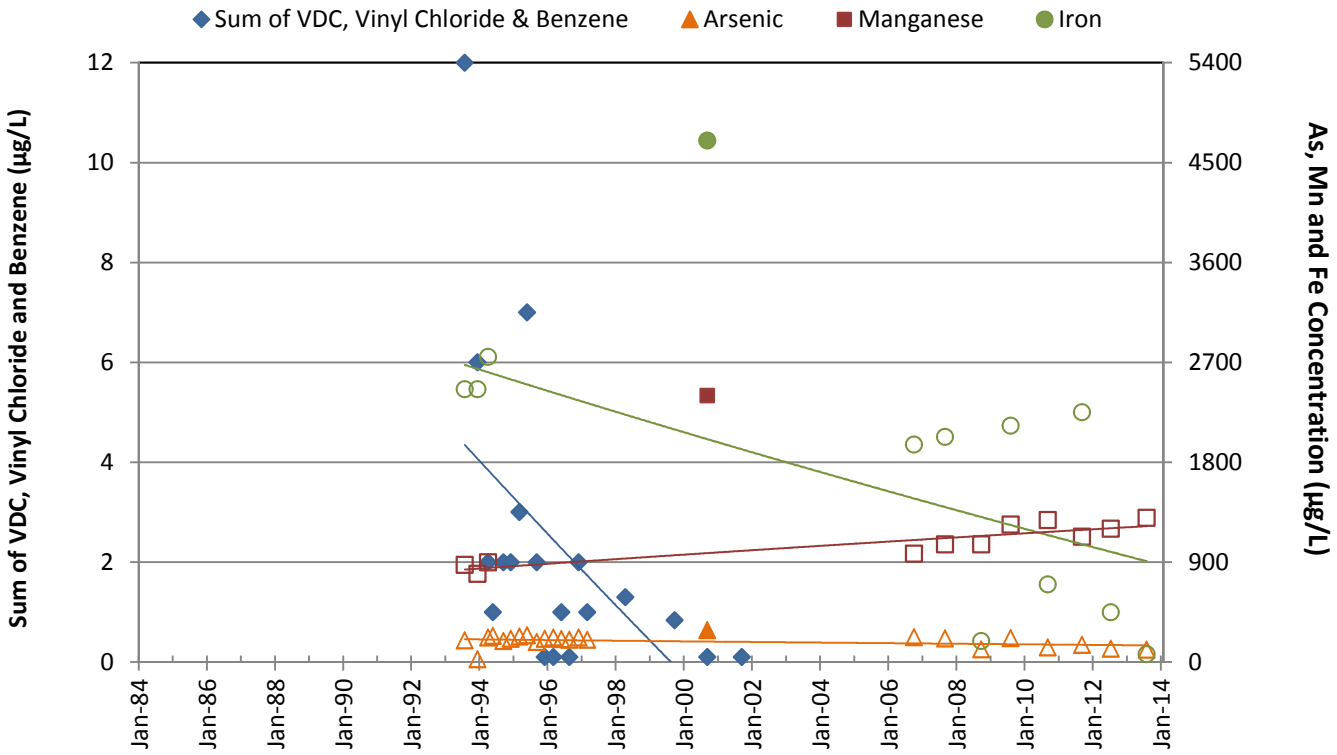
LF-12

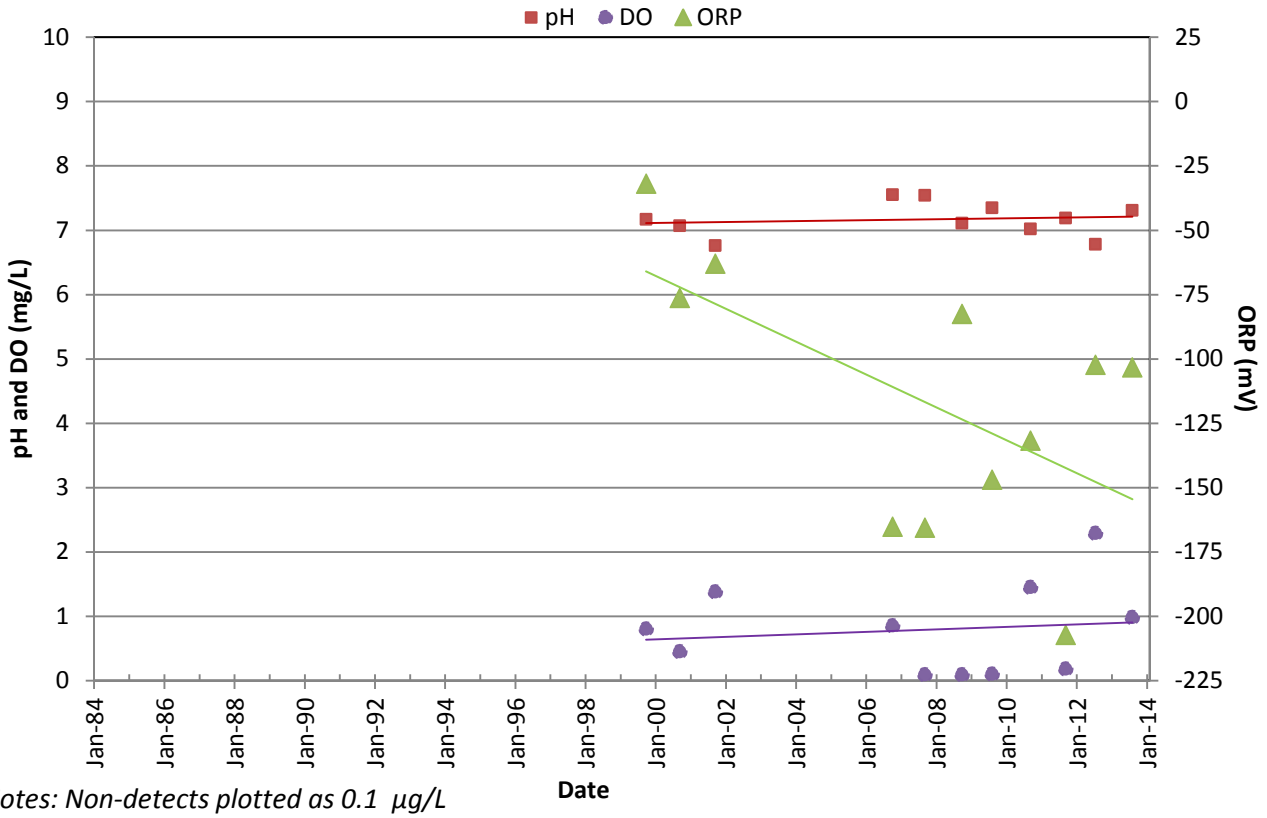




Notes: Non-detects plotted as 0.1 µg/L
Open symbols are dissolved concentrations; solid symbols are total concentrations.

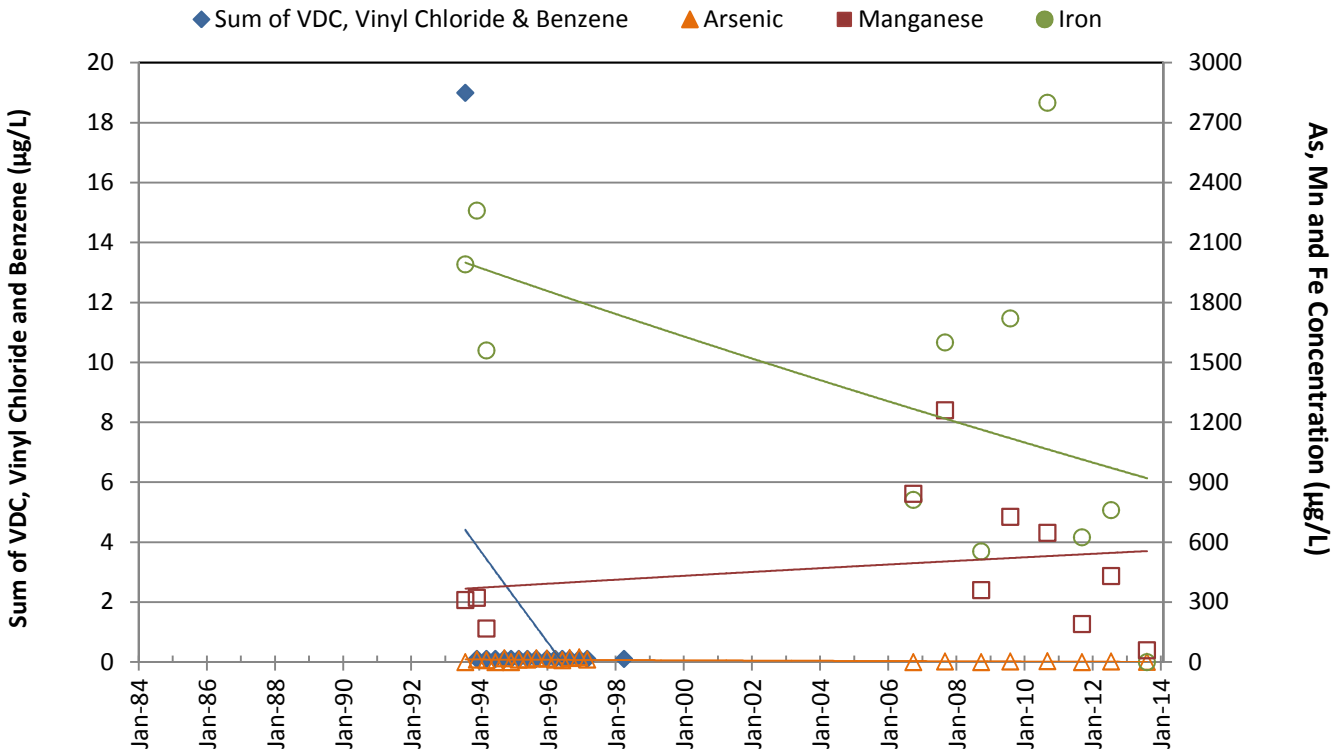
LF-15

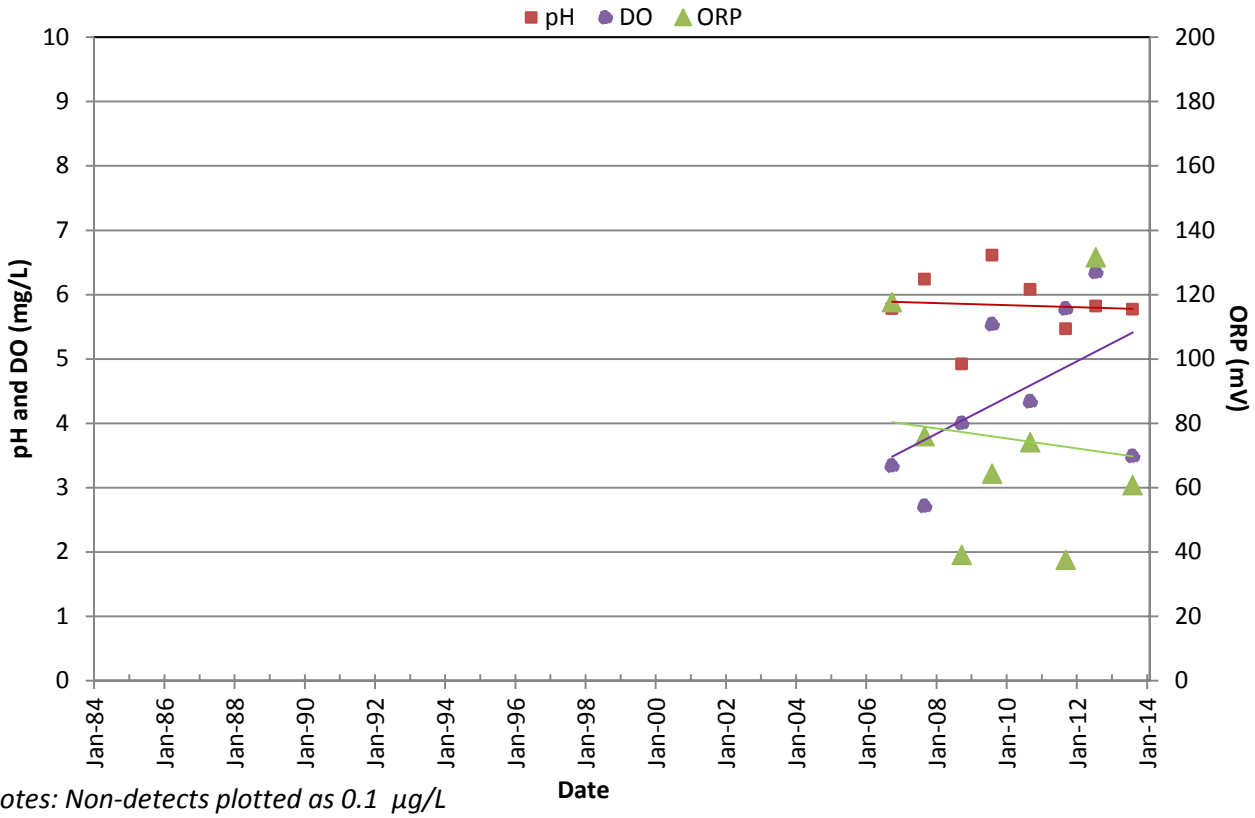




Notes: Non-detects plotted as 0.1 µg/L
Open symbols are dissolved concentrations; solid symbols are total concentrations.

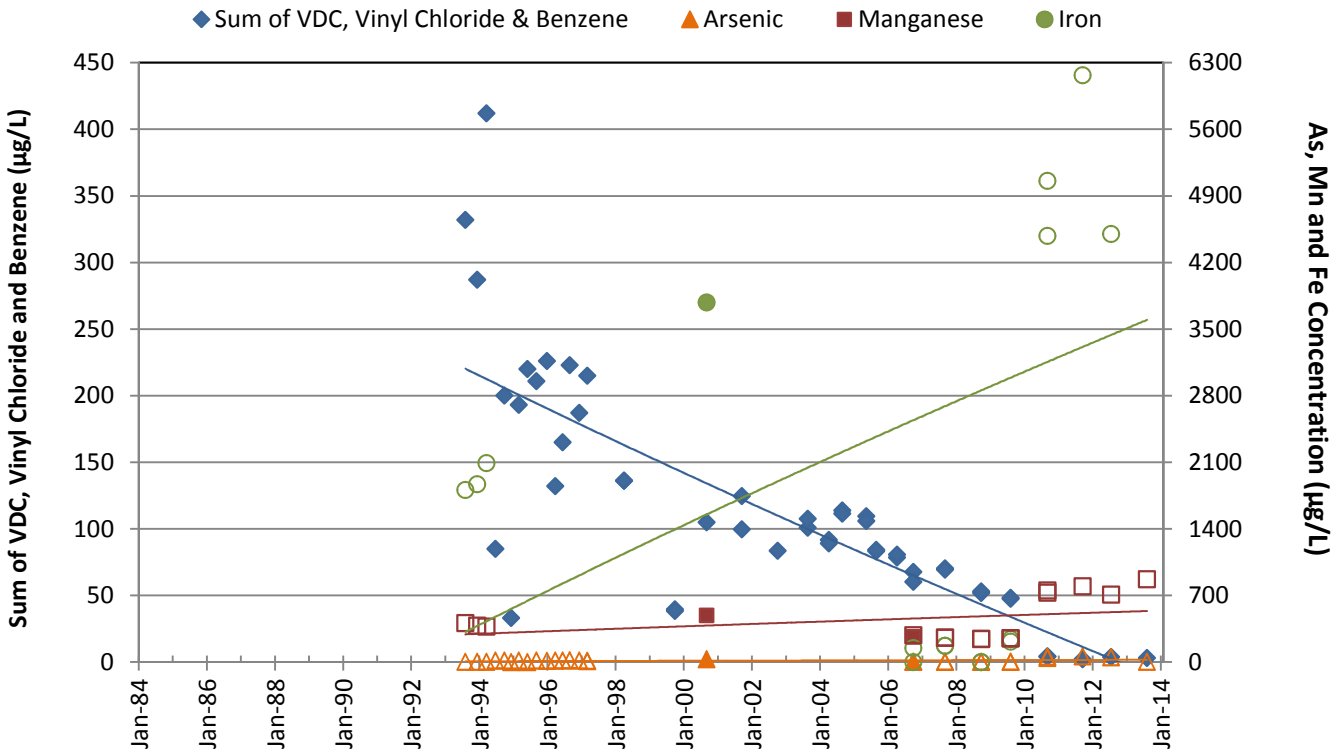
OSA-01B

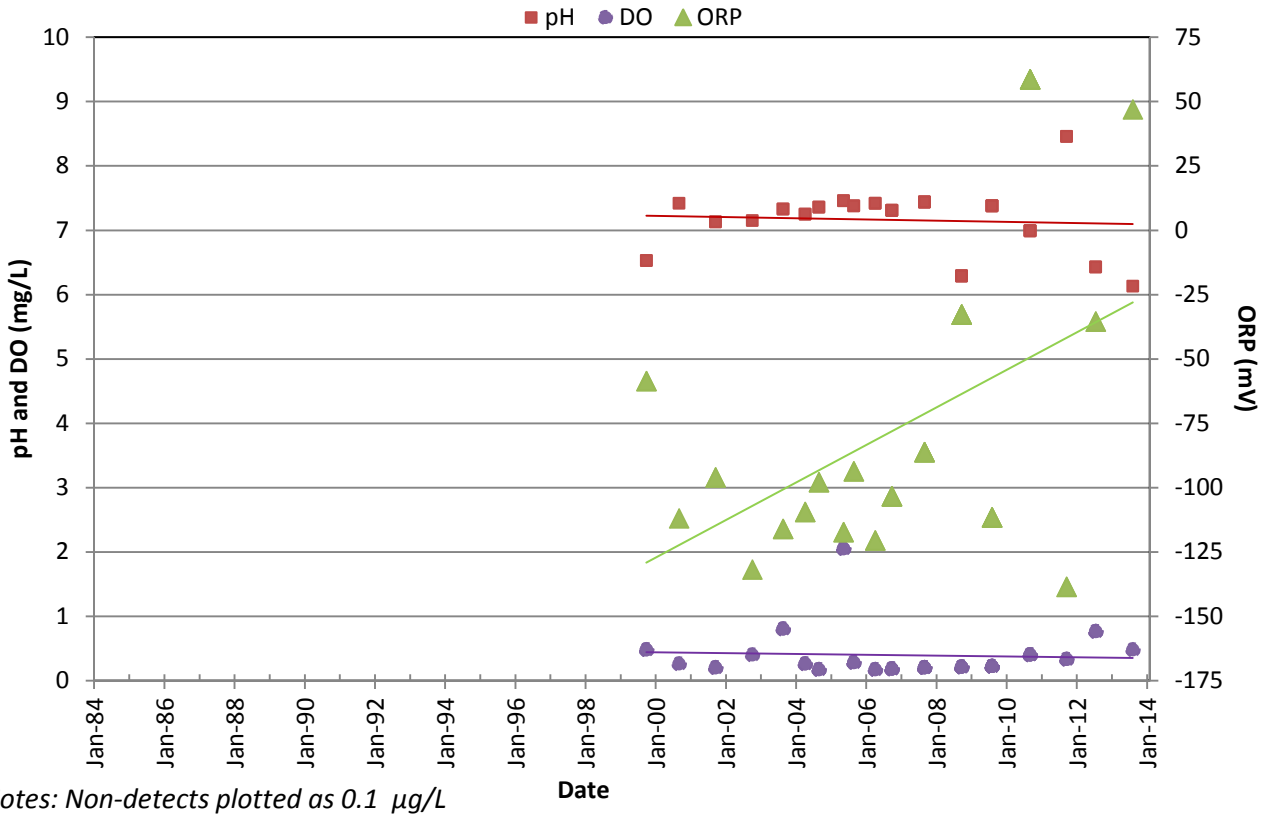




Notes: Non-detects plotted as 0.1 µg/L
Open symbols are dissolved concentrations; solid symbols are total concentrations.

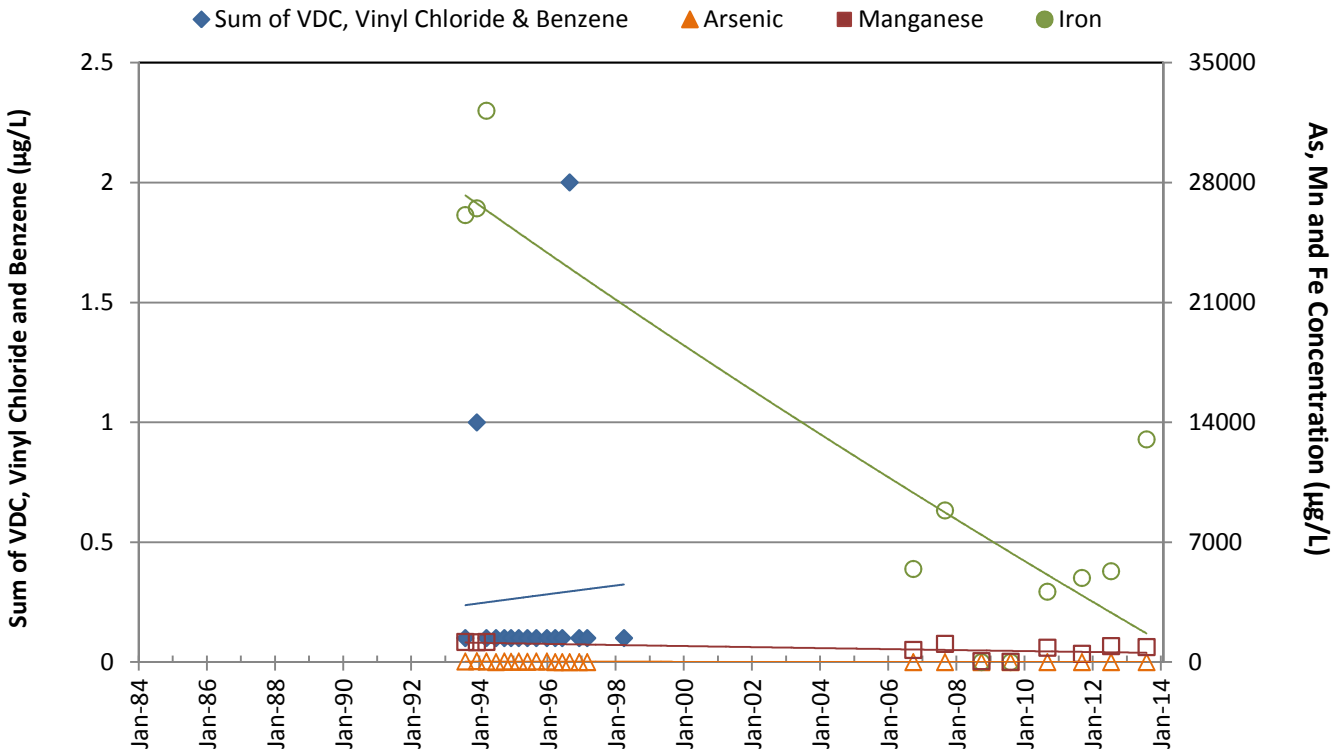
OSA-05A

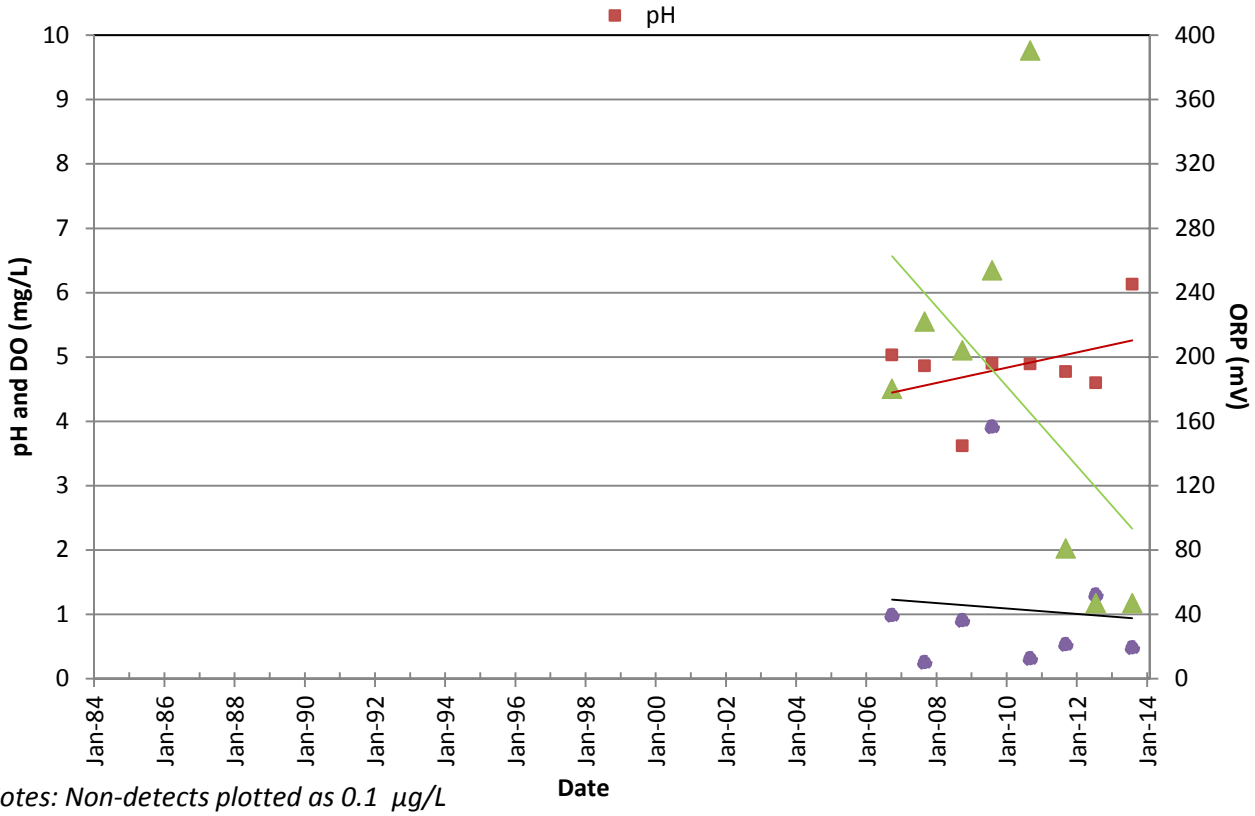




Notes: Non-detects plotted as 0.1 µg/L
Open symbols are dissolved concentrations; solid symbols are total concentrations.

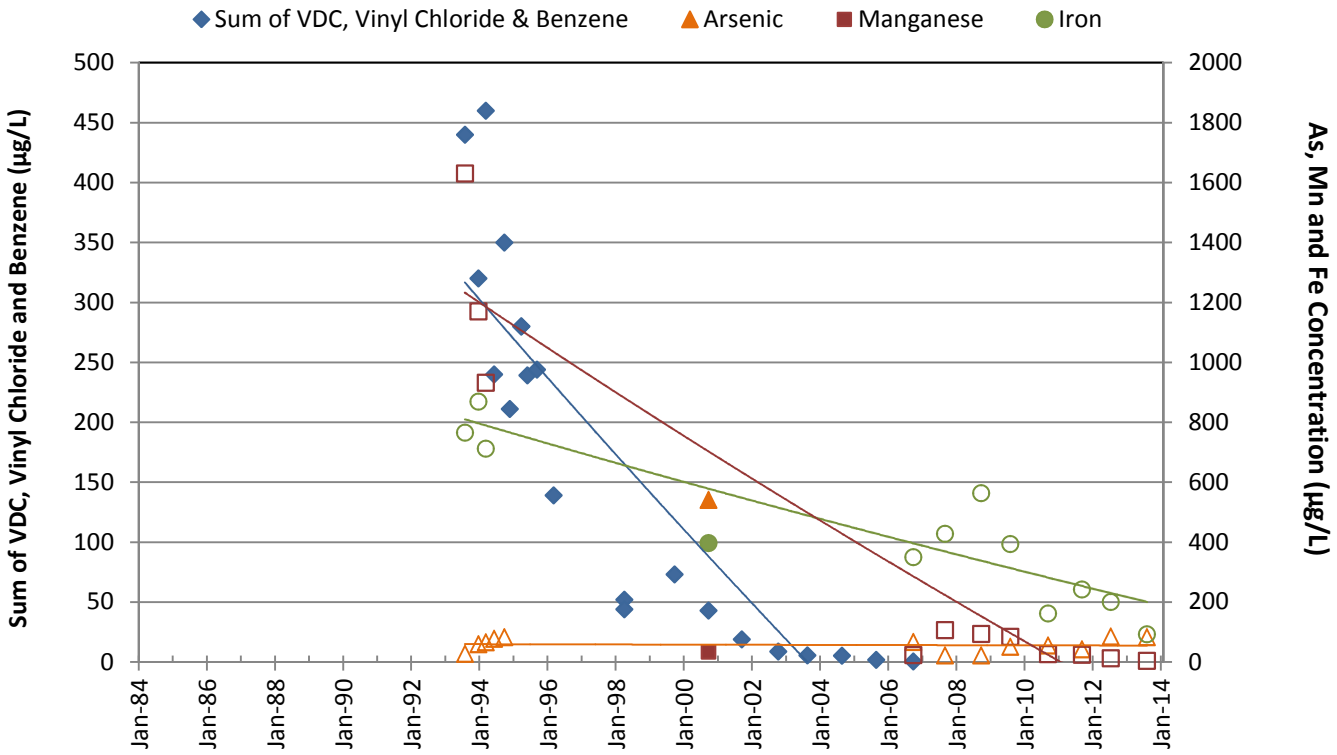
OSA-06BR

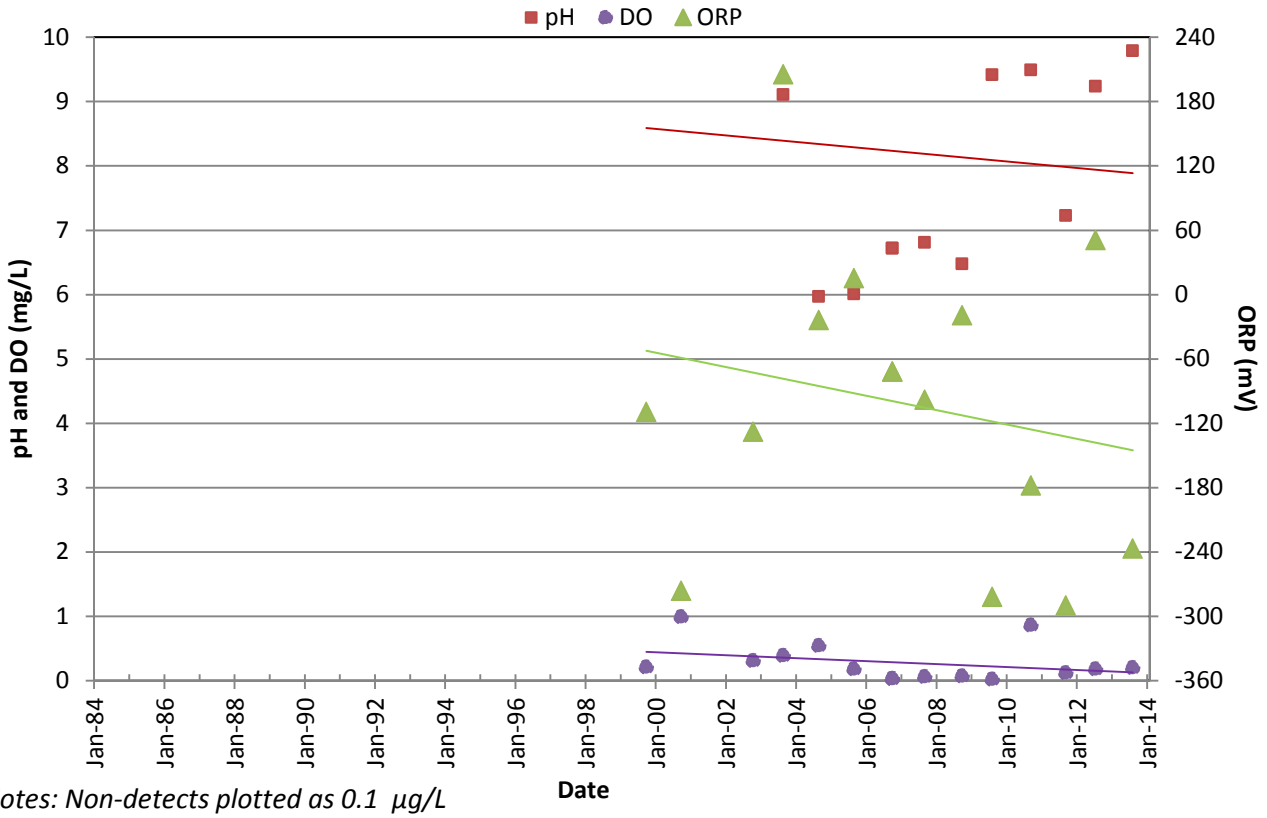




Notes: Non-detects plotted as 0.1 µg/L
Open symbols are dissolved concentrations; solid symbols are total concentrations.

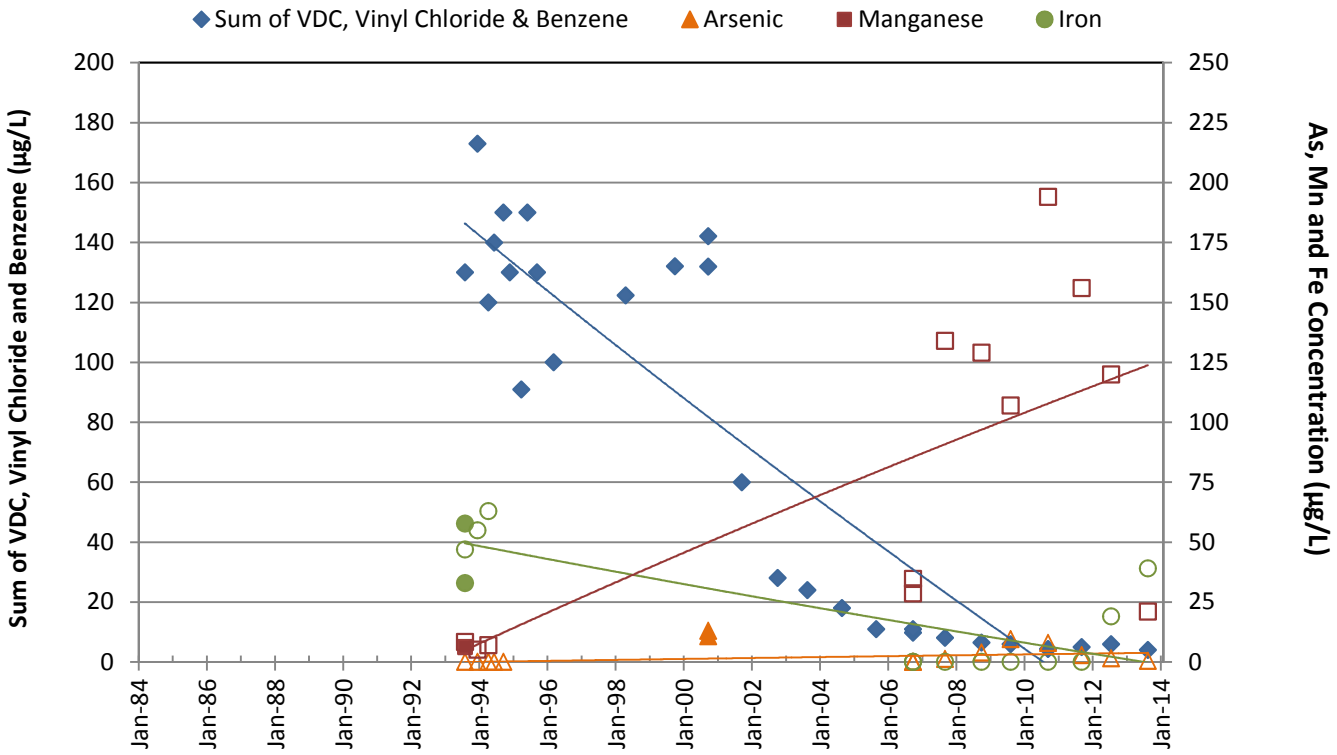
OSA-07A

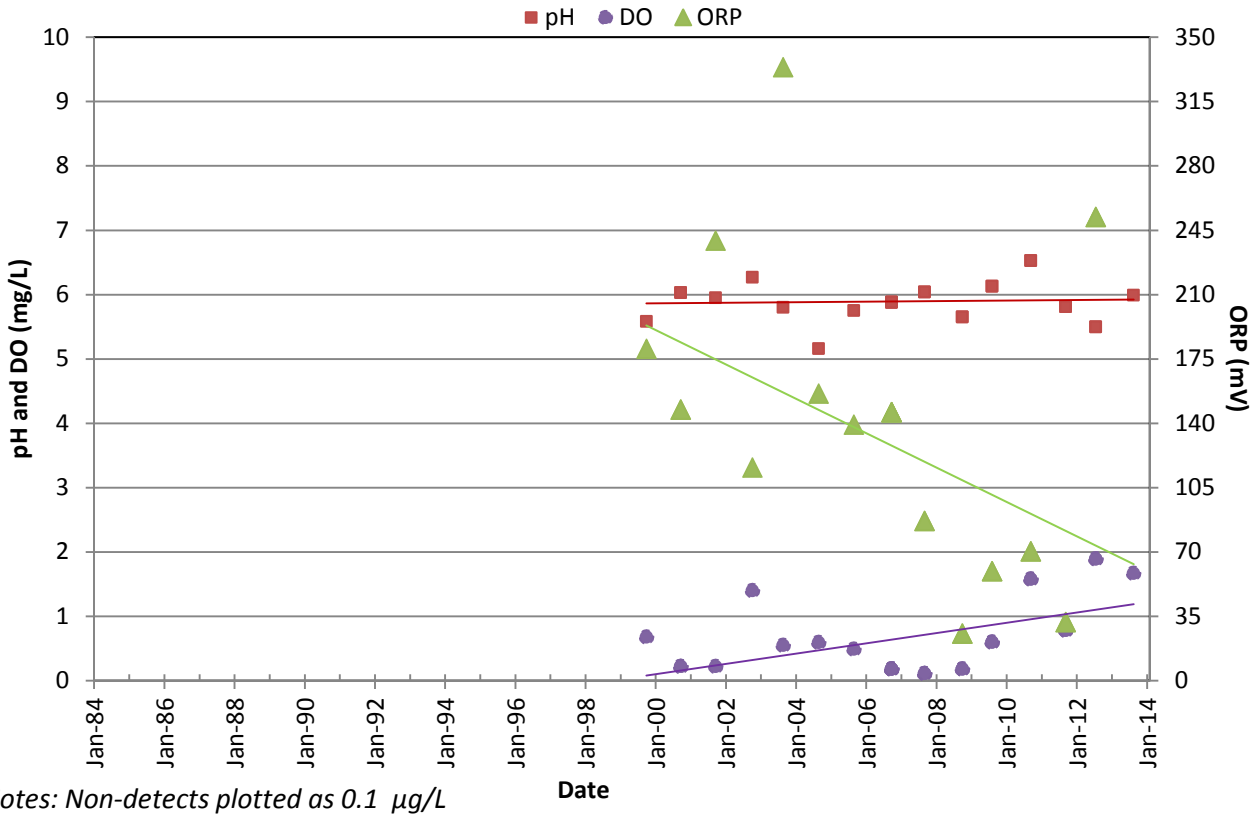




Notes: Non-detects plotted as 0.1 µg/L
Open symbols are dissolved concentrations; solid symbols are total concentrations.

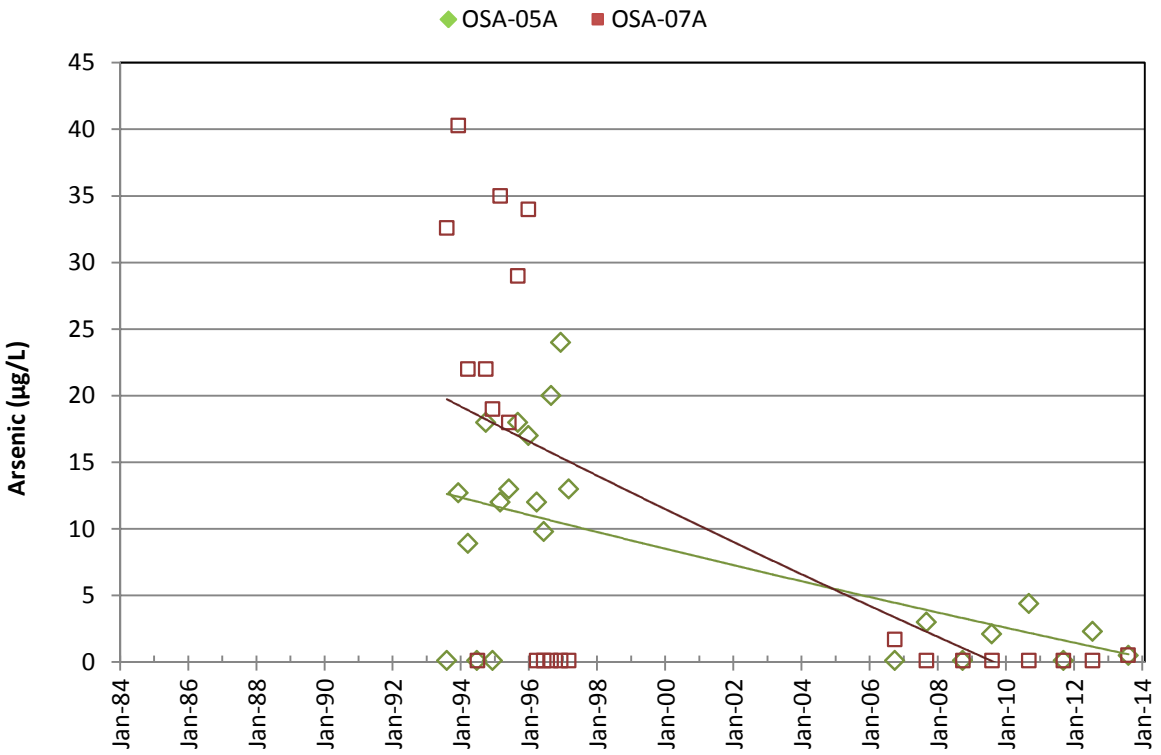
OSA-09B

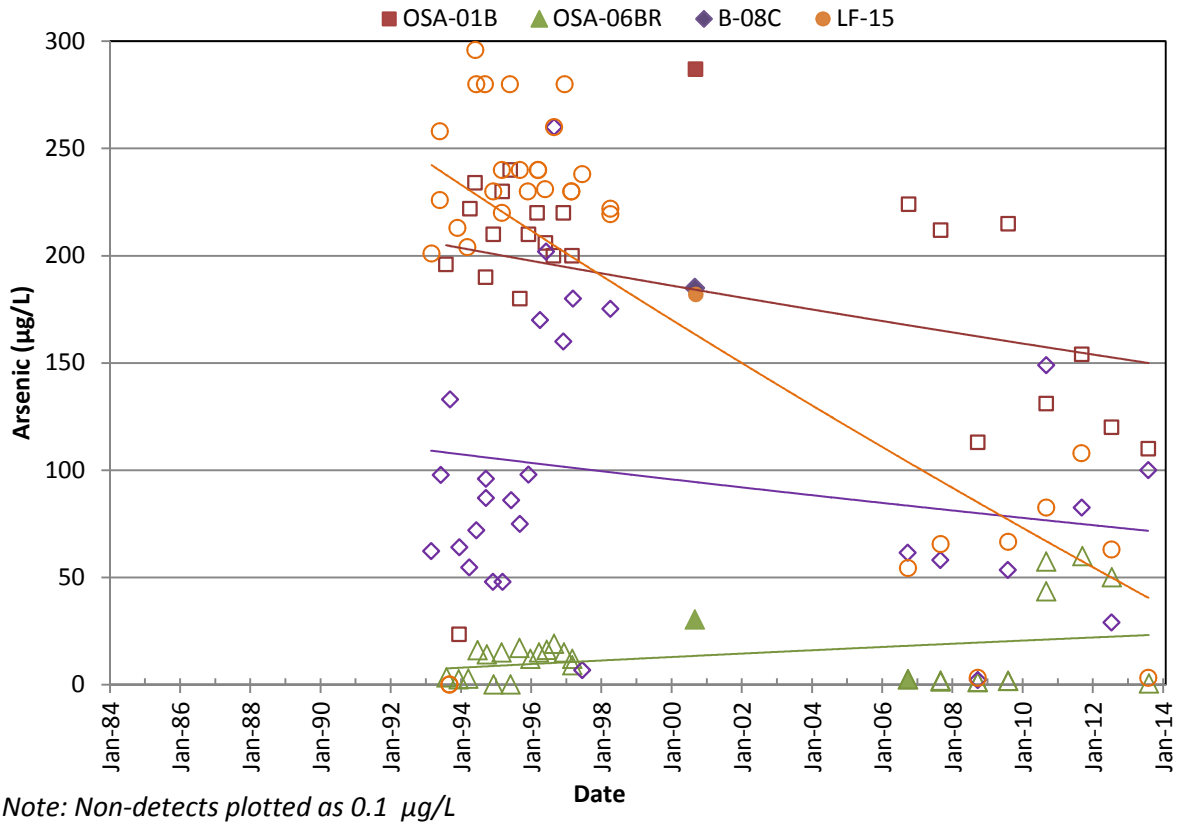




Notes: Non-detects plotted as 0.1 µg/L
Open symbols are dissolved concentrations; solid symbols are total concentrations.

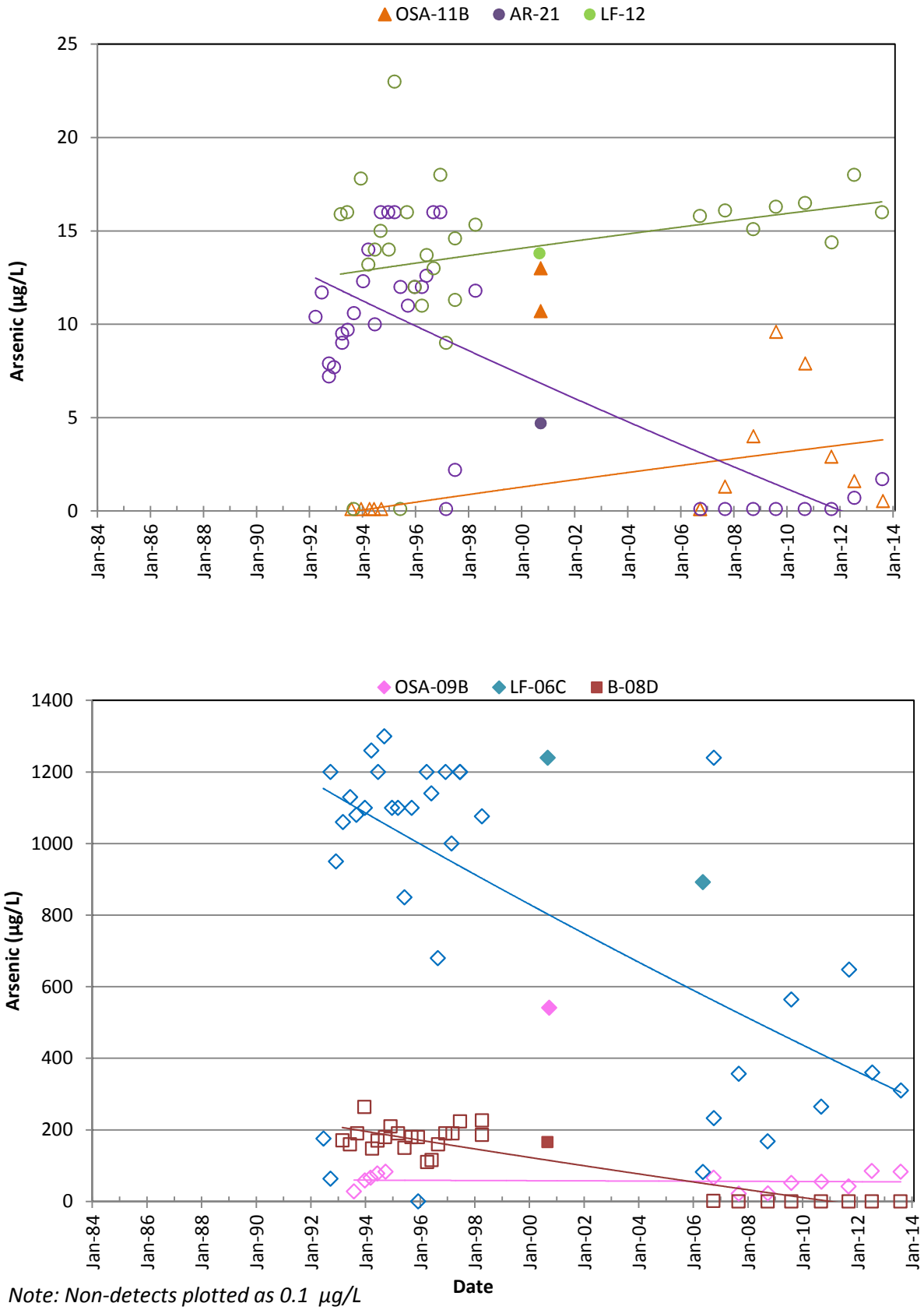
OSA-11B





Note: Non-detects plotted as 0.1 µg/L
Open symbols are dissolved concentrations; Solid symbols are total concentrations.

Arsenic Concentrations in OSA-05A, OSA-07A, OSA-01B, OSA-06BR, B-08C, and LF-15



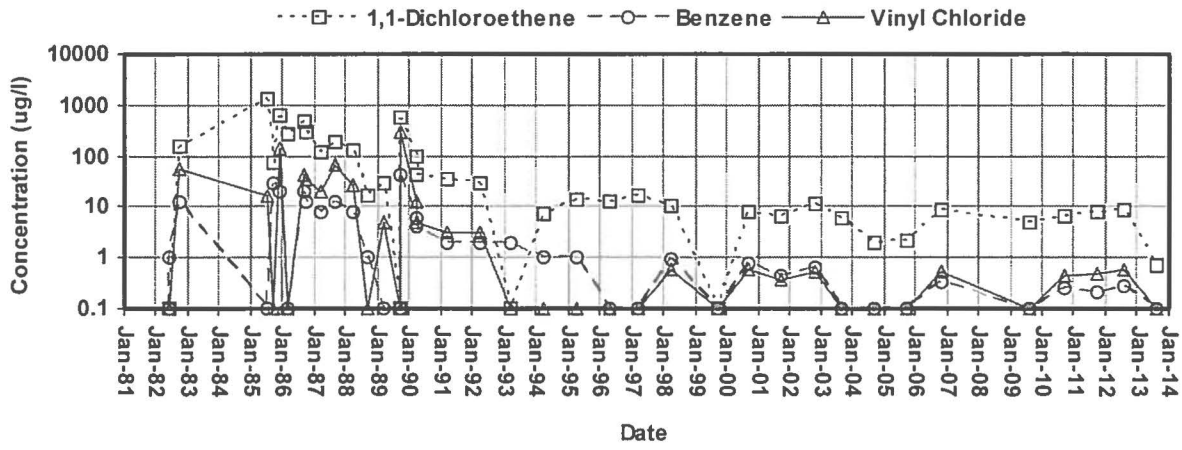
Note: Non-detects plotted as 0.1 µg/L
Open symbols are dissolved concentrations; solid symbols are total concentrations.

Arsenic Concentrations in OSA-11B, AR-21, LF-12, OSA-09B, LF-06C and B-08D

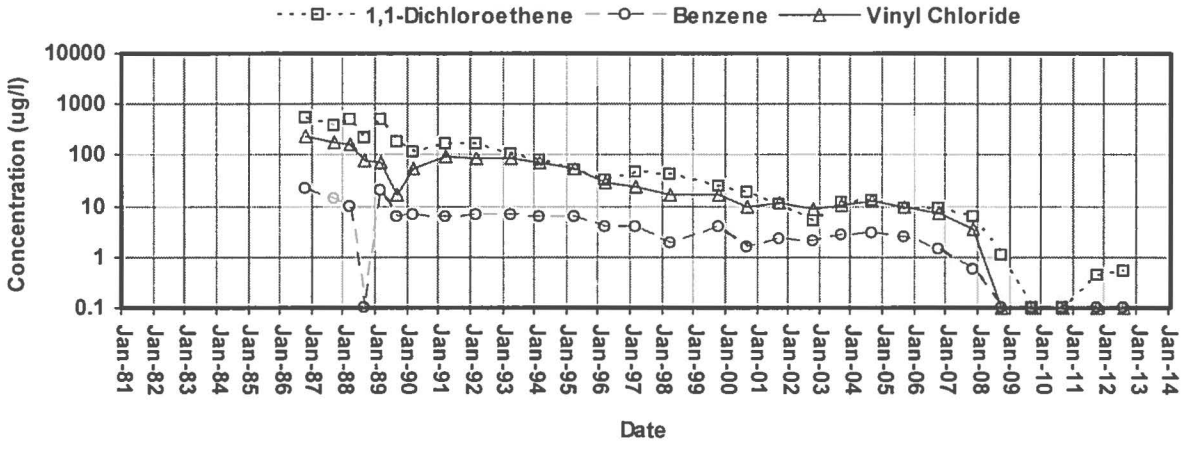
ATTACHMENT D

WATER QUALITY VERSUS TIME GRAPHS

Concentration Plot for: AR-03B1
BOS elevation: 4 (BR)

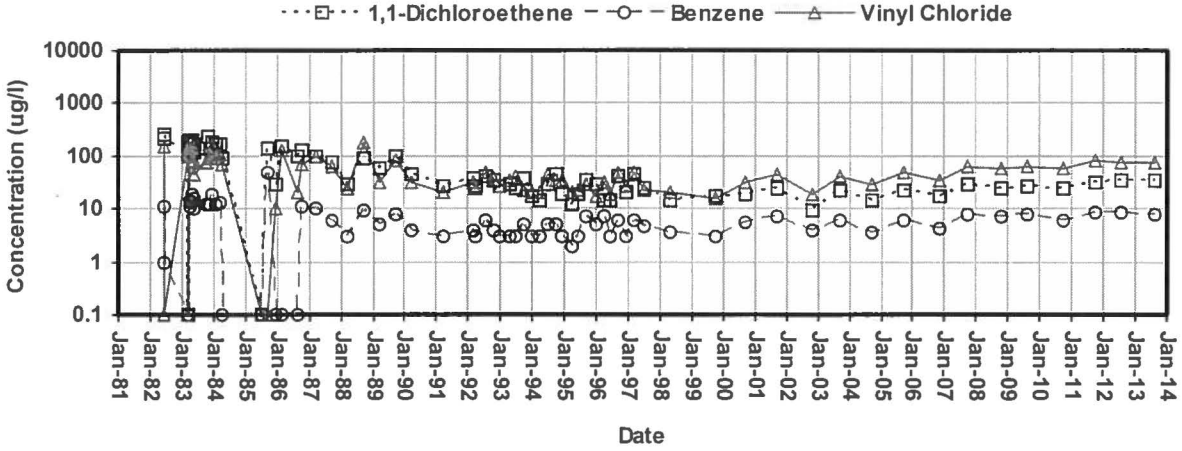


Concentration Plot for: AR-09A
BOS elevation: 68

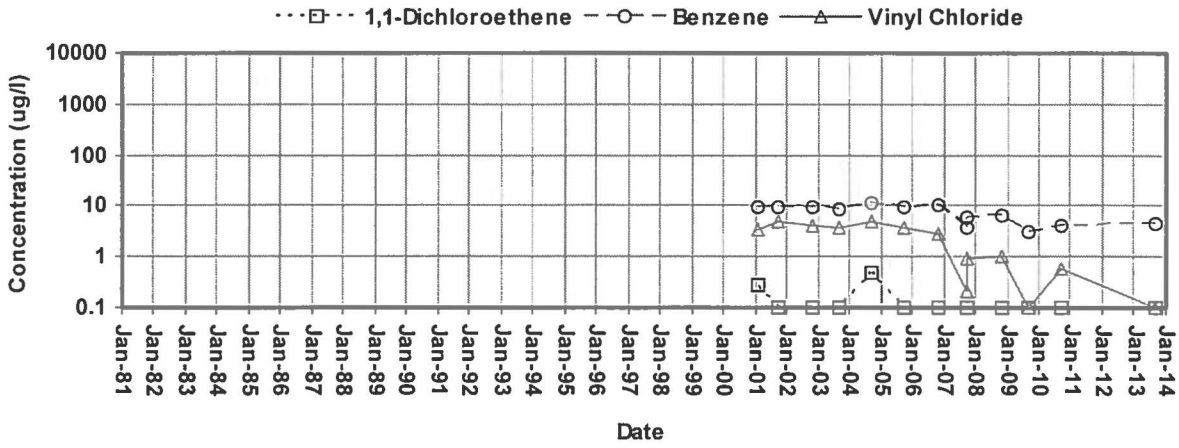


Sampling method switched to PDB in Fall 2007

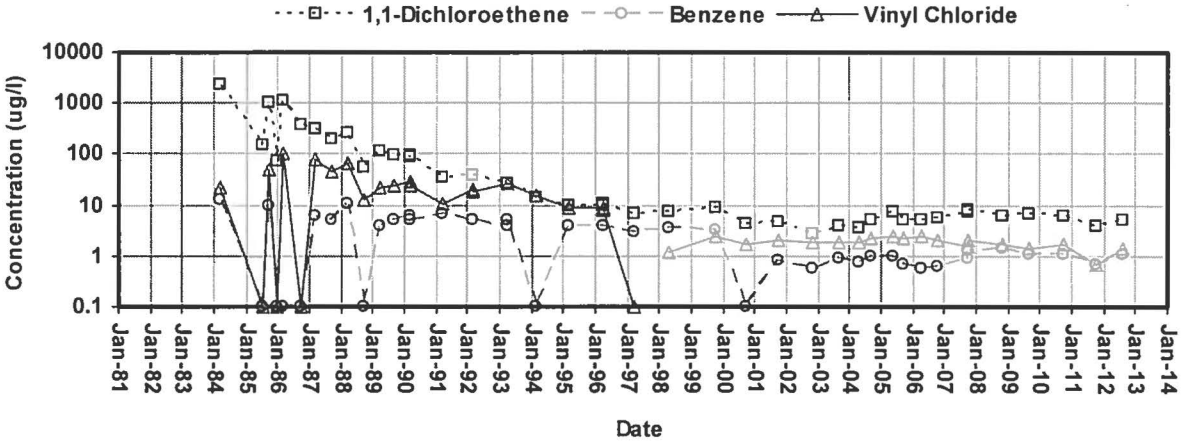
Concentration Plot for: AR-11B2
BOS elevation: 101



Concentration Plot for: AR-11SBR
BOS elevation: 60 (BR)

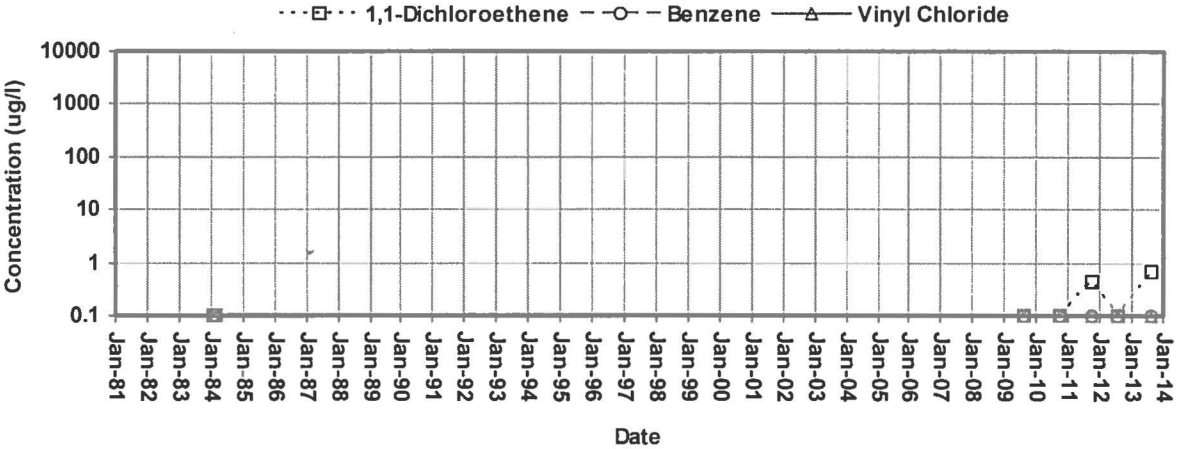


Concentration Plot for: AR-16ADP
BOS elevation: 73 (BR)



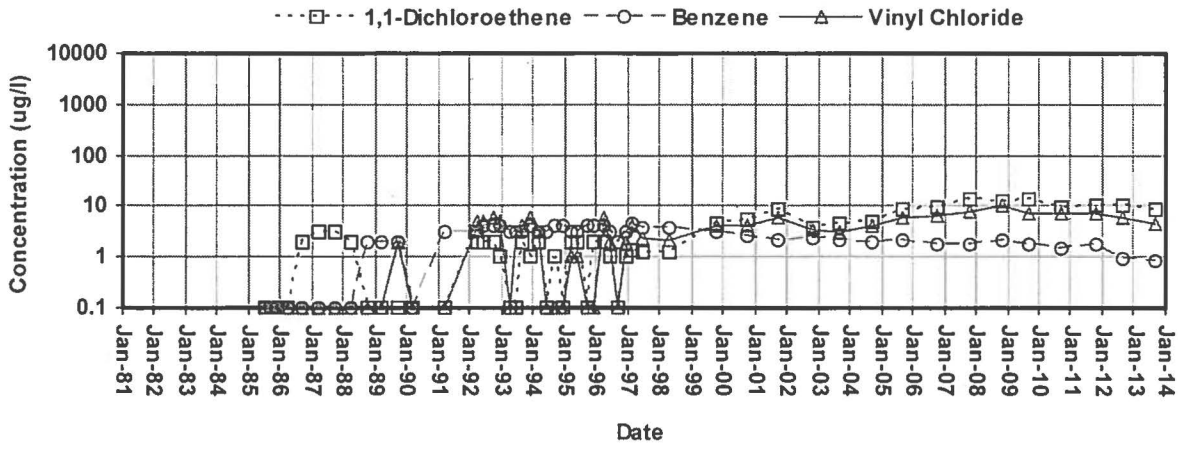
Sampling method switched to PDB in Fall 2007

Concentration Plot for: AR-19AB1
BOS elevation: 60 (BR)

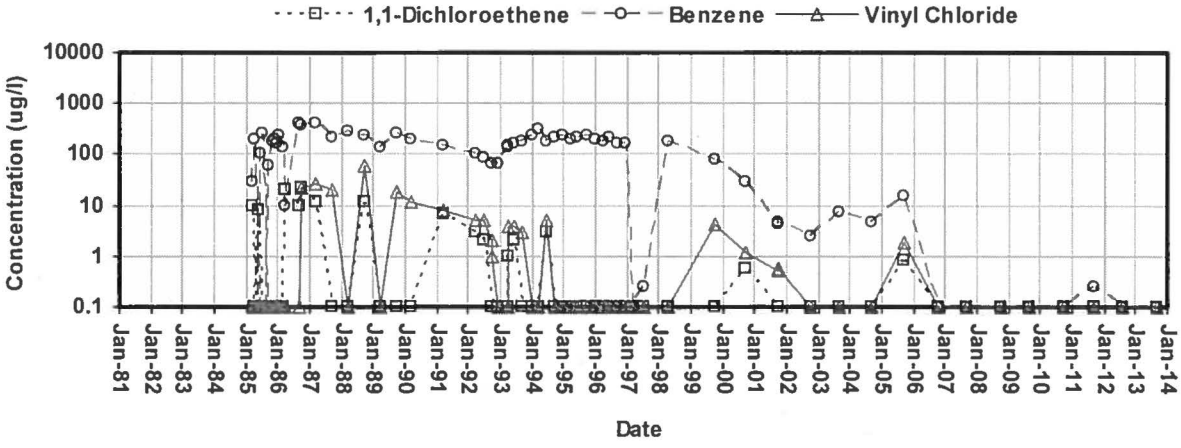


Sampling method switched to PDB in Fall 2007

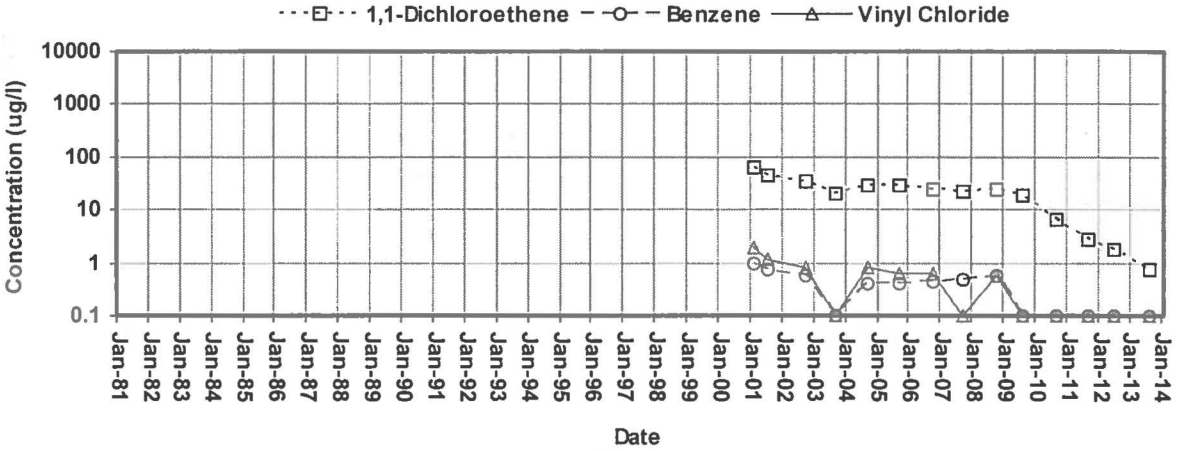
Concentration Plot for: AR-20
BOS elevation: 87 (BR)



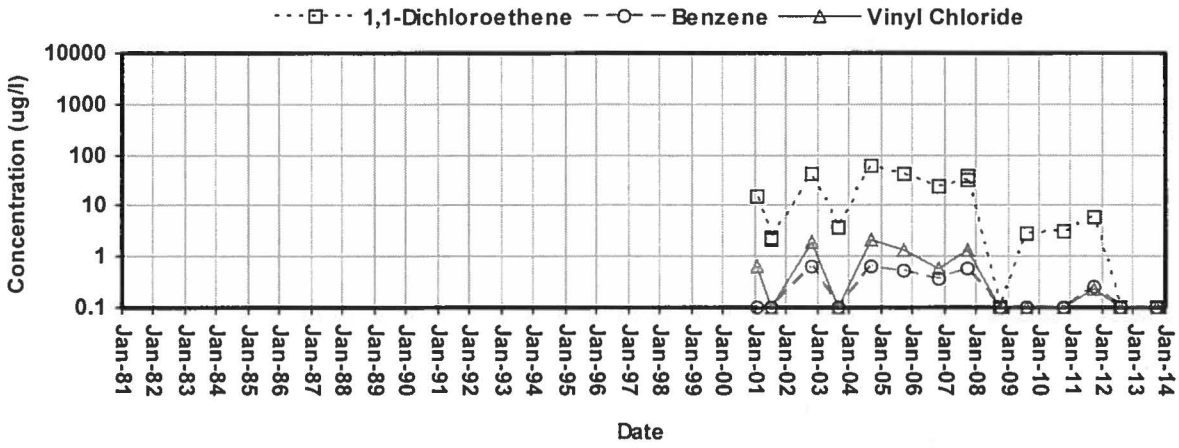
Concentration Plot for: AR-21
BOS elevation: 78 (BR)



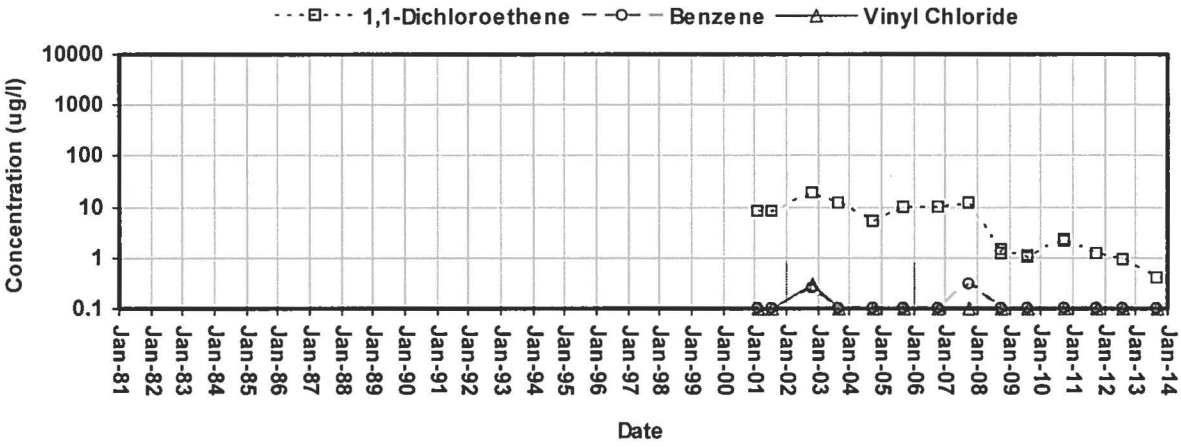
Concentration Plot for: AR-27D
BOS elevation: 104



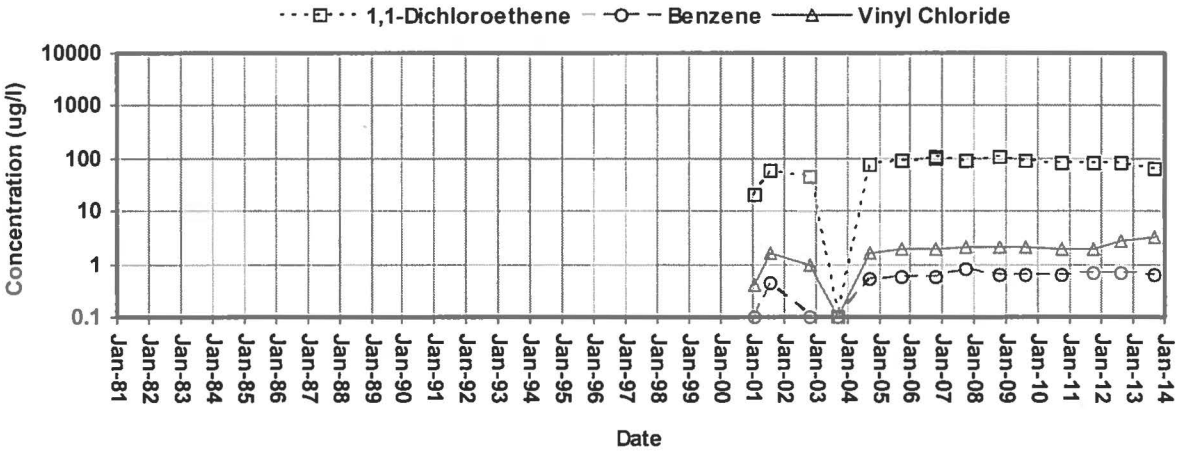
Concentration Plot for: AR-29SBR
BOS elevation: 56 (BR)



Concentration Plot for: AR-30D
BOS elevation: 75

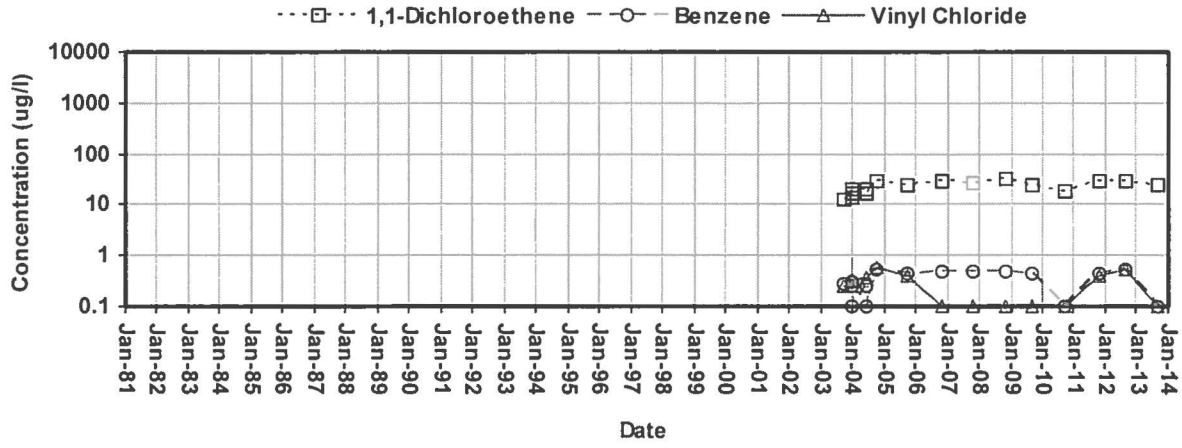


Concentration Plot for: AR-31D
BOS elevation: 82



Concentration Plot for: AR-35MBR

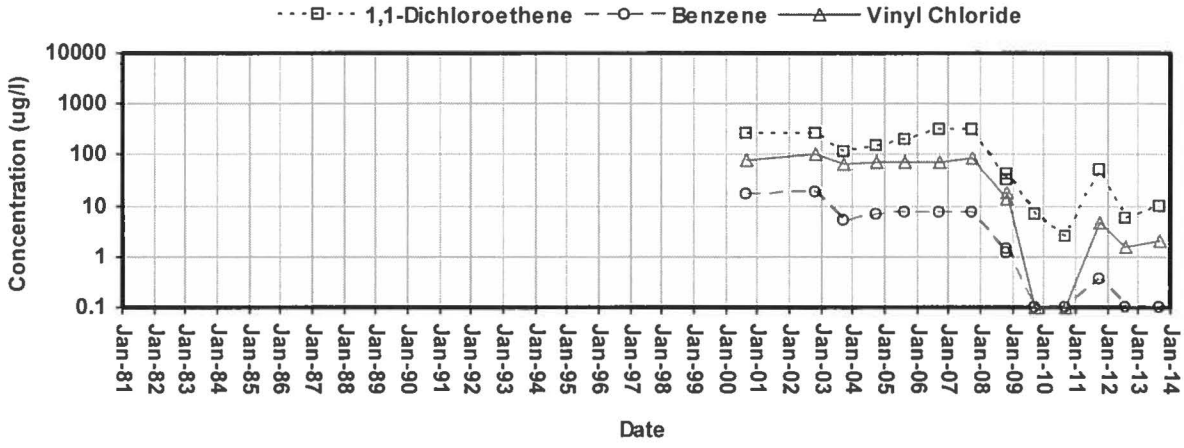
BOS elevation: -88 (BR)



Concentration Plot for: ASBRV-T6A

All samples collected with PDB

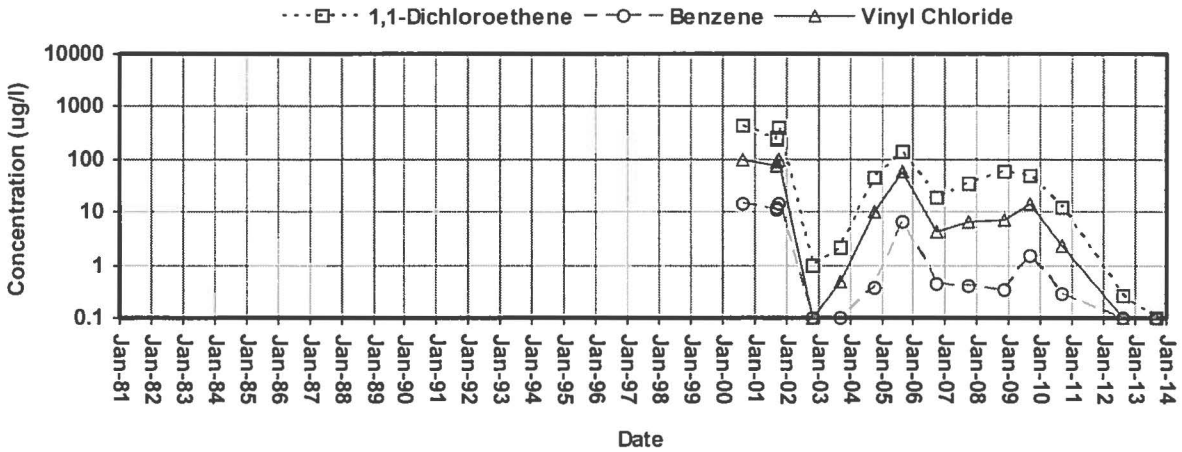
BOS elevation:



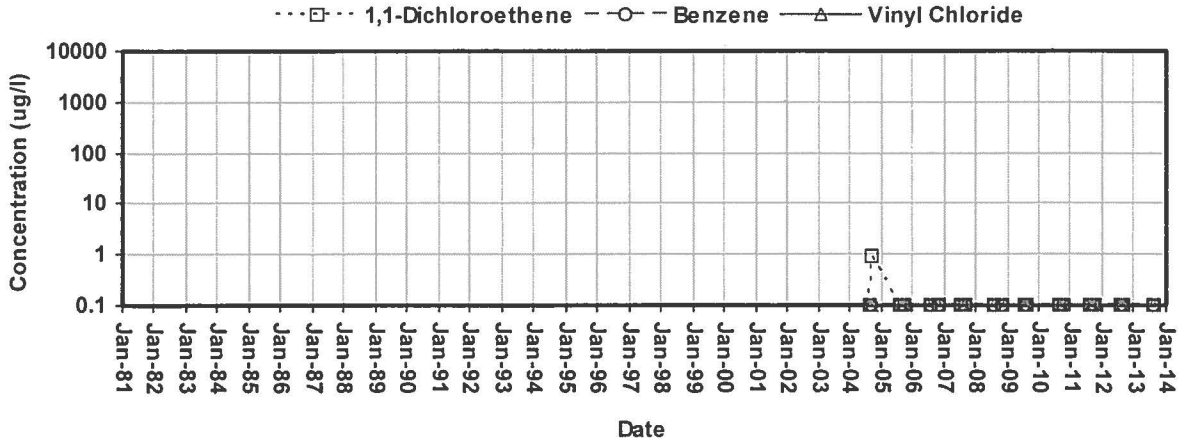
Concentration Plot for: ASBRV-T6B

All samples collected with PDB

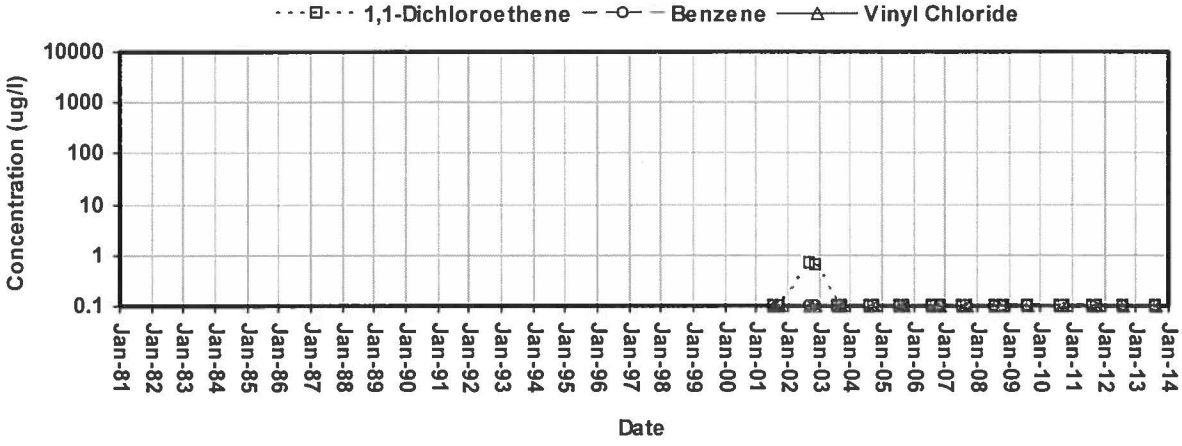
BOS elevation:



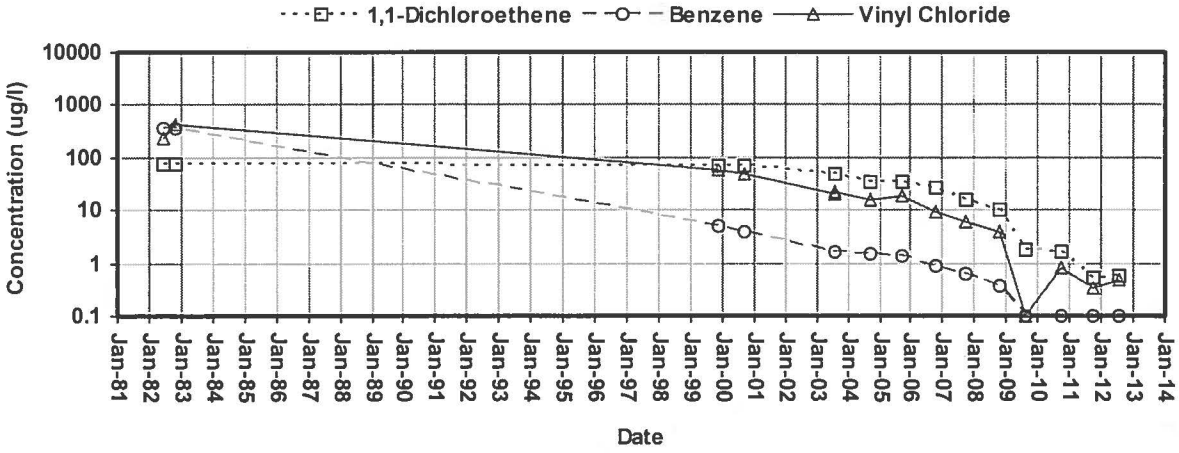
Concentration Plot for: Assabet-1A
BOS elevation: 78



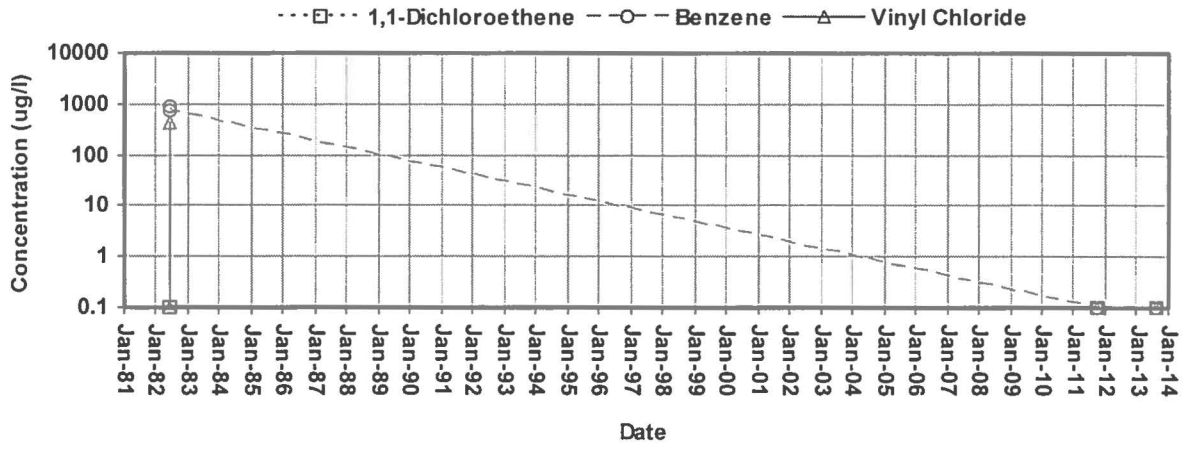
Concentration Plot for: Assabet-2A
BOS elevation: 98



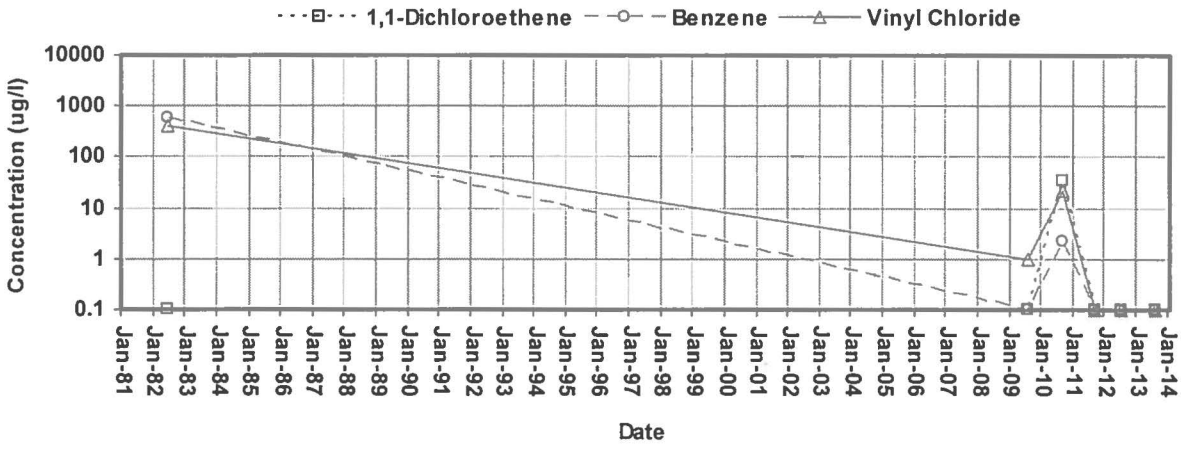
Concentration Plot for: B-03B3
BOS elevation: 91



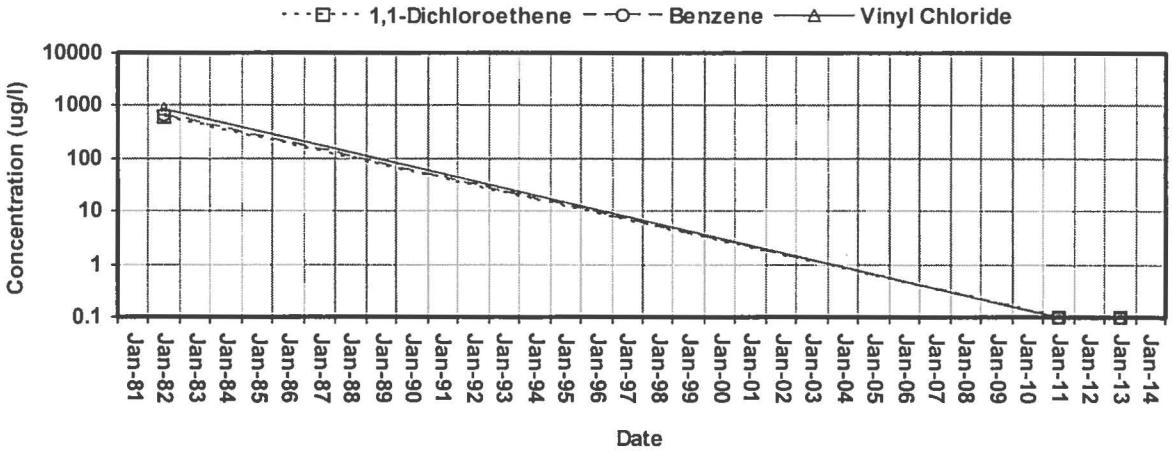
Concentration Plot for: B-04B3
BOS elevation: 93



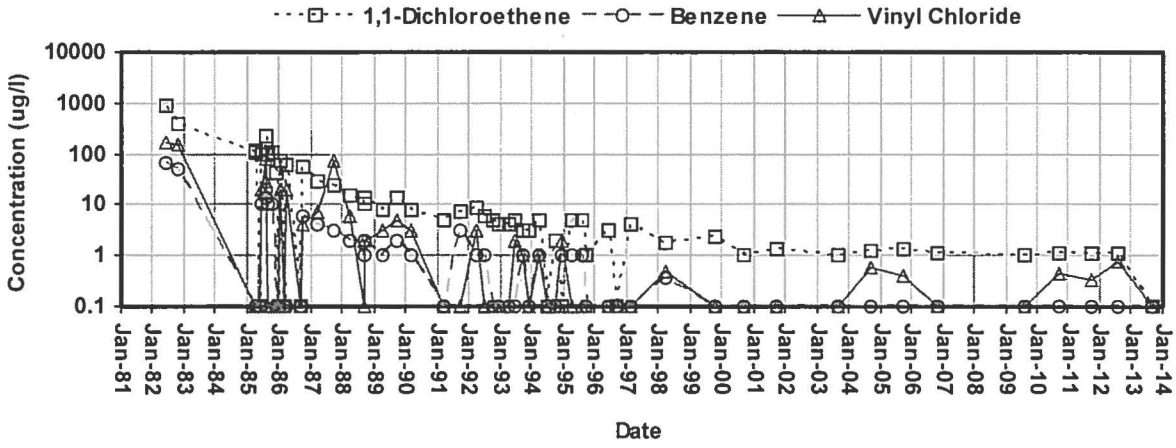
Concentration Plot for: B-04B4
BOS elevation: 73



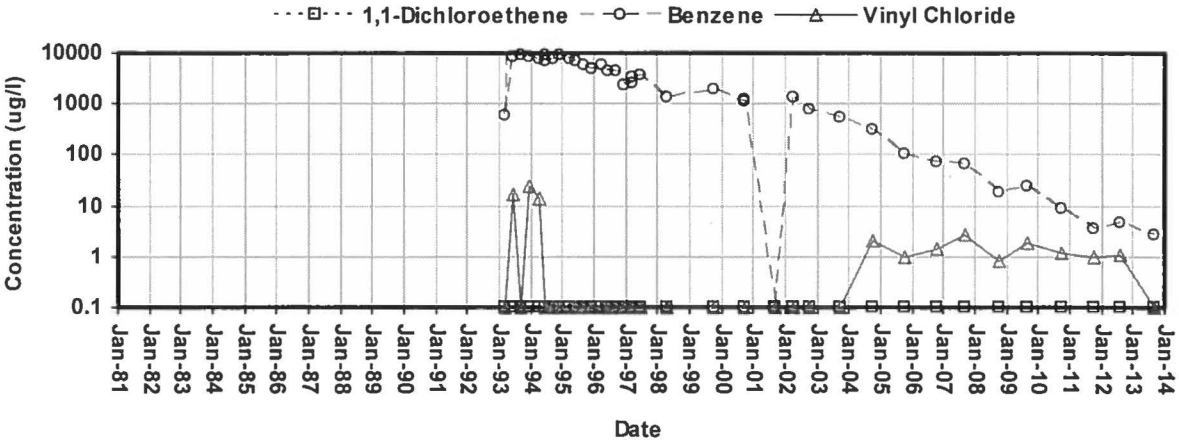
Concentration Plot for: B-04B5
BOS elevation: 57



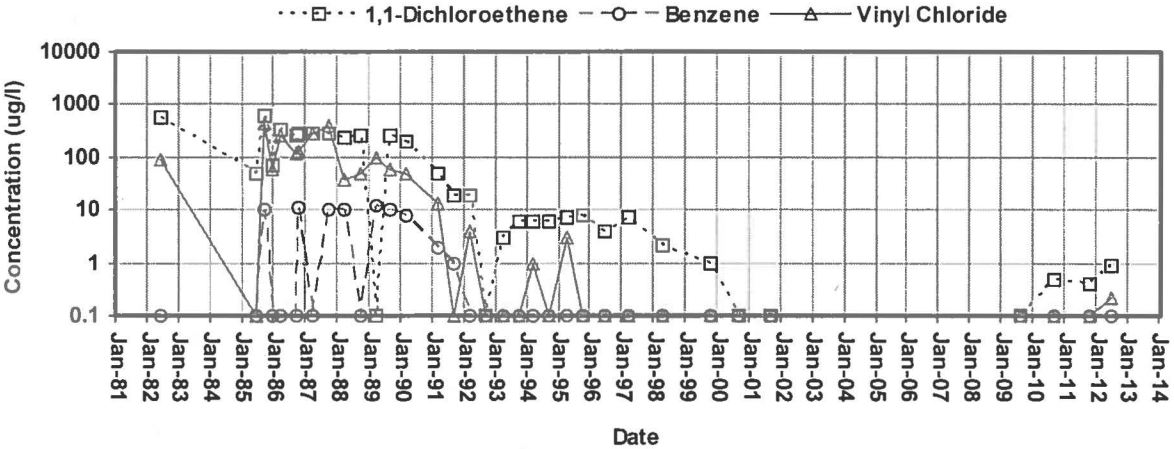
Concentration Plot for: B-05B4
BOS elevation: 24 (BR)



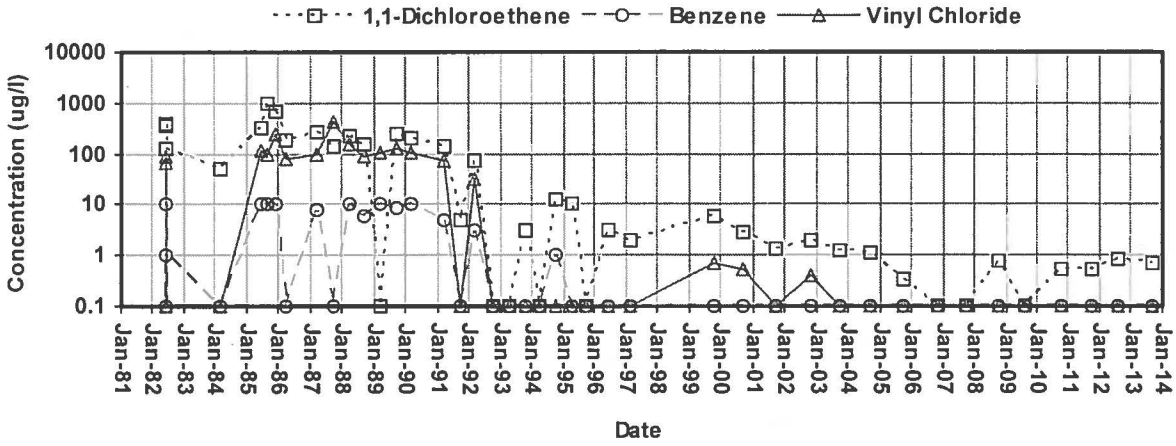
Concentration Plot for: B-08B
BOS elevation: 76



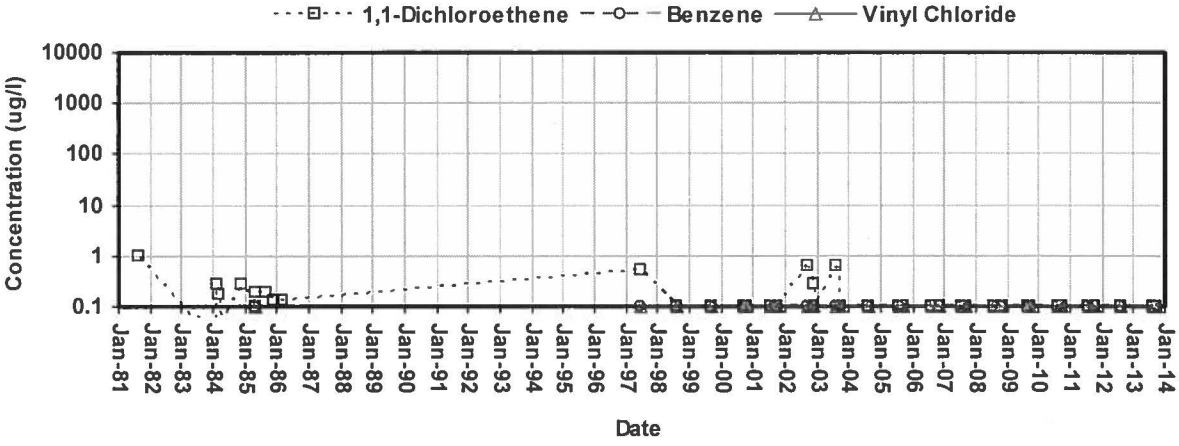
Concentration Plot for: B-09B3
BOS elevation: 30



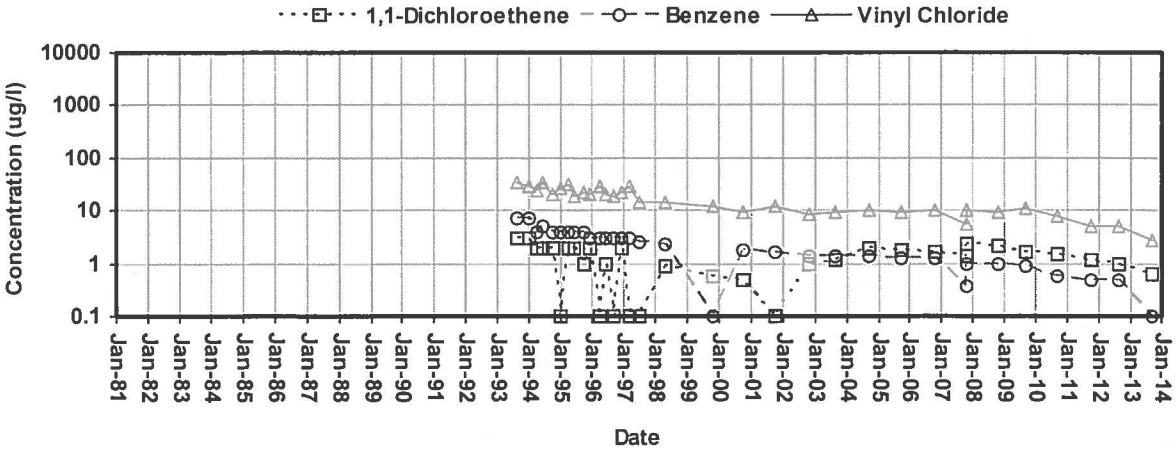
Concentration Plot for: B-09B4
BOS elevation: 13 (BR)



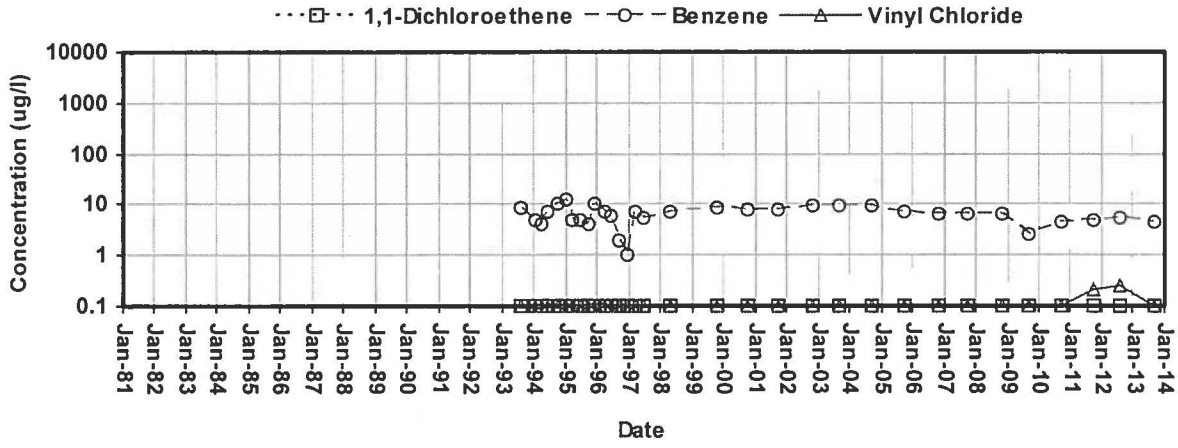
Concentration Plot for: CHRISTOFFERSON
BOS elevation: 86



Concentration Plot for: G-3A
BOS elevation: 43

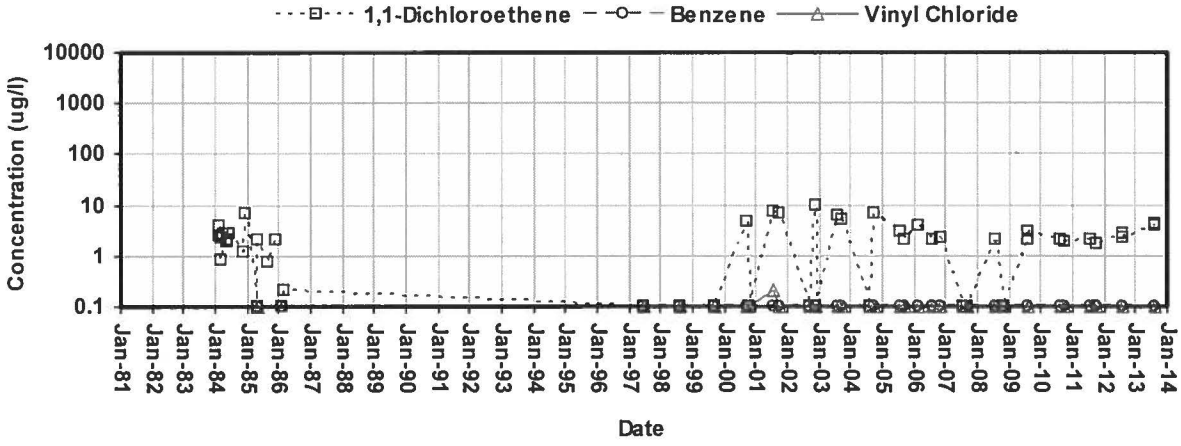


Concentration Plot for: G-3BR
BOS elevation: 10 (BR)

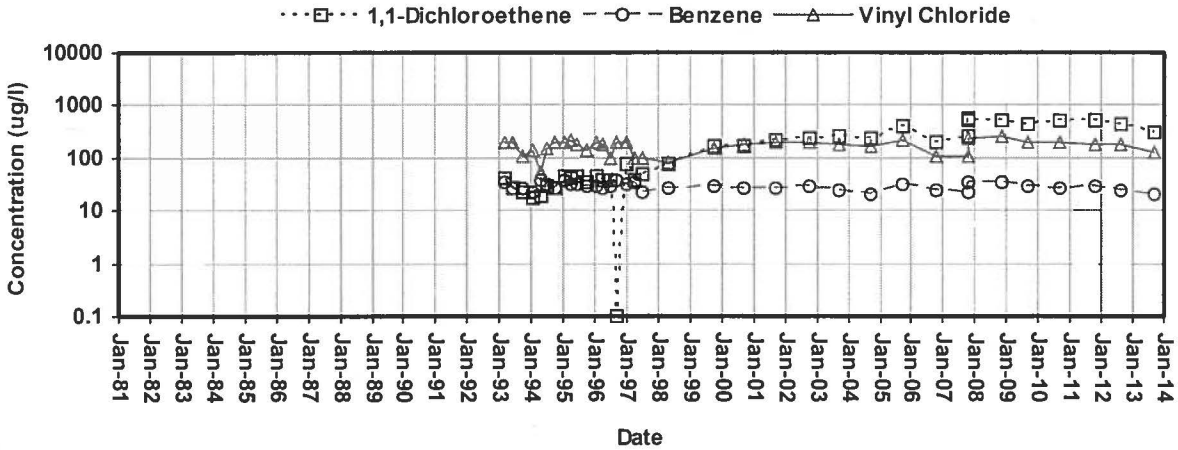


Concentration Plot for: LAWSBROOK
BOS elevation: 108

Sampling method switched to PDB in Fall 2007

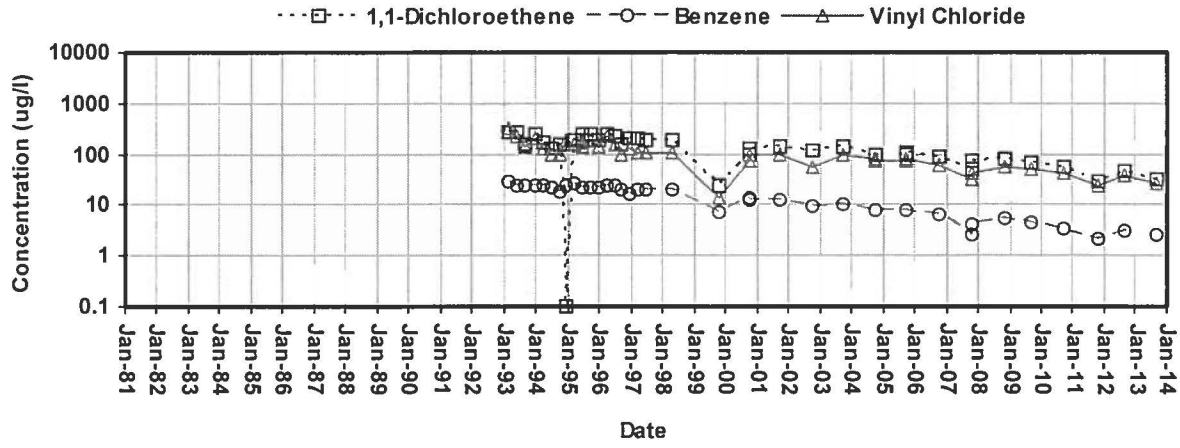


Concentration Plot for: LF-02A
BOS elevation: 35 (BR)

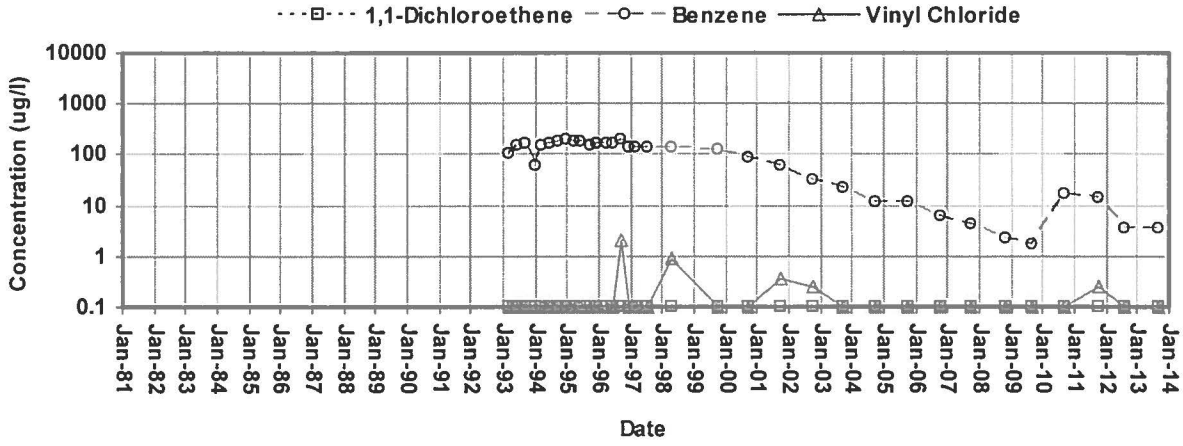


Sampling method switched to PDB in Fall 2007

Concentration Plot for: LF-05E
BOS elevation: 96

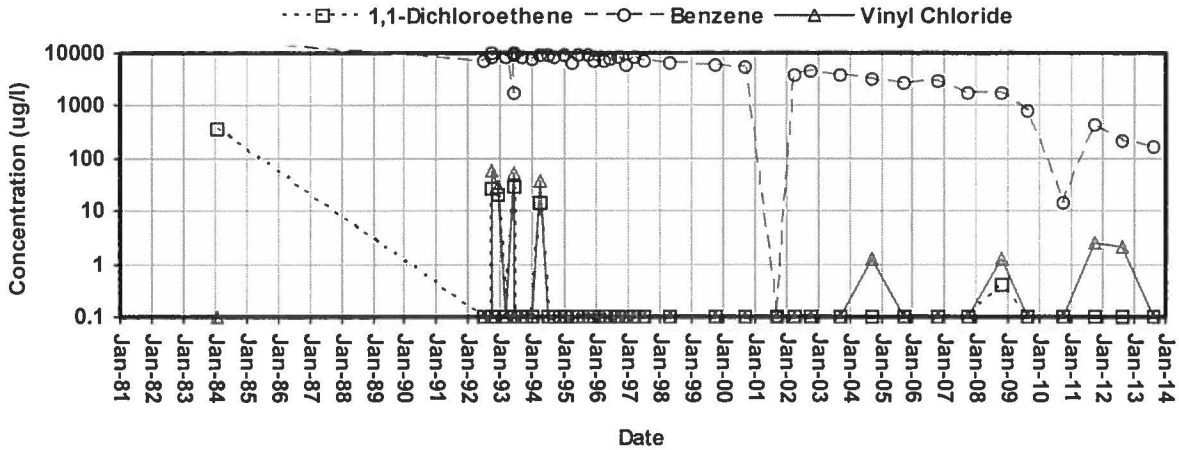


Concentration Plot for: LF-06
BOS elevation: 26 (BR)



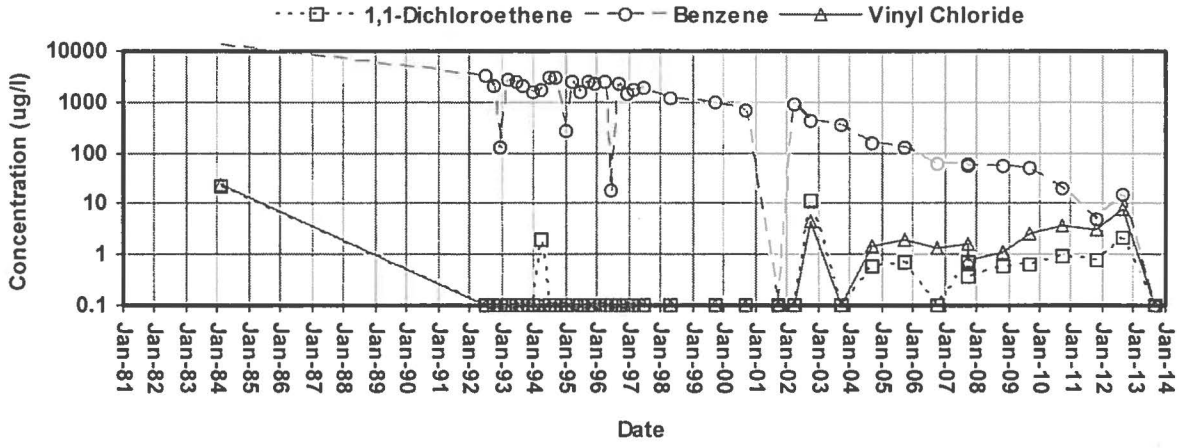
Sampling method switched to PDB in Fall 2007

Concentration Plot for: LF-06C
BOS elevation: 105



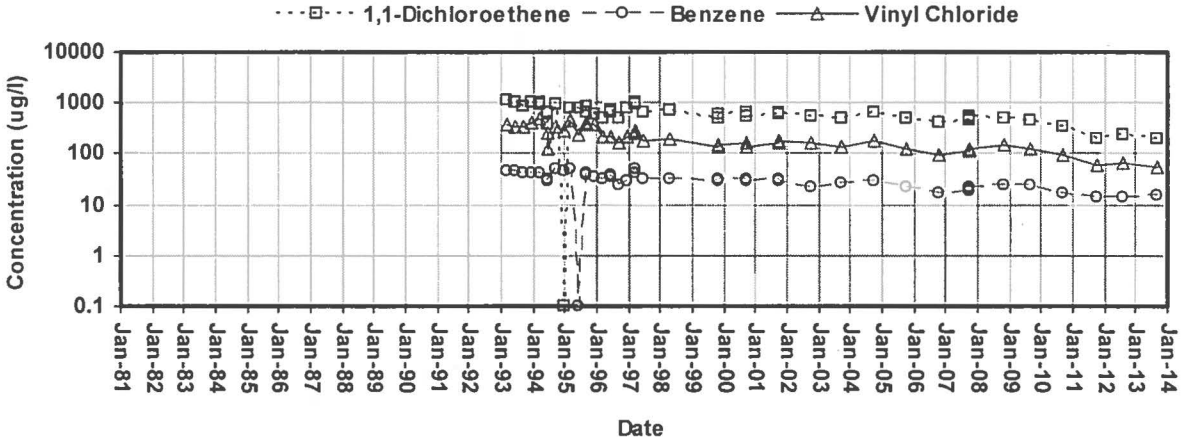
Sampling method switched to PDB in Fall 2007

Concentration Plot for: LF-06N
BOS elevation: 85 (BR)



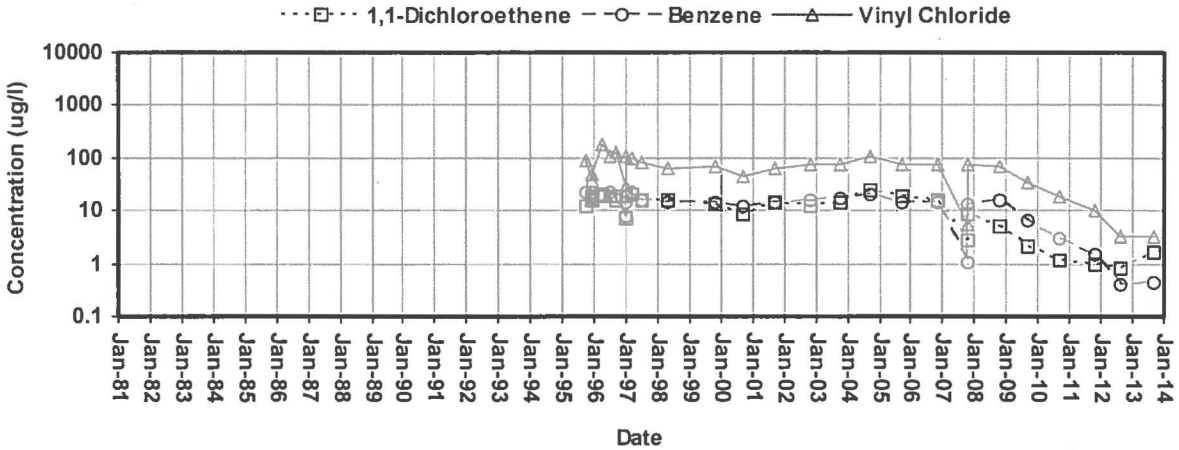
Sampling method switched to PDB in Fall 2007

Concentration Plot for: LF-10
BOS elevation: 35



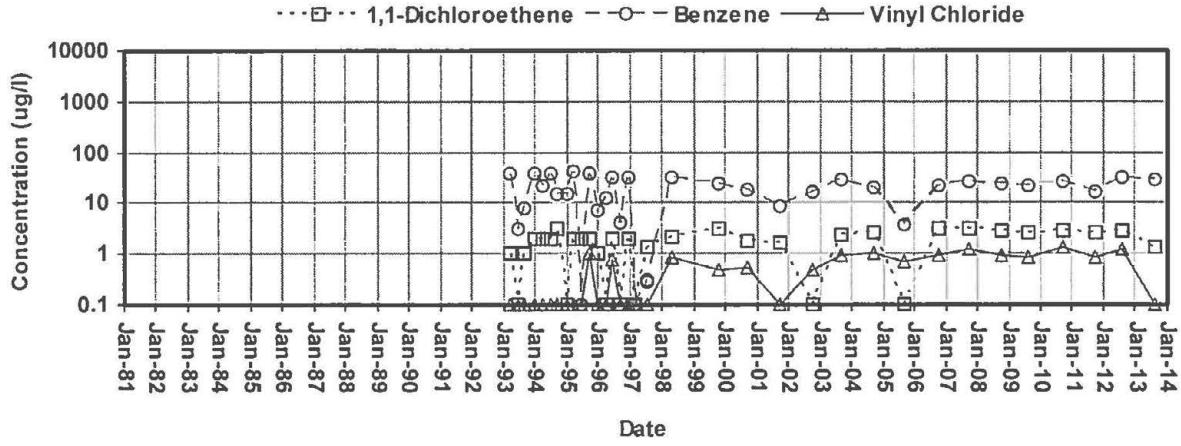
Sampling method switched to PDB in Fall 2007

Concentration Plot for: LF-11AR
BOS elevation: 40

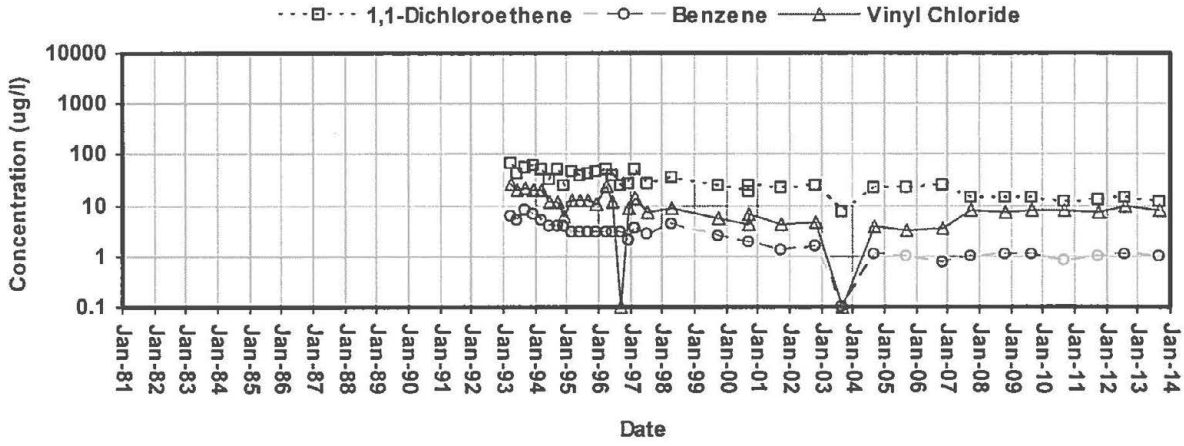


Sampling method switched to PDB in Fall 2007

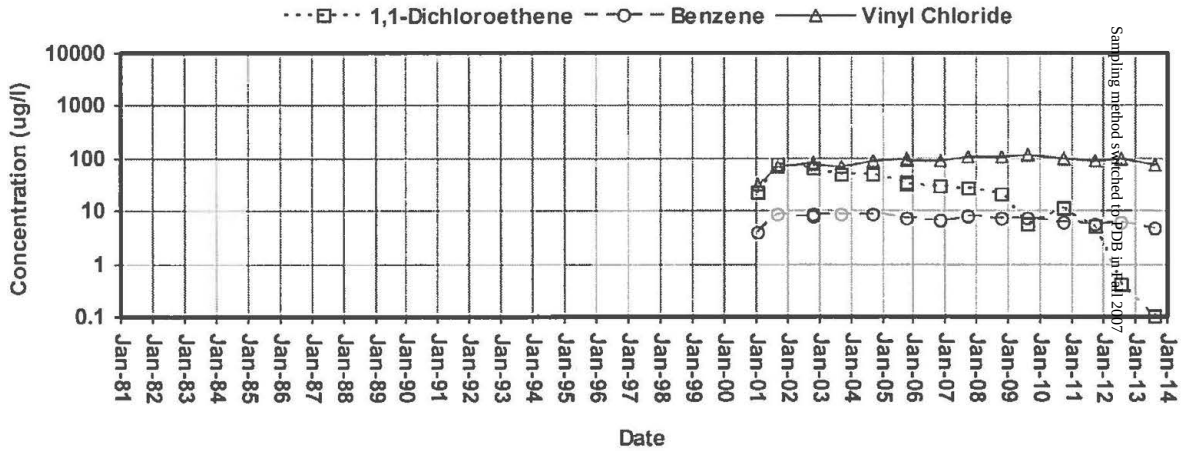
Concentration Plot for: LF-12
BOS elevation: 88



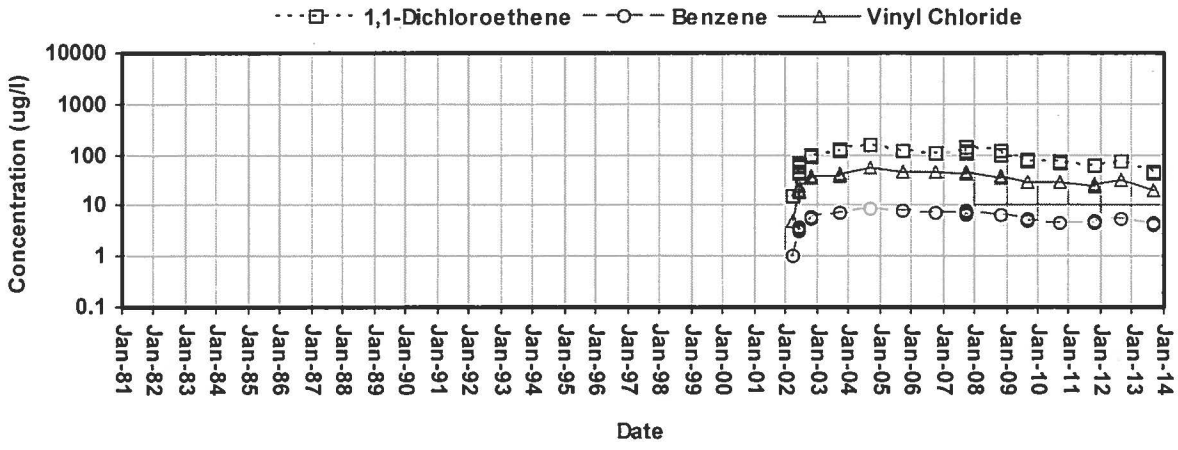
Concentration Plot for: LF-13A
BOS elevation: 90



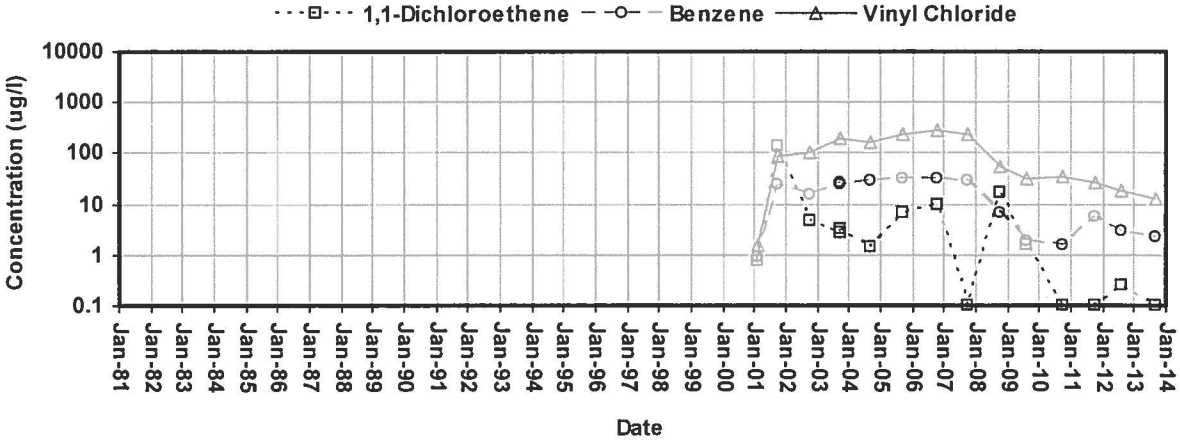
Concentration Plot for: LF-17D
BOS elevation: 83



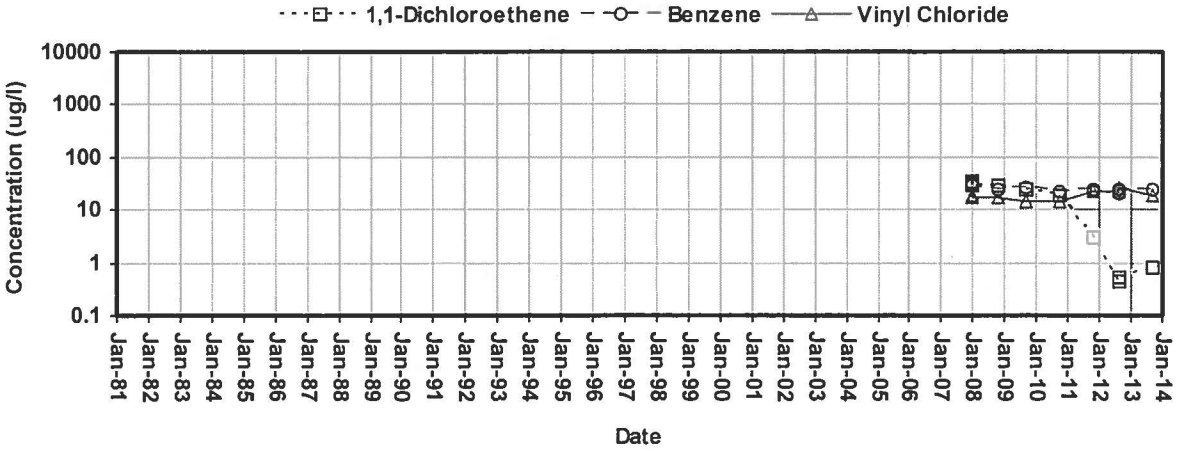
Concentration Plot for: LF-18D
BOS elevation: 53



Concentration Plot for: LF-19D
BOS elevation: 50

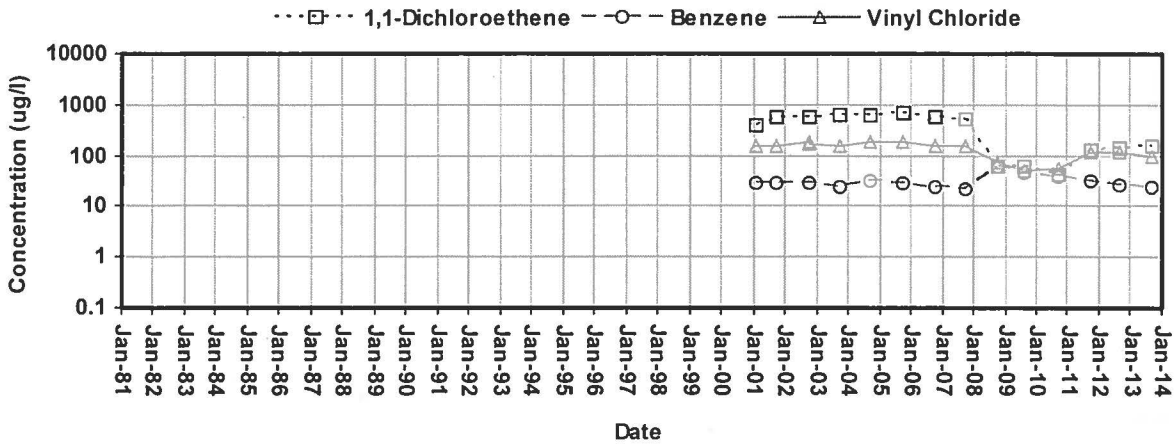


Concentration Plot for: LF-19MBR
BOS elevation: -23 (BR)

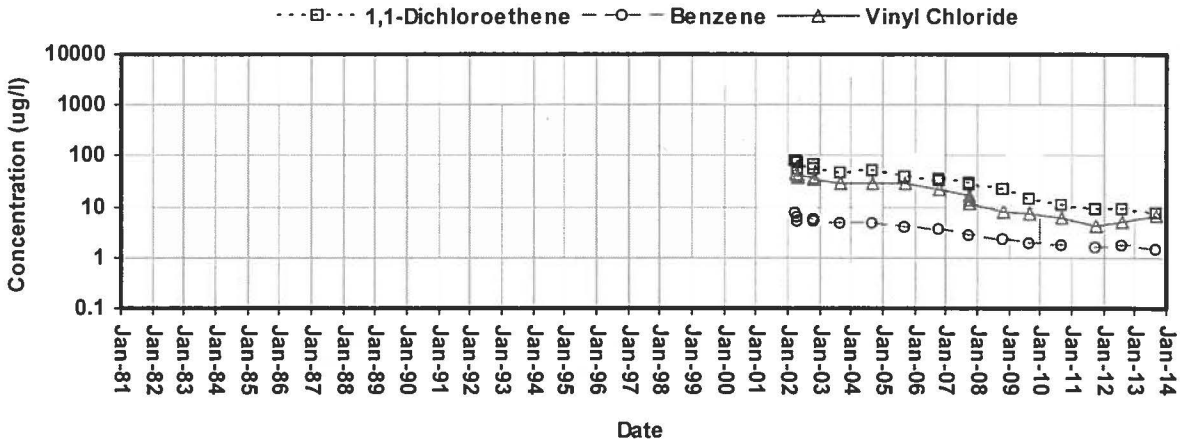


Sampling method switched to PDB in Fall 2007

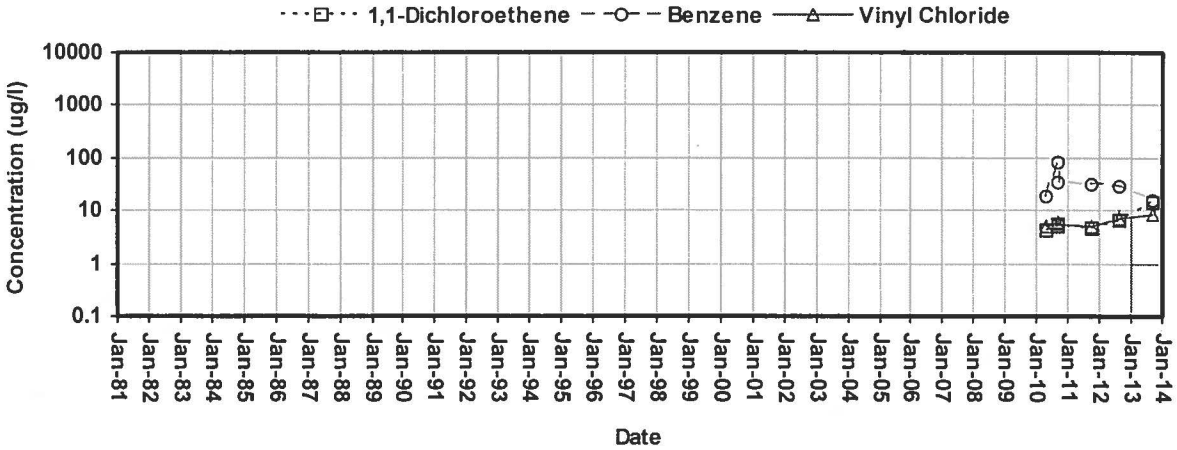
Concentration Plot for: LF-19SBR
BOS elevation: 11 (BR)



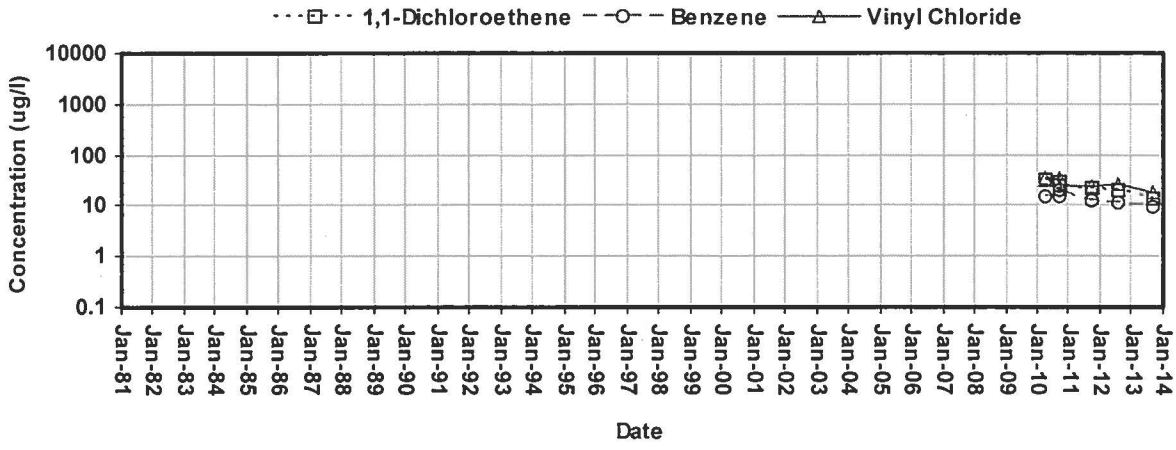
Concentration Plot for: LF-20D
Sampling method switched to PDB in Fall 2010
BOS elevation: 34



Concentration Plot for: LF-22D
Sampling method switched to PDB in Fall 2007
BOS elevation: 80

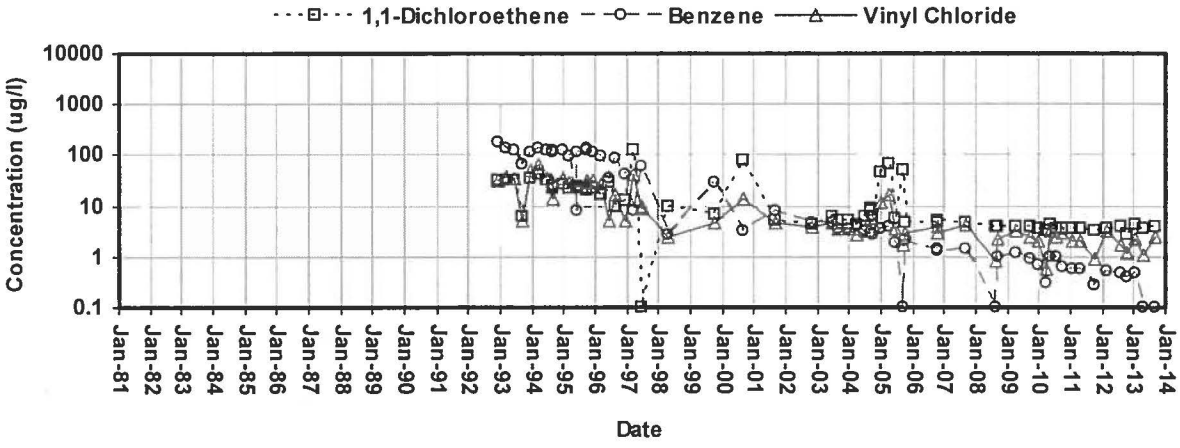


Concentration Plot for: LF-22S
BOS elevation: 100

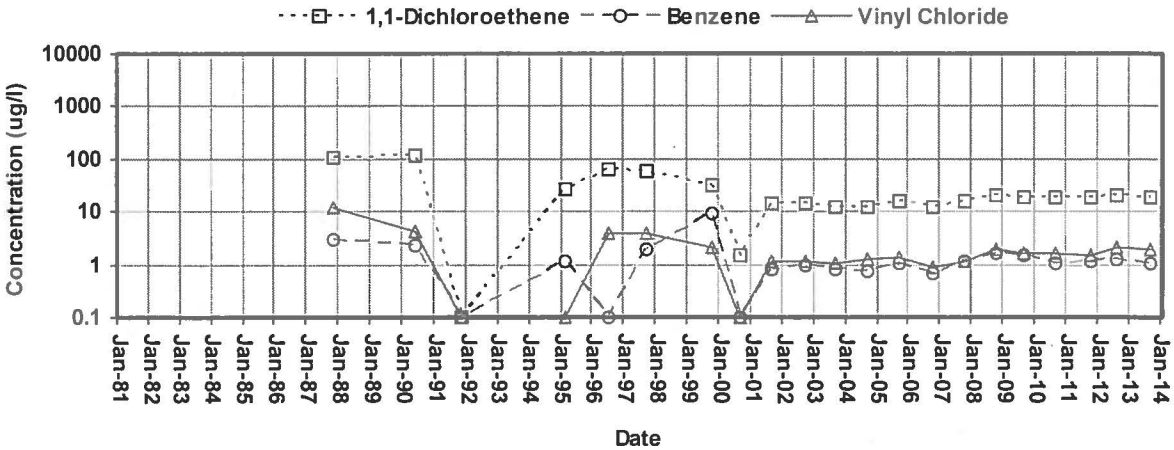


Sampling method switched to PDB in Fall 2007

Concentration Plot for: MLF
BOS elevation: 83

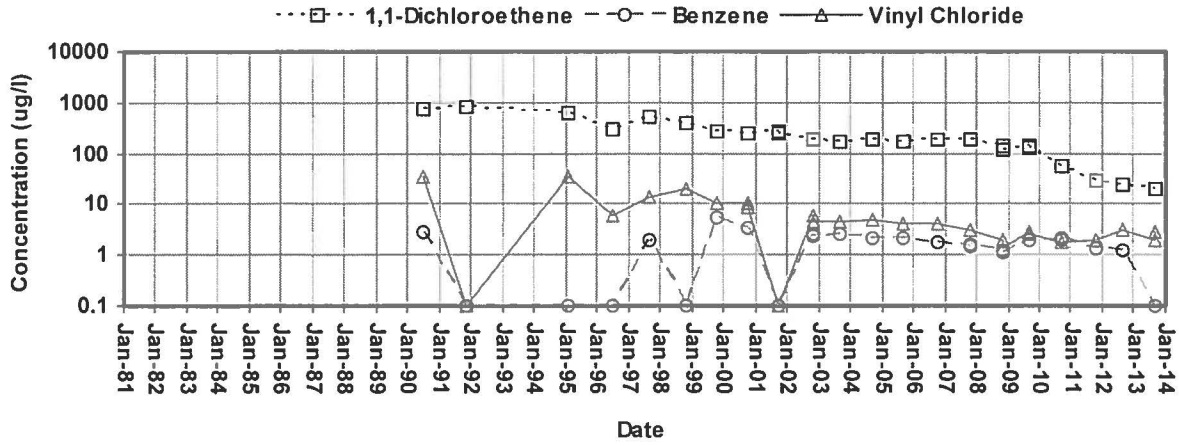


Concentration Plot for: MW-04B
BOS elevation: 36 (BR)

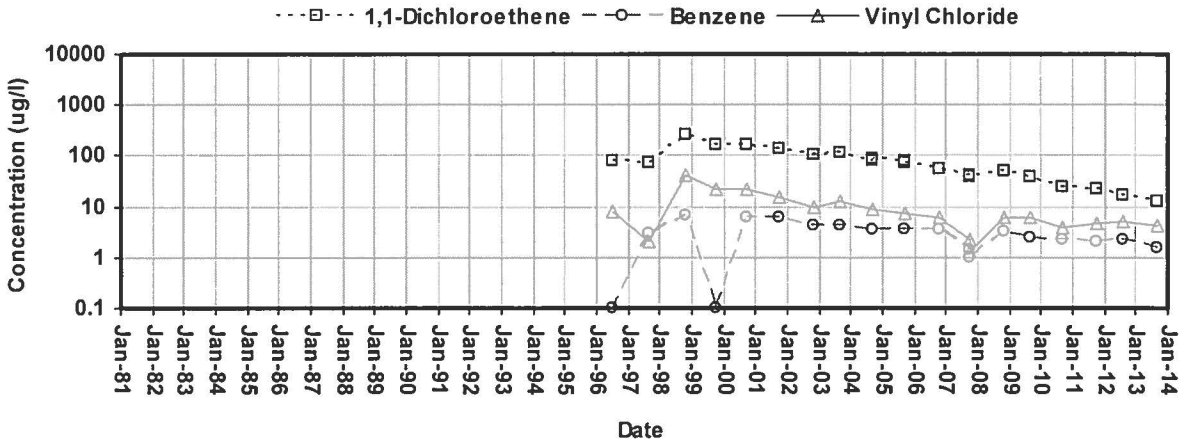


Sampling method switched to PDB in Fall 2010

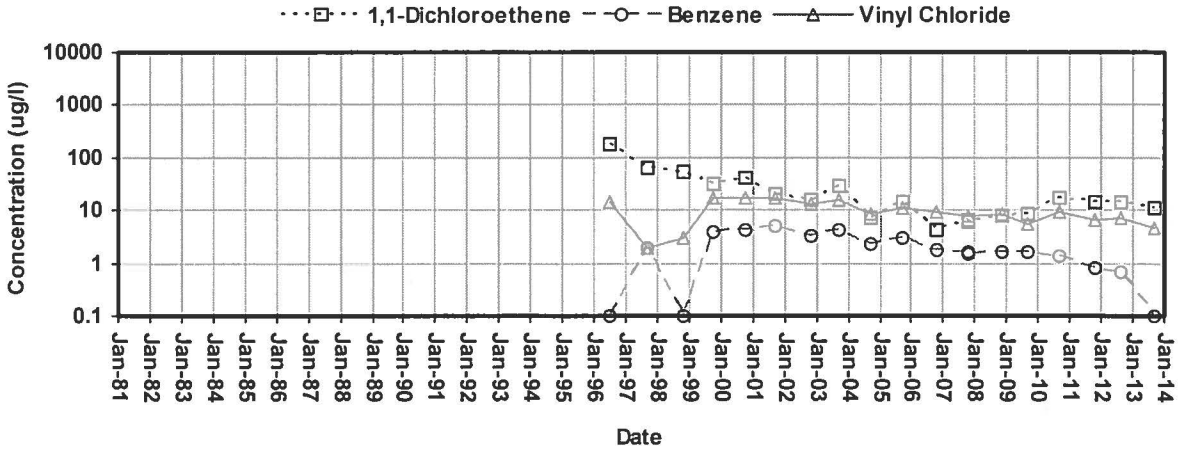
Concentration Plot for: MW-06B
BOS elevation: 40 (BR)



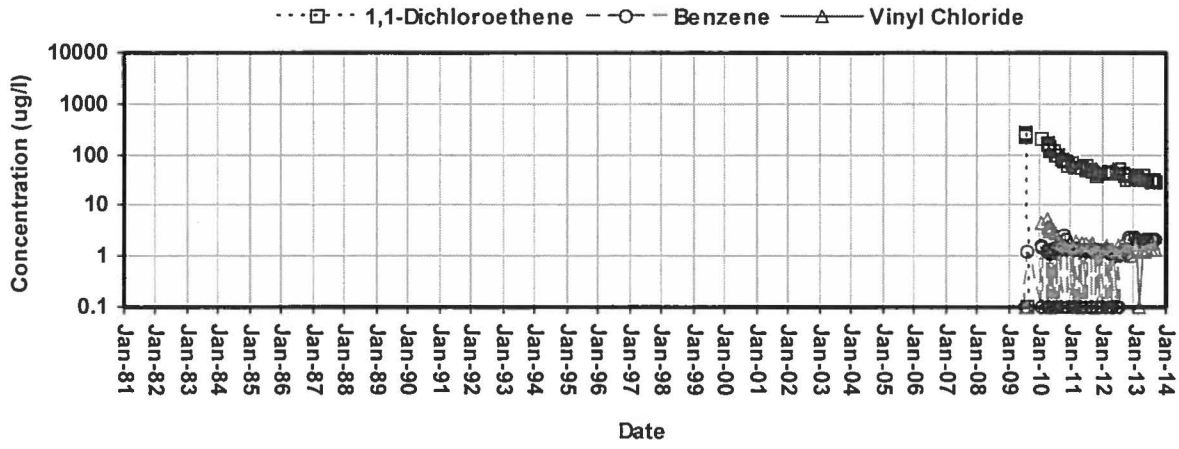
Concentration Plot for: MW-07B
Sampling method switched to PDB in Fall 2007
BOS elevation: 50 (BR)



Concentration Plot for: MW-13B
Sampling method switched to PDB in Fall 2007
BOS elevation: 46 (BR)

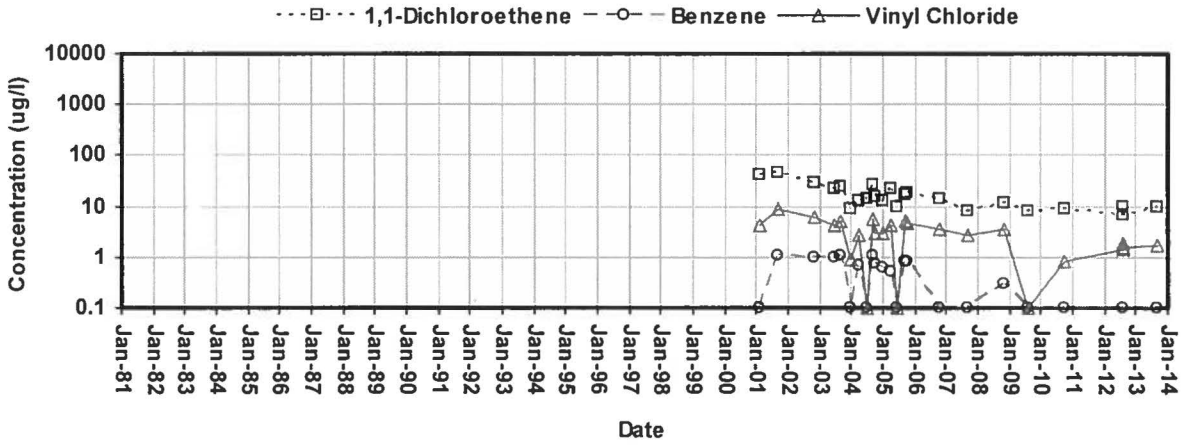


Concentration Plot for: NE-1
BOS elevation: -66 (BR)



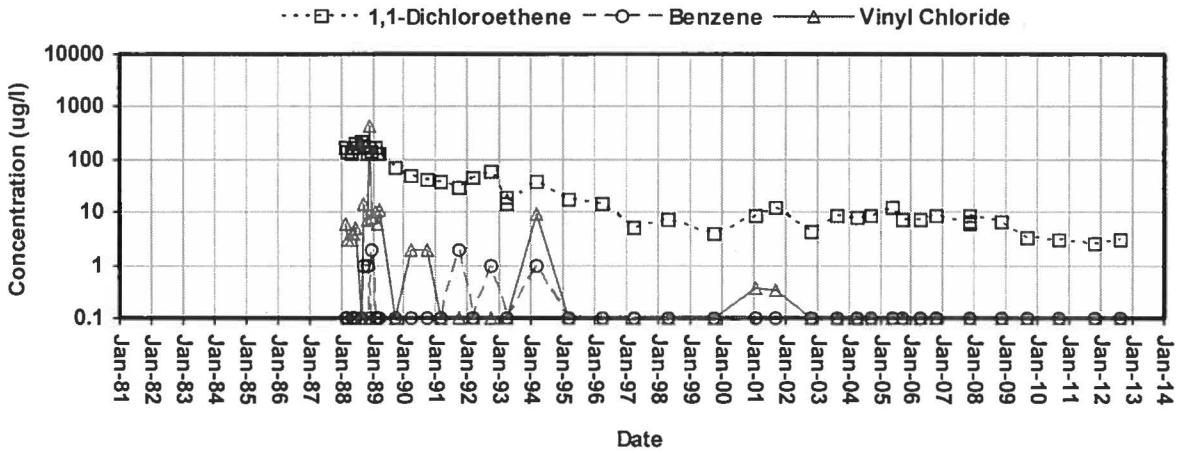
Concentration Plot for: NLBR-R
BOS elevation: 75 (BR)

sampling method switched to PDB in Fall 2007

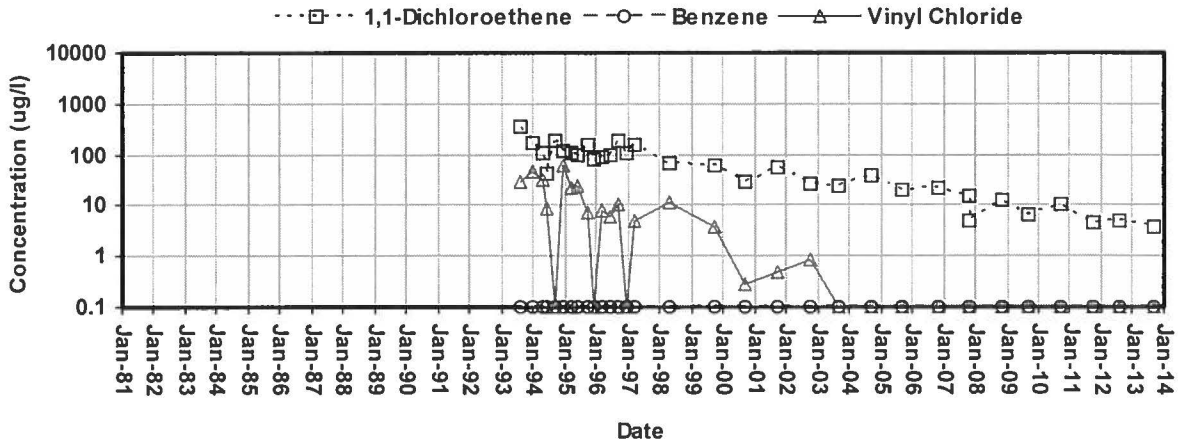


Concentration Plot for: NMGP
BOS elevation: 101

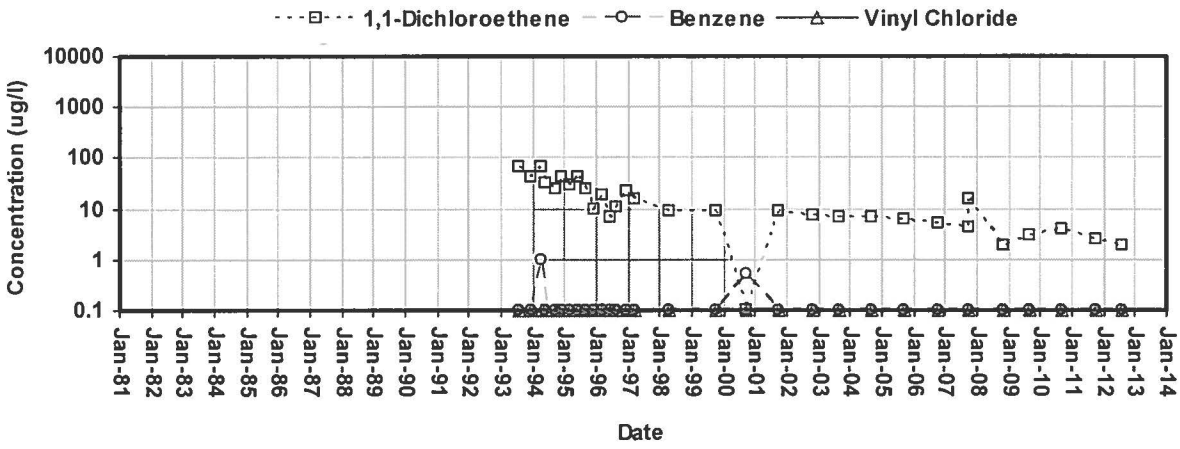
sampling method switched to PDB in Fall 2012



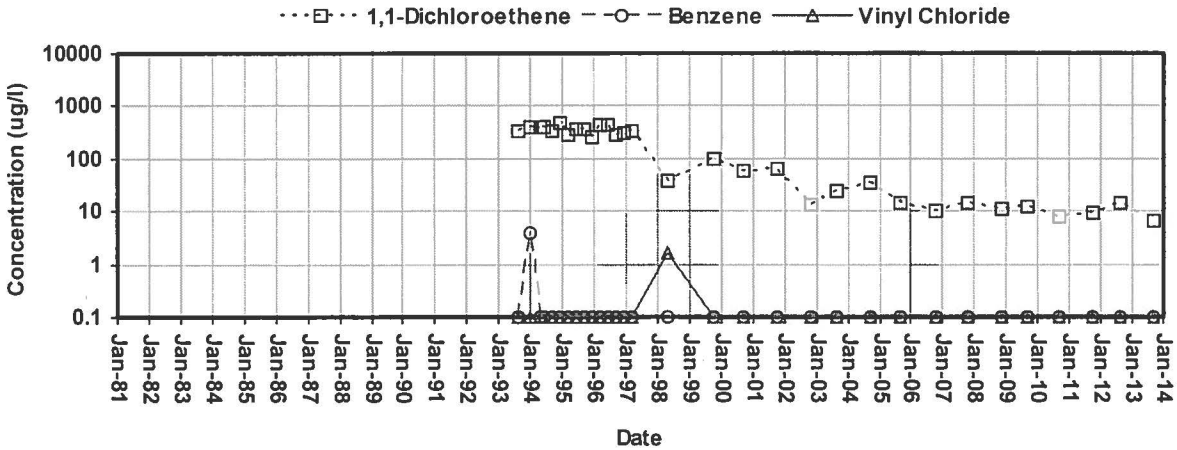
Concentration Plot for: OSA-01A
BOS elevation: 128



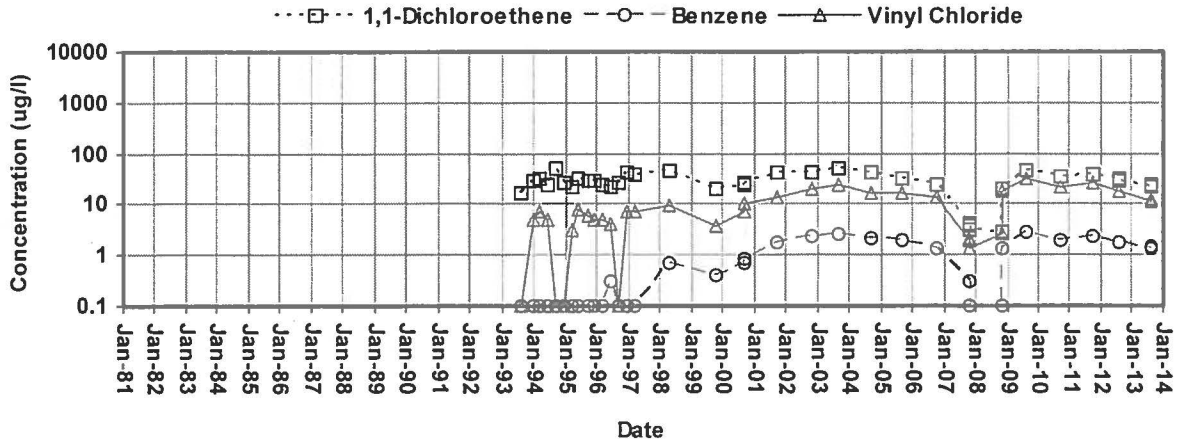
Concentration Plot for: OSA-01C
Sampling method switched to PDB in Fall 2007
BOS elevation: 80



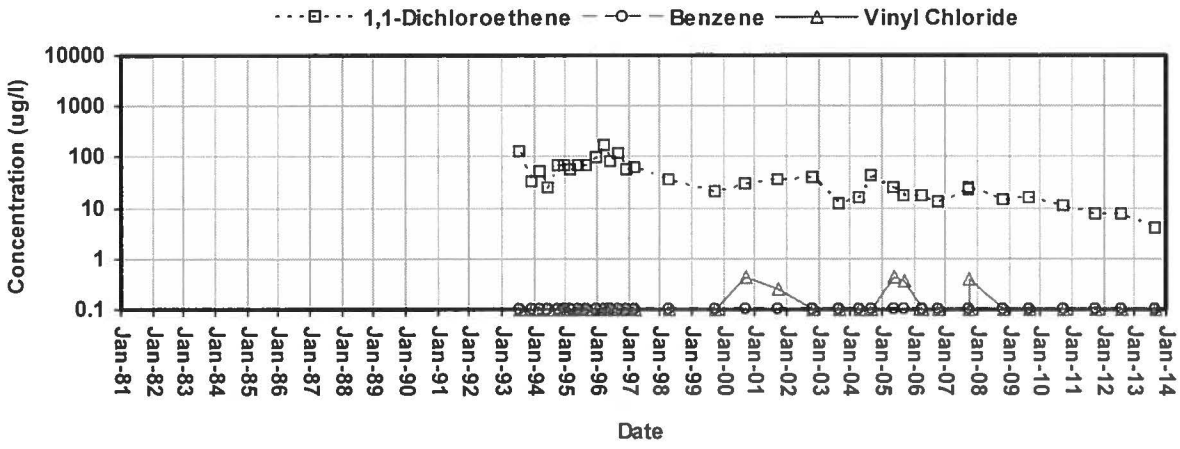
Concentration Plot for: OSA-02A
Sampling method switched to PDB in Fall 2007
BOS elevation: 130



Concentration Plot for: OSA-03BR
BOS elevation: 55 (BR)

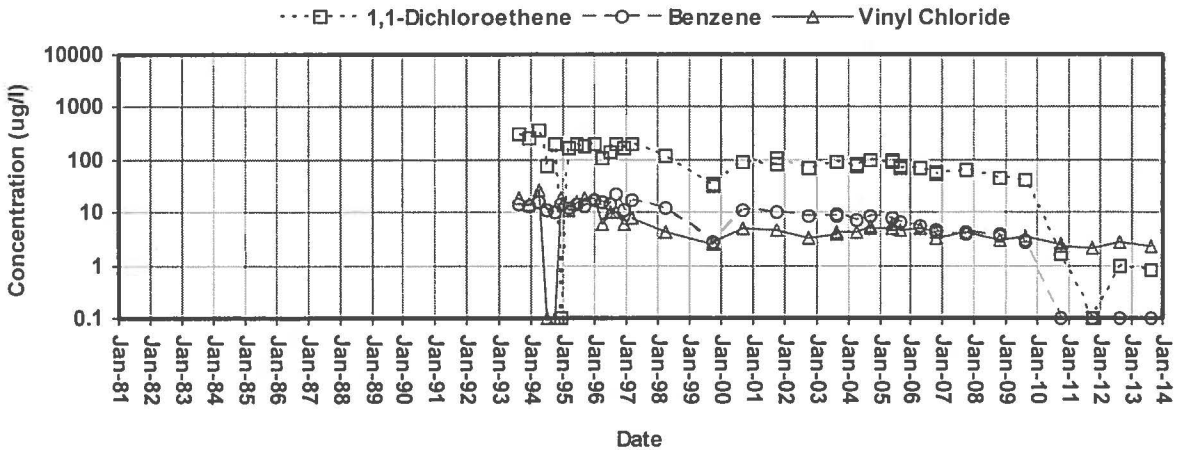


Concentration Plot for: OSA-05B
BOS elevation: 100

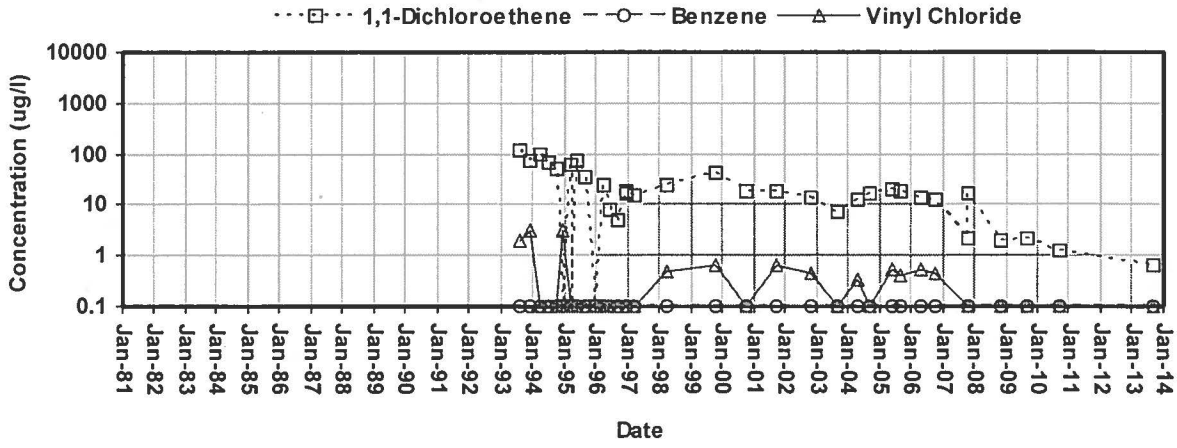


Concentration Plot for: OSA-06BR
BOS elevation: 51 (BR)

Sampling method switched to PDB in Fall 2007

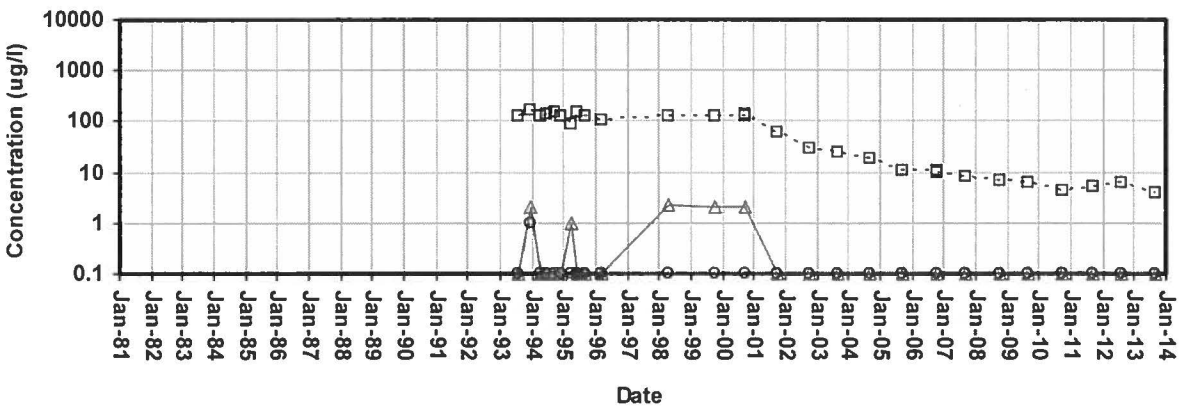


Concentration Plot for: OSA-07B
BOS elevation: 89

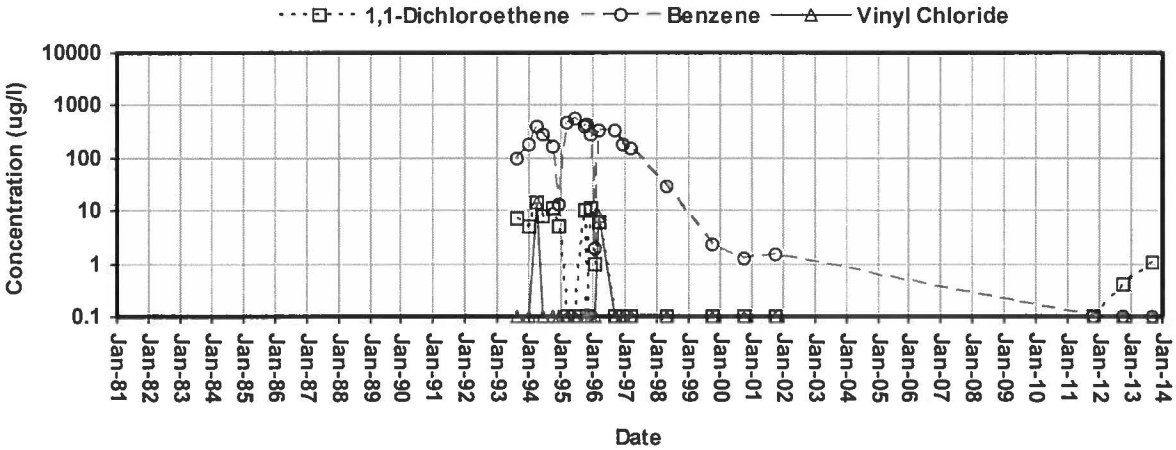


Sampling method switched to PDB in Fall 2011

Concentration Plot for: OSA-11B
BOS elevation: 108

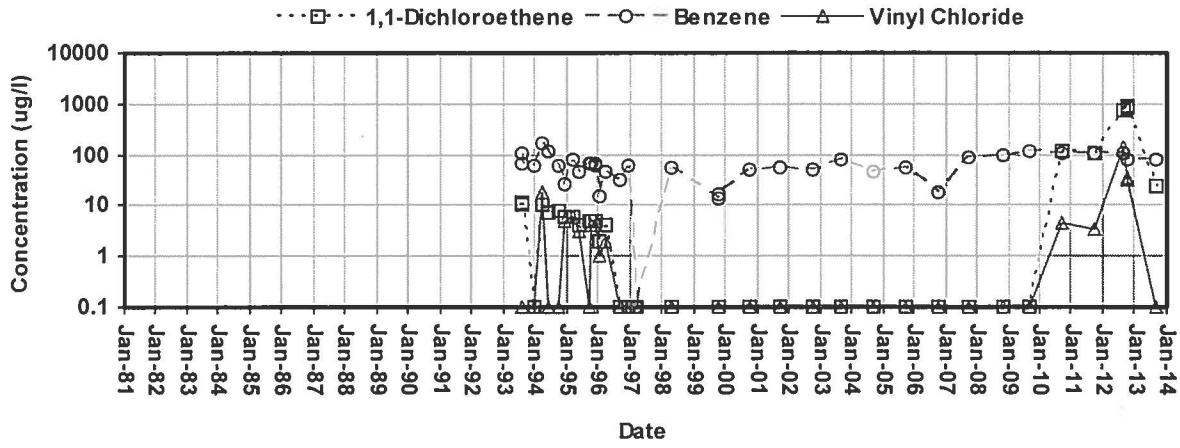


Concentration Plot for: OSA-13A
BOS elevation: 123

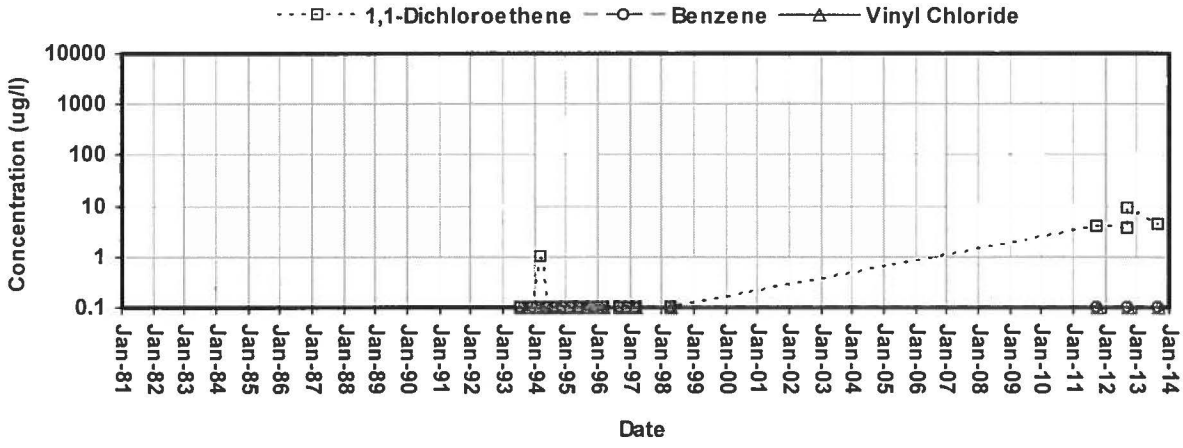


Sampling method switched to PDB in Fall 2007

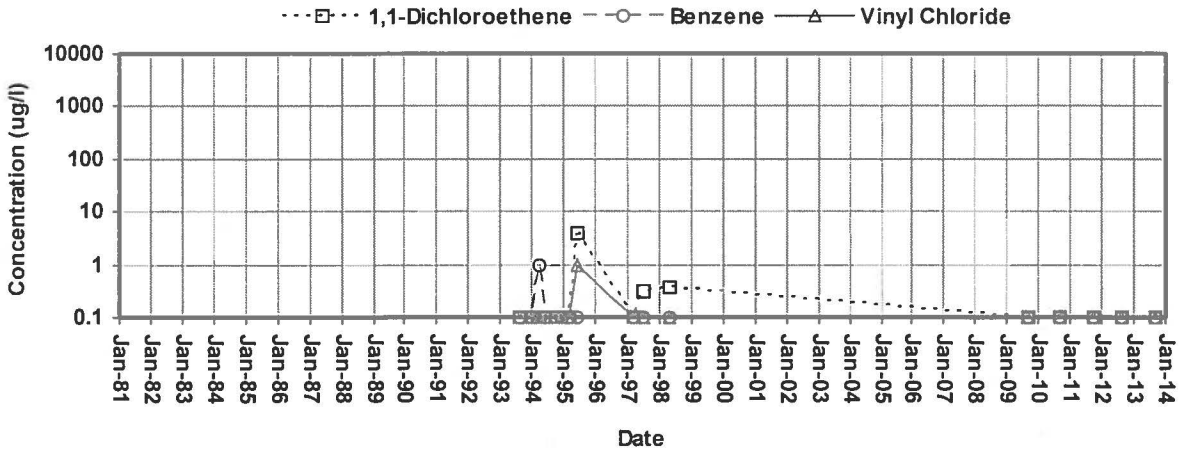
Concentration Plot for: OSA-13B
BOS elevation: 105



Concentration Plot for: OSA-13C
Sampling method switched to PDB in Fall 2009
BOS elevation: 73

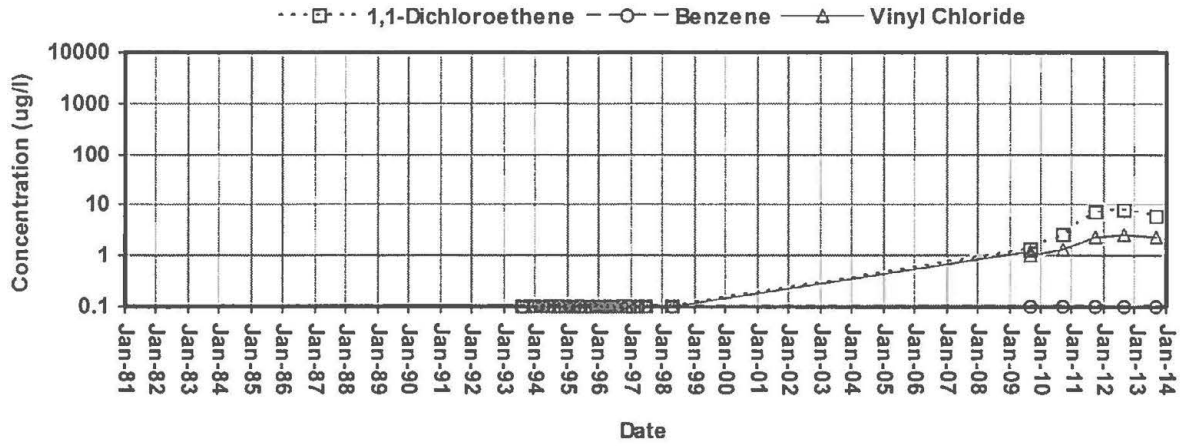


Concentration Plot for: OSA-14B
Sampling method switched to PDB in Fall 2011
BOS elevation: 79

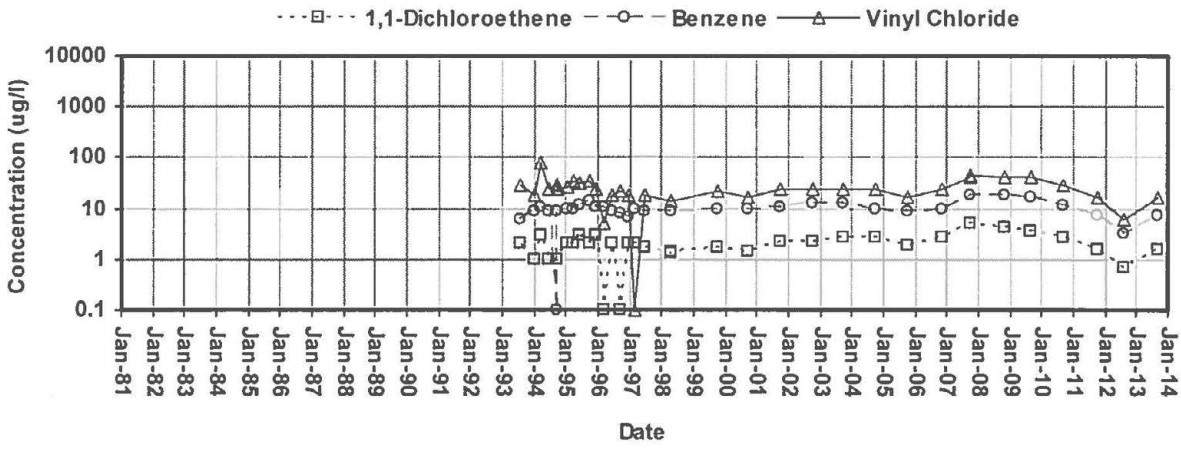


Sampling method switched to PDB in Fall 2007

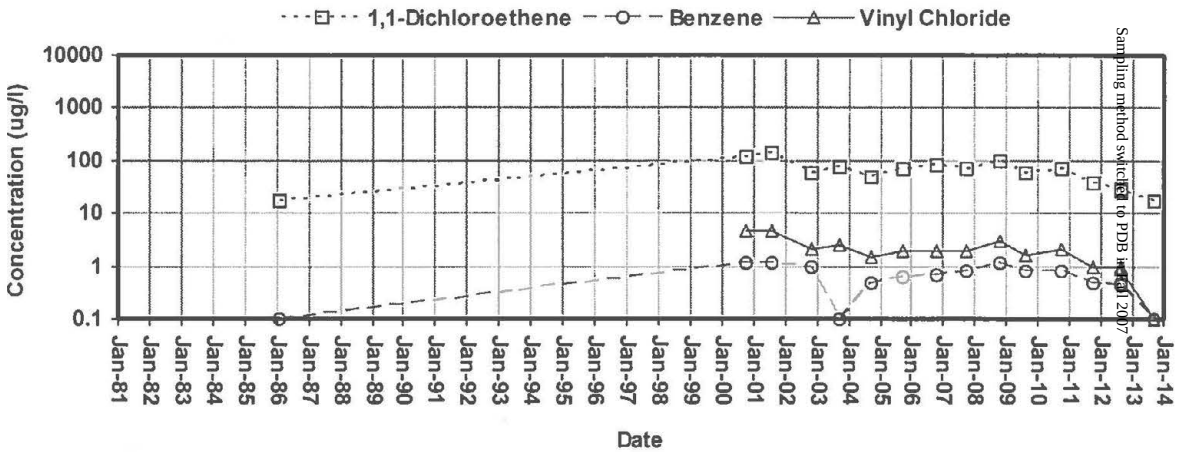
Concentration Plot for: OSA-15B
BOS elevation: 73



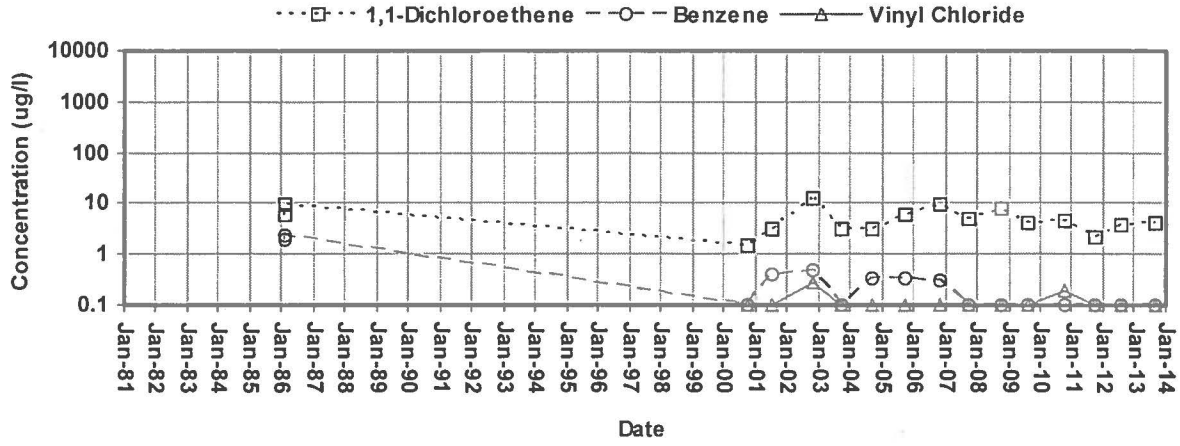
Concentration Plot for: OSA-16B
BOS elevation: 54



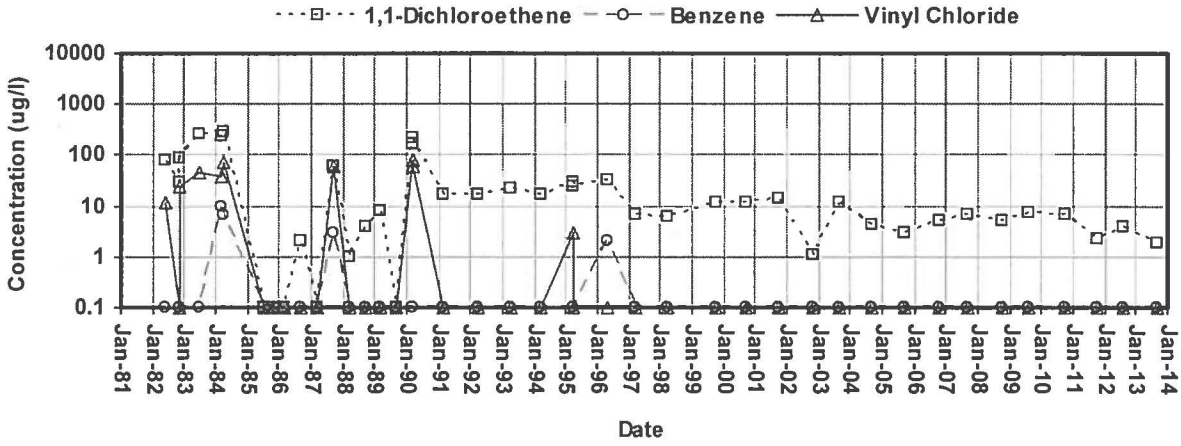
Concentration Plot for: PS-22B
BOS elevation: 96



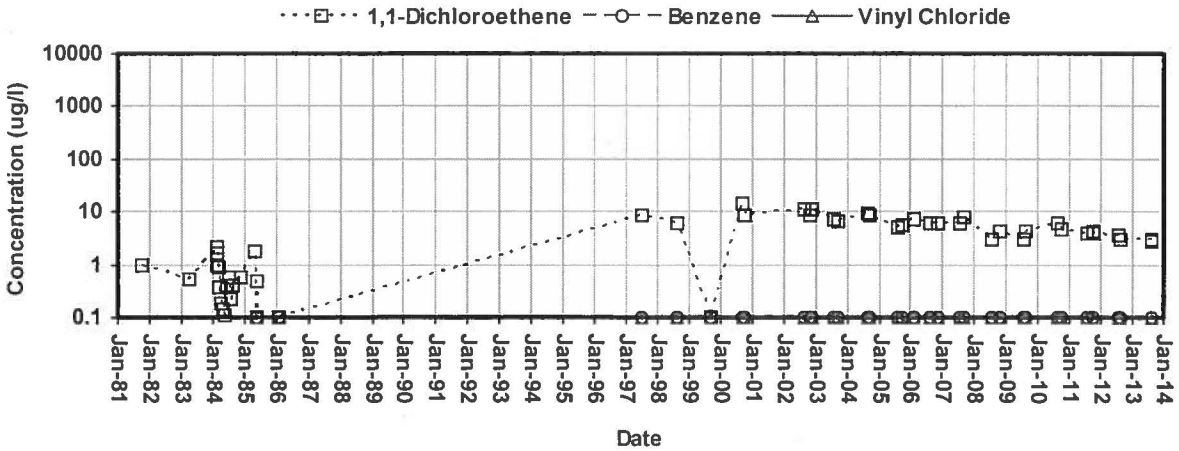
Concentration Plot for: PS-29B
BOS elevation: 86



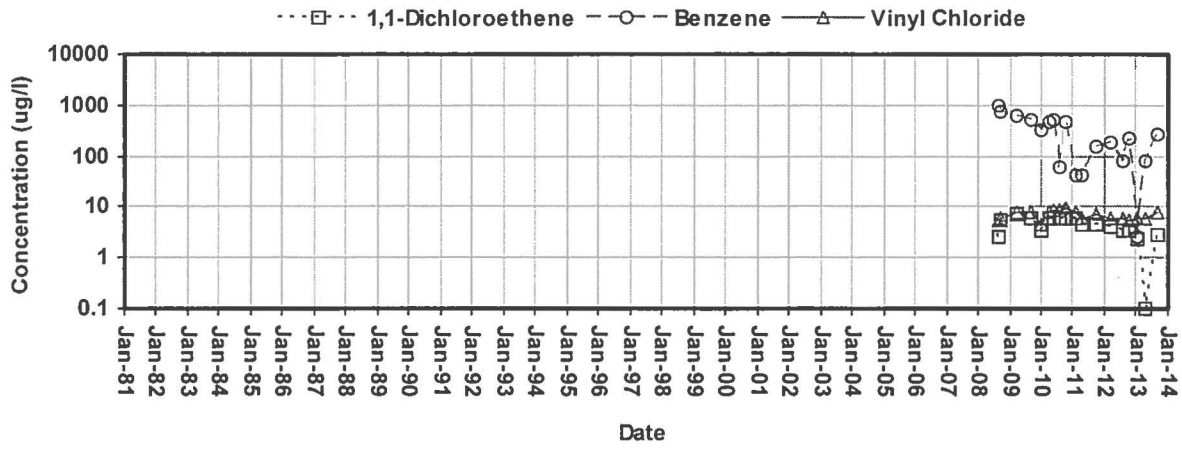
Concentration Plot for: PT-11B1
BOS elevation: 43



Concentration Plot for: SCRIBNER
BOS elevation:

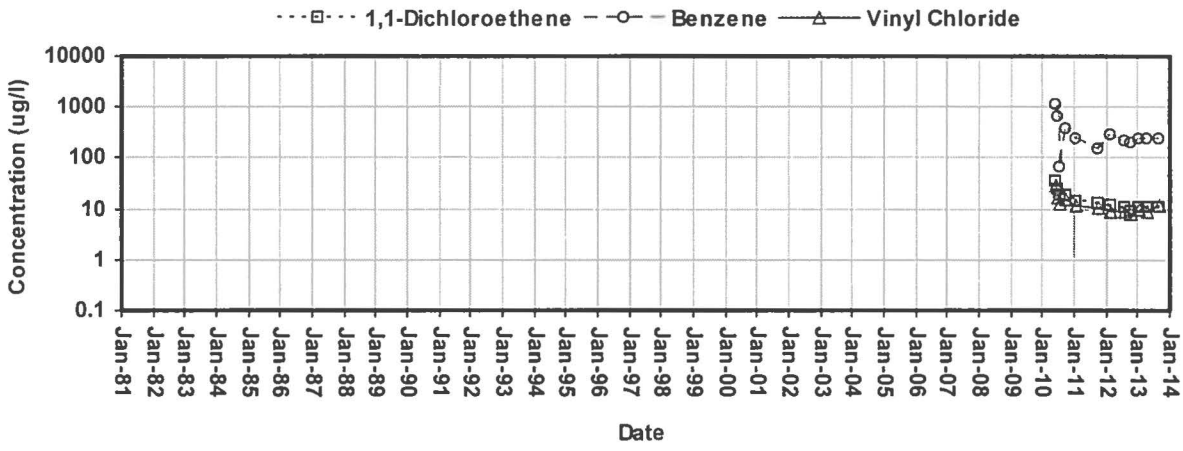


Concentration Plot for: SELF-1
BOS elevation: 95

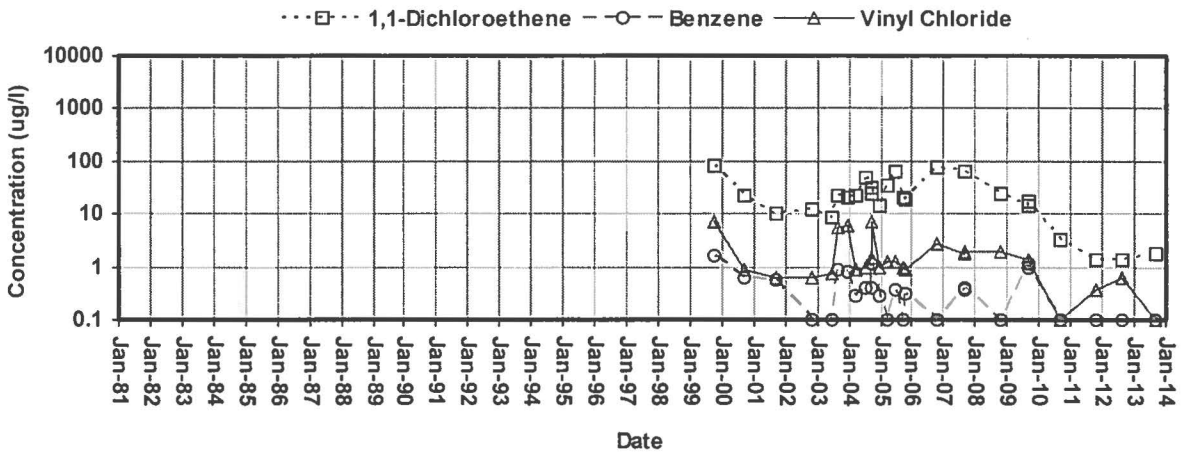


Concentration Plot for: SELF-2
BOS elevation: 85

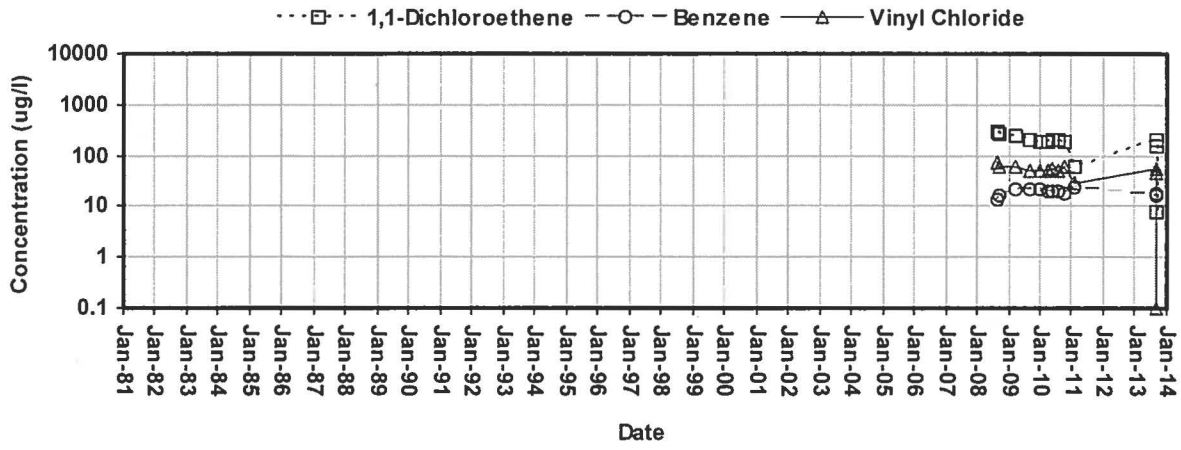
Sampling method switched to PDB in Fall 2009



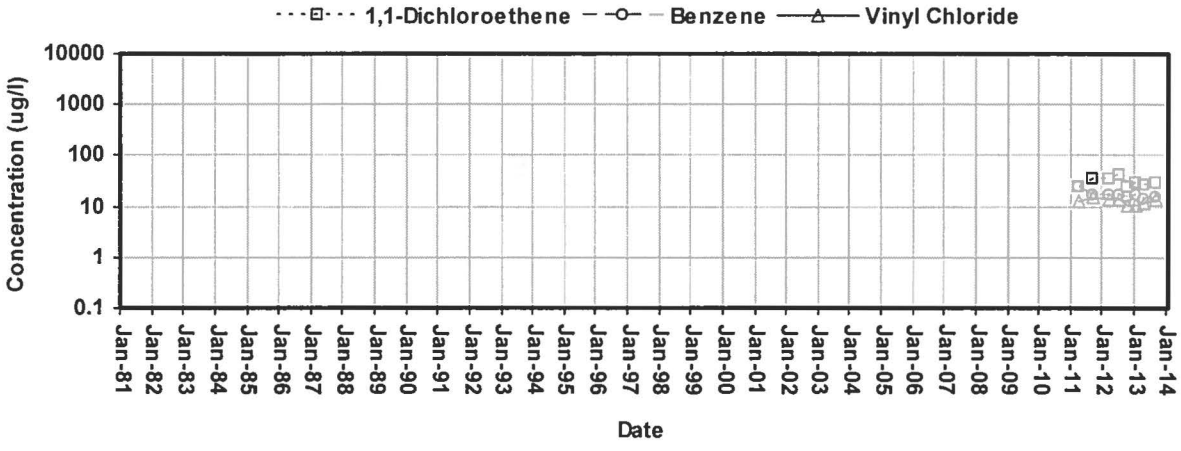
Concentration Plot for: SLGP-R
BOS elevation: 66



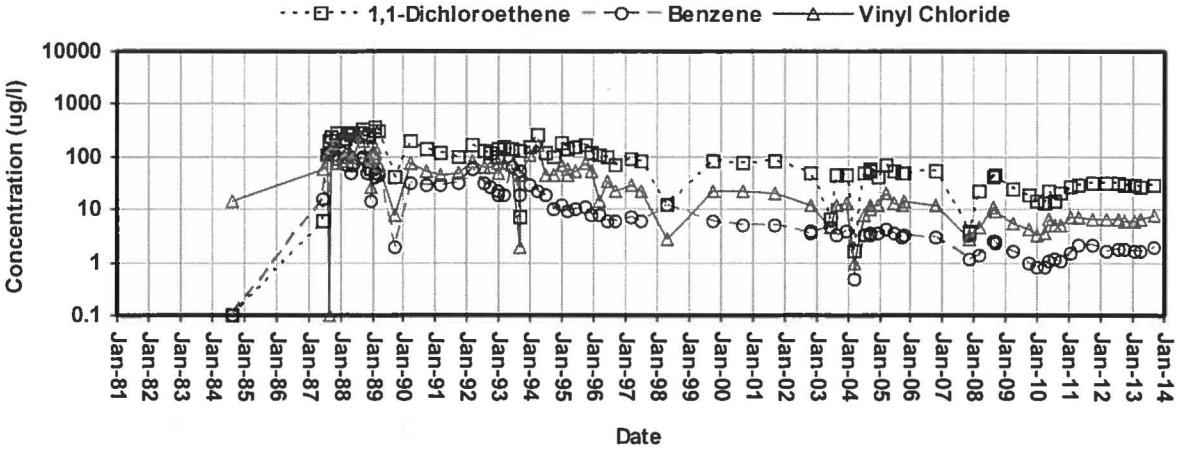
Concentration Plot for: SWLF-1
BOS elevation: -12 (BR)



Concentration Plot for: SWLF-2
BOS elevation: -25 (BR)

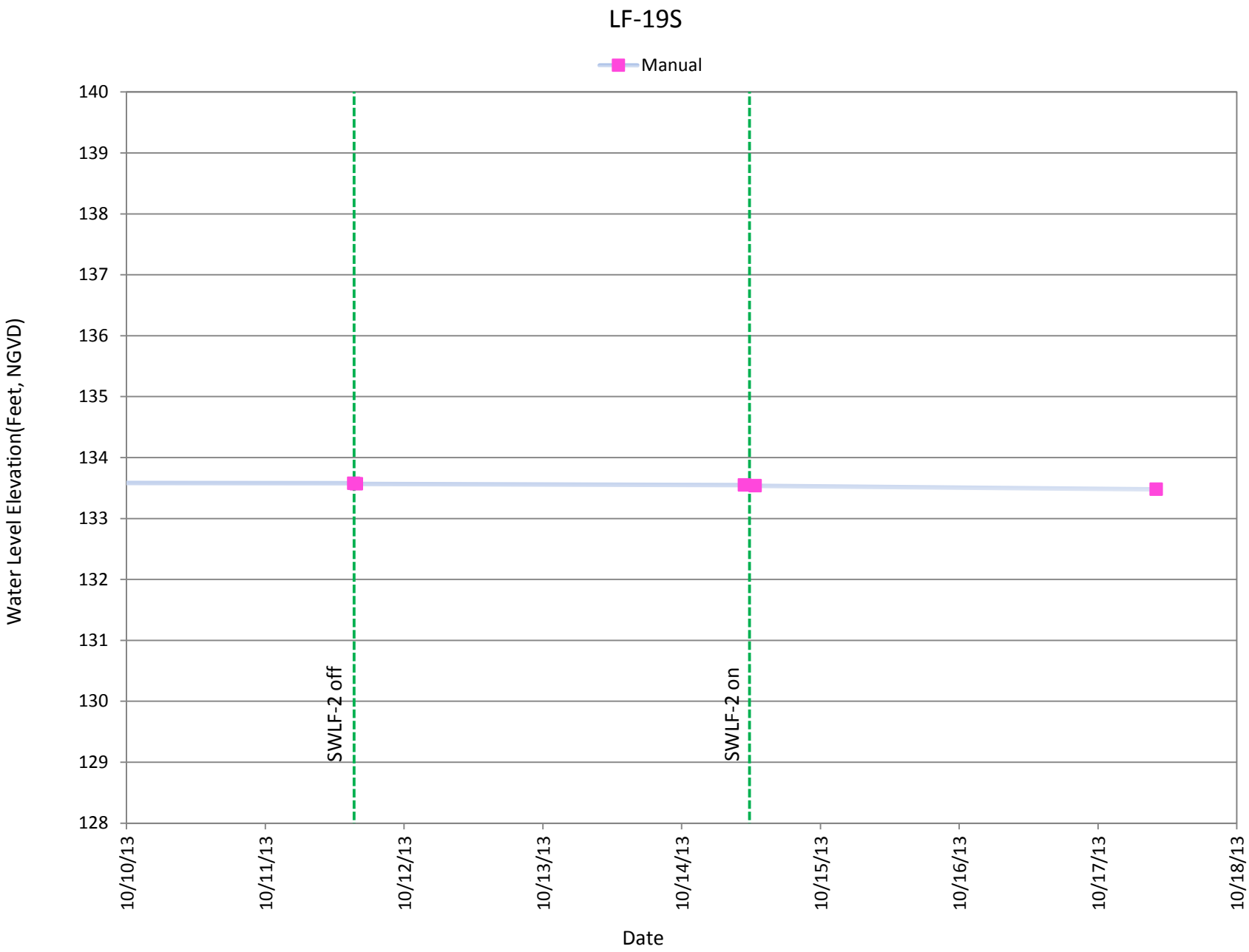


Concentration Plot for: WLF
BOS elevation: 86

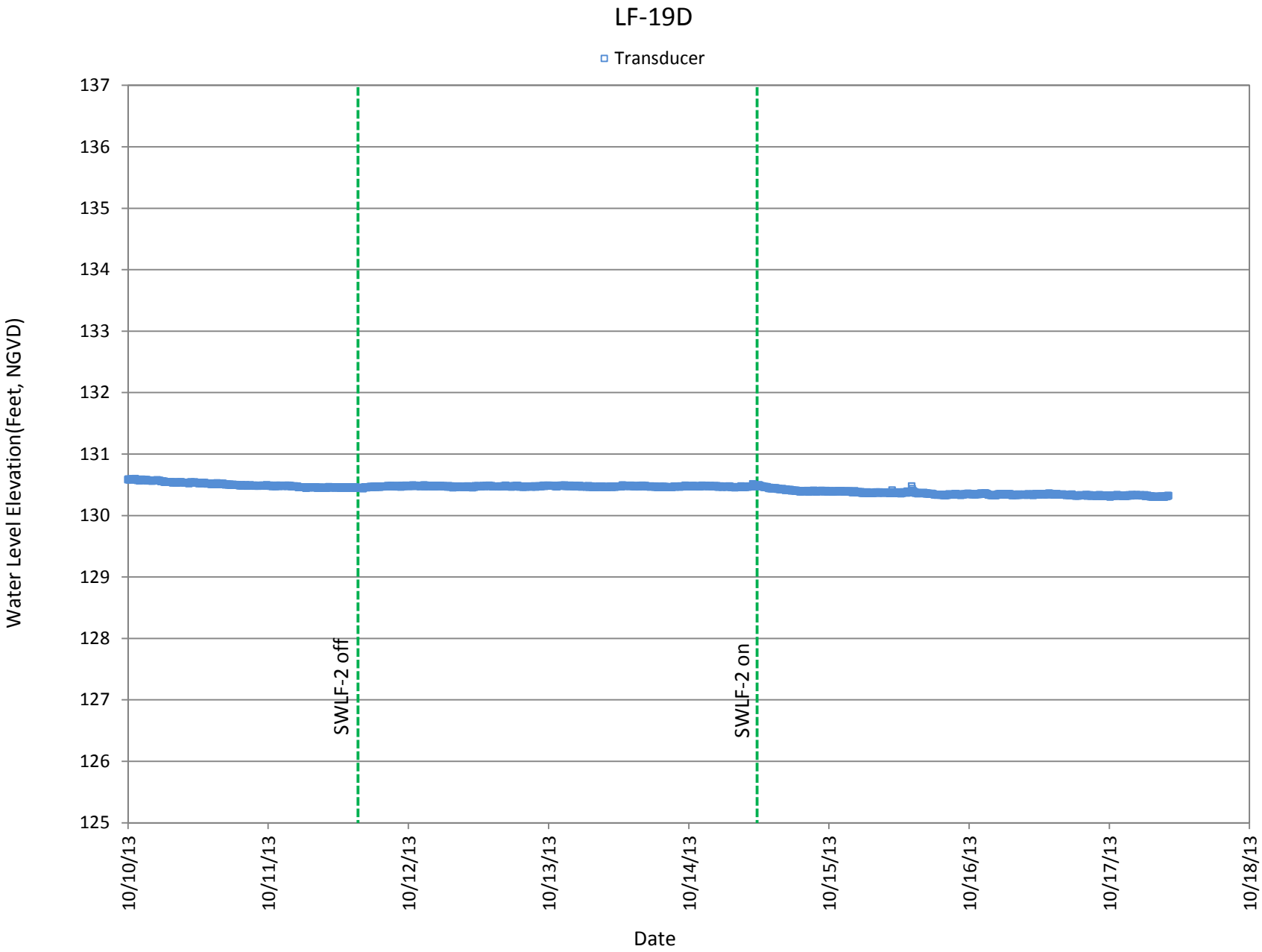


ATTACHMENT E

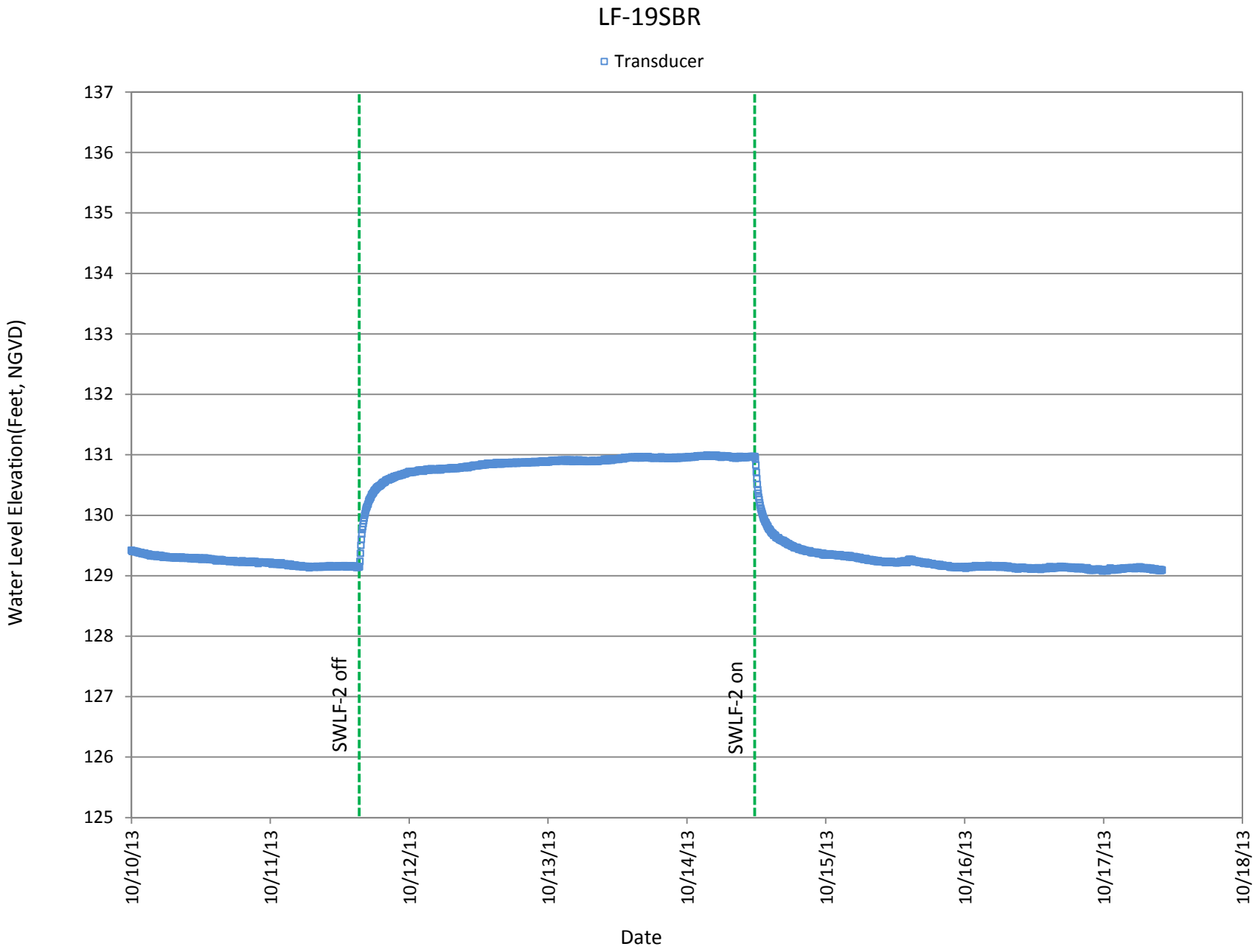
HYDROGRAPHS FROM HYDRAULIC TESTING OF SWLF-2



P:\PROJECT\WRGACTON\Pumping_Tests\2013_SWLF-2_PumpTest\SWLF-2_PumpTestGraphs4.xlsxLF19SGraph



P:\PROJECT\WRGACTON\Pumping_Tests\2013_SWLF-2_PumpTest\SWLF-2_PumpTestGraphs4.xlsxLF19DGraph



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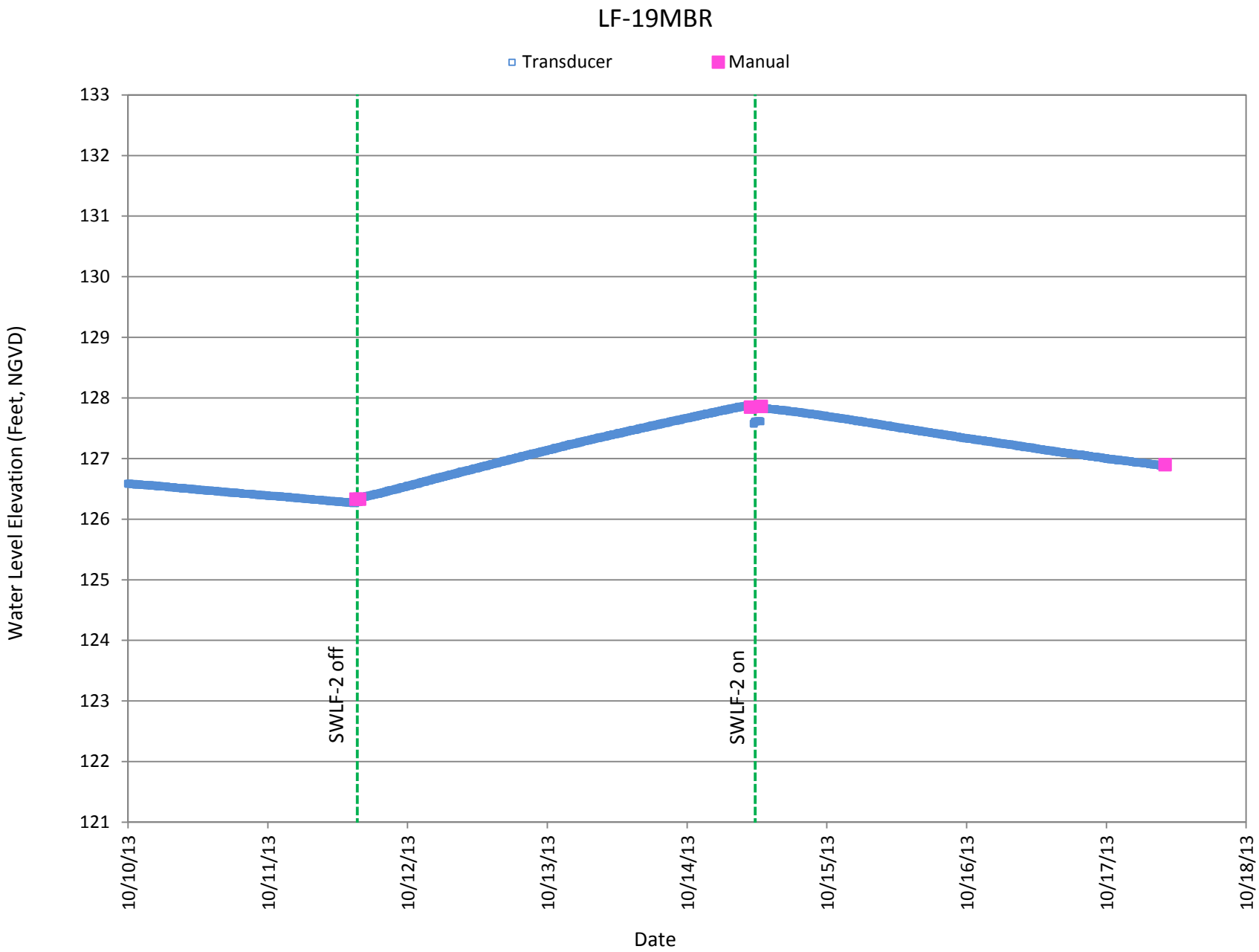
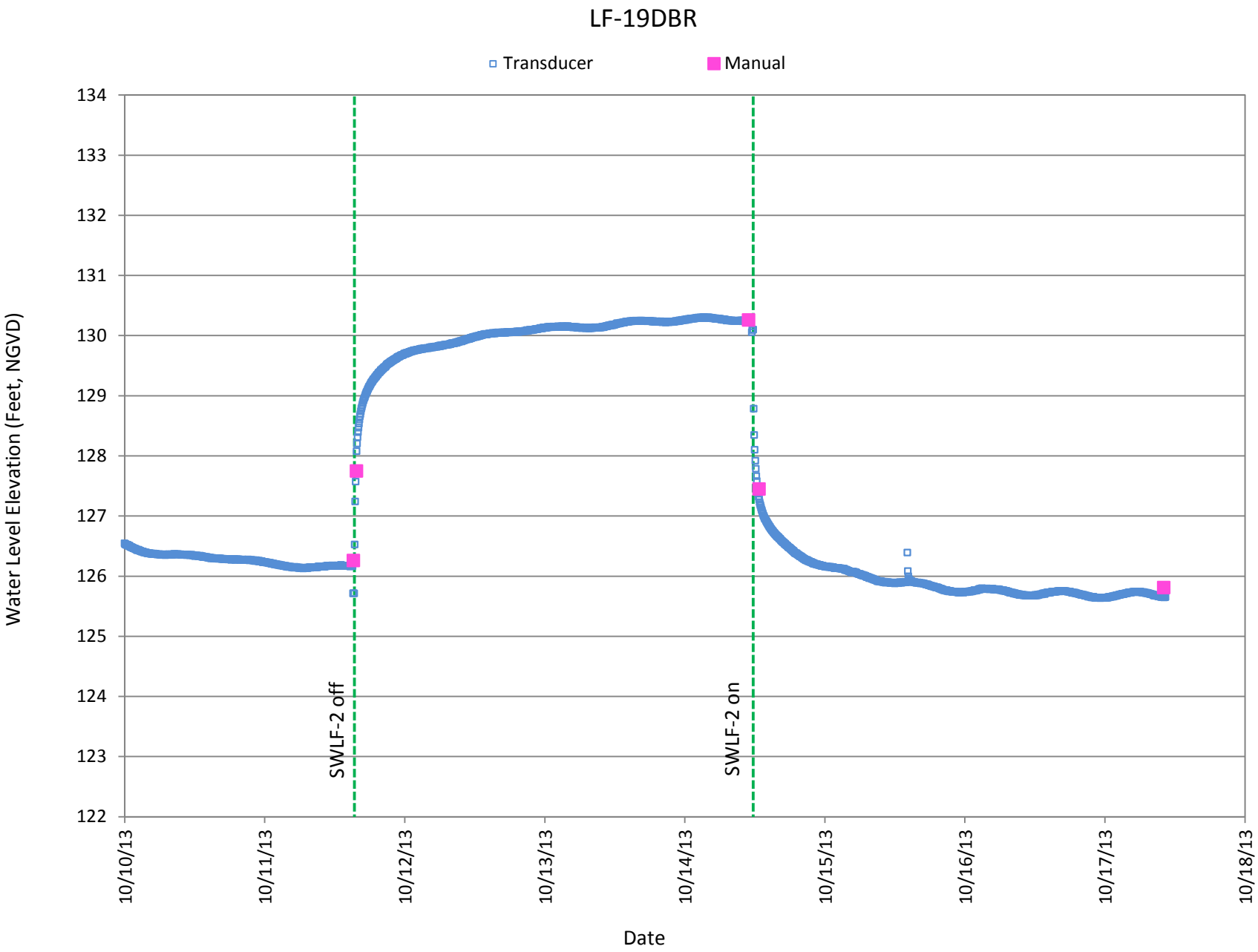


P:\PROJECT\WRGACTON\Pumping_Tests\2013_SWLF-2_PumpTest\SWLF-2_PumpTestGraphs4.xlsxLF19MBRGraph



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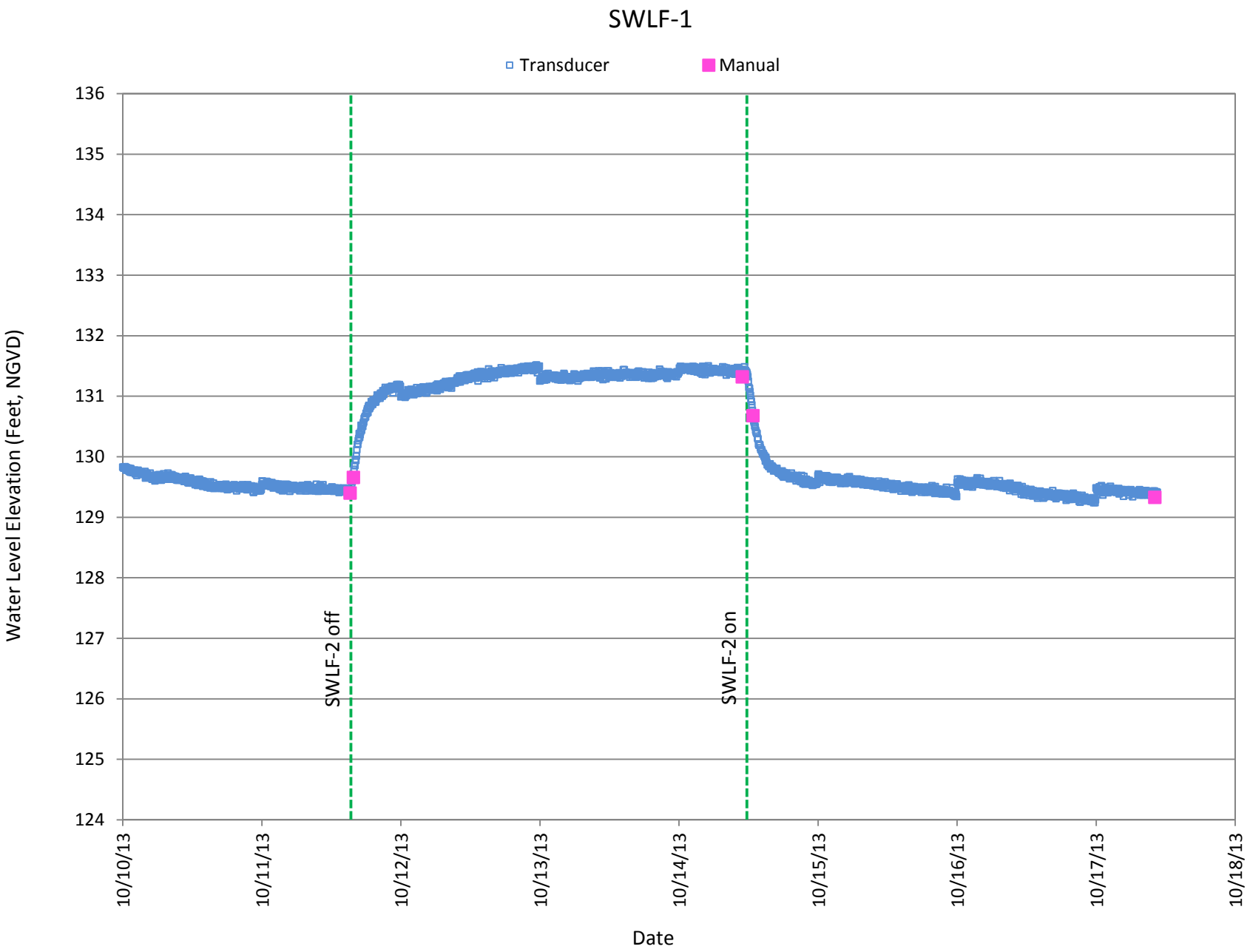
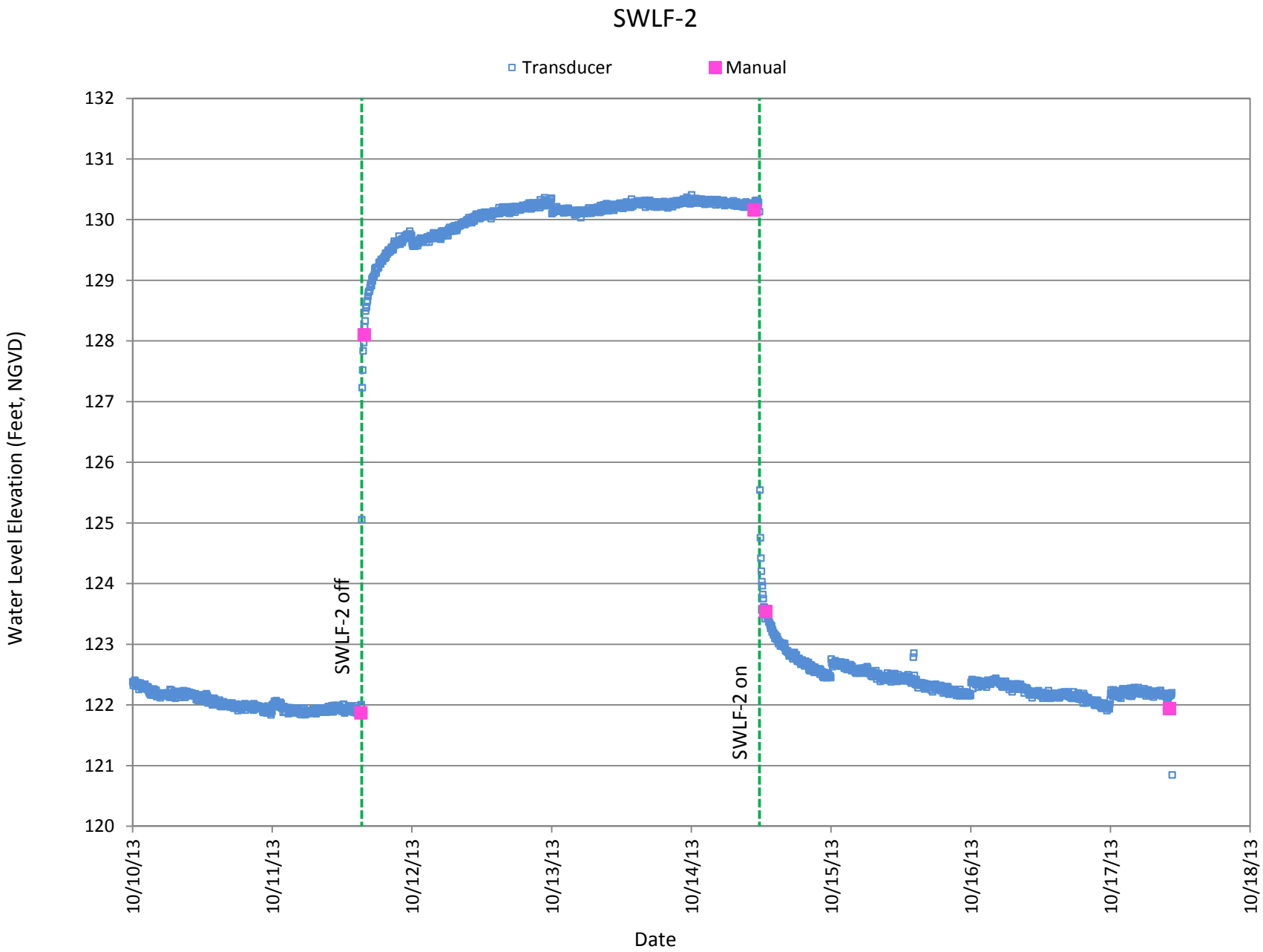
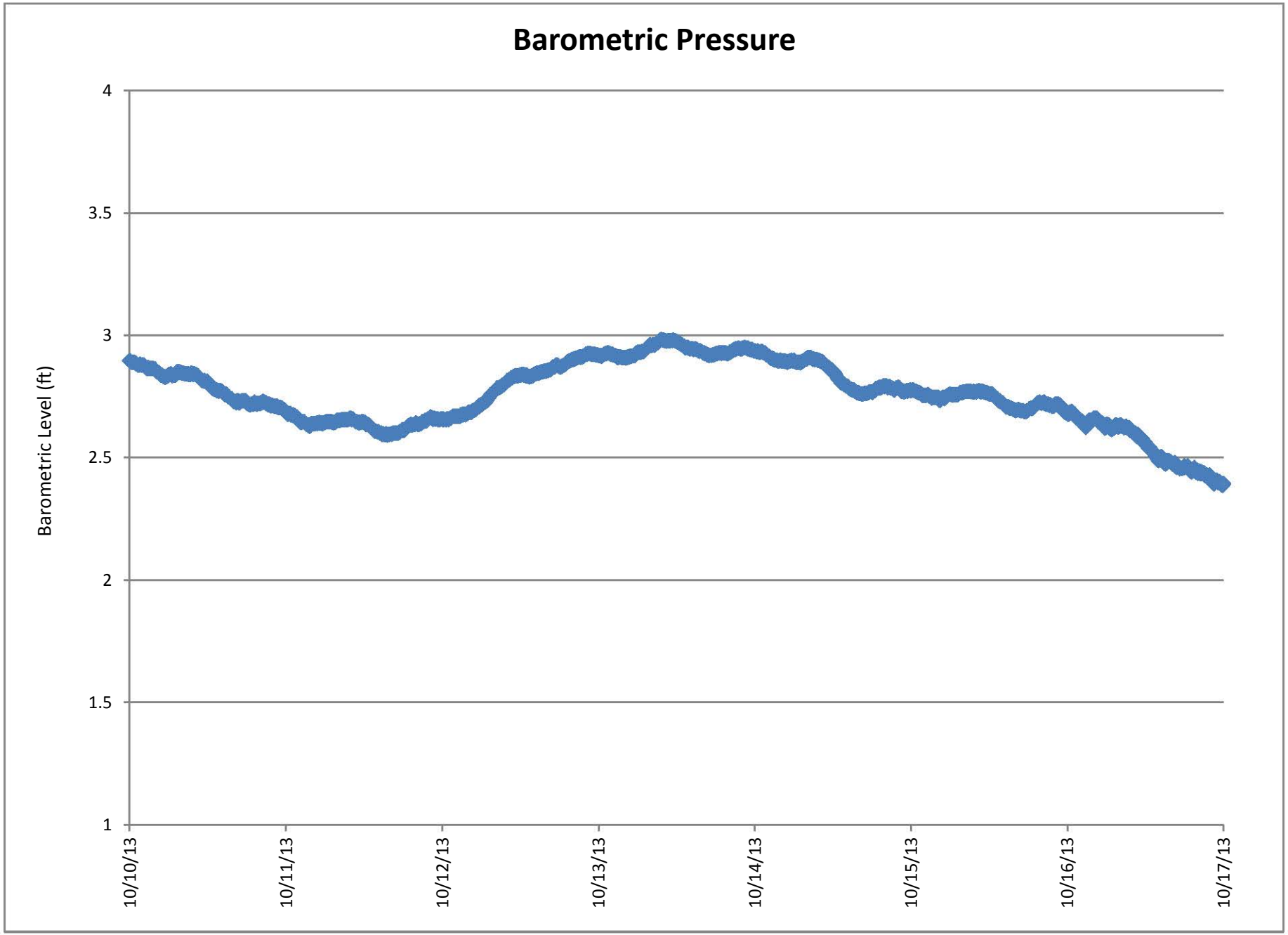


P:\PROJECT\WRGACTON\Pumping_Tests\2013_SWLF-2_PumpTest\SWLF-2_PumpTestGraphs4.xlsxSWLF-1Graph



P:\PROJECT\WRGACTON\Pumping_Tests\2013_SWLF-2_PumpTest\SWLF-2_PumpTestGraphs4.xlsxSWLF-2Graph


Barometric Pressure
Barometric Level (ft)
4
3.5
3
2.5
2
1.5
1
10/10/13
10/11/13
10/12/13
10/13/13
10/14/13
10/15/13
10/16/13
10/17/13