# PHASE V REMEDY OPERATION STATUS REPORT
# AND FIVE-YEAR REVIEW
# JUNE 2018

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## FORMER RCA FACILITY
## ONE NETWORK DRIVE
## BURLINGTON, MASSACHUSETTS
## RTN 3-00265

PREPARED FOR

LOCKHEED MARTIN CORPORATION
6801 ROCKLEDGE DRIVE
MAIL DROP CCT 246
BETHESDA, MD 20817

PREPARED BY

TETRA TECH
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# LIST OF ACRONYMS

| | |
|---|---|
| 1,1-DCA | 1,1-dichloroethane |
| 1,1-DCE | 1,1-dichloroethene |
| 1,1,1-TCA | 1,1,1-trichloroethane |
| bgs | below ground surface |
| BWSC | Bureau of Waste Site Clean-up |
| °C | degrees Celsius |
| cis-1,2-DCE | cis-1,2-dichloroethene |
| CMR | Code of Massachusetts Regulations |
| COC | chain-of-custody |
| CSA | comprehensive site assessment |
| CSM | conceptual site model |
| CVOC | chlorinated volatile organic compounds |
| DUP | duplicate sample |
| EPA | Environmental Protection Agency |
| ERL | effects range low |
| GW | groundwater |
| LCS | laboratory control standard |
| LCSD | laboratory control standard duplicate |
| L | liters |
| Lockheed Martin | Lockheed Martin Corporation |
| LDPE | low density polyethylene |
| LSP | Licensed Site Professional |
| MassDEP | Massachusetts Department of Environmental Protection |
| MCL | maximum contaminant level |
| MCP | Massachusetts Contingency Plan |
| mg/l | milligrams per liter |
| mL/min | milliliters per minute |
| MNA | monitored natural attenuation |
| mS/cm | millisiemens per centimeter |
| MS | matrix spike |
| MSD | matrix spike duplicate |
| mV | millivolt |
| Northbridge | Northbridge Companies |
| NOECs | no observable effect concentrations |
| ORP | oxidation-reduction potential |
| PARCCS | precision, accuracy, representativeness, comparability, completeness, and sensitivity |
| PCE | tetrachloroethene |
| PIP | public involvement plan |
| PRA | Preliminary Response Action |
| QA/QC | quality assurance/duality control |
| RAA | remedial action alternative |
| RAM | Release Abatement Measure |
| RAO | Response Action Outcome |

## LIST OF ACRONYMS (CONT'D)

| | |
|---|---|
| RAP | Remedial Action Plan |
| RCA | Recording Company of America |
| RIP | Remedy Implementation Plan |
| ROS | Remedy Operation Status |
| RPD | relative percent difference |
| RTN | release tracking number |
| Shaw | Shaw Environmental, Inc. |
| Sun | Sun Microsystems, Inc. |
| SSV/VC | subslab soil venting & vapor control system |
| SVOCs | semi-volatile organic compounds |
| TCE | trichloroethene |
| Tetra Tech | Tetra Tech Inc. |
| TOC | total organic carbon |
| µg/l | micrograms per liter |
| VOC | volatile organic compound |

# EXECUTIVE SUMMARY

On behalf of Lockheed Martin Corporation (Lockheed Martin), Tetra Tech Inc. (Tetra Tech) has prepared this Phase V Remedy Operation Status (ROS) Report and Five-Year Review for the former Recording Company of America Facility (former RCA Site) located at 1 Network Drive in Burlington, Massachusetts, Release Tracking Number (RTN) 3-00265. The purpose of this report is to fulfill the six-month reporting requirement under the Remedy Implementation Plan (RIP) and to document the results of the Phase V monitoring program. This report fulfills the requirements of the Code of Massachusetts Regulations (CMR), specifically 310.CMR 40.0892(2) of the Massachusetts Contingency Plan (MCP). The former RCA Site is in Phase V Remedy Operation Status for monitored natural attenuation (MNA) of a chlorinated volatile organic compound (VOC) plume and the occurrence of 1,4-dioxane.

The scope of the monitoring program for this reporting period includes the review and analysis of data from groundwater samples collected in November 2017. The MNA remedy for this site was continued during this reporting period due to the presence of the following VOCs in groundwater: tetrachloroethene (PCE); trichloroethene (TCE); 1,1-dichloroethene (1,1-DCE); 1,1,1-trichloroethane (1,1,1-TCA); 1,1-dichloroethane (1,1-DCA); cis-1,2-dichloroethene (cis-1,2-DCE); and 1,4-dioxane.

1,4-Dioxane was determined to be a contaminant of interest at this site based on concentrations detected in groundwater during the November 2014 and November 2015 sampling events. Tetra Tech notified the Massachusetts Department Environmental Protection (MassDEP) on April 15, 2016 of the groundwater exceedances of the newly established GW-1 standard for 1,4-dioxane and in response MassDEP assigned a new RTN (3-33535) to the site. The assignment of a new RTN requires a Preliminary Response Action (PRA), with respect to 1,4-dioxane at the site. This RTN was addressed by further investigations and submittal of a Tier Classification and Phase I Report (April 17, 2017) linking the new RTN associated with the 1,4-dioxane to the "parent" RTN (3-00265).

As described in the December 2017 ROS report, Tetra Tech installed an additional monitoring well (TTMW-7(R)) in September 2017. During the current reporting period of December 2017 to June 2018, Tetra Tech completed analysis of groundwater samples collected

during the annual groundwater sampling event conducted in November 2017. A summary of the data from the November 2017 annual sampling event is as follows:

- 1,1-DCE was detected above the GW-1 groundwater cleanup standard (7 micrograms per liter µg/l) in well 3G-11 at a concentration of 10 µg/l. Six (6) other quantifiable detections of 1,1-DCE were below the GW-1 standard and none of the detected concentrations exceeded the GW-2 standard (80 µg/l).
- PCE was detected at nine (9) locations with all detections below the GW-1 standard (5 µg/l).
- TCE was quantifiably detected at seven (7) monitoring wells below the MCP GW-1/GW-2 standard (both standards are 5 µg/l), with wells EMW-1D (9.6 µg/l) and EMW-3R (11 µg/l) exceeding the GW-1 standard. Neither well is located within 30 feet of an occupied structure. TTMW-1 is within the GW-2 zone of an occupied structure and the groundwater sampling results were below both GW-1 and GW-2 standards.
- cis-1,2-DCE was quantifiably detected at seven (7) locations with all detections below GW-1 standards.
- 1,1-DCA was quantifiably detected at five (5) locations with all detections well below GW-1 and GW-2 standards.
- 1,4-Dioxane was quantifiably detected in samples from four (4) wells, with two (2) of the detections exceeding the GW-1 standard, and no exceedances of the GW-2 standard. The maximum detected 1,4-dioxane value was 0.69 µg/l at well 3G-11.

Overall, based on the annual sampling results it appears that natural attenuation of chlorinated VOCs (CVOCs) and 1,4-dioxane present in groundwater is continuing and is effectively remediating groundwater at the site. Based on limited data the concentration trend of 1,4-dioxane appears to be either stable or decreasing.

The next annual groundwater sampling event under RTN 3-265 will be conducted in November 2018 and the results of that sampling event will be discussed in the June 2019 Phase V Monitoring Report.

Based on modifications to the existing scope proposed in the Phase I Comprehensive Site Assessment Report, the sampling of TTMW-7(R) for CVOCs and 1,4-dioxane has been integrated into the annual sampling and monitoring program.

# 1.0 INTRODUCTION

This Phase V Monitoring Report has been prepared by Tetra Tech Inc. (Tetra Tech) for Lockheed Martin Corporation (Lockheed Martin), the former owner of the property located at 1 Network Drive in Burlington, Massachusetts, Release Tracking Number (RTN) 3-00265. This report documents the monitoring activities that have been conducted in accordance with the Phase IV Remedy Implementation Plan (RIP) for the former Recording Company of America Facility (former RCA Site) dated December 10, 1998 (and as subsequently modified). The former RCA Site is in Phase V Remedy Operation Status (ROS) for monitored natural attenuation (MNA) of an aqueous phase chlorinated volatile organic compound (VOC) plume and 1,4-dioxane.

This report fulfills the status report requirement for the period of December 15, 2017 through June 14, 2018 and fulfills the requirements of 310 CMR 40.0892(2) of the Massachusetts Contingency Plan (MCP). The purpose of this report is to present field activities and data collected during the monitoring period. The remainder of this section provides a historic background on the former RCA site, report objective, and report outline.

1,4-Dioxane was determined to be a contaminant of interest at this site based on concentrations detected in groundwater during the November 2014 and November 2015 sampling events. Tetra Tech notified MassDEP on April 15, 2016 of the groundwater exceedances of the newly established GW-1 standard for 1,4-dioxane and in response MassDEP assigned a new RTN (3-33535) to the site. This RTN was addressed by further investigations, submittal of a Tier Classification and Phase I Report (April 17, 2017), and linking the RTN associated with the 1,4-dioxane to the "parent" RTN (3-00265) for VOCs.

## 1.1 BACKGROUND

The property located at 1 Network Drive, defined as the former RCA Site is approximately 158 acres, with approximately 140 acres in the Town of Burlington and the remainder in the Town of Bedford (see **Figure 1-1**). The former RCA Site is bound to the north by Vine Brook, to the east by Middlesex Turnpike, to the southeast by a series of industrial properties, and to the southwest by State Route 3. The property is a former industrial facility that included two large buildings (which were demolished in 1996) and several smaller buildings (which were demolished in 1996 and 1997) where industrial activities (primarily manufacturing and testing of military

electronics equipment) occurred between 1958 and 1994. Undeveloped wooded land and wetlands surround these areas. In addition, the following three brooks are located on the property: Vine Brook which flows along the northeastern portion of the property from southeast to northwest; Central Brook which is a tributary to Vine Brook located in the central portion of the property, and West Brook which is a tributary to Vine Brook located in the western portion of the property. The property is partially located within the Zone II of an inactive water supply well in the Town of Bedford.

All of the buildings at the former RCA Site (excluding the Baxter House, which was a former farmhouse) were removed from the property by Lockheed Martin in 1996 and 1997. Sun Microsystems, Inc. (Sun) subsequently purchased the property in August 1997 and redeveloped the property as a corporate office complex for their east coast regional headquarters. This complex was subsequently purchased by the Nordblom Company in 2007 who redeveloped this space for various enterprises. An approximate one-acre parcel on the west side of Corporate Drive (parcel 32-3-11) was purchased by Greenleaf Way Development, LLC from Nordblom in July 2013. **Figure 1-2** shows the current building layout as well as the four-lane Network Drive (formerly Kent Road).

A Phase I Site Investigation Report was prepared by Geraghty & Miller, Inc. in August 1995. The Massachusetts Department of Environmental Protection (MassDEP) approved a Tier IB permit for the former RCA Site on December 11, 1995 (release tracking number 3-00265, and permit number 102258).

A Phase II Comprehensive Site Assessment (CSA) was conducted by EMCON between October 1996 and June 1997, which identified various areas at the former RCA Site with impacted soil, groundwater, surface water, and sediment. Alternatives for addressing the areas of impacted groundwater and sediment at the former RCA Site were identified and evaluated in the Phase III Remedial Action Plan (RAP), which was prepared by EMCON in December 1997. The risk characterization for human health indicated that a condition of No Significant Risk for the foreseeable future did not exist for: 1) soils in limited areas of the Hazardous Waste Storage Area and in the basement of the Baxter House; and 2) groundwater impacted by chlorinated VOCs originating from the former TCE tanks/RCA Building 2 area (now the general location of Building 5, as shown on **Figure 1-2**) and extending downgradient to Vine Brook in both the deep

overburden and shallow bedrock aquifers. In addition, the risk characterization for the environment indicated that a condition of No Significant Risk did not exist for sediment in Central Brook and associated wetlands. As a result of these evaluations, soil removal was performed at specific areas during the summer of 1997 as part of a Release Abatement Measure (RAM). Specific areas of removal included soil located within the former Hazardous Waste Storage Area and sediment associated with the portion of Central Brook located south of Network Drive (formerly Kent Road). In 1998, the former RCA Site was designated as a Public Involvement Plan (PIP) site. Further, additional remedial activities were completed in October 2000, which addressed the impacted soil and groundwater in the vicinity of the Baxter House.

For sediment, the Comprehensive Remedial Action alternative that was initially selected was the No Action Alternative, as a Temporary Solution. It was determined (EMCON, 1998) that although no substantial hazards currently existed at the former RCA Site the potential for future migration of impacted sediment to Vine Brook could result in a Substantial Hazard to the environment. Therefore, the remedial goal of the Temporary Solution for sediment was to minimize the potential for impacted sediment to migrate and accumulate to significant levels at new locations. However, to achieve a permanent solution for the sediment, a Phase IV Addendum was prepared in 2002 to further address the remediation of sediments in the Central Brook (Shaw Environmental, Inc. [Shaw] 2002). Subsequently, additional comprehensive response actions were conducted in Central Brook during the fall of 2002, as discussed later in this section.

For groundwater, the natural attenuation alternative was selected as a Temporary Solution. A Substantial Hazard to human health did not exist at this site in 1997. The remedial goal of a Temporary Solution for groundwater is to minimize the potential for a Substantial Hazard to occur in the future. To further this approach, a Phase IV RIP was prepared in 1998 (EMCON 1998). The key elements of the RIP were: 1) the preparation of monitoring plans to minimize the potential for a Substantial Hazard to exist in the future; 2) contingency plans that would be implemented should conditions be identified that could pose a Substantial Hazard; 3) a predator study plan to gather information to provide direct evidence of whether impacted sediment poses a Significant Risk to the environment; and 4) a plan to re-designate the aquifer so that the GW-1 category will no longer be applicable. With regard to the plan to re-designate the aquifer classification, Lockheed Martin is currently not pursuing activities to formally abandon Bedford Well #3 and re-designate the

aquifer classification. Bedford Well #3 remains inactive and the groundwater in the area remains designated as GW-1.

Based on Phase V monitoring data, a condition of Substantial Hazard has not existed and does not exist. The conclusions of the predator study were that while various life stages of amphibians were observed, in general the study area was not a good habitat for the predators of interest (amphibians and aquatic birds) due to its physical characteristics. The survey indicated that the area is unlikely to represent an important breeding or feeding habitat for aquatic birds, since they prefer areas with dense wetland vegetation, which were not found at this site.

Trigger levels for metals in surface water and sediment, and for VOCs in surface water were established in the Phase IV RIP. The basis for these trigger levels were ambient water quality criteria for metals, drinking water standards for VOCs, and Effects Range Low[1] (ERL) benchmarks for sediment. As documented in the June 2001 Phase V Monitoring Report, a review of trigger levels was warranted for metals in surface water and sediment. Trigger levels for metals in surface water were adjusted as indicated in the June 2001 Phase V Monitoring Report.

The Phase V Addendum, submitted in August 2001, presented a modification to the sediment sampling program and provided a rationale for this modification. The change in sampling protocol and analysis was intended to decrease the number of false-positive trigger exceedances, and to better detect the potential migration of metals from Central Brook to Vine Brook.

A partial Response Action Outcome (RAO) statement was filed on January 22, 2002 for the former RCA Site. The only areas/media not included in the partial RAO were: 1) a chlorinated VOC groundwater plume originating at what is now the location of Building No. 5, and heading approximately north toward Vine Brook (**Figure 1-2**), and 2) surface water and sediments in the Central Brook and associated wetlands area.

A Phase III RAP and a Phase IV RIP Addendum were prepared in July 2002. The Phase III RAP identified and evaluated two remedial action alternatives (RAAs) in addition to the five previously screened technologies in the 1997 Phase III RAP. These additional RAAs (S-6 and S-7) addressed the sediment in Central Brook and/or associated wetlands based on findings from the Phase III Investigation and Treatability Study. The detailed evaluation and comparison of sediment alternatives resulted in the selection of the Focused Excavation Alternative (S-6) via vacuum

excavation as the Permanent Solution for the sediment in Central Brook and/or associated wetlands.

A Phase IV RIP Addendum prepared in July 2002 presented detailed plans relating to the implementation of sediment removal by vacuum dredging and off-site disposal. The Phase IV RIP Addendum focused solely on addressing impacted sediments and outlined the implementation of the remedial alternative selected in the Phase III RAP Addendum.

The Phase IV comprehensive response actions associated with remediating sediments in Central Brook were successfully completed between September and December 2002. Since remediation is complete, Phase V monitoring activities associated with monitoring metal concentrations in Central Brook and Vine Brook sediments and surface water were no longer needed. A significant amount of source material was removed and a condition of No Significant Risk has been achieved, as documented in the partial RAO for Central Brook and associated wetlands submitted in April 2003. A Phase IV Completion Statement, partial RAO, Phase V Monitoring Report, and ROS Submittal were also prepared and submitted in April 2003. Phase V Monitoring Reports have been submitted to the MassDEP since June 2003 in accordance with the six-month reporting requirements of 310 CMR 40.0893(2)(e). ROS activities (consisting of annual groundwater and surface water sampling and analysis) continued at the former RCA site.

In 2012, the Northbridge Companies (Northbridge), an affiliate of the Nordblom Company, began development on the east side of Network Drive. Development to date includes an assisted living facility and an early childhood education facility on a portion of the property. The development is in the vicinity of the well-defined chlorinated VOC groundwater plume associated with the former RCA Site. Shaw conducted assessment activities and evaluations of the proposed development under the MCP, which were reported in the June 2011 Phase V Monitoring Report (Shaw, June 2011). The early assessment conducted by Shaw evaluated suitability for an assisted living facility and retail/restaurant space (the original proposal for land development). For this evaluation, Shaw reviewed existing groundwater data and conducted additional sampling from four temporary water table screened wells installed in the area of the proposed development (one in each of the two planned retail areas [TEMP-3 and TEMP-4] and two in the planned assisted living facility [TEMP-1 and TEMP-2] as shown in **Figure 1-2**). These data were utilized to evaluate the potential for the VOCs in groundwater to impact the air within the planned buildings

at the Northbridge development. The results of the 2011 vapor intrusion assessment activities and evaluations of the Northbridge development as presented by Shaw were as follows:

- Volatilization of the VOCs from groundwater and site soils is not expected to be a concern for indoor air of the proposed buildings;
- The proposed development is not expected to affect current or future remedial activities at the former RCA site and will not exacerbate site conditions or cause contaminants to migrate beyond the currently defined site boundaries; and
- Shaw concluded that the proposed development plans did not require a RAM plan for the proposed construction activities.

In 2013, Northbridge and the Primrose Schools began construction of an early childhood education facility on Greenleaf Way, which is within the defined limits of the VOC plume of the former RCA Site. On behalf of Lockheed Martin, Tetra Tech observed and documented the installation of a sub-slab soil venting & vapor control system (SSV/VC) at the construction site for the Primrose School. The installation of the SSV/VC was completed by a third party contractor, The Waterproofing Company of Boston, Massachusetts and was completed between October 2-9, 2013 in accordance with the design prepared and provided by the Isosceles Group, also of Boston, Massachusetts. Tetra Tech was on site to observe the installation and document conditions related to the specifications of the proposed system design provided by The Isosceles Group. Based on site observations made in November 2014, the construction activities were completed. The property, on which the Primrose School is located, was purchased by Greenleaf Way Development, LLC from Nordblom in July 2013; thus as of 2013 the RTN encompasses two separately owned parcels of land.

In May 2013, a five year re-calculation of the estimated natural attenuation rates for groundwater was performed by Tetra Tech (Tetra Tech June, 2013). Based on the May 2013 analyses, natural attenuation of the VOCs present in groundwater appears to be continuing at rates similar to those previously calculated, and annual monitoring of the groundwater remains adequate. That report stated that the estimated cleanup criteria was calculated to be achieved within the next two years, and that estimate compared favorably with previously estimated timeframes.

In late 2013 a review of the surface water quality results was conducted, which indicated that for the prior several years no VOCs were detected above the Phase IV trigger levels, as defined in the Phase IV RIP. Therefore, three additional rounds of surface water sampling were completed in November 2013, February 2014, and May 2014 to determine if seasonal variations

or trends above the trigger levels would occur. All detected concentrations, as noted in **Table 3-1** of the June 2014 Phase V Monitoring Report (Tetra Tech June, 2014) were reported below the Phase IV surface water trigger levels. Although trace concentrations of benzene, toluene, ethylbenzene and xylene were detected in the surface water samples collected in February 2014, these constituents are not indicative of site-related VOCs, and are more likely to originate from non-point sources associated with local activities at the adjoining Bedford Street north of Vine Brook. Therefore, it was determined that VOCs do not pose a Substantial Hazard as defined in 310 CMR 40.0956 and do not pose a concern. The quarterly surface water sampling results collected since May 2013 confirmed that the cleanup objectives continue to be met over four consecutive seasons and support a decision to cease surface water monitoring activities in accordance with MassDEP policy and the RIP. Therefore, Tetra Tech and Lockheed Martin concluded that surface water sampling was no longer required and hence the surface water sampling efforts were phased out of the monitoring program (Tetra Tech, June 2014).

The 2014 revision to the MCP included requirements to address potential exposures through vapor intrusion from contaminants in soil and groundwater under/adjacent to buildings. The revision indicates that if VOCs are located within 30 feet of an occupied building and the average annual depth to groundwater is 15 feet or less, the responsible party needs to ensure protectiveness of the occupants of the property by ensuring those VOCs cannot enter into the interior spaces of the building and accumulate. One building is present within the footprint of the downgradient plume and an additional well was deemed to be necessary to identify the quality of the shallow groundwater within a distance of 30 feet from this building. Monitoring data from the vicinity of this building indicates that low concentrations of VOCs are present in deep groundwater (>30 feet below ground surface and >15 feet below the top of the water table) and the conceptual site model indicates that there is a lens of clean groundwater present above the deeper groundwater containing the low concentrations of VOCs. Historic data from a shallow well just outside this 30-foot distance has shown no VOC concentrations above the GW-2 standard. In addition, it is noted that the building in question, which is occupied by the Primrose School, an early childhood education center, was constructed with a sub-slab vapor barrier and SSV/VC system. However, to be conservative and ensure protectiveness, in November 2015 a shallow groundwater well (TTMW-1) was added to the monitoring well network within the GW-2 area (within 30 feet) of

the Primrose School to document the shallow water conditions. These activities are described in Section 2.1 of this report.

During the March 10, 2016 Licensed Site Professional (LSP) meeting, MassDEP stated that exceedances of published criteria for the emerging contaminant 1,4-dioxane at sites already tier-classified require separate MassDEP notification. Because 1,4-dioxane had previously been detected at low concentrations, but exceeding GW-1 standards, a release notification was submitted to MassDEP on April 15, 2016 (Transaction ID 821543). On April 20, 2016 the MassDEP issued a new RTN for the site (RTN 3-33535) and also issued a notice of responsibility (NOR) on April 27, 2016. The assignment of a new RTN requires a Preliminary Response Action (PRA), with respect to 1,4-dioxane at the site, and within one year of the notification issuing either a permanent solution statement indicating no risk and no further action with regards to 1,4-dioxane or a tier classification for the new RTN. This RTN was addressed by further investigations and submittal of a Tier Classification and Phase I Report (April 17, 2017) linking the RTN associated with the 1,4-dioxane to the "parent" RTN (3-00265) for VOCs. The Phase I Report indicated that a potential data gap is represented by the potential presence of 1-4-dioxane at Site 7 (**Figure 1-3**) which was a former source area for 1,1,1-trichloroethane (a typical "source" for 1,4-dioxane). Therefore, in September 2017, groundwater monitoring well TTMW-7(R) was installed in Site 7, and modifications to the existing scope were proposed in the Phase I Comprehensive Site Assessment Report including the sampling of TTMW-7(R) for CVOCs and 1,4-dioxane in November 2017.

## 1.2 OBJECTIVE

The objective of this Phase V Monitoring Report is to document the monitoring activities that are conducted during the reporting period from December 15, 2017 through June 14, 2018 at the former RCA site in accordance with the various plans described in the 1998 RIP, the 2001 Phase V Addendum, and the 2003 Phase V Monitoring Report and ROS Statement. In addition, the monitoring report evaluates the monitoring data with respect to identifying conditions that might pose a Substantial Hazard, and if appropriate, evaluate the need for contingency actions. The final objective of the report is to present a five-year review of the MCP response actions at the Site. Given that the selected remedial alternative does not include a remedial system or required Active Exposure Pathway Mitigation Measures (AEPMMs), the monitoring report does

not include any items pertaining to operation or inspection, with the exception of well integrity inspections.

## 1.3 LIST OF CONTACTS

This section identifies the potentially responsible party, Licensed Site Professional (LSP)-of-record, owner, and operator for the subject response action.

**Potentially Responsible Party and Former Owner/Operator**

Lockheed Martin Corporation
6801 Rockledge Drive
Mail Drop CCT 246
Bethesda, MD 20817

Contact: Ms. Glenda B. Clark
Phone: (817) 378-2573
Position: Project Lead, Environmental Remediation

**Licensed Site Professional (LSP)**

Tetra Tech, Inc.
One Monarch Drive, Suite 202
Littleton, MA 01460

Contact: Mr. Thomas Nunno (License Number: 2527)
Phone: (978) 952-0123
Position: Licensed Site Professional

## 1.4 REPORT ORGANIZATION

Tetra Tech has organized this monitoring report and five-year periodic review to follow the requirements specified in 310 CMR 40.0892, as described below:

- Section 2.0: Provides a description of the type and frequency of monitoring/field activities conducted;
- Section 3.0: Presents a description of the field sampling activities, the results of MNA field monitoring parameters and a groundwater elevation contour map and a schedule;
- Section 4.0: Provides a description of conditions or problems noted during the monitoring period which are or may be affecting the performance of the remedial action, and any measures taken to correct those conditions;
- Section 5.0: Provides a description of significant modifications being made to the monitoring program (if any are warranted);
- Section 6.0: Presents a periodic review of the MCP response actions at the Site;

- Section 7.0: Provides the LSP Opinion regarding this report;
- Section 8.0: Provides a list of references; and
- Section 9.0: Provides the limitations regarding this report.

# 2.0 MONITORING AND FIELD ACTIVITIES

This section describes the sampling activities that were conducted in accordance with the detailed monitoring plan presented in the RIP (dated December 10, 1998), as modified by the Phase V Addendum (dated August 28, 2001), the Phase V Monitoring Report and ROS Statement (dated April 28, 2003), and the Phase V Monitoring Report and ROS Statement (dated June 16, 2014). All of the monitoring locations are identified on **Figure 1-2**.

In accordance with the 1998 RIP, surface water sampling for metals was to be conducted quarterly for two years and annually thereafter. However, due to the completion of Phase IV comprehensive response actions performed in the fall of 2002, surface water sampling for metals is no longer warranted, and was therefore removed from the sampling program in April 2003 (Shaw, 2003). Additionally, in accordance with the 1998 RIP, surface water sampling for VOCs was to be conducted quarterly for one year and annually thereafter. Annual surface water sampling began in November 2000. Because multiple years of data indicated chemicals of concern were not present above detection limit in surface water data collected for the former RCA site, and as discussed in Section 1 of this report, Tetra Tech recommended that the surface water sampling be discontinued from the monitoring program (Tetra Tech, June 2013). Therefore; no surface water sampling was conducted during this monitoring period due to its removal from the program after the May 2014 event.

In accordance with the 1998 RIP, sediment sampling was to be conducted quarterly for one year and annually thereafter. However, due to the completion of Phase IV comprehensive response actions performed in the fall of 2002, sediment sampling for metals is no longer warranted, and was therefore removed from the sampling program in April 2003 (see Phase V Monitoring Report and ROS Statement; April 28, 2003).

In accordance with the 1998 RIP and an agreement between Lockheed Martin and the current property owner, groundwater sampling was to be conducted quarterly for two years, and conducted annually thereafter. An annual sampling round was conducted in November 2017. At the time of the December 2017 report preparation, the data from the November 2017 sampling event was not available; therefore, the data for the November 2017 event is provided in this

submittal. Future groundwater sampling and analysis for VOCs will continue to be conducted on an annual basis during the month of November until cleanup objectives are achieved.

## 2.1 ANNUAL GROUNDWATER SAMPLING

To quantify rates of natural attenuation, to monitor long-term trends in VOC concentrations, and to detect changed conditions that may affect the performance of the MNA program, which is the selected remedial action alternative, Tetra Tech conducted annual groundwater sampling on November 11 through November 17 2017. The following 18 monitoring wells were sampled during this sampling event: 3G-11, 3G-12, 3H-1S, 3H-1D, 3H-2, 3H-3, 3H-5, A-1, A-1D, EMW-1D, EMW-2D(R), EMW-3R, EMW-7, EMW-10D, EMW-11R, EMW-12R, TTMW-1 and TTMW-7(R). Each well was sampled by Tetra Tech personnel primarily in accordance with procedures outlined in Low Stress Purging and Sampling Procedure for the Collection of Groundawater Samples from Monitoring Wells United States Environmental Protection Agency (September 2017) as modified in the discussion below.

An inline flow-thru cell (YSI Pro multi-parameter water quality monitoring system) was used to provide measurements of field parameters including conductivity, pH, temperature, oxidation reduction potential, dissolved oxygen, and turbidity.

For each well, the tubing intake was located at the midpoint of the saturated screen interval. Groundwater was purged with a surface-mounted peristaltic pump and Teflon-lined, low density polyethylene (LDPE) tubing at a rate approximately 200 milliliters per minute (mL/min) until stabilization of field chemistry measurements: conductivity (3% variation); pH (0.1 standard unit variation); temperature (3% variation); oxidation reduction potential (10 millivolt (mV) variation); dissolved oxygen (3% variation); and turbidity (10% variation) or after approximately 30 minutes. Groundwater field parameter measurements are included in **Table 2-1**. Once these parameters stabilized, the samples were collected directly from the pump discharge tubing before the flow-thru cell. The VOC vials were checked to confirm that no headspace or air bubbles remained.

Past sampling has shown that for bedrock monitoring wells EMW-3R, EMW-10R, and EMW-11R, pumping at the lowest pump setting will cause the entire water column in the well to be evacuated. Therefore, each well (with the exception of EMW-10R as noted later in this section) was purged dry approximately 24 hours prior to sampling using an inertial pumping system. After

the well recharged, typically within 24 hours, the field chemistry parameters were measured and a direct sample was collected without further purging using the inertial pumping system.

Dedicated tubing was used at each sampling location. Groundwater from each of the wells was evaluated in the field for the following parameters using direct reading instruments: temperature, pH, specific conductivity, dissolved oxygen, and oxidation-reduction potential. All samples were also submitted to ALS Environmental for VOC analysis using the MassDEP Method 8260 CAM Protocols. Samples from the 18 monitoring wells were also submitted for 1,4-dioxane analysis and were analyzed using the MassDEP Method 8270SIM CAM Protocols to achieve a laboratory method reporting limit below the applicable GW-1 standard.

In addition, groundwater samples from three representative wells (3G-12, EMW-2D(R), and EMW-1D) were analyzed for the following natural attenuation parameters: nitrate (EPA method 300.0), sulfate (EPA Method 300.0), methane (Method RSK-175), total organic carbon (SM20 5310C), and a field measurement of ferrous iron using HACH Model IR-18C reagent test kit. For quality assurance/quality control purposes, one trip blank sample and one field duplicate sample were also submitted along with the groundwater samples.

During this sampling period, the water level in each well was measured to the nearest 0.01 foot using a decontaminated electronic water level meter. The elevation of the surface water was also gauged during the sampling events from the surveyed gauging point on the Network Drive Bridge. Groundwater and surface water elevations measured during the November 2017 event are summarized in **Table 2-2** with historic groundwater and surface water elevations. Of note, during several previous monitoring events (November 2014, November 2015, August 2016, and November 2017 the groundwater level in well EMW-10R was recorded at greater than 30 feet below the top of casing which is deeper than the average of less than 0.5 feet during the previous nine (9) events. The reason for the water level fluctuation is unknown. The well was found to still be dry during the November 2017 annual gauging event. Recharge at this well has been problematic for several years. Based the fact that: 1) the well is not hydraulically connected with the aquifer; and redevelopment of this well has been unsuccessful; and 3) analytical results have been consistently below GW-1 standards, the LSP recommends the removal of this well from the monitoring network. The November 2017 groundwater table contour elevation map is presented in **Figure 2-1**.

## 2.2 MONITORING WELL MAINTENANCE

During the November 2017 sampling event, the integrity of the groundwater monitoring well network (19 monitoring wells) was evaluated and found to be acceptable with the exception of EMW-10R; therefore, no well maintenance was performed. As noted above, because EMW-10R provides limited value to the monitoring program and appears to be below GW-1 standards, it will be removed from the monitoring program and permanently closed in accordance with Massachusetts requirements for monitoring wells.

# 3.0 EVALUATION OF WATER QUALITY CONCENTRATION TRENDS AND INTERPRETATION

This section provides an evaluation of the concentration trends and distribution of the three main Site groundwater contaminants: 1,1-DCE, TCE, and PCE, as well as 1,4-dioxane. Sections 3.1 through 3.3 provide a summary of the most recent concentration data. Section 3.4 provides a discussion of the recent monitored natural attenuation changes. The laboratory analytical data sheets for the groundwater samples collected by Tetra Tech in November 2017 are provided in **Appendix A**.

## 3.1 QUALITY ASSURANCE/QUALITY CONTROL

In accordance with MassDEP's Analytical Data Enhancement Program (Quality Assurance and Quality Control Guidelines for Sampling, Data Evaluation and Reporting Activities for the MCP) quality control samples were collected at the frequency required for presumptive certainty and all Precision, Accuracy, Representativeness, Comparability, Completeness, and Sensitivity (PARCCS) criteria were met. The laboratory used MassDEP methods and the laboratory completed and certified the MassDEP MCP Analytical Method Report Certification Forms.

Responses to questions A through F on the forms were answered in the affirmative (where applicable) for all sampling events conducted during the reporting period. Responses to questions H and I on the forms were answered either in the affirmative or all negative responses were addressed in the associated laboratory narrative. Therefore, the data set meets the requirements for "presumptive approval" in accordance with the MassDEP Policy WSC-02-320 - The Compendium of Quality Assurance and Quality Control Requirements and Performance Standards for Selected Analytical Methods Used in Support of Response Actions for the MCP and may be used to support associated LSP opinions.

The analytical data from the groundwater sampling event for CVOCs were electronically entered into the project database and tabulated and validated by Tetra Tech and are included in **Table 3-1**. Validation included a review of all laboratory and field quality control samples including a check of: sample log-in and custody; preservation; analytical holding times; surrogate recoveries; detected results for method and trip blank samples; calculated relative percent differences (RPD) (comparing field and laboratory primary and duplicate samples); laboratory

control standard (LCS) recoveries; and miscellaneous observations. In addition, detection limits were reviewed for appropriateness for this project and analytical data were compared to historic data for consistency. The data used in this report meet the intended purpose under the MCP, which is to monitor the progress of groundwater plume remediation, to evaluate MNA at the former RCA Site, and to evaluate potential exposures at the former RCA Site. The validation report is included in **Appendix B**.

## 3.2 SURFACE WATER

There are several surface-water bodies at the site as shown on Figure 1-3. Low levels of VOCs and metals in surface water (concentrations were all well below the Ambient Water Quality Criteria (AWQC) were detected by Wehran and GZA during previous investigations. Because some of the constituents occurred in upgradient and downgradient surface water (GZA, 1989), surface water impacts at some locations may have occurred as a result of constituents migrating onto the property from an off-site source. As a result, there is evidence of past impacts to surface water at the site. Surface water sampling at the Site was conducted through the end of 2014. Note that 1,4-dioxane was sampled in surface water during 2014 and no detections at a detection limit of 20 µg/l were observed. In 2014 it was determined that since no chlorinated solvents had been detected in surface water for many years, the brook no longer represented a complete pathway, and sampling was discontinued.

## 3.3 GROUNDWATER

Groundwater sampling at the Site is performed to evaluate water quality with respect to CVOCs and 1,4-dioxane and is discussed in the following sub-sections. A groundwater elevation map and inferred flow direction for the November 2017 sampling event is presented on **Figure 2-1.** The groundwater flow direction shows a consistent pattern to historic trends with a flow direction to the north-northwest. This section presents the results for the November 2017 event only. The overall monitoring and performance including data up to November 2017 is provided in Section 3.3

### 3.3.1 Chlorinated Volatile Organic Compounds Analytical Discussion

Analytical results for VOCs in groundwater samples collected during the November 2017 sampling event are detailed in **Table 3-1** (attached) and summarized in **Table 3-2** (below). The

November 2017 1,1-DCE, PCE, and TCE concentrations in unconsolidated deposits and shallow bedrock groundwater are shown on **Figure 3-1** through **Figure 3-3**.

- 1,1-DCE was detected above the GW-1 groundwater cleanup standard (7 ug/l) in well 3G-11 with a concentration of 10 µg/l with six (6) other quantifiable detections below the GW-1 standard. The detected concentrations did not exceed the GW-2 standard.
- PCE was detected at nine (9) locations with all detections below the GW-1 standard (5 ug/l).
- TCE was quantifiably detected at 7 monitoring wells below the MCP GW-1/GW-2 standard (both standards are 5 ug/l) with only two wells EMW-1D (9.6 µg/l) and EMW-3R (11 µg/l) exceeding the GW-1/GW-2 standards. These two wells typically exceed the standards. Wells EMW-1D and EMW-3Rare not within 30 feet of an occupied structure. TTMW-1 is within the GW-2 zone of an occupied structure and the groundwater sampling results were below both standards.
- cis-1,2-DCE was quantifiably detected at seven (7) locations with all detections below GW-1 standards.
- 1,1-DCA was quantifiably detected at five (5) locations with all detections well below GW-1 standards.

**Table 3-1** provides the reported concentrations of CVOCs detected in the November 2017 groundwater samples and also includes historical concentration data. Concentration verses time graphs are included in **Appendix C**. Graphical depictions of the groundwater plume areas and cross sections for each of these primary VOCs are represented in **Figure 3-1** through **Figure 3-6**. Note that **Figure 3-1** through **Figure 3-6** present reported concentrations during four discrete monitoring events (1998, 2001, 2007, and 2017) to demonstrate the overall progress of MNA since 1998, when comprehensive sampling began. A review of the tables, graphs and time-series maps, it is clear that natural attenuation and dispersion is continuing to be effective for reduction of the subject CVOCs in groundwater at the former RCA Site.

Table 3-2

Summary of 2017 Groundwater Results for CVOCs (µg/l)

Phase V and ROS Status Report

Former RCA Facility, Burlington Massachusetts

| November 2017 Sampling Event | | | | | |
|---|---|---|---|---|---|
| **Well ID** | **1,1-DCE** | **PCE** | **TCE** | **cis-1,2-DCE** | **1,1-DCA** |
| **GW-1 Standard** | **7** | **5** | **5** | **70** | **70** |
| **GW-2 Standard** | **80** | **50** | **5** | **20** | **2000** |
| 3G-11 | 10 | 0.1 J | 4.2 | 1.6 | 6.9 |
| 3G-12 | 0.9 | 1.6 | 2.2 | 0.5 | 0.3 J |
| 3G-12D(Dup) | 0.9 | 1.6 | 2.3 | 0.5 | 0.3 J |
| 3H-1D | 0.2 J | <1.0 | 0.1 J | <1.0 | <1.0 |
| 3H-1S | 0.2 J | <1.0 | <1.0 | <1.0 | <1.0 |
| 3H-2 | <1.0 | <1.0 | <1.0 | 0.1 J | <1.0 |
| 3H-3 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 |
| 3H-5 | 3.40 | <1.0 | 1.0 | 0.2 J | 1.40 |
| A-1 | <1.0 | 0.5 | 0. 2 J | <1.0 | 0.1J |
| A-1D | 1.7 | 1.5 | 4.8 | 0.7 | 0.3 J |
| EMW-10D | 0.2 J | 0.7 | 2.3 | 0.4 J | 0.2 J |
| EMW-11R | 1.3 | 1 | 4 | 3.2 | 1.6 |
| EMW-12R | <1.0 | <1.0 | <1.0 | <1.0 | 0.2 J |
| EMW-1D | 0.4 J | 2 | **9.6** | 1.8 | 0.4 J |
| EMW-2D[R] | 3 | 1.5 | 4.8 | 4. | 0.8 |
| EMW-3R | 1.7 | 3.4 | **11** | 3.6 | 0.8 |
| EMW-7 | <1.0 | 1.2 | 0.2 J | 0.1 J | <1.0 |
| TTMW-1 | <1.0 | 0.6 | 0.2 J | <1.0 | <1.0 |
| TTMW-7(R) | <1.0 | <1.0 | 0.1 J | <1.0 | <1.0 |

Notes: EMW-11D has not been sampled since 1999 and has been destroyed

Green Highlight=estimated results

Orange Highlight=Exceeds GW-1 Standard

Orange Highlight, Bold text=Exceeds GW-1 and GW-2 Standards

Dup designates a duplicate sample

### 3.3.2 1,4-Dioxane Analytical Discussion

A select group of wells (wells with typically high CVOC concentrations) were sampled in November 2014 and November 2015 for 1,4-dioxane. 1,4-Dioxane was added to the Massachusetts Oil and Hazardous Materials List as part of the 2014 MCP revision and has been associated with some of the chlorinated VOCs detected at this site. The issuance of a new RTN in April 2016 specific to 1,4-dioxane and the subsequent linking of the RTN for 1,4-dioxane with the original "parent" RTN 3-00265 triggered a more complete sampling network to evaluate its occurrence. Analytical results for 1,4-dioxane in groundwater samples collected during the November 2017 annual sampling event are summarized in **Table 3-3** (below) and shown on **Figure 3-7**.

These data indicate quantifiable detections in samples from four (4) wells, with only two (2) detections exceeding the GW-1 standard (well 3G-11 and 3H-5), and no exceedances of the GW-2 Standard. The maximum detected value was 0.69 µg/l at well 3G-11 during the November 2017 sampling event.

Table 3-3

Summary of 2017 Groundwater Results For 1,4-Dioxane (µg/l)

Phase V and ROS Status Report

Former RCA Facility, Burlington Massachusetts

| **November 2017 Sampling Event** | |
|---|---|
| Well ID | 1,4-Dioxane |
| **GW-1 Standard** | **0.3** |
| **GW-2 Standard** | **6000** |
| 3G-11 | 0.69 |
| 3G-12 | 0.11 J |
| 3G-12D(Dup) | <0.051 |
| 3H-1D | <0.050 |
| 3H-1S | <0.050 |
| 3H-2 | 0.076 J |
| 3H-3 | <0.051 |
| 3H-5 | 0.3 |
| A-1 | <0.050 |
| A-1D | <0.050 |
| EMW-10D | 0.10 J |
| EMW-11R | 0.19 J |
| EMW-12R | <0.05 |
| EMW-1D | 0.10 J |
| EMW-2D(R) | 0.07 J |
| EMW-3R | 0.2 |
| EMW-7 | 0.057 J |
| TTMW-1 | <0.050 |
| TTMW-7(R) | <0.050 |

Notes: EMW-11D has not been sampled since 1999 and has been destroyed;

Green Highlight=estimated results

Orange Highlight=Exceeds GW-1 Standard

Orange Highlight, Bold text=Exceeds GW-1 and GW-2 Standards

Dup designates a duplicate sample

## 3.4 Mann Kendall Analysis

A statistical evaluation of recent groundwater concentration trends was conducted using the Mann-Kendall Trend Test (GSI Environmental, 2012). The Trend Test was completed for the three most prevalent compounds at the former RCA Site, 1,1-DCE, PCE, and TCE, using data collected from 2004 through 2017. The test was also performed for 1,4-dioxane in select wells, as discussed below.

The trend test was used to identify, for the time period between 2004 and 2017, whether there is a statistically significant increasing contaminant concentration trend, decreasing concentration trend, stable trend, or no trend. The trend in concentration is determined by ordering the data temporally and computing all differences between measurements and earlier measurements for 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 statistic is used in conjunction with the total number of data points to determine if there is a statistically significant increasing trend, decreasing trend, or no statistically significant trend in the data set. The trend test was performed on the number of sample results available for each well (see **Appendix E** for sample results included in the analysis). A concentration of one half the detection limit for the relevant compound was assumed for all non-detect results.

**Table 3-4** summarizes the results of the trend test. **Table 3-4** indicates, using the "<=MCL (#)" designation, those locations at which concentrations from all samples collected over the fourteen-year time period were less than the MCL of "#", or for 1,4-dioxane, the GW-1 standard of 0.3 µg/L. For wells at which a trend was identified, the range of concentration change is indicated, with the first number indicating the concentration detected in 2004 and the second number indicating the concentration detected in 2017.

In addition to the trend test, graphs showing the temporal change in 1,1-DCE, PCE, and TCE concentrations in groundwater for all locations currently sampled are included as **Appendix E**.

The trend analysis and evaluation presented in **Table 3-4** generally show a statistically significant decreasing trends (at a 90% or greater confidence level) or stable conditions in all wells and for all compounds of interest. The only exceptions are wells which had no trend or which had

results below the applicable MCL or GW-1 standard for the period under review, as seen on **Table 3-6**.

## 3.5 MONITORED NATURAL ATTENUATION

Field chemistry and natural attenuation parameters, which were measured during the collection of groundwater samples in November 2017, are included in **Table 2-1** and **Table 3-5**, respectively. According to the *OSWER Directive 9200.4-17P – Use of Monitored Natural Attenuation at Superfund, RCRA Corrective Action, and Underground Storage Tank Sites – April, 21, 1999*, MNA monitoring plans should be designed to accomplish several objectives. These sections document that those objectives have been met and provides the associated rationale for both CVOC and 1,4-dioxane detections.

### 3.5.1 CVOC MNA Performance

Groundwater samples from three representative wells (3G-12, EMW-1D, and EMW-2D(R)) were analyzed for the following natural attenuation parameters: nitrate (EPA method 300.0), sulfate (EPA Method 300.0), methane (Microseep's Method AM20GAX), and total organic carbon (EPA Method 415.1). These data along with field chemistry parameters (oxygen, oxygen reduction potential, pH, ferrous iron, and temperature) are presented in **Table 3-5**. Wells EMW-1D, EMW-2D, and 3G-12 are located in the core of the plume; EMW-1D is most upgradient and 3G-12 is most downgradient of these three wells. The data shows a relatively consistent pattern of detections with historic data. Graphs of the MNA parameter data are presented in **Appendix D**:

- Dissolved oxygen has been typically below 2 milligrams per liter (mg/l) (although recent data shows erratic values at EMW-10D) and the oxidation-reduction potential (ORP) is also generally low (<100 mV) with a recent upward trend that would be expected as the contaminant plume is continuing to attenuate.
- Nitrate and sulfate (both electron acceptors that are depleted once oxygen has been used up) values show a slight upward trend when dissolved oxygen is higher.
- Ferrous iron has not historically shown consistent trends except in well EMW-2D, which showed an upward trend up until 2012 as the CVOC concentrations were showing decreasing trends, and a decrease to non-detectable levels since then. This is coincident

with the very low levels of CVOCs being detected in this well. Recent data in Table 3-5, shows an increase in ferrous iron (0.5 mg/l) at EMW-1D

- Methane readings have shown variable trends over time with a generally decreasing trend since 2011.

Overall the data indicate an environment conducive to natural attenuation of CVOCs, with trends indicative of a significantly decreased plume extents that is nearing final attenuation. This data is also consistent with historic trend analyses, referenced below.

#### *3.5.1.1 Demonstration That MNA is Occurring as Expected for CVOCs*

Natural attenuation rates were re-calculated for TCE and 1,1-DCE in 2018 for the 2017 data. The 2018 calculations (**Appendix F**) estimated that all wells which remain above standards for Site CVOCs will achieve cleanup standards within the next 12.8 to 18.9 years for TCE (at EMW-3R and EMW-1D, respectively) and 14.1 years for 1,1-DCE at 3G-11. Calculations have not been conducted for 1,4-dioxane since the data time duration is limited.

#### *3.5.1.2 Changed Conditions Adversely Affecting MNA Have Not Been Detected*

There are no new monitoring data that would indicate that new environmental conditions or new releases of contaminants, which could reduce MNA efficiency, have occurred for CVOCs. Monitoring data supports an overall reduction in groundwater concentrations over time, as shown in **Appendix C** concentration verses time graphs. Natural attenuation parameter data are presented in **Table 3-5**.

The field and laboratory parameters that were measured to evaluate the geochemical state of the Site and whether conditions were indicative of microbial degradation included: conductivity, dissolved oxygen, oxidation reduction potential, temperature, nitrate, sulfate, methane and ferrous iron. The data indicate a slightly reducing environment with minor indications of microbial decay. The natural attenuation of the CVOC plume is potentially dominated by dispersion and fresh water flushing supplemented by microbial decay.

#### *3.5.1.3 No Toxic Transformation Products of CVOCs*

Monitoring data indicate that no potential toxic and/or mobile transformation products are being created as part of the natural attenuation process that could pose a substantial hazard. Although transformation products were being generated (e.g., 1,1-DCE or vinyl chloride), they

are no longer detected above maximum contaminant levels (MCLs) and do not pose a substantial hazard since surface water trigger levels established in the Phase IV RIP have not been exceeded (VOCs in surface water were below laboratory detection limits).

#### *3.5.1.4 Verification That the CVOC Plume Is Not Expanding*

The iso-concentration contour maps and cross-sections (see **Figure 3-1** through **Figure 3-6**) demonstrate that the CVOC plume is not expanding and has in fact significantly contracted.

#### *3.5.1.5 Verification of No Downgradient Unacceptable Impact*

As described above, historic surface water monitoring data confirmed that no substantial hazard exists.

Data collected in November 2017, compared to Mass DEP GW-2 standards stated in the April 2014 MCP update, indicate reductions typically below the GW-2 standard for TCE at A-1D (screened from 30-35 feet below ground surface [bgs]). The concentration of TCE measured in groundwater at this location during the November 2017 sample event was reported at 4.8 µg/l, as compared to the 5 µg/l standard. This well is within 30 feet as measured horizontally of an occupied building; however, this well is screened deeper than 15 feet below the ground surface. The shallow well (TTMW-1) is screened in the shallow portion of the water table (also within 30 feet of the occupied building) and CVOC concentrations measured in this well were an order of magnitude below the GW-2 standards.

There are two factors that further mitigate potential for exposure to TCE in groundwater by occupants in the building through potential vapor intrusion. The first is the presence of a sub-slab vapor barrier and passive depressurization system, installed for this building in a preemptive precautionary measure by the planners prior to building construction. The second is a lens of clean groundwater above the vertical zone where TCE was found in well A-1D as verified by the new water table well, TTMW-1. This data verifies the conceptual site model (CSM) which indicates there is clean water percolating from ground surface that will continually contribute to the saturated zone from above isolating the deeper impacted groundwater originating from the area of well EMW-1D, which is approximately 300 feet to the south-east.

#### *3.5.1.6 Demonstration of Effective Institutional Controls*

There are no requirements for institutional controls at the former RCA Site. Concerns that would identify the need for institutional controls would include the use of site groundwater as a drinking water source and vapor intrusion into buildings constructed on the former RCA Site.

With regard to groundwater use as a drinking source, Bedford Well #3 remains inactive and no wells have been installed for drinking water use at or near the former RCA Site. Other public water supply wells have previously been determined to be outside of the influence of this site. With regard to vapor intrusion, an evaluation of the potential for vapor intrusion into buildings over the CVOC plume was conducted by Shaw and reported in the June 2011 Phase V Monitoring Report (Shaw, June 2011). Since that time, additional buildings have been constructed, changing the previous condition. However, CVOC concentrations are well below GW-2 standards and mitigating conditions are present that would minimize potential for vapor intrusion into these buildings.

#### *3.5.1.7 Verification of Attainment of Remedial Objectives for CVOCs*

Although significant concentration reductions in the CVOCs have been achieved, remedial objectives have not yet been met. After annual monitoring demonstrates that cleanup standards have been met, one additional full year of quarterly monitoring will be performed. The purpose of the quarterly monitoring is to demonstrate attainment of remedial objectives over four seasons in accordance with MassDEP policy.

### 3.5.2 1,4-Dioxane MNA Performance

The evaluation of natural attenuation of 1,4-dioxane is not generally performed using degradation pathway analysis or secondary methods such as geochemistry parameters typical of CVOCs (i.e., nitrate, sulfate, etc.). This is because 1,4-dioxane behaves differently in the environment than CVOCs, such as:

1. It is a recalcitrant compound and does not biodegrade the same way as the reductive dechlorination process for CVOCs;
2. It is completely miscible in water (will not form a separate phase liquid);
3. Is very mobile due to its low $K_{ow}$ (does not readily adsorb to soil or carbon particles), and;
4. Very low Henry's law constant (unlikely to form a vapor plume in the vadose zone)

MNA analyses in future reporting will focus on the typical primary line of MNA evidence which is concentration trend analysis.

Although there is a limited amount of temporal data, 13 wells were able to be evaluated using the Mann-Kendall analysis (GSI, Mann-Kendall Toolkit). A summary table presented in **Appendix E** presents the trend results and a determination as to the frequency with which the well has exceeded the standard. The Mann-Kendall spreadsheets and graphs of wells with fewer than four sample analysis results are attached in **Appendix E**.

Of the four wells that typically or consistently exceed the standard, two of the wells show decreasing concentration trends (3G-11 and EMW-11R) and two wells show probable decreasing trends (EMW-3R and 3H-5). For the remaining nine wells where the detectable concentrations were below the standard, four wells show stable trends, two show no trend (based on fluctuating concentrations the statistical analysis was not able to determine a trend), and three wells 3H-1D, 3H-1S and EMW-1D, show a decreasing trend.

1,4-Dioxane attenuates principally due to dispersion and advection (flushing of consecutive pore volumes of water through the porous media), which are the same primary mechanisms identified for the CVOC plume.

#### *3.5.2.1 Demonstration That MNA is Occurring as Expected for 1,4-Dioxane*

MNA analyses in future reporting will continue to focus on the typical primary line of MNA evidence which is concentration trend analysis.

#### *3.5.2.2 Changed Conditions Adversely Affecting 1,4-Dioxane MNA Have Not Been Detected*

There are no new monitoring data that would indicate that new environmental conditions or new releases of contaminants, which could reduce MNA efficiency, have occurred. Short-term indications from monitoring data supports a reduction in groundwater concentrations over time; however, long-term trends are still to be evaluated. The natural attenuation of the 1,4-dioxane plume is likely more of a result of dispersion and fresh water flushing.

#### *3.5.2.3 No Toxic Transformation Products*

Current literature and understanding of 1,4-dioxane behavior is that this compound will not biodegrade under non-laboratory conditions; therefore, no toxic transformation products are

produced. Regardless, given the very low concentrations of 1,4-dioxane present, such transformation product would be difficult to detect or measure impacts from.

#### *3.5.2.4 Verification That 1,4-Dioxane Plume Is Not Expanding*

Short-term indications from monitoring data (**Table 3-1**) supports a reduction in groundwater concentrations over time; however long-term trends are still to be evaluated. Based on the low concentrations there is no longer a specific source and since the same dilution and flushing mechanisms are applicable for 1,4-dioxane, it is projected that concentrations will continue to decline with time.

#### *3.5.2.5 Verification of No Downgradient Unacceptable Impact*

The primary groundwater discharge point (sink) at the site is Vine Brook where much of the groundwater from the on-site impacted area discharges to. Short-term indications from monitoring data supports a reduction in groundwater concentrations over time; however, long-term trends are still to be evaluated. As noted above (Section 3.5.2) 1,4-dioxane has a very low Henry's law constant and the formation of significant vapor impacts in the vadose zone is physically improbable.

There is no published ecological screening value or regulatory criteria for 1,4 dioxane in surface water (freshwater) under MassDEP Surface Water Quality Standards. To assess the significance of any detected concentrations in surface water relative to aquatic life, a search of the USEPA EcoTox (https://cfpub.epa.gov/ecotox/) database was performed to identify ecologically relevant, freshwater endpoints and associated concentrations for representative freshwater aquatic life. Two studies identified no observable effect concentrations (NOECs) for a representative freshwater invertebrate, the water flea, *Daphnia magna*, and the carp, *Leuciscus idus*, for an acute exposure (1-2 days) for an acute survival and narcosis endpoint. NOECs and associated references were identified as:

| Freshwater Organism | Effects Endpoint | NOEC (µg/l) | Eco-Screening Value[1] (µg/l) | Original Study Reference [2] |
|---|---|---|---|---|
| Water Flea | Immobilization/Narcosis | 2,070,000 | 207,000 | Bringmann, G., and R. Kuhn (1977) |
| Carp | Mortality | 6,180,000 | 618,000 | Juhnke, I. and D. Luedemann (1978) |

Notes:
1-Estimated screening values based on acute NOEC value multiplied by an uncertainty factor (UF) of 0.1

2-As cited in USEPA EcoTox Database (https://cfpub.epa.gov/ecotox/)

An uncertainty factor of 0.1 was applied to the NOEC values to estimate a conservative freshwater screening value for the protection of aquatic life. Owing to the higher concentrations for the NOECs, 1,4-dioxane does not appear to be acutely toxic to aquatic life. A comparison to the observed concentrations revealed indicates that the current maximum concentration of 1,4-dioxane at the site is approximately four orders of magnitude lower than the calculated ecological screening value.

No downgradient Unacceptable Impact was determined, based on the low levels and limited aerial extent of the 1,4-dioxane occurrence at the site in groundwater, the limited presence of current receptors, and the lack of potential to exceed the ecological screening level.

#### *3.5.2.6 Demonstration of Effective Institutional Controls*

There are no institutional controls required at the former RCA Site. Concerns that would identify the need for institutional controls would include the use of site groundwater as a drinking water source and vapor intrusion into buildings constructed on the former RCA Site.

With regard to groundwater use as a drinking source, Bedford Well #3 remains inactive and no wells have been installed for drinking water use at or near the former RCA Site. However, there is no formal institutional control restricting groundwater use.

#### *3.5.2.7 Verification of Attainment of Remedial Objectives for 1,4-Dioxane*

1,4-Dioxane will be addressed with further sampling and analysis as described elsewhere in this report. The groundwater remedial objectives related specifically to 1,4-dioxane will be attained through MNA. Short-term indications from monitoring data support a reduction in groundwater concentrations over time; however, long-term trends are still to be evaluated.

## 3.6 FUTURE SAMPLING

Groundwater sampling for VOCs is currently being conducted annually and the next annual sampling round is scheduled to occur in November 2018. The scheduled sampling events are summarized in **Table 3-6** through November 2023.

# 4.0 CONDITIONS/PROBLEMS AFFECTING REMEDIAL ACTION

The 1998 RIP identified two possible future use changes at or in the vicinity of the former RCA Site that could potentially require implementation of contingency actions to prevent a Substantial Hazard as a result of impacted groundwater. These two possible changes were identified at that time as: 1) a change in property use that would include residential buildings with basements, and 2) reactivation of Bedford Supply Well #3 or the development of a new supply well in the vicinity of the impacted groundwater. A third possible change not envisioned in the RIP concerns the new construction of non-residential buildings completed in 2014, combined with the concurrent change to the GW-2 groundwater standards.

With regard to item 1, a residential building (assisted living facility) has been developed on the east side of Network Drive. This new construction is in the vicinity of the VOC plume, downgradient of the source area. The assisted living facility is outside the current VOC plume boundary identified in Section 3 of this report, and reportedly (Shaw, 2012) does not have a basement. Current groundwater conditions indicate that there is no anticipated impact to this building from the nearby plume. The construction of nonresidential buildings, including a bank (DCU) and the Primrose School, an early childhood development center, are also completed as of late 2014. The school was constructed with a vapor barrier and passive subslab depressurization system, as a precautionary measure opted for by the developer based on Shaw's evaluation of the proposed development plans (Shaw, June 2011). Concentrations of chlorinated VOCs at well TTMW-1 are well below the 2014 GW-2 groundwater standards. Mitigating conditions described in Section 1.1 are anticipated to prevent the potential for exposure to building occupants from any chlorinated VOCs in deeper groundwater, As the conceptual site model extrapolates the protective mitigating conditions to the other buildings near the former plume footprint, completed development to date has not exacerbated site conditions or caused contaminants to migrate beyond the currently defined site boundaries.

With regard to item 2, (Bedford Supply Well #3), this well reportedly (personal correspondence with Town of Bedford water division representative Peter Churchill, November, 2016 and February, 2017) has not been reactivated and no new supply wells have been developed in the vicinity of the VOC plume. Mr. Churchill also indicated that Well #3 has not been operated in over 20 years, and that the Town of Bedford is part of the Massachusetts Water Resources

Authority (MWRA) and that none of the Town of Bedford water supply wells have been operated in the last 1.5 years and that if the wells do come back on line that they will provide approximately 15% of the required water supply needed.

# 5.0 MODIFICATIONS TO MONITORING PROGRAM

As reported in the June 2014 Phase V Monitoring Report, there had been more than five consecutive years of non-detects of chemicals of concern at all surface water samples collected at the former RCA Site, with the exception of trace levels of toluene. Toluene (typically related to gasoline sources and not chlorinated solvent use) is a compound not believed to be site related based on former RCA operations. Therefore, all detected concentrations of compounds of concern were below the MCP GW-1 groundwater standard of 30 µg/L and surface water monitoring was discontinued.

Modifications to the Phase V Monitoring Plan have been incorporated during the reporting period for this RTN which include continued sampling and analysis of groundwater samples for both VOCs and 1,4-dioxane. Groundwater samples that have been collected during this period to evaluate 1,4-dioxane occurrence and MNA conditions pertaining to 1,4-dioxane were done so a separate RTN (3-33535), which was then subsequently linked to this RTN (3-00265) under the Phase I and Tier Classification submitted in April 2017. Based on the Phase I Comprehensive Site Assessment Report, modifications to the existing scope being implemented under current Phase V Remedial Operations included installation and sampling of one monitoring well at Site 7 (TTMW-7(R)) for both CVOCs and 1,4-dioxane.

The property owners for the Primrose School and Nordblom were notified prior to the sampling event and copies of the notification and results transmittal correspondence are included in **Appendix G**.

# 6.0 PERIODIC REVIEW OF THE RESPONSE ACTIONS

A periodic review of the Phase V remedy is conducted by Lockheed for its remediation projects every five years. The following analysis in intended to meet the requirements of this periodic review.

## 6.1 FEASIBILITY OF IMPLEMENTING ONE OR MORE PERMANENT SOLUTIONS

The feasibility of implementing one or more Permanent Solutions for the disposal site at the time of the periodic review, has been evaluated. Because concentrations of Site CVOCs and 1,4-dioxane continue to exceed GW-1 criteria in one or more monitoring wells at the Site (specifically 3G-11 for 1,1,-DCE and 1,4-dioxane, EMW-1D for TCE, and WMW-3R for TCE), a Permanent Solution, pursuant to 310 CMR 40.1050(1)(e)1 is not currently achievable.

## 6.2 EFFECTIVENESS OF THE CURRENT REMEDY

The current MNA remedy continues to be effective at maintaining the following requirements:

(a) A Condition of No Substantial Hazard Exists

The criteria for a condition of no substantial hazard has been re-evaluated for soil and groundwater at the Site.

- Soil Evaluation - As determined at the time of the Temporary Solution Statement and the Partial Permanent Solution for the Source area soils, soils at the Site met applicable a standard of No Significant Risk based upon a Method 1 risk characterization performed for the source area soils in January 2002 (IT Corporation, 2002). Since no changes to the source area has occurred in the past 5 years, this condition is considered to remain unchanged.
- Groundwater Evaluation – As documented in Section 3.0 of this report, recent groundwater sampling results show concentrations in shallow monitoring wells to be well below applicable GW-2 standards. In addition, although sampling results for deeper wells (3G-11, EMW-1D and EMW-3R) are slightly above GW-1 standards, there are no drinking water receptors in the area of these wells, as the

nearby Bedford municipal supply wells are shut down and there are no private wells in the area. Thus, a condition of No Substantial Hazard exists for site groundwater.

- Surface Water Evaluation – As documented in the June 2017 Phase I Site Investigation Report, low levels of VOCs and metals in surface water (concentrations were all well below the Ambient Water Quality Criteria (AWQC) were detected by Wehran and GZA during previous investigations. Surface water sampling at the Site was continued through the end of 2014. Note that 1,4-dioxane was sampled in surface water during 2014 and no detections at a detection limit of 20 ug/l were observed. In 2014 it was determined that since no chlorinated solvents had been detected in surface water for many years, the brook no longer represented a complete pathway, and sampling was discontinued. Within the Phase I report, an ecological screening value of more than 200,000 ug/l was developed for 1,4 dioxane. Given the 1,4-dioxane concentrations in wells closet to Vine Brook of less than 2 ug/l, the tVine Brook surface water would be several orders of magnitude less than the calculated screening criteria. Thus, a condition of No Substantial Hazard exists for Site surface water.

(b) All Sources of OHM Contamination have been identified, characterized, and to the extent feasible, eliminated or controlled;

All sources of CVOCs in the main source area were identified, remediated and/or investigated at the time the Partial Permanent Solution for onsite sources was submitted in 2002. Since that time, Tetra Tech performed a Phase I Report to evaluate any potential sources of 1,4-dioxane that may have been overlooked during the prior investigations. The Phase I Report called for the installation of one additional replacement well (TT-MW1) in Area 7 along the north-eastern edge of the Site. Results from sampling this well, identified only trace concentrations of PCE and 1,4-dioxane, confirming that no uncharacterized or uncontrolled sources of site contaminants exist in this area.

(c) Control of plumes of dissolved OHM in groundwater and vapor-phase OHM in the Vadose Zone has been achieved.

As documented in the No Substantial Hazardous discussion above. Dissolved OHM in groundwater is under control. In addition, although groundwater is not above GW-2

standards in shallow groundwater, as a precautionary measure, a sub slab depressurization system was installed in 2013 at the nearby preschool. Thus, control of dissolved OHM and vapor phase OHM has been achieved.

(d) Non-Aqeuos Phase Liquid (NAPL), if present, has been addressed;

No NAPL, or media concentrations indicative of NAPL, has been observed at the Site in the past 20 years.

(e) It is concluded, after completion of a Phase III evaluation pursuant to 310 CMR 40.0850, that response actions to achieve a Permanent Solution are currently considered feasible and shall be continued toward a Permanent Solution.

The Phase III evaluation, conducted in 1997 by Emcon, evaluated seven groundwater alternatives. At that time, Monitored Natural Attenuation was selected for the groundwater Temporary Solution. The Mann-Kendall analysis presented previously in Section 3.4 concludes that groundwater concentrations at the well are decreasing. In addition, our evaluation of MNA with regard to the CVOC plume is that the data indicate an environment conducive to natural attenuation of CVOCs, with trends indicative of a significantly decreased plume extent that is nearing final attenuation. Thus, it is concluded that MNA to achieve a Permanent Solution continues to be feasible and shall be continued.

## 6.3 STEPS TAKEN TO IDENTIFY DEVELOP AND IMPLEMENT A FEASIBLE PERMANENT SOLUTION

As the text above demonstrates that MNA continues to represent a feasible Permanent Solution, no additional steps have been determined to be necessary to achieve this goal. While the above statement is true, Tetra Tech has continued to research available options for improved remediation. Two such options, particularly application to the 1,4-dioxane contaminant, include Electrical Resistance Heating (ERH) and aerobic biodegradation. The ERH technology is very expensive, and its effectiveness is not demonstrated at (very low) drinking water concentrations. Aerobic biodegradation is in direct contrast to the anaerobic reductive chlorination currently being employed at the CVOC plume.

## 6.4 CHANGES IN ACTIVITIES, USES AND/OR EXPOSURES

No changes at the Site have occurred in the past 5 years that would have caused any actual or potential increase in exposure for human health or environmental receptors to oil or hazardous materials.

## 6.5 RESPONSE ACTIONS REQUIRED TO MAINTAIN THE REMEDY OPERATION STATUS

No response actions have been required in the past 5 years to maintain the Remedy Operation Status.

# 7.0 LSP OPINION

The Phase V monitoring activities described in this report have been conducted in accordance with the Phase IV RIP for the former RCA Site dated December 10, 1998 and a Phase IV RIP Addendum prepared in July 2002. Additionally, monitoring activities were conducted as described in the Phase V Monitoring Plan, and as modified based on recommendations from the June 2013 Five Year Review Report and ROS statement, and the recommendations reported in the June 2017 Phase I Report. Although changed property uses and a changed regulatory conditions have been noted since that time, concentrations of contaminants measured in the groundwater and mitigating conditions described in this report that further reduce or eliminate the potential for exposures, all referenced changes support continuation of the selected groundwater remedy as monitored natural attenuation, and continued monitoring of the groundwater condition is appropriate.

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# 9.0 LIMITATIONS

The services described in this report were performed consistent with generally accepted professional consulting principles and practices. No other warranty, express or implied, is made. These services were performed consistent with our agreement with our client. This report was prepared on behalf of our client to fulfill the requirements of the MCP pursuant to 310 CMR 40.0000.

Opinions and recommendations contained in this report apply to conditions existing when services were performed and are intended only for the purposes, locations, time frames, and project parameters indicated in this report. We are not responsible for the impacts of any changes in environmental standards, practices, or regulations subsequent to performance of services. We do not warrant the accuracy of information supplied by others, nor the use of segregated portions of this report.

# TABLES

**NOTE: TABLE 3-2 AND TABLE 3-3 ARE PROVIDED IN THE BODY OF THE REPORT TEXT**

**Table 2-1**
**Groundwater Field Chemistry Parameters**
**Lockheed Martin Corporation**
**Former RCA Facility, Burlington, Massachusetts**
**November 2017**

| Monitoring Well | Groundwater Field Chemistry Parameters - May, August and November 2017 Sampling Events | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Date | Time | pH (Standard Units) | Specific Conductivity (mS/cm) | Dissolved Oxygen (mg/L) | Turbidity (NTU) | Oxidation Reduction Potential (mV) | Temperature (°C) | Ferrous Iron (mg/L) |
| 3G-11 | 5/16/17 | 11:58 | 8.44 | 0.463 | 0.14 | 2.72 | -183.4 | 11.9 | NA |
| 3G-11 | 8/14/17 | 10:34 | 7.78 | 0.346 | 0.40 | 2.74 | -124.1 | 13 | NA |
| 3G-11 | 11/14/17 | 16:20 | 7.57 | 0.313 | 2.61 | 1.42 | -140.6 | 10.38 | 0.0 |
| 3G-12 | 5/16/17 | 10:17 | 6.37 | 2.090 | 0.32 | 0.44 | 101.1 | 12.2 | NA |
| 3G-12 | 8/14/17 | 11:01 | 6.36 | 1.820 | 1.91 | 0.88 | 55.6 | 13.8 | NA |
| 3G-12 | 11/15/17 | 12:05 | 7.09 | 2.266 | 1.10 | 0.84 | 83.3 | 12.06 | 0.0 |
| 3H-1D | 5/16/17 | 11:35 | 7.06 | 1.060 | 0.73 | 0.31 | -65.6 | 14.3 | NA |
| 3H-1D | 8/14/17 | 10:00 | 6.94 | 0.860 | 0.64 | 0.61 | 14.1 | 14.3 | NA |
| 3H-1D | 11/13/17 | 11:35 | 7.00 | 1.018 | 1.71 | 1.39 | -49.4 | 12.00 | 0.0 |
| 3H-1S | 5/16/17 | 12:28 | 6.60 | 1.120 | 0.51 | 4.99 | -13.8 | 12.8 | NA |
| 3H-1S | 8/14/17 | 9:15 | 6.65 | 0.930 | 0.89 | 1.51 | 29.8 | 13.7 | NA |
| 3H-1S | 11/13/17 | 11:55 | 6.59 | 0.890 | NA | 1.21 | -64.2 | 11.90 | 0.5 |
| 3H-2 | 5/16/17 | 13:52 | 6.92 | 1.040 | 0.69 | 8.21 | -82.1 | 12.1 | NA |
| 3H-2 | 8/14/17 | 12:15 | 6.63 | 2.640 | 2.92 | 8.60 | 72.2 | 11.7 | NA |
| 3H-2 | 11/17/17 | 10:45 | 6.71 | 2.228 | 4.26 | 2.94 | 43.2 | 10.55 | 1.5 |
| 3H-3 | 5/16/17 | 13:54 | 7.14 | 0.740 | 4.87 | 130.00 | -110.2 | 13.8 | NA |
| 3H-3 | 8/14/17 | 12:08 | 6.39 | 0.560 | 1.03 | 131.00 | 52.1 | 13.9 | NA |
| 3H-3 | 11/17/17 | 11:17 | 6.62 | 0.519 | 2.64 | 10.48 | 81.4 | 10.48 | 0.0 |
| 3H-5 | 5/16/17 | 10:24 | 6.41 | 1.070 | 0.35 | 0.90 | -21.2 | 12.0 | NA |
| 3H-5 | 8/14/17 | 8:43 | 5.69 | 0.770 | 1.30 | 0.90 | 93.0 | 13.8 | NA |
| 3H-5 | 11/14/17 | 10:45 | 6.50 | 0.996 | 2.32 | 11.80 | 91.7 | 10.85 | 0.0 |
| A-1 | 5/13/17 | 11:32 | 6.59 | 3.180 | 5.84 | 0.61 | 139.1 | 10.4 | NA |
| A-1 | 8/12/17 | 9:55 | 6.37 | 1.720 | 2.29 | 0.51 | 12.0 | 18.1 | NA |
| A-1 | 11/12/17 | 13:35 | 6.42 | 1.419 | 2.74 | 0.62 | 153.1 | 16.70 | 0.0 |
| A-1D | 5/13/17 | 9:52 | 6.41 | 0.960 | 0.95 | 1.54 | 113.2 | 11.1 | NA |
| A-1D | 8/12/17 | 11:02 | 6.27 | 0.810 | 0.87 | 1.35 | 123.6 | 15.8 | NA |
| A-1D | 11/12/17 | 11:25 | 6.19 | 0.760 | 5.00 | 1.03 | -35.5 | 14.10 | 0.0 |
| EMW-1D | 5/15/17 | 12:42 | 6.66 | 1.180 | 0.37 | 4.11 | 46.3 | 11.7 | NA |
| EMW-1D | 8/15/17 | 9:22 | 6.43 | 0.940 | 0.43 | 3.95 | 11.2 | 14.8 | NA |
| EMW-1D | 11/16/17 | 11:30 | 6.62 | 0.945 | 3.03 | 1.21 | 68.5 | 13.64 | 0.5 |
| EMW-2D (R) | 5/16/17 | 12:44 | 6.95 | 1.700 | 0.38 | 3.62 | -209.0 | 14.4 | NA |
| EMW-2D (R) | 8/15/17 | 8:30 | 6.71 | 1.200 | 1.63 | 3.57 | -79.2 | 15.5 | NA |
| EMW-2D (R) | 11/15/17 | 14:45 | 7.15 | 1.704 | 1.26 | 4.81 | 56.8 | 13.64 | 0.0 |
| EMW-3R | 5/16/17 | 9:55 | 8.21 | 0.541 | 7.12 | NA | -1.2 | 12.0 | NA |
| EMW-3R | 8/15/17 | 8:10 | 8.19 | 0.570 | 8.05 | 5.71 | -3.9 | 12.2 | NA |
| EMW-3R | 11/14/17 | 11:45 | 7.17 | 0.590 | 4.81 | 2.75 | -84.8 | 12.02 | 0.0 |
| EMW-7 | 5/15/17 | 11:28 | 6.99 | 4.530 | 4.63 | 1.61 | 91.8 | 11.9 | NA |
| EMW-7 | 8/15/17 | 10:25 | 6.39 | 5.850 | 2.57 | 1.59 | 91.9 | 18.5 | NA |
| EMW-7 | 11/14/17 | 14:35 | 6.19 | 4.343 | 2.30 | 0.73 | -26.1 | 15.27 | 0.0 |
| EMW-10D | 5/16/17 | 8:57 | 7.11 | 0.229 | 2.90 | 11.10 | 105.0 | 12.4 | NA |
| EMW-10D | 8/12/17 | 12:45 | 6.62 | 0.328 | 0.21 | 1.86 | 113.7 | 16.3 | NA |
| EMW-10D | 11/14/17 | 13:10 | 6.51 | 0.261 | 9.66 | 0.56 | -24.9 | 12.78 | 0.0 |
| EMW-10R [(1)] | 5/16/17 | 8:15 | NA | NA | NA | NA | NA | NA | NA |
| EMW-10R [(1)] | 8/13/17 | 11:20 | NA | NA | NA | NA | NA | NA | NA |
| EMW-10R [(2)] | 11/14/17 | NA | NA | NA | NA | NA | NA | NA | NA |
| EMW-11R | 5/13/17 | 18:30 | 8.43 | 0.910 | 14.30 | 9.11 | -1.2 | NA | NA |
| EMW-11R | 8/17/17 | 11:00 | 8.78 | 0.620 | 5.89 | 16.50 | 87.0 | 19.2 | NA |
| EMW-11R | 11/11/17 | 10:25 | 9.66 | 0.730 | 3.71 | -43.00 | -49.5 | 12.70 | 0.0 |
| EMW-12R | 5/16/17 | 11:08 | 8.37 | 0.313 | 0.28 | 3.04 | -180.2 | 11.2 | NA |
| EMW-12R | 8/14/17 | 9:38 | 7.81 | 0.222 | 0.64 | 3.04 | -141.4 | 13 | NA |
| EMW-12R | 11/17/17 | 13:25 | 8.19 | 0.204 | 2.34 | 1.89 | -31.6 | 10.91 | 0.0 |
| TTMW-1 | 5/13/17 | 10:04 | 5.90 | 2.920 | 1.85 | 12.50 | -65.1 | 10.6 | NA |
| TTMW-1 | 8/12/17 | 10:55 | 5.62 | 5.850 | 1.09 | 12.32 | 213.2 | 17.7 | NA |
| TTMW-1 | 11/12/17 | 13:05 | 5.63 | 5.440 | 1.44 | 2.10 | 173.1 | 16.60 | 0.0 |
| TTMW-7 (R) | 11/16/17 | 13:20 | 6.24 | 2.921 | 4.84 | 5.68 | 92.1 | 13.25 | 0.0 |

Notes:
mS/cm = millisiemens per centimeter
mg/L = milligrams per liter
NTUs = Nephelometric Turbidity Units
mV = millivolt
°C = degrees Celsius
[(1)]Not enough volume in well to collect parameters
[(2)]Not enough volume in well to collect parameters or sample
NA=not analyzed

**Table 2-2**
**Groundwater Elevations**
**Former RCA Facility**
**Burlington, Massachusetts**
**November 2017**

| Water Level Monitoring Location | Elevation of Measuring Point (feet) | Date Measured | Depth to Water from Measuring Point (feet) | Groundwater Elevation (feet) |
|---|---|---|---|---|
| 3H-1S | 125.71 | 05/12/98 | 7.25 | 118.46 |
| | (top of PVC riser) | 08/14/98 | 9.05 | 116.66 |
| | | 11/18/98 | 9.66 | 116.05 |
| | | 02/18/99 | 9.07 | 116.64 |
| | | 05/12/99 | 9.63 | 116.08 |
| | | 05/02/00 | 8.62 | 117.09 |
| | | 06/14/00 | 8.99 | 116.72 |
| | | 08/17/00 | 9.55 | 116.16 |
| | | 11/15/00 | 9.47 | 116.24 |
| | | 02/12/01 | 9.10 | 116.61 |
| | | 11/12/01 | 14.67 | 111.04 |
| | | 11/19/02 | 7.90 | 117.81 |
| | | 11/10/03 | 8.74 | 116.97 |
| | | 11/30/04 | 8.07 | 117.64 |
| | | 11/01/05 | 8.01 | 117.70 |
| | | 11/06/06 | 8.82 | 116.89 |
| | | 11/08/07 | 8.45 | 117.26 |
| | | 11/04/08 | 8.50 | 117.21 |
| | | 11/10/09 | 7.97 | 117.74 |
| | | 06/25/10 | 7.98 | 117.73 |
| | | 11/10/10 | 7.45 | 118.26 |
| | | 11/04/11 | 7.63 | 118.08 |
| | | 11/08/12 | 8.45 | 117.26 |
| | | 11/11/13 | 9.13 | 116.58 |
| | | 11/11/14 | 7.92 | 117.79 |
| | | 11/13/15 | 7.25 | 118.46 |
| | | 08/25/16 | 8.62 | 117.09 |
| | | 11/10/16 | 7.75 | 117.96 |
| | | 02/10/17 | 7.62 | 118.09 |
| | | 05/16/17 | | 125.71 |
| | | 08/14/17 | | 125.71 |
| | | 11/14/17 | 8.31 | 117.40 |
| 3H-1D | 125.76 | 05/12/98 | 7.23 | 118.53 |
| | (top of PVC riser) | 08/20/98 | 9.01 | 116.75 |
| | | 11/18/98 | 9.73 | 116.03 |
| | | 02/18/99 | 8.67 | 117.09 |
| | | 05/12/99 | 9.66 | 116.10 |
| | | 05/02/00 | 8.68 | 117.08 |
| | | 06/14/00 | 9.04 | 116.72 |
| | | 08/17/00 | 9.61 | 116.15 |
| | | 11/15/00 | 9.82 | 115.94 |
| | | 02/12/01 | 9.15 | 116.61 |
| | | 11/12/01 | 14.43 | 111.33 |
| | | 11/19/02 | 7.94 | 117.82 |
| | | 11/10/03 | 8.84 | 116.92 |
| | | 11/30/04 | 8.11 | 117.65 |
| | | 11/01/05 | 8.07 | 117.69 |
| | | 11/06/06 | 8.89 | 116.87 |
| | | 11/08/07 | 8.51 | 117.25 |
| | | 11/04/08 | 8.56 | 117.20 |
| | | 11/10/09 | 8.01 | 117.75 |
| | | 06/25/10 | 8.05 | 117.71 |
| | | 11/10/10 | 7.52 | 118.24 |
| | | 11/04/11 | 7.79 | 117.97 |
| | | 11/12/12 | 8.38 | 117.38 |
| | | 11/11/13 | 9.19 | 116.57 |
| | | 11/11/14 | 7.97 | 117.79 |
| | | 11/13/15 | 7.28 | 118.48 |
| | | 08/25/16 | 8.77 | 116.99 |
| | | 11/10/16 | 7.82 | 117.94 |
| | | 02/10/17 | 7.69 | 118.07 |
| | | 05/16/17 | | 125.76 |
| | | 08/14/17 | | 125.76 |
| | | 11/14/17 | 8.21 | 117.55 |

**Table 2-2**
**Groundwater Elevations**
**Former RCA Facility**
**Burlington, Massachusetts**
**November 2017**

| Water Level Monitoring Location | Elevation of Measuring Point (feet) | Date Measured | Depth to Water from Measuring Point (feet) | Groundwater Elevation (feet) |
|---|---|---|---|---|
| 3G-11 | 120.03 | 05/13/98 | 1.80 | 118.23 |
| | (top of protective casing) | 11/19/98 | 3.70 | 116.33 |
| | | 02/18/99 | 5.62 | 114.41 |
| | | 05/12/99 | 3.71 | 116.32 |
| | | 05/02/00 | 2.68 | 117.35 |
| | | 06/14/00 | 3.15 | 116.88 |
| | | 08/17/00 | 3.75 | 116.28 |
| | | 11/15/00 | 3.61 | 116.42 |
| | | 02/12/01 | 3.28 | 116.75 |
| | | 11/12/01 | 4.36 | 115.67 |
| | | 11/19/02 | 2.02 | 118.01 |
| | | 11/10/03 | 2.79 | 117.24 |
| | | 11/30/04 | 2.15 | 117.88 |
| | | 11/01/05 | 2.14 | 117.89 |
| | | 11/06/06 | 2.95 | 117.08 |
| | | 11/08/07 | 2.65 | 117.38 |
| | | 11/04/08 | 2.64 | 117.39 |
| | | 11/10/09 | 2.06 | 117.97 |
| | | 06/25/10 | 2.14 | 117.89 |
| | | 11/10/10 | 1.61 | 118.42 |
| | | 11/04/11 | 1.87 | 118.16 |
| | | 11/09/12 | 2.47 | 117.56 |
| | | 11/11/13 | 3.35 | 116.68 |
| | | 11/11/14 | 2.10 | 117.93 |
| | | 11/13/15 | 1.40 | 118.63 |
| | | 08/26/16 | 2.82 | 117.21 |
| | | 11/10/16 | 1.99 | 118.04 |
| | | 02/14/17 | 1.81 | 118.22 |
| | | 05/16/17 | | 120.03 |
| | | 08/14/17 | | 120.03 |
| | | 11/14/17 | 2.60 | 117.43 |
| 3G-12 | 120.81 | 05/13/98 | 3.55 | 117.26 |
| | (top of protective casing) | 08/20/98 | 4.26 | 116.55 |
| | | 11/19/98 | 4.74 | 116.07 |
| | | 02/18/99 | 4.22 | 116.59 |
| | | 05/12/99 | 4.70 | 116.11 |
| | | 05/02/00 | 3.73 | 117.08 |
| | | 06/14/00 | 4.09 | 116.72 |
| | | 08/17/00 | 4.69 | 116.12 |
| | | 11/15/00 | 3.97 | 116.84 |
| | | 02/12/01 | 4.21 | 116.60 |
| | | 11/12/01 | 5.39 | 115.42 |
| | | 11/19/02 | 3.00 | 117.81 |
| | | 11/10/03 | 3.79 | 117.02 |
| | | 11/30/04 | 3.18 | 117.63 |
| | | 11/01/05 | 3.12 | 117.69 |
| | | 11/06/06 | 3.95 | 116.86 |
| | | 11/08/07 | 3.61 | 117.20 |
| | | 11/04/08 | 3.62 | 117.19 |
| | | 11/10/09 | 3.06 | 117.75 |
| | | 06/25/10 | 3.09 | 117.72 |
| | | 11/10/10 | 2.57 | 118.24 |
| | | 11/04/11 | 2.82 | 117.99 |
| | | 11/09/12 | 0.85 | 119.96 |
| | | 11/11/13 | 4.26 | 116.55 |
| | | 11/11/14 | 3.05 | 117.76 |
| | | 11/13/15 | 2.24 | 118.57 |
| | | 08/26/16 | 3.81 | 117.00 |
| | | 11/10/16 | 2.82 | 117.99 |
| | | 02/10/17 | 2.69 | 118.12 |
| | | 05/16/17 | | 120.81 |
| | | 08/14/17 | | 120.81 |
| | | 11/14/17 | 3.20 | 117.61 |

**Table 2-2**
**Groundwater Elevations**
**Former RCA Facility**
**Burlington, Massachusetts**
**November 2017**

| Water Level Monitoring Location | Elevation of Measuring Point (feet) | Date Measured | Depth to Water from Measuring Point (feet) | Groundwater Elevation (feet) |
|---|---|---|---|---|
| A-1D | 134.04 | 05/13/98 | 14.25 | 119.79 |
| | (top of PVC riser) | 08/20/98 | 16.15 | 117.89 |
| | | 11/19/98 | 16.66 | 117.38 |
| | | 02/19/99 | 15.66 | 118.38 |
| | | 05/12/99 | 16.45 | 117.59 |
| | | 05/02/00 | 14.84 | 119.20 |
| | | 06/14/00 | 15.80 | 118.24 |
| | | 08/17/00 | 15.82 | 118.22 |
| | | 11/15/00 | 15.89 | 118.15 |
| | | 02/12/01 | 16.09 | 117.95 |
| | | 11/12/01 | 17.29 | 116.75 |
| | | 11/19/02 | 14.70 | 119.34 |
| | 134.32 | 11/10/03 | 14.50 | 119.82 |
| | (top of PVC riser)[2] | 11/30/04 | 14.34 | 119.98 |
| | | 11/01/05 | 13.51 | 120.81 |
| | | 11/06/06 | 14.97 | 119.35 |
| | | 11/08/07 | 14.94 | 119.38 |
| | | 11/04/08 | 14.66 | 119.66 |
| | | 11/10/09 | 14.16 | 120.16 |
| | | 06/25/10 | 14.29 | 120.03 |
| | | 11/10/10 | 13.80 | 120.52 |
| | | 11/04/11 | 13.45 | 120.87 |
| | | 11/08/12 | 14.29 | 120.03 |
| | | 11/11/13 | 15.65 | 118.67 |
| | | 11/11/14 | 13.92 | 120.40 |
| | | 11/13/15 | 13.69 | 120.63 |
| | | 08/28/16 | 15.06 | 119.26 |
| | | 11/12/16 | 14.20 | 120.12 |
| | | 02/11/17 | 13.60 | 120.72 |
| | | 05/16/17 | | 134.32 |
| | | 08/14/17 | | 134.32 |
| | | 11/14/17 | 14.26 | 120.06 |
| EMW-1D | 134.61 | 05/12/98 | 11.55 | 123.06 |
| | (top of PVC riser) [1] | 08/18/98 | 12.36 | 122.25 |
| | | 11/18/98 | 13.53 | 121.08 |
| | | 05/12/99 | 13.00 | 121.61 |
| | | 06/14/00 | 11.79 | 122.82 |
| | | 08/17/00 | 13.06 | 121.55 |
| | | 11/22/00 | 11.87 | 122.74 |
| | | 02/12/01 | 11.84 | 122.77 |
| | | 11/12/01 | 13.05 | 121.56 |
| | | 11/19/02 | 11.12 | 123.49 |
| | | 11/10/03 | 11.23 | 123.38 |
| | | 11/30/04 | 11.25 | 123.36 |
| | | 11/01/05 | 9.81 | 124.80 |
| | | 11/06/06 | 11.45 | 123.16 |
| | | 11/08/07 | 11.97 | 122.64 |
| | | 11/04/08 | 11.27 | 123.34 |
| | | 11/10/09 | 10.95 | 123.66 |
| | | 06/25/10 | 11.07 | 123.54 |
| | | 11/10/10 | 10.88 | 123.73 |
| | | 11/04/11 | 12.87 | 121.74 |
| | | 11/09/12 | 11.20 | 123.41 |
| | | 11/11/13 | 12.60 | 122.01 |
| | | 11/11/14 | 11.16 | 123.45 |
| | | 11/13/15 | 11.82 | 122.79 |
| | | 08/25/16 | 12.58 | 122.03 |
| | | 11/11/16 | 12.11 | 122.50 |
| | | 02/10/17 | 10.77 | 123.84 |
| | | 05/16/17 | | 134.61 |
| | | 08/14/17 | | 134.61 |
| | | 11/14/17 | 11.97 | 122.64 |

**Table 2-2**
**Groundwater Elevations**
**Former RCA Facility**
**Burlington, Massachusetts**
**November 2017**

| Water Level Monitoring Location | Elevation of Measuring Point (feet) | Date Measured | Depth to Water from Measuring Point (feet) | Groundwater Elevation (feet) |
|---|---|---|---|---|
| EMW-2D | 128.30 | 05/13/98 | 9.50 | 118.80 |
| | (top of PVC riser) | 08/20/98 | 11.20 | 117.10 |
| | | 11/18/98 | 11.68 | 116.62 |
| | | 02/18/99 | 11.12 | 117.18 |
| | | 05/12/99 | 11.58 | 116.72 |
| | | 06/14/00 | 10.88 | 117.42 |
| | | 08/17/00 | 11.68 | 116.62 |
| | | 11/22/00 | 11.41 | 116.89 |
| | | 02/12/01 | 11.29 | 117.01 |
| | | 11/12/01 | 12.32 | 115.98 |
| | | 11/19/02 | 9.84 | 118.46 |
| | | 11/10/03 | 10.70 | 117.60 |
| | | 11/30/04 | 10.17 | 118.13 |
| | | 11/01/05 | 9.95 | 118.35 |
| | | 11/06/06 | 10.91 | 117.39 |
| | | 11/08/07 | 10.76 | 117.54 |
| | | 11/04/08 | 10.68 | 117.62 |
| | | 11/10/09 | 10.14 | 118.16 |
| | | 06/25/10 | 10.22 | 118.08 |
| | | 11/10/10 | 9.67 | 118.63 |
| | | 11/04/11 | 12.91 | 115.39 |
| | | 11/16/11 | 10.15 | 118.15 |
| | | 11/09/12 | 10.65 | 117.65 |
| EMW-2D (R) | 131.15 | 11/11/13 | 14.20 | 116.95 |
| | (top of PVC riser)[5] | 11/11/14 | 12.89 | 118.26 |
| | | 11/13/15 | 12.08 | 119.07 |
| | | 08/26/16 | 13.66 | 117.49 |
| | | 11/11/16 | 12.74 | 118.41 |
| | | 02/14/17 | 12.56 | 118.59 |
| | | 05/16/17 | | 131.15 |
| | | 08/14/17 | | 131.15 |
| | | 11/14/17 | 12.35 | 118.80 |
| EMW-3R | 126.48 | 08/20/98 | 9.82 | 116.66 |
| | (top of PVC riser) | 11/18/98 | 10.28 | 116.20 |
| | | 02/18/99 | 9.73 | 116.75 |
| | | 05/12/99 | 10.28 | 116.20 |
| | | 05/02/00 | 9.17 | 117.31 |
| | | 08/17/00 | 9.49 | 116.99 |
| | | 11/15/00 | 9.45 | 117.03 |
| | | 02/12/01 | 9.69 | 116.79 |
| | | 11/12/01 | 10.91 | 115.57 |
| | | 11/19/02 | 8.45 | 118.03 |
| | | 11/10/03 | 9.28 | 117.20 |
| | | 11/30/04 | 8.66 | 117.82 |
| | | 11/01/05 | 8.57 | 117.91 |
| | | 11/06/06 | 9.40 | 117.08 |
| | | 11/08/07 | 9.14 | 117.34 |
| | | 11/04/08 | 9.11 | 117.37 |
| | | 11/10/09 | 8.55 | 117.93 |
| | | 06/25/10 | 8.65 | 117.83 |
| | | 11/10/10 | 8.09 | 118.39 |
| | | 11/04/11 | 8.28 | 118.20 |
| | | 11/09/12 | 5.95 | 120.53 |
| | | 11/11/13 | 9.78 | 116.70 |
| | | 11/11/14 | 8.51 | 117.97 |
| | | 11/13/15 | 7.79 | 118.69 |
| | | 08/25/16 | 9.29 | 117.19 |
| | | 11/10/16 | 8.42 | 118.06 |
| | | 02/11/17 | 8.40 | 118.08 |
| | | 05/16/17 | | 126.48 |
| | | 08/14/17 | | 126.48 |
| | | 11/14/17 | 8.91 | 117.57 |

**Table 2-2**
**Groundwater Elevations**
**Former RCA Facility**
**Burlington, Massachusetts**
**November 2017**

| Water Level Monitoring Location | Elevation of Measuring Point (feet) | Date Measured | Depth to Water from Measuring Point (feet) | Groundwater Elevation (feet) |
|---|---|---|---|---|
| EMW-7 | 135.35 | 05/12/98 | 13.85 | 121.50 |
| | (top of PVC riser) [1] | 08/18/98 | 13.91 | 121.44 |
| | | 11/18/98 | 14.91 | 120.44 |
| | | 02/17/99 | 14.16 | 121.19 |
| | | 05/12/99 | 14.40 | 120.95 |
| | | 05/02/00 | 12.51 | 122.84 |
| | | 06/14/00 | 12.96 | 122.39 |
| | | 08/17/00 | 11.82 | 123.53 |
| | | 11/15/00 | 13.31 | 122.04 |
| | | 11/12/01 | 14.95 | 120.40 |
| | | 11/19/02 | 13.24 | 122.11 |
| | | 11/10/03 | 12.36 | 122.99 |
| | | 11/30/04 | 12.58 | 122.77 |
| | | 11/01/05 | 11.16 | 124.19 |
| | | 11/06/06 | 12.60 | 122.75 |
| | | 11/08/07 | 13.35 | 122.00 |
| | | 11/04/08 | 12.38 | 122.97 |
| | | 11/10/09 | 11.92 | 123.43 |
| | | 06/25/10 | 12.03 | 123.32 |
| | | 11/10/10 | 12.21 | 123.14 |
| | | 11/04/11 | 11.03 | 124.32 |
| | | 11/08/12 | 12.30 | 123.05 |
| | | 11/11/13 | 13.78 | 121.57 |
| | | 11/11/14 | 12.22 | 123.13 |
| | | 11/13/15 | 12.83 | 122.52 |
| | | 08/25/16 | 13.62 | 121.73 |
| | | 11/11/16 | 13.01 | 122.34 |
| | | 02/14/17 | 11.89 | 123.46 |
| | | 05/16/17 | | 135.35 |
| | | 08/14/17 | | 135.35 |
| | | 11/14/17 | 13.87 | 121.48 |
| EMW-10D | 137.51 | 05/11/98 | 10.61 | 126.90 |
| | (top of PVC riser) [1] | 08/18/98 | 11.76 | 125.75 |
| | | 11/18/98 | 13.28 | 124.23 |
| | | 02/17/99 | 12.06 | 125.45 |
| | | 05/12/99 | 12.57 | 124.94 |
| | | 05/02/00 | 12.57 | 124.94 |
| | | 06/14/00 | 11.00 | 126.51 |
| | | 08/17/00 | 12.42 | 125.09 |
| | | 11/15/00 | 12.83 | 124.68 |
| | | 02/12/01 | 13.06 | 124.45 |
| | | 11/12/01 | 14.20 | 123.31 |
| | | 11/19/02 | 12.06 | 125.45 |
| | | 11/10/03 | 12.12 | 125.39 |
| | | 11/30/04 | 12.38 | 125.13 |
| | | 11/01/05 | 10.23 | 127.28 |
| | | 11/06/06 | 12.33 | 125.18 |
| | | 11/08/07 | 12.95 | 124.56 |
| | | 11/04/08 | 12.03 | 125.48 |
| | | 11/10/09 | 11.61 | 125.90 |
| | | 06/25/10 | NM | Road Box Damaged |
| | | 11/10/10 | 12.10 | 125.41 |
| | | 11/04/11 | 10.66 | 126.85 |
| | | 11/09/12 | 12.03 | 125.48 |
| | | 11/11/13 | 13.57 | 123.94 |
| | | 11/11/14 | 12.01 | 125.50 |
| | | 11/13/15 | 13.18 | 124.33 |
| | | 08/26/16 | 14.19 | 123.32 |
| | | 11/11/16 | 13.81 | 123.70 |
| | | 02/10/17 | 11.98 | 125.53 |
| | | 05/16/17 | | 137.51 |
| | | 08/14/17 | | 137.51 |
| | | 11/14/17 | 13.47 | 124.04 |

**Table 2-2**
**Groundwater Elevations**
**Former RCA Facility**
**Burlington, Massachusetts**
**November 2017**

| Water Level Monitoring Location | Elevation of Measuring Point (feet) | Date Measured | Depth to Water from Measuring Point (feet) | Groundwater Elevation (feet) |
|---|---|---|---|---|
| EMW-10R | 137.43 | 05/11/98 | 10.91 | 126.52 |
| | (top of PVC riser) (1) | 08/18/98 | 17.43 | 120.00 |
| | | 11/18/98 | 12.85 | 124.58 |
| | | 02/17/99 | 11.85 | 125.58 |
| | | 05/12/00 | 13.14 | 124.29 |
| | | 06/14/00 | 10.74 | 126.69 |
| | | 08/17/00 | 12.66 | 124.77 |
| | | 11/15/00 | 12.90 | 124.53 |
| | | 02/12/01 | 13.06 | 124.37 |
| | | 11/12/01 | 13.64 | 123.79 |
| | | 11/19/02 | 11.82 | 125.61 |
| | | 11/10/03 | 14.19 | 123.24 |
| | (see note below) (4) | 11/30/04 | 30.20 | 107.23 |
| | | 11/01/05 | 10.22 | 127.21 |
| | | 11/06/06 | 0.48 | 136.95 |
| | | 11/08/07 | 0.28 | 137.15 |
| | | 11/04/08 | 0.16 | 137.27 |
| | | 11/10/09 | 0.15 | 137.28 |
| | | 06/25/10 | 0.50 | 136.93 |
| | | 11/10/10 | 0.00 | 137.43 |
| | | 11/04/11 | 0.18 | 137.25 |
| | | 11/08/12 | 0.70 | 136.73 |
| | | 11/11/13 | 0.09 | 137.34 |
| | (see note below) (6) | 11/11/14 | 31.45 | 105.98 |
| | (see note below) (6) | 11/13/15 | 47.65 | 89.78 |
| | (see note below) (6) | 08/26/16 | 48.21 | 89.22 |
| | (see note below) (6) | 11/10/16 | 0.31 | 137.12 |
| | | 02/11/17 | 23.13 | 114.30 |
| | | 05/16/17 | | 137.43 |
| | | 08/14/17 | | 137.43 |
| | | 11/14/17 | dry @ 65' | |
| EMW-11R | 133.69 | 05/12/98 | 14.86 | 118.83 |
| | (top of PVC riser) | 08/19/98 | 14.88 | 118.81 |
| | | 11/18/98 | 15.42 | 118.27 |
| | | 02/17/98 | 14.42 | 119.27 |
| | | 05/12/99 | 15.22 | 118.47 |
| | | 05/02/00 | 13.64 | 120.05 |
| | | 06/14/00 | 14.16 | 119.53 |
| | | 08/17/00 | 15.40 | 118.29 |
| | | 11/15/00 | 14.65 | 119.04 |
| | | 02/12/01 | 14.21 | 119.48 |
| | | 11/12/01 | 16.06 | 117.63 |
| | 133.02 (2) | 11/20/02 | 14.71 | 118.31 |
| | 137.23 (3) | 11/10/03 | 17.25 | 119.98 |
| | | 11/30/04 | 17.12 | 120.11 |
| | | 11/01/05 | 16.29 | 120.94 |
| | | 11/06/06 | 17.54 | 119.69 |
| | | 11/08/07 | 17.84 | 119.39 |
| | | 11/04/08 | 17.41 | 119.82 |
| | | 11/10/09 | 16.90 | 120.33 |
| | | 06/25/10 | 17.12 | 120.11 |
| | | 11/10/10 | 17.69 | 119.54 |
| | | 11/04/11 | 13.19 | 124.04 |
| | | 11/08/12 | 17.30 | 119.93 |
| | | 11/11/13 | 18.45 | 118.78 |
| | | 11/11/14 | 16.98 | 120.25 |
| | | 11/13/15 | 16.70 | 120.53 |
| | | 08/27/16 | 18.06 | 119.17 |
| | | 11/12/16 | 17.18 | 120.05 |
| | | 02/12/17 | 16.92 | 120.31 |
| | | 05/16/17 | | 137.23 |
| | | 08/14/17 | | 137.23 |
| | | 11/14/17 | 17.28 | 119.95 |

**Table 2-2**
**Groundwater Elevations**
**Former RCA Facility**
**Burlington, Massachusetts**
**November 2017**

| Water Level Monitoring Location | Elevation of Measuring Point (feet) | Date Measured | Depth to Water from Measuring Point (feet) | Groundwater Elevation (feet) |
|---|---|---|---|---|
| A-1 | 135.34 | 11/18/98 | 9.99 | 125.35 |
| | (top of PVC riser) [1] | 05/02/00 | 7.18 | 128.16 |
| | | 02/15/01 | 13.29 | 122.05 |
| | | 11/12/01 | 15.52 | 119.82 |
| | 136.92 [2] | 11/19/02 | 17.66 | 119.26 |
| | 136.17 [3] | 11/10/03 | 19.5 | 116.67 |
| | | 11/30/04 | 19.54 | 116.63 |
| | | 11/01/05 | 18.39 | 117.78 |
| | | 11/06/06 | 19.83 | 116.34 |
| | | 11/08/07 | 20.07 | 116.10 |
| | | 11/04/08 | 19.72 | 116.45 |
| | | 11/10/09 | 19.19 | 116.98 |
| | | 06/25/10 | 19.33 | 116.84 |
| | | 11/10/10 | 18.89 | 117.28 |
| | | 11/04/11 | 18.35 | 117.82 |
| | | 11/12/12 | 19.42 | 116.75 |
| | | 11/11/13 | 20.78 | 115.39 |
| | | 11/11/14 | 19.2 | 116.97 |
| | | 11/13/15 | 19.07 | 117.10 |
| | | 08/27/16 | 20.34 | 115.83 |
| | | 11/12/16 | 18.76 | 117.41 |
| | | 02/12/17 | 18.89 | 117.28 |
| | | 05/16/17 | | 136.17 |
| | | 08/14/17 | | 136.17 |
| | | 11/14/17 | 14.8 | 121.37 |
| EMW-12R | 125.31 | 05/12/00 | 6.65 | 118.66 |
| | (top of PVC riser) | 11/22/00 | 8.83 | 116.48 |
| | | 02/12/01 | 12.28 | 113.03 |
| | 125.31 | 11/10/03 | 6.91 | 118.40 |
| | | 11/30/04 | 6.58 | 118.73 |
| | | 11/01/05 | 6.21 | 119.10 |
| | | 11/06/06 | 7.15 | 118.16 |
| | | 11/08/07 | 7.45 | 117.86 |
| | | 11/04/08 | 7.1 | 118.21 |
| | | 11/10/09 | 6.65 | 118.66 |
| | | 06/25/10 | 6.74 | 118.57 |
| | | 11/10/10 | 6.3 | 119.01 |
| | | 11/04/11 | 6.15 | 119.16 |
| | | 11/12/12 | 6.78 | 118.53 |
| | | 11/11/13 | 7.9 | 117.41 |
| | | 11/11/14 | 6.65 | 118.66 |
| | | 11/13/15 | 6.2 | 119.11 |
| | | 08/27/16 | 7.92 | 117.39 |
| | | 11/10/16 | 6.67 | 118.64 |
| | | 02/14/17 | 6.31 | 119.00 |
| | | 05/16/17 | | 125.31 |
| | | 08/14/17 | | 125.31 |
| | | 11/14/17 | 7.23 | 118.08 |
| 3H-2 | 123.07 | 11/10/03 | 6.99 | 116.08 |
| | (top of protective casing) | 11/22/04 | 6.78 | 116.29 |
| | | 11/01/05 | 6.33 | 116.74 |
| | | 11/06/06 | 7.05 | 116.02 |
| | | 11/08/07 | 6.58 | 116.49 |
| | | 11/04/08 | 6.75 | 116.32 |
| | | 11/10/09 | 6.81 | 116.26 |
| | | 11/10/10 | 5.6 | 117.47 |
| | | 11/04/11 | 5.96 | 117.11 |
| | | 11/12/12 | 6.64 | 116.43 |
| | | 11/11/13 | 6.72 | 116.35 |
| | | 11/11/14 | 5.52 | 117.55 |
| | | 11/13/15 | 5.15 | 117.92 |
| | | 08/25/16 | 6.17 | 116.90 |
| | | 11/11/16 | 5.41 | 117.66 |
| | | 02/18/17 | 5.68 | 117.39 |

**Table 2-2**
**Groundwater Elevations**
**Former RCA Facility**
**Burlington, Massachusetts**
**November 2017**

| Water Level Monitoring Location | Elevation of Measuring Point (feet) | Date Measured | Depth to Water from Measuring Point (feet) | Groundwater Elevation (feet) |
|---|---|---|---|---|
| 3H-3 | 126.23 (top of protective casing) | 08/17/00 | 8.97 | 117.26 |
| | | 11/15/00 | 8.17 | 118.06 |
| | | 02/12/01 | 8.58 | 117.65 |
| | | 11/12/01 | 9.35 | 116.88 |
| | | 11/19/02 | 7.34 | 118.89 |
| | | 11/10/03 | 8.18 | 118.05 |
| | | 11/30/04 | 7.61 | 118.62 |
| | | 11/01/05 | 7.46 | 118.77 |
| | | 11/06/06 | 8.12 | 118.11 |
| | | 11/08/07 | 7.69 | 118.54 |
| | | 11/04/08 | 7.93 | 118.30 |
| | | 11/10/09 | 7.38 | 118.85 |
| | | 11/10/10 | 6.85 | 119.38 |
| | | 11/04/11 | 7.14 | 119.09 |
| | | 11/12/12 | 7.82 | 118.41 |
| | | 11/11/13 | 6.62 | 119.61 |
| | | 11/11/14 | 5.30 | 120.93 |
| | | 11/13/15 | 6.55 | 119.68 |
| | | 08/25/16 | 6.22 | 120.01 |
| | | 11/11/16 | 7.40 | 118.83 |
| | | 02/14/17 | 8.35 | 117.88 |
| 3H-5 | 119.26 (top of protective casing) | 02/12/01 | 5.00 | 114.26 |
| | | 11/12/01 | 4.41 | 114.85 |
| | | 11/19/02 | 2.38 | 116.88 |
| | | 11/10/03 | 3.13 | 116.13 |
| | | 11/30/04 | 2.45 | 116.81 |
| | | 11/01/05 | 2.57 | 116.69 |
| | | 11/06/06 | 3.35 | 115.91 |
| | | 11/08/07 | 3.01 | 116.25 |
| | | 11/04/08 | 3.10 | 116.16 |
| | | 11/10/09 | 2.51 | 116.75 |
| | | 06/25/10 | 2.55 | 116.71 |
| | | 11/10/10 | 2.07 | 117.19 |
| | | 11/04/11 | 2.31 | 116.95 |
| | | 11/12/12 | 2.82 | 116.44 |
| | | 11/11/13 | 3.18 | 116.08 |
| | | 11/11/14 | 2.51 | 116.75 |
| | | 11/13/15 | 1.62 | 117.64 |
| | | 08/25/16 | 2.77 | 116.49 |
| | | 11/10/16 | 1.83 | 117.43 |
| | | 02/14/17 | 2.04 | 117.22 |
| TTMW-1 | 133.06 (top of PVC riser) | 11/13/15 | 13.53 | 119.53 |
| | | 08/27/16 | 12.08 | 120.98 |
| | | 11/13/16 | 13.65 | 119.41 |
| | | 02/11/17 | 13.45 | 119.61 |
| Network Drive Bridge | 121.96 (Chisel mark on bridge) | 11/04/08 | 5.20 | 116.76 |
| | | 11/10/09 | 4.45 | 117.51 |
| | | 06/25/10 | 4.55 | 117.41 |
| | | 11/23/10 | 4.40 | 117.56 |
| | | 12/05/11 | 5.20 | 116.76 |
| | | 11/12/12 | 5.18 | 116.78 |
| | | 11/11/13 | 5.55 | 116.41 |
| | | 11/11/14 | 4.50 | 117.46 |
| | | 11/13/15 | 3.40 | 118.56 |
| | | 08/26/16 | 4.82 | 117.14 |
| | | 11/13/16 | 4.26 | 117.70 |
| | | 03/17/17 | 4.27 | 117.69 |
| EMW-11D | 135.84 (top of PVC riser) | 05/12/98 | 12.99 | 122.85 |
| | | 08/19/98 | 16.70 | 119.14 |
| | | 11/18/98 | 17.26 | 118.58 |
| | | 02/17/99 | 17.06 | 118.78 |
| | | 05/12/99 | 17.05 | 118.79 |
| | | 05/02/00 | 15.48 | 120.36 |
| TTMW-7(R) | 118.015 (top of PVC riser) | 11/14/17 | 5.33 | 112.69 |

**Notes:**
(1) = Well raised during Sun Construction, 1997 - 1998
(2) = Well raised/lowered during Sun Construction, Summer 2002

**Table 2-2**
**Groundwater Elevations**
**Former RCA Facility**
**Burlington, Massachusetts**
**November 2017**

| Water Level Monitoring Location | Elevation of Measuring Point (feet) | Date Measured | Depth to Water from Measuring Point (feet) | Groundwater Elevation (feet) |
|---|---|---|---|---|

(3) = Well raised/lowered during Sun Construction, Fall 2002
(4) = Well EMW-10R did not recover fully from sampling event
(5) = Well EMW-2D was replaced October 2013 after being destroyed by construction activities
(6) = Anomolous measurement checked multiple times, not used in contouring

**Table 3-1**
**Summary of Groundwater Sampling Results for VOCs**
**Phase V Monitoring Report and ROS Statement**
**Former RCA Facility**
**Burlington, Massachusetts**

| | | | COMPOUNDS OF INTEREST | | | | | | Related COCs | OTHER COMPOUNDS IN VOC SCAN | | | | | | | | | | | COMPOUNDS WITH NO STANDARDS ESTABLISHED | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Monitoring Well Number | Sample Type | Date Sampled | 1,1-Dichloroethene | Tetrachloroethene | Trichloroethene | cis-1,2-Dichloroethene | 1,1-Dichloroethane | 1,4-Dioxane | 1,1,1-Trichloroethane | Benzene | Chloroform | Ethyl-benzene | Methylene Chloride | Methyl tert-butyl ether | Toluene | 1,1,2-Trichloroethane | Xylene (total) | Vinyl Chloride | 1,2-Dichloroethane | Chloro-benzene | Trichlorofluoromethane | Dichlorodifluoromethane | Chloromethane | Total VOCs |
| GW-1 Criteria | | | 7 | 5 | 5 | 70 | 70 | 0.3000 | 200 | 5 | 70 | 700 | 5 | 70 | 1,000 | 5 | 10,000 | 2 | 5 | 100 | NE | NE | NE | NE |
| GW-2 Criteria | | | 80 | 50 | 5 | 100 | 1,000 | 6,000 | 4,000 | 2,000 | 50 | 20,000 | 10,000 | 50,000 | 50,000 | 900 | 9,000 | 2 | 5 | 200 | NE | NE | NE | NE |
| GW-3 Criteria | | | 30,000 | 30,000 | 5,000 | 50,000 | 20,000 | 50,000 | 20,000 | 10,000 | 20,000 | 5,000 | 50,000 | 50,000 | 40,000 | 50,000 | 5,000 | 50,000 | 20,000 | 1,000 | NE | NE | NE | NE |
| UCL Criteria | | | 100,000 | 100,000 | 50,000 | 100,000 | 100,000 | | 100,000 | 100,000 | 100,000 | 100,000 | 100,000 | 100,000 | 100,000 | 100,000 | 100,000 | 100,000 | 100,000 | 10,000 | NE | NE | NE | NE |
| 3G-11 | | 8/25/1994 | 31 | ND | ND | 3.5 | 29 | NS | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | NA | NA | NA | 63.5 |
| 3G-11 | | 11/30/1994 | 23 | ND | 8.8 | 3.4 | 25 | NS | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | NA | NA | NA | 60.2 |
| 3G-11 | | 11/14/1996 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <5 | <1 | <1 | <1 | <3 | <1 | NA | NA | <1 | <1 | <1 | 0 |
| 3G-11 | | 5/13/1998 | 18 | <0.4 | 10 | 3 | 20 | NS | <0.4 | <0.2 | <0.3 | <0.2 | <0.4 | <0.3 | <0.2 | <0.5 | <0.3 | <0.3 | <0.5 | <0.3 | <0.3 | <0.3 | <0.4 | 51 |
| 3G-11 | | 8/20/1998 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | NS | <1.0 | <2.0 | <1.0 | <2.0 | <1.0 | <1.0 | <2.0 | <2.0 | <1.0 | <2.0 | <1.0 | <2.0 | <1.0 | <1 | <5 | 0 |
| 3G-11 | | 11/19/1998 | 18 | <1 | 10 | 3 | 21 | NS | <1 | <1 | <1 | 1 | <1 | <1 | <1 | <1 | 12 | <1 | <1 | <1 | <1 | <1 | <1 | 65 |
| 3G-11 | | 2/18/1999 | 13 | <1 | 4 | 1 | 13 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 31 |
| 3G-11 | | 5/13/1999 | 20 | <1 | 9 | 2 | 19 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 50 |
| 3G-11 | | 6/15/2000 | 17 | <1 | 6 | 3 | 19 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 45 |
| 3G-11 | | 8/17/2000 | 23 | <1 | 11 | 3 | 22 | NS | <1 | <1 | <1 | <1 | 3 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 62 |
| 3G-11 | | 11/14/2000 | 36 | <1 | 16 | 5 | 34 | NS | <1 | <1 | <1 | <1 | <5 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 91 |
| 3G-11 | | 2/13/2001 | 25 | <1 | 13 | 4 | 25 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <5 | <1 | 67 |
| 3G-11 | | 11/14/2001 | 24 | <1 | 9.9 | 3 | 19 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | 12 | <5 | <1 | 67.9 |
| 3G-11 | | 11/20/2002 | 20 | 0.26 J | 8.3 | 2.7 | 16 | NS | <1 | <1 | <1 | <1 | <5 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | 6.5 | <5 | <1 | 53.8 J |
| 3G-11 | | 11/3/2003 | 18 | <1 | 8 | 3 | 17 | NS | <1 | <1 | <1 | <1 | <1 | NA | <1 | <1 | <2 | <1 | <1 | <1 | NA | 40 | <1 | 86 |
| 3G-11 | | 11/22/2004 | 19 | <1.0 | 7.4J | 2 J | 16 J | NS | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | 12 | <2.0 | 31 |
| 3G-11 | | 11/2/2005 | 19 | <1.0 | 8.2 | 2.5 | 15 | NS | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | 45 |
| 3G-11 | | 11/6/2006 | 20 | <1.0 | 7.8 | 2.8 | 15 | NS | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | <1.0 | <1.0 | <1.0 | <3.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | 46 |
| 3G-11 | | 11/9/2007 | 15 | <1 | 7.2 | 2.8 | 14 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <3 | <0.5 | <1 | <1 | <1 | <1 | <2 | 39 |
| 3G-11 | | 11/7/2008 | 7.8 | <1 | 2.7 | 1.1 | 6 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5* | <1 | <1 | <1 | <1 | <2 | 18* |
| 3G-11 | | 11/11/2009 | 7.1 | <1 | 2.4 | <1 | 5.5 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | 2.9 | <2 | 17.9 |
| 3G-11 | | 6/25/2010 | 7.5 | <1 | 2.3 | <1 | 5.6 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 15 |
| 3G-11 | | 6/25/2010 | 7.5 | <1 | 2.3 | 1 J | 5.5 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 16.3 J |
| 3G-11 | | 11/12/2010 | 9.7 | <1 | 4.2 | 1.7 | 8.2 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1* | <2 | 23.8* |
| 3G-11 | | 11/17/2011 | 9 | <1 | 3.2 | 1.4 | 6.8 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 20.4 |
| 3G-11 | | 11/9/2012 | 11 | <1 | 6.1 | 2.1 | 8.5 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1* | <2 | 27.7 |
| 3G-11 | | 11/11/2013 | 12 | <1 | 4.8 | 1.8 J | 7.9 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 26.5 |
| 3G-11 | | 11/11/2014 | 12 | <1 | 5.0 | 1.5 | 7 | 2.2 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 25.5 |
| 3G-11 | | 11/13/2015 | 9.1 | <1 | 4.7 | 1.7 | 7.8 | 1.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 23.3 |
| 3G-11 | | 8/26/2016 | 8.9 | <1 | 4.2 | 1.7 | 6.8 | 1.65 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 23.25 |
| 3G-11 | | 11/11/2016 | 8.6 | <1 | 4.4 | 1.8 | 7.2 | 1.76 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 23.76 |
| 3G-11 | | 2/14/2017 | 11 | 0.1 J | 4.8 | 1.8 | 7.7 | 0.87 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 0.2 J | <0.1 | <0.1 | <0.1 | 0.1 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | |
| 3G-11 | | 5/16/2017 | 12 | 0.1 J | 4.8 | 1.9 | 8.2 | 0.82 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 0.2 J | <0.1 | <0.1 | <0.1 | 0.1 J | <0.1 | <0.1 | <0.1 | <0.1 J | <0.1 | 26.9 |
| 3G-11 | | 8/14/2017 | 10 | 0.1 J | 4.4 | 1.7 | 7.6 | 0.63 | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | 0.2 J | <0.1 | <0.1 | <0.1 | 0.1 J | <0.1 | <0.1 | <0.1 | <0.2 | <0.2 | 24.73 |
| 3G-11 | | 11/14/2017 | 10 | 0.1 J | 4.2 | 1.6 | 6.9 | 0.69 | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | 0.1 J | <0.1 | <0.1 | <0.1 | 0.1 J | <0.1 | <0.1 | <0.1 | <0.2 UJ | <0.2 | 23.69 |
| 3G-12 | | 8/25/1994 | 220 | 5.9 | 20 | 3.7 | 46 | NS | 36 | ND | ND | ND | 2.9 | ND | ND | 5.6 | ND | ND | ND | ND | ND | NA | NA | 340.1 |
| 3G-12 | | 12/1/1994 | 240 | 11 | 55 | 8.1 | 65 | NS | 55 | ND | ND | ND | ND | ND | ND | 7.6 | ND | ND | ND | ND | ND | NA | NA | 441.7 |
| 3G-12 | | 11/13/1996 | 72 | 6 | 56 | <1 | 18 | NS | 14 | <1 | <1 | <1 | <5 | <1 | <1 | <1 | <3 | <1 | NA | NA | <1 | <1 | <1 | 166 |
| 3G-12 | | 5/13/1998 | 110 | 12 | 44 | 5 | 24 | NS | 20 | <0.2 | <0.3 | <0.2 | <0.4 | <0.3 | <0.2 | <0.5 | <0.3 | <0.3 | <0.5 | <0.3 | <0.3 | <0.3 | <0.4 | 215 |
| 3G-12 | | 8/20/1998 | 44 | 11 | 33 | 5.5 | 9.6 | NS | 9.5 | <2.0 | <1.0 | <2.0 | <1.0 | <1.0 | <2.0 | <2.0 | <1.0 | <2.0 | <1.0 | <2.0 | 1.4 | <1 | <5 | 114 |
| 3G-12 | | 11/19/1998 | 170 | 10 | 38 | 5 | 45 | NS | 45 | <1 | <1 | <1 | <1 | <1 | <1 | 4 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 317 |
| 3G-12 | | 2/18/1999 | 54 | 11 | 46 | 5 | 41 | NS | 36 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 193 |
| 3G-12 | | 5/13/1999 | 170 | 17 | 69 | 10 | 45 | NS | 52 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 363 |
| 3G-12 | | 6/16/2000 | 79 | 16 | 63 | 12 | 22 | NS | 25 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | 1 | <1 | <1 | <1 | <1 | <1 | 218 |
| 3G-12 | | 8/17/2000 | 130 | 15 | 61 | 9 | 27 | NS | 64 | <1 | <1 | <1 | <1 | 1 | <1 | 1 | <3 | 2 | <1 | <1 | <1 | <1 | <1 | 310 |
| 3G-12 | | 11/13/2000 | 93 | 15 | 48 | 8 | 31 | NS | 61 | <1 | <1 | <1 | <5 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 256 |
| 3G-12 | | 2/13/2001 | 76 | 24 | 46 | 14 | 25 | NS | 41 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | 2 | <1 | <1 | <1 | <5 | <1 | 228 |
| 3G-12 | | 11/14/2001 | 31 J | 6.2 | 19 | 4.5 | 9.5 | NS | 15 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | 1.6 J | <5 | <1 | 86.8 J |
| 3G-12 | | 11/20/2002 | 49 J | 4.9 | 17 | 3.2 | 15 | NS | 29 | <1 | 0.13 J | <1 | <5 | 1.6 | <1 | 0.41 J | <3 | <1 | <1 | <1 | 0.83 J | <5 | <1 | 121.1 J |
| 3G-12 | Duplicate | 11/20/2002 | 49 J | 4.9 | 17 | 3.1 | 14 | NS | 28 | <1 | 0.12 J | <1 | <5 | 1.6 | 0.21 J | 0.41 J | <3 | <1 | 0.26 J | <1 | 0.74 J | <5 | <1 | 119.3 J |
| 3G-12 | | 11/4/2003 | 8 | 11 | 10 | 10 | 3 | NS | 1 | <1 | <1 | <1 | <1 | NA | <1 | <1 | <2 | 1 | <1 | <1 | NA | <1 | 1 | 45 |
| 3G-12 | | 11/23/2004 | 29 | 6.7J | 20J | 4.1J | 7 J | NS | 5.4 | <1.0 | <1.0 | <1.0 | <2.0 | 5.8 | <1.0 | <1.0 | <1.0 | 0.63 J | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | 79 J |
| 3G-12 | | 11/2/2005 | 15 | 4.8 | 13 | 2.5 | 4.2 | NS | 2.7 | <1.0 | <1.0 | <1.0 | <2.0 | 1.2 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | 43.4 |
| 3G-12 | | 11/7/2006 | 15 | 12 | 21 | 7.2 | 4.8 | NS | 1.3 | <1.0 | <1.0 | <1.0 | <2.0 | 1.1 | <1.0 | <1.0 | <3.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | 62.4 |
| 3G-12 | | 11/8/2007 | 14 | 2 | 7 | 1.1 | 2.5 | NS | 2.1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <3 | <0.5 | <1 | <1 | <1 | <1 | <2 | 28.7 |
| 3G-12 | | 11/5/2008 | 5.9 | 5 | 7 | 2.1 | 1.5 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 21.5 |
| 3G-12 | | 11/12/2009 | 4.5 | 2.5 | 4.8 | 1 | 1.3 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 14.1 |

**Table 3-1**
**Summary of Groundwater Sampling Results for VOCs**
**Phase V Monitoring Report and ROS Statement**
**Former RCA Facility**
**Burlington, Massachusetts**

| Monitoring Well Number | Sample Type | Date Sampled | 1,1-Dichloroethene | Tetrachloroethene | Trichloroethene | cis-1,2-Dichloroethene | 1,1-Dichloroethane | 1,4-Dioxane | 1,1,1-Trichloroethane | Benzene | Chloroform | Ethyl-benzene | Methylene Chloride | Methyl tert-butyl ether | Toluene | 1,1,2-Trichloroethane | Xylene (total) | Vinyl Chloride | 1,2-Dichloroethane | Chloro-benzene | Trichlorofluoromethane | Dichlorodifluoromethane | Chloromethane | Total VOCs |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **GW-1 Criteria** | | | **7** | **5** | **5** | **70** | **70** | **0.3000** | **200** | **5** | **70** | **700** | **5** | **70** | **1,000** | **5** | **10,000** | **2** | **5** | **100** | **NE** | **NE** | **NE** | **NE** |
| **GW-2 Criteria** | | | **80** | **50** | **5** | **100** | **1,000** | **6,000** | **4,000** | **2,000** | **50** | **20,000** | **10,000** | **50,000** | **50,000** | **900** | **9,000** | **2** | **5** | **200** | **NE** | **NE** | **NE** | **NE** |
| **GW-3 Criteria** | | | **30,000** | **30,000** | **5,000** | **50,000** | **20,000** | **50,000** | **20,000** | **10,000** | **20,000** | **5,000** | **50,000** | **50,000** | **40,000** | **50,000** | **5,000** | **50,000** | **20,000** | **1,000** | **NE** | **NE** | **NE** | **NE** |
| **UCL Criteria** | | | **100,000** | **100,000** | **50,000** | **100,000** | **100,000** | | **100,000** | **100,000** | **100,000** | **100,000** | **100,000** | **100,000** | **100,000** | **100,000** | **100,000** | **100,000** | **100,000** | **10,000** | **NE** | **NE** | **NE** | **NE** |
| 3G-12 | | 11/11/2010 | 6.5 | 1.8 | **6.4** | 1.2 | 1.7 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 17.6 |
| 3G-12 | | 11/16/2011 | 4.1 | 3.7 | **6** | 1.8 | 1.1 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 16.7 |
| 3G-12 | | 11/9/2012 | 2.1 | 1.9 | 4.2 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 8.2 |
| 3G-12 | | 11/11/2013 | 2.3 | 1.5 J | 2.9 | 0.58 J | 0.61 J | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 7.89 |
| 3G-12 | | 11/11/2014 | 3 | 1.6 | 3.8 | 0.93 J | 0.68 J | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 10.01 |
| 3G-12 | | 11/13/2015 | 0.57 J | 0.83 J | 1.6 | <1 | <1 | **0.3100** | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 3 |
| 3G-12 | Duplicate | 11/13/2015 | 0.61 J | 0.92 J | 1.5 | 0.32 J | 0.34 J | 0.10 J | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 3.69 |
| 3G-12 | | 8/26/2016 | 1.6 | 1.4 | 3.1 | 0.91 | 0.55 | 0.210 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 7.77 |
| 3G-12 | Duplicate | 8/26/2016 | 1.7 | 1.5 | 3.3 | 0.99 | 0.6 | 0.201 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 8.291 |
| 3G-12 | | 11/11/2016 | 1.3 | 1.2 | 2.7 | 0.68J | 0.50 J | 0.2230 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 5.423 |
| 3G-12 | Duplicate | 11/11/2016 | 1.2 | 1.2 | 2.5 | 0.64J | 0.48 J | 0.165 J | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 4.9 |
| 3G-12 | | 2/10/2017 | 1.6 | 1.9 | 3.4 | 1 | 0.5 J | 0.070 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 0.1 J | <0.1 | <0.1 | <0.1 | 0.1 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 7.9 |
| 3G-12 | | 5/16/2017 | 1.8 | 2.0 | 3.2 | 0.9 | 0.6 | 0.076 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 0.1 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 8.5 |
| 3G-12 | Duplicate | 5/16/2017 | 1.7 | 2.0 | 3.2 | 1 | 0.6 | 0.066 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 0.1 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 J | <0.1 | 8.5 |
| 3G-12 | | 8/14/2017 | 1.2 | 2.2 | 2.5 | 0.8 | 0.4 J | 0.072 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 0.1 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | 7.27 |
| 3G-12 | Duplicate | 8/14/2017 | 1.2 | 2.2 | 2.5 | 0.8 | 0.4 J | 0.053 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 0.1 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | 7.25 |
| 3G-12 | | 11/15/2017 | 0.9 | 1.6 | 2.2 | 0.5 | 0.3 J | 0.11 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 UJ | <0.2 | 5.61 |
| 3G-12 | Duplicate | 11/15/2017 | 0.9 | 1.6 | 2.3 | 0.5 | 0.3 J | <0.051 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 UJ | <0.2 | 5.6 |
| EMW-10D | | 5/6/1997 | <1 | 1 | 3 | 3 | <1 | NS | <1 | <1 | <1 | <1 | <5 | <1 | <1 | <1 | <3 | <1 | NA | NA | <1 | <1 | <1 | 7 |
| EMW-10D | | 5/11/1998 | 1 | **18** | **55** | 10 | <1 | NS | <1 | <1 | <1 | <1 | <5 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 84 |
| EMW-10D | | 8/18/1998 | <1.0 | **9.7** | **36** | 6.3 | <1.0 | NS | 1 | <2.0 | <1.0 | <2.0 | <1.0 | <1.0 | <2.0 | <2.0 | <1.0 | <2.0 | <1.0 | <2.0 | <1.0 | <1 | <5 | 53 |
| EMW-10D | | 11/18/1998 | <1 | 3 | **7** | <1 | <1 | NS | <1 | <1 | <1 | 3 | <1 | <1 | 4 | <1 | 29 | <1 | <1 | <1 | <1 | <1 | <1 | 46 |
| EMW-10D | | 2/17/1999 | <1 | **6** | **23** | 2 | <1 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 31 |
| EMW-10D | | 5/12/1999 | <1 | 2 | **6** | 2 | 1 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 11 |
| EMW-10D | | 5/3/2000 | <1 J | 7 J | 22 J | 4 J | <1 J | NS | 2 J | <1 J | <1 J | <1 J | <1 J | <1 J | <1 J | <1 J | <3 J | <1 J | <1 J | <1 J | <1 J | <1 | <1 | 35 |
| EMW-10D | | 6/15/2000 | <1 | 2 | 4 | 2 | <1 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 8 |
| EMW-10D | | 8/17/2000 | 2 | **7** | **25** | 5 | 1 | NS | 3 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 43 |
| EMW-10D | | 11/13/2000 | 1 | **9** | **31** | 6 | <1 | NS | 2 | <1 | <1 | <1 | <5 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 49 |
| EMW-10D | | 2/12/2001 | <1 | 2 | **7** | <1 | <1 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <5 | <1 | 9 |
| EMW-10D | | 11/14/2001 | 1.2 | 4.3 | **17** | 3.1 | 0.87 J | NS | 1.9 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | 1.2 J | <5 | <1 | 29.6 J |
| EMW-10D | Duplicate | 11/14/2001 | 1 | 4.4 | **17** | 3.2 | 0.90 J | NS | 1.9 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | 1.2 J | <5 | <1 | 29.6 J |
| EMW-10D | | 11/20/2002 | 1.1 | 4.1 | **13** | 2.4 | 0.33 J | NS | 5.6 | <1 | 0.21 J | <1 | <5 | 14 | <1 | <1 | <3 | <1 | <1 | <1 | 0.57 J | <5 | <1 | 41.3 J |
| EMW-10D | | 11/3/2003 | 1 | 4 | **11** | 2 | <1 | NS | 6 | <1 | <1 | <1 | <1 | NA | <1 | <1 | <2 | <1 | <1 | <1 | NA | <1 | 20 | 44 |
| EMW-10D | | 11/23/2004 | 1.6 | 2.5 J | 7.6 J | 0.98J | <1.0 | NS | 4.4 | <1.0 | <1.0 | <1.0 | <2.0 | 11 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | 2.2 | <2.0 | 30 J |
| EMW-10D | | 11/1/2005 | <1.0 | 4 | 0.73 J | <1.0 | <1.0 | NS | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | 1 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | 5 |
| EMW-10D | | 11/7/2006 | <1.0 | 2.8 | **7.6** | 1.6 | <1.0 | NS | 3.6 | <1.0 | <1.0 | <1.0 | <2.0 | 2.5 | <1.0 | <1.0 | <3.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | 18.1 |
| EMW-10D | | 11/9/2007 | <1 | <1 | 1.8 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <3 | <0.5 | <1 | <1 | <1 | <1 | <2 | 1.8 |
| EMW-10D | | 11/7/2008 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5* | <1 | <1 | <1 | <1 | <2 | 0 |
| EMW-10D | | 11/11/2009 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 0 |
| EMW-10D | | 11/10/2010 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 0 |
| EMW-10D | | 11/15/2011 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1* | <2 | 0 |
| EMW-10D | | 11/9/2012 | <1 | <1 | 2.8 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 2.8 |
| EMW-10D | | 11/12/2013 | <1 | 0.33 J | 0.66 J | <1 | <1 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 0.99 |
| EMW-10D | | 11/11/2014 | <1 | 0.89 J | 2.5 | 0.47 J | <1 | 0.088 J | 0.37 J | <1 | <1 | <1 | <1 | 0.42 J | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 4.65 |
| EMW-10D | | 11/16/2015 | <1 | 0.61 J | 0.75 J | <1 | <1 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <2 | <2 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 1.36 |
| EMW-10D | | 8/26/2016 | <1.0 | 0.59 | 0.85 | <1.0 | <1.0 | <0.02 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 1.44 |
| EMW-10D | | 11/11/2016 | <1.0 | 0.77 J | 1.7 | 0.45 J | <1.0 | 0.0824 J | <1 | <1 | <1 | <1 | <1 | 0.38 J | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 1.7 |
| EMW-10D | | 2/10/2017 | 0.4 J | 0.5 J | 1.2 | 0.2 J | <0.1 | <0.05 | 0.1 J | <0.1 | <0.1 | <0.1 | <0.1 | 0.1 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | |
| EMW-10D | | 5/16/2017 | <0.1 | 0.2 J | 0.2 J | <0.1 | <0.1 | <0.051 | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 J | <0.2 | |
| EMW-10D | | 8/12/2017 | <0.1 | 0.3 J | 0.2 J | <0.1 | <0.1 | <0.050 | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 0.5 |
| EMW-10D | | 11/14/2017 | 0.2 J | 0.7 | 2.3 | 0.4 J | 0.2 J | 0.1 J | 0.2 J | <0.1 | <0.1 | <0.1 | <0.2 | 0.3 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 UJ | <0.1 | 4.4 |
| EMW-10R | | 5/6/1997 | <1 | <1 | 3 | <1 | <1 | NS | <1 | <1 | 5 | <1 | <5 | <1 | <1 | <1 | <3 | <1 | NA | NA | <1 | <1 | <1 | 8 |
| EMW-10R | | 5/12/1998 | <1 | <1 | 2 | <1 | <1 | NS | <1 | **5** | <1 | <1 | <5 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <5 | 7 |
| EMW-10R | | 8/19/1998 | <1.0 | <1.0 | **5.1** | <1.0 | <1.0 | NS | <1.0 | <2.0 | <1.0 | <2.0 | <1.0 | <1.0 | <2.0 | <2.0 | <1.0 | <2.0 | <1.0 | <2.0 | <1.0 | <1 | <1 | 5.1 |
| EMW-10R | | 11/20/1998 | <1 | 2 | **10** | 1 | <1 | NS | <1 | 2 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 15 |
| EMW-10R | | 2/17/1999 | <1 | <1 | 1 | <1 | <1 | NS | <1 | 3 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 4 |
| EMW-10R | | 5/13/1999 | <1 | <1 | 4 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 4 |
| EMW-10R | | 5/3/2000 | <1 | <1 | 3 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 3 |

**Table 3-1**
**Summary of Groundwater Sampling Results for VOCs**
**Phase V Monitoring Report and ROS Statement**
**Former RCA Facility**
**Burlington, Massachusetts**

| Monitoring Well Number | Sample Type | Date Sampled | 1,1-Dichloroethene | Tetrachloroethene | Trichloroethene | cis-1,2-Dichloroethene | 1,1-Dichloroethane | 1,4-Dioxane | 1,1,1-Trichloroethane | Benzene | Chloroform | Ethyl-benzene | Methylene Chloride | Methyl tert-butyl ether | Toluene | 1,1,2-Trichloroethane | Xylene (total) | Vinyl Chloride | 1,2-Dichloroethane | Chloro-benzene | Trichlorofluoromethane | Dichlorodifluoromethane | Chloromethane | Total VOCs |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **GW-1 Criteria** | | | **7** | **5** | **5** | **70** | **70** | **0.3000** | **200** | **5** | **70** | **700** | **5** | **70** | **1,000** | **5** | **10,000** | **2** | **5** | **100** | **NE** | **NE** | **NE** | **NE** |
| **GW-2 Criteria** | | | **80** | **50** | **5** | **100** | **1,000** | **6,000** | **4,000** | **2,000** | **50** | **20,000** | **10,000** | **50,000** | **50,000** | **900** | **9,000** | **2** | **5** | **200** | **NE** | **NE** | **NE** | **NE** |
| **GW-3 Criteria** | | | **30,000** | **30,000** | **5,000** | **50,000** | **20,000** | **50,000** | **20,000** | **10,000** | **20,000** | **5,000** | **50,000** | **50,000** | **40,000** | **50,000** | **5,000** | **50,000** | **20,000** | **1,000** | **NE** | **NE** | **NE** | **NE** |
| **UCL Criteria** | | | **100,000** | **100,000** | **50,000** | **100,000** | **100,000** | | **100,000** | **100,000** | **100,000** | **100,000** | **100,000** | **100,000** | **100,000** | **100,000** | **100,000** | **100,000** | **100,000** | **10,000** | **NE** | **NE** | **NE** | **NE** |
| EMW-10R | | 6/16/2000 | <1 | <1 | 1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 1 |
| EMW-10R | | 8/17/2000 | 1 | <1 | 5 | <1 | <1 | NS | 2 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 8 |
| EMW-10R | | 11/14/2000 | <1 | 2 | 9 | <1 | <1 | NS | 6 | <1 | <1 | <1 | <5 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 17 |
| EMW-10R | | 2/13/2001 | <1 | <1 | 4 | <1 | <1 | NS | 2 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <5 | <1 | 6 |
| EMW-10R | | 11/15/2001 | <1 | <1 | 1.6 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <5 | <5 | <1 | 1.6 |
| EMW-10R | | 11/21/2002 | 0.33 J | 0.18 J | 2.3 | 0.31 J | <1 | NS | 1.3 | <1 | <1 | <1 | <5 | 0.88 J | <1 | <1 | <3 | <1 | <1 | <1 | <5 | <5 | <1 | 5.3 |
| EMW-10R | | 11/4/2003 | <1 | <1 | 1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <1 | NA | <1 | <1 | <2 | <1 | <1 | <1 | NA | <1 | <1 | 1 |
| EMW-10R | | 11/23/2004 | <1.0 | <1.0 | 0.70 J | <1.0 | <1.0 | NS | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | 0.70 J |
| EMW-10R | | 11/2/2005 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | NS | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | 0 |
| EMW-10R | | 11/7/2006 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | NS | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | <1.0 | <1.0 | <1.0 | <3.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | 0 |
| EMW-10R | | 11/9/2007 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <3 | <0.5 | <1 | <1 | <1 | <1 | <2 | 0 |
| EMW-10R | | 11/5/2008 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 0 |
| EMW-10R | | 11/12/2009 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | ND |
| EMW-10R | | 11/11/2010 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1* | <2 | ND |
| EMW-10R | | 11/15/2011 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1* | <2 | 0 |
| EMW-10R | | 11/8/2012 | <1 | <1 | 1.1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 1.1 |
| EMW-10R | | 11/12/2013 | <1 | <1 | 0.25 J | <1 | <1 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 12.25 |
| EMW-10R | | 11/12/2014 | <1 | <1 | <1 | <1 | <1 | 0.14 J | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 9 |
| EMW-10R | | 11/16/2015 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 1.9 |
| EMW-10R | | 8/26/2016 | <1 | <1 | 1.3 | 0.47 | <1 | 0.210 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 1.98 |
| EMW-10R | | 11/11/2016 | <1.0 | <1.0 | 0.23 J | <1.0 | <1.0 | 0.0354 J | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 0.26J |
| EMW-10R | | 2/11/2017 | <0.1 | <0.1 | 0.3 J | <0.1 | <0.1 | 0.055 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | |
| EMW-10R | | 5/16/2017 | <0.1 | <0.1 | 0.2 J | <0.1 | <0.1 | <0.050 | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 J | <0.2 | |
| EMW-10R | | 8/13/2017 | <0.1 | <0.1 | 0.3 J | <0.1 | <0.1 | 0.058 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <.01 | <0.1 | <.02 | 5.00 |
| EMW-11D | | 5/6/1997 | **51** | **10** | **31** | 4 | 11 | NS | 9 | <1 | <1 | <1 | <5 | <1 | <1 | <1 | <3 | <1 | NA | NA | <1 | <1 | <1 | 116 |
| EMW-11D | | 5/12/1998 | **82** | **18** | **56** | 9 | 18 | NS | 55 | <0.2 | <0.3 | <0.2 | <0.4 | <0.3 | <0.2 | <0.5 | <0.3 | <0.3 | <0.5 | <0.3 | <0.3 | <0.3 | <0.4 | 238 |
| EMW-11D | | 8/19/1998 | **37** | **6.7** | **24** | 4.2 | 8.2 | NS | 27 | <2.0 | <1.0 | <2.0 | <1.0 | <1.0 | <2.0 | <2.0 | <1.0 | <2.0 | <1.0 | <2.0 | <1.0 | <1 | <5 | 107.1 |
| EMW-11D | | 11/19/1998 | **33** | **7** | **27** | 4 | 8 | NS | 26 | <1 | <1 | 2 | <1 | <1 | 3 | <1 | 27 | <1 | <1 | <1 | <1 | <1 | <1 | 137 |
| EMW-11D | | 2/17/1999 | **30** | **6** | **23** | 3 | 6 | NS | 21 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 89 |
| EMW-11D | | 5/12/1999 | **29** | **6** | **23** | 4 | 7 | NS | 31 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 100 |
| EMW-11R | | 5/6/1997 | **43** | **12** | **39** | 9 | 10 | NS | 5 | <1 | <1 | <1 | <5 | <1 | <1 | <1 | <3 | <1 | NA | NA | <1 | <1 | <1 | 118 |
| EMW-11R | | 5/13/1998 | **53** | **23** | **77** | 28 | 22 | NS | 10 | <1 | <1 | <1 | <5 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 213 |
| EMW-11R | | 8/20/1998 | **27** | **15** | **40** | 14 | 11 | NS | 4.6 | <2.0 | <1.0 | <2.0 | <1.0 | <1.0 | <2.0 | <2.0 | <1.0 | <2.0 | <1.0 | <2.0 | <1.0 | <1 | <5 | 111.6 |
| EMW-11R | | 11/19/1998 | **28** | **20** | **50** | 16 | 13 | NS | 6 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 133 |
| EMW-11R | | 2/17/1999 | **13** | 4 | **22** | 9 | 9 | NS | 2 | 1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 60 |
| EMW-11R | | 5/12/1999 | **23** | **12** | **40** | 14 | 12 | NS | 10 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 111 |
| EMW-11R | | 6/16/2000 | **17** | **6** | **29** | 15 | 11 | NS | 3 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 81 |
| EMW-11R | | 8/17/2000 | **29** | **8** | **39** | 17 | 14 | NS | 5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 112 |
| EMW-11R | | 11/14/2000 | **45** | **21** | **68** | 26 | 20 | NS | 10 | <1 | <1 | <1 | <5 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 190 |
| EMW-11R | | 2/13/2001 | **32** | **18** | **53** | 18 | 14 | NS | 7 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <5 | <1 | 142 |
| EMW-11R | | 11/15/2001 | **13** | 3.3 | **23** | 9.6 | 7 | NS | 2 | 0.56 J | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <5 | <5 | <1 | 58.5 J |
| EMW-11R | | 11/21/2002 | **15** | **5.4** | **23** | 11 | 7.7 | NS | 1.7 | 0.36 J | <1 | <1 | <5 | <1 | 1.3 | <1 | <3 | <1 | <1 | <1 | <5 | <5 | <1 | 65.5 J |
| EMW-11R | | 11/4/2003 | 1 | <1 | 1 | 2 | 1 | NS | <1 | <1 | <1 | <1 | <1 | NA | <1 | <1 | <2 | <1 | <1 | <1 | NA | <1 | <1 | 5 |
| EMW-11R | | 11/23/2004 | 5.6 | 0.64 J | 7.6 J | 4.3 J | 4.4 J | NS | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | 22.5 J |
| EMW-11R | | 11/2/2005 | 1.7 | 0.52 J | 4.2 | 3.8 | 3.3 | NS | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | 0.71 J | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | 13 |
| EMW-11R | | 11/7/2006 | 6 | 1.8 | **11** | 7.5 | 5.5 | NS | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | <1.0 | <1.0 | <1.0 | <3.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | 31.8 |
| EMW-11R | | 11/9/2007 | 4.1 | 1.7 | **9.7** | 5 | 3.8 | NS | <1 | <1 | <1 | <1 | <2 | 1.2 | <1 | <1 | <3 | <0.5 | <1 | <1 | <1 | <1 | <2 | 25.5 |
| EMW-11R | | 11/5/2008 | 5.6 | 2.3 | **9.9** | 6.1 | 4.5 | NS | <1 | <1 | <1 | <1 | <2 | 1.5 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 29.9 |
| EMW-11R | | 11/11/2009 | 6.1 | 2.1 | **9.6** | 6.2 | 4.8 | NS | <1 | <1 | <1 | <1 | <2 | 1.3 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 30.1 |
| EMW-11R | | 11/11/2010 | 4.3 | 1.9 | **8.5** | 5.6 | 4 | NS | <1 | <1 | <1 | <1 | <2 | 1.3 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 25.6 |
| EMW-11R | | 11/15/2011 | 3.4 | 2.1 | **7.2** | 5.5 | 3.2 | NS | <1 | <1 | <1 | <1 | <2 | 1.3 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1* | <2 | 22.7 |
| EMW-11R | | 11/8/2012 | 2.6 | 1.7 | **7.5** | 4.4 | 2.5 | NS | <1 | <1 | <1 | <1 | <1 | 1.1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 19.8 |
| EMW-11R | | 11/12/2013 | 2.9 | 1.4 J | **5.7** | 4.6 | 2.8 | NS | <1 | <1 | <1 | <1 | <1 | 1.1 J | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 20 |
| EMW-11R | | 11/12/2014 | 1.6 | 1 | 4.2 | 3.7 | 2.4 | **0.910** | <1 | <1 | <1 | <1 | <1 | 0.86 J | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 13.76 |
| EMW-11R | | 11/15/2015 | 0.74 J | 1.2 | 3.2 | 1.6 | 1.3 | **0.640** | <1 | <1 | <1 | <1 | <1 | 0.87 J | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 11.71 |
| EMW-11R | | 8/26/2016 | 0.95 | 1.3 | 3.5 | 2.9 | 1.6 | **0.742** | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 10.992 |
| EMW-11R | | 11/11/2016 | 1.3 | 1.3 | 3.6 | 3.2 | 1.8 | **0.780** | <1 | <1 | <1 | <1 | <1 | 0.75 J | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 11.98 |
| EMW-11R | | 2/12/2017 | 1.3 | 1.3 | 3.9 | 3.1 | 1.6 | **0.370** | <1 | 0.2 J | <1 | <1 | <1 | 0.7 | <1 | <1 | <1 | 0.1 J | <1 | <1 | <1 | <1 | <1 | |

**Table 3-1**
**Summary of Groundwater Sampling Results for VOCs**
**Phase V Monitoring Report and ROS Statement**
**Former RCA Facility**
**Burlington, Massachusetts**

| Monitoring Well Number | Sample Type | Date Sampled | 1,1-Dichloroethene | Tetrachloroethene | Trichloroethene | cis-1,2-Dichloroethene | 1,1-Dichloroethane | 1,4-Dioxane | 1,1,1-Trichloroethane | Benzene | Chloroform | Ethyl-benzene | Methylene Chloride | Methyl tert-butyl ether | Toluene | 1,1,2-Trichloroethane | Xylene (total) | Vinyl Chloride | 1,2-Dichloroethane | Chloro-benzene | Trichlorofluoromethane | Dichlorodifluoromethane | Chloromethane | Total VOCs |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **GW-1 Criteria** | | | **7** | **5** | **5** | **70** | **70** | **0.3000** | **200** | **5** | **70** | **700** | **5** | **70** | **1,000** | **5** | **10,000** | **2** | **5** | **100** | **NE** | **NE** | **NE** | **NE** |
| **GW-2 Criteria** | | | **80** | **50** | **5** | **100** | **1,000** | **6,000** | **4,000** | **2,000** | **50** | **20,000** | **10,000** | **50,000** | **50,000** | **900** | **9,000** | **2** | **5** | **200** | **NE** | **NE** | **NE** | **NE** |
| **GW-3 Criteria** | | | **30,000** | **30,000** | **5,000** | **50,000** | **20,000** | **50,000** | **20,000** | **10,000** | **20,000** | **5,000** | **50,000** | **50,000** | **40,000** | **50,000** | **5,000** | **50,000** | **20,000** | **1,000** | **NE** | **NE** | **NE** | **NE** |
| **UCL Criteria** | | | **100,000** | **100,000** | **50,000** | **100,000** | **100,000** | | **100,000** | **100,000** | **100,000** | **100,000** | **100,000** | **100,000** | **100,000** | **100,000** | **100,000** | **100,000** | **100,000** | **10,000** | **NE** | **NE** | **NE** | **NE** |
| EMW-11R | | 5/13/2017 | 1.0 | 0.5 J | 2.7 | 3.1 | 1.7 | **0.300** | <0.1 | 0.1 J | <0.1 | <0.1 | <0.2 | 0.6 | <0.1 | <0.1 | <0.1 | 0.1 J | <0.1 | <0.1 | <0.1 | <0.1 J | <0.2 | 9.4 |
| EMW-11R | | 8/13/2017 | 1.3 | 1.5 | 4.1 | 3.3 | 1.7 | **0.300** | <0.1 | 0.1 J | <0.1 | <0.1 | <0.2 | 0.8 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | 13.1 |
| EMW-11R | | 11/12/2017 | 1.3 | 1 | 4 | 3.2 | 1.6 | 0.19 J | <0.1 | 0.1 J | <0.1 | <0.1 | <0.2 | 0.4 J | <0.1 | <0.1 | <0.1 | 0.1 J | <0.1 | <0.1 | <0.1 | <0.1 UJ | <0.2 UJ | 13.1 |
| EMW-1D | | 11/13/1996 | **94** | **12** | **62** | <1 | 14 | NS | <1 | <1 | <1 | <1 | <5 | <1 | <1 | <1 | <3 | 1 | NA | NA | <1 | <1 | <1 | 183 |
| EMW-1D | | 5/12/1998 | **120** | **30** | **160** | 33 | 23 | NS | 3 | <0.2 | <0.3 | <0.2 | <0.4 | <0.3 | <0.2 | <0.5 | 5 | **3** | <0.5 | <0.3 | <0.3 | <0.3 | <0.4 | 377 |
| EMW-1D | | 8/18/1998 | **61** | **22** | **92** | 22 | 12 | NS | 1.1 | <2.0 | <1.0 | <2.0 | <1.0 | <1.0 | <2.0 | <2.0 | <1.0 | **2.2** | <1.0 | <2.0 | <1.0 | <1 | <5 | 212.3 |
| EMW-1D | | 11/20/1998 | **20** | **11** | **46** | 9 | 5 | NS | <1 | <1 | <1 | <1 | <1 | 4 | <1 | <1 | 7 | **2** | <1 | <1 | <1 | <1 | <1 | 104 |
| EMW-1D | | 5/13/1999 | **22** | **10** | **39** | 9 | 6 | NS | **210** | <1 | <1 | <1 | <1 | 2 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 298 |
| EMW-1D | | 6/16/2000 | **22** | **16** | **69** | 19 | 5 | NS | 34 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | **2** | <1 | <1 | <1 | <1 | <1 | 167 |
| EMW-1D | | 8/17/2000 | <1 | 4 | 1 | 2 | 3 | NS | 7 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 17 |
| EMW-1D | | 11/13/2000 | **12** | 3 | **9** | 2 | 5 | NS | 72 | <1 | <1 | <1 | <5 | 3 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 106 |
| EMW-1D | | 2/12/2001 | **8** | 2 | **6** | 1 | 3 | NS | 53 | <1 | <1 | <1 | <1 | 3 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <5 | <1 | 76 |
| EMW-1D | | 11/15/2001 | 4.6 | 1.1 | 2.6 | 0.52 J | 2.9 | NS | 22 | <1 | <1 | <1 | <1 | 0.96 J | <1 | <1 | <3 | <1 | <1 | <1 | 1.3 J | <5 | <1 | 36 J |
| EMW-1D | | 11/20/2002 | **31** | **19** | 73 J | 20 | 5.8 | NS | 13 | 0.14 J | <1 | <1 | <5 | 0.72 J | <1 | <1 | <3 | **2** | <1 | 0.44 J | 0.64 J | <5 | <1 | 165.7 J |
| EMW-1D | | 1/23/2003 | **7.8** | **5.1** | **17** | 3.1 | 2.5 | NS | 24 | <1.0 | <1.0 | <1.0 | <5.0 | <1.0 | <1.0 | <1.0 | <3.0 | <1.0 | <1.0 | <1.0 | <1.0 | <5 | <1 | 59.5 |
| EMW-1D | Duplicate | 1/23/2003 | **11** | 4.9 | **18** | 3.4 | 2.8 | NS | 24 | <1.0 | <1.0 | <1.0 | <5.0 | <1.0 | <1.0 | <1.0 | <3.0 | <1.0 | <1.0 | <1.0 | <1.0 | <5 | <1 | 64.1 |
| EMW-1D | | 11/4/2003 | **16** | **12** | **44** | 11 | 3 | NS | 17 | <1 | <1 | <1 | <1 | NA | <1 | <1 | <2 | 1 | <1 | <1 | NA | <1 | <1 | 104 |
| EMW-1D | | 11/23/2004 | 6.3 | 4.4 J | 18 J | 2.6 J | 2.8 J | NS | 7.6 | <1.0 | <1.0 | <1.0 | <2.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | 13.9 |
| EMW-1D | | 11/2/2005 | **7** | **7.4** | **30** | 5.9 | 3.5 | NS | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | <1.0 | <1.0 | 3.3 | <1.0 | 0.57 J | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | 57.1 |
| EMW-1D | | 11/7/2006 | 5.2 | 4.6 | **17** | 3.9 | 3.3 | NS | 2.4 | <1.0 | <1.0 | <1.0 | <2.0 | <1.0 | <1.0 | <1.0 | <3.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | 36.4 |
| EMW-1D | | 11/8/2007 | 3.6 | 3.1 | **13** | 2.9 | 2.1 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <3 | <0.5 | <1 | <1 | <1 | <1 | <2 | 24.7 |
| EMW-1D | | 11/5/2008 | 4.6 | 3.5 | **15** | 3 | 2.2 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 28.3 |
| EMW-1D | | 11/12/2009 | 5.2 | **5.2** | **23** | 4.5 | 2.3 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | 0.55 | <1 | <1 | <1 | <1 | <2 | 40.75 |
| EMW-1D | | 6/25/2010 | 4.8 | 3.5 | **18** | 3.4 J | 1.9 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 31.6 J |
| EMW-1D | | 11/11/2010 | 3.2 | 3.5 | **17** | 3.5 | 1.4 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 28.6 |
| EMW-1D | | 11/16/2011 | 2.5 | 2.8 | **13** | 2.7 | <1 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 21 |
| EMW-1D | | 11/9/2012 | 2.5 | **5** | **24** | 4.4 | 1.1 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 37 |
| EMW-1D | | 11/12/2013 | 1.6 J | 2 | **12** | 2.1 | 0.59 J | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 18.29 |
| EMW-1D | | 11/12/2014 | 2.2 | 3.6 | **19** | 3.2 | 0.72 J | **0.38** | <1 | <1 | <1 | <1 | <1 | 0.29 J | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 29.01 |
| EMW-1D | | 11/16/2015 | 2 | 4.4 | **23** | 4.3 | 0.89 J | **0.31** | <1 | <1 | <1 | <1 | <1 | 0.52 J | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 35.11 |
| EMW-1D | | 8/26/2016 | 0.73 | 1.5 | **7.1** | 1.6 | 0.36 | 0.191 J | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 11.29 |
| EMW-1D | | 11/11/2016 | 0.95 J | 1.8 | **9.5** | 2.3 | 0.43 J | 0.26 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 13.86 |
| EMW-1D | | 2/10/2017 | 1.2 | 2.2 | **12** | 2.2 | 0.4 J | 0.074 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 0.2 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | |
| EMW-1D | | 5/15/2017 | 0.7 | 1.7 | **7.9** | 1.4 | 0.4 J | 0.081 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 0.2 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 J | <0.2 | 11.7 |
| EMW-1D | | 8/15/2017 | 0.8 | 1.7 | **7.7** | 1.5 | 0.4 J | <0.051 | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | 0.2 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | 12.3 |
| EMW-1D | | 11/16/2017 | 0.4 J | 2 | **9.6** | 1.8 | 0.4 J | 0.10 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | 0.2 J | <0.1 | <0.1 | <0.1 | 0.1 J | <0.1 | <0.1 | <0.1 | <0.1 UJ | <0.2 | 12.3 |
| EMW-2D | | 11/13/1996 | **51** | **12** | **72** | <1 | 14 | NS | <1 | <1 | <1 | <1 | **13** | <1 | <1 | <1 | <3 | <1 | NA | NA | <1 | <1 | <1 | 162 |
| EMW-2D | | 5/13/1998 | **40** | **17** | **64** | 11 | 13 | NS | 2 | <0.2 | <0.3 | <0.2 | <0.4 | <0.3 | <0.2 | <0.5 | <0.3 | <0.3 | <0.5 | <0.3 | <0.3 | <0.3 | <0.4 | 147 |
| EMW-2D | | 8/20/1998 | **23** | **9.2** | **38** | 6.2 | 7 | NS | <1.0 | <2.0 | <1.0 | <2.0 | <1.0 | <1.0 | <2.0 | <2.0 | <1.0 | <2.0 | <1.0 | <2.0 | <1.0 | <1 | <5 | 83.4 |
| EMW-2D | | 11/19/1998 | **24** | **10** | **42** | 6 | 7 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 7 | <1 | <1 | <1 | <1 | <1 | <1 | 96 |
| EMW-2D | | 2/18/1999 | **19** | **7** | **37** | 4 | 6 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 73 |
| EMW-2D | | 5/13/1999 | **8** | **8** | **32** | 5 | 7 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 60 |
| EMW-2D | | 6/15/2000 | **20** | **6** | **23** | 5 | 7 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 61 |
| EMW-2D | | 8/17/2000 | **24** | **10** | **39** | 7 | 8 | NS | 2 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 90 |
| EMW-2D | | 11/13/2000 | **32** | **13** | **52** | 8 | 9 | NS | 2 | <1 | <1 | <1 | <5 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 116 |
| EMW-2D | | 2/13/2001 | **24** | **11** | **41** | 6 | 7 | NS | 1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <5 | <1 | 90 |
| EMW-2D | | 11/14/2001 | **20** | **7.8** | **33** | 5 | 5.1 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | 0.4 J | <5 | <1 | 71.3 J |
| EMW-2D | | 11/20/2002 | 14 J | 6.2 J | 26 J | 4.4 J | 3.8 J | NS | <1 J | <1 J | <1 J | <1 J | <5 J | <1 J | <1 J | <1 J | <3 J | <1 J | <1 J | <1 J | 0.45 J | <5 | <1 | 54.9 J |
| EMW-2D | | 11/4/2003 | **15** | **7** | **23** | 4 | 3 | NS | <1 | <1 | <1 | <1 | <1 | NA | <1 | <1 | <2 | <1 | <1 | <1 | NA | <1 | <1 | 52 |
| EMW-2D | Duplicate | 11/4/2003 | **14** | **7** | **23** | 4 | 3 | NS | <1 | <1 | <1 | <1 | <1 | NA | <1 | <1 | <2 | <1 | <1 | <1 | NA | <1 | <1 | 51 |
| EMW-2D | | 11/23/2004 | **17** | 6.3 J | 29 J | 3.7 J | 4.3 J | NS | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | 0.74 J | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | 112 J |
| EMW-2D | Duplicate | 11/23/2004 | **12** | 4.2 J | 19 J | 2.5 J | 3 J | NS | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | 0.50 J | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | 41 J |
| EMW-2D | | 11/2/2005 | **11** | **5.3** | **19** | 2.9 | 2.6 | NS | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | 1.3 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | 42.1 |
| EMW-2D | Duplicate | 11/1/2005 | **10** | **5.3** | **19** | 2.8 | 2.6 | NS | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | 1.4 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | 41.1 |
| EMW-2D | | 11/7/2006 | **8.3** | 4.4 | **15** | 2.8 | 2.1 | NS | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | 1.9 | <1.0 | <1.0 | <3.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | 34.5 |
| EMW-2D | Duplicate | 11/7/2006 | **8.3** | 4.4 | **15** | 2.7 | 2.1 | NS | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | 1.8 | <1.0 | <1.0 | <3.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | 34.3 |
| EMW-2D | | 11/8/2007 | 5.5 | 2.6 | **9.3** | 1.8 | 1.3 | NS | <1 | <1 | <1 | <1 | <2 | 2.3 | <1 | <1 | <3 | <0.5 | <1 | <1 | <1 | <1 | <2 | 22.8 |
| EMW-2D | Duplicate | 11/8/2007 | 6.1 | 2.6 | **9.4** | 1.9 | 1.5 | NS | <1 | <1 | <1 | <1 | <2 | 1.9 | <1 | <1 | <3 | <0.5 | <1 | <1 | <1 | <1 | <2 | 23.4 |

**Table 3-1**
**Summary of Groundwater Sampling Results for VOCs**
**Phase V Monitoring Report and ROS Statement**
**Former RCA Facility**
**Burlington, Massachusetts**

| Monitoring Well Number | Sample Type | Date Sampled | 1,1-Dichloroethene | Tetrachloroethene | Trichloroethene | cis-1,2-Dichloroethene | 1,1-Dichloroethane | 1,4-Dioxane | 1,1,1-Trichloroethane | Benzene | Chloroform | Ethyl-benzene | Methylene Chloride | Methyl tert-butyl ether | Toluene | 1,1,2-Trichloroethane | Xylene (total) | Vinyl Chloride | 1,2-Dichloroethane | Chloro-benzene | Trichlorofluoromethane | Dichlorodifluoromethane | Chloromethane | Total VOCs |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **GW-1 Criteria** | | | **7** | **5** | **5** | **70** | **70** | **0.3000** | **200** | **5** | **70** | **700** | **5** | **70** | **1,000** | **5** | **10,000** | **2** | **5** | **100** | **NE** | **NE** | **NE** | **NE** |
| **GW-2 Criteria** | | | **80** | **50** | **5** | **100** | **1,000** | **6,000** | **4,000** | **2,000** | **50** | **20,000** | **10,000** | **50,000** | **50,000** | **900** | **9,000** | **2** | **5** | **200** | **NE** | **NE** | **NE** | **NE** |
| **GW-3 Criteria** | | | **30,000** | **30,000** | **5,000** | **50,000** | **20,000** | **50,000** | **20,000** | **10,000** | **20,000** | **5,000** | **50,000** | **50,000** | **40,000** | **50,000** | **5,000** | **50,000** | **20,000** | **1,000** | **NE** | **NE** | **NE** | **NE** |
| **UCL Criteria** | | | **100,000** | **100,000** | **50,000** | **100,000** | **100,000** | | **100,000** | **100,000** | **100,000** | **100,000** | **100,000** | **100,000** | **100,000** | **100,000** | **100,000** | **100,000** | **100,000** | **10,000** | **NE** | **NE** | **NE** | **NE** |
| EMW-2D | | 11/5/2008 | 6.7 | 3 | **11** | 1.8 | 1.3 | NS | <1 | <1 | <1 | <1 | <2 | 1.8 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 25.6 |
| EMW-2D | Duplicate | 11/5/2008 | 6.7 | 3.1 | **11** | 1.8 | 1.3 | NS | <1 | <1 | <1 | <1 | <2 | 1.9 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 25.8 |
| EMW-2D | | 11/12/2009 | 5.7 | 2.6 | **9.7** | 1.6 | 1.1 | NS | <1 | <1 | <1 | <1 | <2 | 1.2 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 21.9 |
| EMW-2D | Duplicate | 11/12/2009 | 6.6 | 2.7 | **9.9** | 1.5 | 1 | NS | <1 | <1 | <1 | <1 | <2 | 1.2 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 22.9 |
| EMW-2D | | 11/11/2010 | 5.3 | 2.4 | **10** | 1.8 | <1 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 19.5 |
| EMW-2D | Duplicate | 11/11/2010 | 5.5 | 2.6 | **10** | 1.8 | 1 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 20.9 |
| EMW-2D | | 11/16/2011 | 4.4 | 2.2 | **9.7** | 1.7 | <1 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 18 |
| EMW-2D | Duplicate | 11/16/2011 | 4.8 | 2.4 | **9.8** | 1.7 | <1 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 18.7 |
| EMW-2D | | 11/9/2012 | 3 | 2.4 | **9.8** | 1.4 | <1 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 16.6 |
| EMW-2D | Duplicate | 11/9/2012 | 2.9 | 2.4 | **9.6** | 1.6 | <1 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1* | <2 | 16.5 |
| EMW-2D(R) | | 11/11/2013 | 5.5 | 1.6 J | **7** | 1.6 J | 1.3 J | NS | <1 | <1 | <1 | <1 | <1 | 0.43 J | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 17.43 |
| EMW-2D(R) | Duplicate | 11/11/2013 | 5.9 | 1.6 J | **6.8** | 1.6 J | 1.3 J | NS | <1 | <1 | <1 | <1 | <1 | 0.39 J | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 17.59 |
| EMW-2D(R) | | 11/11/2014 | 0.62 J | 2.8 | 2.1 | 0.54 J | 0.26 J | 0.085 J | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 6.32 |
| EMW-2D(R) | Duplicate | 11/11/2014 | 0.64 J | 2.5 | 2.2 | 0.59J | 0.29 J | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 6.22 |
| EMW-2D(R) | | 11/13/2015 | <1 | 2.3 | 1.5 | 0.46 J | <1 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 4.26 |
| EMW-2D(R) | | 8/26/2016 | <1 | 3.1 | 1.5 | 0.54 | <1 | 0.0352 J | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 5.14 |
| EMW-2D(R) | | 11/11/2016 | <1.0 | 2.4 | 1.5 | 0.62 J | <1.0 | 0.0418 J | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 3.9 |
| EMW-2D(R) | | 2/14/2017 | 0.6 | 4.1 | 2.4 | 0.8 | 0.2 J | <0.051 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 0.1 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | |
| EMW-2D(R) | | 5/16/2017 | 0.6 | 3.8 | 2.1 | 0.9 | 0.2 J | <0.050 | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 J | <0.2 | 7.4 |
| EMW-2D(R) | | 8/15/2017 | 3.2 | 2 | 4.9 | 4.1 | 0.8 | <0.050 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 0.4 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | 15.4 |
| EMW-2D(R) | | 11/15/2017 | 3 | 1.5 | 4.8 | 4 | 0.8 | 0.07 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 0.3 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 UJ | <0.2 | 14.47 |
| EMW-3R | | 5/13/1998 | **21** | **14** | **63** | 18 | 6 | NS | 6 | <0.2 | <0.3 | <0.2 | <0.4 | <0.3 | <0.2 | <0.5 | <0.3 | <0.3 | <0.5 | <0.3 | <0.3 | <0.3 | <0.4 | 128 |
| EMW-3R | | 8/20/1998 | **12** | **14** | **42** | 9.8 | 3.5 | NS | 3.4 | <2.0 | <1.0 | <2.0 | <1.0 | <1.0 | <2.0 | <2.0 | <1.0 | <2.0 | <1.0 | <2.0 | <1.0 | <1 | <5 | 84.7 |
| EMW-3R | | 11/19/1998 | **12** | **15** | **44** | 10 | 4 | NS | 3 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 88 |
| EMW-3R | | 2/18/1999 | **9** | **10** | **39** | 7 | 2 | NS | 2 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 69 |
| EMW-3R | | 5/13/1999 | **11** | **7** | **33** | 10 | 4 | NS | 2 | 1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 68 |
| EMW-3R | | 6/16/2000 | **10** | **7** | **28** | 10 | 4 | NS | 2 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 61 |
| EMW-3R | | 8/17/2000 | **14** | **11** | **39** | 11 | 5 | NS | 4 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 84 |
| EMW-3R | | 11/14/2000 | **17** | 4 | **42** | 15 | 6 | NS | 5 | 1 | <1 | <1 | <5 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 90 |
| EMW-3R | | 2/13/2001 | **11** | 3 | **30** | 10 | 4 | NS | 3 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <5 | <1 | 61 |
| EMW-3R | | 11/15/2001 | 6.2 | 1.8 | **23** | 6.1 | 2.6 | NS | 1.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <5 | <5 | <1 | 41.2 |
| EMW-3R | | 11/21/2002 | 4.7 | 2.5 | **22** | 5.6 | 2.7 | NS | 0.34 J | <1 | <1 | <1 | <5 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | 0.39 J | <5 | <1 | 38.2 J |
| EMW-3R | | 11/4/2003 | 6 | 3 | **20** | 6 | 2 | NS | <1 | <1 | <1 | <1 | <1 | NA | <1 | <1 | <2 | <1 | <1 | <1 | NA | <1 | <1 | 37 |
| EMW-3R | | 11/23/2004 | 4.4 | 2.4 J | 18 J | 3.4 J | 2.2 J | NS | 1 | <1.0 | <1.0 | <1.0 | <2.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | 5 |
| EMW-3R | | 11/2/2005 | 3.7 | 3.7 | **19** | 3.3 | 2 | NS | 0.91 | <1.0 | <1.0 | <1.0 | <2.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | 32.6 |
| EMW-3R | | 11/7/2006 | 2.6 | 3.3 | **16** | 3.4 | 1.9 | NS | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | <1.0 | <1.0 | <1.0 | <3.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | 27.2 |
| EMW-3R | | 11/9/2007 | 2.1 | 2.9 | **13** | 2.7 | 1.3 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <3 | <0.5 | <1 | <1 | <1 | <1 | <2 | 22 |
| EMW-3R | | 11/5/2008 | 2.3 | 3.8 | **13** | 2.4 | 1.4 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 22.9 |
| EMW-3R | | 11/11/2009 | 2.7 | 4.5 | **14** | 3 | 1.6 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 25.8 |
| EMW-3R | | 6/25/2010 | 2.4 | 3 | **12** | 2.8 J | 1.3 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 21.5 J |
| EMW-3R | | 11/11/2010 | 2.1 | 3.5 | **12** | 3 | 1.2 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 21.8 |
| EMW-3R | | 11/16/2011 | 3.3 | 4 | **13** | 4.5 | 1.4 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 26.2 |
| EMW-3R | | 11/9/2012 | 2.3 | 4.6 | **15** | 3.7 | 1.2 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 26.8 |
| EMW-3R | | 11/12/2013 | 0.83 J | 2.2 | **8.3** | 1.6 J | 0.75 J | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 13.68 |
| EMW-3R | | 11/12/2014 | 1 | 2.3 | **7** | 2.3 | 0.75 J | **0.41** | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 13.35 |
| EMW-3R | | 11/16/2015 | 1.1 | 2.7 | **8.7** | 2.3 | 0.79 J | **0.31** | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 15.59 |
| EMW-3R | | 8/26/2016 | 1.3 | 2.8 | **8.2** | 2.5 | 0.65 | **0.376** | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 15.826 |
| EMW-3R | | 11/11/2016 | 1.3 | 2.3 | **7.5** | 3.3 | 0.99 J | **0.405** | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 14.805 |
| EMW-3R | | 2/11/2017 | 2 | 3 | **10** | 4 | 1 | 0.12 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 0.2 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | |
| EMW-3R | | 5/16/2017 | 1.2 | 2.4 | **8.9** | 3.3 | 0.8 | 0.23 | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | 0.1 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 J | <0.2 | 16.83 |
| EMW-3R | | 8/15/2017 | 1.8 | 4.2 | **12** | 3.5 | 0.9 | 0.18 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | 22.58 |
| EMW-3R | | 11/14/2017 | 1.7 | 3.4 | **11** | 3.6 | 0.8 | 0.2 | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | 0.2 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 UJ | <0.2 | 20.9 |
| EMW-7 | | 11/13/1996 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <5 | <1 | <1 | <1 | <3 | <1 | NA | NA | <1 | <1 | <1 | 0 |
| EMW-7 | | 5/12/1998 | 3 | 4 | 3 | <0.4 | <0.5 | NS | <0.4 | <0.2 | <0.3 | <0.2 | <0.4 | <0.3 | <0.2 | <0.5 | <0.3 | <0.3 | <0.5 | <0.3 | <0.3 | <0.3 | <0.4 | 10 |
| EMW-7 | | 8/18/1998 | <1.0 | 1.9 | 1.6 | <1.0 | <1.0 | NS | 1.5 | <2.0 | <1.0 | <2.0 | <1.0 | <1.0 | <2.0 | <2.0 | <1.0 | <2.0 | <1.0 | <2.0 | <1.0 | <1 | <5 | 5 |
| EMW-7 | | 11/20/1998 | <1 | 4 | 3 | <1 | <1 | NS | 5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 9 | <1 | <1 | <1 | <1 | <1 | <1 | 21 |
| EMW-7 | | 2/17/1999 | <1 | **5** | 2 | 1 | 2 | NS | 11 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 21 |
| EMW-7 | | 5/13/1999 | 2 | 4 | 3 | 2 | 2 | NS | 19 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 32 |

**Table 3-1**
**Summary of Groundwater Sampling Results for VOCs**
**Phase V Monitoring Report and ROS Statement**
**Former RCA Facility**
**Burlington, Massachusetts**

| Monitoring Well Number | Sample Type | Date Sampled | 1,1-Dichloroethene | Tetrachloroethene | Trichloroethene | cis-1,2-Dichloroethene | 1,1-Dichloroethane | 1,4-Dioxane | 1,1,1-Trichloroethane | Benzene | Chloroform | Ethyl-benzene | Methylene Chloride | Methyl tert-butyl ether | Toluene | 1,1,2-Trichloroethane | Xylene (total) | Vinyl Chloride | 1,2-Dichloroethane | Chloro-benzene | Trichlorofluoromethane | Dichlorodifluoromethane | Chloromethane | Total VOCs |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GW-1 Criteria | | | 7 | 5 | 5 | 70 | 70 | 0.3000 | 200 | 5 | 70 | 700 | 5 | 70 | 1,000 | 5 | 10,000 | 2 | 5 | 100 | NE | NE | NE | NE |
| GW-2 Criteria | | | 80 | 50 | 5 | 100 | 1,000 | 6,000 | 4,000 | 2,000 | 50 | 20,000 | 10,000 | 50,000 | 50,000 | 900 | 9,000 | 2 | 5 | 200 | NE | NE | NE | NE |
| GW-3 Criteria | | | 30,000 | 30,000 | 5,000 | 50,000 | 20,000 | 50,000 | 20,000 | 10,000 | 20,000 | 5,000 | 50,000 | 50,000 | 40,000 | 50,000 | 5,000 | 50,000 | 20,000 | 1,000 | NE | NE | NE | NE |
| UCL Criteria | | | 100,000 | 100,000 | 50,000 | 100,000 | 100,000 | | 100,000 | 100,000 | 100,000 | 100,000 | 100,000 | 100,000 | 100,000 | 100,000 | 100,000 | 100,000 | 100,000 | 10,000 | NE | NE | NE | NE |
| EMW-7 | | 5/3/2000 | <1 | 3 | 2 | 1 | 1 | NS | 3 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 10 |
| EMW-7 | | 6/16/2000 | <1 | 5 | <1 | 3 | 2 | NS | 7 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 17 |
| EMW-7 | | 8/17/2000 | 15 | 5 | 21 | 5 | 6 | NS | 66 | <1 | <1 | <1 | <1 | 9 | <1 | <1 | <3 | 1 | <1 | <1 | <1 | <1 | <1 | 128 |
| EMW-7 | | 11/13/2000 | <1 | 11 | 5 | 7 | 7 | NS | 10 | <1 | <1 | <1 | <5 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 40 |
| EMW-7 | | 11/15/2001 | <1 | 6.3 | 2.3 | 4.3 | 4.2 | NS | 3.1 | <1 | <1 | <1 | <1 | 0.59 J | <1 | <1 | <3 | 0.3 J | <1 | <1 | 3.7 J | <5 | <1 | 24.8 J |
| EMW-7 | | 11/20/2002 | 0.37 J | 1.5 | 1.9 | 2.2 | 1.3 | NS | 0.58 J | <1 | <1 | <1 | <5 | 2.1 | <1 | <1 | <3 | <1 | <1 | <1 | 1.5 J | <5 | <1 | 11.5 J |
| EMW-7 | | 11/3/2003 | <1 | 8 | 1 | 2 | 2 | NS | <1 | <1 | <1 | <1 | <1 | NA | <1 | <1 | <2 | <1 | <1 | <1 | NA | <1 | 4 | 17 |
| EMW-7 | | 11/23/2004 | <1.0 | 4.6 J | 0.91 J | 0.60 J | 0.88 J | NS | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | 1.2 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | 0.54 J | <2.0 | 9J |
| EMW-7 | | 11/2/2005 | <1.0 | 4 | 0.73 J | <1.0 | <1.0 | NS | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | 1 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | 5 |
| EMW-7 | | 11/7/2006 | <1.0 | 3.9 | 1.2 | <1.0 | <1.0 | NS | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | <1.0 | <1.0 | <1.0 | <3.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | 5.1 |
| EMW-7 | | 11/9/2007 | <1 | 2.4 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <3 | <0.5 | <1 | <1 | <1 | <1 | <2 | 2.4 |
| EMW-7 | | 11/7/2008 | <1 | 2.2 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 2.2 |
| EMW-7 | | 11/11/2009 | <1 | 1.7 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 1.7 |
| EMW-7 | | 11/12/2010 | <1 | 1.9 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 1.9 |
| EMW-7 | | 11/15/2011 | <1 | 1.5 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 1.5 |
| EMW-7 | | 11/8/2012 | <1 | 1.5 | 1.3 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 2.8 |
| EMW-7 | | 11/12/2013 | <1 | 0.77J | 0.34 J | <1 | <1 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 1.11 |
| EMW-7 | | 11/12/2014 | <1 | 1.4 | 0.27 J | <1 | <1 | 0.026 J | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 1.67 |
| EMW-7 | | 11/13/2015 | <1 | 1.1 | 0.3 J | <1 | <1 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 1.4 |
| EMW-7 | | 8/26/2016 | <1 | 1.3 | 0.3 | <1 | <1 | 0.0230 J | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 1.6 |
| EMW-7 | | 11/11/2016 | <1.0 | 1 | 0.32 J | <1.0 | <1.0 | 0.0320 J | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 1 |
| EMW-7 | | 2/14/2017 | <0.1 | 1.1 | 0.2 J | 0.1 J | <0.1 | <0.051 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | |
| EMW-7 | | 5/15/2017 | <0.1 | 1.3 | 0.2 J | <0.1 | <0.1 | <0.052 | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 J | <0.2 | 1.3 |
| EMW-7 | | 8/15/2017 | <0.1 | 1.5 | 0.2 J | 0.1 J | <0.1 | <0.051 | <0.1 | <0.1 | <.01 | <.01 | <.02 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | 1.8 |
| EMW-7 | | 11/14/2017 | <0.1 | 1.2 | 0.2 J | 0.1 J | <0.1 | 0.057 J | <0.1 | <0.1 | <.01 | <.01 | <.02 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 UJ | <0.2 | 1.557 |
| OA-1 | | 11/29/1994 | ND | ND | ND | ND | ND | NS | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | NA | NA | ND | NA | NA | ND |
| OA-1 | | 8/19/1998 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | NS | <1.0 | <2.0 | <1.0 | <2.0 | <1.0 | <1.0 | <2.0 | <2.0 | <1.0 | <2.0 | <1.0 | <2.0 | <1.0 | NA | <5 | 0 |
| 3H-1D | | 11/29/1994 | ND | ND | ND | ND | ND | NS | ND | ND | 4.2 | ND | ND | ND | ND | ND | ND | ND | NA | NA | ND | NA | NA | 4.2 |
| 3H-1D | | 11/12/1996 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <5 | <1 | <1 | <1 | <3 | <1 | NA | NA | <1 | <1 | <1 | 0 |
| 3H-1D | | 5/12/1998 | 2 | 1 | 4 | <0.4 | <0.5 | NS | <0.4 | <0.2 | <0.3 | <0.2 | <0.4 | <0.3 | <0.2 | <0.5 | <0.3 | <0.3 | <0.5 | <0.3 | <0.3 | <0.3 | <0.4 | 7 |
| 3H-1D | | 8/20/1998 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | NS | <1.0 | <2.0 | <1.0 | <2.0 | <1.0 | <1.0 | <2.0 | <2.0 | <1.0 | <2.0 | <1.0 | <2.0 | <1.0 | <1 | <5 | 0 |
| 3H-1D | | 11/19/1998 | 2 | <1 | 1 | <1 | <1 | NS | <1 | <1 | <1 | 1 | <1 | <1 | <1 | <1 | 11 | <1 | <1 | <1 | <1 | <1 | <1 | 15 |
| 3H-1D | | 2/19/1999 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 0 |
| 3H-1D | | 5/13/1999 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 0 |
| 3H-1D | | 6/16/2000 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 0 |
| 3H-1D | | 8/17/2000 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 0 |
| 3H-1D | | 11/13/2000 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <5 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 0 |
| 3H-1D | | 2/12/2001 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <5 | <1 | 0 |
| 3H-1D | | 11/14/2001 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <5 | <5 | <1 | 0 |
| 3H-1D | | 11/20/2002 | <1 | <1 | 0.32 J | <1 | <1 | NS | <1 | <1 | <1 | <1 | <5 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <5 | <5 | <1 | 0.32 J |
| 3H-1D | | 11/4/2003 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <1 | NA | <1 | <1 | <2 | <1 | <1 | <1 | NA | <1 | <1 | ND |
| 3H-1D | | 11/23/2004 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | NS | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | 0 |
| 3H-1D | | 11/2/2005 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | NS | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | 0 |
| 3H-1D | | 11/7/2006 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | NS | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | <1.0 | <1.0 | <1.0 | <3.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | 0 |
| 3H-1D | | 11/9/2007 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <3 | <0.5 | <1 | <1 | <1 | <1 | <2 | 0 |
| 3H-1D | | 11/7/2008 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 0 |
| 3H-1D | | 11/11/2009 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 0 |
| 3H-1D | | 11/12/2010 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 0 |
| 3H-1D | | 11/14/2011 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 0 |
| 3H-1D | | 11/8/2012 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 0 |
| 3H-1D | | 11/11/2013 | <1 | <1 | 0.27 J | <1 | <1 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 0.27 |
| 3H-1D | | 11/11/2014 | <1 | <1 | <1 | <1 | <1 | 0.11 J | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 0 |
| 3H-1D | | 11/13/2015 | <1 | <1 | 0.22 J | <1 | <1 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 0.22 |
| 3H-1D | | 8/26/2016 | <1 | <1 | 0.23 | <1 | <1 | 0.0914 J | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 0.23 |
| 3H-1D | | 11/11/2016 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | 0.105 J | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 0 |
| 3H-1D | | 2/10/2017 | 0.2 J | <0.1 | 0.2 J | <0.1 | <0.1 | <0.051 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 0.1 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | |
| 3H-1D | | 5/16/2017 | 0.1 J | <0.1 | 0.2 J | <0.1 | <0.1 | 0.071 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 J | <0.2 | 0 |
| 3H-1D | | 8/14/2017 | <0.1 | <0.1 | 0.2 J | <0.1 | <0.1 | 0.058 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | 0.1 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | 0.358 |

**Table 3-1**
**Summary of Groundwater Sampling Results for VOCs**
**Phase V Monitoring Report and ROS Statement**
**Former RCA Facility**
**Burlington, Massachusetts**

| Monitoring Well Number | Sample Type | Date Sampled | 1,1-Dichloroethene | Tetrachloroethene | Trichloroethene | cis-1,2-Dichloroethene | 1,1-Dichloroethane | 1,4-Dioxane | 1,1,1-Trichloroethane | Benzene | Chloroform | Ethyl-benzene | Methylene Chloride | Methyl tert-butyl ether | Toluene | 1,1,2-Trichloroethane | Xylene (total) | Vinyl Chloride | 1,2-Dichloroethane | Chloro-benzene | Trichlorofluoromethane | Dichlorodifluoromethane | Chloromethane | Total VOCs |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GW-1 Criteria | | | 7 | 5 | 5 | 70 | 70 | 0.3000 | 200 | 5 | 70 | 700 | 5 | 70 | 1,000 | 5 | 10,000 | 2 | 5 | 100 | NE | NE | NE | NE |
| GW-2 Criteria | | | 80 | 50 | 5 | 100 | 1,000 | 6,000 | 4,000 | 2,000 | 50 | 20,000 | 10,000 | 50,000 | 50,000 | 900 | 9,000 | 2 | 5 | 200 | NE | NE | NE | NE |
| GW-3 Criteria | | | 30,000 | 30,000 | 5,000 | 50,000 | 20,000 | 50,000 | 20,000 | 10,000 | 20,000 | 5,000 | 50,000 | 50,000 | 40,000 | 50,000 | 5,000 | 50,000 | 20,000 | 1,000 | NE | NE | NE | NE |
| UCL Criteria | | | 100,000 | 100,000 | 50,000 | 100,000 | 100,000 | | 100,000 | 100,000 | 100,000 | 100,000 | 100,000 | 100,000 | 100,000 | 100,000 | 100,000 | 100,000 | 100,000 | 10,000 | NE | NE | NE | NE |
| 3H-1D | | 11/27/2017 | 0.2J | <0.1 | 0.1 J | <0.1 | <0.1 | <0.050 | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 UJ | <0.2 UJ | 0.358 |
| 3H-1S | | 11/29/1994 | 22 | 3.7 | 19 | 3.1 | 5.4 | NS | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | NA | NA | NA | NA | NA | 53.2 |
| 3H-1S | | 11/12/1996 | 5 | 1 | 5 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <5 | <1 | <1 | <1 | <3 | <1 | NA | NA | <1 | <1 | <1 | 11 |
| 3H-1S | | 5/12/1998 | 3 | 1 | 8 | <0.4 | <0.5 | NS | <0.4 | <0.2 | <0.3 | <0.2 | <0.4 | <0.3 | <0.2 | <0.5 | <0.3 | <0.3 | <0.5 | <0.3 | <0.3 | <0.3 | <0.4 | 12 |
| 3H-1S | | 8/19/1998 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | NS | <1.0 | <2.0 | <1.0 | <2.0 | <1.0 | <1.0 | <2.0 | <2.0 | <1.0 | <2.0 | <1.0 | <2.0 | <1.0 | <1 | <5 | 0 |
| 3H-1S | | 11/19/1998 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | 1 | <1 | <1 | 1 | <1 | 12 | <1 | <1 | <1 | <1 | <1 | <1 | 14 |
| 3H-1S | | 2/18/1999 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 0 |
| 3H-1S | | 5/12/1999 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 0 |
| 3H-1S | | 6/16/2000 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 0 |
| 3H-1S | | 8/17/2000 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 0 |
| 3H-1S | | 11/13/2000 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <5 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 0 |
| 3H-1S | | 2/12/2001 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <5 | <1 | 0 |
| 3H-1S | | 11/14/2001 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <5 | <5 | <1 | 0 |
| 3H-1S | | 11/20/2002 | 0.23 J | 0.14 J | 0.29 J | <1 | <1 | NS | <1 | <1 | <1 | <1 | <5 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | 0.3 J | <5 | <1 | 0.96 J |
| 3H-1S | | 11/4/2003 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <1 | NA | <1 | <1 | <2 | <1 | <1 | <1 | NA | <1 | <1 | ND |
| 3H-1S | | 11/23/2004 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | NS | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | 0 |
| 3H-1S | | 11/2/2005 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | NS | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | 0 |
| 3H-1S | | 11/7/2006 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | NS | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | <1.0 | <1.0 | <1.0 | <3.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | 0 |
| 3H-1S | | 11/9/2007 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <3 | <0.5 | <1 | <1 | <1 | <1 | <2 | 0 |
| 3H-1S | | 11/7/2008 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 0 |
| 3H-1S | | 11/11/2009 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 0 |
| 3H-1S | | 11/12/2010 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 0 |
| 3H-1S | | 11/14/2011 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 0 |
| 3H-1S | | 11/8/2012 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 0 |
| 3H-1S | | 11/11/2013 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 0 |
| 3H-1S | | 11/11/2014 | <1 | <1 | <1 | <1 | <1 | 0.071 J | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 0 |
| 3H-1S | | 11/13/2015 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 0 |
| 3H-1S | | 8/26/2016 | <1 | <1 | <1 | <1 | <1 | 0.0590 J | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 0 |
| 3H-1S | | 11/11/2016 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | 0.06780 J | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 0 |
| 3H-1S | | 2/10/2017 | 0.2 J | <0.1 | 0.1 J | <0.1 | <0.1 | <0.05 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | |
| 3H-1S | | 5/16/2017 | 0.1 J | <0.1 | <0.1 | <0.1 | <0.1 | 0.059 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 J | <0.2 | 0 |
| 3H-1S | | 8/14/2017 | <0.1 | <0.1 | 0.1 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | 0.1 |
| 3H-1S | | 11/13/2017 | 0.2J | <0.1 | <0.1 | <0.1 | <0.1 | <0.050 | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 UJ | <0.2 UJ | 0.1 |
| 3H-3 | | 8/23/1994 | ND | ND | ND | ND | ND | NS | ND | ND | ND | ND | 12 | ND | 2.4 | ND | 2.8 | ND | NA | NA | ND | NA | NA | 17.2 |
| 3H-3 | | 12/1/1994 | ND | ND | ND | ND | ND | NS | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | NA | NA | ND | NA | NA | ND |
| 3H-3 | | 11/14/1996 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <5 | <1 | <1 | <1 | <3 | <1 | NA | NA | <1 | <1 | <1 | 0 |
| 3H-3 | | 5/3/2000 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 0 |
| 3H-3 | | 8/17/2000 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 0 |
| 3H-3 | | 8/26/2016 | <1 | <1 | <1 | <1 | <1 | 0.0568 J | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 0 |
| 3H-3 | | 11/11/2016 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | 0.0848 J | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 0 |
| 3H-3 | | 2/14/2017 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.061 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | |
| 3H-3 | | 5/16/2017 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.050 | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | 0.1 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 J | <0.2 | 0 |
| 3H-3 | | 8/14/2017 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <.050 | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | 0 |
| 3H-3 | | 11/17/2017 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.051 | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 UJ | <0.2 | 0 |
| A-1 | | 8/27/2016 | <0.57 | 0.57 J | 0.51 J | 0.39 J | 0.38 J | 0.229 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | |
| A-1 | | 11/11/2016 | <0.57 | 1.8 | 0.72 J | <0.30 | <0.20 | 0.0376 J | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | |
| A-1 | | 2/12/2017 | <0.1 | 3.3 | 1.2 | 0.2 J | <0.1 | <0.051 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | |
| A-1 | | 5/13/2017 | <0.1 | 2.6 | 0.8 | 0.1 J | <0.1 | <0.051 | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 J | <0.2 | 3.4 |
| A-1 | | 8/12/2017 | 0.2 | 0.9 | 0.2 J | 0.1 J | 0.1 J | <0.050 | <.0.1 | <0.1 | <.0.1 | <0.1 | <0.2 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | 1.3 |
| A-1 | | 11/12/2017 | <0.1 | 0.5 | 0.2 J | <0.1 | 0.1 J | <0.050 | <.0.1 | <0.1 | <.0.1 | <0.1 | <0.2 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 UJ | <0.2 UJ | 1.3 |
| A-1D | | 11/29/1994 | 82 | 17 | 64 | 7.6 | 16 | NS | 27 | ND | 2.4 | ND | ND | ND | ND | ND | ND | ND | NA | NA | NA | NA | NA | 216 |
| A-1D | | 11/12/1996 | 76 | 19 | 68 | <1 | 11 | NS | 13 | <1 | <1 | <1 | <5 | <1 | <1 | <1 | <3 | <1 | NA | NA | <1 | <1 | <1 | 187 |
| A-1D | | 5/13/1998 | 73 | 24 | 66 | 11 | 17 | NS | 26 | <0.2 | <0.3 | <0.2 | <0.4 | <0.3 | <0.2 | <0.5 | <0.3 | <0.3 | <0.5 | <0.3 | <0.3 | <0.3 | <0.4 | 217 |
| A-1D | | 8/19/1998 | 42 | 12 | 39 | 6.2 | 9.4 | NS | 17 | <2.0 | <1.0 | <2.0 | <1.0 | <1.0 | <2.0 | <2.0 | <1.0 | <2.0 | <1.0 | <2.0 | <1.0 | <1 | <5 | 125.6 |
| A-1D | | 11/20/1998 | 41 | 14 | 41 | 6 | 10 | NS | 22 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 8 | <1 | <1 | <1 | <1 | <1 | <1 | 142 |
| A-1D | | 2/17/1999 | 28 | 9 | 33 | 4 | 8 | NS | 17 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 99 |
| A-1D | | 5/12/1999 | 36 | 9 | 36 | 6 | 9 | NS | 30 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 126 |
| A-1D | | 6/16/2000 | 24 | 9 | 26 | 5 | 6 | NS | 17 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 87 |

**Table 3-1**
**Summary of Groundwater Sampling Results for VOCs**
**Phase V Monitoring Report and ROS Statement**
**Former RCA Facility**
**Burlington, Massachusetts**

| Monitoring Well Number | Sample Type | Date Sampled | 1,1-Dichloroethene | Tetrachloroethene | Trichloroethene | cis-1,2-Dichloroethene | 1,1-Dichloroethane | 1,4-Dioxane | 1,1,1-Trichloroethane | Benzene | Chloroform | Ethyl-benzene | Methylene Chloride | Methyl tert-butyl ether | Toluene | 1,1,2-Trichloroethane | Xylene (total) | Vinyl Chloride | 1,2-Dichloroethane | Chloro-benzene | Trichlorofluoromethane | Dichlorodifluoromethane | Chloromethane | Total VOCs |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **GW-1 Criteria** | | | **7** | **5** | **5** | **70** | **70** | **0.3000** | **200** | **5** | **70** | **700** | **5** | **70** | **1,000** | **5** | **10,000** | **2** | **5** | **100** | **NE** | **NE** | **NE** | **NE** |
| **GW-2 Criteria** | | | **80** | **50** | **5** | **100** | **1,000** | **6,000** | **4,000** | **2,000** | **50** | **20,000** | **10,000** | **50,000** | **50,000** | **900** | **9,000** | **2** | **5** | **200** | **NE** | **NE** | **NE** | **NE** |
| **GW-3 Criteria** | | | **30,000** | **30,000** | **5,000** | **50,000** | **20,000** | **50,000** | **20,000** | **10,000** | **20,000** | **5,000** | **50,000** | **50,000** | **40,000** | **50,000** | **5,000** | **50,000** | **20,000** | **1,000** | **NE** | **NE** | **NE** | **NE** |
| **UCL Criteria** | | | **100,000** | **100,000** | **50,000** | **100,000** | **100,000** | | **100,000** | **100,000** | **100,000** | **100,000** | **100,000** | **100,000** | **100,000** | **100,000** | **100,000** | **100,000** | **100,000** | **10,000** | **NE** | **NE** | **NE** | **NE** |
| A-1D | | 8/17/2000 | 4 | 2 | 4 | 2 | 3 | NS | 3 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 18 |
| A-1D | | 11/13/2000 | **37** | **11** | **35** | 6 | 9 | NS | 21 | <1 | <1 | <1 | <5 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 119 |
| A-1D | | 2/13/2001 | **29** | **11** | **34** | 5 | 7 | NS | 17 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <5 | <1 | 103 |
| A-1D | | 11/14/2001 | **24** | **6.2** | **24** | 3.6 | 4.7 | NS | 8.9 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | 0.4 J | <5 | <1 | 71.8 J |
| A-1D | | 11/20/2002 | **21** | **5.8** | **20** | 3.4 | 3.7 | NS | 6 | <1 | 0.11 J | <1 | <5 | 0.59 J | <1 | <1 | <3 | <1 | <1 | <1 | 0.6 J | <5 | <1 | 61.2 J |
| A-1D | | 11/3/2003 | **20** | **6** | **17** | 3 | 3 | NS | 3 | <1 | <1 | <1 | <1 | NA | <1 | <1 | <2 | <1 | <1 | <1 | NA | <1 | 3 | 55 |
| A-1D | | 11/23/2004 | **16** | 3.7 J | 15 J | 2.1 J | 2.5 J | NS | 2.6 | <1.0 | <1.0 | <1.0 | <2.0 | 7.9 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | 1 | <2.0 | 27.5 |
| A-1D | | 11/1/2005 | **13** | 4.6 | **14** | 2.5 | 2.1 | NS | 1.9 | <1.0 | <1.0 | <1.0 | <2.0 | 7.5 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1 | <2.0 | 45.6 |
| A-1D | | 11/6/2006 | **11** | 4.2 | **13** | 2.4 | 1.7 | NS | 1.5 | <1.0 | <1.0 | <1.0 | <2.0 | 3.7 | <1.0 | <1.0 | <3.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | 37.5 |
| A-1D | | 11/8/2007 | **9** | 3.1 | **10** | 2.1 | 1.4 | NS | <1 | <1 | <1 | <1 | <2 | 2.4 | <1 | <1 | <3 | <0.5 | <1 | <1 | <1 | <1 | <2 | 28 |
| A-1D | | 11/5/2008 | **8** | 3 | **9.2** | 1.7 | <1 | NS | <1 | <1 | <1 | <1 | <2 | 1.4 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 23.3 |
| A-1D | | 11/12/2009 | **7.6** | 2.8 | **8.7** | 1.5 | <1 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 20.6 |
| A-1D | | 11/10/2010 | 6.3 | 2.7 | **8.8** | 1.7 | <1 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 19.5 |
| A-1D | | 11/15/2011 | 5.3 | 2.6 | **8.4** | 1.5 | <1 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1* | <2 | 17.8 |
| A-1D | | 11/8/2012 | 2.8 | 2.9 | **7.7** | 1.4 | <1 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 14.8 |
| A-1D | | 11/12/2013 | 2.1 | 1.4 J | **5.6** | 1 J | 0.4 J | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 10.5 |
| A-1D | | 11/12/2014 | 2.1 | 1.8 | **5.2** | 0.87 J | 0.33 J | 0.11 J | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 10.3 |
| A-1D | | 11/15/2015 | 1.3 | 1.6 | 4.9 | 0.95 J | 0.33 J | 0.11 J | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 9.08 |
| A-1D | | 8/26/2016 | 1.2 | 1.6 | **5.1** | 0.91 | 0.32 | 0.124 J | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 9.13 |
| A-1D | | 11/11/2016 | 1.3 | 1.5 | 4.7 | 1 | 0.45 J | 0.131 J | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 8.5 |
| A-1D | | 2/11/2017 | 1.8 | 1.6 | **5.3** | 1 | 0.4 J | 0.065 J | 0.1 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | |
| A-1D | | 5/13/2017 | 1.6 | 1.5 | **5.1** | 0.9 | 0.4 J | 0.110 J | 0.1 J | <0.1 | <0.1 | <0.1 | <0.2 | 0.2 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 J | <0.2 | 9.1 |
| A-1D | | 8/12/2017 | 1.5 | 1.6 | 4.8 | 0.9 | 0.4 J | 0.080 J | 0.1 J | <0.1 | <0.1 | <0.1 | <.02 | 0.2 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | 9.58 |
| A-1D | | 11/12/2017 | 1.7 | 1.5 | 4.8 | 0.7 | 0.3J | <0.050 | 0.1 J | <0.1 | <0.1 | <0.1 | <.02 | 0.1 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 UJ | <0.2 UJ | 9.58 |
| EMW-12R | | 8/25/2016 | <0.57 | <0.3 | 0.27 J | <0.3 | 0.29 J | 0.0730 J | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | |
| EMW-12R | | 11/11/2016 | <0.57 | <0.3 | <0.2 | <0.3 | 0.39 J | 0.0704 J | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | |
| EMW-12R | | 2/14/2017 | <0.1 | <0.1 | <0.1 | <0.1 | 0.1 J | <0.051 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | |
| EMW-12R | | 5/16/2017 | <0.1 | <0.1 | 0.1 J | <0.1 | 0.3 J | <0.050 | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 J | <0.2 | |
| EMW-12R | | 8/14/2017 | <0.1 | <0.1 | <0.1 | <0.1 | 0.2 J | <0.050 | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | 0.2 |
| EMW-12R | | 8/14/2017 | <0.1 | <0.1 | <0.1 | <0.1 | 0.2 J | <0.05 | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | 0.2 |
| EMW-12R | | 11/17/2017 | <0.1 | <0.1 | <0.1 | <0.1 | 0.2 J | <0.05 | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 UJ | <0.2 | 0.2 |
| 3H-2 | | 8/25/2016 | <0.57 | <0.30 | <0.20 | <0.30 | <0.20 | 0.0532 J | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | |
| 3H-2 | | 11/11/2016 | <0.57 | <0.30 | <0.20 | <0.30 | <0.20 | 0.0550 J | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | |
| 3H-2 | | 2/14/2017 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.050 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | |
| 3H-2 | | 5/16/2017 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 0.051 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | 0.1 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 J | <0.2 | |
| 3H-2 | | 8/14/2017 | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | | | | | | | | | | | | | | | | | 0 |
| 3H-2 | | 11/17/2017 | <0.1 | <0.1 | <0.1 | 0.1 J | <0.1 | 0.076 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 UJ | <0.2 | 0 |
| 3H-5 | | 8/25/2016 | 3.2 | 1.0 | 1.0 | 0.30 J | 0.90 J | **0.769** | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | |
| 3H-5 | | 11/11/2016 | 5.5 | <0.3 | 1.5 | 0.55 J | 1.3 | **1.02** | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | |
| 3H-5 | | 2/14/2017 | 3.9 | <0.1 | 1.2 | 0.3 J | 1 | **0.44** | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | |
| 3H-5 | | 5/16/2017 | 3.7 | <0.1 | 1.2 | 0.3 J | 1.2 | 0.29 | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 J | <0.2 | |
| 3H-5 | | 8/14/2017 | <0.2 | <0.1 | 0.6 | 0.1 J | 0.7 | 0.17 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | 3.57 |
| 3H-5 | | 11/15/2017 | 3.4 | <0.1 | 1 | 0.2 J | 1.4 | **0.30** | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 UJ | <0.2 | 6.3 |
| TTMW-1 | | 11/15/2015 | <1 | 2.5 | 0.95 J | 0.32 J | <1 | <0.20 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 5.17 |
| TTMW-1 | | 8/26/2016 | <0.57 | 0.37 | 0.27 | <0.30 | <0.20 | 0.0588 J | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 0.64 |
| TTMW-1 | | 11/11/2016 | <0.57 | 0.51 J | <0.22 | <0.30 | <0.20 | 0.0398 J | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 0 |
| TTMW-1 | | 2/11/2017 | <0.1 | 0.8 | 0.3 J | <0.1 | <0.1 | <0.050 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | |
| TTMW-1 | | 5/13/2017 | <0.1 | 0.4 J | 0.1 J | <0.1 | <0.1 | <0.050 | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 J | <0.2 | 0 |
| TTMW-1 | | 8/12/2017 | 0.1 | 0.1 J | <0.1 | <0.1 | <0.1 | <0.050 | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | 3.8 |
| TTMW-1 | | 11/11/2017 | <0.1 | 0.6 | 0.2J | <0.1 | <0.1 | <0.050 | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 UJ | <0.2 UJ | 3.8 |
| TTMW-7R | | 11/16/2017 | <0.1 | <0.1 | 0.1 J | <0.1 | <0.1 | <0.050 | <0.1 | <0.1 | 0.1 J | <0.1 | <0.2 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 UJ | | |

Notes:
< Less than method detection limit. Concentration reported is the detection limit.
J = Estimated concentration, according to data validation protocol. Green highlighted
* = LCS or LCSD did not meet QC criteria.

NS = Not sampled or analyzed for
ND = Not detected in the samp| Concentrations in ug/L
NE = MCP Method 1 GW-1 Standard not established

**Bold and orange highlighted** denotes concentration above MCP Method 1 GW-1 Standard

**Table 3-4**
**Mann-Kendall Summary Table**
**Phase V Monitoring Report and ROS Statement**
**Burlington, Massachusetts**

| Location | 1,1-DCE Trend | 1,1-DCE 2004/2017 | PCE Trend | PCE 2004/2017 | TCE Trend | TCE 2004/2017 | 1,4-Dioxane Trend | 1,4-Dioxane 2004/2017 |
|---|---|---|---|---|---|---|---|---|
| **Former RCA Facility** | | | | | | | | |
| 3G-11 | **DECREASING** | 19/10 | <=MCL (5) | NA | **DECREASING** | 7.4/4.2 | **DECREASING** | 2.2/0.69 |
| 3G-12 | **DECREASING** | 29/0.9 | **DECREASING** | 6.7/1.6 | **DECREASING** | 20/2.2 | STABLE | 0.31/0.11 |
| EMW-10D | <=MCL (7) | NA | <=MCL (5) | NA | NONE | NA | <=GW-1 (0.3) | NA |
| EMW-11R | <=MCL (7) | NA | <=MCL (5) | NA | **DECREASING** | 7.6/4 | **DECREASING** | 0.91/0.19 |
| EMW-1D | <=MCL (7) | NA | **DECREASING** | 4.4/2 | **DECREASING** | 18/9.6 | **DECREASING** | 0.38/0.1 |
| EMW-2D(R) | **DECREASING** | 17/3 | **DECREASING** | 6.3/1.5 | **DECREASING** | 29/4.8 | STABLE | 0.085/0.07 |
| EMW-3R | <=MCL (7) | NA | <=MCL (5) | NA | **DECREASING** | 18/11 | **DECREASING** | 0.41/0.2 |
| EMW-7 | <=MCL (7) | NA | <=MCL (5) | NA | <=MCL (5) | NA | NONE | NA |
| 3H-1S | <=MCL (7) | NA | <=MCL (5) | NA | <=MCL (5) | NA | **DECREASING** | 0.71/ND |
| 3H-1D | <=MCL (7) | NA | <=MCL (5) | NA | <=MCL (5) | NA | **DECREASING** | 0.11/ND |
| 3H-5 | <=MCL (7) | NA | <=MCL (5) | NA | <=MCL (5) | NA | <=MCL (5) | NA |
| 3H-2 | <=MCL (7) | NA | <=MCL (5) | NA | <=MCL (5) | NA | <=GW-1 (0.3) | NA |
| 3H-5 | <=MCL (7) | NA | <=MCL (5) | NA | <=MCL (5) | NA | **DECREASING** | 0.77/0.3 |
| TTMW-1 | <=MCL (7) | NA | <=MCL (5) | NA | <=MCL (5) | NA | <=MCL (5) | NA |
| A-1 | <=MCL (7) | NA | <=MCL (5) | NA | <=MCL (5) | NA | <=MCL (5) | NA |
| A-1D | **DECREASING** | 16/1.7 | <=MCL (5) | NA | **DECREASING** | 15/4.8 | STABLE | NA |

**Notes:**

NA - Not applicable.

<=MCL (7) - Concentrations from all samples collected over the fourteen year time period were less than or equal to the Maximum Contaminat Level (value of MCL and concentrations in µg/L)

<=GW-1 (0.3) - Concentrations from all samples collected over the fourteen year time period were less than or equal to the GW-1 Standard for 1,4-Dioxane, concentrations in µg/L)

ND - Not detected

J - Sample result is estimated.

Table 3-5
Summary of Natural Attenuation Parameter Data
Monitoring Report and ROS Statement
Former RCA Facility, Burlington, Massachusetts

| Sample Location Identifier | Date Sampled | Oxygen (field) (mg/L) | Methane (ug/L) | Nitrate (as Nitrogen) (mg/L) | Oxygen Reduction Potential (field) (mV) | pH (field) (Standard Units) | Sulfate (as SO4) (mg/L) | Temperature (field) (°C) | Total Organic Carbon (mg/L) | Ferrous Iron (field) (mg/L) |
|---|---|---|---|---|---|---|---|---|---|---|
| EMW-10D | 8/18/1998 | 1.88 | <2 | 0.70 | 114.90 | 6.30 | 30.00 | 22.40 | <1 | - |
| EMW-10D | 5/3/2000 | 0.35 | 23.00 | 6.16 | 198.50 | 6.35 | 16.80 | 15.30 | 1.27 | - |
| EMW-10D | 11/23/2004 | 0.73 | - | - | 178.00 | 6.37 | - | 12.73 | - | - |
| EMW-10D | 11/1/2005 | 0.32 | - | - | 214.00 | 5.94 | - | 16.52 | - | - |
| EMW-10D | 11/7/2006 | 0.69 | - | - | -128.00 | 6.81 | - | 12.53 | - | - |
| EMW-10D | 11/15/2011 | 4.58 | - | - | 223.40 | 5.78 | - | 14.34 | - | - |
| EMW-10D | 11/9/2012 | 1.38 | - | - | 169.80 | 6.33 | - | 13.26 | - | - |
| EMW-10D | 11/12/2013 | 3.80 | - | - | 118.90 | 6.31 | - | 13.31 | - | 0.00 |
| EMW-10D | 11/11/2014 | 0.24 | - | - | 74.40 | 5.51 | - | 15.05 | - | - |
| EMW-10D | 11/16/2015 | 1.05 | - | - | 185.40 | 7.74 | - | 14.23 | - | 0.00 |
| EMW-10D | 8/26/2016 | 0.39 | - | - | 105.10 | 7.32 | - | 17.21 | - | - |
| EMW-10D | 11/12/2016 | 3.36 | - | - | 71.20 | 8.20 | - | 14.67 | - | 0.00 |
| EMW-10D | 2/10/2017 | 1.23 | - | - | 9.60 | 5.74 | - | 11.58 | - | - |
| EMW-10D | 2/28/2017 | 0.72 | - | - | 158.60 | 6.27 | - | 12.81 | - | - |
| EMW-10D | 5/16/2017 | 2.90 | - | - | 105.00 | 7.11 | - | 12.40 | - | - |
| EMW-10D | 8/12/2017 | 0.21 | - | - | 113.70 | 6.62 | - | 16.30 | - | - |
| EMW-10D | 11/14/2017 | 9.66 | - | - | -24.90 | 6.51 | - | 12.78 | - | 0.00 |
| | | | | | | | | | | |
| EMW-1D | 8/18/1998 | 2.41 | 210.00 | 4.60 | -124.00 | 6.08 | 80.00 | 19.60 | 2.50 | - |
| EMW-1D | 5/5/2000 | 5.48 | 9.50 | <0.2 | 117.00 | 6.41 | 3.25 | 17.84 | 1.51 | - |
| EMW-1D (DUP) | 5/5/2000 | 5.48 | 11.00 | <0.2 | 117.00 | 6.41 | 2.82 | 17.84 | 1.54 | - |
| EMW-1D | 11/4/2003 | 0.53 | 2.4 J | <0.05 | 58.00 | 6.25 | 37.40 | 13.47 | 2.10 | - |
| EMW-1D | 11/23/2004 | 1.60 | 73.00 | <0.05 | 99.00 | 6.00 | 44.00 | 13.45 | 1.60 | - |
| EMW-1D | 11/2/2005 | 1.23 | 50.00 | <0.05 | 132.00 | 6.47 | 35.00 | 14.82 | 2.10 | - |
| EMW-1D | 11/7/2006 | 0.61 | 58.00 | <.050 | -149.00 | 6.45 | 36.00 | 14.35 | 2.40 | - |
| EMW-1D | 11/8/2007 | 0.15 | 35.00 | <0.05 | 1.30 | 6.73 | 33.00 | 13.75 | 2.20 | 1.50 |
| EMW-1D | 11/5/2008 | 0.55 | 25.00 | <0.05 | 28.00 | 6.54 | 34.00 | 15.83 | 1.60 | 0.90 |
| EMW-1D | 11/12/2009 | 0.65 | 26.00 | <0.05 | 48.10 | 6.51 | 31.00 | 11.91 | 1.30 | 0.20 |
| EMW-1D | 11/11/2010 | 0.45 | 18.00 | <0.05 | 74.00 | 6.58 | 36.00 | 14.37 | 2.30 | 0.70 |
| EMW-1D | 11/16/2011 | 0.54 | 15.00 | <0.05 | 47.90 | 6.54 | 30.00 | 13.82 | 2.50 | - |
| EMW-1D | 11/9/2012 | 0.37 | 11.00 | <0.05 | 64.40 | 6.71 | 25.00 | 13.67 | 1.60 | 0.40 |
| EMW-1D | 11/12/2013 | 1.04 | 6.60 | <1.0 | -37.70 | 7.29 | 28.80 | 13.88 | 1.60 | 0.50 |
| EMW-1D | 11/12/2014 | 0.45 | 4.80 | <1.0 | 49.10 | 8.19 | 27.50 | 14.98 | 1.30 | 0.50 |
| EMW-1D | 11/16/2015 | 0.76 | 5.50 | <1.0 | 54.90 | 8.18 | 33.40 | 13.05 | 1.30 | 0.50 |
| EMW-1D | 8/26/2016 | 0.91 | - | - | 56.90 | 8.16 | - | 12.90 | - | - |
| EMW-1D | 11/11/2016 | 0.89 | 6.30 | <1.0 | 63.10 | 8.15 | 29.70 | 12.71 | 2.40 | 0.00 |
| EMW-1D | 2/10/2017 | 4.22 | - | - | 85.10 | 6.49 | - | 11.21 | - | - |
| EMW-1D | 2/27/2017 | 0.32 | - | - | 65.10 | 6.87 | - | 13.46 | - | - |
| EMW-1D | 5/15/2017 | 0.37 | 4.7 J | <0.25 | 46.30 | 6.66 | 29.80 | 11.70 | 1.40 | - |
| EMW-1D | 8/15/2017 | 0.43 | 4.7 J | <0.25 | 11.20 | 6.43 | 29.70 | 14.80 | 1.40 | - |
| EMW-1D | 11/16/2017 | 3.03 | 9.30 | <0.25 | 68.50 | 6.62 | 27.50 | 13.64 | 1.40 | 0.50 |
| | | | | | | | | | | |
| EMW-11D | 8/19/1998 | 3.19 | <2 | 1.30 | -18.90 | 6.40 | 39.00 | 14.40 | <1 | |
| EMW-11D (Dup) | 8/19/1998 | - | <2 | - | - | - | - | - | <1 | |
| EMW-11D | 5/5/2000 | 1.19 | 0.80 | 1.24 | 149.60 | 6.52 | 21.90 | 13.29 | <1 | |
| | | | | | | | | | | |
| A-1D | 8/19/1998 | 8.20 | <2 | 0.00 | -0.20 | 6.33 | 0.00 | 15.30 | <1 | - |
| A-1D | 5/4/2000 | 0.80 | <0.5 | 0.96 | 171.10 | 6.59 | 24.40 | 15.70 | <1 | - |
| A-1D | 11/22/2004 | 0.40 | - | - | 136.00 | 6.48 | | 14.98 | - | - |
| A-1D | 11/1/2005 | 0.36 | - | - | 184.00 | 6.31 | | 16.95 | - | - |
| A-1D | 11/6/2006 | 0.60 | - | - | -117.00 | 6.36 | | 16.43 | - | - |
| A-1D | 11/15/2011 | 0.48 | - | - | 174.10 | 6.37 | - | 13.96 | - | - |
| A-1D | 11/8/2012 | 3.70 | - | - | 127.90 | 6.55 | - | 13.60 | - | - |
| A-1D | 11/12/2013 | 0.79 | - | - | -42.60 | 6.74 | - | 13.78 | - | 0.00 |
| A-1D | 11/12/2014 | 0.41 | - | - | 40.90 | 8.19 | - | 15.13 | - | - |
| A-1D | 11/15/2015 | 0.57 | - | - | 56.20 | 8.11 | - | 13.42 | - | 0.00 |
| A-1D | 8/28/2016 | 0.57 | - | - | 56.20 | 8.11 | - | 13.42 | - | 0.00 |
| A-1D | 11/12/2016 | 2.75 | - | - | 174.60 | 7.02 | - | 12.51 | - | 0.00 |
| A-1D | 2/11/2017 | 1.39 | - | - | -58.10 | 5.98 | - | 11.83 | - | - |
| A-1D | 2/26/2017 | 1.43 | - | - | -55.10 | 5.95 | - | 11.73 | - | - |
| A-1D | 5/13/2017 | 0.95 | - | - | 113.20 | 6.41 | - | 11.10 | - | - |
| A-1D | 8/12/2017 | 0.87 | - | - | 123.60 | 6.27 | - | 15.80 | - | 0.00 |
| A-1D | 11/12/2017 | 5.00 | - | - | -35.50 | 6.19 | - | 14.10 | - | 0.00 |
| | | | | | | | | | | |
| EMW-2D | 8/20/1998 | 2.90 | <2 | 4.80 | 30.80 | 7.26 | 80.00 | 13.30 | <1 | - |
| EMW-2D | 5/4/2000 | 0.31 | 0.82 | <0.2 | 49.70 | 7.37 | 26.90 | 14.17 | <1 | - |
| EMW-2D (DUP) | 5/4/2000 | 0.31 | 0.89 | <0.2 | 49.70 | 7.37 | 26.80 | 14.17 | <1 | - |
| EMW-2D | 11/4/2003 | 0.31 | 5.3 J | 0.07 | -14.00 | 7.22 | 41.40 | 12.38 | 1.30 | - |
| EMW-2D (DUP) | 11/4/2003 | 0.31 | 3.8 J | 0.07 | -14.00 | 7.22 | 41.60 | 12.38 | 1.10 | - |
| EMW-2D | 11/23/2004 | 0.57 | 4.00 | <0.05 | -19.00 | 6.93 | 41.00 | 14.00 | <1.0 | - |
| EMW-2D (DUP) | 11/23/2004 | 0.57 | 3.50 | 0.08 | -19.00 | 6.93 | 42.00 | 14.00 | <1.0 | - |
| EMW-2D | 11/2/2005 | 0.46 | 7.20 | <0.05 | 21.00 | 7.20 | 44.00 | 13.51 | 1.40 | - |
| EMW-2D | 11/1/2005 | - | 4.20 | <0.05 | - | - | 44.00 | - | 1.40 | - |
| EMW-2D | 11/7/2006 | 1.14 | 3.50 | <0.050 | -145.00 | 7.04 | 43.00 | 13.27 | 1.60 | - |
| EMW-2D (DUP) | 11/7/2006 | 1.14 | 2.30 | <0.050 | -145.00 | 7.04 | 43.00 | 13.27 | 1.80 | - |
| EMW-2D | 11/8/2007 | 0.49 | 1.70 | <0.05 | 38.00 | 7.01 | 42.00 | 13.39 | 1.90 | 0.20 |
| EMW-2D (DUP) | 11/8/2007 | - | 1.80 | <0.05 | - | - | 42.00 | - | 1.70 | - |
| EMW-2D | 11/5/2008 | 0.35 | 2.50 | <0.05 | -34.00 | 7.14 | 44.00 | 13.69 | 1.50 | 0.10 |
| EMW-2D (DUP) | 11/5/2008 | - | 5.40 | <0.05 | - | - | 44.00 | - | 1.40 | - |
| EMW-2D | 11/12/2009 | 0.63 | 2.90 | <0.05 | -32.00 | 7.09 | 41.00 | 10.58 | 1.60 | 0.50 |
| EMW-2D (DUP) | 11/12/2009 | - | 3.30 | <0.05 | - | - | 41.00 | - | 1.40 | - |
| EMW-2D | 11/11/2010 | 0.31 | 3.20 | <0.05 | -0.40 | 7.09 | 46.00 | 13.15 | 1.10 | 0.10 |
| EMW-2D (DUP) | 11/11/2010 | - | 3.10 | <0.05 | - | - | 46.00 | - | 1.20 | - |
| EMW-2D | 11/16/2011 | 0.49 | 3.00 | <0.05 | -39.00 | 7.09 | 40.00 | 12.44 | 2.50 | - |
| EMW-2D (DUP) | 11/16/2011 | - | 2.80 | <0.05 | - | - | 40.00 | - | 2.20 | - |
| EMW-2D | 11/9/2012 | 0.38 | 7.40 | <0.05 | -55.00 | 7.17 | 33.00 | 13.86 | 2.30 | 1.40 |
| EMW-2D (DUP) | 11/9/2012 | - | 2.20 | <0.05 | - | - | 33.00 | - | 1.80 | - |
| EMW-2D(R) | 11/11/2013 | 0.64 | <1.0 | <1.0 | -30.30 | 6.30 | 33.90 | 13.15 | 2.10 | 0.00 |
| EMW-2D(R) (DUP) | 11/11/2013 | - | <1.0 | <1.0 | - | - | 33.10 | - | 2.10 | - |
| EMW-2D(R) | 11/11/2014 | 2.20 | 7.40 | 2.10 | 31.10 | 6.91 | 34.00 | 14.47 | 3.70 | 0.00 |
| EMW-2D(R) (DUP) | 11/11/2014 | - | 7.90 | 2.10 | - | - | 33.70 | - | 3.60 | - |
| EMW-2D(R) | 11/13/2015 | 0.95 | 0.91J | 1.50 | 61.90 | 6.92 | 38.60 | 14.26 | 3.80 | 0.00 |
| EMW-2D(R) | 8/26/2016 | 1.44 | - | - | 148.40 | 6.51 | - | 18.34 | - | - |
| EMW-2D(R) | 11/11/2016 | 0.49 | 4.10 | 1.60 | 75.70 | 6.74 | 37.00 | 15.11 | 6.70 | 0.00 |
| EMW-2D(R) | 2/14/2017 | 0.48 | - | - | -4.00 | 5.96 | - | 12.55 | - | - |
| EMW-2D(R) | 2/27/2017 | 0.33 | - | - | 69.00 | 6.69 | - | 13.71 | - | - |
| EMW-2D(R) | 5/16/2017 | 0.38 | 59.00 | 0.85 | -209.00 | 6.95 | 36.30 | 14.40 | 13.50 | - |
| EMW-2D(R) | 8/15/2017 | 1.63 | 140.00 | 0.84 | -79.20 | 6.71 | 30.30 | 15.50 | 7.90 | - |
| EMW-2D(R) | 11/15/2017 | 1.26 | 38.00 | 1.30 | 56.80 | 7.15 | 33.70 | 13.64 | 3.10 | 0.00 |
| | | | | | | | | | | |
| 3G-12 | 8/20/1998 | 5.30 | <2 | 17.00 | 27.90 | 6.40 | 80.00 | 12.60 | 1.20 | - |
| 3G-12 | 5/4/2000 | 2.43 | 0.86 | 0.93 | 135.20 | 6.50 | 23.20 | 11.19 | <1.0 | - |
| 3G-12 | 11/4/2003 | 0.29 | 8.5 J | 2.05 | 163.00 | 6.29 | 68.90 | 11.95 | 3.60 | - |
| 3G-12 | 11/23/2004 | 0.90 | 3.10 | 1.20 | 78.00 | 6.07 | 48.00 | 11.51 | 1.30 | - |
| 3G-12 | 11/2/2005 | 0.46 | 2.80 | 1.70 | 133.00 | 6.29 | 56.00 | 12.55 | 2.60 | - |
| 3G-12 | 11/7/2006 | 0.36 | 18.00 | 0.32 | 242.90 | 6.40 | 46.00 | 12.26 | 3.50 | - |
| 3G-12 | 11/8/2007 | 1.95 | 0.048J | 0.89 | 167.00 | 6.49 | 32.00 | 12.01 | 2.10 | 0.00 |
| 3G-12 | 11/5/2008 | 0.41 | 6.70 | 0.76 | 188.00 | 6.38 | 43.00 | 13.14 | 2.90 | 0.00 |
| 3G-12 | 11/12/2009 | 0.88 | 0.34 | 0.76 | 87.40 | 6.53 | 30.00 | 9.87 | 3.00 | 0.00 |
| 3G-12 | 11/11/2010 | 1.18 | 0.85 | 1.20 | 136.00 | 6.39 | 40.00 | 11.39 | 1.80 | 0.00 |
| 3G-12 | 11/16/2011 | 0.64 | 18.00 | 0.70 | 11.57 | 6.40 | 34.00 | 11.51 | 3.10 | - |
| 3G-12 | 11/9/2012 | 0.33 | 5.80 | 1.50 | 125.20 | 6.57 | 29.00 | 12.02 | 2.30 | 0.20 |
| 3G-12 | 11/11/2013 | 0.68 | 9.50 | 1.70 | -26.60 | 7.21 | 30.50 | 12.52 | 2.30 | 0.00 |
| 3G-12 | 11/11/2014 | 1.40 | 1.40 | 1.70 | -1.90 | 7.68 | 29.30 | 12.40 | 2.30 | 0.00 |
| 3G-12 | 11/13/2015 | 1.59 | <1.0 | 2.00 | 82.90 | 7.67 | 36.60 | 11.61 | 2.20 | 0.00 |
| 3G-12 | 11/13/2015 | 1.59 | <1.0 | 2.00 | 82.90 | 7.67 | 36.60 | 11.61 | 2.20 | 0.00 |
| 3G-12 | 8/26/2016 | 0.59 | - | - | 242.00 | 6.51 | - | 14.45 | | - |
| 3G-12 | 11/10/2016 | 0.39 | 1.70 | 1.80 | 66.80 | 6.46 | 39.10 | 12.84 | 3.40 | 0.00 |
| 3G-12 (DUP) | 11/10/2016 | - | 1.60 | 1.80 | - | - | 39.30 | - | 3.10 | - |
| 3G-12 | 2/10/2017 | 0.63 | - | - | -73.70 | 5.67 | - | 9.34 | - | - |
| 3G-12 | 2/27/2017 | 0.36 | - | - | 79.60 | 6.69 | - | 12.06 | - | - |
| 3G-12 | 5/16/2017 | 0.32 | <3.0 | 1.60 | 101.10 | 6.37 | 39.60 | 12.20 | 3.10 | - |
| 3G-12 | 8/14/2017 | 1.91 | <3.0 | 1.40 | 55.60 | 6.36 | 38.00 | 13.80 | 2.9 J | |
| 3G-12 (DUP) | 8/14/2017 | 1.91 | <3.0 | 1.40 | 55.60 | 6.36 | 39.80 | 13.80 | 10.1 J | - |
| 3G-12 | 11/15/2017 | 1.10 | <3.0 | 1.70 | 83.30 | 7.09 | 35.40 | 12.06 | 2.60 | 0.00 |
| 3G-12 (DUP) | 11/15/2017 | 1.10 | <3.0 | 1.70 | 83.30 | 7.09 | 35.00 | 12.06 | 2.60 | - |

Notes:
J = Concentration estimated base on data validation.
< Less than method detection limit. Concentration reported is the detection limit.

**Table 3-6**
**Monitoring Schedule**
**Phase V Monitoring Report and ROS Statement**
**Former RCA Facility**
**Burlington, Massachusetts**

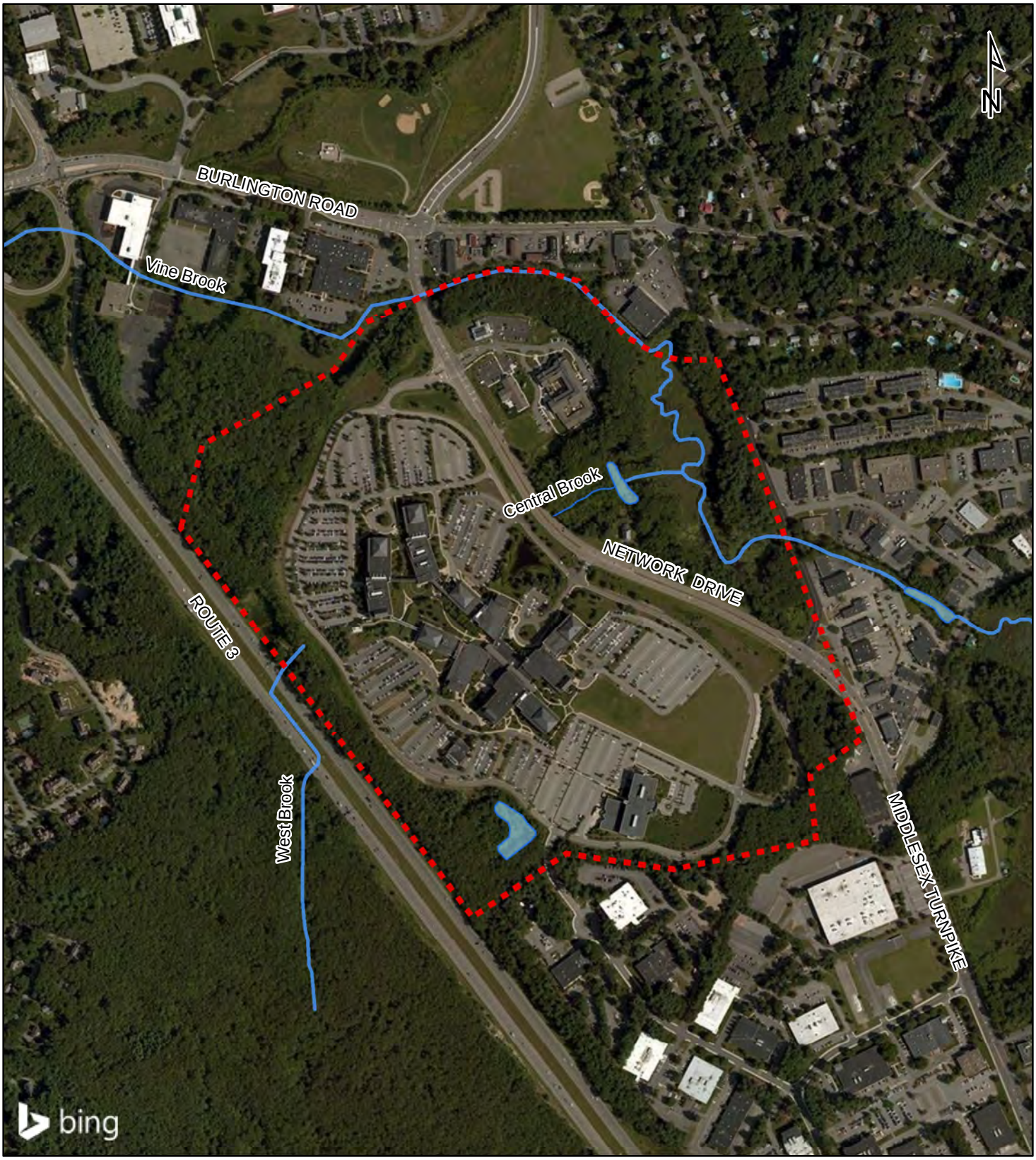
| Media/Analyses | May-98 | Aug-98 | Nov-98 | Feb/ Mar-99 | May/ Jun-99 | Aug-99 | Oct/ Nov-99 | Feb-00 | May/ Jun-00 | Aug/ Sep-00 | Nov-00 | Feb-13 | May-01 | Aug-01 | Nov-01 | Feb-02 | May-02 | Aug-02 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Surface Water/Metals | | | | 1 | 2 | | 3 | 4 | 5 | 6 | 7 | 8 | | | | 9 | | |
| Surface Water/VOCs | | | | 1 | 2 | 3 | 4 | | | | 5 | | | | 6 | | | |
| Sediment/Metals | | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| Groundwater/VOCs | 1 | 2 | 3 | 4 | 5 | | | | 6 | 7 | 8 | 9 | | | 10 | | | |

| Media/Analyses | Nov-02 | Feb-03 | Nov-03 | Nov-04 | Nov-05 | Nov-06 | Nov-07 | Nov-08 | Nov-09 | Nov-10 | Nov-11 | Nov-12 | Aug-13 | Nov-13 | Feb-14 | May-14 | Nov-14* | Nov-15* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Surface Water/Metals | | 10(F) | | | | | | | | | | | | | | | | |
| Surface Water/VOCs | 7 | | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 (F) | | |
| Sediment/Metals | 16 | 17 (F) | | | | | | | | | | | | | | | | |
| Groundwater/VOCs | 11 | | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | | 22 | | | 23 | 24 |

| Media/Analyses | Aug-16** | Nov-16 | Feb-17 | May-17 | Aug-17 | Nov-17 | Nov-18 | Nov-19 | Nov-20 | Nov-21 | Nov-22 | Nov-23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Surface Water/Metals | | | | | | | | | | | | |
| Surface Water/VOCs | | | | | | | | | | | | |
| Sediment/Metals | | | | | | | | | | | | |
| Groundwater/CVOCs | 25 | 26 | 27 | 28 | 29 | 30 | X | X | X | X | X | X |
| Groundwater/1,4-Dioxane | 1 | 2 | 3 | 4 | 5 | 6 | X | X | X | X | X | X |

Notes
X = Future Sampling Event
# = Round
F = Final Sampling Event for Media/Analyses
* Select wells were sampled for 1,4-Dioxane in November 2014 and 2015 prior to becoming a contaminant of interest
** New Media/Analyses added to table

# FIGURES



Site Boundary (Approximate)

Perennial Stream

Intermittent Stream

Water Body

0 250 500 Feet

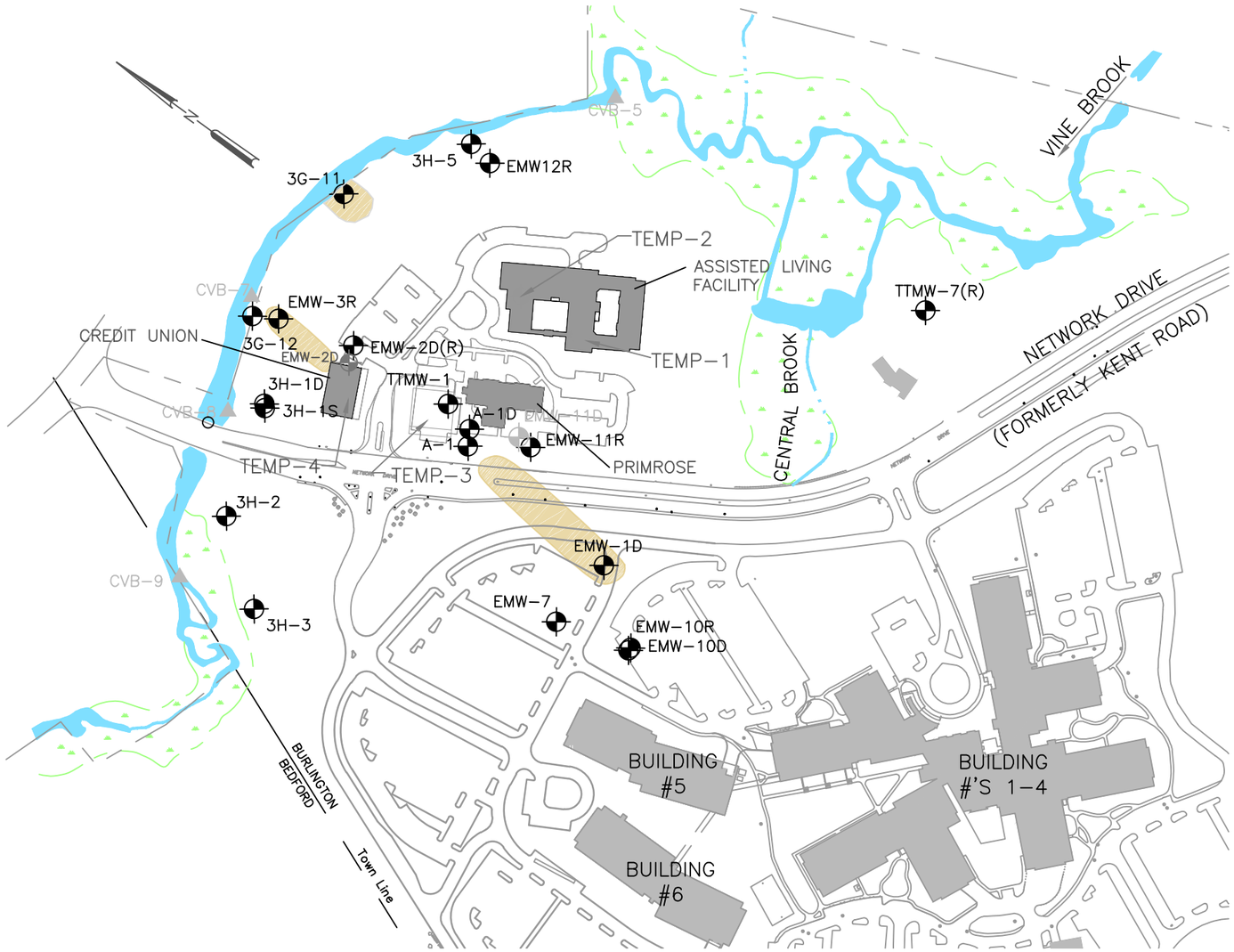
Imagery Source: USGSEarthstar Geographics 2015 Microsoft Corp.

**SITE AREA MAP**

Former RCA Facility
One Network Drive, Burlington, Massachusetts

TETRA TECH

| | | |
|---|---|---|
| APPROVED | ED | FIGURE |
| DRAFTED | JML | |
| PROJECT# | 117-0507550 | 1-1 |
| DATE | MAY 2018 | |




LEGEND

- PROPERTY LINE
- BUILDING
- PAVED ROAD
- LIMITS OF SWAMP
- WETLANDS
- BODY OF WATER/STREAM
- EMW-1D — MONITORING WELL AND IDENTIFIER
- CVB-1 — FORMER SURFACE WATER SAMPLING LOCATION AND IDENTIFIER
- TEMP-1 — TEMPORARY WELL OR ABANDONED WELL AND IDENTIFIER
- CHLORINATED VOC PLUME BASED ON DECEMBER 2017 WATER QUALITY DATA
- SURFACE WATER MEASUREMENT LOCATION

NOTE: BUILDINGS 1 THROUGH 6 ARE COMMERCIAL OFFICE SPACE

WELL LIST

| |
|---|
| 3G-11 |
| 3G-12 |
| 3H-1D |
| 3H-1S |
| 3H-2 |
| 3H-3 |
| 3H-5 |
| A-1 |
| A-1D |
| EMW-1D |
| EMW-2D (R) |
| EMW-3R |
| EMW-7 |
| EMW-10D |
| EMW-10R |
| EMW-11R |
| EMW-12R |
| TTMW-1 |
| TTMW-7(R) |

0 300 600

SCALE IN FEET

BASE MAP SOURCES: VANASSE HANGEN BRUSTIN, INC., MAP, DRAWING #C-3, SHEET 3 OF 11 PROJECT #06830, 1/18/00, AND EMCON DRAWING #1, PROJECT #86075-001.000, 1/10/97. THE ISOSCELES GROUP MAY 2014.

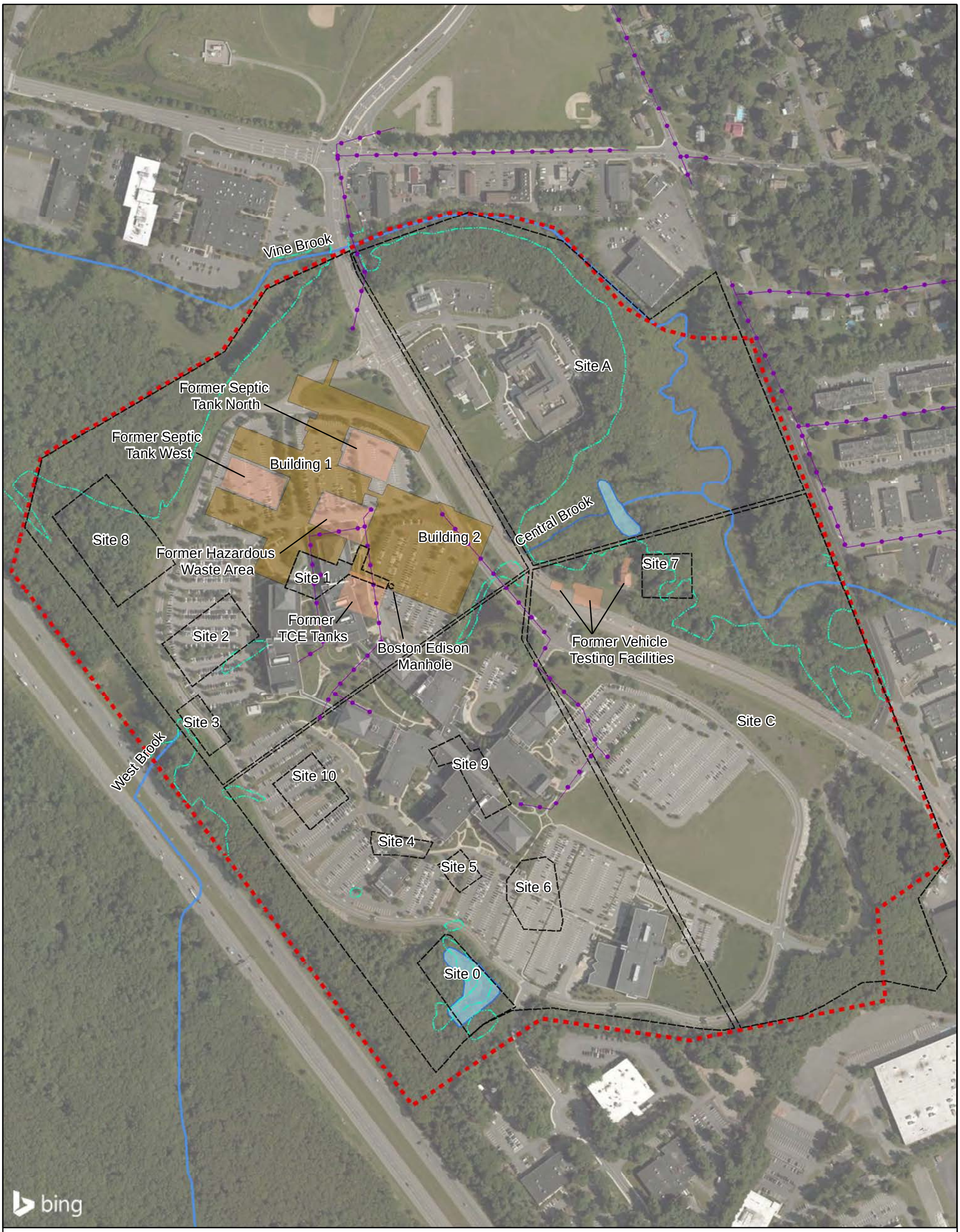
TITLE: SITE PLAN WITH PHASE V SAMPLING LOCATIONS AND CVOC PLUME

LOCATION: Former RCA Facility
One Network Drive, Burlington, Massachusetts

TETRA TECH

| | | |
|---|---|---|
| APPROVED | CC ED | FIGURE |
| DRAFTED | JML | 1-2 |
| PROJECT# | 117-0507550 | |
| DATE | JUNE 2018 | |

G:\LOCKHEADY 2018\WL-MAP_DEC_2017.DWG




## Legend

- Historic Assessment Area
- Sewer Line (Weston & Sampson 2016)
- Potential Source Areas
- Former Building
- Site Boundary (Approximate)
- Wetland Extent (VBH 1992)
- Perennial Stream
- Intermittent Stream
- Pond, Lake, Ocean

Sources: Tetra Tech, Weston & Sampson, EMCON, Vanasse Hargen Brustlin, Inc.

All locations and dimensions are approximate

N

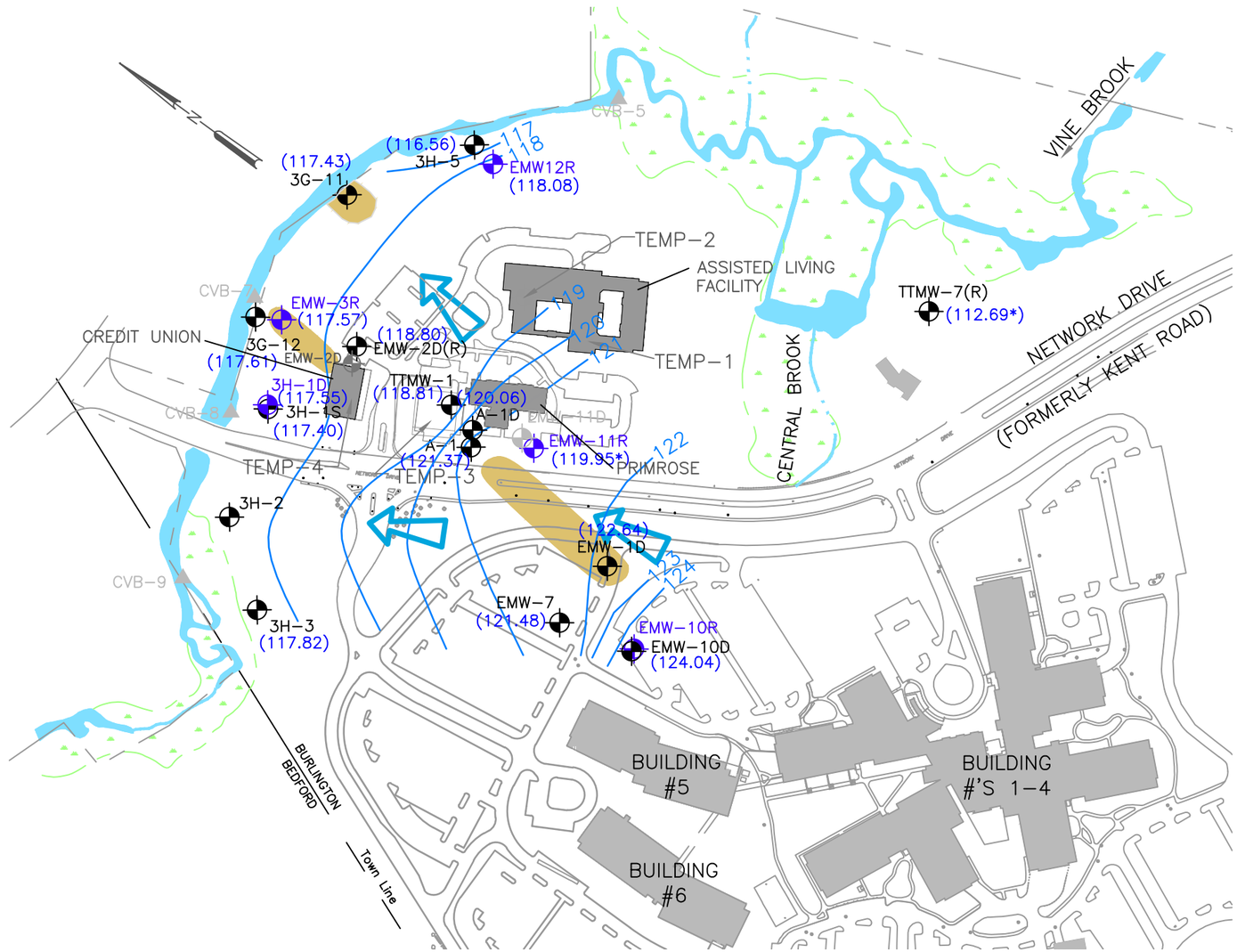
0 100 200 400 Feet

**HISTORIC INVESTIGATION "SITES" WITH THE RTN BOUNDARY**

Former RCA Facility
One Network Drive, Burlington, Massachusetts

TETRA TECH

| | | |
|---|---|---|
| APPROVED | ED | FIGURE |
| DRAFTED | JML | |
| PROJECT# | 117-0507550 | 1-3 |
| DATE | June 2018 | |




LEGEND

- PROPERTY LINE
- BUILDING
- PAVED ROAD
- APPROXIMATE LIMITS OF SWAMP
- BODY OF WATER/STREAM
- EMW-1D — OVERBURDEN MONITORING WELL AND IDENTIFIER
- EMW-12R — BEDROCK MONITORING WELL AND IDENTIFIER
- CVB-1 — FORMER SURFACE WATER SAMPLING LOCATION AND IDENTIFIER
- TEMP-1 — TEMPORARY WELL OR ABANDONED AND IDENTIFIER
- CHLORINATED VOC PLUME BASED ON NOVEMBER 2017 WATER QUALITY DATA
- 124 — POTENTIOMETRIC CONTOUR (FT)
- (127.28) — GROUNDWATER ELEVATION (FT)
- GROUNDWATER FLOW
- * — NOT USED IN CONTOURING

0 300 600

SCALE IN FEET

BASE MAP SOURCES: VANASSE HANGEN BRUSTIN, INC., MAP, DRAWING #C-3, SHEET 3 OF 11 PROJECT #06830, 1/18/00, AND EMCON DRAWING #1, PROJECT #86075-001.000, 1/10/97, THE ISOSCELES GROUP MAY 2014.

G:\LOCKHEAD\2018\WL-MAP_DEC_2017.DWG

TITLE: **POTENTIOMETRIC WATER LEVEL ELEVATION MAP NOVEMBER 2017**

LOCATION: **Former RCA Facility One Network Drive, Burlington, Massachusetts**

TETRA TECH

| | | |
|---|---|---|
| APPROVED | CC ED | FIGURE |
| DRAFTED | JML | 2-1 |
| PROJECT# | 117-0507550 | |
| DATE | JUNE 2018 | |

1,1-DCE LEGEND

[2] ug/L

7-49 ug/L

50-99 ug/L

>100 ug/L

## 1,1-DCE MAY 1998

1,1-DCE LEGEND

[2] ug/L

7-49 ug/L

50-99 ug/L

>100 ug/L

## 1,1-DCE FEB 2001

1,1-DCE LEGEND

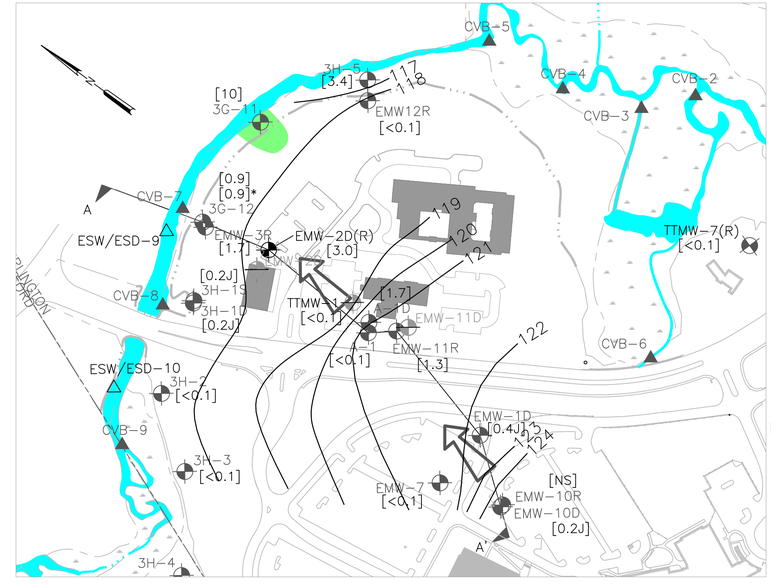
[2] ug/L

7-49 ug/L

50-99 ug/L

>100 ug/L

## 1,1-DCE NOV 2007




1,1-DCE LEGEND

[2] ug/L

7-49 ug/L

50-99 ug/L

>100 ug/L

[1.2]* = DUPLICATE SAMPLE

J = ESTIMATED CONCENTRATION

NS = NOT SAMPLED

## 1,1-DCE NOV 2017

LEGEND

A — A' LOCATION OF CROSS-SECTIONS SHOWN IN FIGURE 3-2

GROUNDWATER FLOW DIRECTION

(119.34) WATER TABLE ELEVATION (FT)

WATER TABLE ELEVATION CONTOUR

WELLS SHOWN IN GRAY HAVE BEEN ABANDONED

**NOT TO SCALE**

NOTE:

1. MCL FOR 1,1-DCE = 7 ug/L, CONCENTRATIONS BELOW MCL ARE NOT CONTOURED
2. MCL = MAXIMUM CONCENTRATION LEVEL

NOTE:
BASE MAP AND ALL DATA FOR 1998, 2001 AND 2007 PREPARED BY SHAW EVIRONMENTAL, INC.

| | | | |
|---|---|---|---|
| TITLE: 1,1-DCE PLUME MAPS | | | |
| LOCATION: Former RCA Facility, One Network Drive, Burlington, Massachusetts | | | |
| TETRA TECH | APPROVED | CC ED | FIGURE 3-1 |
| | DRAFTED | JML | |
| | PROJECT# | 117-0507550 | |
| | DATE | JUNE 2018 | |

PCE LEGEND

[2] ug/L

5-9 ug/L

10-19 ug/L

>20 ug/L

## PCE MAY 1998

PCE LEGEND

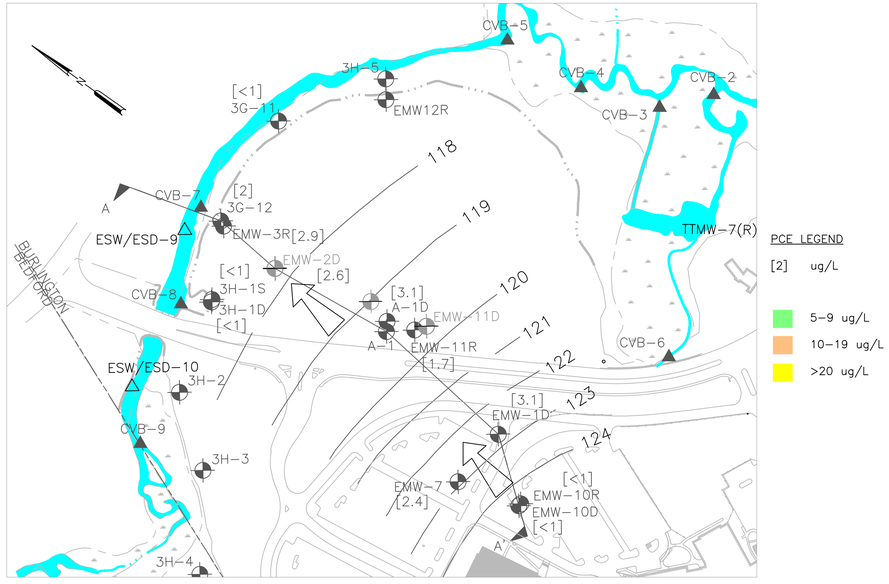
[2] ug/L

5-9 ug/L

10-19 ug/L

>20 ug/L

## PCE FEB 2001




PCE LEGEND

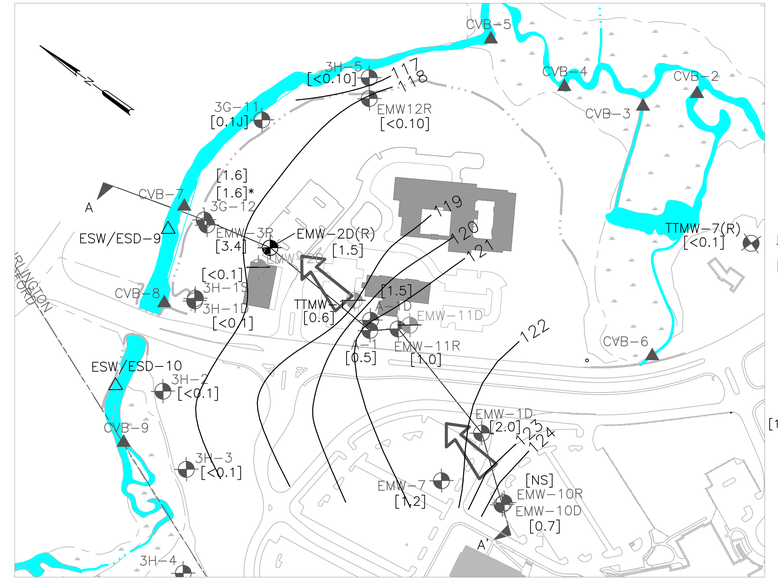
[2] ug/L

5-9 ug/L

10-19 ug/L

>20 ug/L

## PCE NOV 2007




PCE LEGEND

[2] ug/L

5-9 ug/L

10-19 ug/L

>20 ug/L

[1.6J]* = DUPLICATE SAMPLE

J = ESTIMATED CONCENTRATION

## PCE NOV 2017

LEGEND

A — A' LOCATION OF CROSS-SECTIONS SHOWN IN FIGURE 3-2

GROUNDWATER FLOW DIRECTION

(119.34) WATER TABLE ELEVATION (FT)

WATER TABLE ELEVATION CONTOUR

WELLS SHOWN IN GRAY HAVE BEEN ABANDONED

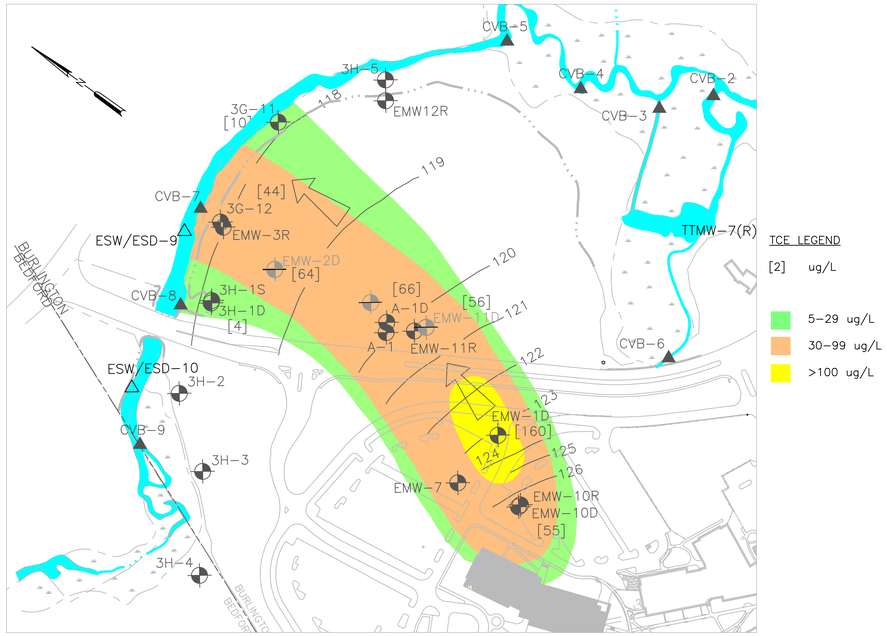
**NOT TO SCALE**

NOTE:

1. MCL FOR 1,1-DCE = 7 ug/L, CONCENTRATIONS BELOW MCL ARE NOT CONTOURED
2. MCL = MAXIMUM CONCENTRATION LEVEL

NOTE:
BASE MAP AND ALL DATA FOR 1998, 2001 AND 2007 PREPARED BY SHAW EVIRONMENTAL, INC.

| | | | |
|---|---|---|---|
| TITLE: | PCE PLUME MAPS | | |
| LOCATION: | Former RCA Facility<br>One Network Drive, Burlington, Massachusetts | | |
| TETRA TECH | APPROVED | CC ED | FIGURE |
| | DRAFTED | JML | 3-2 |
| | PROJECT# | 117-0507550 | |
| | DATE | JUNE 2018 | |




TCE LEGEND

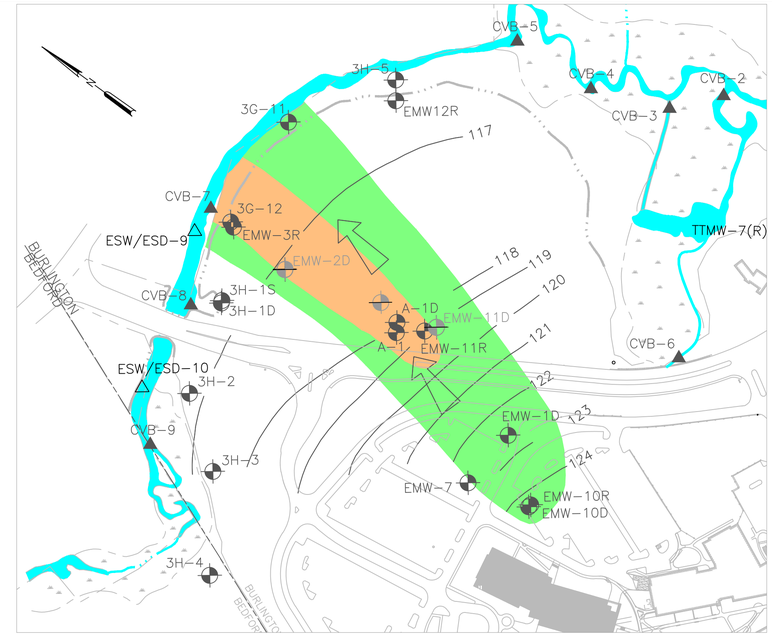
[2] ug/L

5–29 ug/L

30–99 ug/L

>100 ug/L

**TCE MAY 1998**




TCE LEGEND

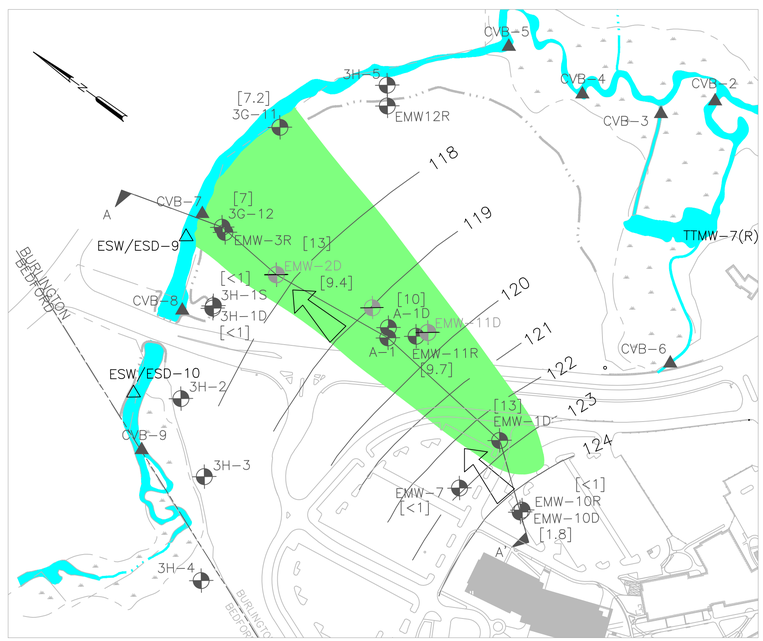
[2] ug/L

5–29 ug/L

30–99 ug/L

>100 ug/L

**TCE FEB 2001**




TCE LEGEND

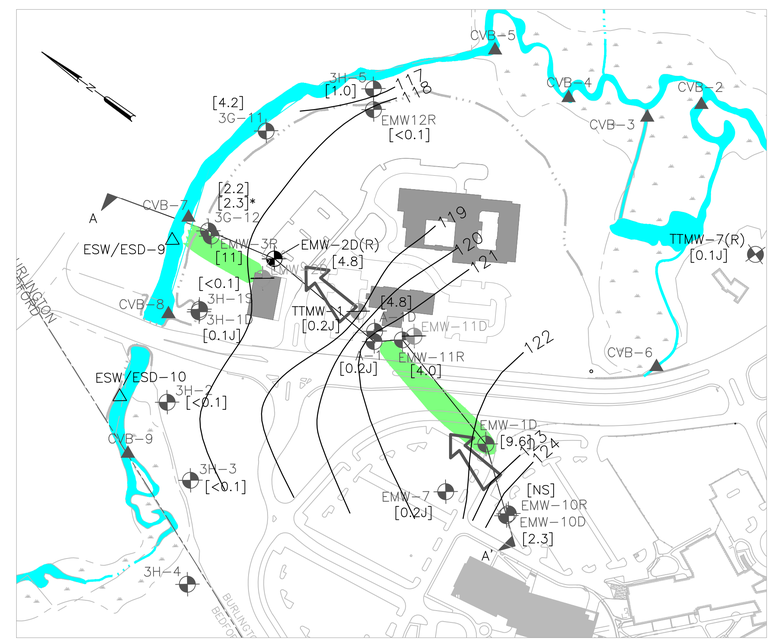
[2] ug/L

5–29 ug/L

30–99 ug/L

>100 ug/L

**TCE NOV 2007**




TCE LEGEND

[2] ug/L

5–29 ug/L

30–99 ug/L

>100 ug/L

[2.5]* = DUPLICATE SAMPLE

J = ESTIMATED CONCENTRATION

NS = NOT SAMPLED

**TCE NOV 2017**

LEGEND

A — A' LOCATION OF CROSS-SECTIONS SHOWN IN FIGURE 3-2

GROUNDWATER FLOW DIRECTION

(119.34) WATER TABLE ELEVATION (FT)

WATER TABLE ELEVATION CONTOUR

WELLS SHOWN IN GRAY HAVE BEEN ABANDONED

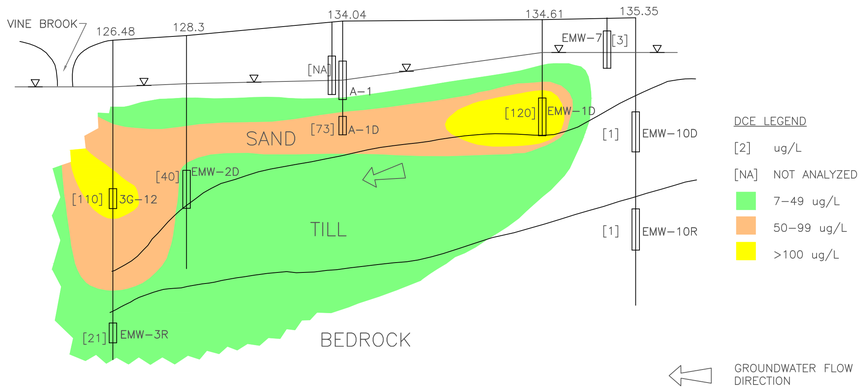
**NOT TO SCALE**

NOTE:

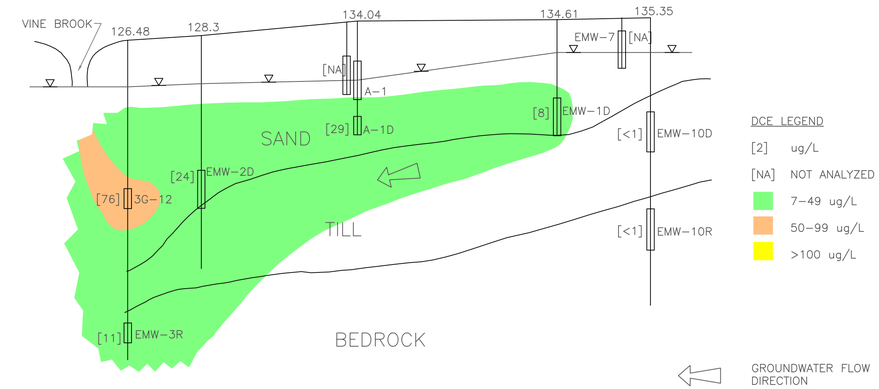
1. MCL FOR 1,1-DCE = 7 ug/L, CONCENTRATIONS BELOW MCL ARE NOT CONTOURED
2. MCL = MAXIMUM CONCENTRATION LEVEL

NOTE:
BASE MAP AND ALL DATA FOR 1998, 2001 AND 2007 PREPARED BY SHAW EVIRONMENTAL, INC.

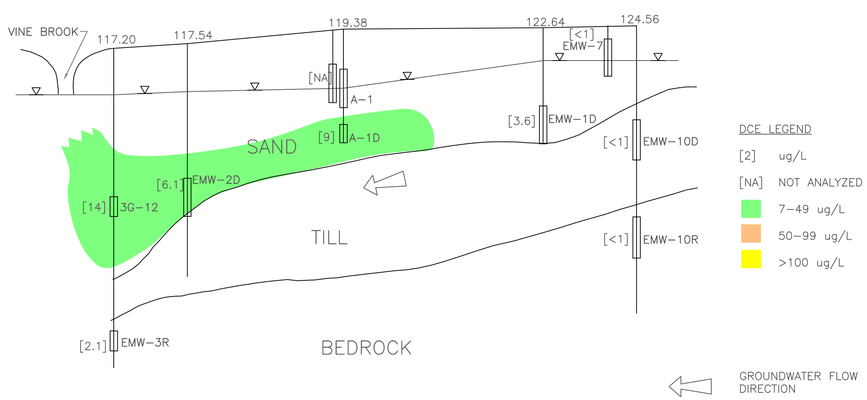
| | | | |
|---|---|---|---|
| TITLE: | TCE PLUME MAPS | | |
| LOCATION: | Former RCA Facility<br>One Network Drive, Burlington, Massachusetts | | |
| TETRA TECH | APPROVED | CC ED | FIGURE |
| | DRAFTED | JML | 3-3 |
| | PROJECT# | 117-0507550 | |
| | DATE | JUNE 2018 | |



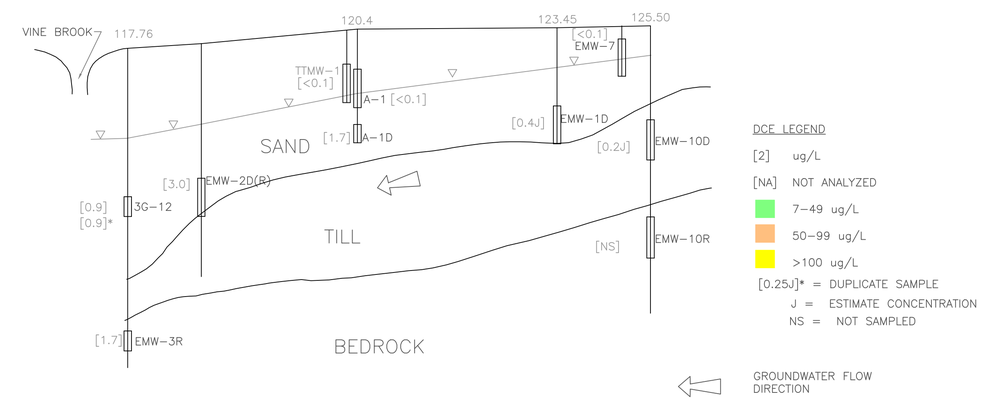

## 1,1-DCE MAY 1998




## 1,1-DCE FEB 2001




## 1,1-DCE NOV 2007




## 1,1-DCE NOV 2017

NOTE:

1. MCL FOR PCE = 5 ug/L
2. MCL = MAXIMUM CONCENTRATION LEVEL

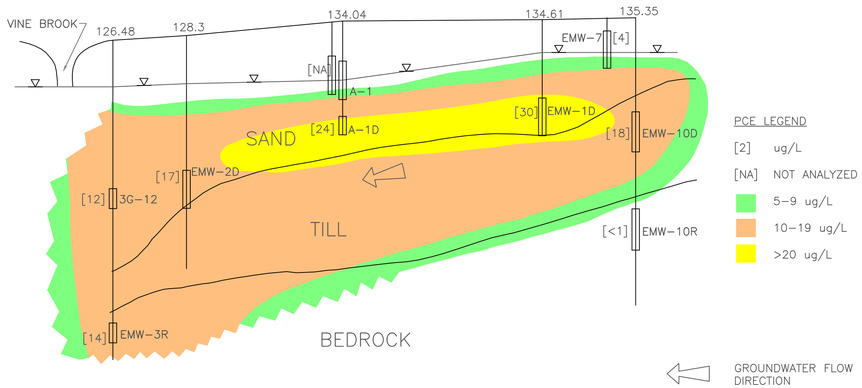
0 200 400
HORIZONTAL SCALE IN FEET

0 20 40
VERTICAL SCALE IN FEET

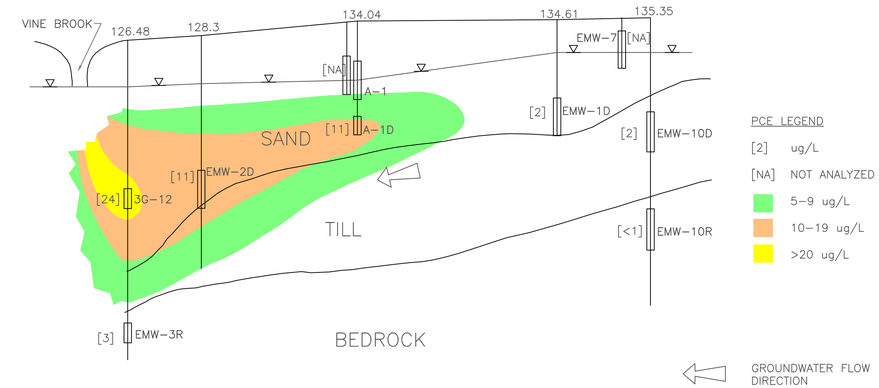
NOTE:
BASE CROSS SECTION AND ALL DATA FOR 1998, 2001 AND 2007 PREPARED BY SHAW EVIRONMENTAL, INC.

| | |
|---|---|
| TITLE: | 1,1-DCE PLUME CROSS SECTION |
| LOCATION: | Former RCA Facility<br>One Network Drive, Burlington, Massachusetts |
| TETRA TECH | APPROVED: CC ED<br>DRAFTED: JML<br>PROJECT#: 117-0507550<br>DATE: JUNE 2018 |
| FIGURE | 3-4 |

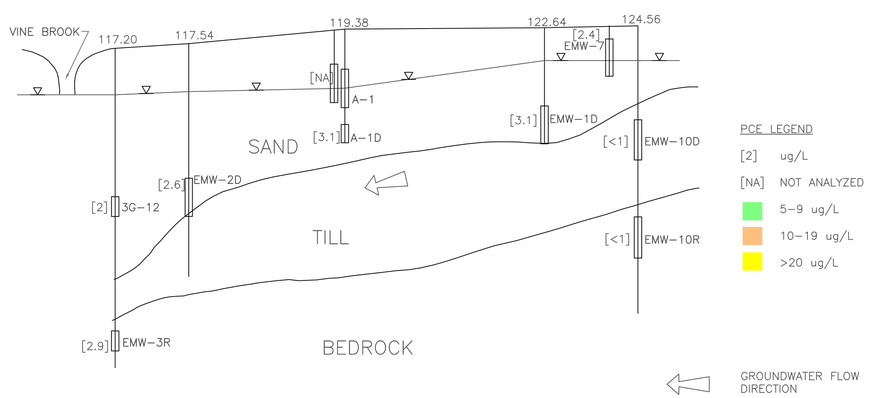
S:\CORP\GIS\117-0507550_ONE NETWORK DRIVE_BURLINGTON\FIG3-4_1-DCE-PLUMES.DWG



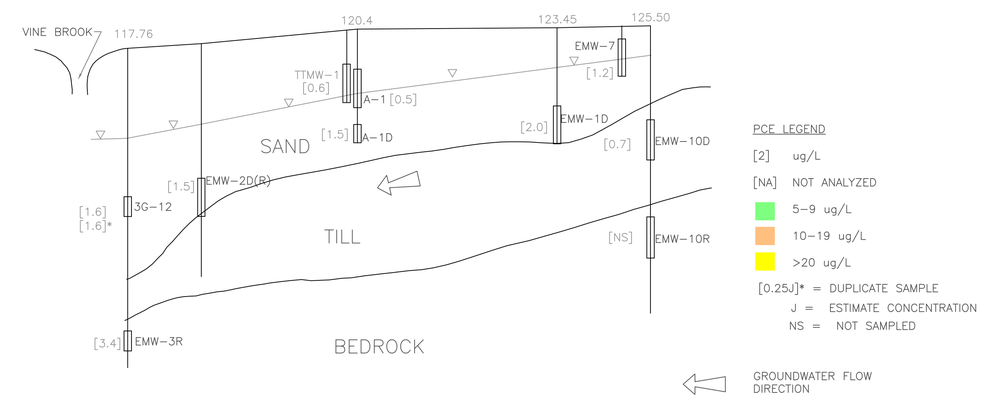

**PCE MAY 1998**




**PCE FEB 2001**




**PCE NOV 2007**




**PCE NOV 2017**

NOTE:

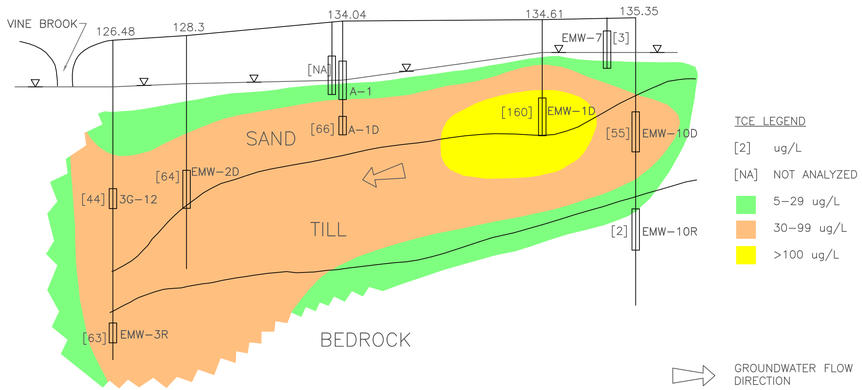
1. MCL FOR PCE = 5 ug/L
2. MCL = MAXIMUM CONCENTRATION LEVEL

0 200 400
HORIZONTAL SCALE IN FEET

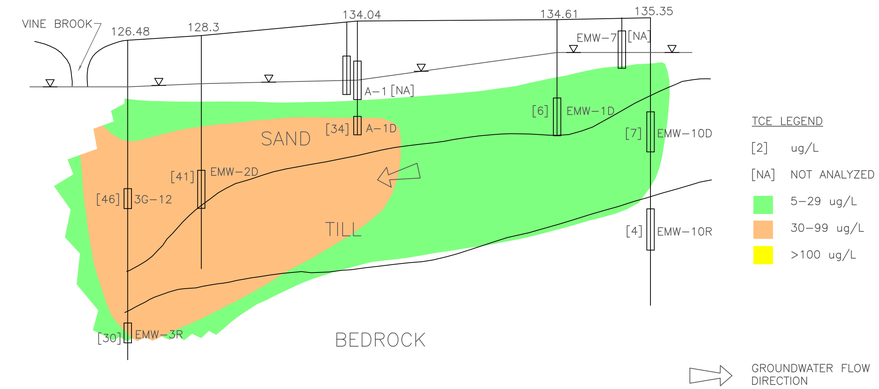
0 20 40
VERTICAL SCALE IN FEET

NOTE:
BASE CROSS SECTION AND ALL DATA FOR 1998, 2001 AND 2007 PREPARED BY SHAW EVIRONMENTAL, INC.

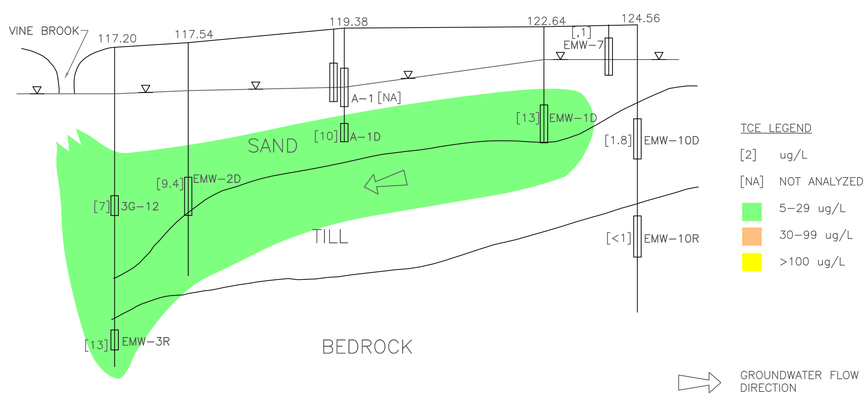
| | |
|---|---|
| TITLE: | PCE PLUME CROSS SECTION |
| LOCATION: | Former RCA Facility<br>One Network Drive, Burlington, Massachusetts |
| TETRA TECH | |
| APPROVED | CC ED |
| DRAFTED | JML |
| PROJECT# | 117-0507550 |
| DATE | JUNE 2018 |
| FIGURE | 3-5 |



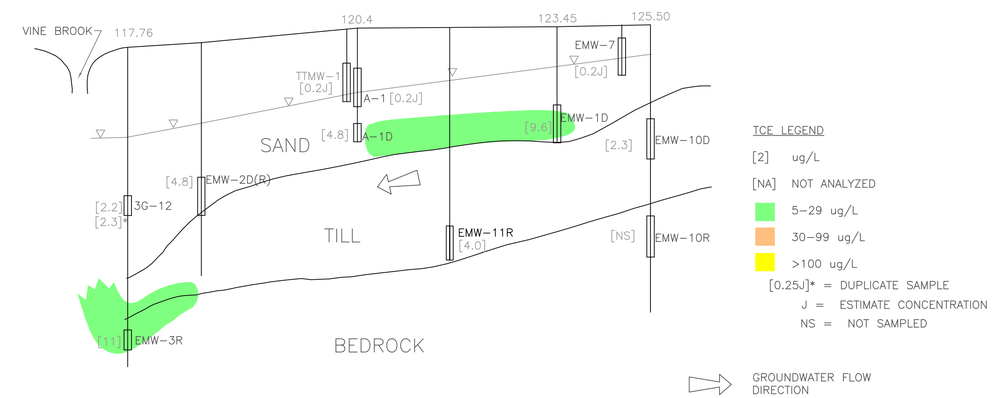

**TCE MAY 1998**




**TCE FEB 2001**




**TCE NOV 2007**




**TCE NOV 2017**

NOTE:

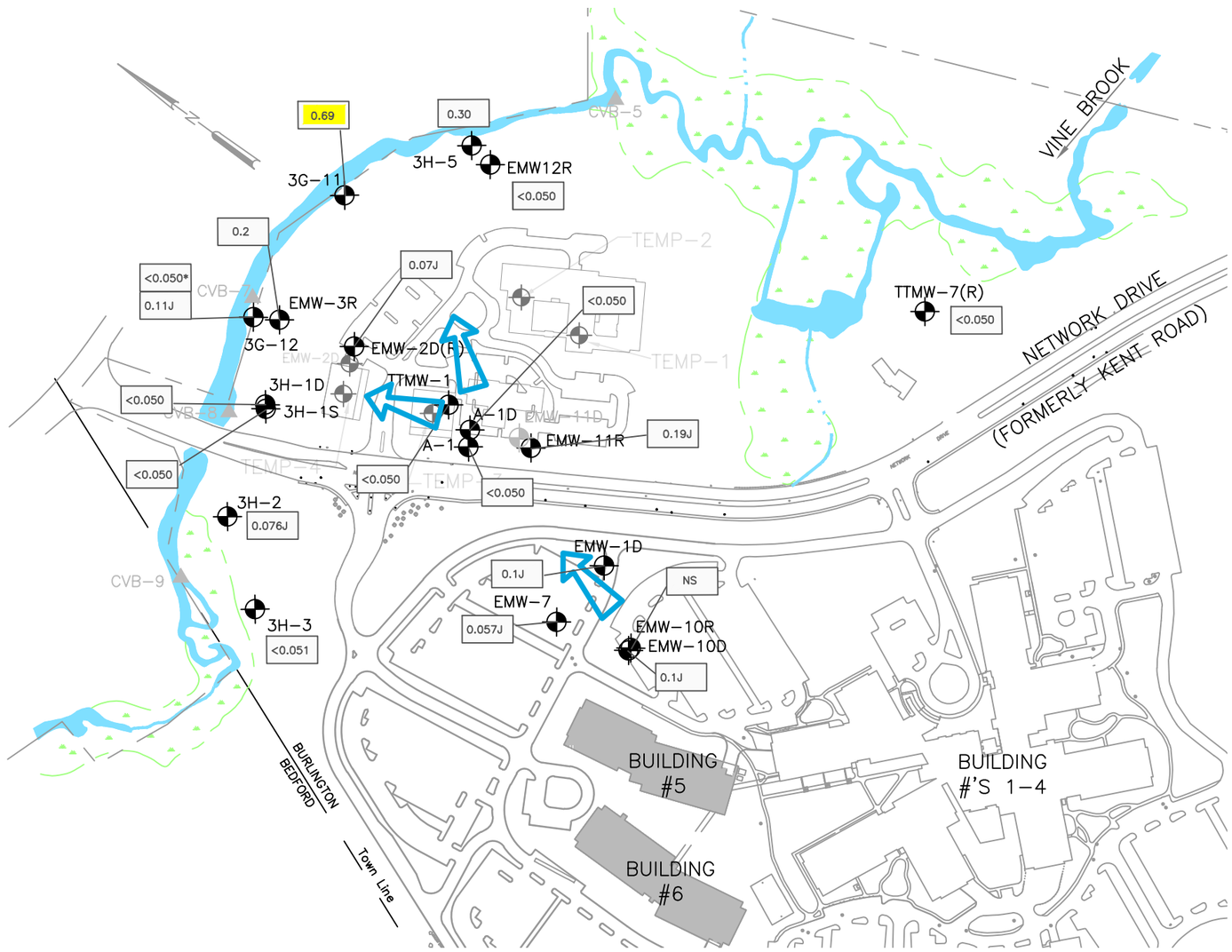
1. MCL FOR PCE = 5 ug/L
2. MCL = MAXIMUM CONCENTRATION LEVEL

0 200 400
HORIZONTAL SCALE IN FEET

0 20 40
VERTICAL SCALE IN FEET

NOTE:
BASE CROSS SECTION AND ALL DATA FOR 1998, 2001 AND 2007 PREPARED BY SHAW EVIRONMENTAL, INC.

| | | | |
|---|---|---|---|
| TITLE: | TCE PLUME CROSS SECTION | | |
| LOCATION: | Former RCA Facility<br>One Network Drive, Burlington, Massachusetts | | |
| TETRA TECH | APPROVED | CC ED | FIGURE |
| | DRAFTED | JML | 3-6 |
| | PROJECT# | 117-0507550 | |
| | DATE | JUNE 2018 | |




LEGEND

| | |
|---|---|
| VINE BROOK | SURFACE WATER FLOW DIRECTION |
| | PROPERTY LINE |
| | BUILDING |
| | PAVED ROAD |
| | LIMITS OF SWAMP |
| | BODY OF WATER/STREAM |
| EMW–1D | MONITORING WELL AND IDENTIFIER |
| CVB–1 | FORMER SURFACE WATER SAMPLING LOCATION AND IDENTIFIER |
| TEMP–1 | TEMPORARY WELL OR ABANDONED AND IDENTIFIER |
| 0.22 | 1,4–DIOXANE RESULTS IN ug/L<br>* = DUPLICATE SAMPLE<br>J = ESTIMATED VALUE<br>NS = NOT SAMPLED |
| 0.31 | Highlighted value indicated exceedance of MCP GW–1 standard of 0.3 ug/L |
| | GROUNDWATER FLOW |
| NS | NOT SAMPLED |

0 300 600

SCALE IN FEET

BASE MAP SOURCES: VANASSE HANGEN BRUSTIN, INC., MAP, DRAWING #C–3, SHEET 3 OF 11 PROJECT #06830, 1/18/00, AND EMCON DRAWING #1, PROJECT #86075–001.000, 1/10/97, THE ISOSCELES GROUP MAY 2014.

G:\LOCKHEADX 2018\MAY2018\DIOXANE_NOV17.DWG

TITLE: **1,4-DIOXANE MAP NOV 2017**

LOCATION: **Former RCA Facility One Network Drive, Burlington, Massachusetts**

TETRA TECH

| | | |
|---|---|---|
| APPROVED | CC ED | FIGURE |
| DRAFTED | JML | 3-7 |
| PROJECT# | 117–0507550 | |
| DATE | MAY 2018 | |

# APPENDIX A

## GROUNDWATER LABORATORY ANALYTICAL RESULTS

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# ANALYSIS REPORT

Prepared by:

Eurofins Lancaster Laboratories Environmental
2425 New Holland Pike
Lancaster, PA 17601

Prepared for:

Tetra Tech, Inc.
One Monarch Drive
Suite 202
Littleton MA 01460

Report Date: November 27, 2017 13:18

**Project: Lockheed Martin - Burlington, MA**

Account #: 19999
Group Number: 1875060
SDG: LMB08
PO Number: 117-0507550
State of Sample Origin: MA

Regulatory agencies do not accredit laboratories for all methods, analytes, and matrices. Our current scopes of accreditation can be viewed at http://www.eurofinsus.com/environment-testing/laboratories/eurofins-lancaster-laboratories-environmental/resources/certifications/ . To request copies of prior scopes of accreditation, contact your project manager.

| | | |
|---|---|---|
| Electronic Copy To | Tetra Tech, Inc. | Attn: Thomas Nunno |
| Electronic Copy To | Tetra Tech, Inc. | Attn: Ed Dolan |
| Electronic Copy To | Tetra Tech, Inc. | Attn: Chris Conor |

Respectfully Submitted,

Barbara Weyandt

Barbara A. Weyandt
Specialist

(717) 556-7264

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Environmental

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## SAMPLE INFORMATION

| Client Sample Description | Sample Collection Date/Time | ELLE# |
|---|---|---|
| EH1D-111317 Grab Groundwater | 11/13/2017 11:35 | 9316648 |
| EH1S-111317 Grab Groundwater | 11/13/2017 11:55 | 9316649 |
| EMW-11R-111217 Grab Groundwater | 11/12/2017 10:25 | 9316650 |
| TTMW-1-111217 Grab Groundwater | 11/12/2017 13:00 | 9316651 |
| A-1-111217 Grab Groundwater | 11/12/2017 13:35 | 9316652 |
| A-1D-111217 Grab Groundwater | 11/12/2017 11:25 | 9316653 |
| Trip Blank Water | 11/12/2017 07:00 | 9316654 |

The specific methodologies used in obtaining the enclosed analytical results are indicated on the Laboratory Sample Analysis Record.

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## MADEP MCP Analytical Method Report Certification Form

Laboratory Name: Eurofins Lancaster Laboratories Environmental
Project: Lockheed Martin - Burlington, MA
This form provides certifications for the following data set: 9316648-9316654

Sample Matrices: Water

Methods Used:
SW-846 8260C; SW-846 8270D SIM

| Affirmative responses to questions A through F are required for "Presumptive Certainty" status | | Yes or No[1] |
|---|---|---|
| A | Were all samples received in a condition consistent with those described on the Chain-of-Custody, properly preserved (including temperature) in the field or laboratory, and prepared/analyzed within method holding times? | Yes |
| B | Were the analytical method(s) and all associated QC requirements specified in the selected CAM protocol(s) followed? | No |
| C | Were all required corrective actions and analytical response actions specified in the selected CAM protocol(s) implemented for all identified performance standard non-conformances? | Yes |
| D | Does the laboratory report comply with all the reporting requirements specified in CAM VII A, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data"? | Yes |
| E | **VPH, EPH, APH, and TO-15 only:**<br>a. VPH, EPH, and APH Methods only: Was each method conducted without significant modification(s)? (Refer to the individual method(s) for a list of significant modifications).<br>b. APH and TO-15 Methods only. Was the complete analyte list reported for each method? | <br>NA<br><br>NA |
| F | Were all applicable CAM protocol QC and performance standard non-conformances identified and evaluated in a laboratory narrative (including all "No" responses to Questions A through E)? | Yes |
| Responses to Questions G, H and I below are required for "Presumptive Certainty" status | | |
| G | Were the reporting limits at or below all CAM reporting limits specified in the selected CAM protocol(s)? | Yes |
| *Data User Note: Data that achieve "Presumptive Certainty" status may not necessarily meet the data usability and representativeness requirements described in 310 CMR 40. 1056 (2)(k) and WSC-07-350.* | | |
| H | Were all QC performance standards specified in the CAM protocol(s) achieved? | No |
| I | Were results reported for the complete analyte list specified in the selected CAM protocol(s)? | No |
| [1] Refer to the Case Narrative for information regarding negative responses. | | |
| I, the undersigned, attest under the pains and penalties of perjury that the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete. | | |
| Kathryn A. Brungard<br>Senior Specialist | | |

Project Name: Lockheed Martin - Burlington, MA
ELLE Group #: 1875060

**General Comments:**

See the Laboratory Sample Analysis Record section of the Analysis Report for the method references.

All QC met criteria unless otherwise noted in an Analysis Specific Comment below.

Refer to the QC Summary for specific values and acceptance criteria.

Project specific QC samples are not included in this data set.

Matrix QC may not be reported if site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

Surrogate recoveries (if applicable) which are outside of the QC window are confirmed unless attributed to a dilution or otherwise noted in an Analysis Specific Comment below.

For dual column analyses, the surrogate (for multi-surrogate tests, at least one surrogate) must be within the acceptance limits on at least one of the two columns.

The samples were received at the appropriate temperature and in accordance with the chain of custody unless otherwise noted.

**Analysis Specific Comments:**

**SW-846 8260C, GC/MS Volatiles**

Sample #s: 9316648, 9316649, 9316650, 9316651, 9316652, 9316653, 9316654

The percent drift for the following is >20% in the continuing calibration verification standard associated with this sample: dichlorodifluoromethane, chloromethane, vinyl chloride, bromomethane, chloroethane and trichlorofluoromethane.

A Method Detection Limit (MDL) standard is analyzed to confirm sensitivity of the instrument for samples with non-detect analytes associated with a continuing calibration verification standard exhibiting low response (outside the 20%D criteria). The MDL standard shows adequate sensitivity at or below the reporting limit.

The percent recovery for dichlorodifluoromethane and chloromethane are outside of the 70 - 130% QC windows in the LCS and/or LCSD associated with this sample. Dichlorodifluoromethane and chloromethane are considered to be difficult analytes and the percent recoveries are within the allowed 40 - 160% window.

Batch #: I173231AA (Sample number(s): 9316648-9316654)

The recovery(ies) for the following analyte(s) in the LCS and/or LCSD were below the acceptance window: Dichlorodifluoromethane, Chloromethane

**SW-846 8270D SIM, GC/MS Semivolatiles**

Sample #s: 9316648, 9316649, 9316650, 9316651, 9316652, 9316653

The recovery for a target analyte(s) in the Laboratory Control Spike(s) is outside the QC acceptance limits as noted on the QC Summary. Sufficient sample was not available to repeat the analysis.

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The MA MCP analyte list requirement was not met for Method 8270D.
The client specified list was reported.

Batch #: 17320WAO026 (Sample number(s): 9316648-9316653)

The recovery(ies) for the following analyte(s) in the LCS and/or LCSD were below the acceptance window: 1,4-Dioxane

The relative percent difference(s) for the following analyte(s) in the LCS/LCSD were outside acceptance windows: 1,4-Dioxane. When the individual % recovery is within the acceptance limits, the data is reported.

The recovery(ies) for one or more surrogates were below the acceptance window for sample(s) LCS

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# Analysis Report

**Sample Description:** **EH1D-111317 Grab Groundwater**
**Lockheed Martin, Burlington**

**Project Name:** **Lockheed Martin - Burlington, MA**

Submittal Date/Time: 11/14/2017 09:40
Collection Date/Time: 11/13/2017 11:35
SDG#: LMB08-01

**Tetra Tech, Inc.**
**ELLE Sample #: GW 9316648**
**ELLE Group #: 1875060**
**Matrix: Groundwater**

| CAT No. | Analysis Name | CAS Number | As Received Result | As Received Method Detection Limit* | As Received Limit of Quantitation | Dilution Factor |
|---|---|---|---|---|---|---|
| **GC/MS Volatiles** | **SW-846 8260C** | | **ug/l** | **ug/l** | **ug/l** | |
| 11996 | Acetone | 67-64-1 | N.D. | 3.0 | 5.0 | 1 |
| 11996 | t-Amyl methyl ether | 994-05-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Benzene | 71-43-2 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Bromobenzene | 108-86-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Bromochloromethane | 74-97-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Bromodichloromethane | 75-27-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Bromoform | 75-25-2 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Bromomethane | 74-83-9 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 2-Butanone | 78-93-3 | N.D. | 1.0 | 5.0 | 1 |
| 11996 | n-Butylbenzene | 104-51-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | sec-Butylbenzene | 135-98-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | tert-Butylbenzene | 98-06-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Carbon Disulfide | 75-15-0 | N.D. | 0.4 | 1.0 | 1 |
| 11996 | Carbon Tetrachloride | 56-23-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Chlorobenzene | 108-90-7 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Chloroethane | 75-00-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Chloroform | 67-66-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Chloromethane | 74-87-3 | N.D. | 0.2 | 0.5 | 1 |
| 11996 | 2-Chlorotoluene | 95-49-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 4-Chlorotoluene | 106-43-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dibromo-3-chloropropane | 96-12-8 | N.D. | 0.2 | 0.5 | 1 |
| 11996 | Dibromochloromethane | 124-48-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dibromoethane | 106-93-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Dibromomethane | 74-95-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dichlorobenzene | 95-50-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,3-Dichlorobenzene | 541-73-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,4-Dichlorobenzene | 106-46-7 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Dichlorodifluoromethane | 75-71-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1-Dichloroethane | 75-34-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dichloroethane | 107-06-2 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | **1,1-Dichloroethene** | 75-35-4 | **0.2 J** | 0.1 | 0.5 | 1 |
| 11996 | cis-1,2-Dichloroethene | 156-59-2 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | trans-1,2-Dichloroethene | 156-60-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dichloropropane | 78-87-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,3-Dichloropropane | 142-28-9 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 2,2-Dichloropropane | 594-20-7 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1-Dichloropropene | 563-58-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | cis-1,3-Dichloropropene | 10061-01-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | trans-1,3-Dichloropropene | 10061-02-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,4-Dioxane | 123-91-1 | N.D. | 20 | 100 | 1 |
| 11996 | Ethyl ether | 60-29-7 | N.D. | 0.1 | 0.5 | 1 |

*=This limit was used in the evaluation of the final result

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# Analysis Report

**Sample Description:** **EH1D-111317 Grab Groundwater**
**Lockheed Martin, Burlington**

**Project Name:** **Lockheed Martin - Burlington, MA**

Submittal Date/Time: 11/14/2017 09:40
Collection Date/Time: 11/13/2017 11:35
SDG#: LMB08-01

**Tetra Tech, Inc.**
**ELLE Sample #: GW 9316648**
**ELLE Group #: 1875060**
**Matrix: Groundwater**

| CAT No. | Analysis Name | CAS Number | As Received Result | As Received Method Detection Limit* | As Received Limit of Quantitation | Dilution Factor |
|---|---|---|---|---|---|---|
| **GC/MS Volatiles** | **SW-846 8260C** | | **ug/l** | **ug/l** | **ug/l** | |
| 11996 | Ethyl t-butyl ether | 637-92-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Ethylbenzene | 100-41-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Hexachlorobutadiene | 87-68-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 2-Hexanone | 591-78-6 | N.D. | 1.0 | 5.0 | 1 |
| 11996 | di-Isopropyl Ether | 108-20-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Isopropylbenzene | 98-82-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | p-Isopropyltoluene | 99-87-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Methyl Tertiary Butyl Ether | 1634-04-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 4-Methyl-2-Pentanone | 108-10-1 | N.D. | 1.0 | 5.0 | 1 |
| 11996 | Methylene Chloride | 75-09-2 | N.D. | 0.2 | 0.5 | 1 |
| 11996 | Naphthalene | 91-20-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | n-Propylbenzene | 103-65-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Styrene | 100-42-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1,1,2-Tetrachloroethane | 630-20-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1,2,2-Tetrachloroethane | 79-34-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Tetrachloroethene | 127-18-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Tetrahydrofuran | 109-99-9 | N.D. | 2.0 | 5.0 | 1 |
| 11996 | Toluene | 108-88-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2,3-Trichlorobenzene | 87-61-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2,4-Trichlorobenzene | 120-82-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1,1-Trichloroethane | 71-55-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1,2-Trichloroethane | 79-00-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | **Trichloroethene** | 79-01-6 | **0.1 J** | 0.1 | 0.5 | 1 |
| 11996 | Trichlorofluoromethane | 75-69-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2,3-Trichloropropane | 96-18-4 | N.D. | 0.3 | 1.0 | 1 |
| 11996 | 1,2,4-Trimethylbenzene | 95-63-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,3,5-Trimethylbenzene | 108-67-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Vinyl Chloride | 75-01-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | m+p-Xylene | 179601-23-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | o-Xylene | 95-47-6 | N.D. | 0.1 | 0.5 | 1 |

The project QA/QC requirements were not met.

The percent drift for the following is >20% in the continuing calibration verification standard associated with this sample: dichlorodifluoromethane, chloromethane, vinyl chloride, bromomethane, chloroethane and trichlorofluoromethane.

A Method Detection Limit (MDL) standard is analyzed to confirm sensitivity of the instrument for samples with non-detect analytes associated with a continuing calibration verification standard exhibiting low response (outside the 20%D criteria). The MDL standard shows adequate sensitivity at or below the reporting limit.

The percent recovery for dichlorodifluoromethane and chloromethane are

*=This limit was used in the evaluation of the final result

**Sample Description:** **EH1D-111317 Grab Groundwater Lockheed Martin, Burlington**

**Project Name:** **Lockheed Martin - Burlington, MA**

Submittal Date/Time: 11/14/2017 09:40
Collection Date/Time: 11/13/2017 11:35
SDG#: LMB08-01

**Tetra Tech, Inc.**
**ELLE Sample #: GW 9316648**
**ELLE Group #: 1875060**
**Matrix: Groundwater**

| CAT No. | Analysis Name | CAS Number | As Received Result | As Received Method Detection Limit* | As Received Limit of Quantitation | Dilution Factor |
|---|---|---|---|---|---|---|
| | outside of the 70 - 130% QC windows in the LCS and/or LCSD associated with this sample. Dichlorodifluoromethane and chloromethane are considered to be difficult analytes and the percent recoveries are within the allowed 40 - 160% window. | | | | | |
| **GC/MS Semivolatiles** | | **SW-846 8270D SIM** | **ug/l** | **ug/l** | **ug/l** | |
| 14244 | 1,4-Dioxane | 123-91-1 | N.D. | 0.050 | 0.20 | 1 |
| | The project QA/QC requirements were not met. The recovery for a target analyte(s) in the Laboratory Control Spike(s) is outside the QC acceptance limits as noted on the QC Summary. Sufficient sample was not available to repeat the analysis. The MA MCP analyte list requirement was not met for Method 8270D. The client specified list was reported. | | | | | |

## Sample Comments

State of Massachusetts Laboratory Non-Potable Water Certification M-PA009

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name | Method | Trial# | Batch# | Analysis Date and Time | Analyst | Dilution Factor |
|---|---|---|---|---|---|---|---|
| 11996 | VOCs- 25ml Water by 8260C | SW-846 8260C | 1 | I173231AA | 11/19/2017 20:08 | Don V Viray | 1 |
| 01163 | GC/MS VOA Water Prep | SW-846 5030C | 1 | I173231AA | 11/19/2017 20:08 | Don V Viray | 1 |
| 14244 | SIM SVOAs 8270D MINI | SW-846 8270D SIM | 1 | 17320WAO026 | 11/22/2017 05:57 | Edward C Monborne | 1 |
| 10466 | BNA Water Extraction SIM | SW-846 3510C | 1 | 17320WAO026 | 11/17/2017 15:50 | Christine E Gleim | 1 |

*=This limit was used in the evaluation of the final result

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# Analysis Report

**Sample Description:** **EH1S-111317 Grab Groundwater**
**Lockheed Martin, Burlington**

**Project Name:** **Lockheed Martin - Burlington, MA**

Submittal Date/Time: 11/14/2017 09:40
Collection Date/Time: 11/13/2017 11:55
SDG#: LMB08-02

**Tetra Tech, Inc.**
**ELLE Sample #: GW 9316649**
**ELLE Group #: 1875060**
**Matrix: Groundwater**

| CAT No. | Analysis Name | CAS Number | As Received Result | As Received Method Detection Limit* | As Received Limit of Quantitation | Dilution Factor |
|---|---|---|---|---|---|---|
| **GC/MS Volatiles** | **SW-846 8260C** | | **ug/l** | **ug/l** | **ug/l** | |
| 11996 | Acetone | 67-64-1 | N.D. | 3.0 | 5.0 | 1 |
| 11996 | t-Amyl methyl ether | 994-05-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Benzene | 71-43-2 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Bromobenzene | 108-86-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Bromochloromethane | 74-97-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Bromodichloromethane | 75-27-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Bromoform | 75-25-2 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Bromomethane | 74-83-9 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 2-Butanone | 78-93-3 | N.D. | 1.0 | 5.0 | 1 |
| 11996 | n-Butylbenzene | 104-51-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | sec-Butylbenzene | 135-98-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | tert-Butylbenzene | 98-06-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Carbon Disulfide | 75-15-0 | N.D. | 0.4 | 1.0 | 1 |
| 11996 | Carbon Tetrachloride | 56-23-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Chlorobenzene | 108-90-7 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Chloroethane | 75-00-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Chloroform | 67-66-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Chloromethane | 74-87-3 | N.D. | 0.2 | 0.5 | 1 |
| 11996 | 2-Chlorotoluene | 95-49-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 4-Chlorotoluene | 106-43-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dibromo-3-chloropropane | 96-12-8 | N.D. | 0.2 | 0.5 | 1 |
| 11996 | Dibromochloromethane | 124-48-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dibromoethane | 106-93-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Dibromomethane | 74-95-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dichlorobenzene | 95-50-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,3-Dichlorobenzene | 541-73-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,4-Dichlorobenzene | 106-46-7 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Dichlorodifluoromethane | 75-71-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1-Dichloroethane | 75-34-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dichloroethane | 107-06-2 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | **1,1-Dichloroethene** | 75-35-4 | **0.2 J** | 0.1 | 0.5 | 1 |
| 11996 | cis-1,2-Dichloroethene | 156-59-2 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | trans-1,2-Dichloroethene | 156-60-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dichloropropane | 78-87-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,3-Dichloropropane | 142-28-9 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 2,2-Dichloropropane | 594-20-7 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1-Dichloropropene | 563-58-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | cis-1,3-Dichloropropene | 10061-01-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | trans-1,3-Dichloropropene | 10061-02-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,4-Dioxane | 123-91-1 | N.D. | 20 | 100 | 1 |
| 11996 | Ethyl ether | 60-29-7 | N.D. | 0.1 | 0.5 | 1 |

*=This limit was used in the evaluation of the final result

**Sample Description:** **EH1S-111317 Grab Groundwater**
**Lockheed Martin, Burlington**

**Project Name:** **Lockheed Martin - Burlington, MA**

Submittal Date/Time: 11/14/2017 09:40
Collection Date/Time: 11/13/2017 11:55
SDG#: LMB08-02

**Tetra Tech, Inc.**
**ELLE Sample #: GW 9316649**
**ELLE Group #: 1875060**
**Matrix: Groundwater**

| CAT No. | Analysis Name | CAS Number | As Received Result | As Received Method Detection Limit* | As Received Limit of Quantitation | Dilution Factor |
|---|---|---|---|---|---|---|
| **GC/MS Volatiles** | **SW-846 8260C** | | **ug/l** | **ug/l** | **ug/l** | |
| 11996 | Ethyl t-butyl ether | 637-92-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Ethylbenzene | 100-41-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Hexachlorobutadiene | 87-68-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 2-Hexanone | 591-78-6 | N.D. | 1.0 | 5.0 | 1 |
| 11996 | di-Isopropyl Ether | 108-20-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Isopropylbenzene | 98-82-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | p-Isopropyltoluene | 99-87-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Methyl Tertiary Butyl Ether | 1634-04-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 4-Methyl-2-Pentanone | 108-10-1 | N.D. | 1.0 | 5.0 | 1 |
| 11996 | Methylene Chloride | 75-09-2 | N.D. | 0.2 | 0.5 | 1 |
| 11996 | Naphthalene | 91-20-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | n-Propylbenzene | 103-65-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Styrene | 100-42-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1,1,2-Tetrachloroethane | 630-20-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1,2,2-Tetrachloroethane | 79-34-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Tetrachloroethene | 127-18-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Tetrahydrofuran | 109-99-9 | N.D. | 2.0 | 5.0 | 1 |
| 11996 | Toluene | 108-88-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2,3-Trichlorobenzene | 87-61-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2,4-Trichlorobenzene | 120-82-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1,1-Trichloroethane | 71-55-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1,2-Trichloroethane | 79-00-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Trichloroethene | 79-01-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Trichlorofluoromethane | 75-69-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2,3-Trichloropropane | 96-18-4 | N.D. | 0.3 | 1.0 | 1 |
| 11996 | 1,2,4-Trimethylbenzene | 95-63-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,3,5-Trimethylbenzene | 108-67-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Vinyl Chloride | 75-01-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | m+p-Xylene | 179601-23-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | o-Xylene | 95-47-6 | N.D. | 0.1 | 0.5 | 1 |

The project QA/QC requirements were not met.

The percent drift for the following is >20% in the continuing calibration verification standard associated with this sample: dichlorodifluoromethane, chloromethane, vinyl chloride, bromomethane, chloroethane and trichlorofluoromethane.

A Method Detection Limit (MDL) standard is analyzed to confirm sensitivity of the instrument for samples with non-detect analytes associated with a continuing calibration verification standard exhibiting low response (outside the 20%D criteria). The MDL standard shows adequate sensitivity at or below the reporting limit.

The percent recovery for dichlorodifluoromethane and chloromethane are

*=This limit was used in the evaluation of the final result

**Sample Description:** **EH1S-111317 Grab Groundwater**
**Lockheed Martin, Burlington**

**Project Name:** **Lockheed Martin - Burlington, MA**

Submittal Date/Time: 11/14/2017 09:40
Collection Date/Time: 11/13/2017 11:55
SDG#: LMB08-02

**Tetra Tech, Inc.**
**ELLE Sample #: GW 9316649**
**ELLE Group #: 1875060**
**Matrix: Groundwater**

| CAT No. | Analysis Name | CAS Number | As Received Result | As Received Method Detection Limit* | As Received Limit of Quantitation | Dilution Factor |
|---|---|---|---|---|---|---|
| | outside of the 70 - 130% QC windows in the LCS and/or LCSD associated with this sample. Dichlorodifluoromethane and chloromethane are considered to be difficult analytes and the percent recoveries are within the allowed 40 - 160% window. | | | | | |
| **GC/MS Semivolatiles** | | **SW-846 8270D SIM** | **ug/l** | **ug/l** | **ug/l** | |
| 14244 | 1,4-Dioxane | 123-91-1 | N.D. | 0.050 | 0.20 | 1 |
| | The project QA/QC requirements were not met. The recovery for a target analyte(s) in the Laboratory Control Spike(s) is outside the QC acceptance limits as noted on the QC Summary. Sufficient sample was not available to repeat the analysis. The MA MCP analyte list requirement was not met for Method 8270D. The client specified list was reported. | | | | | |

## Sample Comments

State of Massachusetts Laboratory Non-Potable Water Certification M-PA009

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name | Method | Trial# | Batch# | Analysis Date and Time | Analyst | Dilution Factor |
|---|---|---|---|---|---|---|---|
| 11996 | VOCs- 25ml Water by 8260C | SW-846 8260C | 1 | I173231AA | 11/19/2017 20:29 | Don V Viray | 1 |
| 01163 | GC/MS VOA Water Prep | SW-846 5030C | 1 | I173231AA | 11/19/2017 20:29 | Don V Viray | 1 |
| 14244 | SIM SVOAs 8270D MINI | SW-846 8270D SIM | 1 | 17320WAO026 | 11/22/2017 06:25 | Edward C Monborne | 1 |
| 10466 | BNA Water Extraction SIM | SW-846 3510C | 1 | 17320WAO026 | 11/17/2017 15:50 | Christine E Gleim | 1 |

*=This limit was used in the evaluation of the final result

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# Analysis Report

**Sample Description:** **EMW-11R-111217 Grab Groundwater**
**Lockheed Martin, Burlington**

**Project Name:** **Lockheed Martin - Burlington, MA**

Submittal Date/Time: 11/14/2017 09:40
Collection Date/Time: 11/12/2017 10:25
SDG#: LMB08-03

**Tetra Tech, Inc.**
**ELLE Sample #: GW 9316650**
**ELLE Group #: 1875060**
**Matrix: Groundwater**

| CAT No. | Analysis Name | CAS Number | As Received Result | As Received Method Detection Limit* | As Received Limit of Quantitation | Dilution Factor |
|---|---|---|---|---|---|---|
| **GC/MS Volatiles** | **SW-846 8260C** | | **ug/l** | **ug/l** | **ug/l** | |
| 11996 | Acetone | 67-64-1 | N.D. | 3.0 | 5.0 | 1 |
| 11996 | t-Amyl methyl ether | 994-05-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | **Benzene** | 71-43-2 | **0.1 J** | 0.1 | 0.5 | 1 |
| 11996 | Bromobenzene | 108-86-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Bromochloromethane | 74-97-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Bromodichloromethane | 75-27-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Bromoform | 75-25-2 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Bromomethane | 74-83-9 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 2-Butanone | 78-93-3 | N.D. | 1.0 | 5.0 | 1 |
| 11996 | n-Butylbenzene | 104-51-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | sec-Butylbenzene | 135-98-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | tert-Butylbenzene | 98-06-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Carbon Disulfide | 75-15-0 | N.D. | 0.4 | 1.0 | 1 |
| 11996 | Carbon Tetrachloride | 56-23-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Chlorobenzene | 108-90-7 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Chloroethane | 75-00-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Chloroform | 67-66-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Chloromethane | 74-87-3 | N.D. | 0.2 | 0.5 | 1 |
| 11996 | 2-Chlorotoluene | 95-49-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 4-Chlorotoluene | 106-43-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dibromo-3-chloropropane | 96-12-8 | N.D. | 0.2 | 0.5 | 1 |
| 11996 | Dibromochloromethane | 124-48-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dibromoethane | 106-93-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Dibromomethane | 74-95-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dichlorobenzene | 95-50-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,3-Dichlorobenzene | 541-73-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,4-Dichlorobenzene | 106-46-7 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Dichlorodifluoromethane | 75-71-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | **1,1-Dichloroethane** | 75-34-3 | **1.6** | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dichloroethane | 107-06-2 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | **1,1-Dichloroethene** | 75-35-4 | **1.3** | 0.1 | 0.5 | 1 |
| 11996 | **cis-1,2-Dichloroethene** | 156-59-2 | **3.2** | 0.1 | 0.5 | 1 |
| 11996 | trans-1,2-Dichloroethene | 156-60-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dichloropropane | 78-87-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,3-Dichloropropane | 142-28-9 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 2,2-Dichloropropane | 594-20-7 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1-Dichloropropene | 563-58-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | cis-1,3-Dichloropropene | 10061-01-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | trans-1,3-Dichloropropene | 10061-02-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,4-Dioxane | 123-91-1 | N.D. | 20 | 100 | 1 |
| 11996 | Ethyl ether | 60-29-7 | N.D. | 0.1 | 0.5 | 1 |

*=This limit was used in the evaluation of the final result

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# Analysis Report

**Sample Description:** **EMW-11R-111217 Grab Groundwater**
**Lockheed Martin, Burlington**

**Project Name:** **Lockheed Martin - Burlington, MA**

Submittal Date/Time: 11/14/2017 09:40
Collection Date/Time: 11/12/2017 10:25
SDG#: LMB08-03

**Tetra Tech, Inc.**
**ELLE Sample #: GW 9316650**
**ELLE Group #: 1875060**
**Matrix: Groundwater**

| CAT No. | Analysis Name | CAS Number | As Received Result | As Received Method Detection Limit* | As Received Limit of Quantitation | Dilution Factor |
|---|---|---|---|---|---|---|
| **GC/MS Volatiles** | **SW-846 8260C** | | **ug/l** | **ug/l** | **ug/l** | |
| 11996 | Ethyl t-butyl ether | 637-92-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Ethylbenzene | 100-41-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Hexachlorobutadiene | 87-68-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 2-Hexanone | 591-78-6 | N.D. | 1.0 | 5.0 | 1 |
| 11996 | di-Isopropyl Ether | 108-20-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Isopropylbenzene | 98-82-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | p-Isopropyltoluene | 99-87-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | **Methyl Tertiary Butyl Ether** | 1634-04-4 | **0.4 J** | 0.1 | 0.5 | 1 |
| 11996 | 4-Methyl-2-Pentanone | 108-10-1 | N.D. | 1.0 | 5.0 | 1 |
| 11996 | Methylene Chloride | 75-09-2 | N.D. | 0.2 | 0.5 | 1 |
| 11996 | Naphthalene | 91-20-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | n-Propylbenzene | 103-65-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Styrene | 100-42-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1,1,2-Tetrachloroethane | 630-20-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1,2,2-Tetrachloroethane | 79-34-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | **Tetrachloroethene** | 127-18-4 | **1.0** | 0.1 | 0.5 | 1 |
| 11996 | Tetrahydrofuran | 109-99-9 | N.D. | 2.0 | 5.0 | 1 |
| 11996 | Toluene | 108-88-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2,3-Trichlorobenzene | 87-61-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2,4-Trichlorobenzene | 120-82-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1,1-Trichloroethane | 71-55-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1,2-Trichloroethane | 79-00-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | **Trichloroethene** | 79-01-6 | **4.0** | 0.1 | 0.5 | 1 |
| 11996 | Trichlorofluoromethane | 75-69-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2,3-Trichloropropane | 96-18-4 | N.D. | 0.3 | 1.0 | 1 |
| 11996 | 1,2,4-Trimethylbenzene | 95-63-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,3,5-Trimethylbenzene | 108-67-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | **Vinyl Chloride** | 75-01-4 | **0.1 J** | 0.1 | 0.5 | 1 |
| 11996 | m+p-Xylene | 179601-23-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | o-Xylene | 95-47-6 | N.D. | 0.1 | 0.5 | 1 |

The project QA/QC requirements were not met.

The percent drift for the following is >20% in the continuing calibration verification standard associated with this sample: dichlorodifluoromethane, chloromethane, vinyl chloride, bromomethane, chloroethane and trichlorofluoromethane.

A Method Detection Limit (MDL) standard is analyzed to confirm sensitivity of the instrument for samples with non-detect analytes associated with a continuing calibration verification standard exhibiting low response (outside the 20%D criteria). The MDL standard shows adequate sensitivity at or below the reporting limit.

The percent recovery for dichlorodifluoromethane and chloromethane are

*=This limit was used in the evaluation of the final result

**Sample Description:** **EMW-11R-111217 Grab Groundwater Lockheed Martin, Burlington**

**Project Name:** **Lockheed Martin - Burlington, MA**

Submittal Date/Time: 11/14/2017 09:40
Collection Date/Time: 11/12/2017 10:25
SDG#: LMB08-03

**Tetra Tech, Inc.**
**ELLE Sample #: GW 9316650**
**ELLE Group #: 1875060**
**Matrix: Groundwater**

| CAT No. | Analysis Name | CAS Number | As Received Result | As Received Method Detection Limit* | As Received Limit of Quantitation | Dilution Factor |
|---|---|---|---|---|---|---|
| | outside of the 70 - 130% QC windows in the LCS and/or LCSD associated with this sample. Dichlorodifluoromethane and chloromethane are considered to be difficult analytes and the percent recoveries are within the allowed 40 - 160% window. | | | | | |
| **GC/MS Semivolatiles** | **SW-846 8270D SIM** | | **ug/l** | **ug/l** | **ug/l** | |
| 14244 | **1,4-Dioxane** | 123-91-1 | **0.19 J** | 0.050 | 0.20 | 1 |
| | The project QA/QC requirements were not met. The recovery for a target analyte(s) in the Laboratory Control Spike(s) is outside the QC acceptance limits as noted on the QC Summary. Sufficient sample was not available to repeat the analysis. The MA MCP analyte list requirement was not met for Method 8270D. The client specified list was reported. | | | | | |

## Sample Comments

State of Massachusetts Laboratory Non-Potable Water Certification M-PA009

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name | Method | Trial# | Batch# | Analysis Date and Time | Analyst | Dilution Factor |
|---|---|---|---|---|---|---|---|
| 11996 | VOCs- 25ml Water by 8260C | SW-846 8260C | 1 | I173231AA | 11/19/2017 20:51 | Don V Viray | 1 |
| 01163 | GC/MS VOA Water Prep | SW-846 5030C | 1 | I173231AA | 11/19/2017 20:51 | Don V Viray | 1 |
| 14244 | SIM SVOAs 8270D MINI | SW-846 8270D SIM | 1 | 17320WAO026 | 11/22/2017 06:53 | Edward C Monborne | 1 |
| 10466 | BNA Water Extraction SIM | SW-846 3510C | 1 | 17320WAO026 | 11/17/2017 15:50 | Christine E Gleim | 1 |

*=This limit was used in the evaluation of the final result

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# Analysis Report

**Sample Description:** **TTMW-1-111217 Grab Groundwater Lockheed Martin, Burlington**

**Project Name:** **Lockheed Martin - Burlington, MA**

**Tetra Tech, Inc.**
**ELLE Sample #: GW 9316651**
**ELLE Group #: 1875060**
**Matrix: Groundwater**

Submittal Date/Time: 11/14/2017 09:40
Collection Date/Time: 11/12/2017 13:00
SDG#: LMB08-04

| CAT No. | Analysis Name | CAS Number | As Received Result | As Received Method Detection Limit* | As Received Limit of Quantitation | Dilution Factor |
|---|---|---|---|---|---|---|
| **GC/MS Volatiles** | **SW-846 8260C** | | **ug/l** | **ug/l** | **ug/l** | |
| 11996 | Acetone | 67-64-1 | N.D. | 3.0 | 5.0 | 1 |
| 11996 | t-Amyl methyl ether | 994-05-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Benzene | 71-43-2 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Bromobenzene | 108-86-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Bromochloromethane | 74-97-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Bromodichloromethane | 75-27-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Bromoform | 75-25-2 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Bromomethane | 74-83-9 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 2-Butanone | 78-93-3 | N.D. | 1.0 | 5.0 | 1 |
| 11996 | n-Butylbenzene | 104-51-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | sec-Butylbenzene | 135-98-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | tert-Butylbenzene | 98-06-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Carbon Disulfide | 75-15-0 | N.D. | 0.4 | 1.0 | 1 |
| 11996 | Carbon Tetrachloride | 56-23-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Chlorobenzene | 108-90-7 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Chloroethane | 75-00-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Chloroform | 67-66-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Chloromethane | 74-87-3 | N.D. | 0.2 | 0.5 | 1 |
| 11996 | 2-Chlorotoluene | 95-49-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 4-Chlorotoluene | 106-43-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dibromo-3-chloropropane | 96-12-8 | N.D. | 0.2 | 0.5 | 1 |
| 11996 | Dibromochloromethane | 124-48-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dibromoethane | 106-93-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Dibromomethane | 74-95-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dichlorobenzene | 95-50-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,3-Dichlorobenzene | 541-73-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,4-Dichlorobenzene | 106-46-7 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Dichlorodifluoromethane | 75-71-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1-Dichloroethane | 75-34-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dichloroethane | 107-06-2 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1-Dichloroethene | 75-35-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | cis-1,2-Dichloroethene | 156-59-2 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | trans-1,2-Dichloroethene | 156-60-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dichloropropane | 78-87-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,3-Dichloropropane | 142-28-9 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 2,2-Dichloropropane | 594-20-7 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1-Dichloropropene | 563-58-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | cis-1,3-Dichloropropene | 10061-01-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | trans-1,3-Dichloropropene | 10061-02-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,4-Dioxane | 123-91-1 | N.D. | 20 | 100 | 1 |
| 11996 | Ethyl ether | 60-29-7 | N.D. | 0.1 | 0.5 | 1 |

*=This limit was used in the evaluation of the final result

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# Analysis Report

**Sample Description:** **TTMW-1-111217 Grab Groundwater Lockheed Martin, Burlington**

**Project Name:** **Lockheed Martin - Burlington, MA**

**Tetra Tech, Inc.**
**ELLE Sample #: GW 9316651**
**ELLE Group #: 1875060**
**Matrix: Groundwater**

Submittal Date/Time: 11/14/2017 09:40
Collection Date/Time: 11/12/2017 13:00
SDG#: LMB08-04

| CAT No. | Analysis Name | CAS Number | As Received Result | As Received Method Detection Limit* | As Received Limit of Quantitation | Dilution Factor |
|---|---|---|---|---|---|---|
| **GC/MS Volatiles** | **SW-846 8260C** | | **ug/l** | **ug/l** | **ug/l** | |
| 11996 | Ethyl t-butyl ether | 637-92-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Ethylbenzene | 100-41-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Hexachlorobutadiene | 87-68-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 2-Hexanone | 591-78-6 | N.D. | 1.0 | 5.0 | 1 |
| 11996 | di-Isopropyl Ether | 108-20-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Isopropylbenzene | 98-82-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | p-Isopropyltoluene | 99-87-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Methyl Tertiary Butyl Ether | 1634-04-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 4-Methyl-2-Pentanone | 108-10-1 | N.D. | 1.0 | 5.0 | 1 |
| 11996 | Methylene Chloride | 75-09-2 | N.D. | 0.2 | 0.5 | 1 |
| 11996 | Naphthalene | 91-20-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | n-Propylbenzene | 103-65-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Styrene | 100-42-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1,1,2-Tetrachloroethane | 630-20-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1,2,2-Tetrachloroethane | 79-34-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | **Tetrachloroethene** | 127-18-4 | **0.6** | 0.1 | 0.5 | 1 |
| 11996 | Tetrahydrofuran | 109-99-9 | N.D. | 2.0 | 5.0 | 1 |
| 11996 | Toluene | 108-88-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2,3-Trichlorobenzene | 87-61-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2,4-Trichlorobenzene | 120-82-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1,1-Trichloroethane | 71-55-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1,2-Trichloroethane | 79-00-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | **Trichloroethene** | 79-01-6 | **0.2 J** | 0.1 | 0.5 | 1 |
| 11996 | Trichlorofluoromethane | 75-69-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2,3-Trichloropropane | 96-18-4 | N.D. | 0.3 | 1.0 | 1 |
| 11996 | 1,2,4-Trimethylbenzene | 95-63-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,3,5-Trimethylbenzene | 108-67-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Vinyl Chloride | 75-01-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | m+p-Xylene | 179601-23-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | o-Xylene | 95-47-6 | N.D. | 0.1 | 0.5 | 1 |

The project QA/QC requirements were not met.

The percent drift for the following is >20% in the continuing calibration verification standard associated with this sample: dichlorodifluoromethane, chloromethane, vinyl chloride, bromomethane, chloroethane and trichlorofluoromethane.

A Method Detection Limit (MDL) standard is analyzed to confirm sensitivity of the instrument for samples with non-detect analytes associated with a continuing calibration verification standard exhibiting low response (outside the 20%D criteria). The MDL standard shows adequate sensitivity at or below the reporting limit.

The percent recovery for dichlorodifluoromethane and chloromethane are

*=This limit was used in the evaluation of the final result

**Sample Description:** **TTMW-1-111217 Grab Groundwater Lockheed Martin, Burlington**

**Project Name:** **Lockheed Martin - Burlington, MA**

**Tetra Tech, Inc.**
**ELLE Sample #: GW 9316651**
**ELLE Group #: 1875060**
**Matrix: Groundwater**

Submittal Date/Time: 11/14/2017 09:40
Collection Date/Time: 11/12/2017 13:00
SDG#: LMB08-04

| CAT No. | Analysis Name | CAS Number | As Received Result | As Received Method Detection Limit* | As Received Limit of Quantitation | Dilution Factor |
|---|---|---|---|---|---|---|
| | outside of the 70 - 130% QC windows in the LCS and/or LCSD associated with this sample. Dichlorodifluoromethane and chloromethane are considered to be difficult analytes and the percent recoveries are within the allowed 40 - 160% window. | | | | | |
| **GC/MS Semivolatiles** | | **SW-846 8270D SIM** | **ug/l** | **ug/l** | **ug/l** | |
| 14244 | 1,4-Dioxane | 123-91-1 | N.D. | 0.050 | 0.20 | 1 |
| | The project QA/QC requirements were not met. The recovery for a target analyte(s) in the Laboratory Control Spike(s) is outside the QC acceptance limits as noted on the QC Summary. Sufficient sample was not available to repeat the analysis. The MA MCP analyte list requirement was not met for Method 8270D. The client specified list was reported. | | | | | |

## Sample Comments

State of Massachusetts Laboratory Non-Potable Water Certification M-PA009

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name | Method | Trial# | Batch# | Analysis Date and Time | Analyst | Dilution Factor |
|---|---|---|---|---|---|---|---|
| 11996 | VOCs- 25ml Water by 8260C | SW-846 8260C | 1 | I173231AA | 11/19/2017 21:12 | Don V Viray | 1 |
| 01163 | GC/MS VOA Water Prep | SW-846 5030C | 1 | I173231AA | 11/19/2017 21:12 | Don V Viray | 1 |
| 14244 | SIM SVOAs 8270D MINI | SW-846 8270D SIM | 1 | 17320WAO026 | 11/22/2017 12:31 | Kira N Klaassen | 1 |
| 10466 | BNA Water Extraction SIM | SW-846 3510C | 1 | 17320WAO026 | 11/17/2017 15:50 | Christine E Gleim | 1 |

*=This limit was used in the evaluation of the final result

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# Analysis Report

**Sample Description:** **A-1-111217 Grab Groundwater Lockheed Martin, Burlington**

**Project Name:** **Lockheed Martin - Burlington, MA**

Submittal Date/Time: 11/14/2017 09:40
Collection Date/Time: 11/12/2017 13:35
SDG#: LMB08-05

**Tetra Tech, Inc.**
**ELLE Sample #: GW 9316652**
**ELLE Group #: 1875060**
**Matrix: Groundwater**

| CAT No. | Analysis Name | CAS Number | As Received Result | As Received Method Detection Limit* | As Received Limit of Quantitation | Dilution Factor |
|---|---|---|---|---|---|---|
| **GC/MS Volatiles** | **SW-846 8260C** | | **ug/l** | **ug/l** | **ug/l** | |
| 11996 | Acetone | 67-64-1 | N.D. | 3.0 | 5.0 | 1 |
| 11996 | t-Amyl methyl ether | 994-05-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Benzene | 71-43-2 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Bromobenzene | 108-86-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Bromochloromethane | 74-97-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Bromodichloromethane | 75-27-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Bromoform | 75-25-2 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Bromomethane | 74-83-9 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 2-Butanone | 78-93-3 | N.D. | 1.0 | 5.0 | 1 |
| 11996 | n-Butylbenzene | 104-51-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | sec-Butylbenzene | 135-98-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | tert-Butylbenzene | 98-06-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Carbon Disulfide | 75-15-0 | N.D. | 0.4 | 1.0 | 1 |
| 11996 | Carbon Tetrachloride | 56-23-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Chlorobenzene | 108-90-7 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Chloroethane | 75-00-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Chloroform | 67-66-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Chloromethane | 74-87-3 | N.D. | 0.2 | 0.5 | 1 |
| 11996 | 2-Chlorotoluene | 95-49-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 4-Chlorotoluene | 106-43-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dibromo-3-chloropropane | 96-12-8 | N.D. | 0.2 | 0.5 | 1 |
| 11996 | Dibromochloromethane | 124-48-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dibromoethane | 106-93-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Dibromomethane | 74-95-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dichlorobenzene | 95-50-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,3-Dichlorobenzene | 541-73-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,4-Dichlorobenzene | 106-46-7 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Dichlorodifluoromethane | 75-71-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | **1,1-Dichloroethane** | 75-34-3 | **0.1 J** | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dichloroethane | 107-06-2 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1-Dichloroethene | 75-35-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | **cis-1,2-Dichloroethene** | 156-59-2 | **0.1 J** | 0.1 | 0.5 | 1 |
| 11996 | trans-1,2-Dichloroethene | 156-60-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dichloropropane | 78-87-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,3-Dichloropropane | 142-28-9 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 2,2-Dichloropropane | 594-20-7 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1-Dichloropropene | 563-58-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | cis-1,3-Dichloropropene | 10061-01-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | trans-1,3-Dichloropropene | 10061-02-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,4-Dioxane | 123-91-1 | N.D. | 20 | 100 | 1 |
| 11996 | Ethyl ether | 60-29-7 | N.D. | 0.1 | 0.5 | 1 |

*=This limit was used in the evaluation of the final result

**Sample Description:** **A-1-111217 Grab Groundwater Lockheed Martin, Burlington**

**Project Name:** **Lockheed Martin - Burlington, MA**

Submittal Date/Time: 11/14/2017 09:40
Collection Date/Time: 11/12/2017 13:35
SDG#: LMB08-05

**Tetra Tech, Inc.**
**ELLE Sample #: GW 9316652**
**ELLE Group #: 1875060**
**Matrix: Groundwater**

| CAT No. | Analysis Name | CAS Number | As Received Result | As Received Method Detection Limit* | As Received Limit of Quantitation | Dilution Factor |
|---|---|---|---|---|---|---|
| **GC/MS Volatiles** | **SW-846 8260C** | | **ug/l** | **ug/l** | **ug/l** | |
| 11996 | Ethyl t-butyl ether | 637-92-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Ethylbenzene | 100-41-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Hexachlorobutadiene | 87-68-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 2-Hexanone | 591-78-6 | N.D. | 1.0 | 5.0 | 1 |
| 11996 | di-Isopropyl Ether | 108-20-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Isopropylbenzene | 98-82-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | p-Isopropyltoluene | 99-87-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Methyl Tertiary Butyl Ether | 1634-04-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 4-Methyl-2-Pentanone | 108-10-1 | N.D. | 1.0 | 5.0 | 1 |
| 11996 | Methylene Chloride | 75-09-2 | N.D. | 0.2 | 0.5 | 1 |
| 11996 | Naphthalene | 91-20-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | n-Propylbenzene | 103-65-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Styrene | 100-42-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1,1,2-Tetrachloroethane | 630-20-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1,2,2-Tetrachloroethane | 79-34-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | **Tetrachloroethene** | 127-18-4 | **0.5** | 0.1 | 0.5 | 1 |
| 11996 | Tetrahydrofuran | 109-99-9 | N.D. | 2.0 | 5.0 | 1 |
| 11996 | Toluene | 108-88-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2,3-Trichlorobenzene | 87-61-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2,4-Trichlorobenzene | 120-82-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1,1-Trichloroethane | 71-55-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1,2-Trichloroethane | 79-00-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | **Trichloroethene** | 79-01-6 | **0.2 J** | 0.1 | 0.5 | 1 |
| 11996 | Trichlorofluoromethane | 75-69-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2,3-Trichloropropane | 96-18-4 | N.D. | 0.3 | 1.0 | 1 |
| 11996 | 1,2,4-Trimethylbenzene | 95-63-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,3,5-Trimethylbenzene | 108-67-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Vinyl Chloride | 75-01-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | m+p-Xylene | 179601-23-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | o-Xylene | 95-47-6 | N.D. | 0.1 | 0.5 | 1 |

The project QA/QC requirements were not met.

The percent drift for the following is >20% in the continuing calibration verification standard associated with this sample: dichlorodifluoromethane, chloromethane, vinyl chloride, bromomethane, chloroethane and trichlorofluoromethane.

A Method Detection Limit (MDL) standard is analyzed to confirm sensitivity of the instrument for samples with non-detect analytes associated with a continuing calibration verification standard exhibiting low response (outside the 20%D criteria). The MDL standard shows adequate sensitivity at or below the reporting limit.

The percent recovery for dichlorodifluoromethane and chloromethane are

*=This limit was used in the evaluation of the final result

**Sample Description:** **A-1-111217 Grab Groundwater Lockheed Martin, Burlington**

**Project Name:** **Lockheed Martin - Burlington, MA**

Submittal Date/Time: 11/14/2017 09:40
Collection Date/Time: 11/12/2017 13:35
SDG#: LMB08-05

**Tetra Tech, Inc.**
**ELLE Sample #: GW 9316652**
**ELLE Group #: 1875060**
**Matrix: Groundwater**

| CAT No. | Analysis Name | CAS Number | As Received Result | As Received Method Detection Limit* | As Received Limit of Quantitation | Dilution Factor |
|---|---|---|---|---|---|---|
| | outside of the 70 - 130% QC windows in the LCS and/or LCSD associated with this sample. Dichlorodifluoromethane and chloromethane are considered to be difficult analytes and the percent recoveries are within the allowed 40 - 160% window. | | | | | |
| **GC/MS Semivolatiles** | | **SW-846 8270D SIM** | **ug/l** | **ug/l** | **ug/l** | |
| 14244 | 1,4-Dioxane | 123-91-1 | N.D. | 0.050 | 0.20 | 1 |
| | The project QA/QC requirements were not met. The recovery for a target analyte(s) in the Laboratory Control Spike(s) is outside the QC acceptance limits as noted on the QC Summary. Sufficient sample was not available to repeat the analysis. The MA MCP analyte list requirement was not met for Method 8270D. The client specified list was reported. | | | | | |

## Sample Comments

State of Massachusetts Laboratory Non-Potable Water Certification M-PA009

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name | Method | Trial# | Batch# | Analysis Date and Time | Analyst | Dilution Factor |
|---|---|---|---|---|---|---|---|
| 11996 | VOCs- 25ml Water by 8260C | SW-846 8260C | 1 | I173231AA | 11/19/2017 21:33 | Don V Viray | 1 |
| 01163 | GC/MS VOA Water Prep | SW-846 5030C | 1 | I173231AA | 11/19/2017 21:33 | Don V Viray | 1 |
| 14244 | SIM SVOAs 8270D MINI | SW-846 8270D SIM | 1 | 17320WAO026 | 11/22/2017 13:27 | Kira N Klaassen | 1 |
| 10466 | BNA Water Extraction SIM | SW-846 3510C | 1 | 17320WAO026 | 11/17/2017 15:50 | Christine E Gleim | 1 |

*=This limit was used in the evaluation of the final result

**Sample Description:** **A-1D-111217 Grab Groundwater**
**Lockheed Martin, Burlington**

**Project Name:** **Lockheed Martin - Burlington, MA**

Submittal Date/Time: 11/14/2017 09:40
Collection Date/Time: 11/12/2017 11:25
SDG#: LMB08-06

**Tetra Tech, Inc.**
**ELLE Sample #: GW 9316653**
**ELLE Group #: 1875060**
**Matrix: Groundwater**

| CAT No. | Analysis Name | CAS Number | As Received Result | As Received Method Detection Limit* | As Received Limit of Quantitation | Dilution Factor |
|---|---|---|---|---|---|---|
| **GC/MS Volatiles** | **SW-846 8260C** | | **ug/l** | **ug/l** | **ug/l** | |
| 11996 | Acetone | 67-64-1 | N.D. | 3.0 | 5.0 | 1 |
| 11996 | t-Amyl methyl ether | 994-05-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Benzene | 71-43-2 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Bromobenzene | 108-86-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Bromochloromethane | 74-97-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Bromodichloromethane | 75-27-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Bromoform | 75-25-2 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Bromomethane | 74-83-9 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 2-Butanone | 78-93-3 | N.D. | 1.0 | 5.0 | 1 |
| 11996 | n-Butylbenzene | 104-51-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | sec-Butylbenzene | 135-98-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | tert-Butylbenzene | 98-06-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Carbon Disulfide | 75-15-0 | N.D. | 0.4 | 1.0 | 1 |
| 11996 | Carbon Tetrachloride | 56-23-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Chlorobenzene | 108-90-7 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Chloroethane | 75-00-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Chloroform | 67-66-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Chloromethane | 74-87-3 | N.D. | 0.2 | 0.5 | 1 |
| 11996 | 2-Chlorotoluene | 95-49-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 4-Chlorotoluene | 106-43-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dibromo-3-chloropropane | 96-12-8 | N.D. | 0.2 | 0.5 | 1 |
| 11996 | Dibromochloromethane | 124-48-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dibromoethane | 106-93-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Dibromomethane | 74-95-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dichlorobenzene | 95-50-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,3-Dichlorobenzene | 541-73-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,4-Dichlorobenzene | 106-46-7 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Dichlorodifluoromethane | 75-71-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | **1,1-Dichloroethane** | 75-34-3 | **0.3 J** | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dichloroethane | 107-06-2 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | **1,1-Dichloroethene** | 75-35-4 | **1.7** | 0.1 | 0.5 | 1 |
| 11996 | **cis-1,2-Dichloroethene** | 156-59-2 | **0.7** | 0.1 | 0.5 | 1 |
| 11996 | trans-1,2-Dichloroethene | 156-60-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dichloropropane | 78-87-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,3-Dichloropropane | 142-28-9 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 2,2-Dichloropropane | 594-20-7 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1-Dichloropropene | 563-58-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | cis-1,3-Dichloropropene | 10061-01-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | trans-1,3-Dichloropropene | 10061-02-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,4-Dioxane | 123-91-1 | N.D. | 20 | 100 | 1 |
| 11996 | Ethyl ether | 60-29-7 | N.D. | 0.1 | 0.5 | 1 |

*=This limit was used in the evaluation of the final result

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# Analysis Report

**Sample Description:** **A-1D-111217 Grab Groundwater**
**Lockheed Martin, Burlington**

**Project Name:** **Lockheed Martin - Burlington, MA**

Submittal Date/Time: 11/14/2017 09:40
Collection Date/Time: 11/12/2017 11:25
SDG#: LMB08-06

**Tetra Tech, Inc.**
**ELLE Sample #: GW 9316653**
**ELLE Group #: 1875060**
**Matrix: Groundwater**

| CAT No. | Analysis Name | CAS Number | As Received Result | As Received Method Detection Limit* | As Received Limit of Quantitation | Dilution Factor |
|---|---|---|---|---|---|---|
| **GC/MS Volatiles** | **SW-846 8260C** | | **ug/l** | **ug/l** | **ug/l** | |
| 11996 | Ethyl t-butyl ether | 637-92-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Ethylbenzene | 100-41-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Hexachlorobutadiene | 87-68-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 2-Hexanone | 591-78-6 | N.D. | 1.0 | 5.0 | 1 |
| 11996 | di-Isopropyl Ether | 108-20-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Isopropylbenzene | 98-82-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | p-Isopropyltoluene | 99-87-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | **Methyl Tertiary Butyl Ether** | 1634-04-4 | **0.1 J** | 0.1 | 0.5 | 1 |
| 11996 | 4-Methyl-2-Pentanone | 108-10-1 | N.D. | 1.0 | 5.0 | 1 |
| 11996 | Methylene Chloride | 75-09-2 | N.D. | 0.2 | 0.5 | 1 |
| 11996 | Naphthalene | 91-20-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | n-Propylbenzene | 103-65-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Styrene | 100-42-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1,1,2-Tetrachloroethane | 630-20-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1,2,2-Tetrachloroethane | 79-34-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | **Tetrachloroethene** | 127-18-4 | **1.5** | 0.1 | 0.5 | 1 |
| 11996 | Tetrahydrofuran | 109-99-9 | N.D. | 2.0 | 5.0 | 1 |
| 11996 | Toluene | 108-88-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2,3-Trichlorobenzene | 87-61-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2,4-Trichlorobenzene | 120-82-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | **1,1,1-Trichloroethane** | 71-55-6 | **0.1 J** | 0.1 | 0.5 | 1 |
| 11996 | 1,1,2-Trichloroethane | 79-00-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | **Trichloroethene** | 79-01-6 | **4.8** | 0.1 | 0.5 | 1 |
| 11996 | Trichlorofluoromethane | 75-69-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2,3-Trichloropropane | 96-18-4 | N.D. | 0.3 | 1.0 | 1 |
| 11996 | 1,2,4-Trimethylbenzene | 95-63-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,3,5-Trimethylbenzene | 108-67-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Vinyl Chloride | 75-01-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | m+p-Xylene | 179601-23-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | o-Xylene | 95-47-6 | N.D. | 0.1 | 0.5 | 1 |

The project QA/QC requirements were not met.

The percent drift for the following is >20% in the continuing calibration verification standard associated with this sample: dichlorodifluoromethane, chloromethane, vinyl chloride, bromomethane, chloroethane and trichlorofluoromethane.

A Method Detection Limit (MDL) standard is analyzed to confirm sensitivity of the instrument for samples with non-detect analytes associated with a continuing calibration verification standard exhibiting low response (outside the 20%D criteria). The MDL standard shows adequate sensitivity at or below the reporting limit.

The percent recovery for dichlorodifluoromethane and chloromethane are

*=This limit was used in the evaluation of the final result

**Sample Description:** **A-1D-111217 Grab Groundwater**
**Lockheed Martin, Burlington**

**Project Name:** **Lockheed Martin - Burlington, MA**

Submittal Date/Time: 11/14/2017 09:40
Collection Date/Time: 11/12/2017 11:25
SDG#: LMB08-06

**Tetra Tech, Inc.**
**ELLE Sample #: GW 9316653**
**ELLE Group #: 1875060**
**Matrix: Groundwater**

| CAT No. | Analysis Name | CAS Number | As Received Result | As Received Method Detection Limit* | As Received Limit of Quantitation | Dilution Factor |
|---|---|---|---|---|---|---|
| | outside of the 70 - 130% QC windows in the LCS and/or LCSD associated with this sample. Dichlorodifluoromethane and chloromethane are considered to be difficult analytes and the percent recoveries are within the allowed 40 - 160% window. | | | | | |
| **GC/MS Semivolatiles** | | **SW-846 8270D SIM** | **ug/l** | **ug/l** | **ug/l** | |
| 14244 | 1,4-Dioxane | 123-91-1 | N.D. | 0.050 | 0.20 | 1 |
| | The project QA/QC requirements were not met. The recovery for a target analyte(s) in the Laboratory Control Spike(s) is outside the QC acceptance limits as noted on the QC Summary. Sufficient sample was not available to repeat the analysis. The MA MCP analyte list requirement was not met for Method 8270D. The client specified list was reported. | | | | | |

## Sample Comments

State of Massachusetts Laboratory Non-Potable Water Certification M-PA009

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name | Method | Trial# | Batch# | Analysis Date and Time | Analyst | Dilution Factor |
|---|---|---|---|---|---|---|---|
| 11996 | VOCs- 25ml Water by 8260C | SW-846 8260C | 1 | I173231AA | 11/19/2017 21:54 | Don V Viray | 1 |
| 01163 | GC/MS VOA Water Prep | SW-846 5030C | 1 | I173231AA | 11/19/2017 21:54 | Don V Viray | 1 |
| 14244 | SIM SVOAs 8270D MINI | SW-846 8270D SIM | 1 | 17320WAO026 | 11/22/2017 13:55 | Kira N Klaassen | 1 |
| 10466 | BNA Water Extraction SIM | SW-846 3510C | 1 | 17320WAO026 | 11/17/2017 15:50 | Christine E Gleim | 1 |

*=This limit was used in the evaluation of the final result

**Sample Description:** **Trip Blank Water**
**Lockheed Martin, Burlington**

**Project Name:** **Lockheed Martin - Burlington, MA**

Submittal Date/Time: 11/14/2017 09:40
Collection Date/Time: 11/12/2017 07:00
SDG#: LMB08-07TB

**Tetra Tech, Inc.**
**ELLE Sample #: GW 9316654**
**ELLE Group #: 1875060**
**Matrix: Water**

| CAT No. | Analysis Name | CAS Number | As Received Result | As Received Method Detection Limit* | As Received Limit of Quantitation | Dilution Factor |
|---|---|---|---|---|---|---|
| **GC/MS Volatiles** | **SW-846 8260C** | | **ug/l** | **ug/l** | **ug/l** | |
| 11996 | Acetone | 67-64-1 | N.D. | 3.0 | 5.0 | 1 |
| 11996 | t-Amyl methyl ether | 994-05-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Benzene | 71-43-2 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Bromobenzene | 108-86-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Bromochloromethane | 74-97-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Bromodichloromethane | 75-27-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Bromoform | 75-25-2 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Bromomethane | 74-83-9 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 2-Butanone | 78-93-3 | N.D. | 1.0 | 5.0 | 1 |
| 11996 | n-Butylbenzene | 104-51-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | sec-Butylbenzene | 135-98-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | tert-Butylbenzene | 98-06-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Carbon Disulfide | 75-15-0 | N.D. | 0.4 | 1.0 | 1 |
| 11996 | Carbon Tetrachloride | 56-23-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Chlorobenzene | 108-90-7 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Chloroethane | 75-00-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Chloroform | 67-66-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Chloromethane | 74-87-3 | N.D. | 0.2 | 0.5 | 1 |
| 11996 | 2-Chlorotoluene | 95-49-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 4-Chlorotoluene | 106-43-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dibromo-3-chloropropane | 96-12-8 | N.D. | 0.2 | 0.5 | 1 |
| 11996 | Dibromochloromethane | 124-48-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dibromoethane | 106-93-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Dibromomethane | 74-95-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dichlorobenzene | 95-50-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,3-Dichlorobenzene | 541-73-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,4-Dichlorobenzene | 106-46-7 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Dichlorodifluoromethane | 75-71-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1-Dichloroethane | 75-34-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dichloroethane | 107-06-2 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1-Dichloroethene | 75-35-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | cis-1,2-Dichloroethene | 156-59-2 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | trans-1,2-Dichloroethene | 156-60-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dichloropropane | 78-87-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,3-Dichloropropane | 142-28-9 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 2,2-Dichloropropane | 594-20-7 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1-Dichloropropene | 563-58-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | cis-1,3-Dichloropropene | 10061-01-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | trans-1,3-Dichloropropene | 10061-02-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,4-Dioxane | 123-91-1 | N.D. | 20 | 100 | 1 |
| 11996 | Ethyl ether | 60-29-7 | N.D. | 0.1 | 0.5 | 1 |

*=This limit was used in the evaluation of the final result

**Sample Description:** **Trip Blank Water**
**Lockheed Martin, Burlington**

**Project Name:** **Lockheed Martin - Burlington, MA**

Submittal Date/Time: 11/14/2017 09:40
Collection Date/Time: 11/12/2017 07:00
SDG#: LMB08-07TB

**Tetra Tech, Inc.**
**ELLE Sample #: GW 9316654**
**ELLE Group #: 1875060**
**Matrix: Water**

| CAT No. | Analysis Name | CAS Number | As Received Result | As Received Method Detection Limit* | As Received Limit of Quantitation | Dilution Factor |
|---|---|---|---|---|---|---|
| **GC/MS Volatiles** | **SW-846 8260C** | | **ug/l** | **ug/l** | **ug/l** | |
| 11996 | Ethyl t-butyl ether | 637-92-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Ethylbenzene | 100-41-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Hexachlorobutadiene | 87-68-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 2-Hexanone | 591-78-6 | N.D. | 1.0 | 5.0 | 1 |
| 11996 | di-Isopropyl Ether | 108-20-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Isopropylbenzene | 98-82-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | p-Isopropyltoluene | 99-87-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Methyl Tertiary Butyl Ether | 1634-04-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 4-Methyl-2-Pentanone | 108-10-1 | N.D. | 1.0 | 5.0 | 1 |
| 11996 | Methylene Chloride | 75-09-2 | N.D. | 0.2 | 0.5 | 1 |
| 11996 | Naphthalene | 91-20-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | n-Propylbenzene | 103-65-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Styrene | 100-42-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1,1,2-Tetrachloroethane | 630-20-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1,2,2-Tetrachloroethane | 79-34-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Tetrachloroethene | 127-18-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Tetrahydrofuran | 109-99-9 | N.D. | 2.0 | 5.0 | 1 |
| 11996 | Toluene | 108-88-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2,3-Trichlorobenzene | 87-61-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2,4-Trichlorobenzene | 120-82-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1,1-Trichloroethane | 71-55-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1,2-Trichloroethane | 79-00-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Trichloroethene | 79-01-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Trichlorofluoromethane | 75-69-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2,3-Trichloropropane | 96-18-4 | N.D. | 0.3 | 1.0 | 1 |
| 11996 | 1,2,4-Trimethylbenzene | 95-63-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,3,5-Trimethylbenzene | 108-67-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Vinyl Chloride | 75-01-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | m+p-Xylene | 179601-23-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | o-Xylene | 95-47-6 | N.D. | 0.1 | 0.5 | 1 |

The project QA/QC requirements were not met.

The percent drift for the following is >20% in the continuing calibration verification standard associated with this sample: dichlorodifluoromethane, chloromethane, vinyl chloride, bromomethane, chloroethane and trichlorofluoromethane.

A Method Detection Limit (MDL) standard is analyzed to confirm sensitivity of the instrument for samples with non-detect analytes associated with a continuing calibration verification standard exhibiting low response (outside the 20%D criteria). The MDL standard shows adequate sensitivity at or below the reporting limit.

The percent recovery for dichlorodifluoromethane and chloromethane are

*=This limit was used in the evaluation of the final result

**Sample Description:** **Trip Blank Water**
**Lockheed Martin, Burlington**

**Project Name:** **Lockheed Martin - Burlington, MA**

Submittal Date/Time: 11/14/2017 09:40
Collection Date/Time: 11/12/2017 07:00
SDG#: LMB08-07TB

**Tetra Tech, Inc.**
**ELLE Sample #: GW 9316654**
**ELLE Group #: 1875060**
**Matrix: Water**

| CAT No. | Analysis Name | CAS Number | As Received Result | As Received Method Detection Limit* | As Received Limit of Quantitation | Dilution Factor |
|---|---|---|---|---|---|---|

outside of the 70 - 130% QC windows in the LCS and/or LCSD associated with this sample. Dichlorodifluoromethane and chloromethane are considered to be difficult analytes and the percent recoveries are within the allowed 40 - 160% window.

## Sample Comments

State of Massachusetts Laboratory Non-Potable Water Certification M-PA009

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name | Method | Trial# | Batch# | Analysis Date and Time | Analyst | Dilution Factor |
|---|---|---|---|---|---|---|---|
| 11996 | VOCs- 25ml Water by 8260C | SW-846 8260C | 1 | I173231AA | 11/19/2017 19:47 | Don V Viray | 1 |
| 01163 | GC/MS VOA Water Prep | SW-846 5030C | 1 | I173231AA | 11/19/2017 19:47 | Don V Viray | 1 |

*=This limit was used in the evaluation of the final result

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# Quality Control Summary

Client Name: Tetra Tech, Inc.
Reported: 11/27/2017 13:18

Group Number: 1875060

Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

All Inorganic Initial Calibration and Continuing Calibration Blanks met acceptable method criteria unless otherwise noted on the Analysis Report.

## Method Blank

| Analysis Name | Result | MDL** | LOQ |
|---|---|---|---|
| | ug/l | ug/l | ug/l |
| Batch number: I173231AA | Sample number(s): 9316648-9316654 | | |
| Acetone | N.D. | 3.0 | 5.0 |
| t-Amyl methyl ether | N.D. | 0.1 | 0.5 |
| Benzene | N.D. | 0.1 | 0.5 |
| Bromobenzene | N.D. | 0.1 | 0.5 |
| Bromochloromethane | N.D. | 0.1 | 0.5 |
| Bromodichloromethane | N.D. | 0.1 | 0.5 |
| Bromoform | N.D. | 0.1 | 0.5 |
| Bromomethane | N.D. | 0.1 | 0.5 |
| 2-Butanone | N.D. | 1.0 | 5.0 |
| n-Butylbenzene | N.D. | 0.1 | 0.5 |
| sec-Butylbenzene | N.D. | 0.1 | 0.5 |
| tert-Butylbenzene | N.D. | 0.1 | 0.5 |
| Carbon Disulfide | N.D. | 0.4 | 1.0 |
| Carbon Tetrachloride | N.D. | 0.1 | 0.5 |
| Chlorobenzene | N.D. | 0.1 | 0.5 |
| Chloroethane | N.D. | 0.1 | 0.5 |
| Chloroform | N.D. | 0.1 | 0.5 |
| Chloromethane | N.D. | 0.2 | 0.5 |
| 2-Chlorotoluene | N.D. | 0.1 | 0.5 |
| 4-Chlorotoluene | N.D. | 0.1 | 0.5 |
| 1,2-Dibromo-3-chloropropane | N.D. | 0.2 | 0.5 |
| Dibromochloromethane | N.D. | 0.1 | 0.5 |
| 1,2-Dibromoethane | N.D. | 0.1 | 0.5 |
| Dibromomethane | N.D. | 0.1 | 0.5 |
| 1,2-Dichlorobenzene | N.D. | 0.1 | 0.5 |
| 1,3-Dichlorobenzene | N.D. | 0.1 | 0.5 |
| 1,4-Dichlorobenzene | N.D. | 0.1 | 0.5 |
| Dichlorodifluoromethane | N.D. | 0.1 | 0.5 |
| 1,1-Dichloroethane | N.D. | 0.1 | 0.5 |
| 1,2-Dichloroethane | N.D. | 0.1 | 0.5 |
| 1,1-Dichloroethene | N.D. | 0.1 | 0.5 |
| cis-1,2-Dichloroethene | N.D. | 0.1 | 0.5 |
| trans-1,2-Dichloroethene | N.D. | 0.1 | 0.5 |
| 1,2-Dichloropropane | N.D. | 0.1 | 0.5 |
| 1,3-Dichloropropane | N.D. | 0.1 | 0.5 |
| 2,2-Dichloropropane | N.D. | 0.1 | 0.5 |
| 1,1-Dichloropropene | N.D. | 0.1 | 0.5 |
| cis-1,3-Dichloropropene | N.D. | 0.1 | 0.5 |
| trans-1,3-Dichloropropene | N.D. | 0.1 | 0.5 |

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.
P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

# Quality Control Summary

Client Name: Tetra Tech, Inc.
Reported: 11/27/2017 13:18

Group Number: 1875060

## Method Blank (continued)

| Analysis Name | Result ug/l | MDL** ug/l | LOQ ug/l |
|---|---|---|---|
| 1,4-Dioxane | N.D. | 20 | 100 |
| Ethyl ether | N.D. | 0.1 | 0.5 |
| Ethyl t-butyl ether | N.D. | 0.1 | 0.5 |
| Ethylbenzene | N.D. | 0.1 | 0.5 |
| Hexachlorobutadiene | N.D. | 0.1 | 0.5 |
| 2-Hexanone | N.D. | 1.0 | 5.0 |
| di-Isopropyl Ether | N.D. | 0.1 | 0.5 |
| Isopropylbenzene | N.D. | 0.1 | 0.5 |
| p-Isopropyltoluene | N.D. | 0.1 | 0.5 |
| Methyl Tertiary Butyl Ether | N.D. | 0.1 | 0.5 |
| 4-Methyl-2-Pentanone | N.D. | 1.0 | 5.0 |
| Methylene Chloride | N.D. | 0.2 | 0.5 |
| Naphthalene | N.D. | 0.1 | 0.5 |
| n-Propylbenzene | N.D. | 0.1 | 0.5 |
| Styrene | N.D. | 0.1 | 0.5 |
| 1,1,1,2-Tetrachloroethane | N.D. | 0.1 | 0.5 |
| 1,1,2,2-Tetrachloroethane | N.D. | 0.1 | 0.5 |
| Tetrachloroethene | N.D. | 0.1 | 0.5 |
| Tetrahydrofuran | N.D. | 2.0 | 5.0 |
| Toluene | N.D. | 0.1 | 0.5 |
| 1,2,3-Trichlorobenzene | N.D. | 0.1 | 0.5 |
| 1,2,4-Trichlorobenzene | N.D. | 0.1 | 0.5 |
| 1,1,1-Trichloroethane | N.D. | 0.1 | 0.5 |
| 1,1,2-Trichloroethane | N.D. | 0.1 | 0.5 |
| Trichloroethene | N.D. | 0.1 | 0.5 |
| Trichlorofluoromethane | N.D. | 0.1 | 0.5 |
| 1,2,3-Trichloropropane | N.D. | 0.3 | 1.0 |
| 1,2,4-Trimethylbenzene | N.D. | 0.1 | 0.5 |
| 1,3,5-Trimethylbenzene | N.D. | 0.1 | 0.5 |
| Vinyl Chloride | N.D. | 0.1 | 0.5 |
| m+p-Xylene | N.D. | 0.1 | 0.5 |
| o-Xylene | N.D. | 0.1 | 0.5 |
| Batch number: 17320WAO026 | Sample number(s): 9316648-9316653 | | |
| 1,4-Dioxane | N.D. | 0.050 | 0.20 |

## LCS/LCSD

| Analysis Name | LCS Spike Added ug/l | LCS Conc ug/l | LCSD Spike Added ug/l | LCSD Conc ug/l | LCS %REC | LCSD %REC | LCS/LCSD Limits | RPD | RPD Max |
|---|---|---|---|---|---|---|---|---|---|
| Batch number: I173231AA | Sample number(s): 9316648-9316654 | | | | | | | | |

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.
P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

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# Quality Control Summary

Client Name: Tetra Tech, Inc.
Reported: 11/27/2017 13:18

Group Number: 1875060

## LCS/LCSD

| Analysis Name | LCS Spike Added ug/l | LCS Conc ug/l | LCSD Spike Added ug/l | LCSD Conc ug/l | LCS %REC | LCSD %REC | LCS/LCSD Limits | RPD | RPD Max |
|---|---|---|---|---|---|---|---|---|---|
| Acetone | 37.5 | 42.79 | 37.5 | 39.09 | 114 | 104 | 70-130 | 9 | 30 |
| t-Amyl methyl ether | 5.00 | 4.51 | 5.00 | 4.69 | 90 | 94 | 70-130 | 4 | 30 |
| Benzene | 5.00 | 5.04 | 5.00 | 5.02 | 101 | 100 | 70-130 | 0 | 30 |
| Bromobenzene | 5.00 | 4.71 | 5.00 | 4.70 | 94 | 94 | 70-130 | 0 | 30 |
| Bromochloromethane | 5.00 | 5.04 | 5.00 | 4.99 | 101 | 100 | 70-130 | 1 | 30 |
| Bromodichloromethane | 5.00 | 5.19 | 5.00 | 5.19 | 104 | 104 | 70-130 | 0 | 30 |
| Bromoform | 5.00 | 5.12 | 5.00 | 5.09 | 102 | 102 | 70-130 | 1 | 30 |
| Bromomethane | 5.00 | 3.85 | 5.00 | 3.72 | 77 | 74 | 70-130 | 3 | 30 |
| 2-Butanone | 37.5 | 40.39 | 37.5 | 35.45 | 108 | 95 | 70-130 | 13 | 30 |
| n-Butylbenzene | 5.00 | 5.14 | 5.00 | 5.06 | 103 | 101 | 70-130 | 2 | 30 |
| sec-Butylbenzene | 5.00 | 5.05 | 5.00 | 5.08 | 101 | 102 | 70-130 | 1 | 30 |
| tert-Butylbenzene | 5.00 | 4.73 | 5.00 | 4.78 | 95 | 96 | 70-130 | 1 | 30 |
| Carbon Disulfide | 5.00 | 4.89 | 5.00 | 4.83 | 98 | 97 | 70-130 | 1 | 30 |
| Carbon Tetrachloride | 5.00 | 4.92 | 5.00 | 4.88 | 98 | 98 | 70-130 | 1 | 30 |
| Chlorobenzene | 5.00 | 4.92 | 5.00 | 4.92 | 98 | 98 | 70-130 | 0 | 30 |
| Chloroethane | 5.00 | 3.99 | 5.00 | 3.57 | 80 | 71 | 70-130 | 11 | 30 |
| Chloroform | 5.00 | 4.99 | 5.00 | 4.93 | 100 | 99 | 70-130 | 1 | 30 |
| Chloromethane | 5.00 | 3.55 | 5.00 | 3.40 | 71 | 68* | 70-130 | 4 | 30 |
| 2-Chlorotoluene | 5.00 | 4.88 | 5.00 | 4.87 | 98 | 97 | 70-130 | 0 | 30 |
| 4-Chlorotoluene | 5.00 | 4.87 | 5.00 | 4.84 | 97 | 97 | 70-130 | 1 | 30 |
| 1,2-Dibromo-3-chloropropane | 5.00 | 4.96 | 5.00 | 4.42 | 99 | 88 | 70-130 | 11 | 30 |
| Dibromochloromethane | 5.00 | 5.39 | 5.00 | 5.38 | 108 | 108 | 70-130 | 0 | 30 |
| 1,2-Dibromoethane | 5.00 | 5.35 | 5.00 | 5.42 | 107 | 108 | 70-130 | 1 | 30 |
| Dibromomethane | 5.00 | 5.35 | 5.00 | 5.34 | 107 | 107 | 70-130 | 0 | 30 |
| 1,2-Dichlorobenzene | 5.00 | 4.85 | 5.00 | 4.82 | 97 | 96 | 70-130 | 1 | 30 |
| 1,3-Dichlorobenzene | 5.00 | 4.75 | 5.00 | 4.72 | 95 | 94 | 70-130 | 1 | 30 |
| 1,4-Dichlorobenzene | 5.00 | 4.71 | 5.00 | 4.69 | 94 | 94 | 70-130 | 0 | 30 |
| Dichlorodifluoromethane | 5.00 | 2.26 | 5.00 | 2.20 | 45* | 44* | 70-130 | 3 | 30 |
| 1,1-Dichloroethane | 5.00 | 4.96 | 5.00 | 4.95 | 99 | 99 | 70-130 | 0 | 30 |
| 1,2-Dichloroethane | 5.00 | 4.82 | 5.00 | 4.75 | 96 | 95 | 70-130 | 1 | 30 |
| 1,1-Dichloroethene | 5.00 | 4.92 | 5.00 | 5.03 | 98 | 101 | 70-130 | 2 | 30 |
| cis-1,2-Dichloroethene | 5.00 | 5.07 | 5.00 | 5.05 | 101 | 101 | 70-130 | 0 | 30 |
| trans-1,2-Dichloroethene | 5.00 | 5.18 | 5.00 | 5.14 | 104 | 103 | 70-130 | 1 | 30 |
| 1,2-Dichloropropane | 5.00 | 5.30 | 5.00 | 5.23 | 106 | 105 | 70-130 | 1 | 30 |
| 1,3-Dichloropropane | 5.00 | 5.24 | 5.00 | 5.26 | 105 | 105 | 70-130 | 0 | 30 |
| 2,2-Dichloropropane | 5.00 | 5.12 | 5.00 | 5.20 | 102 | 104 | 70-130 | 1 | 30 |
| 1,1-Dichloropropene | 5.00 | 4.77 | 5.00 | 4.79 | 95 | 96 | 70-130 | 0 | 30 |
| cis-1,3-Dichloropropene | 5.00 | 5.17 | 5.00 | 5.28 | 103 | 106 | 70-130 | 2 | 30 |
| trans-1,3-Dichloropropene | 5.00 | 5.53 | 5.00 | 5.60 | 111 | 112 | 70-130 | 1 | 30 |
| 1,4-Dioxane | 125 | 129.66 | 125 | 145.87 | 104 | 117 | 70-130 | 12 | 30 |
| Ethyl ether | 5.00 | 5.65 | 5.00 | 5.67 | 113 | 113 | 70-130 | 0 | 30 |
| Ethyl t-butyl ether | 5.00 | 4.39 | 5.00 | 4.63 | 88 | 93 | 70-130 | 5 | 30 |
| Ethylbenzene | 5.00 | 4.91 | 5.00 | 4.90 | 98 | 98 | 70-130 | 0 | 30 |
| Hexachlorobutadiene | 5.00 | 4.63 | 5.00 | 4.59 | 93 | 92 | 70-130 | 1 | 30 |

*- Outside of specification
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(2) The unspiked result was more than four times the spike added.
P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

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# Quality Control Summary

Client Name: Tetra Tech, Inc.
Reported: 11/27/2017 13:18

Group Number: 1875060

## LCS/LCSD (continued)

| Analysis Name | LCS Spike Added ug/l | LCS Conc ug/l | LCSD Spike Added ug/l | LCSD Conc ug/l | LCS %REC | LCSD %REC | LCS/LCSD Limits | RPD | RPD Max |
|---|---|---|---|---|---|---|---|---|---|
| 2-Hexanone | 25 | 25.12 | 25 | 21.81 | 100 | 87 | 70-130 | 14 | 30 |
| di-Isopropyl Ether | 5.00 | 4.77 | 5.00 | 4.89 | 95 | 98 | 70-130 | 3 | 30 |
| Isopropylbenzene | 5.00 | 4.81 | 5.00 | 4.87 | 96 | 97 | 70-130 | 1 | 30 |
| p-Isopropyltoluene | 5.00 | 5.01 | 5.00 | 5.00 | 100 | 100 | 70-130 | 0 | 30 |
| Methyl Tertiary Butyl Ether | 5.00 | 4.67 | 5.00 | 4.86 | 93 | 97 | 70-130 | 4 | 30 |
| 4-Methyl-2-Pentanone | 25 | 25.6 | 25 | 22.39 | 102 | 90 | 70-130 | 13 | 30 |
| Methylene Chloride | 5.00 | 5.14 | 5.00 | 5.11 | 103 | 102 | 70-130 | 1 | 30 |
| Naphthalene | 5.00 | 5.89 | 5.00 | 5.45 | 118 | 109 | 70-130 | 8 | 30 |
| n-Propylbenzene | 5.00 | 5.17 | 5.00 | 5.08 | 103 | 102 | 70-130 | 2 | 30 |
| Styrene | 5.00 | 5.11 | 5.00 | 5.07 | 102 | 101 | 70-130 | 1 | 30 |
| 1,1,1,2-Tetrachloroethane | 5.00 | 5.16 | 5.00 | 5.13 | 103 | 103 | 70-130 | 1 | 30 |
| 1,1,2,2-Tetrachloroethane | 5.00 | 5.22 | 5.00 | 5.27 | 104 | 105 | 70-130 | 1 | 30 |
| Tetrachloroethene | 5.00 | 4.62 | 5.00 | 4.65 | 92 | 93 | 70-130 | 1 | 30 |
| Tetrahydrofuran | 25 | 27.34 | 25 | 23.87 | 109 | 95 | 70-130 | 14 | 30 |
| Toluene | 5.00 | 4.93 | 5.00 | 4.91 | 99 | 98 | 70-130 | 0 | 30 |
| 1,2,3-Trichlorobenzene | 5.00 | 5.28 | 5.00 | 5.05 | 106 | 101 | 70-130 | 4 | 30 |
| 1,2,4-Trichlorobenzene | 5.00 | 4.90 | 5.00 | 4.79 | 98 | 96 | 70-130 | 2 | 30 |
| 1,1,1-Trichloroethane | 5.00 | 4.82 | 5.00 | 4.83 | 96 | 97 | 70-130 | 0 | 30 |
| 1,1,2-Trichloroethane | 5.00 | 5.43 | 5.00 | 5.47 | 109 | 109 | 70-130 | 1 | 30 |
| Trichloroethene | 5.00 | 4.87 | 5.00 | 4.86 | 97 | 97 | 70-130 | 0 | 30 |
| Trichlorofluoromethane | 5.00 | 3.79 | 5.00 | 3.78 | 76 | 76 | 70-130 | 0 | 30 |
| 1,2,3-Trichloropropane | 5.00 | 5.33 | 5.00 | 5.29 | 107 | 106 | 70-130 | 1 | 30 |
| 1,2,4-Trimethylbenzene | 5.00 | 5.09 | 5.00 | 5.06 | 102 | 101 | 70-130 | 1 | 30 |
| 1,3,5-Trimethylbenzene | 5.00 | 5.04 | 5.00 | 4.99 | 101 | 100 | 70-130 | 1 | 30 |
| Vinyl Chloride | 5.00 | 3.51 | 5.00 | 3.64 | 70 | 73 | 70-130 | 4 | 30 |
| m+p-Xylene | 10 | 9.81 | 10 | 9.81 | 98 | 98 | 70-130 | 0 | 30 |
| o-Xylene | 5.00 | 4.68 | 5.00 | 4.73 | 94 | 95 | 70-130 | 1 | 30 |
| | ug/l | ug/l | ug/l | ug/l | | | | | |
| Batch number: 17320WAO026 | Sample number(s): 9316648-9316653 | | | | | | | | |
| 1,4-Dioxane | 1.00 | N.D. | 1.00 | 0.440 | 0* | 44 | 25-72 | 200* | 30 |

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.
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# Quality Control Summary

Client Name: Tetra Tech, Inc.
Reported: 11/27/2017 13:18

Group Number: 1875060

## Surrogate Quality Control

Surrogate recoveries which are outside of the QC window are confirmed unless attributed to dilution or otherwise noted on the Analysis Report. For dual column analyses, the surrogate (at least one surrogate for multi-surrogate tests) must be within the acceptance limits on at least one of the two columns.

Analysis Name: VOCs- 25ml Water by 8260C
Batch number: I173231AA

| | Dibromofluoromethane | 1,2-Dichloroethane-d4 | Toluene-d8 | 4-Bromofluorobenzene |
|---|---|---|---|---|
| 9316648 | 100 | 105 | 101 | 93 |
| 9316649 | 100 | 106 | 100 | 94 |
| 9316650 | 101 | 105 | 101 | 95 |
| 9316651 | 102 | 104 | 101 | 92 |
| 9316652 | 102 | 106 | 101 | 92 |
| 9316653 | 102 | 104 | 102 | 92 |
| 9316654 | 99 | 106 | 101 | 95 |
| Blank | 99 | 103 | 101 | 94 |
| LCS | 97 | 100 | 101 | 99 |
| LCSD | 98 | 101 | 100 | 99 |
| Limits: | 70-130 | 70-130 | 70-130 | 70-130 |

Analysis Name: SIM SVOAs 8270D MINI
Batch number: 17320WAO026

| | Fluoranthene-d10 | Benzo(a)pyrene-d12 | 1-Methylnaphthalene-d10 |
|---|---|---|---|
| 9316648 | 85 | 64 | 80 |
| 9316649 | 83 | 55 | 73 |
| 9316650 | 88 | 83 | 78 |
| 9316651 | 100 | 73 | 78 |
| 9316652 | 97 | 85 | 76 |
| 9316653 | 99 | 54 | 71 |
| Blank | 80 | 76 | 65 |
| LCS | 67 | 72 | 10* |
| LCSD | 92 | 91 | 83 |
| Limits: | 44-115 | 25-125 | 33-112 |

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
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(2) The unspiked result was more than four times the spike added.
P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

# Environmental Analysis Request/Chain of Custody

eurofins

Lancaster Laboratories Environmental

For Eurofins Lancaster Laboratories Environmental use only

Acct. # 19999 Group # 1875060 Sample # 9316648-54

**COC #** 557717

## Client Information

Client: LMC BURLINGTON TETRA TECH

Acct. #:

Project Name/#: 117-0507550

PWSID #:

Project Manager: ED DOLAN

P.O. #: 117-0507550

Sampler: JAKE PICARD

Quote #:

State where samples were collected: MA

For Compliance: Yes ☐ No ☐

For Lab Use Only

FSC:

SCR#:

| Sample Identification | Collected Date | Collected Time | Grab | Composite | Soil | Sediment | Tissue | Water: Potable | Water: Ground | Water: Surface | Water: NPDES | Other: | Total # of Containers | VOCs 8260 | 1,4 DIOXANE 522 | | | | | | | | | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GH1D-111317 | 11/13/17 | 1135 | X | | | | | | GW | | | | | 3 | 1 | | | | | | | | | MCP SITE ANALYZE IT 1,4 DIOXANE TO .3 ug/L RL |
| GH1S-111317 | 11/13/17 | 1155 | X | | | | | | GW | | | | | 3 | 1 | | | | | | | | | |
| GMW-112-111217 | 11/12/17 | 1025 | X | | | | | | GW | | | | | 3 | 1 | | | | | | | | | |
| TTMW-1-111217 | 11/12/17 | 1300 | X | | | | | | GW | | | | | 3 | 1 | | | | | | | | | |
| A-1-111217 | 11/12/17 | 1335 | X | | | | | | GW | | | | | 3 | 1 | | | | | | | | | |
| A-1D-111217 | 11/12/17 | 1125 | X | | | | | | GW | | | | | 3 | 1 | | | | | | | | | |
| TRIP BLANK | 11/12/17 | 0700 | | | | | | | | | | | | | | | | | | | | | | |

**Turnaround Time (TAT) Requested** (please circle)

Standard Rush

(Rush TAT is subject to laboratory approval and surcharge.)

Date results are needed: _____

E-mail address: _____

**Data Package Options** (circle if required)

Type I (EPA Level 3 Equivalent/non-CLP) Type VI (Raw Data Only)

Type III (Reduced non-CLP) NJ DKQP TX TRRP-13

NYSDEC Category A or B MA MCP CT RCP

| Relinquished by | Date | Time | Received by | Date | Time |
|---|---|---|---|---|---|
| JAKE PICARD | 11/13/17 | 409 | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

EDD Required? Yes No

If yes, format: PDF / EXCEL

Site-Specific QC (MS/MSD/Dup)? Yes No

(If yes, indicate QC sample and submit triplicate sample volume.)

Relinquished by Commercial Carrier: UPS ____ FedEx ✓ Other ____

Temperature upon receipt 4.1 °C

**Preservation Codes**

H=HCl T=Thiosulfate

N=$HNO_3$ B=NaOH

S=$H_2SO_4$ P=$H_3PO_4$

F=Field Filtered O=Other

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# Sample Administration Receipt Documentation Log

Doc Log ID: 200967

Group Number(s): 1875060

Client: Tetra Tech

## Delivery and Receipt Information

| | | | |
|---|---|---|---|
| Delivery Method: | Fed Ex | Arrival Timestamp: | 11/14/2017 9:40 |
| Number of Packages: | 1 | Number of Projects: | 1 |
| State/Province of Origin: | MA | | |

## Arrival Condition Summary

| | | | |
|---|---|---|---|
| Shipping Container Sealed: | Yes | Sample IDs on COC match Containers: | Yes |
| Custody Seal Present: | Yes | Sample Date/Times match COC: | Yes |
| Custody Seal Intact: | Yes | VOA Vial Headspace ≥ 6mm: | No |
| Samples Chilled: | Yes | Total Trip Blank Qty: | 3 |
| Paperwork Enclosed: | Yes | Trip Blank Type: | HCL |
| Samples Intact: | Yes | Air Quality Samples Present: | No |
| Missing Samples: | No | | |
| Extra Samples: | No | | |
| Discrepancy in Container Qty on COC: | No | | |

*Unpacked by Wyatt Shiffler (12792) at 11:08 on 11/14/2017*

## Samples Chilled Details

*Thermometer Types: DT = Digital (Temp. Bottle) IR = Infrared (Surface Temp) All Temperatures in °C.*

| Cooler # | Thermometer ID | Corrected Temp | Therm. Type | Ice Type | Ice Present? | Ice Container | Elevated Temp? |
|---|---|---|---|---|---|---|---|
| 1 | 32170023 | 4.1 | IR | Wet | Y | Bagged | N |



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T | 717-656-2300
F | 717-656-2681
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# Explanation of Symbols and Abbreviations

*The following defines common symbols and abbreviations used in reporting technical data:*

| | | | |
|---|---|---|---|
| **BMQL** | Below Minimum Quantitation Level | **mg** | milligram(s) |
| **C** | degrees Celsius | **mL** | milliliter(s) |
| **cfu** | colony forming units | **MPN** | Most Probable Number |
| **CP Units** | cobalt-chloroplatinate units | **N.D.** | non-detect |
| **F** | degrees Fahrenheit | **ng** | nanogram(s) |
| **g** | gram(s) | **NTU** | nephelometric turbidity units |
| **IU** | International Units | **pg/L** | picogram/liter |
| **kg** | kilogram(s) | **RL** | Reporting Limit |
| **L** | liter(s) | **TNTC** | Too Numerous To Count |
| **lb.** | pound(s) | **µg** | microgram(s) |
| **m3** | cubic meter(s) | **µL** | microliter(s) |
| **meq** | milliequivalents | **umhos/cm** | micromhos/cm |

| | |
|---|---|
| **<** | less than |
| **>** | greater than |
| **ppm** | parts per million - One ppm is equivalent to one milligram per kilogram (mg/kg) or one gram per million grams. For aqueous liquids, ppm is usually taken to be equivalent to milligrams per liter (mg/l), because one liter of water has a weight very close to a kilogram. For gases or vapors, one ppm is equivalent to one microliter per liter of gas. |
| **ppb** | parts per billion |
| **Dry weight basis** | Results printed under this heading have been adjusted for moisture content. This increases the analyte weight concentration to approximate the value present in a similar sample without moisture. All other results are reported on an as-received basis. |

**Analytical test results meet all requirements of the associated regulatory program (i.e., NELAC (TNI), DoD, and ISO 17025) unless otherwise noted under the individual analysis.**

Measurement uncertainty values, as applicable, are available upon request.

Tests results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff.

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Times are local to the area of activity. Parameters listed in the 40 CFR Part 136 Table II as “analyze immediately” are not performed within 15 minutes.

**WARRANTY AND LIMITS OF LIABILITY** - In accepting analytical work, we warrant the accuracy of test results for the sample as submitted. THE FOREGOING EXPRESS WARRANTY IS EXCLUSIVE AND IS GIVEN IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED. WE DISCLAIM ANY OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING A WARRANTY OF FITNESS FOR PARTICULAR PURPOSE AND WARRANTY OF MERCHANTABILITY. IN NO EVENT SHALL EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL, LLC BE LIABLE FOR INDIRECT, SPECIAL, CONSEQUENTIAL, OR INCIDENTAL DAMAGES INCLUDING, BUT NOT LIMITED TO, DAMAGES FOR LOSS OF PROFIT OR GOODWILL REGARDLESS OF (A) THE NEGLIGENCE (EITHER SOLE OR CONCURRENT) OF EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL AND (B) WHETHER EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL HAS BEEN INFORMED OF THE POSSIBILITY OF SUCH DAMAGES. We accept no legal responsibility for the purposes for which the client uses the test results. No purchase order or other order for work shall be accepted by Eurofins Lancaster Laboratories Environmental which includes any conditions that vary from the Standard Terms and Conditions, and Eurofins Lancaster Laboratories Environmental hereby objects to any conflicting terms contained in any acceptance or order submitted by client.

# Data Qualifiers

| Qualifier | Definition |
|---|---|
| C | Result confirmed by reanalysis |
| D1 | Indicates for dual column analyses that the result is reported from column 1 |
| D2 | Indicates for dual column analyses that the result is reported from column 2 |
| E | Concentration exceeds the calibration range |
| J (or G, I, X) | Estimated value >= the Method Detection Limit (MDL or DL) and < the Limit of Quantitation (LOQ or RL) |
| P | Concentration difference between the primary and confirmation column >40%. The lower result is reported. |
| U | Analyte was not detected at the value indicated |
| V | Concentration difference between the primary and confirmation column >100%. The reporting limit is raised due to this disparity and evident interference. |
| W | The dissolved oxygen uptake for the unseeded blank is greater than 0.20 mg/L. |
| Z | Laboratory Defined - see analysis report |

Additional Organic and Inorganic CLP qualifiers may be used with Form 1 reports as defined by the CLP methods.
Qualifiers specific to Dioxin/Furans and PCB Congeners are detailed on the individual Analysis Report.

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# ANALYSIS REPORT

Prepared by:

Eurofins Lancaster Laboratories Environmental
2425 New Holland Pike
Lancaster, PA 17601

Prepared for:

Tetra Tech, Inc.
One Monarch Drive
Suite 202
Littleton MA 01460

Report Date: December 04, 2017 19:22

**Project: Lockheed Martin - Burlington, MA**

Account #: 19999
Group Number: 1876333
SDG: LMB08
PO Number: 117-0507550
State of Sample Origin: MA

Regulatory agencies do not accredit laboratories for all methods, analytes, and matrices. Our current scopes of accreditation can be viewed at http://www.eurofinsus.com/environment-testing/laboratories/eurofins-lancaster-laboratories-environmental/resources/certifications/ . To request copies of prior scopes of accreditation, contact your project manager.

| | | |
|---|---|---|
| Electronic Copy To | Tetra Tech, Inc. | Attn: Thomas Nunno |
| Electronic Copy To | Tetra Tech, Inc. | Attn: Ed Dolan |
| Electronic Copy To | Tetra Tech, Inc. | Attn: Chris Conor |

Respectfully Submitted,

Barbara Weyandt

Barbara A. Weyandt
Specialist

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## SAMPLE INFORMATION

| Client Sample Description | Sample Collection Date/Time | ELLE# |
|---|---|---|
| 3G-11-111417 Grab Groundwater | 11/14/2017 16:20 | 9322175 |
| EMW-3R-111417 Grab Groundwater | 11/14/2017 11:45 | 9322176 |
| EMW-7-111417 Grab Groundwater | 11/14/2017 14:35 | 9322177 |
| EMW-10D-111417 Grab Groundwater | 11/14/2017 13:10 | 9322178 |
| 3H-5-111517 Grab Groundwater | 11/15/2017 10:45 | 9322179 |
| 3G-12-111517 Grab Groundwater | 11/15/2017 12:05 | 9322180 |
| 3G-12-D-111517 Grab Groundwater | 11/15/2017 12:10 | 9322181 |
| EMW-2D(R)-111517 Grab Groundwater | 11/15/2017 14:45 | 9322182 |
| Trip Blank Grab Water | 11/15/2017 | 9322183 |

The specific methodologies used in obtaining the enclosed analytical results are indicated on the Laboratory Sample Analysis Record.

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## MADEP MCP Analytical Method Report Certification Form

Laboratory Name: Eurofins Lancaster Laboratories Environmental
Project: Lockheed Martin - Burlington, MA
This form provides certifications for the following data set: 9322175-9322183

Sample Matrices: Water

Methods Used:
EPA 300.0; RSKSOP-175 modified; SM 5310 C-2000; SW-846 8260C; SW-846 8270D SIM

| Affirmative responses to questions A through F are required for "Presumptive Certainty" status | | Yes or No[1] |
|---|---|---|
| A | Were all samples received in a condition consistent with those described on the Chain-of-Custody, properly preserved (including temperature) in the field or laboratory, and prepared/analyzed within method holding times? | Yes |
| B | Were the analytical method(s) and all associated QC requirements specified in the selected CAM protocol(s) followed? | No |
| C | Were all required corrective actions and analytical response actions specified in the selected CAM protocol(s) implemented for all identified performance standard non-conformances? | Yes |
| D | Does the laboratory report comply with all the reporting requirements specified in CAM VII A, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data"? | Yes |
| E | **VPH, EPH, APH, and TO-15 only:**<br>a. VPH, EPH, and APH Methods only: Was each method conducted without significant modification(s)? (Refer to the individual method(s) for a list of significant modifications).<br>b. APH and TO-15 Methods only. Was the complete analyte list reported for each method? | <br>NA<br><br>NA |
| F | Were all applicable CAM protocol QC and performance standard non-conformances identified and evaluated in a laboratory narrative (including all "No" responses to Questions A through E)? | Yes |
| Responses to Questions G, H and I below are required for "Presumptive Certainty" status | | |
| G | Were the reporting limits at or below all CAM reporting limits specified in the selected CAM protocol(s)? | Yes |
| *Data User Note: Data that achieve "Presumptive Certainty" status may not necessarily meet the data usability and representativeness requirements described in 310 CMR 40. 1056 (2)(k) and WSC-07-350.* | | |
| H | Were all QC performance standards specified in the CAM protocol(s) achieved? | No |
| I | Were results reported for the complete analyte list specified in the selected CAM protocol(s)? | No |
| [1] Refer to the Case Narrative for information regarding negative responses. | | |
| I, the undersigned, attest under the pains and penalties of perjury that the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete. | | |
| Kathryn A. Brungard<br>Senior Specialist | | |

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Project Name: Lockheed Martin - Burlington, MA
ELLE Group #: 1876333

**General Comments:**

See the Laboratory Sample Analysis Record section of the Analysis Report for the method references.

All QC met criteria unless otherwise noted in an Analysis Specific Comment below.

Refer to the QC Summary for specific values and acceptance criteria.

Project specific QC samples are not included in this data set.

Matrix QC may not be reported if site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

Surrogate recoveries (if applicable) which are outside of the QC window are confirmed unless attributed to a dilution or otherwise noted in an Analysis Specific Comment below.

For dual column analyses, the surrogate (for multi-surrogate tests, at least one surrogate) must be within the acceptance limits on at least one of the two columns.

The samples were received at the appropriate temperature and in accordance with the chain of custody unless otherwise noted.

**Analysis Specific Comments:**

**SW-846 8260C, GC/MS Volatiles**

Sample #s: 9322183

The percent drift for the following is >20% in the continuing calibration verification standard associated with this sample: Dichlorodifluoromethane, Bromomethane, Chloroethane, 1,4-Dioxane.

The percent recovery for Dichlorodifluoromethane is outside of the 70 - 130% QC windows in the LCS and/or LCSD associated with this sample. Dichlorodifluoromethane is considered a difficult analyte and the percent recovery is within the allowed 40 - 160% window.

A Method Detection Limit (MDL) standard is analyzed to confirm sensitivity of the instrument for samples with non-detect analytes associated with a continuing calibration verification standard exhibiting low response (outside the 20%D criteria). The MDL standard shows adequate sensitivity at or below the reporting limit.

Sample #s: 9322175, 9322176, 9322177, 9322178, 9322179, 9322180, 9322181, 9322182

The percent drift for the following is >20% in the continuing calibration verification standard associated with this sample: Dichlorodifluoromethane

The percent recovery for Dichlorodifluoromethane is outside of the 70 - 130% QC windows in the LCS and/or LCSD associated with this sample. Dichlorodifluoromethane is considered a difficult analyte and the percent recovery is within the allowed 40 - 160% window.

A Method Detection Limit (MDL) standard is analyzed to confirm sensitivity of the instrument for samples with non-detect analytes associated with a continuing calibration verification standard exhibiting low response (outside

the 20%D criteria). The MDL standard shows adequate sensitivity at or below the reporting limit.

Batch #: I173321AA (Sample number(s): 9322175-9322182)

The recovery(ies) for the following analyte(s) in the LCS and/or LCSD were below the acceptance window: Dichlorodifluoromethane

Batch #: I173332AA (Sample number(s): 9322183 UNSPK: P324688)

The recovery(ies) for the following analyte(s) in the LCS exceeded the acceptance window indicating a positive bias: Tetrahydrofuran

The recovery(ies) for the following analyte(s) in the LCS were below the acceptance window: Dichlorodifluoromethane

The recovery(ies) for the following analyte(s) in the MS and/or MSD exceeded the acceptance window indicating a positive bias: 2-Butanone, Tetrahydrofuran, 4-Methyl-2-Pentanone, 2-Hexanone, 1,2-Dibromo-3-chloropropane

The recovery(ies) for the following analyte(s) in the MS and/or MSD were below the acceptance window: Dichlorodifluoromethane

The relative percent difference(s) for the following analyte(s) in the MS/MSD were outside acceptance windows: Tetrahydrofuran, 4-Methyl-2-Pentanone, 2-Hexanone, 1,2-Dibromo-3-chloropropane

**SW-846 8270D SIM, GC/MS Semivolatiles**

Sample #s: 9322181

The MA MCP analyte list requirement was not met for Method 8270D. The client requested analyte list was reported for this sample.

Sample #s: 9322180

The MA MCP analyte list requirement was not met for Method 8270D. The client requested analyte list was reported for this sample.

Target analytes were detected in the method blank associated with the samples as noted on the QC Summary. The following corrective action was taken:
The sample was re-extracted outside the method required holding time and the QC is compliant. All results are reported from the first trial. Similar results were obtained in both trials with the exception of: 1,4-dioxane was not detected in the re-extract.

Sample #s: 9322179, 9322182

The MA MCP analyte list requirement was not met for Method 8270D. The client requested analyte list was reported for this sample.

Target analytes were detected in the method blank associated with the samples as noted on the QC Summary. The following corrective action was taken:
The sample was re-extracted outside the method required holding time and the QC is compliant. All results are reported from the first trial. Similar results were obtained in both trials.

Sample #s: 9322175, 9322176, 9322177, 9322178

The MA MCP analyte list requirement was not met for Method 8270D. The client requested analyte list was reported for this sample. Target analytes were detected in the method blank associated with the samples as noted on the QC Summary.

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Samples could not be re-extracted due to insufficient sample.

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# Analysis Report

**Sample Description:** **3G-11-111417 Grab Groundwater Lockheed Martin, Burlington**

**Project Name:** **Lockheed Martin - Burlington, MA**

Submittal Date/Time: 11/16/2017 09:40
Collection Date/Time: 11/14/2017 16:20
SDG#: LMB08-08

**Tetra Tech, Inc.**
**ELLE Sample #: WW 9322175**
**ELLE Group #: 1876333**
**Matrix: Groundwater**

| CAT No. | Analysis Name | CAS Number | Result | Method Detection Limit* | Limit of Quantitation | Dilution Factor |
|---|---|---|---|---|---|---|
| **GC/MS Volatiles** | **SW-846 8260C** | | **ug/l** | **ug/l** | **ug/l** | |
| 11996 | Acetone | 67-64-1 | N.D. | 3.0 | 5.0 | 1 |
| 11996 | t-Amyl methyl ether | 994-05-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Benzene | 71-43-2 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Bromobenzene | 108-86-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Bromochloromethane | 74-97-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Bromodichloromethane | 75-27-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Bromoform | 75-25-2 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Bromomethane | 74-83-9 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 2-Butanone | 78-93-3 | N.D. | 1.0 | 5.0 | 1 |
| 11996 | n-Butylbenzene | 104-51-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | sec-Butylbenzene | 135-98-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | tert-Butylbenzene | 98-06-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Carbon Disulfide | 75-15-0 | N.D. | 0.4 | 1.0 | 1 |
| 11996 | Carbon Tetrachloride | 56-23-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Chlorobenzene | 108-90-7 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Chloroethane | 75-00-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Chloroform | 67-66-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Chloromethane | 74-87-3 | N.D. | 0.2 | 0.5 | 1 |
| 11996 | 2-Chlorotoluene | 95-49-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 4-Chlorotoluene | 106-43-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dibromo-3-chloropropane | 96-12-8 | N.D. | 0.2 | 0.5 | 1 |
| 11996 | Dibromochloromethane | 124-48-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dibromoethane | 106-93-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Dibromomethane | 74-95-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dichlorobenzene | 95-50-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,3-Dichlorobenzene | 541-73-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,4-Dichlorobenzene | 106-46-7 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Dichlorodifluoromethane | 75-71-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | **1,1-Dichloroethane** | 75-34-3 | **6.9** | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dichloroethane | 107-06-2 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | **1,1-Dichloroethene** | 75-35-4 | **10** | 0.1 | 0.5 | 1 |
| 11996 | **cis-1,2-Dichloroethene** | 156-59-2 | **1.6** | 0.1 | 0.5 | 1 |
| 11996 | trans-1,2-Dichloroethene | 156-60-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dichloropropane | 78-87-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,3-Dichloropropane | 142-28-9 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 2,2-Dichloropropane | 594-20-7 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1-Dichloropropene | 563-58-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | cis-1,3-Dichloropropene | 10061-01-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | trans-1,3-Dichloropropene | 10061-02-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,4-Dioxane | 123-91-1 | N.D. | 20 | 100 | 1 |
| 11996 | Ethyl ether | 60-29-7 | N.D. | 0.1 | 0.5 | 1 |

*=This limit was used in the evaluation of the final result

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# Analysis Report

**Sample Description:** **3G-11-111417 Grab Groundwater Lockheed Martin, Burlington**

**Project Name:** **Lockheed Martin - Burlington, MA**

Submittal Date/Time: 11/16/2017 09:40
Collection Date/Time: 11/14/2017 16:20
SDG#: LMB08-08

**Tetra Tech, Inc.**
**ELLE Sample #: WW 9322175**
**ELLE Group #: 1876333**
**Matrix: Groundwater**

| CAT No. | Analysis Name | CAS Number | Result | | Method Detection Limit* | Limit of Quantitation | Dilution Factor |
|---|---|---|---|---|---|---|---|
| **GC/MS Volatiles** | **SW-846 8260C** | | **ug/l** | | **ug/l** | **ug/l** | |
| 11996 | Ethyl t-butyl ether | 637-92-3 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Ethylbenzene | 100-41-4 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Hexachlorobutadiene | 87-68-3 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 2-Hexanone | 591-78-6 | N.D. | | 1.0 | 5.0 | 1 |
| 11996 | di-Isopropyl Ether | 108-20-3 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Isopropylbenzene | 98-82-8 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | p-Isopropyltoluene | 99-87-6 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | **Methyl Tertiary Butyl Ether** | 1634-04-4 | **0.1** | **J** | 0.1 | 0.5 | 1 |
| 11996 | 4-Methyl-2-Pentanone | 108-10-1 | N.D. | | 1.0 | 5.0 | 1 |
| 11996 | Methylene Chloride | 75-09-2 | N.D. | | 0.2 | 0.5 | 1 |
| 11996 | Naphthalene | 91-20-3 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | n-Propylbenzene | 103-65-1 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Styrene | 100-42-5 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,1,1,2-Tetrachloroethane | 630-20-6 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,1,2,2-Tetrachloroethane | 79-34-5 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | **Tetrachloroethene** | 127-18-4 | **0.1** | **J** | 0.1 | 0.5 | 1 |
| 11996 | Tetrahydrofuran | 109-99-9 | N.D. | | 2.0 | 5.0 | 1 |
| 11996 | Toluene | 108-88-3 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,2,3-Trichlorobenzene | 87-61-6 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,2,4-Trichlorobenzene | 120-82-1 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,1,1-Trichloroethane | 71-55-6 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,1,2-Trichloroethane | 79-00-5 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | **Trichloroethene** | 79-01-6 | **4.2** | | 0.1 | 0.5 | 1 |
| 11996 | Trichlorofluoromethane | 75-69-4 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,2,3-Trichloropropane | 96-18-4 | N.D. | | 0.3 | 1.0 | 1 |
| 11996 | 1,2,4-Trimethylbenzene | 95-63-6 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,3,5-Trimethylbenzene | 108-67-8 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | **Vinyl Chloride** | 75-01-4 | **0.1** | **J** | 0.1 | 0.5 | 1 |
| 11996 | m+p-Xylene | 179601-23-1 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | o-Xylene | 95-47-6 | N.D. | | 0.1 | 0.5 | 1 |

The percent drift for the following is >20% in the continuing calibration verification standard associated with this sample: Dichlorodifluoromethane

The percent recovery for Dichlorodifluoromethane is outside of the 70 - 130% QC windows in the LCS and/or LCSD associated with this sample. Dichlorodifluoromethane is considered a difficult analyte and the percent recovery is within the allowed 40 - 160% window.

A Method Detection Limit (MDL) standard is analyzed to confirm sensitivity of the instrument for samples with non-detect analytes associated with a continuing calibration verification standard exhibiting low response (outside the 20%D criteria). The MDL standard shows adequate sensitivity at or below the reporting limit.

*=This limit was used in the evaluation of the final result

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# Analysis Report

**Sample Description:** **3G-11-111417 Grab Groundwater**
**Lockheed Martin, Burlington**

**Project Name:** **Lockheed Martin - Burlington, MA**

Submittal Date/Time: 11/16/2017 09:40
Collection Date/Time: 11/14/2017 16:20
SDG#: LMB08-08

**Tetra Tech, Inc.**
**ELLE Sample #: WW 9322175**
**ELLE Group #: 1876333**
**Matrix: Groundwater**

| CAT No. | Analysis Name | CAS Number | Result | Method Detection Limit* | Limit of Quantitation | Dilution Factor |
|---|---|---|---|---|---|---|
| **GC/MS Semivolatiles** | **SW-846 8270D SIM** | | **ug/l** | **ug/l** | **ug/l** | |
| 14244 | **1,4-Dioxane** | 123-91-1 | **0.69** | 0.050 | 0.20 | 1 |

The MA MCP analyte list requirement was not met for Method 8270D.
The client requested analyte list was reported for this sample.
The project QA/QC requirements were not met.
Target analytes were detected in the method blank associated with the samples as noted on the QC Summary.
Samples could not be re-extracted due to insufficient sample.

## Sample Comments

State of Massachusetts Laboratory Non-Potable Water Certification M-PA009

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name | Method | Trial# | Batch# | Analysis Date and Time | Analyst | Dilution Factor |
|---|---|---|---|---|---|---|---|
| 11996 | VOCs- 25ml Water by 8260C | SW-846 8260C | 1 | I173321AA | 11/28/2017 14:04 | Kevin A Sposito | 1 |
| 01163 | GC/MS VOA Water Prep | SW-846 5030C | 1 | I173321AA | 11/28/2017 14:04 | Kevin A Sposito | 1 |
| 14244 | SIM SVOAs 8270D MINI | SW-846 8270D SIM | 1 | 17321WAK026 | 11/23/2017 06:54 | William H Saadeh | 1 |
| 10466 | BNA Water Extraction SIM | SW-846 3510C | 1 | 17321WAK026 | 11/18/2017 15:45 | Kate E Lutte | 1 |

*=This limit was used in the evaluation of the final result

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# Analysis Report

**Sample Description:** **EMW-3R-111417 Grab Groundwater**
**Lockheed Martin, Burlington**

**Project Name:** **Lockheed Martin - Burlington, MA**

Submittal Date/Time: 11/16/2017 09:40
Collection Date/Time: 11/14/2017 11:45
SDG#: LMB08-09

**Tetra Tech, Inc.**
**ELLE Sample #: WW 9322176**
**ELLE Group #: 1876333**
**Matrix: Groundwater**

| CAT No. | Analysis Name | CAS Number | Result | Method Detection Limit* | Limit of Quantitation | Dilution Factor |
|---|---|---|---|---|---|---|
| **GC/MS Volatiles** | **SW-846 8260C** | | **ug/l** | **ug/l** | **ug/l** | |
| 11996 | Acetone | 67-64-1 | N.D. | 3.0 | 5.0 | 1 |
| 11996 | t-Amyl methyl ether | 994-05-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Benzene | 71-43-2 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Bromobenzene | 108-86-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Bromochloromethane | 74-97-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Bromodichloromethane | 75-27-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Bromoform | 75-25-2 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Bromomethane | 74-83-9 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 2-Butanone | 78-93-3 | N.D. | 1.0 | 5.0 | 1 |
| 11996 | n-Butylbenzene | 104-51-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | sec-Butylbenzene | 135-98-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | tert-Butylbenzene | 98-06-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Carbon Disulfide | 75-15-0 | N.D. | 0.4 | 1.0 | 1 |
| 11996 | Carbon Tetrachloride | 56-23-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Chlorobenzene | 108-90-7 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Chloroethane | 75-00-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Chloroform | 67-66-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Chloromethane | 74-87-3 | N.D. | 0.2 | 0.5 | 1 |
| 11996 | 2-Chlorotoluene | 95-49-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 4-Chlorotoluene | 106-43-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dibromo-3-chloropropane | 96-12-8 | N.D. | 0.2 | 0.5 | 1 |
| 11996 | Dibromochloromethane | 124-48-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dibromoethane | 106-93-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Dibromomethane | 74-95-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dichlorobenzene | 95-50-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,3-Dichlorobenzene | 541-73-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,4-Dichlorobenzene | 106-46-7 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Dichlorodifluoromethane | 75-71-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | **1,1-Dichloroethane** | 75-34-3 | **0.8** | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dichloroethane | 107-06-2 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | **1,1-Dichloroethene** | 75-35-4 | **1.7** | 0.1 | 0.5 | 1 |
| 11996 | **cis-1,2-Dichloroethene** | 156-59-2 | **3.6** | 0.1 | 0.5 | 1 |
| 11996 | trans-1,2-Dichloroethene | 156-60-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dichloropropane | 78-87-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,3-Dichloropropane | 142-28-9 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 2,2-Dichloropropane | 594-20-7 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1-Dichloropropene | 563-58-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | cis-1,3-Dichloropropene | 10061-01-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | trans-1,3-Dichloropropene | 10061-02-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,4-Dioxane | 123-91-1 | N.D. | 20 | 100 | 1 |
| 11996 | Ethyl ether | 60-29-7 | N.D. | 0.1 | 0.5 | 1 |

*=This limit was used in the evaluation of the final result

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# Analysis Report

**Sample Description:** **EMW-3R-111417 Grab Groundwater Lockheed Martin, Burlington**

**Project Name:** **Lockheed Martin - Burlington, MA**

Submittal Date/Time: 11/16/2017 09:40
Collection Date/Time: 11/14/2017 11:45
SDG#: LMB08-09

**Tetra Tech, Inc.**
**ELLE Sample #: WW 9322176**
**ELLE Group #: 1876333**
**Matrix: Groundwater**

| CAT No. | Analysis Name | CAS Number | Result | | Method Detection Limit* | Limit of Quantitation | Dilution Factor |
|---|---|---|---|---|---|---|---|
| **GC/MS Volatiles** | **SW-846 8260C** | | **ug/l** | | **ug/l** | **ug/l** | |
| 11996 | Ethyl t-butyl ether | 637-92-3 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Ethylbenzene | 100-41-4 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Hexachlorobutadiene | 87-68-3 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 2-Hexanone | 591-78-6 | N.D. | | 1.0 | 5.0 | 1 |
| 11996 | di-Isopropyl Ether | 108-20-3 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Isopropylbenzene | 98-82-8 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | p-Isopropyltoluene | 99-87-6 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | **Methyl Tertiary Butyl Ether** | 1634-04-4 | **0.2** | **J** | 0.1 | 0.5 | 1 |
| 11996 | 4-Methyl-2-Pentanone | 108-10-1 | N.D. | | 1.0 | 5.0 | 1 |
| 11996 | Methylene Chloride | 75-09-2 | N.D. | | 0.2 | 0.5 | 1 |
| 11996 | Naphthalene | 91-20-3 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | n-Propylbenzene | 103-65-1 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Styrene | 100-42-5 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,1,1,2-Tetrachloroethane | 630-20-6 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,1,2,2-Tetrachloroethane | 79-34-5 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | **Tetrachloroethene** | 127-18-4 | **3.4** | | 0.1 | 0.5 | 1 |
| 11996 | Tetrahydrofuran | 109-99-9 | N.D. | | 2.0 | 5.0 | 1 |
| 11996 | Toluene | 108-88-3 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,2,3-Trichlorobenzene | 87-61-6 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,2,4-Trichlorobenzene | 120-82-1 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,1,1-Trichloroethane | 71-55-6 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,1,2-Trichloroethane | 79-00-5 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | **Trichloroethene** | 79-01-6 | **11** | | 0.1 | 0.5 | 1 |
| 11996 | Trichlorofluoromethane | 75-69-4 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,2,3-Trichloropropane | 96-18-4 | N.D. | | 0.3 | 1.0 | 1 |
| 11996 | 1,2,4-Trimethylbenzene | 95-63-6 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,3,5-Trimethylbenzene | 108-67-8 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Vinyl Chloride | 75-01-4 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | m+p-Xylene | 179601-23-1 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | o-Xylene | 95-47-6 | N.D. | | 0.1 | 0.5 | 1 |

The percent drift for the following is >20% in the continuing calibration verification standard associated with this sample: Dichlorodifluoromethane

The percent recovery for Dichlorodifluoromethane is outside of the 70 - 130% QC windows in the LCS and/or LCSD associated with this sample. Dichlorodifluoromethane is considered a difficult analyte and the percent recovery is within the allowed 40 - 160% window.

A Method Detection Limit (MDL) standard is analyzed to confirm sensitivity of the instrument for samples with non-detect analytes associated with a continuing calibration verification standard exhibiting low response (outside the 20%D criteria). The MDL standard shows adequate sensitivity at or below the reporting limit.

*=This limit was used in the evaluation of the final result

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# Analysis Report

**Sample Description:** **EMW-3R-111417 Grab Groundwater**
**Lockheed Martin, Burlington**

**Project Name:** **Lockheed Martin - Burlington, MA**

Submittal Date/Time: 11/16/2017 09:40
Collection Date/Time: 11/14/2017 11:45
SDG#: LMB08-09

**Tetra Tech, Inc.**
**ELLE Sample #: WW 9322176**
**ELLE Group #: 1876333**
**Matrix: Groundwater**

| CAT No. | Analysis Name | CAS Number | Result | Method Detection Limit* | Limit of Quantitation | Dilution Factor |
|---|---|---|---|---|---|---|
| **GC/MS Semivolatiles** | **SW-846 8270D SIM** | | **ug/l** | **ug/l** | **ug/l** | |
| 14244 | **1,4-Dioxane** | 123-91-1 | **0.20** | 0.050 | 0.20 | 1 |

The MA MCP analyte list requirement was not met for Method 8270D.
The client requested analyte list was reported for this sample.
The project QA/QC requirements were not met.
Target analytes were detected in the method blank associated with the samples as noted on the QC Summary.
Samples could not be re-extracted due to insufficient sample.

## Sample Comments

State of Massachusetts Laboratory Non-Potable Water Certification M-PA009

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name | Method | Trial# | Batch# | Analysis Date and Time | Analyst | Dilution Factor |
|---|---|---|---|---|---|---|---|
| 11996 | VOCs- 25ml Water by 8260C | SW-846 8260C | 1 | I173321AA | 11/28/2017 14:25 | Kevin A Sposito | 1 |
| 01163 | GC/MS VOA Water Prep | SW-846 5030C | 1 | I173321AA | 11/28/2017 14:25 | Kevin A Sposito | 1 |
| 14244 | SIM SVOAs 8270D MINI | SW-846 8270D SIM | 1 | 17321WAK026 | 11/23/2017 07:22 | William H Saadeh | 1 |
| 10466 | BNA Water Extraction SIM | SW-846 3510C | 1 | 17321WAK026 | 11/18/2017 15:45 | Kate E Lutte | 1 |

*=This limit was used in the evaluation of the final result

**Sample Description:** **EMW-7-111417 Grab Groundwater**
**Lockheed Martin, Burlington**

**Project Name:** **Lockheed Martin - Burlington, MA**

Submittal Date/Time: 11/16/2017 09:40
Collection Date/Time: 11/14/2017 14:35
SDG#: LMB08-10

**Tetra Tech, Inc.**
**ELLE Sample #: WW 9322177**
**ELLE Group #: 1876333**
**Matrix: Groundwater**

| CAT No. | Analysis Name | CAS Number | Result | Method Detection Limit* | Limit of Quantitation | Dilution Factor |
|---|---|---|---|---|---|---|
| **GC/MS Volatiles** | **SW-846 8260C** | | **ug/l** | **ug/l** | **ug/l** | |
| 11996 | Acetone | 67-64-1 | N.D. | 3.0 | 5.0 | 1 |
| 11996 | t-Amyl methyl ether | 994-05-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Benzene | 71-43-2 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Bromobenzene | 108-86-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Bromochloromethane | 74-97-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Bromodichloromethane | 75-27-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Bromoform | 75-25-2 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Bromomethane | 74-83-9 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 2-Butanone | 78-93-3 | N.D. | 1.0 | 5.0 | 1 |
| 11996 | n-Butylbenzene | 104-51-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | sec-Butylbenzene | 135-98-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | tert-Butylbenzene | 98-06-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Carbon Disulfide | 75-15-0 | N.D. | 0.4 | 1.0 | 1 |
| 11996 | Carbon Tetrachloride | 56-23-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Chlorobenzene | 108-90-7 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Chloroethane | 75-00-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Chloroform | 67-66-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Chloromethane | 74-87-3 | N.D. | 0.2 | 0.5 | 1 |
| 11996 | 2-Chlorotoluene | 95-49-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 4-Chlorotoluene | 106-43-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dibromo-3-chloropropane | 96-12-8 | N.D. | 0.2 | 0.5 | 1 |
| 11996 | Dibromochloromethane | 124-48-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dibromoethane | 106-93-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Dibromomethane | 74-95-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dichlorobenzene | 95-50-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,3-Dichlorobenzene | 541-73-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,4-Dichlorobenzene | 106-46-7 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Dichlorodifluoromethane | 75-71-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1-Dichloroethane | 75-34-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dichloroethane | 107-06-2 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1-Dichloroethene | 75-35-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | **cis-1,2-Dichloroethene** | 156-59-2 | **0.1 J** | 0.1 | 0.5 | 1 |
| 11996 | trans-1,2-Dichloroethene | 156-60-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dichloropropane | 78-87-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,3-Dichloropropane | 142-28-9 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 2,2-Dichloropropane | 594-20-7 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1-Dichloropropene | 563-58-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | cis-1,3-Dichloropropene | 10061-01-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | trans-1,3-Dichloropropene | 10061-02-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,4-Dioxane | 123-91-1 | N.D. | 20 | 100 | 1 |
| 11996 | Ethyl ether | 60-29-7 | N.D. | 0.1 | 0.5 | 1 |

*=This limit was used in the evaluation of the final result

**Sample Description:** **EMW-7-111417 Grab Groundwater**
**Lockheed Martin, Burlington**

**Project Name:** **Lockheed Martin - Burlington, MA**

Submittal Date/Time: 11/16/2017 09:40
Collection Date/Time: 11/14/2017 14:35
SDG#: LMB08-10

**Tetra Tech, Inc.**
**ELLE Sample #: WW 9322177**
**ELLE Group #: 1876333**
**Matrix: Groundwater**

| CAT No. | Analysis Name | CAS Number | Result | | Method Detection Limit* | Limit of Quantitation | Dilution Factor |
|---|---|---|---|---|---|---|---|
| **GC/MS Volatiles** | **SW-846 8260C** | | **ug/l** | | **ug/l** | **ug/l** | |
| 11996 | Ethyl t-butyl ether | 637-92-3 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Ethylbenzene | 100-41-4 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Hexachlorobutadiene | 87-68-3 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 2-Hexanone | 591-78-6 | N.D. | | 1.0 | 5.0 | 1 |
| 11996 | di-Isopropyl Ether | 108-20-3 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Isopropylbenzene | 98-82-8 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | p-Isopropyltoluene | 99-87-6 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Methyl Tertiary Butyl Ether | 1634-04-4 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 4-Methyl-2-Pentanone | 108-10-1 | N.D. | | 1.0 | 5.0 | 1 |
| 11996 | Methylene Chloride | 75-09-2 | N.D. | | 0.2 | 0.5 | 1 |
| 11996 | Naphthalene | 91-20-3 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | n-Propylbenzene | 103-65-1 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Styrene | 100-42-5 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,1,1,2-Tetrachloroethane | 630-20-6 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,1,2,2-Tetrachloroethane | 79-34-5 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | **Tetrachloroethene** | 127-18-4 | **1.2** | | 0.1 | 0.5 | 1 |
| 11996 | Tetrahydrofuran | 109-99-9 | N.D. | | 2.0 | 5.0 | 1 |
| 11996 | Toluene | 108-88-3 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,2,3-Trichlorobenzene | 87-61-6 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,2,4-Trichlorobenzene | 120-82-1 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,1,1-Trichloroethane | 71-55-6 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,1,2-Trichloroethane | 79-00-5 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | **Trichloroethene** | 79-01-6 | **0.2** | **J** | 0.1 | 0.5 | 1 |
| 11996 | Trichlorofluoromethane | 75-69-4 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,2,3-Trichloropropane | 96-18-4 | N.D. | | 0.3 | 1.0 | 1 |
| 11996 | 1,2,4-Trimethylbenzene | 95-63-6 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,3,5-Trimethylbenzene | 108-67-8 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Vinyl Chloride | 75-01-4 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | m+p-Xylene | 179601-23-1 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | o-Xylene | 95-47-6 | N.D. | | 0.1 | 0.5 | 1 |

The percent drift for the following is >20% in the continuing calibration verification standard associated with this sample:
Dichlorodifluoromethane

The percent recovery for Dichlorodifluoromethane is outside of the 70 - 130% QC windows in the LCS and/or LCSD associated with this sample. Dichlorodifluoromethane is considered a difficult analyte and the percent recovery is within the allowed 40 - 160% window.

A Method Detection Limit (MDL) standard is analyzed to confirm sensitivity of the instrument for samples with non-detect analytes associated with a continuing calibration verification standard exhibiting low response (outside the 20%D criteria). The MDL standard shows adequate sensitivity at or below the reporting limit.

*=This limit was used in the evaluation of the final result

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# Analysis Report

**Sample Description:** **EMW-7-111417 Grab Groundwater**
**Lockheed Martin, Burlington**

**Project Name:** **Lockheed Martin - Burlington, MA**

Submittal Date/Time: 11/16/2017 09:40
Collection Date/Time: 11/14/2017 14:35
SDG#: LMB08-10

**Tetra Tech, Inc.**
**ELLE Sample #: WW 9322177**
**ELLE Group #: 1876333**
**Matrix: Groundwater**

| CAT No. | Analysis Name | CAS Number | Result | Method Detection Limit* | Limit of Quantitation | Dilution Factor |
|---|---|---|---|---|---|---|
| **GC/MS Semivolatiles** | **SW-846 8270D SIM** | | **ug/l** | **ug/l** | **ug/l** | |
| 14244 | **1,4-Dioxane** | 123-91-1 | **0.057 J** | 0.050 | 0.20 | 1 |

The MA MCP analyte list requirement was not met for Method 8270D.
The client requested analyte list was reported for this sample.
The project QA/QC requirements were not met.
Target analytes were detected in the method blank associated with the samples as noted on the QC Summary.
Samples could not be re-extracted due to insufficient sample.

## Sample Comments

State of Massachusetts Laboratory Non-Potable Water Certification M-PA009

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name | Method | Trial# | Batch# | Analysis Date and Time | Analyst | Dilution Factor |
|---|---|---|---|---|---|---|---|
| 11996 | VOCs- 25ml Water by 8260C | SW-846 8260C | 1 | I173321AA | 11/28/2017 14:47 | Kevin A Sposito | 1 |
| 01163 | GC/MS VOA Water Prep | SW-846 5030C | 1 | I173321AA | 11/28/2017 14:47 | Kevin A Sposito | 1 |
| 14244 | SIM SVOAs 8270D MINI | SW-846 8270D SIM | 1 | 17321WAK026 | 11/23/2017 07:50 | William H Saadeh | 1 |
| 10466 | BNA Water Extraction SIM | SW-846 3510C | 1 | 17321WAK026 | 11/18/2017 15:45 | Kate E Lutte | 1 |

*=This limit was used in the evaluation of the final result

**Sample Description:** **EMW-10D-111417 Grab Groundwater**
**Lockheed Martin, Burlington**

**Project Name:** **Lockheed Martin - Burlington, MA**

Submittal Date/Time: 11/16/2017 09:40
Collection Date/Time: 11/14/2017 13:10
SDG#: LMB08-11

**Tetra Tech, Inc.**
**ELLE Sample #: WW 9322178**
**ELLE Group #: 1876333**
**Matrix: Groundwater**

| CAT No. | Analysis Name | CAS Number | Result | Method Detection Limit* | Limit of Quantitation | Dilution Factor |
|---|---|---|---|---|---|---|
| **GC/MS Volatiles** | **SW-846 8260C** | | **ug/l** | **ug/l** | **ug/l** | |
| 11996 | Acetone | 67-64-1 | N.D. | 3.0 | 5.0 | 1 |
| 11996 | t-Amyl methyl ether | 994-05-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Benzene | 71-43-2 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Bromobenzene | 108-86-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Bromochloromethane | 74-97-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Bromodichloromethane | 75-27-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Bromoform | 75-25-2 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Bromomethane | 74-83-9 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 2-Butanone | 78-93-3 | N.D. | 1.0 | 5.0 | 1 |
| 11996 | n-Butylbenzene | 104-51-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | sec-Butylbenzene | 135-98-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | tert-Butylbenzene | 98-06-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Carbon Disulfide | 75-15-0 | N.D. | 0.4 | 1.0 | 1 |
| 11996 | Carbon Tetrachloride | 56-23-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Chlorobenzene | 108-90-7 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Chloroethane | 75-00-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Chloroform | 67-66-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Chloromethane | 74-87-3 | N.D. | 0.2 | 0.5 | 1 |
| 11996 | 2-Chlorotoluene | 95-49-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 4-Chlorotoluene | 106-43-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dibromo-3-chloropropane | 96-12-8 | N.D. | 0.2 | 0.5 | 1 |
| 11996 | Dibromochloromethane | 124-48-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dibromoethane | 106-93-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Dibromomethane | 74-95-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dichlorobenzene | 95-50-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,3-Dichlorobenzene | 541-73-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,4-Dichlorobenzene | 106-46-7 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Dichlorodifluoromethane | 75-71-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | **1,1-Dichloroethane** | 75-34-3 | **0.2 J** | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dichloroethane | 107-06-2 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | **1,1-Dichloroethene** | 75-35-4 | **0.2 J** | 0.1 | 0.5 | 1 |
| 11996 | **cis-1,2-Dichloroethene** | 156-59-2 | **0.4 J** | 0.1 | 0.5 | 1 |
| 11996 | trans-1,2-Dichloroethene | 156-60-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dichloropropane | 78-87-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,3-Dichloropropane | 142-28-9 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 2,2-Dichloropropane | 594-20-7 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1-Dichloropropene | 563-58-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | cis-1,3-Dichloropropene | 10061-01-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | trans-1,3-Dichloropropene | 10061-02-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,4-Dioxane | 123-91-1 | N.D. | 20 | 100 | 1 |
| 11996 | Ethyl ether | 60-29-7 | N.D. | 0.1 | 0.5 | 1 |

*=This limit was used in the evaluation of the final result

**Sample Description:** **EMW-10D-111417 Grab Groundwater Lockheed Martin, Burlington**

**Project Name:** **Lockheed Martin - Burlington, MA**

Submittal Date/Time: 11/16/2017 09:40
Collection Date/Time: 11/14/2017 13:10
SDG#: LMB08-11

**Tetra Tech, Inc.**
**ELLE Sample #: WW 9322178**
**ELLE Group #: 1876333**
**Matrix: Groundwater**

| CAT No. | Analysis Name | CAS Number | Result | | Method Detection Limit* | Limit of Quantitation | Dilution Factor |
|---|---|---|---|---|---|---|---|
| **GC/MS Volatiles** | **SW-846 8260C** | | **ug/l** | | **ug/l** | **ug/l** | |
| 11996 | Ethyl t-butyl ether | 637-92-3 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Ethylbenzene | 100-41-4 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Hexachlorobutadiene | 87-68-3 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 2-Hexanone | 591-78-6 | N.D. | | 1.0 | 5.0 | 1 |
| 11996 | di-Isopropyl Ether | 108-20-3 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Isopropylbenzene | 98-82-8 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | p-Isopropyltoluene | 99-87-6 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | **Methyl Tertiary Butyl Ether** | 1634-04-4 | **0.3** | **J** | 0.1 | 0.5 | 1 |
| 11996 | 4-Methyl-2-Pentanone | 108-10-1 | N.D. | | 1.0 | 5.0 | 1 |
| 11996 | Methylene Chloride | 75-09-2 | N.D. | | 0.2 | 0.5 | 1 |
| 11996 | Naphthalene | 91-20-3 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | n-Propylbenzene | 103-65-1 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Styrene | 100-42-5 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,1,1,2-Tetrachloroethane | 630-20-6 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,1,2,2-Tetrachloroethane | 79-34-5 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | **Tetrachloroethene** | 127-18-4 | **0.7** | | 0.1 | 0.5 | 1 |
| 11996 | Tetrahydrofuran | 109-99-9 | N.D. | | 2.0 | 5.0 | 1 |
| 11996 | Toluene | 108-88-3 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,2,3-Trichlorobenzene | 87-61-6 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,2,4-Trichlorobenzene | 120-82-1 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | **1,1,1-Trichloroethane** | 71-55-6 | **0.2** | **J** | 0.1 | 0.5 | 1 |
| 11996 | 1,1,2-Trichloroethane | 79-00-5 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | **Trichloroethene** | 79-01-6 | **2.3** | | 0.1 | 0.5 | 1 |
| 11996 | Trichlorofluoromethane | 75-69-4 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,2,3-Trichloropropane | 96-18-4 | N.D. | | 0.3 | 1.0 | 1 |
| 11996 | 1,2,4-Trimethylbenzene | 95-63-6 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,3,5-Trimethylbenzene | 108-67-8 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Vinyl Chloride | 75-01-4 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | m+p-Xylene | 179601-23-1 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | o-Xylene | 95-47-6 | N.D. | | 0.1 | 0.5 | 1 |

The percent drift for the following is >20% in the continuing calibration verification standard associated with this sample: Dichlorodifluoromethane

The percent recovery for Dichlorodifluoromethane is outside of the 70 - 130% QC windows in the LCS and/or LCSD associated with this sample. Dichlorodifluoromethane is considered a difficult analyte and the percent recovery is within the allowed 40 - 160% window.

A Method Detection Limit (MDL) standard is analyzed to confirm sensitivity of the instrument for samples with non-detect analytes associated with a continuing calibration verification standard exhibiting low response (outside the 20%D criteria). The MDL standard shows adequate sensitivity at or below the reporting limit.

*=This limit was used in the evaluation of the final result

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# Analysis Report

**Sample Description:** **EMW-10D-111417 Grab Groundwater**
**Lockheed Martin, Burlington**

**Project Name:** **Lockheed Martin - Burlington, MA**

Submittal Date/Time: 11/16/2017 09:40
Collection Date/Time: 11/14/2017 13:10
SDG#: LMB08-11

**Tetra Tech, Inc.**
**ELLE Sample #: WW 9322178**
**ELLE Group #: 1876333**
**Matrix: Groundwater**

| CAT No. | Analysis Name | CAS Number | Result | Method Detection Limit* | Limit of Quantitation | Dilution Factor |
|---|---|---|---|---|---|---|
| **GC/MS Semivolatiles** | **SW-846 8270D SIM** | | **ug/l** | **ug/l** | **ug/l** | |
| 14244 | **1,4-Dioxane** | 123-91-1 | **0.10 J** | 0.050 | 0.20 | 1 |

The MA MCP analyte list requirement was not met for Method 8270D.
The client requested analyte list was reported for this sample.
The project QA/QC requirements were not met.
Target analytes were detected in the method blank associated with the samples as noted on the QC Summary.
Samples could not be re-extracted due to insufficient sample.

## Sample Comments

State of Massachusetts Laboratory Non-Potable Water Certification M-PA009

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name | Method | Trial# | Batch# | Analysis Date and Time | Analyst | Dilution Factor |
|---|---|---|---|---|---|---|---|
| 11996 | VOCs- 25ml Water by 8260C | SW-846 8260C | 1 | I173321AA | 11/28/2017 17:37 | Kevin A Sposito | 1 |
| 01163 | GC/MS VOA Water Prep | SW-846 5030C | 1 | I173321AA | 11/28/2017 17:37 | Kevin A Sposito | 1 |
| 14244 | SIM SVOAs 8270D MINI | SW-846 8270D SIM | 1 | 17321WAK026 | 11/23/2017 08:18 | William H Saadeh | 1 |
| 10466 | BNA Water Extraction SIM | SW-846 3510C | 1 | 17321WAK026 | 11/18/2017 15:45 | Kate E Lutte | 1 |

*=This limit was used in the evaluation of the final result

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# Analysis Report

**Sample Description:** **3H-5-111517 Grab Groundwater**
**Lockheed Martin, Burlington**

**Project Name:** **Lockheed Martin - Burlington, MA**

Submittal Date/Time: 11/16/2017 09:40
Collection Date/Time: 11/15/2017 10:45
SDG#: LMB08-12

**Tetra Tech, Inc.**
**ELLE Sample #: WW 9322179**
**ELLE Group #: 1876333**
**Matrix: Groundwater**

| CAT No. | Analysis Name | CAS Number | Result | Method Detection Limit* | Limit of Quantitation | Dilution Factor |
|---|---|---|---|---|---|---|
| **GC/MS Volatiles** | **SW-846 8260C** | | **ug/l** | **ug/l** | **ug/l** | |
| 11996 | Acetone | 67-64-1 | N.D. | 3.0 | 5.0 | 1 |
| 11996 | t-Amyl methyl ether | 994-05-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Benzene | 71-43-2 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Bromobenzene | 108-86-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Bromochloromethane | 74-97-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Bromodichloromethane | 75-27-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Bromoform | 75-25-2 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Bromomethane | 74-83-9 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 2-Butanone | 78-93-3 | N.D. | 1.0 | 5.0 | 1 |
| 11996 | n-Butylbenzene | 104-51-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | sec-Butylbenzene | 135-98-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | tert-Butylbenzene | 98-06-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Carbon Disulfide | 75-15-0 | N.D. | 0.4 | 1.0 | 1 |
| 11996 | Carbon Tetrachloride | 56-23-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Chlorobenzene | 108-90-7 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Chloroethane | 75-00-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Chloroform | 67-66-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Chloromethane | 74-87-3 | N.D. | 0.2 | 0.5 | 1 |
| 11996 | 2-Chlorotoluene | 95-49-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 4-Chlorotoluene | 106-43-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dibromo-3-chloropropane | 96-12-8 | N.D. | 0.2 | 0.5 | 1 |
| 11996 | Dibromochloromethane | 124-48-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dibromoethane | 106-93-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Dibromomethane | 74-95-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dichlorobenzene | 95-50-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,3-Dichlorobenzene | 541-73-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,4-Dichlorobenzene | 106-46-7 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Dichlorodifluoromethane | 75-71-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | **1,1-Dichloroethane** | 75-34-3 | **1.4** | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dichloroethane | 107-06-2 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | **1,1-Dichloroethene** | 75-35-4 | **3.4** | 0.1 | 0.5 | 1 |
| 11996 | **cis-1,2-Dichloroethene** | 156-59-2 | **0.2 J** | 0.1 | 0.5 | 1 |
| 11996 | trans-1,2-Dichloroethene | 156-60-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dichloropropane | 78-87-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,3-Dichloropropane | 142-28-9 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 2,2-Dichloropropane | 594-20-7 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1-Dichloropropene | 563-58-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | cis-1,3-Dichloropropene | 10061-01-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | trans-1,3-Dichloropropene | 10061-02-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,4-Dioxane | 123-91-1 | N.D. | 20 | 100 | 1 |
| 11996 | Ethyl ether | 60-29-7 | N.D. | 0.1 | 0.5 | 1 |

*=This limit was used in the evaluation of the final result

**Sample Description:** **3H-5-111517 Grab Groundwater Lockheed Martin, Burlington**

**Project Name:** **Lockheed Martin - Burlington, MA**

Submittal Date/Time: 11/16/2017 09:40
Collection Date/Time: 11/15/2017 10:45
SDG#: LMB08-12

**Tetra Tech, Inc.**
**ELLE Sample #: WW 9322179**
**ELLE Group #: 1876333**
**Matrix: Groundwater**

| CAT No. | Analysis Name | CAS Number | Result | Method Detection Limit* | Limit of Quantitation | Dilution Factor |
|---|---|---|---|---|---|---|
| **GC/MS Volatiles** | **SW-846 8260C** | | **ug/l** | **ug/l** | **ug/l** | |
| 11996 | Ethyl t-butyl ether | 637-92-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Ethylbenzene | 100-41-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Hexachlorobutadiene | 87-68-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 2-Hexanone | 591-78-6 | N.D. | 1.0 | 5.0 | 1 |
| 11996 | di-Isopropyl Ether | 108-20-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Isopropylbenzene | 98-82-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | p-Isopropyltoluene | 99-87-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Methyl Tertiary Butyl Ether | 1634-04-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 4-Methyl-2-Pentanone | 108-10-1 | N.D. | 1.0 | 5.0 | 1 |
| 11996 | Methylene Chloride | 75-09-2 | N.D. | 0.2 | 0.5 | 1 |
| 11996 | Naphthalene | 91-20-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | n-Propylbenzene | 103-65-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Styrene | 100-42-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1,1,2-Tetrachloroethane | 630-20-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1,2,2-Tetrachloroethane | 79-34-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Tetrachloroethene | 127-18-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Tetrahydrofuran | 109-99-9 | N.D. | 2.0 | 5.0 | 1 |
| 11996 | Toluene | 108-88-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2,3-Trichlorobenzene | 87-61-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2,4-Trichlorobenzene | 120-82-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1,1-Trichloroethane | 71-55-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1,2-Trichloroethane | 79-00-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | **Trichloroethene** | 79-01-6 | **1.0** | 0.1 | 0.5 | 1 |
| 11996 | Trichlorofluoromethane | 75-69-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2,3-Trichloropropane | 96-18-4 | N.D. | 0.3 | 1.0 | 1 |
| 11996 | 1,2,4-Trimethylbenzene | 95-63-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,3,5-Trimethylbenzene | 108-67-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Vinyl Chloride | 75-01-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | m+p-Xylene | 179601-23-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | o-Xylene | 95-47-6 | N.D. | 0.1 | 0.5 | 1 |

The percent drift for the following is >20% in the continuing calibration verification standard associated with this sample: Dichlorodifluoromethane

The percent recovery for Dichlorodifluoromethane is outside of the 70 - 130% QC windows in the LCS and/or LCSD associated with this sample. Dichlorodifluoromethane is considered a difficult analyte and the percent recovery is within the allowed 40 - 160% window.

A Method Detection Limit (MDL) standard is analyzed to confirm sensitivity of the instrument for samples with non-detect analytes associated with a continuing calibration verification standard exhibiting low response (outside the 20%D criteria). The MDL standard shows adequate sensitivity at or below the reporting limit.

*=This limit was used in the evaluation of the final result

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# Analysis Report

**Sample Description:** **3H-5-111517 Grab Groundwater**
**Lockheed Martin, Burlington**

**Project Name:** **Lockheed Martin - Burlington, MA**

Submittal Date/Time: 11/16/2017 09:40
Collection Date/Time: 11/15/2017 10:45
SDG#: LMB08-12

**Tetra Tech, Inc.**
**ELLE Sample #: WW 9322179**
**ELLE Group #: 1876333**
**Matrix: Groundwater**

| CAT No. | Analysis Name | CAS Number | Result | Method Detection Limit* | Limit of Quantitation | Dilution Factor |
|---|---|---|---|---|---|---|
| **GC/MS Semivolatiles** | **SW-846 8270D SIM** | | **ug/l** | **ug/l** | **ug/l** | |
| 14244 | **1,4-Dioxane** | 123-91-1 | **0.30** | 0.050 | 0.20 | 1 |

The MA MCP analyte list requirement was not met for Method 8270D.
The client requested analyte list was reported for this sample.

Target analytes were detected in the method blank associated with the samples as noted on the QC Summary. The following corrective action was taken:
The sample was re-extracted outside the method required holding time and the QC is compliant. All results are reported from the first trial. Similar results were obtained in both trials.

## Sample Comments

State of Massachusetts Laboratory Non-Potable Water Certification M-PA009

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name | Method | Trial# | Batch# | Analysis Date and Time | Analyst | Dilution Factor |
|---|---|---|---|---|---|---|---|
| 11996 | VOCs- 25ml Water by 8260C | SW-846 8260C | 1 | I173321AA | 11/28/2017 15:30 | Kevin A Sposito | 1 |
| 01163 | GC/MS VOA Water Prep | SW-846 5030C | 1 | I173321AA | 11/28/2017 15:30 | Kevin A Sposito | 1 |
| 14244 | SIM SVOAs 8270D MINI | SW-846 8270D SIM | 1 | 17321WAK026 | 11/23/2017 08:46 | William H Saadeh | 1 |
| 10466 | BNA Water Extraction SIM | SW-846 3510C | 1 | 17321WAK026 | 11/18/2017 15:45 | Kate E Lutte | 1 |

*=This limit was used in the evaluation of the final result

**Sample Description:** **3G-12-111517 Grab Groundwater Lockheed Martin, Burlington**

**Project Name:** **Lockheed Martin - Burlington, MA**

Submittal Date/Time: 11/16/2017 09:40
Collection Date/Time: 11/15/2017 12:05
SDG#: LMB08-13

**Tetra Tech, Inc.**
**ELLE Sample #: WW 9322180**
**ELLE Group #: 1876333**
**Matrix: Groundwater**

| CAT No. | Analysis Name | CAS Number | Result | | Method Detection Limit* | Limit of Quantitation | Dilution Factor |
|---|---|---|---|---|---|---|---|
| **GC/MS Volatiles** | **SW-846 8260C** | | **ug/l** | | **ug/l** | **ug/l** | |
| 11996 | Acetone | 67-64-1 | N.D. | | 3.0 | 5.0 | 1 |
| 11996 | t-Amyl methyl ether | 994-05-8 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Benzene | 71-43-2 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Bromobenzene | 108-86-1 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Bromochloromethane | 74-97-5 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Bromodichloromethane | 75-27-4 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Bromoform | 75-25-2 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Bromomethane | 74-83-9 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 2-Butanone | 78-93-3 | N.D. | | 1.0 | 5.0 | 1 |
| 11996 | n-Butylbenzene | 104-51-8 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | sec-Butylbenzene | 135-98-8 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | tert-Butylbenzene | 98-06-6 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Carbon Disulfide | 75-15-0 | N.D. | | 0.4 | 1.0 | 1 |
| 11996 | Carbon Tetrachloride | 56-23-5 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Chlorobenzene | 108-90-7 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Chloroethane | 75-00-3 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Chloroform | 67-66-3 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Chloromethane | 74-87-3 | N.D. | | 0.2 | 0.5 | 1 |
| 11996 | 2-Chlorotoluene | 95-49-8 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 4-Chlorotoluene | 106-43-4 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dibromo-3-chloropropane | 96-12-8 | N.D. | | 0.2 | 0.5 | 1 |
| 11996 | Dibromochloromethane | 124-48-1 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dibromoethane | 106-93-4 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Dibromomethane | 74-95-3 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dichlorobenzene | 95-50-1 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,3-Dichlorobenzene | 541-73-1 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,4-Dichlorobenzene | 106-46-7 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Dichlorodifluoromethane | 75-71-8 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | **1,1-Dichloroethane** | 75-34-3 | **0.3** | **J** | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dichloroethane | 107-06-2 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | **1,1-Dichloroethene** | 75-35-4 | **0.9** | | 0.1 | 0.5 | 1 |
| 11996 | **cis-1,2-Dichloroethene** | 156-59-2 | **0.5** | | 0.1 | 0.5 | 1 |
| 11996 | trans-1,2-Dichloroethene | 156-60-5 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dichloropropane | 78-87-5 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,3-Dichloropropane | 142-28-9 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 2,2-Dichloropropane | 594-20-7 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,1-Dichloropropene | 563-58-6 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | cis-1,3-Dichloropropene | 10061-01-5 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | trans-1,3-Dichloropropene | 10061-02-6 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,4-Dioxane | 123-91-1 | N.D. | | 20 | 100 | 1 |
| 11996 | Ethyl ether | 60-29-7 | N.D. | | 0.1 | 0.5 | 1 |

*=This limit was used in the evaluation of the final result

**Sample Description:** **3G-12-111517 Grab Groundwater Lockheed Martin, Burlington**

**Project Name:** **Lockheed Martin - Burlington, MA**

Submittal Date/Time: 11/16/2017 09:40
Collection Date/Time: 11/15/2017 12:05
SDG#: LMB08-13

**Tetra Tech, Inc.**
**ELLE Sample #: WW 9322180**
**ELLE Group #: 1876333**
**Matrix: Groundwater**

| CAT No. | Analysis Name | CAS Number | Result | Method Detection Limit* | Limit of Quantitation | Dilution Factor |
|---|---|---|---|---|---|---|
| **GC/MS Volatiles** | **SW-846 8260C** | | **ug/l** | **ug/l** | **ug/l** | |
| 11996 | Ethyl t-butyl ether | 637-92-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Ethylbenzene | 100-41-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Hexachlorobutadiene | 87-68-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 2-Hexanone | 591-78-6 | N.D. | 1.0 | 5.0 | 1 |
| 11996 | di-Isopropyl Ether | 108-20-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Isopropylbenzene | 98-82-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | p-Isopropyltoluene | 99-87-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Methyl Tertiary Butyl Ether | 1634-04-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 4-Methyl-2-Pentanone | 108-10-1 | N.D. | 1.0 | 5.0 | 1 |
| 11996 | Methylene Chloride | 75-09-2 | N.D. | 0.2 | 0.5 | 1 |
| 11996 | Naphthalene | 91-20-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | n-Propylbenzene | 103-65-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Styrene | 100-42-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1,1,2-Tetrachloroethane | 630-20-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1,2,2-Tetrachloroethane | 79-34-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | **Tetrachloroethene** | 127-18-4 | **1.6** | 0.1 | 0.5 | 1 |
| 11996 | Tetrahydrofuran | 109-99-9 | N.D. | 2.0 | 5.0 | 1 |
| 11996 | Toluene | 108-88-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2,3-Trichlorobenzene | 87-61-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2,4-Trichlorobenzene | 120-82-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1,1-Trichloroethane | 71-55-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1,2-Trichloroethane | 79-00-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | **Trichloroethene** | 79-01-6 | **2.2** | 0.1 | 0.5 | 1 |
| 11996 | Trichlorofluoromethane | 75-69-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2,3-Trichloropropane | 96-18-4 | N.D. | 0.3 | 1.0 | 1 |
| 11996 | 1,2,4-Trimethylbenzene | 95-63-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,3,5-Trimethylbenzene | 108-67-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Vinyl Chloride | 75-01-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | m+p-Xylene | 179601-23-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | o-Xylene | 95-47-6 | N.D. | 0.1 | 0.5 | 1 |

The percent drift for the following is >20% in the continuing calibration verification standard associated with this sample: Dichlorodifluoromethane

The percent recovery for Dichlorodifluoromethane is outside of the 70 - 130% QC windows in the LCS and/or LCSD associated with this sample. Dichlorodifluoromethane is considered a difficult analyte and the percent recovery is within the allowed 40 - 160% window.

A Method Detection Limit (MDL) standard is analyzed to confirm sensitivity of the instrument for samples with non-detect analytes associated with a continuing calibration verification standard exhibiting low response (outside the 20%D criteria). The MDL standard shows adequate sensitivity at or below the reporting limit.

*=This limit was used in the evaluation of the final result

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# Analysis Report

**Sample Description:** **3G-12-111517 Grab Groundwater Lockheed Martin, Burlington**

**Project Name:** **Lockheed Martin - Burlington, MA**

Submittal Date/Time: 11/16/2017 09:40
Collection Date/Time: 11/15/2017 12:05
SDG#: LMB08-13

**Tetra Tech, Inc.**
**ELLE Sample #: WW 9322180**
**ELLE Group #: 1876333**
**Matrix: Groundwater**

| CAT No. | Analysis Name | CAS Number | Result | Method Detection Limit* | Limit of Quantitation | Dilution Factor |
|---|---|---|---|---|---|---|
| **GC/MS Semivolatiles** | **SW-846 8270D SIM** | | **ug/l** | **ug/l** | **ug/l** | |
| 14244 | **1,4-Dioxane** | 123-91-1 | **0.11 J** | 0.050 | 0.20 | 1 |

The MA MCP analyte list requirement was not met for Method 8270D.
The client requested analyte list was reported for this sample.

Target analytes were detected in the method blank associated with the samples as noted on the QC Summary. The following corrective action was taken:
The sample was re-extracted outside the method required holding time and the QC is compliant. All results are reported from the first trial. Similar results were obtained in both trials with the exception of: 1,4-dioxane was not detected in the re-extract.

| | | | | | | |
|---|---|---|---|---|---|---|
| **GC Miscellaneous** | **RSKSOP-175 modified** | | **ug/l** | **ug/l** | **ug/l** | |
| 07105 | Methane | 74-82-8 | N.D. | 3.0 | 5.0 | 1 |
| **Wet Chemistry** | **EPA 300.0** | | **mg/l** | **mg/l** | **mg/l** | |
| 00368 | **Nitrate Nitrogen** | 14797-55-8 | **1.7** | 0.25 | 0.50 | 5 |
| 00228 | **Sulfate** | 14808-79-8 | **35.4** | 1.5 | 5.0 | 5 |
| | **SM 5310 C-2000** | | **mg/l** | **mg/l** | **mg/l** | |
| 00273 | **Total Organic Carbon** | n.a. | **2.6** | 0.50 | 1.0 | 1 |

## Sample Comments

State of Massachusetts Laboratory Non-Potable Water Certification M-PA009

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name | Method | Trial# | Batch# | Analysis Date and Time | Analyst | Dilution Factor |
|---|---|---|---|---|---|---|---|
| 11996 | VOCs- 25ml Water by 8260C | SW-846 8260C | 1 | I173321AA | 11/28/2017 15:51 | Kevin A Sposito | 1 |
| 01163 | GC/MS VOA Water Prep | SW-846 5030C | 1 | I173321AA | 11/28/2017 15:51 | Kevin A Sposito | 1 |
| 14244 | SIM SVOAs 8270D MINI | SW-846 8270D SIM | 1 | 17321WAK026 | 11/23/2017 09:14 | William H Saadeh | 1 |
| 10466 | BNA Water Extraction SIM | SW-846 3510C | 1 | 17321WAK026 | 11/18/2017 15:45 | Kate E Lutte | 1 |
| 07105 | Volatile Headspace Hydrocarbon | RSKSOP-175 modified | 1 | 173210013A | 11/17/2017 13:27 | Johanna C Kennedy | 1 |
| 00368 | Nitrate Nitrogen | EPA 300.0 | 1 | 17320120113A | 11/17/2017 00:41 | Hallie A Burnett | 5 |
| 00228 | Sulfate | EPA 300.0 | 1 | 17320120113A | 11/17/2017 00:41 | Hallie A Burnett | 5 |
| 00273 | Total Organic Carbon | SM 5310 C-2000 | 1 | 17324667606A | 11/21/2017 10:26 | Drew M Gerhart | 1 |

*=This limit was used in the evaluation of the final result

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# Analysis Report

**Sample Description:** **3G-12-D-111517 Grab Groundwater Lockheed Martin, Burlington**

**Project Name:** **Lockheed Martin - Burlington, MA**

Submittal Date/Time: 11/16/2017 09:40
Collection Date/Time: 11/15/2017 12:10
SDG#: LMB08-14FD

**Tetra Tech, Inc.**
**ELLE Sample #: WW 9322181**
**ELLE Group #: 1876333**
**Matrix: Groundwater**

| CAT No. | Analysis Name | CAS Number | Result | | Method Detection Limit* | Limit of Quantitation | Dilution Factor |
|---|---|---|---|---|---|---|---|
| **GC/MS Volatiles** | **SW-846 8260C** | | **ug/l** | | **ug/l** | **ug/l** | |
| 11996 | Acetone | 67-64-1 | N.D. | | 3.0 | 5.0 | 1 |
| 11996 | t-Amyl methyl ether | 994-05-8 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Benzene | 71-43-2 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Bromobenzene | 108-86-1 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Bromochloromethane | 74-97-5 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Bromodichloromethane | 75-27-4 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Bromoform | 75-25-2 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Bromomethane | 74-83-9 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 2-Butanone | 78-93-3 | N.D. | | 1.0 | 5.0 | 1 |
| 11996 | n-Butylbenzene | 104-51-8 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | sec-Butylbenzene | 135-98-8 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | tert-Butylbenzene | 98-06-6 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Carbon Disulfide | 75-15-0 | N.D. | | 0.4 | 1.0 | 1 |
| 11996 | Carbon Tetrachloride | 56-23-5 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Chlorobenzene | 108-90-7 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Chloroethane | 75-00-3 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Chloroform | 67-66-3 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Chloromethane | 74-87-3 | N.D. | | 0.2 | 0.5 | 1 |
| 11996 | 2-Chlorotoluene | 95-49-8 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 4-Chlorotoluene | 106-43-4 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dibromo-3-chloropropane | 96-12-8 | N.D. | | 0.2 | 0.5 | 1 |
| 11996 | Dibromochloromethane | 124-48-1 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dibromoethane | 106-93-4 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Dibromomethane | 74-95-3 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dichlorobenzene | 95-50-1 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,3-Dichlorobenzene | 541-73-1 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,4-Dichlorobenzene | 106-46-7 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Dichlorodifluoromethane | 75-71-8 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | **1,1-Dichloroethane** | 75-34-3 | **0.3** | **J** | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dichloroethane | 107-06-2 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | **1,1-Dichloroethene** | 75-35-4 | **0.9** | | 0.1 | 0.5 | 1 |
| 11996 | **cis-1,2-Dichloroethene** | 156-59-2 | **0.5** | | 0.1 | 0.5 | 1 |
| 11996 | trans-1,2-Dichloroethene | 156-60-5 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dichloropropane | 78-87-5 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,3-Dichloropropane | 142-28-9 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 2,2-Dichloropropane | 594-20-7 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,1-Dichloropropene | 563-58-6 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | cis-1,3-Dichloropropene | 10061-01-5 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | trans-1,3-Dichloropropene | 10061-02-6 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,4-Dioxane | 123-91-1 | N.D. | | 20 | 100 | 1 |
| 11996 | Ethyl ether | 60-29-7 | N.D. | | 0.1 | 0.5 | 1 |

*=This limit was used in the evaluation of the final result

**Sample Description:** **3G-12-D-111517 Grab Groundwater Lockheed Martin, Burlington**

**Project Name:** **Lockheed Martin - Burlington, MA**

Submittal Date/Time: 11/16/2017 09:40
Collection Date/Time: 11/15/2017 12:10
SDG#: LMB08-14FD

**Tetra Tech, Inc.**
**ELLE Sample #: WW 9322181**
**ELLE Group #: 1876333**
**Matrix: Groundwater**

| CAT No. | Analysis Name | CAS Number | Result | Method Detection Limit* | Limit of Quantitation | Dilution Factor |
|---|---|---|---|---|---|---|
| **GC/MS Volatiles** | **SW-846 8260C** | | **ug/l** | **ug/l** | **ug/l** | |
| 11996 | Ethyl t-butyl ether | 637-92-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Ethylbenzene | 100-41-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Hexachlorobutadiene | 87-68-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 2-Hexanone | 591-78-6 | N.D. | 1.0 | 5.0 | 1 |
| 11996 | di-Isopropyl Ether | 108-20-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Isopropylbenzene | 98-82-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | p-Isopropyltoluene | 99-87-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Methyl Tertiary Butyl Ether | 1634-04-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 4-Methyl-2-Pentanone | 108-10-1 | N.D. | 1.0 | 5.0 | 1 |
| 11996 | Methylene Chloride | 75-09-2 | N.D. | 0.2 | 0.5 | 1 |
| 11996 | Naphthalene | 91-20-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | n-Propylbenzene | 103-65-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Styrene | 100-42-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1,1,2-Tetrachloroethane | 630-20-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1,2,2-Tetrachloroethane | 79-34-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | **Tetrachloroethene** | 127-18-4 | **1.6** | 0.1 | 0.5 | 1 |
| 11996 | Tetrahydrofuran | 109-99-9 | N.D. | 2.0 | 5.0 | 1 |
| 11996 | Toluene | 108-88-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2,3-Trichlorobenzene | 87-61-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2,4-Trichlorobenzene | 120-82-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1,1-Trichloroethane | 71-55-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1,2-Trichloroethane | 79-00-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | **Trichloroethene** | 79-01-6 | **2.3** | 0.1 | 0.5 | 1 |
| 11996 | Trichlorofluoromethane | 75-69-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2,3-Trichloropropane | 96-18-4 | N.D. | 0.3 | 1.0 | 1 |
| 11996 | 1,2,4-Trimethylbenzene | 95-63-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,3,5-Trimethylbenzene | 108-67-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Vinyl Chloride | 75-01-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | m+p-Xylene | 179601-23-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | o-Xylene | 95-47-6 | N.D. | 0.1 | 0.5 | 1 |

The percent drift for the following is >20% in the continuing calibration verification standard associated with this sample: Dichlorodifluoromethane

The percent recovery for Dichlorodifluoromethane is outside of the 70 - 130% QC windows in the LCS and/or LCSD associated with this sample. Dichlorodifluoromethane is considered a difficult analyte and the percent recovery is within the allowed 40 - 160% window.

A Method Detection Limit (MDL) standard is analyzed to confirm sensitivity of the instrument for samples with non-detect analytes associated with a continuing calibration verification standard exhibiting low response (outside the 20%D criteria). The MDL standard shows adequate sensitivity at or below the reporting limit.

*=This limit was used in the evaluation of the final result

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# Analysis Report

**Sample Description:** **3G-12-D-111517 Grab Groundwater Lockheed Martin, Burlington**

**Project Name:** **Lockheed Martin - Burlington, MA**

Submittal Date/Time: 11/16/2017 09:40
Collection Date/Time: 11/15/2017 12:10
SDG#: LMB08-14FD

**Tetra Tech, Inc.**
**ELLE Sample #: WW 9322181**
**ELLE Group #: 1876333**
**Matrix: Groundwater**

| CAT No. | Analysis Name | CAS Number | Result | Method Detection Limit* | Limit of Quantitation | Dilution Factor |
|---|---|---|---|---|---|---|
| **GC/MS Semivolatiles** | **SW-846 8270D SIM** | | **ug/l** | **ug/l** | **ug/l** | |
| 14244 | 1,4-Dioxane | 123-91-1 | N.D. | 0.051 | 0.20 | 1 |
| The MA MCP analyte list requirement was not met for Method 8270D. The client requested analyte list was reported for this sample. | | | | | | |
| **GC Miscellaneous** | **RSKSOP-175 modified** | | **ug/l** | **ug/l** | **ug/l** | |
| 07105 | Methane | 74-82-8 | N.D. | 3.0 | 5.0 | 1 |
| **Wet Chemistry** | **EPA 300.0** | | **mg/l** | **mg/l** | **mg/l** | |
| 00368 | **Nitrate Nitrogen** | 14797-55-8 | **1.7** | 0.25 | 0.50 | 5 |
| 00228 | **Sulfate** | 14808-79-8 | **35.0** | 1.5 | 5.0 | 5 |
| | **SM 5310 C-2000** | | **mg/l** | **mg/l** | **mg/l** | |
| 00273 | **Total Organic Carbon** | n.a. | **2.6** | 0.50 | 1.0 | 1 |

## Sample Comments

State of Massachusetts Laboratory Non-Potable Water Certification M-PA009

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name | Method | Trial# | Batch# | Analysis Date and Time | Analyst | Dilution Factor |
|---|---|---|---|---|---|---|---|
| 11996 | VOCs- 25ml Water by 8260C | SW-846 8260C | 1 | I173321AA | 11/28/2017 16:12 | Kevin A Sposito | 1 |
| 01163 | GC/MS VOA Water Prep | SW-846 5030C | 1 | I173321AA | 11/28/2017 16:12 | Kevin A Sposito | 1 |
| 14244 | SIM SVOAs 8270D MINI | SW-846 8270D SIM | 1 | 17321WAK026 | 11/23/2017 09:41 | William H Saadeh | 1 |
| 10466 | BNA Water Extraction SIM | SW-846 3510C | 1 | 17321WAK026 | 11/18/2017 15:45 | Kate E Lutte | 1 |
| 07105 | Volatile Headspace Hydrocarbon | RSKSOP-175 modified | 1 | 173210013A | 11/17/2017 13:45 | Johanna C Kennedy | 1 |
| 00368 | Nitrate Nitrogen | EPA 300.0 | 1 | 17320120113B | 11/17/2017 03:40 | Hallie A Burnett | 5 |
| 00228 | Sulfate | EPA 300.0 | 1 | 17320120113B | 11/17/2017 03:40 | Hallie A Burnett | 5 |
| 00273 | Total Organic Carbon | SM 5310 C-2000 | 1 | 17324667606A | 11/21/2017 10:40 | Drew M Gerhart | 1 |

*=This limit was used in the evaluation of the final result

**Sample Description:** **EMW-2D(R)-111517 Grab Groundwater**
**Lockheed Martin, Burlington**

**Project Name:** **Lockheed Martin - Burlington, MA**

Submittal Date/Time: 11/16/2017 09:40
Collection Date/Time: 11/15/2017 14:45
SDG#: LMB08-15

**Tetra Tech, Inc.**
**ELLE Sample #: WW 9322182**
**ELLE Group #: 1876333**
**Matrix: Groundwater**

| CAT No. | Analysis Name | CAS Number | Result | Method Detection Limit* | Limit of Quantitation | Dilution Factor |
|---|---|---|---|---|---|---|
| **GC/MS Volatiles** | **SW-846 8260C** | | **ug/l** | **ug/l** | **ug/l** | |
| 11996 | Acetone | 67-64-1 | N.D. | 3.0 | 5.0 | 1 |
| 11996 | t-Amyl methyl ether | 994-05-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Benzene | 71-43-2 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Bromobenzene | 108-86-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Bromochloromethane | 74-97-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Bromodichloromethane | 75-27-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Bromoform | 75-25-2 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Bromomethane | 74-83-9 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 2-Butanone | 78-93-3 | N.D. | 1.0 | 5.0 | 1 |
| 11996 | n-Butylbenzene | 104-51-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | sec-Butylbenzene | 135-98-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | tert-Butylbenzene | 98-06-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Carbon Disulfide | 75-15-0 | N.D. | 0.4 | 1.0 | 1 |
| 11996 | Carbon Tetrachloride | 56-23-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Chlorobenzene | 108-90-7 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Chloroethane | 75-00-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Chloroform | 67-66-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Chloromethane | 74-87-3 | N.D. | 0.2 | 0.5 | 1 |
| 11996 | 2-Chlorotoluene | 95-49-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 4-Chlorotoluene | 106-43-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dibromo-3-chloropropane | 96-12-8 | N.D. | 0.2 | 0.5 | 1 |
| 11996 | Dibromochloromethane | 124-48-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dibromoethane | 106-93-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Dibromomethane | 74-95-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dichlorobenzene | 95-50-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,3-Dichlorobenzene | 541-73-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,4-Dichlorobenzene | 106-46-7 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Dichlorodifluoromethane | 75-71-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | **1,1-Dichloroethane** | 75-34-3 | **0.8** | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dichloroethane | 107-06-2 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | **1,1-Dichloroethene** | 75-35-4 | **3.0** | 0.1 | 0.5 | 1 |
| 11996 | **cis-1,2-Dichloroethene** | 156-59-2 | **4.0** | 0.1 | 0.5 | 1 |
| 11996 | trans-1,2-Dichloroethene | 156-60-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dichloropropane | 78-87-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,3-Dichloropropane | 142-28-9 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 2,2-Dichloropropane | 594-20-7 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1-Dichloropropene | 563-58-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | cis-1,3-Dichloropropene | 10061-01-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | trans-1,3-Dichloropropene | 10061-02-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,4-Dioxane | 123-91-1 | N.D. | 20 | 100 | 1 |
| 11996 | Ethyl ether | 60-29-7 | N.D. | 0.1 | 0.5 | 1 |

*=This limit was used in the evaluation of the final result

**Sample Description:** **EMW-2D(R)-111517 Grab Groundwater Lockheed Martin, Burlington**

**Project Name:** **Lockheed Martin - Burlington, MA**

Submittal Date/Time: 11/16/2017 09:40
Collection Date/Time: 11/15/2017 14:45
SDG#: LMB08-15

**Tetra Tech, Inc.**
**ELLE Sample #: WW 9322182**
**ELLE Group #: 1876333**
**Matrix: Groundwater**

| CAT No. | Analysis Name | CAS Number | Result | | Method Detection Limit* | Limit of Quantitation | Dilution Factor |
|---|---|---|---|---|---|---|---|
| **GC/MS Volatiles** | **SW-846 8260C** | | **ug/l** | | **ug/l** | **ug/l** | |
| 11996 | Ethyl t-butyl ether | 637-92-3 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Ethylbenzene | 100-41-4 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Hexachlorobutadiene | 87-68-3 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 2-Hexanone | 591-78-6 | N.D. | | 1.0 | 5.0 | 1 |
| 11996 | di-Isopropyl Ether | 108-20-3 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Isopropylbenzene | 98-82-8 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | p-Isopropyltoluene | 99-87-6 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | **Methyl Tertiary Butyl Ether** | 1634-04-4 | **0.3** | **J** | 0.1 | 0.5 | 1 |
| 11996 | 4-Methyl-2-Pentanone | 108-10-1 | N.D. | | 1.0 | 5.0 | 1 |
| 11996 | Methylene Chloride | 75-09-2 | N.D. | | 0.2 | 0.5 | 1 |
| 11996 | Naphthalene | 91-20-3 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | n-Propylbenzene | 103-65-1 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Styrene | 100-42-5 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,1,1,2-Tetrachloroethane | 630-20-6 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,1,2,2-Tetrachloroethane | 79-34-5 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | **Tetrachloroethene** | 127-18-4 | **1.5** | | 0.1 | 0.5 | 1 |
| 11996 | Tetrahydrofuran | 109-99-9 | N.D. | | 2.0 | 5.0 | 1 |
| 11996 | Toluene | 108-88-3 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,2,3-Trichlorobenzene | 87-61-6 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,2,4-Trichlorobenzene | 120-82-1 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,1,1-Trichloroethane | 71-55-6 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,1,2-Trichloroethane | 79-00-5 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | **Trichloroethene** | 79-01-6 | **4.8** | | 0.1 | 0.5 | 1 |
| 11996 | Trichlorofluoromethane | 75-69-4 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,2,3-Trichloropropane | 96-18-4 | N.D. | | 0.3 | 1.0 | 1 |
| 11996 | 1,2,4-Trimethylbenzene | 95-63-6 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,3,5-Trimethylbenzene | 108-67-8 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Vinyl Chloride | 75-01-4 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | m+p-Xylene | 179601-23-1 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | o-Xylene | 95-47-6 | N.D. | | 0.1 | 0.5 | 1 |

The percent drift for the following is >20% in the continuing calibration verification standard associated with this sample: Dichlorodifluoromethane

The percent recovery for Dichlorodifluoromethane is outside of the 70 - 130% QC windows in the LCS and/or LCSD associated with this sample. Dichlorodifluoromethane is considered a difficult analyte and the percent recovery is within the allowed 40 - 160% window.

A Method Detection Limit (MDL) standard is analyzed to confirm sensitivity of the instrument for samples with non-detect analytes associated with a continuing calibration verification standard exhibiting low response (outside the 20%D criteria). The MDL standard shows adequate sensitivity at or below the reporting limit.

*=This limit was used in the evaluation of the final result

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# Analysis Report

**Sample Description:** **EMW-2D(R)-111517 Grab Groundwater**
**Lockheed Martin, Burlington**

**Project Name:** **Lockheed Martin - Burlington, MA**

Submittal Date/Time: 11/16/2017 09:40
Collection Date/Time: 11/15/2017 14:45
SDG#: LMB08-15

**Tetra Tech, Inc.**
**ELLE Sample #: WW 9322182**
**ELLE Group #: 1876333**
**Matrix: Groundwater**

| CAT No. | Analysis Name | CAS Number | Result | Method Detection Limit* | Limit of Quantitation | Dilution Factor |
|---|---|---|---|---|---|---|
| **GC/MS Semivolatiles** | **SW-846 8270D SIM** | | **ug/l** | **ug/l** | **ug/l** | |
| 14244 | **1,4-Dioxane** | 123-91-1 | **0.070 J** | 0.050 | 0.20 | 1 |

The MA MCP analyte list requirement was not met for Method 8270D.
The client requested analyte list was reported for this sample.

Target analytes were detected in the method blank associated with the samples as noted on the QC Summary. The following corrective action was taken:
The sample was re-extracted outside the method required holding time and the QC is compliant. All results are reported from the first trial. Similar results were obtained in both trials.

| | | | | | | |
|---|---|---|---|---|---|---|
| **GC Miscellaneous** | **RSKSOP-175 modified** | | **ug/l** | **ug/l** | **ug/l** | |
| 07105 | **Methane** | 74-82-8 | **38** | 3.0 | 5.0 | 1 |
| **Wet Chemistry** | **EPA 300.0** | | **mg/l** | **mg/l** | **mg/l** | |
| 00368 | **Nitrate Nitrogen** | 14797-55-8 | **1.3** | 0.25 | 0.50 | 5 |
| 00228 | **Sulfate** | 14808-79-8 | **33.7** | 1.5 | 5.0 | 5 |
| | **SM 5310 C-2000** | | **mg/l** | **mg/l** | **mg/l** | |
| 00273 | **Total Organic Carbon** | n.a. | **3.1** | 0.50 | 1.0 | 1 |

## Sample Comments

State of Massachusetts Laboratory Non-Potable Water Certification M-PA009

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name | Method | Trial# | Batch# | Analysis Date and Time | Analyst | Dilution Factor |
|---|---|---|---|---|---|---|---|
| 11996 | VOCs- 25ml Water by 8260C | SW-846 8260C | 1 | I173321AA | 11/28/2017 16:33 | Kevin A Sposito | 1 |
| 01163 | GC/MS VOA Water Prep | SW-846 5030C | 1 | I173321AA | 11/28/2017 16:33 | Kevin A Sposito | 1 |
| 14244 | SIM SVOAs 8270D MINI | SW-846 8270D SIM | 1 | 17321WAK026 | 11/23/2017 10:09 | William H Saadeh | 1 |
| 10466 | BNA Water Extraction SIM | SW-846 3510C | 1 | 17321WAK026 | 11/18/2017 15:45 | Kate E Lutte | 1 |
| 07105 | Volatile Headspace Hydrocarbon | RSKSOP-175 modified | 1 | 173210013A | 11/17/2017 14:03 | Johanna C Kennedy | 1 |
| 00368 | Nitrate Nitrogen | EPA 300.0 | 1 | 17320120113B | 11/17/2017 03:57 | Hallie A Burnett | 5 |
| 00228 | Sulfate | EPA 300.0 | 1 | 17320120113B | 11/17/2017 03:57 | Hallie A Burnett | 5 |
| 00273 | Total Organic Carbon | SM 5310 C-2000 | 1 | 17324667606A | 11/21/2017 10:55 | Drew M Gerhart | 1 |

*=This limit was used in the evaluation of the final result

**Sample Description:** **Trip Blank Grab Water**
**Lockheed Martin, Burlington**

**Project Name:** **Lockheed Martin - Burlington, MA**

Submittal Date/Time: 11/16/2017 09:40
Collection Date/Time: 11/15/2017
SDG#: LMB08-16TB

**Tetra Tech, Inc.**
**ELLE Sample #: WW 9322183**
**ELLE Group #: 1876333**
**Matrix: Water**

| CAT No. | Analysis Name | CAS Number | Result | Method Detection Limit* | Limit of Quantitation | Dilution Factor |
|---|---|---|---|---|---|---|
| **GC/MS Volatiles** | **SW-846 8260C** | | **ug/l** | **ug/l** | **ug/l** | |
| 11996 | Acetone | 67-64-1 | N.D. | 3.0 | 5.0 | 1 |
| 11996 | t-Amyl methyl ether | 994-05-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Benzene | 71-43-2 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Bromobenzene | 108-86-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Bromochloromethane | 74-97-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Bromodichloromethane | 75-27-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Bromoform | 75-25-2 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Bromomethane | 74-83-9 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 2-Butanone | 78-93-3 | N.D. | 1.0 | 5.0 | 1 |
| 11996 | n-Butylbenzene | 104-51-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | sec-Butylbenzene | 135-98-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | tert-Butylbenzene | 98-06-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Carbon Disulfide | 75-15-0 | N.D. | 0.4 | 1.0 | 1 |
| 11996 | Carbon Tetrachloride | 56-23-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Chlorobenzene | 108-90-7 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Chloroethane | 75-00-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Chloroform | 67-66-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Chloromethane | 74-87-3 | N.D. | 0.2 | 0.5 | 1 |
| 11996 | 2-Chlorotoluene | 95-49-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 4-Chlorotoluene | 106-43-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dibromo-3-chloropropane | 96-12-8 | N.D. | 0.2 | 0.5 | 1 |
| 11996 | Dibromochloromethane | 124-48-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dibromoethane | 106-93-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Dibromomethane | 74-95-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dichlorobenzene | 95-50-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,3-Dichlorobenzene | 541-73-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,4-Dichlorobenzene | 106-46-7 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Dichlorodifluoromethane | 75-71-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1-Dichloroethane | 75-34-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dichloroethane | 107-06-2 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1-Dichloroethene | 75-35-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | cis-1,2-Dichloroethene | 156-59-2 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | trans-1,2-Dichloroethene | 156-60-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dichloropropane | 78-87-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,3-Dichloropropane | 142-28-9 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 2,2-Dichloropropane | 594-20-7 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1-Dichloropropene | 563-58-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | cis-1,3-Dichloropropene | 10061-01-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | trans-1,3-Dichloropropene | 10061-02-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,4-Dioxane | 123-91-1 | N.D. | 20 | 100 | 1 |
| 11996 | Ethyl ether | 60-29-7 | N.D. | 0.1 | 0.5 | 1 |

*=This limit was used in the evaluation of the final result

**Sample Description:** **Trip Blank Grab Water**
**Lockheed Martin, Burlington**

**Project Name:** **Lockheed Martin - Burlington, MA**

Submittal Date/Time: 11/16/2017 09:40
Collection Date/Time: 11/15/2017
SDG#: LMB08-16TB

**Tetra Tech, Inc.**
**ELLE Sample #: WW 9322183**
**ELLE Group #: 1876333**
**Matrix: Water**

| CAT No. | Analysis Name | CAS Number | Result | Method Detection Limit* | Limit of Quantitation | Dilution Factor |
|---|---|---|---|---|---|---|
| **GC/MS Volatiles** | **SW-846 8260C** | | **ug/l** | **ug/l** | **ug/l** | |
| 11996 | Ethyl t-butyl ether | 637-92-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Ethylbenzene | 100-41-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Hexachlorobutadiene | 87-68-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 2-Hexanone | 591-78-6 | N.D. | 1.0 | 5.0 | 1 |
| 11996 | di-Isopropyl Ether | 108-20-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Isopropylbenzene | 98-82-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | p-Isopropyltoluene | 99-87-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Methyl Tertiary Butyl Ether | 1634-04-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 4-Methyl-2-Pentanone | 108-10-1 | N.D. | 1.0 | 5.0 | 1 |
| 11996 | Methylene Chloride | 75-09-2 | N.D. | 0.2 | 0.5 | 1 |
| 11996 | Naphthalene | 91-20-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | n-Propylbenzene | 103-65-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Styrene | 100-42-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1,1,2-Tetrachloroethane | 630-20-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1,2,2-Tetrachloroethane | 79-34-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Tetrachloroethene | 127-18-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Tetrahydrofuran | 109-99-9 | N.D. | 2.0 | 5.0 | 1 |
| 11996 | Toluene | 108-88-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2,3-Trichlorobenzene | 87-61-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2,4-Trichlorobenzene | 120-82-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1,1-Trichloroethane | 71-55-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1,2-Trichloroethane | 79-00-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Trichloroethene | 79-01-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Trichlorofluoromethane | 75-69-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2,3-Trichloropropane | 96-18-4 | N.D. | 0.3 | 1.0 | 1 |
| 11996 | 1,2,4-Trimethylbenzene | 95-63-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,3,5-Trimethylbenzene | 108-67-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Vinyl Chloride | 75-01-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | m+p-Xylene | 179601-23-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | o-Xylene | 95-47-6 | N.D. | 0.1 | 0.5 | 1 |

The percent drift for the following is >20% in the continuing calibration verification standard associated with this sample: Dichlorodifluoromethane, Bromomethane, Chloroethane, 1,4-Dioxane.

The percent recovery for Dichlorodifluoromethane is outside of the 70 - 130% QC windows in the LCS and/or LCSD associated with this sample. Dichlorodifluoromethane is considered a difficult analyte and the percent recovery is within the allowed 40 - 160% window.

A Method Detection Limit (MDL) standard is analyzed to confirm sensitivity of the instrument for samples with non-detect analytes associated with a continuing calibration verification standard exhibiting low response (outside the 20%D criteria). The MDL standard shows adequate sensitivity at or below

*=This limit was used in the evaluation of the final result

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# Analysis Report

**Sample Description:** **Trip Blank Grab Water**
**Lockheed Martin, Burlington**

**Project Name:** **Lockheed Martin - Burlington, MA**

Submittal Date/Time: 11/16/2017 09:40
Collection Date/Time: 11/15/2017
SDG#: LMB08-16TB

**Tetra Tech, Inc.**
**ELLE Sample #: WW 9322183**
**ELLE Group #: 1876333**
**Matrix: Water**

| CAT No. | Analysis Name | CAS Number | Result | Method Detection Limit* | Limit of Quantitation | Dilution Factor |
|---|---|---|---|---|---|---|
| the reporting limit. | | | | | | |
| **GC Miscellaneous** | | **RSKSOP-175 modified** | **ug/l** | **ug/l** | **ug/l** | |
| 07105 | Methane | 74-82-8 | N.D. | 3.0 | 5.0 | 1 |

## Sample Comments

State of Massachusetts Laboratory Non-Potable Water Certification M-PA009

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name | Method | Trial# | Batch# | Analysis Date and Time | Analyst | Dilution Factor |
|---|---|---|---|---|---|---|---|
| 11996 | VOCs- 25ml Water by 8260C | SW-846 8260C | 1 | I173332AA | 11/29/2017 13:56 | Kevin A Sposito | 1 |
| 01163 | GC/MS VOA Water Prep | SW-846 5030C | 1 | I173332AA | 11/29/2017 13:56 | Kevin A Sposito | 1 |
| 07105 | Volatile Headspace Hydrocarbon | RSKSOP-175 modified | 1 | 173210013A | 11/17/2017 11:06 | Johanna C Kennedy | 1 |

*=This limit was used in the evaluation of the final result

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# Quality Control Summary

Client Name: Tetra Tech, Inc.
Reported: 12/04/2017 19:22

Group Number: 1876333

Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

All Inorganic Initial Calibration and Continuing Calibration Blanks met acceptable method criteria unless otherwise noted on the Analysis Report.

## Method Blank

| Analysis Name | Result | MDL** | LOQ |
|---|---|---|---|
| | ug/l | ug/l | ug/l |
| Batch number: I173321AA | Sample number(s): 9322175-9322182 | | |
| Acetone | N.D. | 3.0 | 5.0 |
| t-Amyl methyl ether | N.D. | 0.1 | 0.5 |
| Benzene | N.D. | 0.1 | 0.5 |
| Bromobenzene | N.D. | 0.1 | 0.5 |
| Bromochloromethane | N.D. | 0.1 | 0.5 |
| Bromodichloromethane | N.D. | 0.1 | 0.5 |
| Bromoform | N.D. | 0.1 | 0.5 |
| Bromomethane | N.D. | 0.1 | 0.5 |
| 2-Butanone | N.D. | 1.0 | 5.0 |
| n-Butylbenzene | N.D. | 0.1 | 0.5 |
| sec-Butylbenzene | N.D. | 0.1 | 0.5 |
| tert-Butylbenzene | N.D. | 0.1 | 0.5 |
| Carbon Disulfide | N.D. | 0.4 | 1.0 |
| Carbon Tetrachloride | N.D. | 0.1 | 0.5 |
| Chlorobenzene | N.D. | 0.1 | 0.5 |
| Chloroethane | N.D. | 0.1 | 0.5 |
| Chloroform | N.D. | 0.1 | 0.5 |
| Chloromethane | N.D. | 0.2 | 0.5 |
| 2-Chlorotoluene | N.D. | 0.1 | 0.5 |
| 4-Chlorotoluene | N.D. | 0.1 | 0.5 |
| 1,2-Dibromo-3-chloropropane | N.D. | 0.2 | 0.5 |
| Dibromochloromethane | N.D. | 0.1 | 0.5 |
| 1,2-Dibromoethane | N.D. | 0.1 | 0.5 |
| Dibromomethane | N.D. | 0.1 | 0.5 |
| 1,2-Dichlorobenzene | N.D. | 0.1 | 0.5 |
| 1,3-Dichlorobenzene | N.D. | 0.1 | 0.5 |
| 1,4-Dichlorobenzene | N.D. | 0.1 | 0.5 |
| Dichlorodifluoromethane | N.D. | 0.1 | 0.5 |
| 1,1-Dichloroethane | N.D. | 0.1 | 0.5 |
| 1,2-Dichloroethane | N.D. | 0.1 | 0.5 |
| 1,1-Dichloroethene | N.D. | 0.1 | 0.5 |
| cis-1,2-Dichloroethene | N.D. | 0.1 | 0.5 |
| trans-1,2-Dichloroethene | N.D. | 0.1 | 0.5 |
| 1,2-Dichloropropane | N.D. | 0.1 | 0.5 |
| 1,3-Dichloropropane | N.D. | 0.1 | 0.5 |
| 2,2-Dichloropropane | N.D. | 0.1 | 0.5 |
| 1,1-Dichloropropene | N.D. | 0.1 | 0.5 |
| cis-1,3-Dichloropropene | N.D. | 0.1 | 0.5 |
| trans-1,3-Dichloropropene | N.D. | 0.1 | 0.5 |

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.
P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

# Quality Control Summary

Client Name: Tetra Tech, Inc.
Reported: 12/04/2017 19:22

Group Number: 1876333

## Method Blank (continued)

| Analysis Name | Result | MDL** | LOQ |
|---|---|---|---|
| | ug/l | ug/l | ug/l |
| 1,4-Dioxane | N.D. | 20 | 100 |
| Ethyl ether | N.D. | 0.1 | 0.5 |
| Ethyl t-butyl ether | N.D. | 0.1 | 0.5 |
| Ethylbenzene | N.D. | 0.1 | 0.5 |
| Hexachlorobutadiene | N.D. | 0.1 | 0.5 |
| 2-Hexanone | N.D. | 1.0 | 5.0 |
| di-Isopropyl Ether | N.D. | 0.1 | 0.5 |
| Isopropylbenzene | N.D. | 0.1 | 0.5 |
| p-Isopropyltoluene | N.D. | 0.1 | 0.5 |
| Methyl Tertiary Butyl Ether | N.D. | 0.1 | 0.5 |
| 4-Methyl-2-Pentanone | N.D. | 1.0 | 5.0 |
| Methylene Chloride | N.D. | 0.2 | 0.5 |
| Naphthalene | N.D. | 0.1 | 0.5 |
| n-Propylbenzene | N.D. | 0.1 | 0.5 |
| Styrene | N.D. | 0.1 | 0.5 |
| 1,1,1,2-Tetrachloroethane | N.D. | 0.1 | 0.5 |
| 1,1,2,2-Tetrachloroethane | N.D. | 0.1 | 0.5 |
| Tetrachloroethene | N.D. | 0.1 | 0.5 |
| Tetrahydrofuran | N.D. | 2.0 | 5.0 |
| Toluene | N.D. | 0.1 | 0.5 |
| 1,2,3-Trichlorobenzene | N.D. | 0.1 | 0.5 |
| 1,2,4-Trichlorobenzene | N.D. | 0.1 | 0.5 |
| 1,1,1-Trichloroethane | N.D. | 0.1 | 0.5 |
| 1,1,2-Trichloroethane | N.D. | 0.1 | 0.5 |
| Trichloroethene | N.D. | 0.1 | 0.5 |
| Trichlorofluoromethane | N.D. | 0.1 | 0.5 |
| 1,2,3-Trichloropropane | N.D. | 0.3 | 1.0 |
| 1,2,4-Trimethylbenzene | N.D. | 0.1 | 0.5 |
| 1,3,5-Trimethylbenzene | N.D. | 0.1 | 0.5 |
| Vinyl Chloride | N.D. | 0.1 | 0.5 |
| m+p-Xylene | N.D. | 0.1 | 0.5 |
| o-Xylene | N.D. | 0.1 | 0.5 |
| Batch number: I173332AA | Sample number(s): 9322183 | | |
| Acetone | N.D. | 3.0 | 5.0 |
| t-Amyl methyl ether | N.D. | 0.1 | 0.5 |
| Benzene | N.D. | 0.1 | 0.5 |
| Bromobenzene | N.D. | 0.1 | 0.5 |
| Bromochloromethane | N.D. | 0.1 | 0.5 |
| Bromodichloromethane | N.D. | 0.1 | 0.5 |
| Bromoform | N.D. | 0.1 | 0.5 |
| Bromomethane | N.D. | 0.1 | 0.5 |
| 2-Butanone | N.D. | 1.0 | 5.0 |
| n-Butylbenzene | N.D. | 0.1 | 0.5 |
| sec-Butylbenzene | N.D. | 0.1 | 0.5 |

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.
P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

# Quality Control Summary

Client Name: Tetra Tech, Inc.
Reported: 12/04/2017 19:22

Group Number: 1876333

## Method Blank (continued)

| Analysis Name | Result | MDL** | LOQ |
|---|---|---|---|
| | ug/l | ug/l | ug/l |
| tert-Butylbenzene | N.D. | 0.1 | 0.5 |
| Carbon Disulfide | N.D. | 0.4 | 1.0 |
| Carbon Tetrachloride | N.D. | 0.1 | 0.5 |
| Chlorobenzene | N.D. | 0.1 | 0.5 |
| Chloroethane | N.D. | 0.1 | 0.5 |
| Chloroform | N.D. | 0.1 | 0.5 |
| Chloromethane | N.D. | 0.2 | 0.5 |
| 2-Chlorotoluene | N.D. | 0.1 | 0.5 |
| 4-Chlorotoluene | N.D. | 0.1 | 0.5 |
| 1,2-Dibromo-3-chloropropane | N.D. | 0.2 | 0.5 |
| Dibromochloromethane | N.D. | 0.1 | 0.5 |
| 1,2-Dibromoethane | N.D. | 0.1 | 0.5 |
| Dibromomethane | N.D. | 0.1 | 0.5 |
| 1,2-Dichlorobenzene | N.D. | 0.1 | 0.5 |
| 1,3-Dichlorobenzene | N.D. | 0.1 | 0.5 |
| 1,4-Dichlorobenzene | N.D. | 0.1 | 0.5 |
| Dichlorodifluoromethane | N.D. | 0.1 | 0.5 |
| 1,1-Dichloroethane | N.D. | 0.1 | 0.5 |
| 1,2-Dichloroethane | N.D. | 0.1 | 0.5 |
| 1,1-Dichloroethene | N.D. | 0.1 | 0.5 |
| cis-1,2-Dichloroethene | N.D. | 0.1 | 0.5 |
| trans-1,2-Dichloroethene | N.D. | 0.1 | 0.5 |
| 1,2-Dichloropropane | N.D. | 0.1 | 0.5 |
| 1,3-Dichloropropane | N.D. | 0.1 | 0.5 |
| 2,2-Dichloropropane | N.D. | 0.1 | 0.5 |
| 1,1-Dichloropropene | N.D. | 0.1 | 0.5 |
| cis-1,3-Dichloropropene | N.D. | 0.1 | 0.5 |
| trans-1,3-Dichloropropene | N.D. | 0.1 | 0.5 |
| 1,4-Dioxane | N.D. | 20 | 100 |
| Ethyl ether | N.D. | 0.1 | 0.5 |
| Ethyl t-butyl ether | N.D. | 0.1 | 0.5 |
| Ethylbenzene | N.D. | 0.1 | 0.5 |
| Hexachlorobutadiene | N.D. | 0.1 | 0.5 |
| 2-Hexanone | N.D. | 1.0 | 5.0 |
| di-Isopropyl Ether | N.D. | 0.1 | 0.5 |
| Isopropylbenzene | N.D. | 0.1 | 0.5 |
| p-Isopropyltoluene | N.D. | 0.1 | 0.5 |
| Methyl Tertiary Butyl Ether | N.D. | 0.1 | 0.5 |
| 4-Methyl-2-Pentanone | N.D. | 1.0 | 5.0 |
| Methylene Chloride | N.D. | 0.2 | 0.5 |
| Naphthalene | N.D. | 0.1 | 0.5 |
| n-Propylbenzene | N.D. | 0.1 | 0.5 |
| Styrene | N.D. | 0.1 | 0.5 |
| 1,1,1,2-Tetrachloroethane | N.D. | 0.1 | 0.5 |
| 1,1,2,2-Tetrachloroethane | N.D. | 0.1 | 0.5 |

*- Outside of specification
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(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.
P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

# Quality Control Summary

Client Name: Tetra Tech, Inc.
Reported: 12/04/2017 19:22

Group Number: 1876333

## Method Blank (continued)

| Analysis Name | Result | MDL** | LOQ |
|---|---|---|---|
| | ug/l | ug/l | ug/l |
| Tetrachloroethene | N.D. | 0.1 | 0.5 |
| Tetrahydrofuran | N.D. | 2.0 | 5.0 |
| Toluene | N.D. | 0.1 | 0.5 |
| 1,2,3-Trichlorobenzene | N.D. | 0.1 | 0.5 |
| 1,2,4-Trichlorobenzene | N.D. | 0.1 | 0.5 |
| 1,1,1-Trichloroethane | N.D. | 0.1 | 0.5 |
| 1,1,2-Trichloroethane | N.D. | 0.1 | 0.5 |
| Trichloroethene | N.D. | 0.1 | 0.5 |
| Trichlorofluoromethane | N.D. | 0.1 | 0.5 |
| 1,2,3-Trichloropropane | N.D. | 0.3 | 1.0 |
| 1,2,4-Trimethylbenzene | N.D. | 0.1 | 0.5 |
| 1,3,5-Trimethylbenzene | N.D. | 0.1 | 0.5 |
| Vinyl Chloride | N.D. | 0.1 | 0.5 |
| m+p-Xylene | N.D. | 0.1 | 0.5 |
| o-Xylene | N.D. | 0.1 | 0.5 |
| Batch number: 17321WAK026 | Sample number(s): 9322175-9322182 | | |
| 1,4-Dioxane | 0.069 J | 0.050 | 0.20 |
| Batch number: 173210013A | Sample number(s): 9322180-9322183 | | |
| Methane | N.D. | 3.0 | 5.0 |
| | mg/l | mg/l | mg/l |
| Batch number: 17320120113A | Sample number(s): 9322180 | | |
| Nitrate Nitrogen | N.D. | 0.050 | 0.10 |
| Sulfate | N.D. | 0.30 | 1.0 |
| Batch number: 17320120113B | Sample number(s): 9322181-9322182 | | |
| Nitrate Nitrogen | N.D. | 0.050 | 0.10 |
| Sulfate | N.D. | 0.30 | 1.0 |
| Batch number: 17324667606A | Sample number(s): 9322180-9322182 | | |
| Total Organic Carbon | N.D. | 0.50 | 1.0 |

## LCS/LCSD

| Analysis Name | LCS Spike Added ug/l | LCS Conc ug/l | LCSD Spike Added ug/l | LCSD Conc ug/l | LCS %REC | LCSD %REC | LCS/LCSD Limits | RPD | RPD Max |
|---|---|---|---|---|---|---|---|---|---|
| Batch number: I173321AA | Sample number(s): 9322175-9322182 | | | | | | | | |
| Acetone | 37.5 | 43.66 | 37.5 | 44.94 | 116 | 120 | 70-130 | 3 | 30 |
| t-Amyl methyl ether | 5.00 | 5.01 | 5.00 | 4.77 | 100 | 95 | 70-130 | 5 | 30 |
| Benzene | 5.00 | 5.61 | 5.00 | 5.34 | 112 | 107 | 70-130 | 5 | 30 |
| Bromobenzene | 5.00 | 5.11 | 5.00 | 4.89 | 102 | 98 | 70-130 | 4 | 30 |

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.
P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

# Quality Control Summary

Client Name: Tetra Tech, Inc.
Reported: 12/04/2017 19:22

Group Number: 1876333

## LCS/LCSD (continued)

| Analysis Name | LCS Spike Added ug/l | LCS Conc ug/l | LCSD Spike Added ug/l | LCSD Conc ug/l | LCS %REC | LCSD %REC | LCS/LCSD Limits | RPD | RPD Max |
|---|---|---|---|---|---|---|---|---|---|
| Bromochloromethane | 5.00 | 5.51 | 5.00 | 5.22 | 110 | 104 | 70-130 | 5 | 30 |
| Bromodichloromethane | 5.00 | 5.56 | 5.00 | 5.35 | 111 | 107 | 70-130 | 4 | 30 |
| Bromoform | 5.00 | 5.33 | 5.00 | 4.94 | 107 | 99 | 70-130 | 8 | 30 |
| Bromomethane | 5.00 | 3.98 | 5.00 | 3.73 | 80 | 75 | 70-130 | 7 | 30 |
| 2-Butanone | 37.5 | 41.25 | 37.5 | 44.7 | 110 | 119 | 70-130 | 8 | 30 |
| n-Butylbenzene | 5.00 | 5.64 | 5.00 | 5.31 | 113 | 106 | 70-130 | 6 | 30 |
| sec-Butylbenzene | 5.00 | 5.65 | 5.00 | 5.32 | 113 | 106 | 70-130 | 6 | 30 |
| tert-Butylbenzene | 5.00 | 5.29 | 5.00 | 5.06 | 106 | 101 | 70-130 | 5 | 30 |
| Carbon Disulfide | 5.00 | 5.66 | 5.00 | 5.38 | 113 | 108 | 70-130 | 5 | 30 |
| Carbon Tetrachloride | 5.00 | 5.62 | 5.00 | 5.35 | 112 | 107 | 70-130 | 5 | 30 |
| Chlorobenzene | 5.00 | 5.37 | 5.00 | 5.06 | 107 | 101 | 70-130 | 6 | 30 |
| Chloroethane | 5.00 | 3.82 | 5.00 | 3.67 | 76 | 73 | 70-130 | 4 | 30 |
| Chloroform | 5.00 | 5.51 | 5.00 | 5.24 | 110 | 105 | 70-130 | 5 | 30 |
| Chloromethane | 5.00 | 4.36 | 5.00 | 4.17 | 87 | 83 | 70-130 | 5 | 30 |
| 2-Chlorotoluene | 5.00 | 5.43 | 5.00 | 5.18 | 109 | 104 | 70-130 | 5 | 30 |
| 4-Chlorotoluene | 5.00 | 5.36 | 5.00 | 5.10 | 107 | 102 | 70-130 | 5 | 30 |
| 1,2-Dibromo-3-chloropropane | 5.00 | 5.81 | 5.00 | 6.04 | 116 | 121 | 70-130 | 4 | 30 |
| Dibromochloromethane | 5.00 | 5.72 | 5.00 | 5.39 | 114 | 108 | 70-130 | 6 | 30 |
| 1,2-Dibromoethane | 5.00 | 5.86 | 5.00 | 5.44 | 117 | 109 | 70-130 | 7 | 30 |
| Dibromomethane | 5.00 | 5.76 | 5.00 | 5.43 | 115 | 109 | 70-130 | 6 | 30 |
| 1,2-Dichlorobenzene | 5.00 | 5.26 | 5.00 | 5.02 | 105 | 100 | 70-130 | 5 | 30 |
| 1,3-Dichlorobenzene | 5.00 | 5.17 | 5.00 | 4.91 | 103 | 98 | 70-130 | 5 | 30 |
| 1,4-Dichlorobenzene | 5.00 | 5.07 | 5.00 | 4.84 | 101 | 97 | 70-130 | 5 | 30 |
| Dichlorodifluoromethane | 5.00 | 3.41 | 5.00 | 3.29 | 68* | 66* | 70-130 | 4 | 30 |
| 1,1-Dichloroethane | 5.00 | 5.59 | 5.00 | 5.33 | 112 | 107 | 70-130 | 5 | 30 |
| 1,2-Dichloroethane | 5.00 | 5.19 | 5.00 | 4.88 | 104 | 98 | 70-130 | 6 | 30 |
| 1,1-Dichloroethene | 5.00 | 5.91 | 5.00 | 5.59 | 118 | 112 | 70-130 | 6 | 30 |
| cis-1,2-Dichloroethene | 5.00 | 5.77 | 5.00 | 5.48 | 115 | 110 | 70-130 | 5 | 30 |
| trans-1,2-Dichloroethene | 5.00 | 5.90 | 5.00 | 5.62 | 118 | 112 | 70-130 | 5 | 30 |
| 1,2-Dichloropropane | 5.00 | 5.78 | 5.00 | 5.47 | 116 | 109 | 70-130 | 6 | 30 |
| 1,3-Dichloropropane | 5.00 | 5.70 | 5.00 | 5.32 | 114 | 106 | 70-130 | 7 | 30 |
| 2,2-Dichloropropane | 5.00 | 5.81 | 5.00 | 5.43 | 116 | 109 | 70-130 | 7 | 30 |
| 1,1-Dichloropropene | 5.00 | 5.38 | 5.00 | 5.16 | 108 | 103 | 70-130 | 4 | 30 |
| cis-1,3-Dichloropropene | 5.00 | 5.51 | 5.00 | 5.26 | 110 | 105 | 70-130 | 5 | 30 |
| trans-1,3-Dichloropropene | 5.00 | 5.92 | 5.00 | 5.51 | 118 | 110 | 70-130 | 7 | 30 |
| 1,4-Dioxane | 125 | 150.71 | 125 | 131.41 | 121 | 105 | 70-130 | 14 | 30 |
| Ethyl ether | 5.00 | 5.45 | 5.00 | 5.17 | 109 | 103 | 70-130 | 5 | 30 |
| Ethyl t-butyl ether | 5.00 | 4.94 | 5.00 | 4.71 | 99 | 94 | 70-130 | 5 | 30 |
| Ethylbenzene | 5.00 | 5.42 | 5.00 | 5.07 | 108 | 101 | 70-130 | 7 | 30 |
| Hexachlorobutadiene | 5.00 | 5.16 | 5.00 | 4.78 | 103 | 96 | 70-130 | 8 | 30 |
| 2-Hexanone | 25 | 27.84 | 25 | 28.4 | 111 | 114 | 70-130 | 2 | 30 |
| di-Isopropyl Ether | 5.00 | 5.31 | 5.00 | 5.07 | 106 | 101 | 70-130 | 5 | 30 |
| Isopropylbenzene | 5.00 | 5.38 | 5.00 | 5.07 | 108 | 101 | 70-130 | 6 | 30 |
| p-Isopropyltoluene | 5.00 | 5.55 | 5.00 | 5.22 | 111 | 104 | 70-130 | 6 | 30 |

*- Outside of specification
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(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.
P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

# Quality Control Summary

Client Name: Tetra Tech, Inc.
Reported: 12/04/2017 19:22

Group Number: 1876333

## LCS/LCSD (continued)

| Analysis Name | LCS Spike Added ug/l | LCS Conc ug/l | LCSD Spike Added ug/l | LCSD Conc ug/l | LCS %REC | LCSD %REC | LCS/LCSD Limits | RPD | RPD Max |
|---|---|---|---|---|---|---|---|---|---|
| Methyl Tertiary Butyl Ether | 5.00 | 5.18 | 5.00 | 4.91 | 104 | 98 | 70-130 | 5 | 30 |
| 4-Methyl-2-Pentanone | 25 | 29.46 | 25 | 30.21 | 118 | 121 | 70-130 | 3 | 30 |
| Methylene Chloride | 5.00 | 5.85 | 5.00 | 5.54 | 117 | 111 | 70-130 | 5 | 30 |
| Naphthalene | 5.00 | 6.05 | 5.00 | 5.60 | 121 | 112 | 70-130 | 8 | 30 |
| n-Propylbenzene | 5.00 | 5.67 | 5.00 | 5.40 | 113 | 108 | 70-130 | 5 | 30 |
| Styrene | 5.00 | 5.53 | 5.00 | 5.21 | 111 | 104 | 70-130 | 6 | 30 |
| 1,1,1,2-Tetrachloroethane | 5.00 | 5.64 | 5.00 | 5.29 | 113 | 106 | 70-130 | 6 | 30 |
| 1,1,2,2-Tetrachloroethane | 5.00 | 5.73 | 5.00 | 5.41 | 115 | 108 | 70-130 | 6 | 30 |
| Tetrachloroethene | 5.00 | 5.23 | 5.00 | 4.96 | 105 | 99 | 70-130 | 5 | 30 |
| Tetrahydrofuran | 25 | 31.51 | 25 | 31.89 | 126 | 128 | 70-130 | 1 | 30 |
| Toluene | 5.00 | 5.45 | 5.00 | 5.12 | 109 | 102 | 70-130 | 6 | 30 |
| 1,2,3-Trichlorobenzene | 5.00 | 5.59 | 5.00 | 5.20 | 112 | 104 | 70-130 | 7 | 30 |
| 1,2,4-Trichlorobenzene | 5.00 | 5.14 | 5.00 | 4.80 | 103 | 96 | 70-130 | 7 | 30 |
| 1,1,1-Trichloroethane | 5.00 | 5.54 | 5.00 | 5.23 | 111 | 105 | 70-130 | 6 | 30 |
| 1,1,2-Trichloroethane | 5.00 | 5.88 | 5.00 | 5.57 | 118 | 111 | 70-130 | 5 | 30 |
| Trichloroethene | 5.00 | 5.55 | 5.00 | 5.20 | 111 | 104 | 70-130 | 7 | 30 |
| Trichlorofluoromethane | 5.00 | 4.55 | 5.00 | 4.19 | 91 | 84 | 70-130 | 8 | 30 |
| 1,2,3-Trichloropropane | 5.00 | 5.71 | 5.00 | 5.38 | 114 | 108 | 70-130 | 6 | 30 |
| 1,2,4-Trimethylbenzene | 5.00 | 5.57 | 5.00 | 5.29 | 111 | 106 | 70-130 | 5 | 30 |
| 1,3,5-Trimethylbenzene | 5.00 | 5.48 | 5.00 | 5.27 | 110 | 105 | 70-130 | 4 | 30 |
| Vinyl Chloride | 5.00 | 4.53 | 5.00 | 4.27 | 91 | 85 | 70-130 | 6 | 30 |
| m+p-Xylene | 10 | 10.72 | 10 | 10.1 | 107 | 101 | 70-130 | 6 | 30 |
| o-Xylene | 5.00 | 5.21 | 5.00 | 4.91 | 104 | 98 | 70-130 | 6 | 30 |
| Batch number: I173332AA | Sample number(s): 9322183 | | | | | | | | |
| Acetone | 37.5 | 45.85 | | | 122 | | 70-130 | | |
| t-Amyl methyl ether | 5.00 | 4.71 | | | 94 | | 70-130 | | |
| Benzene | 5.00 | 5.40 | | | 108 | | 70-130 | | |
| Bromobenzene | 5.00 | 4.86 | | | 97 | | 70-130 | | |
| Bromochloromethane | 5.00 | 5.19 | | | 104 | | 70-130 | | |
| Bromodichloromethane | 5.00 | 5.34 | | | 107 | | 70-130 | | |
| Bromoform | 5.00 | 4.74 | | | 95 | | 70-130 | | |
| Bromomethane | 5.00 | 3.70 | | | 74 | | 70-130 | | |
| 2-Butanone | 37.5 | 46.43 | | | 124 | | 70-130 | | |
| n-Butylbenzene | 5.00 | 5.47 | | | 109 | | 70-130 | | |
| sec-Butylbenzene | 5.00 | 5.40 | | | 108 | | 70-130 | | |
| tert-Butylbenzene | 5.00 | 5.01 | | | 100 | | 70-130 | | |
| Carbon Disulfide | 5.00 | 5.35 | | | 107 | | 70-130 | | |
| Carbon Tetrachloride | 5.00 | 5.43 | | | 109 | | 70-130 | | |
| Chlorobenzene | 5.00 | 5.13 | | | 103 | | 70-130 | | |
| Chloroethane | 5.00 | 3.84 | | | 77 | | 70-130 | | |
| Chloroform | 5.00 | 5.35 | | | 107 | | 70-130 | | |
| Chloromethane | 5.00 | 4.07 | | | 81 | | 70-130 | | |
| 2-Chlorotoluene | 5.00 | 5.17 | | | 103 | | 70-130 | | |

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.
P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

# Quality Control Summary

Client Name: Tetra Tech, Inc.
Reported: 12/04/2017 19:22

Group Number: 1876333

## LCS/LCSD (continued)

| Analysis Name | LCS Spike Added ug/l | LCS Conc ug/l | LCSD Spike Added ug/l | LCSD Conc ug/l | LCS %REC | LCSD %REC | LCS/LCSD Limits | RPD | RPD Max |
|---|---|---|---|---|---|---|---|---|---|
| 4-Chlorotoluene | 5.00 | 5.14 | | | 103 | | 70-130 | | |
| 1,2-Dibromo-3-chloropropane | 5.00 | 5.87 | | | 117 | | 70-130 | | |
| Dibromochloromethane | 5.00 | 5.24 | | | 105 | | 70-130 | | |
| 1,2-Dibromoethane | 5.00 | 5.39 | | | 108 | | 70-130 | | |
| Dibromomethane | 5.00 | 5.56 | | | 111 | | 70-130 | | |
| 1,2-Dichlorobenzene | 5.00 | 5.03 | | | 101 | | 70-130 | | |
| 1,3-Dichlorobenzene | 5.00 | 4.93 | | | 99 | | 70-130 | | |
| 1,4-Dichlorobenzene | 5.00 | 4.87 | | | 97 | | 70-130 | | |
| Dichlorodifluoromethane | 5.00 | 3.00 | | | 60* | | 70-130 | | |
| 1,1-Dichloroethane | 5.00 | 5.41 | | | 108 | | 70-130 | | |
| 1,2-Dichloroethane | 5.00 | 5.06 | | | 101 | | 70-130 | | |
| 1,1-Dichloroethene | 5.00 | 5.58 | | | 112 | | 70-130 | | |
| cis-1,2-Dichloroethene | 5.00 | 5.51 | | | 110 | | 70-130 | | |
| trans-1,2-Dichloroethene | 5.00 | 5.63 | | | 113 | | 70-130 | | |
| 1,2-Dichloropropane | 5.00 | 5.66 | | | 113 | | 70-130 | | |
| 1,3-Dichloropropane | 5.00 | 5.41 | | | 108 | | 70-130 | | |
| 2,2-Dichloropropane | 5.00 | 5.63 | | | 113 | | 70-130 | | |
| 1,1-Dichloropropene | 5.00 | 5.22 | | | 104 | | 70-130 | | |
| cis-1,3-Dichloropropene | 5.00 | 5.11 | | | 102 | | 70-130 | | |
| trans-1,3-Dichloropropene | 5.00 | 5.31 | | | 106 | | 70-130 | | |
| 1,4-Dioxane | 125 | 123.59 | | | 99 | | 70-130 | | |
| Ethyl ether | 5.00 | 5.27 | | | 105 | | 70-130 | | |
| Ethyl t-butyl ether | 5.00 | 4.60 | | | 92 | | 70-130 | | |
| Ethylbenzene | 5.00 | 5.20 | | | 104 | | 70-130 | | |
| Hexachlorobutadiene | 5.00 | 4.81 | | | 96 | | 70-130 | | |
| 2-Hexanone | 25 | 29.29 | | | 117 | | 70-130 | | |
| di-Isopropyl Ether | 5.00 | 5.09 | | | 102 | | 70-130 | | |
| Isopropylbenzene | 5.00 | 5.07 | | | 101 | | 70-130 | | |
| p-Isopropyltoluene | 5.00 | 5.26 | | | 105 | | 70-130 | | |
| Methyl Tertiary Butyl Ether | 5.00 | 4.85 | | | 97 | | 70-130 | | |
| 4-Methyl-2-Pentanone | 25 | 30.83 | | | 123 | | 70-130 | | |
| Methylene Chloride | 5.00 | 5.58 | | | 112 | | 70-130 | | |
| Naphthalene | 5.00 | 5.44 | | | 109 | | 70-130 | | |
| n-Propylbenzene | 5.00 | 5.49 | | | 110 | | 70-130 | | |
| Styrene | 5.00 | 5.31 | | | 106 | | 70-130 | | |
| 1,1,1,2-Tetrachloroethane | 5.00 | 5.33 | | | 107 | | 70-130 | | |
| 1,1,2,2-Tetrachloroethane | 5.00 | 5.43 | | | 109 | | 70-130 | | |
| Tetrachloroethene | 5.00 | 4.91 | | | 98 | | 70-130 | | |
| Tetrahydrofuran | 25 | 33.58 | | | 134* | | 70-130 | | |
| Toluene | 5.00 | 5.20 | | | 104 | | 70-130 | | |
| 1,2,3-Trichlorobenzene | 5.00 | 5.10 | | | 102 | | 70-130 | | |
| 1,2,4-Trichlorobenzene | 5.00 | 4.67 | | | 93 | | 70-130 | | |
| 1,1,1-Trichloroethane | 5.00 | 5.34 | | | 107 | | 70-130 | | |
| 1,1,2-Trichloroethane | 5.00 | 5.75 | | | 115 | | 70-130 | | |

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(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.
P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

# Quality Control Summary

Client Name: Tetra Tech, Inc.
Reported: 12/04/2017 19:22

Group Number: 1876333

## LCS/LCSD (continued)

| Analysis Name | LCS Spike Added ug/l | LCS Conc ug/l | LCSD Spike Added ug/l | LCSD Conc ug/l | LCS %REC | LCSD %REC | LCS/LCSD Limits | RPD | RPD Max |
|---|---|---|---|---|---|---|---|---|---|
| Trichloroethene | 5.00 | 5.33 | | | 107 | | 70-130 | | |
| Trichlorofluoromethane | 5.00 | 4.17 | | | 83 | | 70-130 | | |
| 1,2,3-Trichloropropane | 5.00 | 5.46 | | | 109 | | 70-130 | | |
| 1,2,4-Trimethylbenzene | 5.00 | 5.38 | | | 108 | | 70-130 | | |
| 1,3,5-Trimethylbenzene | 5.00 | 5.30 | | | 106 | | 70-130 | | |
| Vinyl Chloride | 5.00 | 4.14 | | | 83 | | 70-130 | | |
| m+p-Xylene | 10 | 10.29 | | | 103 | | 70-130 | | |
| o-Xylene | 5.00 | 4.91 | | | 98 | | 70-130 | | |
| | **ug/l** | **ug/l** | **ug/l** | **ug/l** | | | | | |
| Batch number: 17321WAK026 | Sample number(s): 9322175-9322182 | | | | | | | | |
| 1,4-Dioxane | 1.00 | 0.504 | 1.00 | 0.484 | 50 | 48 | 25-72 | 4 | 30 |
| | **ug/l** | **ug/l** | **ug/l** | **ug/l** | | | | | |
| Batch number: 173210013A | Sample number(s): 9322180-9322183 | | | | | | | | |
| Methane | 59.8 | 62.15 | 59.8 | 63.45 | 104 | 106 | 85-115 | 2 | 20 |
| | **mg/l** | **mg/l** | **mg/l** | **mg/l** | | | | | |
| Batch number: 17320120113A | Sample number(s): 9322180 | | | | | | | | |
| Nitrate Nitrogen | 0.750 | 0.724 | 0.750 | 0.721 | 96 | 96 | 90-110 | 0 | 20 |
| Sulfate | 7.50 | 7.52 | 7.50 | 7.48 | 100 | 100 | 90-110 | 0 | 20 |
| Batch number: 17320120113B | Sample number(s): 9322181-9322182 | | | | | | | | |
| Nitrate Nitrogen | 0.750 | 0.724 | 0.750 | 0.721 | 96 | 96 | 90-110 | 0 | 20 |
| Sulfate | 7.50 | 7.52 | 7.50 | 7.48 | 100 | 100 | 90-110 | 0 | 20 |
| Batch number: 17324667606A | Sample number(s): 9322180-9322182 | | | | | | | | |
| Total Organic Carbon | 25 | 26.57 | | | 106 | | 91-113 | | |

## MS/MSD

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike

| Analysis Name | Unspiked Conc ug/l | MS Spike Added ug/l | MS Conc ug/l | MSD Spike Added ug/l | MSD Conc ug/l | MS %Rec | MSD %Rec | MS/MSD Limits | RPD | RPD Max |
|---|---|---|---|---|---|---|---|---|---|---|
| Batch number: I173332AA | Sample number(s): 9322183 UNSPK: P324688 | | | | | | | | | |
| Acetone | N.D. | 37.5 | 37.57 | 37.5 | 38.44 | 100 | 103 | 70-130 | 2 | 20 |
| t-Amyl methyl ether | N.D. | 5.00 | 4.51 | 5.00 | 4.61 | 90 | 92 | 70-130 | 2 | 20 |
| Benzene | N.D. | 5.00 | 5.74 | 5.00 | 5.72 | 115 | 114 | 70-130 | 0 | 20 |
| Bromobenzene | N.D. | 5.00 | 4.85 | 5.00 | 4.93 | 97 | 99 | 70-130 | 2 | 20 |
| Bromochloromethane | N.D. | 5.00 | 5.29 | 5.00 | 5.32 | 106 | 106 | 70-130 | 1 | 20 |

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.
P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

# Quality Control Summary

Client Name: Tetra Tech, Inc.
Reported: 12/04/2017 19:22

Group Number: 1876333

## MS/MSD (continued)

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike

| Analysis Name | Unspiked Conc ug/l | MS Spike Added ug/l | MS Conc ug/l | MSD Spike Added ug/l | MSD Conc ug/l | MS %Rec | MSD %Rec | MS/MSD Limits | RPD | RPD Max |
|---|---|---|---|---|---|---|---|---|---|---|
| Bromodichloromethane | N.D. | 5.00 | 5.59 | 5.00 | 5.54 | 112 | 111 | 70-130 | 1 | 20 |
| Bromoform | N.D. | 5.00 | 4.75 | 5.00 | 4.72 | 95 | 94 | 70-130 | 1 | 20 |
| Bromomethane | N.D. | 5.00 | 4.16 | 5.00 | 4.14 | 83 | 83 | 70-130 | 1 | 20 |
| 2-Butanone | N.D. | 37.5 | 52.34 | 37.5 | 43.34 | 140* | 116 | 70-130 | 19 | 20 |
| n-Butylbenzene | N.D. | 5.00 | 5.76 | 5.00 | 5.78 | 115 | 116 | 70-130 | 0 | 20 |
| sec-Butylbenzene | N.D. | 5.00 | 5.65 | 5.00 | 5.71 | 113 | 114 | 70-130 | 1 | 20 |
| tert-Butylbenzene | N.D. | 5.00 | 5.10 | 5.00 | 5.21 | 102 | 104 | 70-130 | 2 | 20 |
| Carbon Disulfide | N.D. | 5.00 | 5.84 | 5.00 | 5.89 | 117 | 118 | 70-130 | 1 | 20 |
| Carbon Tetrachloride | N.D. | 5.00 | 5.93 | 5.00 | 5.92 | 119 | 118 | 70-130 | 0 | 20 |
| Chlorobenzene | N.D. | 5.00 | 5.42 | 5.00 | 5.38 | 108 | 108 | 70-130 | 1 | 20 |
| Chloroethane | N.D. | 5.00 | 4.06 | 5.00 | 4.22 | 81 | 84 | 70-130 | 4 | 20 |
| Chloroform | N.D. | 5.00 | 5.65 | 5.00 | 5.61 | 113 | 112 | 70-130 | 1 | 20 |
| Chloromethane | N.D. | 5.00 | 4.49 | 5.00 | 4.50 | 90 | 90 | 70-130 | 0 | 20 |
| 2-Chlorotoluene | N.D. | 5.00 | 5.27 | 5.00 | 5.37 | 105 | 107 | 70-130 | 2 | 20 |
| 4-Chlorotoluene | N.D. | 5.00 | 5.21 | 5.00 | 5.31 | 104 | 106 | 70-130 | 2 | 20 |
| 1,2-Dibromo-3-chloropropane | N.D. | 5.00 | 6.95 | 5.00 | 5.39 | 139* | 108 | 70-130 | 25* | 20 |
| Dibromochloromethane | N.D. | 5.00 | 5.29 | 5.00 | 5.29 | 106 | 106 | 70-130 | 0 | 20 |
| 1,2-Dibromoethane | N.D. | 5.00 | 5.37 | 5.00 | 5.36 | 107 | 107 | 70-130 | 0 | 20 |
| Dibromomethane | N.D. | 5.00 | 5.61 | 5.00 | 5.58 | 112 | 112 | 70-130 | 1 | 20 |
| 1,2-Dichlorobenzene | N.D. | 5.00 | 5.14 | 5.00 | 5.18 | 103 | 104 | 70-130 | 1 | 20 |
| 1,3-Dichlorobenzene | N.D. | 5.00 | 5.03 | 5.00 | 5.05 | 101 | 101 | 70-130 | 0 | 20 |
| 1,4-Dichlorobenzene | N.D. | 5.00 | 4.98 | 5.00 | 4.98 | 100 | 100 | 70-130 | 0 | 20 |
| Dichlorodifluoromethane | N.D. | 5.00 | 3.23 | 5.00 | 3.37 | 65* | 67* | 70-130 | 4 | 20 |
| 1,1-Dichloroethane | 0.416 | 5.00 | 6.05 | 5.00 | 6.12 | 113 | 114 | 70-130 | 1 | 20 |
| 1,2-Dichloroethane | N.D. | 5.00 | 5.17 | 5.00 | 5.12 | 103 | 102 | 70-130 | 1 | 20 |
| 1,1-Dichloroethene | 0.841 | 5.00 | 6.80 | 5.00 | 7.01 | 119 | 123 | 70-130 | 3 | 20 |
| cis-1,2-Dichloroethene | 1.76 | 5.00 | 7.86 | 5.00 | 7.94 | 122 | 124 | 70-130 | 1 | 20 |
| trans-1,2-Dichloroethene | N.D. | 5.00 | 5.96 | 5.00 | 5.96 | 119 | 119 | 70-130 | 0 | 20 |
| 1,2-Dichloropropane | N.D. | 5.00 | 5.85 | 5.00 | 5.84 | 117 | 117 | 70-130 | 0 | 20 |
| 1,3-Dichloropropane | N.D. | 5.00 | 5.41 | 5.00 | 5.41 | 108 | 108 | 70-130 | 0 | 20 |
| 2,2-Dichloropropane | N.D. | 5.00 | 5.98 | 5.00 | 6.11 | 120 | 122 | 70-130 | 2 | 20 |
| 1,1-Dichloropropene | N.D. | 5.00 | 5.64 | 5.00 | 5.64 | 113 | 113 | 70-130 | 0 | 20 |
| cis-1,3-Dichloropropene | N.D. | 5.00 | 5.06 | 5.00 | 5.17 | 101 | 103 | 70-130 | 2 | 20 |
| trans-1,3-Dichloropropene | N.D. | 5.00 | 5.28 | 5.00 | 5.35 | 106 | 107 | 70-130 | 1 | 20 |
| 1,4-Dioxane | N.D. | 125 | 95.47 | 125 | 112.07 | 76 | 90 | 70-130 | 16 | 20 |
| Ethyl ether | N.D. | 5.00 | 5.24 | 5.00 | 5.32 | 105 | 106 | 70-130 | 1 | 20 |
| Ethyl t-butyl ether | N.D. | 5.00 | 4.36 | 5.00 | 4.53 | 87 | 91 | 70-130 | 4 | 20 |
| Ethylbenzene | N.D. | 5.00 | 5.50 | 5.00 | 5.41 | 110 | 108 | 70-130 | 2 | 20 |
| Hexachlorobutadiene | N.D. | 5.00 | 4.89 | 5.00 | 5.08 | 98 | 102 | 70-130 | 4 | 20 |
| 2-Hexanone | N.D. | 25 | 34.44 | 25 | 27.37 | 138* | 109 | 70-130 | 23* | 20 |
| di-Isopropyl Ether | N.D. | 5.00 | 5.02 | 5.00 | 5.15 | 100 | 103 | 70-130 | 3 | 20 |
| Isopropylbenzene | N.D. | 5.00 | 5.36 | 5.00 | 5.35 | 107 | 107 | 70-130 | 0 | 20 |
| p-Isopropyltoluene | N.D. | 5.00 | 5.47 | 5.00 | 5.55 | 109 | 111 | 70-130 | 1 | 20 |

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.
P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

# Quality Control Summary

Client Name: Tetra Tech, Inc.
Reported: 12/04/2017 19:22

Group Number: 1876333

## MS/MSD (continued)

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike

| Analysis Name | Unspiked Conc ug/l | MS Spike Added ug/l | MS Conc ug/l | MSD Spike Added ug/l | MSD Conc ug/l | MS %Rec | MSD %Rec | MS/MSD Limits | RPD | RPD Max |
|---|---|---|---|---|---|---|---|---|---|---|
| Methyl Tertiary Butyl Ether | 0.156 | 5.00 | 4.79 | 5.00 | 5.02 | 93 | 97 | 70-130 | 5 | 20 |
| 4-Methyl-2-Pentanone | N.D. | 25 | 35.75 | 25 | 28.12 | 143* | 112 | 70-130 | 24* | 20 |
| Methylene Chloride | N.D. | 5.00 | 5.68 | 5.00 | 5.76 | 114 | 115 | 70-130 | 1 | 20 |
| Naphthalene | N.D. | 5.00 | 5.14 | 5.00 | 5.33 | 103 | 107 | 70-130 | 4 | 20 |
| n-Propylbenzene | N.D. | 5.00 | 5.74 | 5.00 | 5.76 | 115 | 115 | 70-130 | 0 | 20 |
| Styrene | N.D. | 5.00 | 5.53 | 5.00 | 5.45 | 111 | 109 | 70-130 | 1 | 20 |
| 1,1,1,2-Tetrachloroethane | N.D. | 5.00 | 5.46 | 5.00 | 5.44 | 109 | 109 | 70-130 | 0 | 20 |
| 1,1,2,2-Tetrachloroethane | N.D. | 5.00 | 5.33 | 5.00 | 5.51 | 107 | 110 | 70-130 | 3 | 20 |
| Tetrachloroethene | 1.97 | 5.00 | 6.97 | 5.00 | 6.98 | 100 | 100 | 70-130 | 0 | 20 |
| Tetrahydrofuran | N.D. | 25 | 37 | 25 | 30.07 | 148* | 120 | 70-130 | 21* | 20 |
| Toluene | N.D. | 5.00 | 5.46 | 5.00 | 5.46 | 109 | 109 | 70-130 | 0 | 20 |
| 1,2,3-Trichlorobenzene | N.D. | 5.00 | 5.06 | 5.00 | 5.08 | 101 | 102 | 70-130 | 1 | 20 |
| 1,2,4-Trichlorobenzene | N.D. | 5.00 | 4.65 | 5.00 | 4.70 | 93 | 94 | 70-130 | 1 | 20 |
| 1,1,1-Trichloroethane | N.D. | 5.00 | 5.76 | 5.00 | 5.76 | 115 | 115 | 70-130 | 0 | 20 |
| 1,1,2-Trichloroethane | N.D. | 5.00 | 5.61 | 5.00 | 5.68 | 112 | 114 | 70-130 | 1 | 20 |
| Trichloroethene | 9.60 | 5.00 | 15.85 | 5.00 | 15.94 | 125 | 127 | 70-130 | 1 | 20 |
| Trichlorofluoromethane | N.D. | 5.00 | 4.89 | 5.00 | 4.62 | 98 | 92 | 70-130 | 6 | 20 |
| 1,2,3-Trichloropropane | N.D. | 5.00 | 5.34 | 5.00 | 5.37 | 107 | 107 | 70-130 | 1 | 20 |
| 1,2,4-Trimethylbenzene | N.D. | 5.00 | 5.46 | 5.00 | 5.50 | 109 | 110 | 70-130 | 1 | 20 |
| 1,3,5-Trimethylbenzene | N.D. | 5.00 | 5.48 | 5.00 | 5.51 | 110 | 110 | 70-130 | 1 | 20 |
| Vinyl Chloride | 0.103 | 5.00 | 4.80 | 5.00 | 4.79 | 94 | 94 | 70-130 | 0 | 20 |
| m+p-Xylene | N.D. | 10 | 10.85 | 10 | 10.75 | 108 | 108 | 70-130 | 1 | 20 |
| o-Xylene | N.D. | 5.00 | 5.13 | 5.00 | 5.11 | 103 | 102 | 70-130 | 0 | 20 |
| | mg/l | mg/l | mg/l | mg/l | mg/l | | | | | |
| Batch number: 17320120113A | Sample number(s): 9322180 UNSPK: P322200 | | | | | | | | | |
| Nitrate Nitrogen | 1.07 | 2.50 | 3.34 | | | 91 | | 90-110 | | |
| Sulfate | 8.04 | 25 | 31.57 | | | 94 | | 90-110 | | |
| Batch number: 17320120113B | Sample number(s): 9322181-9322182 UNSPK: P321897 | | | | | | | | | |
| Nitrate Nitrogen | N.D. | 2.50 | 2.65 | | | 106 | | 90-110 | | |
| Sulfate | 1078.84 | 1000 | 2141.3 | | | 106 | | 90-110 | | |
| Batch number: 17324667606A | Sample number(s): 9322180-9322182 UNSPK: P324688 | | | | | | | | | |
| Total Organic Carbon | 1.39 | 10 | 11.83 | | | 104 | | 91-113 | | |

## Laboratory Duplicate

Background (BKG) = the sample used in conjunction with the duplicate

| Analysis Name | BKG Conc | DUP Conc | DUP RPD | DUP RPD Max |
|---|---|---|---|---|

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.
P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

# Quality Control Summary

Client Name: Tetra Tech, Inc.
Reported: 12/04/2017 19:22

Group Number: 1876333

## Laboratory Duplicate

Background (BKG) = the sample used in conjunction with the duplicate

| Analysis Name | BKG Conc mg/l | DUP Conc mg/l | DUP RPD | DUP RPD Max |
|---|---|---|---|---|
| Batch number: 17320120113A | Sample number(s): 9322180 BKG: P322200 | | | |
| Nitrate Nitrogen | 1.07 | 1.07 | 0 (1) | 15 |
| Sulfate | 8.04 | 7.92 | 1 (1) | 15 |
| Batch number: 17320120113B | Sample number(s): 9322181-9322182 BKG: P321897 | | | |
| Nitrate Nitrogen | N.D. | N.D. | 0 (1) | 15 |
| Sulfate | 1078.84 | 1060.67 | 2 | 15 |
| Batch number: 17324667606A | Sample number(s): 9322180-9322182 BKG: P324688 | | | |
| Total Organic Carbon | 1.39 | 1.29 | 8 (1) | 9 |

## Surrogate Quality Control

Surrogate recoveries which are outside of the QC window are confirmed unless attributed to dilution or otherwise noted on the Analysis Report. For dual column analyses, the surrogate (at least one surrogate for multi-surrogate tests) must be within the acceptance limits on at least one of the two columns.

Analysis Name: VOCs- 25ml Water by 8260C
Batch number: I173321AA

| | Dibromofluoromethane | 1,2-Dichloroethane-d4 | Toluene-d8 | 4-Bromofluorobenzene |
|---|---|---|---|---|
| 9322175 | 100 | 101 | 101 | 95 |
| 9322176 | 100 | 105 | 101 | 96 |
| 9322177 | 101 | 104 | 100 | 94 |
| 9322178 | 102 | 103 | 101 | 93 |
| 9322179 | 102 | 102 | 100 | 93 |
| 9322180 | 101 | 102 | 101 | 93 |
| 9322181 | 102 | 105 | 101 | 93 |
| 9322182 | 102 | 105 | 101 | 94 |
| Blank | 100 | 103 | 101 | 94 |
| LCS | 97 | 102 | 101 | 100 |
| LCSD | 98 | 99 | 100 | 98 |
| Limits: | 70-130 | 70-130 | 70-130 | 70-130 |

Analysis Name: VOCs- 25ml Water by 8260C
Batch number: I173332AA

| | Dibromofluoromethane | 1,2-Dichloroethane-d4 | Toluene-d8 | 4-Bromofluorobenzene |
|---|---|---|---|---|
| 9322183 | 102 | 105 | 101 | 96 |
| Blank | 102 | 101 | 103 | 94 |
| LCS | 97 | 100 | 100 | 99 |

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.
P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

# Quality Control Summary

Client Name: Tetra Tech, Inc.
Reported: 12/04/2017 19:22

Group Number: 1876333

## Surrogate Quality Control (continued)

Surrogate recoveries which are outside of the QC window are confirmed unless attributed to dilution or otherwise noted on the Analysis Report. For dual column analyses, the surrogate (at least one surrogate for multi-surrogate tests) must be within the acceptance limits on at least one of the two columns.

Analysis Name: VOCs- 25ml Water by 8260C
Batch number: I173332AA

| | Dibromofluoromethane | 1,2-Dichloroethane-d4 | Toluene-d8 | 4-Bromofluorobenzene |
|---|---|---|---|---|
| MS | 98 | 99 | 101 | 100 |
| MSD | 98 | 100 | 100 | 100 |
| Limits: | 70-130 | 70-130 | 70-130 | 70-130 |

Analysis Name: SIM SVOAs 8270D MINI
Batch number: 17321WAK026

| | Fluoranthene-d10 | Benzo(a)pyrene-d12 | 1-Methylnaphthalene-d10 |
|---|---|---|---|
| 9322175 | 93 | 27 | 85 |
| 9322176 | 90 | 52 | 82 |
| 9322177 | 93 | 88 | 82 |
| 9322178 | 92 | 39 | 86 |
| 9322179 | 88 | 41 | 82 |
| 9322180 | 94 | 77 | 76 |
| 9322181 | 84 | 60 | 59 |
| 9322182 | 86 | 61 | 54 |
| Blank | 88 | 80 | 76 |
| LCS | 93 | 95 | 80 |
| LCSD | 90 | 95 | 89 |
| Limits: | 44-115 | 25-125 | 33-112 |

Analysis Name: Volatile Headspace Hydrocarbon
Batch number: 173210013A

| | Propene |
|---|---|
| 9322180 | 87 |
| 9322181 | 86 |
| 9322182 | 87 |
| 9322183 | 92 |
| Blank | 95 |
| LCS | 99 |
| LCSD | 98 |
| Limits: | 44-123 |

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.
P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

# Environmental Analysis Request/Chain of Custody

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For Eurofins Lancaster Laboratories Environmental use only

Acct. # 19999 Group # 1876333 Sample # 9322175-83

**COC #** 557718

## Client Information

Client: TETRA TECH

Acct. #:

Project Name/#: LMC BURLINGTON 117-0507550

PWSID #:

Project Manager: ED DOLAN

P.O. #: 117-0507550

Sampler: JAKE PICARD

Quote #:

State where samples were collected: MA

For Compliance: Yes ☐ No ☐

For Lab Use Only

FSC:

SCR#: 215229

**Preservation Codes**

H=HCl T=Thiosulfate
N=$HNO_3$ B=NaOH
S=$H_2SO_4$ P=$H_3PO_4$
F=Field Filtered O=Other

**Remarks**

MCP SITE ANALYZE IT 1,4 DIOXANE TO 0.3 MG/L RL

| Sample Identification | Collected Date | Collected Time | Grab | Composite | Soil | Sediment | Tissue | Potable | Ground | Surface | Water | NPDES | Other: | Total # of Containers | VOC 8260 | 1,4 DIOXANE 8270 SIM SCR | NITRATE NITROGEN N026 | METHANE HCl | TOC $H_3PO_4$ | Sulfate* | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3G-11-111417 | 11/14/17 | 1620 | X | | | | | | | | GW | | | 4 | 3 | 1 | | | | | *correction per Chris Cone e-mail BW 11/17/17 |
| EMW-3R-111417 | 11/14/17 | 1145 | X | | | | | | | | GW | | | 4 | 3 | 1 | | | | | |
| EMW-7-111417 | 11/14/17 | 1435 | X | | | | | | | | GW | | | 4 | 3 | 1 | | | | | |
| EMW-10D-111417 | 11/14/17 | 1310 | X | | | | | | | | GW | | | 4 | 3 | 1 | | | | | |
| 3H-5-111517 | 11/15/17 | 1045 | X | | | | | | | | GW | | | 5 | 3 | 2 | | | | | |
| *3EG-12-111517 | 11/15/17 | 1205 | X | | | | | | | | GW | | | 11 | 3 | 2 | 2 | 2 | 2 | X | |
| *3EG-12D-111517 | 11/15/17 | 1210 | X | | | | | | | | GW | | | 11 | 3 | 2 | 2 | 2 | 2 | X | |
| EMW-20(R) | 11/15/17 | 1445 | X | | | | | | | | GW | | | 11 | 3 | 2 | 2 | 2 | 2 | X | |
| *Trip Blank | | | | | | | | | | | | | | | X | | | X | | | |

**Turnaround Time (TAT) Requested** (please circle)

Standard Rush

(Rush TAT is subject to laboratory approval and surcharge.)

Date results are needed: _____

E-mail address: _____

**Data Package Options** (circle if required)

Type I (EPA Level 3 Equivalent/non-CLP) Type VI (Raw Data Only)

Type III (Reduced non-CLP) NJ DKQP TX TRRP-13

NYSDEC Category A or B MA MCP CT RCP

| Relinquished by | Date | Time | Received by | Date | Time |
|---|---|---|---|---|---|
| [illegible] | 11/02/17 | [illegible] | | | |
| JAKE PICARD | 11/15/17 | 1551 | | | |
| | | | | | |
| | | | | | |
| | | | [illegible] | 11/16/17 | 940 |

EDD Required? Yes No

If yes, format: PDF / EXCEL

Site-Specific QC (MS/MSD/Dup)? Yes No

(If yes, indicate QC sample and submit triplicate sample volume.)

Relinquished by Commercial Carrier:

UPS _____ FedEx ✓ Other _____

Temperature upon receipt 1.5 °C

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# Sample Administration Receipt Documentation Log

Doc Log ID: 201288

Group Number(s): 1876333

Client: Tetra Tech

## Delivery and Receipt Information

| | | | |
|---|---|---|---|
| Delivery Method: | Fed Ex | Arrival Timestamp: | 11/16/2017 9:40 |
| Number of Packages: | 1 | Number of Projects: | 1 |
| State/Province of Origin: | MA | | |

## Arrival Condition Summary

| | | | |
|---|---|---|---|
| Shipping Container Sealed: | Yes | Sample IDs on COC match Containers: | No |
| Custody Seal Present: | Yes | Sample Date/Times match COC: | Yes |
| Custody Seal Intact: | Yes | VOA Vial Headspace ≥ 6mm: | No |
| Samples Chilled: | Yes | Total Trip Blank Qty: | 3 |
| Paperwork Enclosed: | Yes | Trip Blank Type: | HCL |
| Samples Intact: | Yes | Air Quality Samples Present: | No |
| Missing Samples: | No | | |
| Extra Samples: | No | | |
| Discrepancy in Container Qty on COC: | No | | |

*Unpacked by Wyatt Shiffler (12792) at 10:38 on 11/16/2017*

## Samples Chilled Details

*Thermometer Types: DT = Digital (Temp. Bottle) IR = Infrared (Surface Temp) All Temperatures in °C.*

| Cooler # | Thermometer ID | Corrected Temp | Therm. Type | Ice Type | Ice Present? | Ice Container | Elevated Temp? |
|---|---|---|---|---|---|---|---|
| 1 | DT146 | 1.5 | DT | Wet | Y | Bagged | N |

## Sample ID Discrepancy Details

| Sample ID on COC | Sample ID on Label | Comments |
|---|---|---|
| E6-12-111517 | E6-12-111517 DUP | |



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Lancaster, PA 17605-2425
T | 717-656-2300
F | 717-656-2681
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# Explanation of Symbols and Abbreviations

*The following defines common symbols and abbreviations used in reporting technical data:*

| | | | |
|---|---|---|---|
| **BMQL** | Below Minimum Quantitation Level | **mg** | milligram(s) |
| **C** | degrees Celsius | **mL** | milliliter(s) |
| **cfu** | colony forming units | **MPN** | Most Probable Number |
| **CP Units** | cobalt-chloroplatinate units | **N.D.** | non-detect |
| **F** | degrees Fahrenheit | **ng** | nanogram(s) |
| **g** | gram(s) | **NTU** | nephelometric turbidity units |
| **IU** | International Units | **pg/L** | picogram/liter |
| **kg** | kilogram(s) | **RL** | Reporting Limit |
| **L** | liter(s) | **TNTC** | Too Numerous To Count |
| **lb.** | pound(s) | **µg** | microgram(s) |
| **m3** | cubic meter(s) | **µL** | microliter(s) |
| **meq** | milliequivalents | **umhos/cm** | micromhos/cm |

| | |
|---|---|
| **<** | less than |
| **>** | greater than |
| **ppm** | parts per million - One ppm is equivalent to one milligram per kilogram (mg/kg) or one gram per million grams. For aqueous liquids, ppm is usually taken to be equivalent to milligrams per liter (mg/l), because one liter of water has a weight very close to a kilogram. For gases or vapors, one ppm is equivalent to one microliter per liter of gas. |
| **ppb** | parts per billion |
| **Dry weight basis** | Results printed under this heading have been adjusted for moisture content. This increases the analyte weight concentration to approximate the value present in a similar sample without moisture. All other results are reported on an as-received basis. |

**Analytical test results meet all requirements of the associated regulatory program (i.e., NELAC (TNI), DoD, and ISO 17025) unless otherwise noted under the individual analysis.**

Measurement uncertainty values, as applicable, are available upon request.

Tests results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff.

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Times are local to the area of activity. Parameters listed in the 40 CFR Part 136 Table II as “analyze immediately” are not performed within 15 minutes.

**WARRANTY AND LIMITS OF LIABILITY** - In accepting analytical work, we warrant the accuracy of test results for the sample as submitted. THE FOREGOING EXPRESS WARRANTY IS EXCLUSIVE AND IS GIVEN IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED. WE DISCLAIM ANY OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING A WARRANTY OF FITNESS FOR PARTICULAR PURPOSE AND WARRANTY OF MERCHANTABILITY. IN NO EVENT SHALL EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL, LLC BE LIABLE FOR INDIRECT, SPECIAL, CONSEQUENTIAL, OR INCIDENTAL DAMAGES INCLUDING, BUT NOT LIMITED TO, DAMAGES FOR LOSS OF PROFIT OR GOODWILL REGARDLESS OF (A) THE NEGLIGENCE (EITHER SOLE OR CONCURRENT) OF EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL AND (B) WHETHER EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL HAS BEEN INFORMED OF THE POSSIBILITY OF SUCH DAMAGES. We accept no legal responsibility for the purposes for which the client uses the test results. No purchase order or other order for work shall be accepted by Eurofins Lancaster Laboratories Environmental which includes any conditions that vary from the Standard Terms and Conditions, and Eurofins Lancaster Laboratories Environmental hereby objects to any conflicting terms contained in any acceptance or order submitted by client.

# Data Qualifiers

| Qualifier | Definition |
|---|---|
| C | Result confirmed by reanalysis |
| D1 | Indicates for dual column analyses that the result is reported from column 1 |
| D2 | Indicates for dual column analyses that the result is reported from column 2 |
| E | Concentration exceeds the calibration range |
| J (or G, I, X) | Estimated value >= the Method Detection Limit (MDL or DL) and < the Limit of Quantitation (LOQ or RL) |
| P | Concentration difference between the primary and confirmation column >40%. The lower result is reported. |
| U | Analyte was not detected at the value indicated |
| V | Concentration difference between the primary and confirmation column >100%. The reporting limit is raised due to this disparity and evident interference. |
| W | The dissolved oxygen uptake for the unseeded blank is greater than 0.20 mg/L. |
| Z | Laboratory Defined - see analysis report |

Additional Organic and Inorganic CLP qualifiers may be used with Form 1 reports as defined by the CLP methods.
Qualifiers specific to Dioxin/Furans and PCB Congeners are detailed on the individual Analysis Report.

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# ANALYSIS REPORT

Prepared by:

Eurofins Lancaster Laboratories Environmental
2425 New Holland Pike
Lancaster, PA 17601

Prepared for:

Tetra Tech, Inc.
One Monarch Drive
Suite 202
Littleton MA 01460

Report Date: November 30, 2017 00:10

**Project: Lockheed Martin - Burlington, MA**

Account #: 19999
Group Number: 1877597
SDG: LMB09
PO Number: 117-0507550
State of Sample Origin: MA

Regulatory agencies do not accredit laboratories for all methods, analytes, and matrices. Our current scopes of accreditation can be viewed at http://www.eurofinsus.com/environment-testing/laboratories/eurofins-lancaster-laboratories-environmental/resources/certifications/ . To request copies of prior scopes of accreditation, contact your project manager.

| | | |
|---|---|---|
| Electronic Copy To | Tetra Tech, Inc. | Attn: Thomas Nunno |
| Electronic Copy To | Tetra Tech, Inc. | Attn: Ed Dolan |
| Electronic Copy To | Tetra Tech, Inc. | Attn: Chris Conor |

Respectfully Submitted,

Barbara Weyandt

Barbara A. Weyandt
Specialist

(717) 556-7264

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## SAMPLE INFORMATION

| Client Sample Description | Sample Collection Date/Time | ELLE# |
|---|---|---|
| 3H-2-111717 Grab Groundwater | 11/17/2017 11:32 | 9327872 |
| 3H-3-111717 Grab Groundwater | 11/17/2017 11:45 | 9327873 |
| GMW-12R-111717 Grab Groundwater | 11/17/2017 13:25 | 9327874 |
| Trip Blank Water | 11/17/2017 07:00 | 9327875 |

The specific methodologies used in obtaining the enclosed analytical results are indicated on the Laboratory Sample Analysis Record.

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## MADEP MCP Analytical Method Report Certification Form

Laboratory Name: Eurofins Lancaster Laboratories Environmental
Project: Lockheed Martin - Burlington, MA
This form provides certifications for the following data set: 9327872-9327875

Sample Matrices: Water

Methods Used:
SW-846 8260C; SW-846 8270D SIM

| Affirmative responses to questions A through F are required for "Presumptive Certainty" status | | Yes or No[1] |
|---|---|---|
| A | Were all samples received in a condition consistent with those described on the Chain-of-Custody, properly preserved (including temperature) in the field or laboratory, and prepared/analyzed within method holding times? | Yes |
| B | Were the analytical method(s) and all associated QC requirements specified in the selected CAM protocol(s) followed? | Yes |
| C | Were all required corrective actions and analytical response actions specified in the selected CAM protocol(s) implemented for all identified performance standard non-conformances? | Yes |
| D | Does the laboratory report comply with all the reporting requirements specified in CAM VII A, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data"? | Yes |
| E | **VPH, EPH, APH, and TO-15 only:**<br>a. VPH, EPH, and APH Methods only: Was each method conducted without significant modification(s)? (Refer to the individual method(s) for a list of significant modifications).<br>b. APH and TO-15 Methods only. Was the complete analyte list reported for each method? | <br>NA<br><br>NA |
| F | Were all applicable CAM protocol QC and performance standard non-conformances identified and evaluated in a laboratory narrative (including all "No" responses to Questions A through E)? | Yes |
| Responses to Questions G, H and I below are required for "Presumptive Certainty" status | | |
| G | Were the reporting limits at or below all CAM reporting limits specified in the selected CAM protocol(s)? | Yes |
| *Data User Note: Data that achieve "Presumptive Certainty" status may not necessarily meet the data usability and representativeness requirements described in 310 CMR 40. 1056 (2)(k) and WSC-07-350.* | | |
| H | Were all QC performance standards specified in the CAM protocol(s) achieved? | No |
| I | Were results reported for the complete analyte list specified in the selected CAM protocol(s)? | No |
| [1] Refer to the Case Narrative for information regarding negative responses. | | |
| I, the undersigned, attest under the pains and penalties of perjury that the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete. | | |
| Christiane S. Sweigart<br>Senior Specialist | | |

Project Name: Lockheed Martin - Burlington, MA
ELLE Group #: 1877597

**General Comments:**

See the Laboratory Sample Analysis Record section of the Analysis Report for the method references.

All QC met criteria unless otherwise noted in an Analysis Specific Comment below.

Refer to the QC Summary for specific values and acceptance criteria.

Project specific QC samples are not included in this data set.

Matrix QC may not be reported if site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

Surrogate recoveries (if applicable) which are outside of the QC window are confirmed unless attributed to a dilution or otherwise noted in an Analysis Specific Comment below.

For dual column analyses, the surrogate (for multi-surrogate tests, at least one surrogate) must be within the acceptance limits on at least one of the two columns.

The samples were received at the appropriate temperature and in accordance with the chain of custody unless otherwise noted.

**Analysis Specific Comments:**

**SW-846 8260C, GC/MS Volatiles**

Sample #s: 9327872, 9327873, 9327874, 9327875

The percent drift for the following is >20% in the continuing calibration verification standard associated with this sample: Dichlorodifluoromethane, Bromomethane, Chloroethane, 1,4-Dioxane.

The percent recovery for Dichlorodifluoromethane is outside of the 70 - 130% QC windows in the LCS and/or LCSD associated with this sample. Dichlorodifluoromethane is considered a difficult analyte and the percent recovery is within the allowed 40 - 160% window.

A Method Detection Limit (MDL) standard is analyzed to confirm sensitivity of the instrument for samples with non-detect analytes associated with a continuing calibration verification standard exhibiting low response (outside the 20%D criteria). The MDL standard shows adequate sensitivity at or below the reporting limit.

Batch #: I173332AA (Sample number(s): 9327872-9327875 UNSPK: P324688)

The recovery(ies) for the following analyte(s) in the LCS exceeded the acceptance window indicating a positive bias: Tetrahydrofuran

The recovery(ies) for the following analyte(s) in the LCS were below the acceptance window: Dichlorodifluoromethane

The recovery(ies) for the following analyte(s) in the MS and/or MSD exceeded the acceptance window indicating a positive bias: 2-Butanone, Tetrahydrofuran, 4-Methyl-2-Pentanone, 2-Hexanone, 1,2-Dibromo-3-chloropropane

The recovery(ies) for the following analyte(s) in the MS and/or MSD were below the acceptance window: Dichlorodifluoromethane

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The relative percent difference(s) for the following analyte(s) in the MS/MSD were outside acceptance windows: Tetrahydrofuran, 4-Methyl-2-Pentanone, 2-Hexanone, 1,2-Dibromo-3-chloropropane

**SW-846 8270D SIM, GC/MS Semivolatiles**

Sample #s: 9327872, 9327873, 9327874

The MA MCP analyte list requirement was not met for Method 8270D.
The client specified list is reported.

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# Analysis Report

**Sample Description:** **3H-2-111717 Grab Groundwater**
**Lockheed Martin, Burlington**

**Project Name:** **Lockheed Martin - Burlington, MA**

Submittal Date/Time: 11/18/2017 10:05
Collection Date/Time: 11/17/2017 11:32
SDG#: LMB09-03

**Tetra Tech, Inc.**
**ELLE Sample #: WW 9327872**
**ELLE Group #: 1877597**
**Matrix: Groundwater**

| CAT No. | Analysis Name | CAS Number | Result | Method Detection Limit* | Limit of Quantitation | Dilution Factor |
|---|---|---|---|---|---|---|
| **GC/MS Volatiles** | **SW-846 8260C** | | **ug/l** | **ug/l** | **ug/l** | |
| 11996 | Acetone | 67-64-1 | N.D. | 3.0 | 5.0 | 1 |
| 11996 | t-Amyl methyl ether | 994-05-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Benzene | 71-43-2 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Bromobenzene | 108-86-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Bromochloromethane | 74-97-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Bromodichloromethane | 75-27-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Bromoform | 75-25-2 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Bromomethane | 74-83-9 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 2-Butanone | 78-93-3 | N.D. | 1.0 | 5.0 | 1 |
| 11996 | n-Butylbenzene | 104-51-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | sec-Butylbenzene | 135-98-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | tert-Butylbenzene | 98-06-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Carbon Disulfide | 75-15-0 | N.D. | 0.4 | 1.0 | 1 |
| 11996 | Carbon Tetrachloride | 56-23-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Chlorobenzene | 108-90-7 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Chloroethane | 75-00-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Chloroform | 67-66-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Chloromethane | 74-87-3 | N.D. | 0.2 | 0.5 | 1 |
| 11996 | 2-Chlorotoluene | 95-49-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 4-Chlorotoluene | 106-43-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dibromo-3-chloropropane | 96-12-8 | N.D. | 0.2 | 0.5 | 1 |
| 11996 | Dibromochloromethane | 124-48-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dibromoethane | 106-93-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Dibromomethane | 74-95-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dichlorobenzene | 95-50-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,3-Dichlorobenzene | 541-73-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,4-Dichlorobenzene | 106-46-7 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Dichlorodifluoromethane | 75-71-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1-Dichloroethane | 75-34-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dichloroethane | 107-06-2 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1-Dichloroethene | 75-35-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | **cis-1,2-Dichloroethene** | 156-59-2 | **0.1 J** | 0.1 | 0.5 | 1 |
| 11996 | trans-1,2-Dichloroethene | 156-60-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dichloropropane | 78-87-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,3-Dichloropropane | 142-28-9 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 2,2-Dichloropropane | 594-20-7 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1-Dichloropropene | 563-58-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | cis-1,3-Dichloropropene | 10061-01-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | trans-1,3-Dichloropropene | 10061-02-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,4-Dioxane | 123-91-1 | N.D. | 20 | 100 | 1 |
| 11996 | Ethyl ether | 60-29-7 | N.D. | 0.1 | 0.5 | 1 |

*=This limit was used in the evaluation of the final result

**Sample Description:** **3H-2-111717 Grab Groundwater Lockheed Martin, Burlington**

**Project Name:** **Lockheed Martin - Burlington, MA**

Submittal Date/Time: 11/18/2017 10:05
Collection Date/Time: 11/17/2017 11:32
SDG#: LMB09-03

**Tetra Tech, Inc.**
**ELLE Sample #: WW 9327872**
**ELLE Group #: 1877597**
**Matrix: Groundwater**

| CAT No. | Analysis Name | CAS Number | Result | Method Detection Limit* | Limit of Quantitation | Dilution Factor |
|---|---|---|---|---|---|---|
| **GC/MS Volatiles** | **SW-846 8260C** | | **ug/l** | **ug/l** | **ug/l** | |
| 11996 | Ethyl t-butyl ether | 637-92-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Ethylbenzene | 100-41-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Hexachlorobutadiene | 87-68-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 2-Hexanone | 591-78-6 | N.D. | 1.0 | 5.0 | 1 |
| 11996 | di-Isopropyl Ether | 108-20-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Isopropylbenzene | 98-82-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | p-Isopropyltoluene | 99-87-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Methyl Tertiary Butyl Ether | 1634-04-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 4-Methyl-2-Pentanone | 108-10-1 | N.D. | 1.0 | 5.0 | 1 |
| 11996 | Methylene Chloride | 75-09-2 | N.D. | 0.2 | 0.5 | 1 |
| 11996 | Naphthalene | 91-20-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | n-Propylbenzene | 103-65-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Styrene | 100-42-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1,1,2-Tetrachloroethane | 630-20-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1,2,2-Tetrachloroethane | 79-34-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Tetrachloroethene | 127-18-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Tetrahydrofuran | 109-99-9 | N.D. | 2.0 | 5.0 | 1 |
| 11996 | Toluene | 108-88-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2,3-Trichlorobenzene | 87-61-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2,4-Trichlorobenzene | 120-82-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1,1-Trichloroethane | 71-55-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1,2-Trichloroethane | 79-00-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Trichloroethene | 79-01-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Trichlorofluoromethane | 75-69-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2,3-Trichloropropane | 96-18-4 | N.D. | 0.3 | 1.0 | 1 |
| 11996 | 1,2,4-Trimethylbenzene | 95-63-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,3,5-Trimethylbenzene | 108-67-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Vinyl Chloride | 75-01-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | m+p-Xylene | 179601-23-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | o-Xylene | 95-47-6 | N.D. | 0.1 | 0.5 | 1 |

The percent drift for the following is >20% in the continuing calibration verification standard associated with this sample: Dichlorodifluoromethane, Bromomethane, Chloroethane, 1,4-Dioxane.

The percent recovery for Dichlorodifluoromethane is outside of the 70 - 130% QC windows in the LCS and/or LCSD associated with this sample. Dichlorodifluoromethane is considered a difficult analyte and the percent recovery is within the allowed 40 - 160% window.

A Method Detection Limit (MDL) standard is analyzed to confirm sensitivity of the instrument for samples with non-detect analytes associated with a continuing calibration verification standard exhibiting low response (outside the 20%D criteria). The MDL standard shows adequate sensitivity at or below

*=This limit was used in the evaluation of the final result

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# Analysis Report

**Sample Description:** **3H-2-111717 Grab Groundwater**
**Lockheed Martin, Burlington**

**Project Name:** **Lockheed Martin - Burlington, MA**

Submittal Date/Time: 11/18/2017 10:05
Collection Date/Time: 11/17/2017 11:32
SDG#: LMB09-03

**Tetra Tech, Inc.**
**ELLE Sample #: WW 9327872**
**ELLE Group #: 1877597**
**Matrix: Groundwater**

| CAT No. | Analysis Name | CAS Number | Result | Method Detection Limit* | Limit of Quantitation | Dilution Factor |
|---|---|---|---|---|---|---|
| the reporting limit. | | | | | | |
| **GC/MS Semivolatiles** | **SW-846 8270D SIM** | | **ug/l** | **ug/l** | **ug/l** | |
| 14244 | **1,4-Dioxane** | 123-91-1 | **0.076 J** | 0.051 | 0.20 | 1 |

The MA MCP analyte list requirement was not met for Method 8270D.
The client specified list is reported.

## Sample Comments

State of Massachusetts Laboratory Non-Potable Water Certification M-PA009

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name | Method | Trial# | Batch# | Analysis Date and Time | Analyst | Dilution Factor |
|---|---|---|---|---|---|---|---|
| 11996 | VOCs- 25ml Water by 8260C | SW-846 8260C | 1 | I173332AA | 11/29/2017 16:03 | Kevin A Sposito | 1 |
| 01163 | GC/MS VOA Water Prep | SW-846 5030C | 1 | I173332AA | 11/29/2017 16:03 | Kevin A Sposito | 1 |
| 14244 | SIM SVOAs 8270D MINI | SW-846 8270D SIM | 1 | 17325WAI026 | 11/23/2017 05:02 | William H Saadeh | 1 |
| 10466 | BNA Water Extraction SIM | SW-846 3510C | 1 | 17325WAI026 | 11/22/2017 08:00 | Bradley W VanLeuven | 1 |

*=This limit was used in the evaluation of the final result

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# Analysis Report

**Sample Description:** **3H-3-111717 Grab Groundwater**
**Lockheed Martin, Burlington**

**Project Name:** **Lockheed Martin - Burlington, MA**

Submittal Date/Time: 11/18/2017 10:05
Collection Date/Time: 11/17/2017 11:45
SDG#: LMB09-04

**Tetra Tech, Inc.**
**ELLE Sample #: WW 9327873**
**ELLE Group #: 1877597**
**Matrix: Groundwater**

| CAT No. | Analysis Name | CAS Number | Result | Method Detection Limit* | Limit of Quantitation | Dilution Factor |
|---|---|---|---|---|---|---|
| **GC/MS Volatiles** | **SW-846 8260C** | | **ug/l** | **ug/l** | **ug/l** | |
| 11996 | Acetone | 67-64-1 | N.D. | 3.0 | 5.0 | 1 |
| 11996 | t-Amyl methyl ether | 994-05-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Benzene | 71-43-2 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Bromobenzene | 108-86-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Bromochloromethane | 74-97-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Bromodichloromethane | 75-27-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Bromoform | 75-25-2 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Bromomethane | 74-83-9 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 2-Butanone | 78-93-3 | N.D. | 1.0 | 5.0 | 1 |
| 11996 | n-Butylbenzene | 104-51-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | sec-Butylbenzene | 135-98-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | tert-Butylbenzene | 98-06-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Carbon Disulfide | 75-15-0 | N.D. | 0.4 | 1.0 | 1 |
| 11996 | Carbon Tetrachloride | 56-23-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Chlorobenzene | 108-90-7 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Chloroethane | 75-00-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Chloroform | 67-66-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Chloromethane | 74-87-3 | N.D. | 0.2 | 0.5 | 1 |
| 11996 | 2-Chlorotoluene | 95-49-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 4-Chlorotoluene | 106-43-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dibromo-3-chloropropane | 96-12-8 | N.D. | 0.2 | 0.5 | 1 |
| 11996 | Dibromochloromethane | 124-48-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dibromoethane | 106-93-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Dibromomethane | 74-95-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dichlorobenzene | 95-50-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,3-Dichlorobenzene | 541-73-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,4-Dichlorobenzene | 106-46-7 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Dichlorodifluoromethane | 75-71-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1-Dichloroethane | 75-34-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dichloroethane | 107-06-2 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1-Dichloroethene | 75-35-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | cis-1,2-Dichloroethene | 156-59-2 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | trans-1,2-Dichloroethene | 156-60-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dichloropropane | 78-87-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,3-Dichloropropane | 142-28-9 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 2,2-Dichloropropane | 594-20-7 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1-Dichloropropene | 563-58-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | cis-1,3-Dichloropropene | 10061-01-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | trans-1,3-Dichloropropene | 10061-02-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,4-Dioxane | 123-91-1 | N.D. | 20 | 100 | 1 |
| 11996 | Ethyl ether | 60-29-7 | N.D. | 0.1 | 0.5 | 1 |

*=This limit was used in the evaluation of the final result

**Sample Description:** **3H-3-111717 Grab Groundwater Lockheed Martin, Burlington**

**Project Name:** **Lockheed Martin - Burlington, MA**

Submittal Date/Time: 11/18/2017 10:05
Collection Date/Time: 11/17/2017 11:45
SDG#: LMB09-04

**Tetra Tech, Inc.**
**ELLE Sample #: WW 9327873**
**ELLE Group #: 1877597**
**Matrix: Groundwater**

| CAT No. | Analysis Name | CAS Number | Result | Method Detection Limit* | Limit of Quantitation | Dilution Factor |
|---|---|---|---|---|---|---|
| **GC/MS Volatiles** | **SW-846 8260C** | | **ug/l** | **ug/l** | **ug/l** | |
| 11996 | Ethyl t-butyl ether | 637-92-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Ethylbenzene | 100-41-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Hexachlorobutadiene | 87-68-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 2-Hexanone | 591-78-6 | N.D. | 1.0 | 5.0 | 1 |
| 11996 | di-Isopropyl Ether | 108-20-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Isopropylbenzene | 98-82-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | p-Isopropyltoluene | 99-87-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Methyl Tertiary Butyl Ether | 1634-04-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 4-Methyl-2-Pentanone | 108-10-1 | N.D. | 1.0 | 5.0 | 1 |
| 11996 | Methylene Chloride | 75-09-2 | N.D. | 0.2 | 0.5 | 1 |
| 11996 | Naphthalene | 91-20-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | n-Propylbenzene | 103-65-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Styrene | 100-42-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1,1,2-Tetrachloroethane | 630-20-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1,2,2-Tetrachloroethane | 79-34-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Tetrachloroethene | 127-18-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Tetrahydrofuran | 109-99-9 | N.D. | 2.0 | 5.0 | 1 |
| 11996 | Toluene | 108-88-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2,3-Trichlorobenzene | 87-61-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2,4-Trichlorobenzene | 120-82-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1,1-Trichloroethane | 71-55-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1,2-Trichloroethane | 79-00-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Trichloroethene | 79-01-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Trichlorofluoromethane | 75-69-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2,3-Trichloropropane | 96-18-4 | N.D. | 0.3 | 1.0 | 1 |
| 11996 | 1,2,4-Trimethylbenzene | 95-63-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,3,5-Trimethylbenzene | 108-67-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Vinyl Chloride | 75-01-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | m+p-Xylene | 179601-23-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | o-Xylene | 95-47-6 | N.D. | 0.1 | 0.5 | 1 |

The percent drift for the following is >20% in the continuing calibration verification standard associated with this sample: Dichlorodifluoromethane, Bromomethane, Chloroethane, 1,4-Dioxane.

The percent recovery for Dichlorodifluoromethane is outside of the 70 - 130% QC windows in the LCS and/or LCSD associated with this sample. Dichlorodifluoromethane is considered a difficult analyte and the percent recovery is within the allowed 40 - 160% window.

A Method Detection Limit (MDL) standard is analyzed to confirm sensitivity of the instrument for samples with non-detect analytes associated with a continuing calibration verification standard exhibiting low response (outside the 20%D criteria). The MDL standard shows adequate sensitivity at or below

*=This limit was used in the evaluation of the final result

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# Analysis Report

**Sample Description:** **3H-3-111717 Grab Groundwater**
**Lockheed Martin, Burlington**

**Project Name:** **Lockheed Martin - Burlington, MA**

Submittal Date/Time: 11/18/2017 10:05
Collection Date/Time: 11/17/2017 11:45
SDG#: LMB09-04

**Tetra Tech, Inc.**
**ELLE Sample #: WW 9327873**
**ELLE Group #: 1877597**
**Matrix: Groundwater**

| CAT No. | Analysis Name | CAS Number | Result | Method Detection Limit* | Limit of Quantitation | Dilution Factor |
|---|---|---|---|---|---|---|
| the reporting limit. | | | | | | |
| **GC/MS Semivolatiles** | | **SW-846 8270D SIM** | **ug/l** | **ug/l** | **ug/l** | |
| 14244 | 1,4-Dioxane | 123-91-1 | N.D. | 0.051 | 0.20 | 1 |

The MA MCP analyte list requirement was not met for Method 8270D.
The client specified list is reported.

## Sample Comments

State of Massachusetts Laboratory Non-Potable Water Certification M-PA009

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name | Method | Trial# | Batch# | Analysis Date and Time | Analyst | Dilution Factor |
|---|---|---|---|---|---|---|---|
| 11996 | VOCs- 25ml Water by 8260C | SW-846 8260C | 1 | I173332AA | 11/29/2017 16:25 | Kevin A Sposito | 1 |
| 01163 | GC/MS VOA Water Prep | SW-846 5030C | 1 | I173332AA | 11/29/2017 16:25 | Kevin A Sposito | 1 |
| 14244 | SIM SVOAs 8270D MINI | SW-846 8270D SIM | 1 | 17325WAI026 | 11/23/2017 05:30 | William H Saadeh | 1 |
| 10466 | BNA Water Extraction SIM | SW-846 3510C | 1 | 17325WAI026 | 11/22/2017 08:00 | Bradley W VanLeuven | 1 |

*=This limit was used in the evaluation of the final result

**Sample Description:** **GMW-12R-111717 Grab Groundwater**
**Lockheed Martin, Burlington**

**Project Name:** **Lockheed Martin - Burlington, MA**

Submittal Date/Time: 11/18/2017 10:05
Collection Date/Time: 11/17/2017 13:25
SDG#: LMB09-05

**Tetra Tech, Inc.**
**ELLE Sample #: WW 9327874**
**ELLE Group #: 1877597**
**Matrix: Groundwater**

| CAT No. | Analysis Name | CAS Number | Result | | Method Detection Limit* | Limit of Quantitation | Dilution Factor |
|---|---|---|---|---|---|---|---|
| **GC/MS Volatiles** | **SW-846 8260C** | | **ug/l** | | **ug/l** | **ug/l** | |
| 11996 | Acetone | 67-64-1 | N.D. | | 3.0 | 5.0 | 1 |
| 11996 | t-Amyl methyl ether | 994-05-8 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Benzene | 71-43-2 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Bromobenzene | 108-86-1 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Bromochloromethane | 74-97-5 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Bromodichloromethane | 75-27-4 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Bromoform | 75-25-2 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Bromomethane | 74-83-9 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 2-Butanone | 78-93-3 | N.D. | | 1.0 | 5.0 | 1 |
| 11996 | n-Butylbenzene | 104-51-8 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | sec-Butylbenzene | 135-98-8 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | tert-Butylbenzene | 98-06-6 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Carbon Disulfide | 75-15-0 | N.D. | | 0.4 | 1.0 | 1 |
| 11996 | Carbon Tetrachloride | 56-23-5 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Chlorobenzene | 108-90-7 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Chloroethane | 75-00-3 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Chloroform | 67-66-3 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Chloromethane | 74-87-3 | N.D. | | 0.2 | 0.5 | 1 |
| 11996 | 2-Chlorotoluene | 95-49-8 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 4-Chlorotoluene | 106-43-4 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dibromo-3-chloropropane | 96-12-8 | N.D. | | 0.2 | 0.5 | 1 |
| 11996 | Dibromochloromethane | 124-48-1 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dibromoethane | 106-93-4 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Dibromomethane | 74-95-3 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dichlorobenzene | 95-50-1 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,3-Dichlorobenzene | 541-73-1 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,4-Dichlorobenzene | 106-46-7 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Dichlorodifluoromethane | 75-71-8 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | **1,1-Dichloroethane** | 75-34-3 | **0.2** | **J** | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dichloroethane | 107-06-2 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,1-Dichloroethene | 75-35-4 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | cis-1,2-Dichloroethene | 156-59-2 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | trans-1,2-Dichloroethene | 156-60-5 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dichloropropane | 78-87-5 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,3-Dichloropropane | 142-28-9 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 2,2-Dichloropropane | 594-20-7 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,1-Dichloropropene | 563-58-6 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | cis-1,3-Dichloropropene | 10061-01-5 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | trans-1,3-Dichloropropene | 10061-02-6 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,4-Dioxane | 123-91-1 | N.D. | | 20 | 100 | 1 |
| 11996 | Ethyl ether | 60-29-7 | N.D. | | 0.1 | 0.5 | 1 |

*=This limit was used in the evaluation of the final result

**Sample Description:** **GMW-12R-111717 Grab Groundwater**
**Lockheed Martin, Burlington**

**Project Name:** **Lockheed Martin - Burlington, MA**

Submittal Date/Time: 11/18/2017 10:05
Collection Date/Time: 11/17/2017 13:25
SDG#: LMB09-05

**Tetra Tech, Inc.**
**ELLE Sample #: WW 9327874**
**ELLE Group #: 1877597**
**Matrix: Groundwater**

| CAT No. | Analysis Name | CAS Number | Result | Method Detection Limit* | Limit of Quantitation | Dilution Factor |
|---|---|---|---|---|---|---|
| **GC/MS Volatiles** | **SW-846 8260C** | | **ug/l** | **ug/l** | **ug/l** | |
| 11996 | Ethyl t-butyl ether | 637-92-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Ethylbenzene | 100-41-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Hexachlorobutadiene | 87-68-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 2-Hexanone | 591-78-6 | N.D. | 1.0 | 5.0 | 1 |
| 11996 | di-Isopropyl Ether | 108-20-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Isopropylbenzene | 98-82-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | p-Isopropyltoluene | 99-87-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Methyl Tertiary Butyl Ether | 1634-04-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 4-Methyl-2-Pentanone | 108-10-1 | N.D. | 1.0 | 5.0 | 1 |
| 11996 | Methylene Chloride | 75-09-2 | N.D. | 0.2 | 0.5 | 1 |
| 11996 | Naphthalene | 91-20-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | n-Propylbenzene | 103-65-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Styrene | 100-42-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1,1,2-Tetrachloroethane | 630-20-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1,2,2-Tetrachloroethane | 79-34-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Tetrachloroethene | 127-18-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Tetrahydrofuran | 109-99-9 | N.D. | 2.0 | 5.0 | 1 |
| 11996 | Toluene | 108-88-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2,3-Trichlorobenzene | 87-61-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2,4-Trichlorobenzene | 120-82-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1,1-Trichloroethane | 71-55-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1,2-Trichloroethane | 79-00-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Trichloroethene | 79-01-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Trichlorofluoromethane | 75-69-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2,3-Trichloropropane | 96-18-4 | N.D. | 0.3 | 1.0 | 1 |
| 11996 | 1,2,4-Trimethylbenzene | 95-63-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,3,5-Trimethylbenzene | 108-67-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Vinyl Chloride | 75-01-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | m+p-Xylene | 179601-23-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | o-Xylene | 95-47-6 | N.D. | 0.1 | 0.5 | 1 |

The percent drift for the following is >20% in the continuing calibration verification standard associated with this sample: Dichlorodifluoromethane, Bromomethane, Chloroethane, 1,4-Dioxane.

The percent recovery for Dichlorodifluoromethane is outside of the 70 - 130% QC windows in the LCS and/or LCSD associated with this sample. Dichlorodifluoromethane is considered a difficult analyte and the percent recovery is within the allowed 40 - 160% window.

A Method Detection Limit (MDL) standard is analyzed to confirm sensitivity of the instrument for samples with non-detect analytes associated with a continuing calibration verification standard exhibiting low response (outside the 20%D criteria). The MDL standard shows adequate sensitivity at or below

*=This limit was used in the evaluation of the final result

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# Analysis Report

**Sample Description:** **GMW-12R-111717 Grab Groundwater**
**Lockheed Martin, Burlington**

**Project Name:** **Lockheed Martin - Burlington, MA**

Submittal Date/Time: 11/18/2017 10:05
Collection Date/Time: 11/17/2017 13:25
SDG#: LMB09-05

**Tetra Tech, Inc.**
**ELLE Sample #: WW 9327874**
**ELLE Group #: 1877597**
**Matrix: Groundwater**

| CAT No. | Analysis Name | CAS Number | Result | Method Detection Limit* | Limit of Quantitation | Dilution Factor |
|---|---|---|---|---|---|---|
| the reporting limit. | | | | | | |
| **GC/MS Semivolatiles** | | **SW-846 8270D SIM** | **ug/l** | **ug/l** | **ug/l** | |
| 14244 | 1,4-Dioxane | 123-91-1 | N.D. | 0.050 | 0.20 | 1 |

The MA MCP analyte list requirement was not met for Method 8270D.
The client specified list is reported.

## Sample Comments

State of Massachusetts Laboratory Non-Potable Water Certification M-PA009

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name | Method | Trial# | Batch# | Analysis Date and Time | Analyst | Dilution Factor |
|---|---|---|---|---|---|---|---|
| 11996 | VOCs- 25ml Water by 8260C | SW-846 8260C | 1 | I173332AA | 11/29/2017 16:46 | Kevin A Sposito | 1 |
| 01163 | GC/MS VOA Water Prep | SW-846 5030C | 1 | I173332AA | 11/29/2017 16:46 | Kevin A Sposito | 1 |
| 14244 | SIM SVOAs 8270D MINI | SW-846 8270D SIM | 1 | 17325WAI026 | 11/23/2017 05:58 | William H Saadeh | 1 |
| 10466 | BNA Water Extraction SIM | SW-846 3510C | 1 | 17325WAI026 | 11/22/2017 08:00 | Bradley W VanLeuven | 1 |

*=This limit was used in the evaluation of the final result

**Sample Description:** **Trip Blank Water**
**Lockheed Martin, Burlington**

**Project Name:** **Lockheed Martin - Burlington, MA**

Submittal Date/Time: 11/18/2017 10:05
Collection Date/Time: 11/17/2017 07:00
SDG#: LMB09-06TB

**Tetra Tech, Inc.**
**ELLE Sample #: WW 9327875**
**ELLE Group #: 1877597**
**Matrix: Water**

| CAT No. | Analysis Name | CAS Number | Result | Method Detection Limit* | Limit of Quantitation | Dilution Factor |
|---|---|---|---|---|---|---|
| **GC/MS Volatiles** | **SW-846 8260C** | | **ug/l** | **ug/l** | **ug/l** | |
| 11996 | Acetone | 67-64-1 | N.D. | 3.0 | 5.0 | 1 |
| 11996 | t-Amyl methyl ether | 994-05-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Benzene | 71-43-2 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Bromobenzene | 108-86-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Bromochloromethane | 74-97-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Bromodichloromethane | 75-27-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Bromoform | 75-25-2 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Bromomethane | 74-83-9 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 2-Butanone | 78-93-3 | N.D. | 1.0 | 5.0 | 1 |
| 11996 | n-Butylbenzene | 104-51-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | sec-Butylbenzene | 135-98-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | tert-Butylbenzene | 98-06-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Carbon Disulfide | 75-15-0 | N.D. | 0.4 | 1.0 | 1 |
| 11996 | Carbon Tetrachloride | 56-23-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Chlorobenzene | 108-90-7 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Chloroethane | 75-00-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Chloroform | 67-66-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Chloromethane | 74-87-3 | N.D. | 0.2 | 0.5 | 1 |
| 11996 | 2-Chlorotoluene | 95-49-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 4-Chlorotoluene | 106-43-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dibromo-3-chloropropane | 96-12-8 | N.D. | 0.2 | 0.5 | 1 |
| 11996 | Dibromochloromethane | 124-48-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dibromoethane | 106-93-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Dibromomethane | 74-95-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dichlorobenzene | 95-50-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,3-Dichlorobenzene | 541-73-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,4-Dichlorobenzene | 106-46-7 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Dichlorodifluoromethane | 75-71-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1-Dichloroethane | 75-34-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dichloroethane | 107-06-2 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1-Dichloroethene | 75-35-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | cis-1,2-Dichloroethene | 156-59-2 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | trans-1,2-Dichloroethene | 156-60-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dichloropropane | 78-87-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,3-Dichloropropane | 142-28-9 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 2,2-Dichloropropane | 594-20-7 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1-Dichloropropene | 563-58-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | cis-1,3-Dichloropropene | 10061-01-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | trans-1,3-Dichloropropene | 10061-02-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,4-Dioxane | 123-91-1 | N.D. | 20 | 100 | 1 |
| 11996 | Ethyl ether | 60-29-7 | N.D. | 0.1 | 0.5 | 1 |

*=This limit was used in the evaluation of the final result

**Sample Description:** **Trip Blank Water**
**Lockheed Martin, Burlington**

**Project Name:** **Lockheed Martin - Burlington, MA**

Submittal Date/Time: 11/18/2017 10:05
Collection Date/Time: 11/17/2017 07:00
SDG#: LMB09-06TB

**Tetra Tech, Inc.**
**ELLE Sample #: WW 9327875**
**ELLE Group #: 1877597**
**Matrix: Water**

| CAT No. | Analysis Name | CAS Number | Result | Method Detection Limit* | Limit of Quantitation | Dilution Factor |
|---|---|---|---|---|---|---|
| **GC/MS Volatiles** | **SW-846 8260C** | | **ug/l** | **ug/l** | **ug/l** | |
| 11996 | Ethyl t-butyl ether | 637-92-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Ethylbenzene | 100-41-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Hexachlorobutadiene | 87-68-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 2-Hexanone | 591-78-6 | N.D. | 1.0 | 5.0 | 1 |
| 11996 | di-Isopropyl Ether | 108-20-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Isopropylbenzene | 98-82-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | p-Isopropyltoluene | 99-87-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Methyl Tertiary Butyl Ether | 1634-04-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 4-Methyl-2-Pentanone | 108-10-1 | N.D. | 1.0 | 5.0 | 1 |
| 11996 | Methylene Chloride | 75-09-2 | N.D. | 0.2 | 0.5 | 1 |
| 11996 | Naphthalene | 91-20-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | n-Propylbenzene | 103-65-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Styrene | 100-42-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1,1,2-Tetrachloroethane | 630-20-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1,2,2-Tetrachloroethane | 79-34-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Tetrachloroethene | 127-18-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Tetrahydrofuran | 109-99-9 | N.D. | 2.0 | 5.0 | 1 |
| 11996 | Toluene | 108-88-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2,3-Trichlorobenzene | 87-61-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2,4-Trichlorobenzene | 120-82-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1,1-Trichloroethane | 71-55-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1,2-Trichloroethane | 79-00-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Trichloroethene | 79-01-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Trichlorofluoromethane | 75-69-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2,3-Trichloropropane | 96-18-4 | N.D. | 0.3 | 1.0 | 1 |
| 11996 | 1,2,4-Trimethylbenzene | 95-63-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,3,5-Trimethylbenzene | 108-67-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Vinyl Chloride | 75-01-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | m+p-Xylene | 179601-23-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | o-Xylene | 95-47-6 | N.D. | 0.1 | 0.5 | 1 |

The percent drift for the following is >20% in the continuing calibration verification standard associated with this sample: Dichlorodifluoromethane, Bromomethane, Chloroethane, 1,4-Dioxane.

The percent recovery for Dichlorodifluoromethane is outside of the 70 - 130% QC windows in the LCS and/or LCSD associated with this sample. Dichlorodifluoromethane is considered a difficult analyte and the percent recovery is within the allowed 40 - 160% window.

A Method Detection Limit (MDL) standard is analyzed to confirm sensitivity of the instrument for samples with non-detect analytes associated with a continuing calibration verification standard exhibiting low response (outside the 20%D criteria). The MDL standard shows adequate sensitivity at or below

*=This limit was used in the evaluation of the final result

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# Analysis Report

**Sample Description:** **Trip Blank Water**
**Lockheed Martin, Burlington**

**Project Name:** **Lockheed Martin - Burlington, MA**

**Tetra Tech, Inc.**
**ELLE Sample #:** **WW 9327875**
**ELLE Group #:** **1877597**
**Matrix: Water**

Submittal Date/Time: 11/18/2017 10:05
Collection Date/Time: 11/17/2017 07:00
SDG#: LMB09-06TB

| CAT No. | Analysis Name | CAS Number | Result | Method Detection Limit* | Limit of Quantitation | Dilution Factor |
|---|---|---|---|---|---|---|

the reporting limit.

## Sample Comments

State of Massachusetts Laboratory Non-Potable Water Certification M-PA009

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name | Method | Trial# | Batch# | Analysis Date and Time | Analyst | Dilution Factor |
|---|---|---|---|---|---|---|---|
| 11996 | VOCs- 25ml Water by 8260C | SW-846 8260C | 1 | I173332AA | 11/29/2017 14:17 | Kevin A Sposito | 1 |
| 01163 | GC/MS VOA Water Prep | SW-846 5030C | 1 | I173332AA | 11/29/2017 14:17 | Kevin A Sposito | 1 |

*=This limit was used in the evaluation of the final result

# Quality Control Summary

Client Name: Tetra Tech, Inc.
Reported: 11/30/2017 00:10

Group Number: 1877597

Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

All Inorganic Initial Calibration and Continuing Calibration Blanks met acceptable method criteria unless otherwise noted on the Analysis Report.

## Method Blank

| Analysis Name | Result | MDL** | LOQ |
|---|---|---|---|
| | ug/l | ug/l | ug/l |
| Batch number: I173332AA | Sample number(s): 9327872-9327875 | | |
| Acetone | N.D. | 3.0 | 5.0 |
| t-Amyl methyl ether | N.D. | 0.1 | 0.5 |
| Benzene | N.D. | 0.1 | 0.5 |
| Bromobenzene | N.D. | 0.1 | 0.5 |
| Bromochloromethane | N.D. | 0.1 | 0.5 |
| Bromodichloromethane | N.D. | 0.1 | 0.5 |
| Bromoform | N.D. | 0.1 | 0.5 |
| Bromomethane | N.D. | 0.1 | 0.5 |
| 2-Butanone | N.D. | 1.0 | 5.0 |
| n-Butylbenzene | N.D. | 0.1 | 0.5 |
| sec-Butylbenzene | N.D. | 0.1 | 0.5 |
| tert-Butylbenzene | N.D. | 0.1 | 0.5 |
| Carbon Disulfide | N.D. | 0.4 | 1.0 |
| Carbon Tetrachloride | N.D. | 0.1 | 0.5 |
| Chlorobenzene | N.D. | 0.1 | 0.5 |
| Chloroethane | N.D. | 0.1 | 0.5 |
| Chloroform | N.D. | 0.1 | 0.5 |
| Chloromethane | N.D. | 0.2 | 0.5 |
| 2-Chlorotoluene | N.D. | 0.1 | 0.5 |
| 4-Chlorotoluene | N.D. | 0.1 | 0.5 |
| 1,2-Dibromo-3-chloropropane | N.D. | 0.2 | 0.5 |
| Dibromochloromethane | N.D. | 0.1 | 0.5 |
| 1,2-Dibromoethane | N.D. | 0.1 | 0.5 |
| Dibromomethane | N.D. | 0.1 | 0.5 |
| 1,2-Dichlorobenzene | N.D. | 0.1 | 0.5 |
| 1,3-Dichlorobenzene | N.D. | 0.1 | 0.5 |
| 1,4-Dichlorobenzene | N.D. | 0.1 | 0.5 |
| Dichlorodifluoromethane | N.D. | 0.1 | 0.5 |
| 1,1-Dichloroethane | N.D. | 0.1 | 0.5 |
| 1,2-Dichloroethane | N.D. | 0.1 | 0.5 |
| 1,1-Dichloroethene | N.D. | 0.1 | 0.5 |
| cis-1,2-Dichloroethene | N.D. | 0.1 | 0.5 |
| trans-1,2-Dichloroethene | N.D. | 0.1 | 0.5 |
| 1,2-Dichloropropane | N.D. | 0.1 | 0.5 |
| 1,3-Dichloropropane | N.D. | 0.1 | 0.5 |
| 2,2-Dichloropropane | N.D. | 0.1 | 0.5 |
| 1,1-Dichloropropene | N.D. | 0.1 | 0.5 |
| cis-1,3-Dichloropropene | N.D. | 0.1 | 0.5 |
| trans-1,3-Dichloropropene | N.D. | 0.1 | 0.5 |

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.
P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

# Quality Control Summary

Client Name: Tetra Tech, Inc.
Reported: 11/30/2017 00:10

Group Number: 1877597

## Method Blank (continued)

| Analysis Name | Result ug/l | MDL** ug/l | LOQ ug/l |
|---|---|---|---|
| 1,4-Dioxane | N.D. | 20 | 100 |
| Ethyl ether | N.D. | 0.1 | 0.5 |
| Ethyl t-butyl ether | N.D. | 0.1 | 0.5 |
| Ethylbenzene | N.D. | 0.1 | 0.5 |
| Hexachlorobutadiene | N.D. | 0.1 | 0.5 |
| 2-Hexanone | N.D. | 1.0 | 5.0 |
| di-Isopropyl Ether | N.D. | 0.1 | 0.5 |
| Isopropylbenzene | N.D. | 0.1 | 0.5 |
| p-Isopropyltoluene | N.D. | 0.1 | 0.5 |
| Methyl Tertiary Butyl Ether | N.D. | 0.1 | 0.5 |
| 4-Methyl-2-Pentanone | N.D. | 1.0 | 5.0 |
| Methylene Chloride | N.D. | 0.2 | 0.5 |
| Naphthalene | N.D. | 0.1 | 0.5 |
| n-Propylbenzene | N.D. | 0.1 | 0.5 |
| Styrene | N.D. | 0.1 | 0.5 |
| 1,1,1,2-Tetrachloroethane | N.D. | 0.1 | 0.5 |
| 1,1,2,2-Tetrachloroethane | N.D. | 0.1 | 0.5 |
| Tetrachloroethene | N.D. | 0.1 | 0.5 |
| Tetrahydrofuran | N.D. | 2.0 | 5.0 |
| Toluene | N.D. | 0.1 | 0.5 |
| 1,2,3-Trichlorobenzene | N.D. | 0.1 | 0.5 |
| 1,2,4-Trichlorobenzene | N.D. | 0.1 | 0.5 |
| 1,1,1-Trichloroethane | N.D. | 0.1 | 0.5 |
| 1,1,2-Trichloroethane | N.D. | 0.1 | 0.5 |
| Trichloroethene | N.D. | 0.1 | 0.5 |
| Trichlorofluoromethane | N.D. | 0.1 | 0.5 |
| 1,2,3-Trichloropropane | N.D. | 0.3 | 1.0 |
| 1,2,4-Trimethylbenzene | N.D. | 0.1 | 0.5 |
| 1,3,5-Trimethylbenzene | N.D. | 0.1 | 0.5 |
| Vinyl Chloride | N.D. | 0.1 | 0.5 |
| m+p-Xylene | N.D. | 0.1 | 0.5 |
| o-Xylene | N.D. | 0.1 | 0.5 |
| Batch number: 17325WAI026 | Sample number(s): 9327872-9327874 | | |
| 1,4-Dioxane | N.D. | 0.050 | 0.20 |

## LCS/LCSD

| Analysis Name | LCS Spike Added ug/l | LCS Conc ug/l | LCSD Spike Added ug/l | LCSD Conc ug/l | LCS %REC | LCSD %REC | LCS/LCSD Limits | RPD | RPD Max |
|---|---|---|---|---|---|---|---|---|---|
| Batch number: I173332AA | Sample number(s): 9327872-9327875 | | | | | | | | |

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.
P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

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# Quality Control Summary

Client Name: Tetra Tech, Inc.
Reported: 11/30/2017 00:10

Group Number: 1877597

## LCS/LCSD

| Analysis Name | LCS Spike Added ug/l | LCS Conc ug/l | LCSD Spike Added ug/l | LCSD Conc ug/l | LCS %REC | LCSD %REC | LCS/LCSD Limits | RPD | RPD Max |
|---|---|---|---|---|---|---|---|---|---|
| Acetone | 37.5 | 45.85 | | | 122 | | 70-130 | | |
| t-Amyl methyl ether | 5.00 | 4.71 | | | 94 | | 70-130 | | |
| Benzene | 5.00 | 5.40 | | | 108 | | 70-130 | | |
| Bromobenzene | 5.00 | 4.86 | | | 97 | | 70-130 | | |
| Bromochloromethane | 5.00 | 5.19 | | | 104 | | 70-130 | | |
| Bromodichloromethane | 5.00 | 5.34 | | | 107 | | 70-130 | | |
| Bromoform | 5.00 | 4.74 | | | 95 | | 70-130 | | |
| Bromomethane | 5.00 | 3.70 | | | 74 | | 70-130 | | |
| 2-Butanone | 37.5 | 46.43 | | | 124 | | 70-130 | | |
| n-Butylbenzene | 5.00 | 5.47 | | | 109 | | 70-130 | | |
| sec-Butylbenzene | 5.00 | 5.40 | | | 108 | | 70-130 | | |
| tert-Butylbenzene | 5.00 | 5.01 | | | 100 | | 70-130 | | |
| Carbon Disulfide | 5.00 | 5.35 | | | 107 | | 70-130 | | |
| Carbon Tetrachloride | 5.00 | 5.43 | | | 109 | | 70-130 | | |
| Chlorobenzene | 5.00 | 5.13 | | | 103 | | 70-130 | | |
| Chloroethane | 5.00 | 3.84 | | | 77 | | 70-130 | | |
| Chloroform | 5.00 | 5.35 | | | 107 | | 70-130 | | |
| Chloromethane | 5.00 | 4.07 | | | 81 | | 70-130 | | |
| 2-Chlorotoluene | 5.00 | 5.17 | | | 103 | | 70-130 | | |
| 4-Chlorotoluene | 5.00 | 5.14 | | | 103 | | 70-130 | | |
| 1,2-Dibromo-3-chloropropane | 5.00 | 5.87 | | | 117 | | 70-130 | | |
| Dibromochloromethane | 5.00 | 5.24 | | | 105 | | 70-130 | | |
| 1,2-Dibromoethane | 5.00 | 5.39 | | | 108 | | 70-130 | | |
| Dibromomethane | 5.00 | 5.56 | | | 111 | | 70-130 | | |
| 1,2-Dichlorobenzene | 5.00 | 5.03 | | | 101 | | 70-130 | | |
| 1,3-Dichlorobenzene | 5.00 | 4.93 | | | 99 | | 70-130 | | |
| 1,4-Dichlorobenzene | 5.00 | 4.87 | | | 97 | | 70-130 | | |
| Dichlorodifluoromethane | 5.00 | 3.00 | | | 60* | | 70-130 | | |
| 1,1-Dichloroethane | 5.00 | 5.41 | | | 108 | | 70-130 | | |
| 1,2-Dichloroethane | 5.00 | 5.06 | | | 101 | | 70-130 | | |
| 1,1-Dichloroethene | 5.00 | 5.58 | | | 112 | | 70-130 | | |
| cis-1,2-Dichloroethene | 5.00 | 5.51 | | | 110 | | 70-130 | | |
| trans-1,2-Dichloroethene | 5.00 | 5.63 | | | 113 | | 70-130 | | |
| 1,2-Dichloropropane | 5.00 | 5.66 | | | 113 | | 70-130 | | |
| 1,3-Dichloropropane | 5.00 | 5.41 | | | 108 | | 70-130 | | |
| 2,2-Dichloropropane | 5.00 | 5.63 | | | 113 | | 70-130 | | |
| 1,1-Dichloropropene | 5.00 | 5.22 | | | 104 | | 70-130 | | |
| cis-1,3-Dichloropropene | 5.00 | 5.11 | | | 102 | | 70-130 | | |
| trans-1,3-Dichloropropene | 5.00 | 5.31 | | | 106 | | 70-130 | | |
| 1,4-Dioxane | 125 | 123.59 | | | 99 | | 70-130 | | |
| Ethyl ether | 5.00 | 5.27 | | | 105 | | 70-130 | | |
| Ethyl t-butyl ether | 5.00 | 4.60 | | | 92 | | 70-130 | | |
| Ethylbenzene | 5.00 | 5.20 | | | 104 | | 70-130 | | |
| Hexachlorobutadiene | 5.00 | 4.81 | | | 96 | | 70-130 | | |

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.
P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

# Quality Control Summary

Client Name: Tetra Tech, Inc.
Reported: 11/30/2017 00:10

Group Number: 1877597

## LCS/LCSD (continued)

| Analysis Name | LCS Spike Added ug/l | LCS Conc ug/l | LCSD Spike Added ug/l | LCSD Conc ug/l | LCS %REC | LCSD %REC | LCS/LCSD Limits | RPD | RPD Max |
|---|---|---|---|---|---|---|---|---|---|
| 2-Hexanone | 25 | 29.29 | | | 117 | | 70-130 | | |
| di-Isopropyl Ether | 5.00 | 5.09 | | | 102 | | 70-130 | | |
| Isopropylbenzene | 5.00 | 5.07 | | | 101 | | 70-130 | | |
| p-Isopropyltoluene | 5.00 | 5.26 | | | 105 | | 70-130 | | |
| Methyl Tertiary Butyl Ether | 5.00 | 4.85 | | | 97 | | 70-130 | | |
| 4-Methyl-2-Pentanone | 25 | 30.83 | | | 123 | | 70-130 | | |
| Methylene Chloride | 5.00 | 5.58 | | | 112 | | 70-130 | | |
| Naphthalene | 5.00 | 5.44 | | | 109 | | 70-130 | | |
| n-Propylbenzene | 5.00 | 5.49 | | | 110 | | 70-130 | | |
| Styrene | 5.00 | 5.31 | | | 106 | | 70-130 | | |
| 1,1,1,2-Tetrachloroethane | 5.00 | 5.33 | | | 107 | | 70-130 | | |
| 1,1,2,2-Tetrachloroethane | 5.00 | 5.43 | | | 109 | | 70-130 | | |
| Tetrachloroethene | 5.00 | 4.91 | | | 98 | | 70-130 | | |
| Tetrahydrofuran | 25 | 33.58 | | | 134* | | 70-130 | | |
| Toluene | 5.00 | 5.20 | | | 104 | | 70-130 | | |
| 1,2,3-Trichlorobenzene | 5.00 | 5.10 | | | 102 | | 70-130 | | |
| 1,2,4-Trichlorobenzene | 5.00 | 4.67 | | | 93 | | 70-130 | | |
| 1,1,1-Trichloroethane | 5.00 | 5.34 | | | 107 | | 70-130 | | |
| 1,1,2-Trichloroethane | 5.00 | 5.75 | | | 115 | | 70-130 | | |
| Trichloroethene | 5.00 | 5.33 | | | 107 | | 70-130 | | |
| Trichlorofluoromethane | 5.00 | 4.17 | | | 83 | | 70-130 | | |
| 1,2,3-Trichloropropane | 5.00 | 5.46 | | | 109 | | 70-130 | | |
| 1,2,4-Trimethylbenzene | 5.00 | 5.38 | | | 108 | | 70-130 | | |
| 1,3,5-Trimethylbenzene | 5.00 | 5.30 | | | 106 | | 70-130 | | |
| Vinyl Chloride | 5.00 | 4.14 | | | 83 | | 70-130 | | |
| m+p-Xylene | 10 | 10.29 | | | 103 | | 70-130 | | |
| o-Xylene | 5.00 | 4.91 | | | 98 | | 70-130 | | |
| | ug/l | ug/l | ug/l | ug/l | | | | | |
| Batch number: 17325WAI026 | Sample number(s): 9327872-9327874 | | | | | | | | |
| 1,4-Dioxane | 1.00 | 0.433 | | | 43 | | 25-72 | | |

## MS/MSD

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike

| Analysis Name | Unspiked Conc ug/l | MS Spike Added ug/l | MS Conc ug/l | MSD Spike Added ug/l | MSD Conc ug/l | MS %Rec | MSD %Rec | MS/MSD Limits | RPD | RPD Max |
|---|---|---|---|---|---|---|---|---|---|---|
| Batch number: I173332AA | Sample number(s): 9327872-9327875 UNSPK: P324688 | | | | | | | | | |
| Acetone | N.D. | 37.5 | 37.57 | 37.5 | 38.44 | 100 | 103 | 70-130 | 2 | 20 |
| t-Amyl methyl ether | N.D. | 5.00 | 4.51 | 5.00 | 4.61 | 90 | 92 | 70-130 | 2 | 20 |

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.
P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

# Quality Control Summary

Client Name: Tetra Tech, Inc.
Reported: 11/30/2017 00:10

Group Number: 1877597

## MS/MSD (continued)

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike

| Analysis Name | Unspiked Conc ug/l | MS Spike Added ug/l | MS Conc ug/l | MSD Spike Added ug/l | MSD Conc ug/l | MS %Rec | MSD %Rec | MS/MSD Limits | RPD | RPD Max |
|---|---|---|---|---|---|---|---|---|---|---|
| Benzene | N.D. | 5.00 | 5.74 | 5.00 | 5.72 | 115 | 114 | 70-130 | 0 | 20 |
| Bromobenzene | N.D. | 5.00 | 4.85 | 5.00 | 4.93 | 97 | 99 | 70-130 | 2 | 20 |
| Bromochloromethane | N.D. | 5.00 | 5.29 | 5.00 | 5.32 | 106 | 106 | 70-130 | 1 | 20 |
| Bromodichloromethane | N.D. | 5.00 | 5.59 | 5.00 | 5.54 | 112 | 111 | 70-130 | 1 | 20 |
| Bromoform | N.D. | 5.00 | 4.75 | 5.00 | 4.72 | 95 | 94 | 70-130 | 1 | 20 |
| Bromomethane | N.D. | 5.00 | 4.16 | 5.00 | 4.14 | 83 | 83 | 70-130 | 1 | 20 |
| 2-Butanone | N.D. | 37.5 | 52.34 | 37.5 | 43.34 | 140* | 116 | 70-130 | 19 | 20 |
| n-Butylbenzene | N.D. | 5.00 | 5.76 | 5.00 | 5.78 | 115 | 116 | 70-130 | 0 | 20 |
| sec-Butylbenzene | N.D. | 5.00 | 5.65 | 5.00 | 5.71 | 113 | 114 | 70-130 | 1 | 20 |
| tert-Butylbenzene | N.D. | 5.00 | 5.10 | 5.00 | 5.21 | 102 | 104 | 70-130 | 2 | 20 |
| Carbon Disulfide | N.D. | 5.00 | 5.84 | 5.00 | 5.89 | 117 | 118 | 70-130 | 1 | 20 |
| Carbon Tetrachloride | N.D. | 5.00 | 5.93 | 5.00 | 5.92 | 119 | 118 | 70-130 | 0 | 20 |
| Chlorobenzene | N.D. | 5.00 | 5.42 | 5.00 | 5.38 | 108 | 108 | 70-130 | 1 | 20 |
| Chloroethane | N.D. | 5.00 | 4.06 | 5.00 | 4.22 | 81 | 84 | 70-130 | 4 | 20 |
| Chloroform | N.D. | 5.00 | 5.65 | 5.00 | 5.61 | 113 | 112 | 70-130 | 1 | 20 |
| Chloromethane | N.D. | 5.00 | 4.49 | 5.00 | 4.50 | 90 | 90 | 70-130 | 0 | 20 |
| 2-Chlorotoluene | N.D. | 5.00 | 5.27 | 5.00 | 5.37 | 105 | 107 | 70-130 | 2 | 20 |
| 4-Chlorotoluene | N.D. | 5.00 | 5.21 | 5.00 | 5.31 | 104 | 106 | 70-130 | 2 | 20 |
| 1,2-Dibromo-3-chloropropane | N.D. | 5.00 | 6.95 | 5.00 | 5.39 | 139* | 108 | 70-130 | 25* | 20 |
| Dibromochloromethane | N.D. | 5.00 | 5.29 | 5.00 | 5.29 | 106 | 106 | 70-130 | 0 | 20 |
| 1,2-Dibromoethane | N.D. | 5.00 | 5.37 | 5.00 | 5.36 | 107 | 107 | 70-130 | 0 | 20 |
| Dibromomethane | N.D. | 5.00 | 5.61 | 5.00 | 5.58 | 112 | 112 | 70-130 | 1 | 20 |
| 1,2-Dichlorobenzene | N.D. | 5.00 | 5.14 | 5.00 | 5.18 | 103 | 104 | 70-130 | 1 | 20 |
| 1,3-Dichlorobenzene | N.D. | 5.00 | 5.03 | 5.00 | 5.05 | 101 | 101 | 70-130 | 0 | 20 |
| 1,4-Dichlorobenzene | N.D. | 5.00 | 4.98 | 5.00 | 4.98 | 100 | 100 | 70-130 | 0 | 20 |
| Dichlorodifluoromethane | N.D. | 5.00 | 3.23 | 5.00 | 3.37 | 65* | 67* | 70-130 | 4 | 20 |
| 1,1-Dichloroethane | 0.416 | 5.00 | 6.05 | 5.00 | 6.12 | 113 | 114 | 70-130 | 1 | 20 |
| 1,2-Dichloroethane | N.D. | 5.00 | 5.17 | 5.00 | 5.12 | 103 | 102 | 70-130 | 1 | 20 |
| 1,1-Dichloroethene | 0.841 | 5.00 | 6.80 | 5.00 | 7.01 | 119 | 123 | 70-130 | 3 | 20 |
| cis-1,2-Dichloroethene | 1.76 | 5.00 | 7.86 | 5.00 | 7.94 | 122 | 124 | 70-130 | 1 | 20 |
| trans-1,2-Dichloroethene | N.D. | 5.00 | 5.96 | 5.00 | 5.96 | 119 | 119 | 70-130 | 0 | 20 |
| 1,2-Dichloropropane | N.D. | 5.00 | 5.85 | 5.00 | 5.84 | 117 | 117 | 70-130 | 0 | 20 |
| 1,3-Dichloropropane | N.D. | 5.00 | 5.41 | 5.00 | 5.41 | 108 | 108 | 70-130 | 0 | 20 |
| 2,2-Dichloropropane | N.D. | 5.00 | 5.98 | 5.00 | 6.11 | 120 | 122 | 70-130 | 2 | 20 |
| 1,1-Dichloropropene | N.D. | 5.00 | 5.64 | 5.00 | 5.64 | 113 | 113 | 70-130 | 0 | 20 |
| cis-1,3-Dichloropropene | N.D. | 5.00 | 5.06 | 5.00 | 5.17 | 101 | 103 | 70-130 | 2 | 20 |
| trans-1,3-Dichloropropene | N.D. | 5.00 | 5.28 | 5.00 | 5.35 | 106 | 107 | 70-130 | 1 | 20 |
| 1,4-Dioxane | N.D. | 125 | 95.47 | 125 | 112.07 | 76 | 90 | 70-130 | 16 | 20 |
| Ethyl ether | N.D. | 5.00 | 5.24 | 5.00 | 5.32 | 105 | 106 | 70-130 | 1 | 20 |
| Ethyl t-butyl ether | N.D. | 5.00 | 4.36 | 5.00 | 4.53 | 87 | 91 | 70-130 | 4 | 20 |
| Ethylbenzene | N.D. | 5.00 | 5.50 | 5.00 | 5.41 | 110 | 108 | 70-130 | 2 | 20 |
| Hexachlorobutadiene | N.D. | 5.00 | 4.89 | 5.00 | 5.08 | 98 | 102 | 70-130 | 4 | 20 |
| 2-Hexanone | N.D. | 25 | 34.44 | 25 | 27.37 | 138* | 109 | 70-130 | 23* | 20 |

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.
P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

# Quality Control Summary

Client Name: Tetra Tech, Inc.
Reported: 11/30/2017 00:10

Group Number: 1877597

## MS/MSD (continued)

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike

| Analysis Name | Unspiked Conc ug/l | MS Spike Added ug/l | MS Conc ug/l | MSD Spike Added ug/l | MSD Conc ug/l | MS %Rec | MSD %Rec | MS/MSD Limits | RPD | RPD Max |
|---|---|---|---|---|---|---|---|---|---|---|
| di-Isopropyl Ether | N.D. | 5.00 | 5.02 | 5.00 | 5.15 | 100 | 103 | 70-130 | 3 | 20 |
| Isopropylbenzene | N.D. | 5.00 | 5.36 | 5.00 | 5.35 | 107 | 107 | 70-130 | 0 | 20 |
| p-Isopropyltoluene | N.D. | 5.00 | 5.47 | 5.00 | 5.55 | 109 | 111 | 70-130 | 1 | 20 |
| Methyl Tertiary Butyl Ether | 0.156 | 5.00 | 4.79 | 5.00 | 5.02 | 93 | 97 | 70-130 | 5 | 20 |
| 4-Methyl-2-Pentanone | N.D. | 25 | 35.75 | 25 | 28.12 | 143* | 112 | 70-130 | 24* | 20 |
| Methylene Chloride | N.D. | 5.00 | 5.68 | 5.00 | 5.76 | 114 | 115 | 70-130 | 1 | 20 |
| Naphthalene | N.D. | 5.00 | 5.14 | 5.00 | 5.33 | 103 | 107 | 70-130 | 4 | 20 |
| n-Propylbenzene | N.D. | 5.00 | 5.74 | 5.00 | 5.76 | 115 | 115 | 70-130 | 0 | 20 |
| Styrene | N.D. | 5.00 | 5.53 | 5.00 | 5.45 | 111 | 109 | 70-130 | 1 | 20 |
| 1,1,1,2-Tetrachloroethane | N.D. | 5.00 | 5.46 | 5.00 | 5.44 | 109 | 109 | 70-130 | 0 | 20 |
| 1,1,2,2-Tetrachloroethane | N.D. | 5.00 | 5.33 | 5.00 | 5.51 | 107 | 110 | 70-130 | 3 | 20 |
| Tetrachloroethene | 1.97 | 5.00 | 6.97 | 5.00 | 6.98 | 100 | 100 | 70-130 | 0 | 20 |
| Tetrahydrofuran | N.D. | 25 | 37 | 25 | 30.07 | 148* | 120 | 70-130 | 21* | 20 |
| Toluene | N.D. | 5.00 | 5.46 | 5.00 | 5.46 | 109 | 109 | 70-130 | 0 | 20 |
| 1,2,3-Trichlorobenzene | N.D. | 5.00 | 5.06 | 5.00 | 5.08 | 101 | 102 | 70-130 | 1 | 20 |
| 1,2,4-Trichlorobenzene | N.D. | 5.00 | 4.65 | 5.00 | 4.70 | 93 | 94 | 70-130 | 1 | 20 |
| 1,1,1-Trichloroethane | N.D. | 5.00 | 5.76 | 5.00 | 5.76 | 115 | 115 | 70-130 | 0 | 20 |
| 1,1,2-Trichloroethane | N.D. | 5.00 | 5.61 | 5.00 | 5.68 | 112 | 114 | 70-130 | 1 | 20 |
| Trichloroethene | 9.60 | 5.00 | 15.85 | 5.00 | 15.94 | 125 | 127 | 70-130 | 1 | 20 |
| Trichlorofluoromethane | N.D. | 5.00 | 4.89 | 5.00 | 4.62 | 98 | 92 | 70-130 | 6 | 20 |
| 1,2,3-Trichloropropane | N.D. | 5.00 | 5.34 | 5.00 | 5.37 | 107 | 107 | 70-130 | 1 | 20 |
| 1,2,4-Trimethylbenzene | N.D. | 5.00 | 5.46 | 5.00 | 5.50 | 109 | 110 | 70-130 | 1 | 20 |
| 1,3,5-Trimethylbenzene | N.D. | 5.00 | 5.48 | 5.00 | 5.51 | 110 | 110 | 70-130 | 1 | 20 |
| Vinyl Chloride | 0.103 | 5.00 | 4.80 | 5.00 | 4.79 | 94 | 94 | 70-130 | 0 | 20 |
| m+p-Xylene | N.D. | 10 | 10.85 | 10 | 10.75 | 108 | 108 | 70-130 | 1 | 20 |
| o-Xylene | N.D. | 5.00 | 5.13 | 5.00 | 5.11 | 103 | 102 | 70-130 | 0 | 20 |
| | ug/l | ug/l | ug/l | ug/l | ug/l | | | | | |
| Batch number: 17325WAI026 | Sample number(s): 9327872-9327874 UNSPK: P324688 | | | | | | | | | |
| 1,4-Dioxane | 0.101 | 1.01 | 0.525 | 1.01 | 0.485 | 42 | 38 | 25-72 | 8 | 30 |

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.
P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

# Quality Control Summary

Client Name: Tetra Tech, Inc.
Reported: 11/30/2017 00:10

Group Number: 1877597

## Surrogate Quality Control

Surrogate recoveries which are outside of the QC window are confirmed unless attributed to dilution or otherwise noted on the Analysis Report. For dual column analyses, the surrogate (at least one surrogate for multi-surrogate tests) must be within the acceptance limits on at least one of the two columns.

Analysis Name: VOCs- 25ml Water by 8260C
Batch number: I173332AA

| | Dibromofluoromethane | 1,2-Dichloroethane-d4 | Toluene-d8 | 4-Bromofluorobenzene |
|---|---|---|---|---|
| 9327872 | 102 | 104 | 100 | 95 |
| 9327873 | 103 | 104 | 100 | 93 |
| 9327874 | 102 | 107 | 101 | 96 |
| 9327875 | 102 | 105 | 102 | 93 |
| Blank | 102 | 101 | 103 | 94 |
| LCS | 97 | 100 | 100 | 99 |
| MS | 98 | 99 | 101 | 100 |
| MSD | 98 | 100 | 100 | 100 |
| Limits: | 70-130 | 70-130 | 70-130 | 70-130 |

Analysis Name: SIM SVOAs 8270D MINI
Batch number: 17325WAI026

| | Fluoranthene-d10 | Benzo(a)pyrene-d12 | 1-Methylnaphthalene-d10 |
|---|---|---|---|
| 9327872 | 87 | 65 | 70 |
| 9327873 | 87 | 33 | 76 |
| 9327874 | 88 | 73 | 77 |
| Blank | 87 | 82 | 80 |
| LCS | 88 | 90 | 87 |
| MS | 93 | 60 | 90 |
| MSD | 94 | 67 | 87 |
| Limits: | 44-115 | 25-125 | 33-112 |

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.
P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

# Environmental Analysis Request/Chain of Custody

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For Eurofins Lancaster Laboratories Environmental use only

Acct. # 19999 Group # 1877597 Sample # 9327872-75

**COC #** 557716

## Client Information

Client: TETRA TECH

Acct. #:

Project Name/#: 117-0567550 LMC BURLINGTON

PWSID #:

Project Manager: GD DOLAN

P.O. #: 117-0567550

Sampler: JAKE PICARD

Quote #:

State where samples were collected: MA

For Compliance: Yes ☐ No ☐

For Lab Use Only

FSC:

SCR#:

## Preservation Codes

H=HCl T=Thiosulfate
N=$HNO_3$ B=NaOH
S=$H_2SO_4$ P=$H_3PO_4$
F=Field Filtered O=Other

| Sample Identification | Collected Date | Collected Time | Grab | Composite | Matrix: Soil | Sediment | Tissue | Potable | Ground Water | Surface | NPDES | Other: | Total # of Containers | VOC 8260 | 1,4 DIOXANE 522 | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3M-2-111717 | 11/17/17 | 1132 | X | | | | | | GW | | | | 4 | 3 | 1 | ONE DIOXANE BROKE |
| 3M-3-11717 | 11/17/17 | 1145 | X | | | | | | GW | | | | 4 | 2 | 1 | ONE VOC BROKE |
| GMW-12R-111717 | 11/17/17 | 1325 | X | | | | | | GW | | | | 5 | 3 | 2 | |
| TEST BLANK | 11/17/17 | 0700 | | | | | | | | | | | 3 | | | |

Remarks: MCP SITE ANALYZE 1,4 DIOXANE TO 3 MG/L

**Turnaround Time (TAT) Requested** (please circle)

Standard Rush

(Rush TAT is subject to laboratory approval and surcharge.)

Date results are needed: _____

E-mail address: _____

**Data Package Options** (circle if required)

Type I (EPA Level 3 Equivalent/non-CLP) Type VI (Raw Data Only)

Type III (Reduced non-CLP) NJ DKQP TX TRRP-13

NYSDEC Category A or B MA MCP CT RCP

| Relinquished by | Date | Time | Received by | Date | Time |
|---|---|---|---|---|---|
| JAKE PICARD | 11/17/17 | 1430 | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

EDD Required? Yes No

If yes, format: PDF / EXCEL

Site-Specific QC (MS/MSD/Dup)? Yes No

(If yes, indicate QC sample and submit triplicate sample volume.)

Relinquished by Commercial Carrier: UPS _____ FedEx X Other _____

Temperature upon receipt 2.7 °C

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# Sample Administration Receipt Documentation Log

Doc Log ID: 201633

Group Number(s): 1877597

Client: Tetra Tech

## Delivery and Receipt Information

| | | | |
|---|---|---|---|
| Delivery Method: | Fed Ex | Arrival Timestamp: | 11/18/2017 10:05 |
| Number of Packages: | 1 | Number of Projects: | 1 |
| State/Province of Origin: | MA | | |

## Arrival Condition Summary

| | | | |
|---|---|---|---|
| Shipping Container Sealed: | Yes | Sample IDs on COC match Containers: | Yes |
| Custody Seal Present: | Yes | Sample Date/Times match COC: | Yes |
| Custody Seal Intact: | Yes | VOA Vial Headspace ≥ 6mm: | No |
| Samples Chilled: | Yes | Total Trip Blank Qty: | 3 |
| Paperwork Enclosed: | Yes | Trip Blank Type: | HCl |
| Samples Intact: | Yes | Air Quality Samples Present: | No |
| Missing Samples: | No | | |
| Extra Samples: | No | | |
| Discrepancy in Container Qty on COC: | No | | |

*Unpacked by Simon Nies (25112) at 15:53 on 11/18/2017*

## Samples Chilled Details

*Thermometer Types: DT = Digital (Temp. Bottle) IR = Infrared (Surface Temp) All Temperatures in °C.*

| Cooler # | Thermometer ID | Corrected Temp | Therm. Type | Ice Type | Ice Present? | Ice Container | Elevated Temp? |
|---|---|---|---|---|---|---|---|
| 1 | IR42-01 | 2.7 | IR | Wet | Y | Bagged | N |



2425 New Holland Pike
Lancaster, PA 17605-2425
T | 717-656-2300
F | 717-656-2681
www.LancasterLabs.com

# Explanation of Symbols and Abbreviations

*The following defines common symbols and abbreviations used in reporting technical data:*

| | | | |
|---|---|---|---|
| **BMQL** | Below Minimum Quantitation Level | **mg** | milligram(s) |
| **C** | degrees Celsius | **mL** | milliliter(s) |
| **cfu** | colony forming units | **MPN** | Most Probable Number |
| **CP Units** | cobalt-chloroplatinate units | **N.D.** | non-detect |
| **F** | degrees Fahrenheit | **ng** | nanogram(s) |
| **g** | gram(s) | **NTU** | nephelometric turbidity units |
| **IU** | International Units | **pg/L** | picogram/liter |
| **kg** | kilogram(s) | **RL** | Reporting Limit |
| **L** | liter(s) | **TNTC** | Too Numerous To Count |
| **lb.** | pound(s) | **µg** | microgram(s) |
| **m3** | cubic meter(s) | **µL** | microliter(s) |
| **meq** | milliequivalents | **umhos/cm** | micromhos/cm |

| | |
|---|---|
| **<** | less than |
| **>** | greater than |
| **ppm** | parts per million - One ppm is equivalent to one milligram per kilogram (mg/kg) or one gram per million grams. For aqueous liquids, ppm is usually taken to be equivalent to milligrams per liter (mg/l), because one liter of water has a weight very close to a kilogram. For gases or vapors, one ppm is equivalent to one microliter per liter of gas. |
| **ppb** | parts per billion |
| **Dry weight basis** | Results printed under this heading have been adjusted for moisture content. This increases the analyte weight concentration to approximate the value present in a similar sample without moisture. All other results are reported on an as-received basis. |

**Analytical test results meet all requirements of the associated regulatory program (i.e., NELAC (TNI), DoD, and ISO 17025) unless otherwise noted under the individual analysis.**

Measurement uncertainty values, as applicable, are available upon request.

Tests results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff.

This report shall not be reproduced except in full, without the written approval of the laboratory.

Times are local to the area of activity. Parameters listed in the 40 CFR Part 136 Table II as “analyze immediately” are not performed within 15 minutes.

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# Data Qualifiers

| Qualifier | Definition |
|---|---|
| C | Result confirmed by reanalysis |
| D1 | Indicates for dual column analyses that the result is reported from column 1 |
| D2 | Indicates for dual column analyses that the result is reported from column 2 |
| E | Concentration exceeds the calibration range |
| J (or G, I, X) | Estimated value >= the Method Detection Limit (MDL or DL) and < the Limit of Quantitation (LOQ or RL) |
| P | Concentration difference between the primary and confirmation column >40%. The lower result is reported. |
| U | Analyte was not detected at the value indicated |
| V | Concentration difference between the primary and confirmation column >100%. The reporting limit is raised due to this disparity and evident interference. |
| W | The dissolved oxygen uptake for the unseeded blank is greater than 0.20 mg/L. |
| Z | Laboratory Defined - see analysis report |

Additional Organic and Inorganic CLP qualifiers may be used with Form 1 reports as defined by the CLP methods.
Qualifiers specific to Dioxin/Furans and PCB Congeners are detailed on the individual Analysis Report.

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# ANALYSIS REPORT

Prepared by:

Eurofins Lancaster Laboratories Environmental
2425 New Holland Pike
Lancaster, PA 17601

Prepared for:

Tetra Tech, Inc.
One Monarch Drive
Suite 202
Littleton MA 01460

Report Date: December 01, 2017 17:18

**Project: Lockheed Martin - Burlington, MA**

Account #: 19999
Group Number: 1876931
SDG: LMB09
PO Number: 117-0507550
State of Sample Origin: MA

Regulatory agencies do not accredit laboratories for all methods, analytes, and matrices. Our current scopes of accreditation can be viewed at http://www.eurofinsus.com/environment-testing/laboratories/eurofins-lancaster-laboratories-environmental/resources/certifications/ . To request copies of prior scopes of accreditation, contact your project manager.

| | | |
|---|---|---|
| Electronic Copy To | Tetra Tech, Inc. | Attn: Thomas Nunno |
| Electronic Copy To | Tetra Tech, Inc. | Attn: Ed Dolan |
| Electronic Copy To | Tetra Tech, Inc. | Attn: Chris Conor |

Respectfully Submitted,

Barbara Weyandt

Barbara A. Weyandt
Specialist

(717) 556-7264

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## SAMPLE INFORMATION

| Client Sample Description | Sample Collection Date/Time | ELLE# |
|---|---|---|
| EMW-1D-111617 Grab Groundwater | 11/16/2017 11:30 | 9324688 |
| EMW-1D-111617 MS Grab Groundwater | 11/16/2017 11:30 | 9324689 |
| EMW-1D-111617 MSD Grab Groundwater | 11/16/2017 11:30 | 9324690 |
| EMW-1D-111617 DUP Grab Groundwater | 11/16/2017 11:30 | 9324691 |
| TTMW-7(R)-111617 Grab Groundwater | 11/16/2017 13:20 | 9324692 |

The specific methodologies used in obtaining the enclosed analytical results are indicated on the Laboratory Sample Analysis Record.

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## MADEP MCP Analytical Method Report Certification Form

Laboratory Name: Eurofins Lancaster Laboratories Environmental
Project: Lockheed Martin - Burlington, MA
This form provides certifications for the following data set: 9324688-9324692

Sample Matrices: Water

Methods Used:
EPA 300.0; RSKSOP-175 modified; SM 5310 C-2000; SW-846 8260C; SW-846 8270D SIM

| Affirmative responses to questions A through F are required for "Presumptive Certainty" status | | Yes or No[1] |
|---|---|---|
| A | Were all samples received in a condition consistent with those described on the Chain-of-Custody, properly preserved (including temperature) in the field or laboratory, and prepared/analyzed within method holding times? | Yes |
| B | Were the analytical method(s) and all associated QC requirements specified in the selected CAM protocol(s) followed? | Yes |
| C | Were all required corrective actions and analytical response actions specified in the selected CAM protocol(s) implemented for all identified performance standard non-conformances? | Yes |
| D | Does the laboratory report comply with all the reporting requirements specified in CAM VII A, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data"? | Yes |
| E | **VPH, EPH, APH, and TO-15 only:**<br>a. VPH, EPH, and APH Methods only: Was each method conducted without significant modification(s)? (Refer to the individual method(s) for a list of significant modifications).<br>b. APH and TO-15 Methods only. Was the complete analyte list reported for each method? | <br>NA<br><br>NA |
| F | Were all applicable CAM protocol QC and performance standard non-conformances identified and evaluated in a laboratory narrative (including all "No" responses to Questions A through E)? | Yes |
| Responses to Questions G, H and I below are required for "Presumptive Certainty" status | | |
| G | Were the reporting limits at or below all CAM reporting limits specified in the selected CAM protocol(s)? | Yes |
| *Data User Note: Data that achieve "Presumptive Certainty" status may not necessarily meet the data usability and representativeness requirements described in 310 CMR 40. 1056 (2)(k) and WSC-07-350.* | | |
| H | Were all QC performance standards specified in the CAM protocol(s) achieved? | No |
| I | Were results reported for the complete analyte list specified in the selected CAM protocol(s)? | No |
| [1] Refer to the Case Narrative for information regarding negative responses. | | |
| I, the undersigned, attest under the pains and penalties of perjury that the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete. | | |

Dorothy M Love

Dorothy M. Love
Director

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Project Name: Lockheed Martin - Burlington, MA
ELLE Group #: 1876931

**General Comments:**

See the Laboratory Sample Analysis Record section of the Analysis Report for the method references.

All QC met criteria unless otherwise noted in an Analysis Specific Comment below.

Refer to the QC Summary for specific values and acceptance criteria.

Project specific QC samples are included in this data set.

Matrix QC may not be reported if site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

Surrogate recoveries (if applicable) which are outside of the QC window are confirmed unless attributed to a dilution or otherwise noted in an Analysis Specific Comment below.

For dual column analyses, the surrogate (for multi-surrogate tests, at least one surrogate) must be within the acceptance limits on at least one of the two columns.

The samples were received at the appropriate temperature and in accordance with the chain of custody unless otherwise noted.

**Analysis Specific Comments:**

**SW-846 8260C, GC/MS Volatiles**

Sample #s: 9324689, 9324690

The percent drift for the following is >20% in the continuing calibration verification standard associated with this sample: Dichlorodifluoromethane, Bromomethane, Chloroethane, 1,4-Dioxane.

The percent recovery for Dichlorodifluoromethane is outside of the 70 - 130% QC windows in the LCS and/or LCSD associated with this sample. Dichlorodifluoromethane is considered a difficult analyte and the percent recovery is within the allowed 40 - 160% window.

Sample #s: 9324688

The percent drift for the following is >20% in the continuing calibration verification standard associated with this sample: Dichlorodifluoromethane, Bromomethane, Chloroethane, 1,4-Dioxane.

The percent recovery for Dichlorodifluoromethane is outside of the 70 - 130% QC windows in the LCS and/or LCSD associated with this sample. Dichlorodifluoromethane is considered a difficult analyte and the percent recovery is within the allowed 40 - 160% window.

A Method Detection Limit (MDL) standard is analyzed to confirm sensitivity of the instrument for samples with non-detect analytes associated with a continuing calibration verification standard exhibiting low response (outside the 20%D criteria). The MDL standard shows adequate sensitivity at or below the reporting limit.

Sample #s: 9324692

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The percent drift for the following is >20% in the continuing calibration verification standard associated with this sample: Dichlorodifluoromethane, Bromomethane, Chloroethane, 1,4-Dioxane.

The percent recovery for Dichlorodifluoromethane is outside of the 70 - 130% QC windows in the LCS and/or LCSD associated with this sample. Dichlorodifluoromethane is considered a difficult analyte and the percent recovery is within the allowed 40 - 160% window.

A Method Detection Limit (MDL) standard is analyzed to confirm sensitivity of the instrument for samples with non-detect analytes associated with a continuing calibration verification standard exhibiting low response (outside the 20%D criteria). The MDL standard shows adequate sensitivity at or below the reporting limit.

This analysis was performed from a previously opened container with headspace.

Batch #: I173332AA (Sample number(s): 9324688-9324690, 9324692 UNSPK: 9324688)

The recovery(ies) for the following analyte(s) in the LCS exceeded the acceptance window indicating a positive bias: Tetrahydrofuran

The recovery(ies) for the following analyte(s) in the LCS were below the acceptance window: Dichlorodifluoromethane

The recovery(ies) for the following analyte(s) in the MS and/or MSD exceeded the acceptance window indicating a positive bias: 2-Butanone, Tetrahydrofuran, 4-Methyl-2-Pentanone, 2-Hexanone, 1,2-Dibromo-3-chloropropane

The recovery(ies) for the following analyte(s) in the MS and/or MSD were below the acceptance window: Dichlorodifluoromethane

The relative percent difference(s) for the following analyte(s) in the MS/MSD were outside acceptance windows: Tetrahydrofuran, 4-Methyl-2-Pentanone, 2-Hexanone, 1,2-Dibromo-3-chloropropane

**SW-846 8270D SIM, GC/MS Semivolatiles**

Sample #s: 9324688, 9324689, 9324690, 9324692

The MA MCP analyte list requirement was not met for Method 8270D.
The client specified list is reported.

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# Analysis Report

**Sample Description:** **EMW-1D-111617 Grab Groundwater**
**Lockheed Martin, Burlington**

**Project Name:** **Lockheed Martin - Burlington, MA**

Submittal Date/Time: 11/17/2017 09:45
Collection Date/Time: 11/16/2017 11:30
SDG#: LMB09-01BKG

**Tetra Tech, Inc.**
**ELLE Sample #: WW 9324688**
**ELLE Group #: 1876931**
**Matrix: Groundwater**

| CAT No. | Analysis Name | CAS Number | Result | | Method Detection Limit* | Limit of Quantitation | Dilution Factor |
|---|---|---|---|---|---|---|---|
| **GC/MS Volatiles** | **SW-846 8260C** | | **ug/l** | | **ug/l** | **ug/l** | |
| 11996 | Acetone | 67-64-1 | N.D. | | 3.0 | 5.0 | 1 |
| 11996 | t-Amyl methyl ether | 994-05-8 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Benzene | 71-43-2 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Bromobenzene | 108-86-1 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Bromochloromethane | 74-97-5 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Bromodichloromethane | 75-27-4 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Bromoform | 75-25-2 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Bromomethane | 74-83-9 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 2-Butanone | 78-93-3 | N.D. | | 1.0 | 5.0 | 1 |
| 11996 | n-Butylbenzene | 104-51-8 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | sec-Butylbenzene | 135-98-8 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | tert-Butylbenzene | 98-06-6 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Carbon Disulfide | 75-15-0 | N.D. | | 0.4 | 1.0 | 1 |
| 11996 | Carbon Tetrachloride | 56-23-5 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Chlorobenzene | 108-90-7 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Chloroethane | 75-00-3 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Chloroform | 67-66-3 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Chloromethane | 74-87-3 | N.D. | | 0.2 | 0.5 | 1 |
| 11996 | 2-Chlorotoluene | 95-49-8 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 4-Chlorotoluene | 106-43-4 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dibromo-3-chloropropane | 96-12-8 | N.D. | | 0.2 | 0.5 | 1 |
| 11996 | Dibromochloromethane | 124-48-1 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dibromoethane | 106-93-4 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Dibromomethane | 74-95-3 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dichlorobenzene | 95-50-1 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,3-Dichlorobenzene | 541-73-1 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,4-Dichlorobenzene | 106-46-7 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Dichlorodifluoromethane | 75-71-8 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | **1,1-Dichloroethane** | 75-34-3 | **0.4** | **J** | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dichloroethane | 107-06-2 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | **1,1-Dichloroethene** | 75-35-4 | **0.8** | | 0.1 | 0.5 | 1 |
| 11996 | **cis-1,2-Dichloroethene** | 156-59-2 | **1.8** | | 0.1 | 0.5 | 1 |
| 11996 | trans-1,2-Dichloroethene | 156-60-5 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dichloropropane | 78-87-5 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,3-Dichloropropane | 142-28-9 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 2,2-Dichloropropane | 594-20-7 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,1-Dichloropropene | 563-58-6 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | cis-1,3-Dichloropropene | 10061-01-5 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | trans-1,3-Dichloropropene | 10061-02-6 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,4-Dioxane | 123-91-1 | N.D. | | 20 | 100 | 1 |
| 11996 | Ethyl ether | 60-29-7 | N.D. | | 0.1 | 0.5 | 1 |

*=This limit was used in the evaluation of the final result

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# Analysis Report

**Sample Description:** **EMW-1D-111617 Grab Groundwater Lockheed Martin, Burlington**

**Project Name:** **Lockheed Martin - Burlington, MA**

Submittal Date/Time: 11/17/2017 09:45
Collection Date/Time: 11/16/2017 11:30
SDG#: LMB09-01BKG

**Tetra Tech, Inc.**
**ELLE Sample #: WW 9324688**
**ELLE Group #: 1876931**
**Matrix: Groundwater**

| CAT No. | Analysis Name | CAS Number | Result | | Method Detection Limit* | Limit of Quantitation | Dilution Factor |
|---|---|---|---|---|---|---|---|
| **GC/MS Volatiles** | **SW-846 8260C** | | **ug/l** | | **ug/l** | **ug/l** | |
| 11996 | Ethyl t-butyl ether | 637-92-3 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Ethylbenzene | 100-41-4 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Hexachlorobutadiene | 87-68-3 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 2-Hexanone | 591-78-6 | N.D. | | 1.0 | 5.0 | 1 |
| 11996 | di-Isopropyl Ether | 108-20-3 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Isopropylbenzene | 98-82-8 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | p-Isopropyltoluene | 99-87-6 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | **Methyl Tertiary Butyl Ether** | 1634-04-4 | **0.2** | **J** | 0.1 | 0.5 | 1 |
| 11996 | 4-Methyl-2-Pentanone | 108-10-1 | N.D. | | 1.0 | 5.0 | 1 |
| 11996 | Methylene Chloride | 75-09-2 | N.D. | | 0.2 | 0.5 | 1 |
| 11996 | Naphthalene | 91-20-3 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | n-Propylbenzene | 103-65-1 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Styrene | 100-42-5 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,1,1,2-Tetrachloroethane | 630-20-6 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,1,2,2-Tetrachloroethane | 79-34-5 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | **Tetrachloroethene** | 127-18-4 | **2.0** | | 0.1 | 0.5 | 1 |
| 11996 | Tetrahydrofuran | 109-99-9 | N.D. | | 2.0 | 5.0 | 1 |
| 11996 | Toluene | 108-88-3 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,2,3-Trichlorobenzene | 87-61-6 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,2,4-Trichlorobenzene | 120-82-1 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,1,1-Trichloroethane | 71-55-6 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,1,2-Trichloroethane | 79-00-5 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | **Trichloroethene** | 79-01-6 | **9.6** | | 0.1 | 0.5 | 1 |
| 11996 | Trichlorofluoromethane | 75-69-4 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,2,3-Trichloropropane | 96-18-4 | N.D. | | 0.3 | 1.0 | 1 |
| 11996 | 1,2,4-Trimethylbenzene | 95-63-6 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,3,5-Trimethylbenzene | 108-67-8 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | **Vinyl Chloride** | 75-01-4 | **0.1** | **J** | 0.1 | 0.5 | 1 |
| 11996 | m+p-Xylene | 179601-23-1 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | o-Xylene | 95-47-6 | N.D. | | 0.1 | 0.5 | 1 |

The percent drift for the following is >20% in the continuing calibration verification standard associated with this sample: Dichlorodifluoromethane, Bromomethane, Chloroethane, 1,4-Dioxane.

The percent recovery for Dichlorodifluoromethane is outside of the 70 - 130% QC windows in the LCS and/or LCSD associated with this sample. Dichlorodifluoromethane is considered a difficult analyte and the percent recovery is within the allowed 40 - 160% window.

A Method Detection Limit (MDL) standard is analyzed to confirm sensitivity of the instrument for samples with non-detect analytes associated with a continuing calibration verification standard exhibiting low response (outside the 20%D criteria). The MDL standard shows adequate sensitivity at or below

*=This limit was used in the evaluation of the final result

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# Analysis Report

**Sample Description:** **EMW-1D-111617 Grab Groundwater**
**Lockheed Martin, Burlington**

**Project Name:** **Lockheed Martin - Burlington, MA**

Submittal Date/Time: 11/17/2017 09:45
Collection Date/Time: 11/16/2017 11:30
SDG#: LMB09-01BKG

**Tetra Tech, Inc.**
**ELLE Sample #: WW 9324688**
**ELLE Group #: 1876931**
**Matrix: Groundwater**

| CAT No. | Analysis Name | CAS Number | Result | Method Detection Limit* | Limit of Quantitation | Dilution Factor |
|---|---|---|---|---|---|---|
| the reporting limit. | | | | | | |
| **GC/MS Semivolatiles** | **SW-846 8270D SIM** | | **ug/l** | **ug/l** | **ug/l** | |
| 14244 | **1,4-Dioxane** | 123-91-1 | **0.10 J** | 0.051 | 0.20 | 1 |
| The MA MCP analyte list requirement was not met for Method 8270D. The client specified list is reported. | | | | | | |
| **GC Miscellaneous** | **RSKSOP-175 modified** | | **ug/l** | **ug/l** | **ug/l** | |
| 07105 | **Methane** | 74-82-8 | **9.3** | 3.0 | 5.0 | 1 |
| **Wet Chemistry** | **EPA 300.0** | | **mg/l** | **mg/l** | **mg/l** | |
| 00368 | Nitrate Nitrogen | 14797-55-8 | N.D. | 0.25 | 0.50 | 5 |
| 00228 | **Sulfate** | 14808-79-8 | **27.5** | 1.5 | 5.0 | 5 |
| | **SM 5310 C-2000** | | **mg/l** | **mg/l** | **mg/l** | |
| 00273 | **Total Organic Carbon** | n.a. | **1.4** | 0.50 | 1.0 | 1 |

## Sample Comments

State of Massachusetts Laboratory Non-Potable Water Certification M-PA009

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name | Method | Trial# | Batch# | Analysis Date and Time | Analyst | Dilution Factor |
|---|---|---|---|---|---|---|---|
| 11996 | VOCs- 25ml Water by 8260C | SW-846 8260C | 1 | I173332AA | 11/29/2017 14:38 | Kevin A Sposito | 1 |
| 01163 | GC/MS VOA Water Prep | SW-846 5030C | 1 | I173332AA | 11/29/2017 14:38 | Kevin A Sposito | 1 |
| 14244 | SIM SVOAs 8270D MINI | SW-846 8270D SIM | 1 | 17325WAI026 | 11/23/2017 03:10 | William H Saadeh | 1 |
| 10466 | BNA Water Extraction SIM | SW-846 3510C | 1 | 17325WAI026 | 11/22/2017 08:00 | Bradley W VanLeuven | 1 |
| 07105 | Volatile Headspace Hydrocarbon | RSKSOP-175 modified | 1 | 173220016A | 11/18/2017 13:25 | Johanna C Kennedy | 1 |
| 00368 | Nitrate Nitrogen | EPA 300.0 | 1 | 17321987115A | 11/17/2017 21:06 | Clinton M Wilson | 5 |
| 00228 | Sulfate | EPA 300.0 | 1 | 17321987115A | 11/17/2017 21:06 | Clinton M Wilson | 5 |
| 00273 | Total Organic Carbon | SM 5310 C-2000 | 1 | 17324667606A | 11/21/2017 08:31 | Drew M Gerhart | 1 |

*=This limit was used in the evaluation of the final result

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# Analysis Report

**Sample Description:** **EMW-1D-111617 MS Grab Groundwater Lockheed Martin, Burlington**

**Project Name:** **Lockheed Martin - Burlington, MA**

**Tetra Tech, Inc.**
**ELLE Sample #:** **WW 9324689**
**ELLE Group #:** **1876931**
**Matrix: Groundwater**

Submittal Date/Time: 11/17/2017 09:45
Collection Date/Time: 11/16/2017 11:30
SDG#: LMB09-01MS

| CAT No. | Analysis Name | CAS Number | Result | | Method Detection Limit* | Limit of Quantitation | Dilution Factor |
|---|---|---|---|---|---|---|---|
| **GC/MS Volatiles** | **SW-846 8260C** | | **ug/l** | | **ug/l** | **ug/l** | |
| 11996 | **Acetone** | 67-64-1 | **38** | | 3.0 | 5.0 | 1 |
| 11996 | **t-Amyl methyl ether** | 994-05-8 | **4.5** | | 0.1 | 0.5 | 1 |
| 11996 | **Benzene** | 71-43-2 | **5.7** | | 0.1 | 0.5 | 1 |
| 11996 | **Bromobenzene** | 108-86-1 | **4.8** | | 0.1 | 0.5 | 1 |
| 11996 | **Bromochloromethane** | 74-97-5 | **5.3** | | 0.1 | 0.5 | 1 |
| 11996 | **Bromodichloromethane** | 75-27-4 | **5.6** | | 0.1 | 0.5 | 1 |
| 11996 | **Bromoform** | 75-25-2 | **4.8** | | 0.1 | 0.5 | 1 |
| 11996 | **Bromomethane** | 74-83-9 | **4.2** | | 0.1 | 0.5 | 1 |
| 11996 | **2-Butanone** | 78-93-3 | **52** | | 1.0 | 5.0 | 1 |
| 11996 | **n-Butylbenzene** | 104-51-8 | **5.8** | | 0.1 | 0.5 | 1 |
| 11996 | **sec-Butylbenzene** | 135-98-8 | **5.7** | | 0.1 | 0.5 | 1 |
| 11996 | **tert-Butylbenzene** | 98-06-6 | **5.1** | | 0.1 | 0.5 | 1 |
| 11996 | **Carbon Disulfide** | 75-15-0 | **5.8** | | 0.4 | 1.0 | 1 |
| 11996 | **Carbon Tetrachloride** | 56-23-5 | **5.9** | | 0.1 | 0.5 | 1 |
| 11996 | **Chlorobenzene** | 108-90-7 | **5.4** | | 0.1 | 0.5 | 1 |
| 11996 | **Chloroethane** | 75-00-3 | **4.1** | | 0.1 | 0.5 | 1 |
| 11996 | **Chloroform** | 67-66-3 | **5.6** | | 0.1 | 0.5 | 1 |
| 11996 | **Chloromethane** | 74-87-3 | **4.5** | | 0.2 | 0.5 | 1 |
| 11996 | **2-Chlorotoluene** | 95-49-8 | **5.3** | | 0.1 | 0.5 | 1 |
| 11996 | **4-Chlorotoluene** | 106-43-4 | **5.2** | | 0.1 | 0.5 | 1 |
| 11996 | **1,2-Dibromo-3-chloropropane** | 96-12-8 | **7.0** | | 0.2 | 0.5 | 1 |
| 11996 | **Dibromochloromethane** | 124-48-1 | **5.3** | | 0.1 | 0.5 | 1 |
| 11996 | **1,2-Dibromoethane** | 106-93-4 | **5.4** | | 0.1 | 0.5 | 1 |
| 11996 | **Dibromomethane** | 74-95-3 | **5.6** | | 0.1 | 0.5 | 1 |
| 11996 | **1,2-Dichlorobenzene** | 95-50-1 | **5.1** | | 0.1 | 0.5 | 1 |
| 11996 | **1,3-Dichlorobenzene** | 541-73-1 | **5.0** | | 0.1 | 0.5 | 1 |
| 11996 | **1,4-Dichlorobenzene** | 106-46-7 | **5.0** | | 0.1 | 0.5 | 1 |
| 11996 | **Dichlorodifluoromethane** | 75-71-8 | **3.2** | | 0.1 | 0.5 | 1 |
| 11996 | **1,1-Dichloroethane** | 75-34-3 | **6.0** | | 0.1 | 0.5 | 1 |
| 11996 | **1,2-Dichloroethane** | 107-06-2 | **5.2** | | 0.1 | 0.5 | 1 |
| 11996 | **1,1-Dichloroethene** | 75-35-4 | **6.8** | | 0.1 | 0.5 | 1 |
| 11996 | **cis-1,2-Dichloroethene** | 156-59-2 | **7.9** | | 0.1 | 0.5 | 1 |
| 11996 | **trans-1,2-Dichloroethene** | 156-60-5 | **6.0** | | 0.1 | 0.5 | 1 |
| 11996 | **1,2-Dichloropropane** | 78-87-5 | **5.9** | | 0.1 | 0.5 | 1 |
| 11996 | **1,3-Dichloropropane** | 142-28-9 | **5.4** | | 0.1 | 0.5 | 1 |
| 11996 | **2,2-Dichloropropane** | 594-20-7 | **6.0** | | 0.1 | 0.5 | 1 |
| 11996 | **1,1-Dichloropropene** | 563-58-6 | **5.6** | | 0.1 | 0.5 | 1 |
| 11996 | **cis-1,3-Dichloropropene** | 10061-01-5 | **5.1** | | 0.1 | 0.5 | 1 |
| 11996 | **trans-1,3-Dichloropropene** | 10061-02-6 | **5.3** | | 0.1 | 0.5 | 1 |
| 11996 | **1,4-Dioxane** | 123-91-1 | **95** | **J** | 20 | 100 | 1 |
| 11996 | **Ethyl ether** | 60-29-7 | **5.2** | | 0.1 | 0.5 | 1 |

*=This limit was used in the evaluation of the final result

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# Analysis Report

**Sample Description:** **EMW-1D-111617 MS Grab Groundwater Lockheed Martin, Burlington**

**Project Name:** **Lockheed Martin - Burlington, MA**

Submittal Date/Time: 11/17/2017 09:45
Collection Date/Time: 11/16/2017 11:30
SDG#: LMB09-01MS

**Tetra Tech, Inc.**
**ELLE Sample #: WW 9324689**
**ELLE Group #: 1876931**
**Matrix: Groundwater**

| CAT No. | Analysis Name | CAS Number | Result | Method Detection Limit* | Limit of Quantitation | Dilution Factor |
|---|---|---|---|---|---|---|
| **GC/MS Volatiles** | **SW-846 8260C** | | ug/l | ug/l | ug/l | |
| 11996 | **Ethyl t-butyl ether** | 637-92-3 | **4.4** | 0.1 | 0.5 | 1 |
| 11996 | **Ethylbenzene** | 100-41-4 | **5.5** | 0.1 | 0.5 | 1 |
| 11996 | **Hexachlorobutadiene** | 87-68-3 | **4.9** | 0.1 | 0.5 | 1 |
| 11996 | **2-Hexanone** | 591-78-6 | **34** | 1.0 | 5.0 | 1 |
| 11996 | **di-Isopropyl Ether** | 108-20-3 | **5.0** | 0.1 | 0.5 | 1 |
| 11996 | **Isopropylbenzene** | 98-82-8 | **5.4** | 0.1 | 0.5 | 1 |
| 11996 | **p-Isopropyltoluene** | 99-87-6 | **5.5** | 0.1 | 0.5 | 1 |
| 11996 | **Methyl Tertiary Butyl Ether** | 1634-04-4 | **4.8** | 0.1 | 0.5 | 1 |
| 11996 | **4-Methyl-2-Pentanone** | 108-10-1 | **36** | 1.0 | 5.0 | 1 |
| 11996 | **Methylene Chloride** | 75-09-2 | **5.7** | 0.2 | 0.5 | 1 |
| 11996 | **Naphthalene** | 91-20-3 | **5.1** | 0.1 | 0.5 | 1 |
| 11996 | **n-Propylbenzene** | 103-65-1 | **5.7** | 0.1 | 0.5 | 1 |
| 11996 | **Styrene** | 100-42-5 | **5.5** | 0.1 | 0.5 | 1 |
| 11996 | **1,1,1,2-Tetrachloroethane** | 630-20-6 | **5.5** | 0.1 | 0.5 | 1 |
| 11996 | **1,1,2,2-Tetrachloroethane** | 79-34-5 | **5.3** | 0.1 | 0.5 | 1 |
| 11996 | **Tetrachloroethene** | 127-18-4 | **7.0** | 0.1 | 0.5 | 1 |
| 11996 | **Tetrahydrofuran** | 109-99-9 | **37** | 2.0 | 5.0 | 1 |
| 11996 | **Toluene** | 108-88-3 | **5.5** | 0.1 | 0.5 | 1 |
| 11996 | **1,2,3-Trichlorobenzene** | 87-61-6 | **5.1** | 0.1 | 0.5 | 1 |
| 11996 | **1,2,4-Trichlorobenzene** | 120-82-1 | **4.7** | 0.1 | 0.5 | 1 |
| 11996 | **1,1,1-Trichloroethane** | 71-55-6 | **5.8** | 0.1 | 0.5 | 1 |
| 11996 | **1,1,2-Trichloroethane** | 79-00-5 | **5.6** | 0.1 | 0.5 | 1 |
| 11996 | **Trichloroethene** | 79-01-6 | **16** | 0.1 | 0.5 | 1 |
| 11996 | **Trichlorofluoromethane** | 75-69-4 | **4.9** | 0.1 | 0.5 | 1 |
| 11996 | **1,2,3-Trichloropropane** | 96-18-4 | **5.3** | 0.3 | 1.0 | 1 |
| 11996 | **1,2,4-Trimethylbenzene** | 95-63-6 | **5.5** | 0.1 | 0.5 | 1 |
| 11996 | **1,3,5-Trimethylbenzene** | 108-67-8 | **5.5** | 0.1 | 0.5 | 1 |
| 11996 | **Vinyl Chloride** | 75-01-4 | **4.8** | 0.1 | 0.5 | 1 |
| 11996 | **m+p-Xylene** | 179601-23-1 | **11** | 0.1 | 0.5 | 1 |
| 11996 | **o-Xylene** | 95-47-6 | **5.1** | 0.1 | 0.5 | 1 |

The percent drift for the following is >20% in the continuing calibration verification standard associated with this sample: Dichlorodifluoromethane, Bromomethane, Chloroethane, 1,4-Dioxane.

The percent recovery for Dichlorodifluoromethane is outside of the 70 - 130% QC windows in the LCS and/or LCSD associated with this sample. Dichlorodifluoromethane is considered a difficult analyte and the percent recovery is within the allowed 40 - 160% window.

| | | | | | | |
|---|---|---|---|---|---|---|
| **GC/MS Semivolatiles** | **SW-846 8270D SIM** | | ug/l | ug/l | ug/l | |
| 14244 | **1,4-Dioxane** | 123-91-1 | **0.53** | 0.051 | 0.20 | 1 |

The MA MCP analyte list requirement was not met for Method 8270D.

*=This limit was used in the evaluation of the final result

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# Analysis Report

**Sample Description:** **EMW-1D-111617 MS Grab Groundwater Lockheed Martin, Burlington**

**Project Name:** **Lockheed Martin - Burlington, MA**

Submittal Date/Time: 11/17/2017 09:45
Collection Date/Time: 11/16/2017 11:30
SDG#: LMB09-01MS

**Tetra Tech, Inc.**
**ELLE Sample #: WW 9324689**
**ELLE Group #: 1876931**
**Matrix: Groundwater**

| CAT No. | Analysis Name | CAS Number | Result | Method Detection Limit* | Limit of Quantitation | Dilution Factor |
|---|---|---|---|---|---|---|
| The client specified list is reported. | | | | | | |
| **GC Miscellaneous** | **RSKSOP-175 modified** | | **ug/l** | **ug/l** | **ug/l** | |
| 07105 | **Methane** | 74-82-8 | **75** | 3.0 | 5.0 | 1 |
| **Wet Chemistry** | **EPA 300.0** | | **mg/l** | **mg/l** | **mg/l** | |
| 00368 | **Nitrate Nitrogen** | 14797-55-8 | **2.6** | 0.25 | 0.50 | 5 |
| 00228 | **Sulfate** | 14808-79-8 | **51.6** | 1.5 | 5.0 | 5 |
| | **SM 5310 C-2000** | | **mg/l** | **mg/l** | **mg/l** | |
| 00273 | **Total Organic Carbon** | n.a. | **11.8** | 0.50 | 1.0 | 1 |

## Sample Comments

State of Massachusetts Laboratory Non-Potable Water Certification M-PA009

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name | Method | Trial# | Batch# | Analysis Date and Time | Analyst | Dilution Factor |
|---|---|---|---|---|---|---|---|
| 11996 | VOCs- 25ml Water by 8260C | SW-846 8260C | 1 | I173332AA | 11/29/2017 14:59 | Kevin A Sposito | 1 |
| 01163 | GC/MS VOA Water Prep | SW-846 5030C | 1 | I173332AA | 11/29/2017 14:59 | Kevin A Sposito | 1 |
| 14244 | SIM SVOAs 8270D MINI | SW-846 8270D SIM | 1 | 17325WAI026 | 11/23/2017 03:38 | William H Saadeh | 1 |
| 10466 | BNA Water Extraction SIM | SW-846 3510C | 1 | 17325WAI026 | 11/22/2017 08:00 | Bradley W VanLeuven | 1 |
| 07105 | Volatile Headspace Hydrocarbon | RSKSOP-175 modified | 1 | 173220016A | 11/18/2017 13:41 | Johanna C Kennedy | 1 |
| 00368 | Nitrate Nitrogen | EPA 300.0 | 1 | 17321987115A | 11/17/2017 21:36 | Clinton M Wilson | 5 |
| 00228 | Sulfate | EPA 300.0 | 1 | 17321987115A | 11/17/2017 21:36 | Clinton M Wilson | 5 |
| 00273 | Total Organic Carbon | SM 5310 C-2000 | 1 | 17324667606A | 11/21/2017 08:45 | Drew M Gerhart | 1 |

*=This limit was used in the evaluation of the final result

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# Analysis Report

**Sample Description:** **EMW-1D-111617 MSD Grab Groundwater Lockheed Martin, Burlington**

**Project Name:** **Lockheed Martin - Burlington, MA**

Submittal Date/Time: 11/17/2017 09:45
Collection Date/Time: 11/16/2017 11:30
SDG#: LMB09-01MSD

**Tetra Tech, Inc.**
**ELLE Sample #: WW 9324690**
**ELLE Group #: 1876931**
**Matrix: Groundwater**

| CAT No. | Analysis Name | CAS Number | Result | Method Detection Limit* | Limit of Quantitation | Dilution Factor |
|---|---|---|---|---|---|---|
| **GC/MS Volatiles** | **SW-846 8260C** | | ug/l | ug/l | ug/l | |
| 11996 | **Acetone** | 67-64-1 | **38** | 3.0 | 5.0 | 1 |
| 11996 | **t-Amyl methyl ether** | 994-05-8 | **4.6** | 0.1 | 0.5 | 1 |
| 11996 | **Benzene** | 71-43-2 | **5.7** | 0.1 | 0.5 | 1 |
| 11996 | **Bromobenzene** | 108-86-1 | **4.9** | 0.1 | 0.5 | 1 |
| 11996 | **Bromochloromethane** | 74-97-5 | **5.3** | 0.1 | 0.5 | 1 |
| 11996 | **Bromodichloromethane** | 75-27-4 | **5.5** | 0.1 | 0.5 | 1 |
| 11996 | **Bromoform** | 75-25-2 | **4.7** | 0.1 | 0.5 | 1 |
| 11996 | **Bromomethane** | 74-83-9 | **4.1** | 0.1 | 0.5 | 1 |
| 11996 | **2-Butanone** | 78-93-3 | **43** | 1.0 | 5.0 | 1 |
| 11996 | **n-Butylbenzene** | 104-51-8 | **5.8** | 0.1 | 0.5 | 1 |
| 11996 | **sec-Butylbenzene** | 135-98-8 | **5.7** | 0.1 | 0.5 | 1 |
| 11996 | **tert-Butylbenzene** | 98-06-6 | **5.2** | 0.1 | 0.5 | 1 |
| 11996 | **Carbon Disulfide** | 75-15-0 | **5.9** | 0.4 | 1.0 | 1 |
| 11996 | **Carbon Tetrachloride** | 56-23-5 | **5.9** | 0.1 | 0.5 | 1 |
| 11996 | **Chlorobenzene** | 108-90-7 | **5.4** | 0.1 | 0.5 | 1 |
| 11996 | **Chloroethane** | 75-00-3 | **4.2** | 0.1 | 0.5 | 1 |
| 11996 | **Chloroform** | 67-66-3 | **5.6** | 0.1 | 0.5 | 1 |
| 11996 | **Chloromethane** | 74-87-3 | **4.5** | 0.2 | 0.5 | 1 |
| 11996 | **2-Chlorotoluene** | 95-49-8 | **5.4** | 0.1 | 0.5 | 1 |
| 11996 | **4-Chlorotoluene** | 106-43-4 | **5.3** | 0.1 | 0.5 | 1 |
| 11996 | **1,2-Dibromo-3-chloropropane** | 96-12-8 | **5.4** | 0.2 | 0.5 | 1 |
| 11996 | **Dibromochloromethane** | 124-48-1 | **5.3** | 0.1 | 0.5 | 1 |
| 11996 | **1,2-Dibromoethane** | 106-93-4 | **5.4** | 0.1 | 0.5 | 1 |
| 11996 | **Dibromomethane** | 74-95-3 | **5.6** | 0.1 | 0.5 | 1 |
| 11996 | **1,2-Dichlorobenzene** | 95-50-1 | **5.2** | 0.1 | 0.5 | 1 |
| 11996 | **1,3-Dichlorobenzene** | 541-73-1 | **5.1** | 0.1 | 0.5 | 1 |
| 11996 | **1,4-Dichlorobenzene** | 106-46-7 | **5.0** | 0.1 | 0.5 | 1 |
| 11996 | **Dichlorodifluoromethane** | 75-71-8 | **3.4** | 0.1 | 0.5 | 1 |
| 11996 | **1,1-Dichloroethane** | 75-34-3 | **6.1** | 0.1 | 0.5 | 1 |
| 11996 | **1,2-Dichloroethane** | 107-06-2 | **5.1** | 0.1 | 0.5 | 1 |
| 11996 | **1,1-Dichloroethene** | 75-35-4 | **7.0** | 0.1 | 0.5 | 1 |
| 11996 | **cis-1,2-Dichloroethene** | 156-59-2 | **7.9** | 0.1 | 0.5 | 1 |
| 11996 | **trans-1,2-Dichloroethene** | 156-60-5 | **6.0** | 0.1 | 0.5 | 1 |
| 11996 | **1,2-Dichloropropane** | 78-87-5 | **5.8** | 0.1 | 0.5 | 1 |
| 11996 | **1,3-Dichloropropane** | 142-28-9 | **5.4** | 0.1 | 0.5 | 1 |
| 11996 | **2,2-Dichloropropane** | 594-20-7 | **6.1** | 0.1 | 0.5 | 1 |
| 11996 | **1,1-Dichloropropene** | 563-58-6 | **5.6** | 0.1 | 0.5 | 1 |
| 11996 | **cis-1,3-Dichloropropene** | 10061-01-5 | **5.2** | 0.1 | 0.5 | 1 |
| 11996 | **trans-1,3-Dichloropropene** | 10061-02-6 | **5.4** | 0.1 | 0.5 | 1 |
| 11996 | **1,4-Dioxane** | 123-91-1 | **110** | 20 | 100 | 1 |
| 11996 | **Ethyl ether** | 60-29-7 | **5.3** | 0.1 | 0.5 | 1 |

*=This limit was used in the evaluation of the final result

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# Analysis Report

**Sample Description:** **EMW-1D-111617 MSD Grab Groundwater Lockheed Martin, Burlington**

**Project Name:** **Lockheed Martin - Burlington, MA**

**Tetra Tech, Inc.**
**ELLE Sample #: WW 9324690**
**ELLE Group #: 1876931**
**Matrix: Groundwater**

Submittal Date/Time: 11/17/2017 09:45
Collection Date/Time: 11/16/2017 11:30
SDG#: LMB09-01MSD

| CAT No. | Analysis Name | CAS Number | Result | Method Detection Limit* | Limit of Quantitation | Dilution Factor |
|---|---|---|---|---|---|---|
| **GC/MS Volatiles** | **SW-846 8260C** | | ug/l | ug/l | ug/l | |
| 11996 | **Ethyl t-butyl ether** | 637-92-3 | **4.5** | 0.1 | 0.5 | 1 |
| 11996 | **Ethylbenzene** | 100-41-4 | **5.4** | 0.1 | 0.5 | 1 |
| 11996 | **Hexachlorobutadiene** | 87-68-3 | **5.1** | 0.1 | 0.5 | 1 |
| 11996 | **2-Hexanone** | 591-78-6 | **27** | 1.0 | 5.0 | 1 |
| 11996 | **di-Isopropyl Ether** | 108-20-3 | **5.1** | 0.1 | 0.5 | 1 |
| 11996 | **Isopropylbenzene** | 98-82-8 | **5.4** | 0.1 | 0.5 | 1 |
| 11996 | **p-Isopropyltoluene** | 99-87-6 | **5.5** | 0.1 | 0.5 | 1 |
| 11996 | **Methyl Tertiary Butyl Ether** | 1634-04-4 | **5.0** | 0.1 | 0.5 | 1 |
| 11996 | **4-Methyl-2-Pentanone** | 108-10-1 | **28** | 1.0 | 5.0 | 1 |
| 11996 | **Methylene Chloride** | 75-09-2 | **5.8** | 0.2 | 0.5 | 1 |
| 11996 | **Naphthalene** | 91-20-3 | **5.3** | 0.1 | 0.5 | 1 |
| 11996 | **n-Propylbenzene** | 103-65-1 | **5.8** | 0.1 | 0.5 | 1 |
| 11996 | **Styrene** | 100-42-5 | **5.5** | 0.1 | 0.5 | 1 |
| 11996 | **1,1,1,2-Tetrachloroethane** | 630-20-6 | **5.4** | 0.1 | 0.5 | 1 |
| 11996 | **1,1,2,2-Tetrachloroethane** | 79-34-5 | **5.5** | 0.1 | 0.5 | 1 |
| 11996 | **Tetrachloroethene** | 127-18-4 | **7.0** | 0.1 | 0.5 | 1 |
| 11996 | **Tetrahydrofuran** | 109-99-9 | **30** | 2.0 | 5.0 | 1 |
| 11996 | **Toluene** | 108-88-3 | **5.5** | 0.1 | 0.5 | 1 |
| 11996 | **1,2,3-Trichlorobenzene** | 87-61-6 | **5.1** | 0.1 | 0.5 | 1 |
| 11996 | **1,2,4-Trichlorobenzene** | 120-82-1 | **4.7** | 0.1 | 0.5 | 1 |
| 11996 | **1,1,1-Trichloroethane** | 71-55-6 | **5.8** | 0.1 | 0.5 | 1 |
| 11996 | **1,1,2-Trichloroethane** | 79-00-5 | **5.7** | 0.1 | 0.5 | 1 |
| 11996 | **Trichloroethene** | 79-01-6 | **16** | 0.1 | 0.5 | 1 |
| 11996 | **Trichlorofluoromethane** | 75-69-4 | **4.6** | 0.1 | 0.5 | 1 |
| 11996 | **1,2,3-Trichloropropane** | 96-18-4 | **5.4** | 0.3 | 1.0 | 1 |
| 11996 | **1,2,4-Trimethylbenzene** | 95-63-6 | **5.5** | 0.1 | 0.5 | 1 |
| 11996 | **1,3,5-Trimethylbenzene** | 108-67-8 | **5.5** | 0.1 | 0.5 | 1 |
| 11996 | **Vinyl Chloride** | 75-01-4 | **4.8** | 0.1 | 0.5 | 1 |
| 11996 | **m+p-Xylene** | 179601-23-1 | **11** | 0.1 | 0.5 | 1 |
| 11996 | **o-Xylene** | 95-47-6 | **5.1** | 0.1 | 0.5 | 1 |

The percent drift for the following is >20% in the continuing calibration verification standard associated with this sample: Dichlorodifluoromethane, Bromomethane, Chloroethane, 1,4-Dioxane.

The percent recovery for Dichlorodifluoromethane is outside of the 70 - 130% QC windows in the LCS and/or LCSD associated with this sample. Dichlorodifluoromethane is considered a difficult analyte and the percent recovery is within the allowed 40 - 160% window.

| | | | | | | |
|---|---|---|---|---|---|---|
| **GC/MS Semivolatiles** | **SW-846 8270D SIM** | | ug/l | ug/l | ug/l | |
| 14244 | **1,4-Dioxane** | 123-91-1 | **0.49** | 0.050 | 0.20 | 1 |

The MA MCP analyte list requirement was not met for Method 8270D.

*=This limit was used in the evaluation of the final result

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# Analysis Report

**Sample Description:** **EMW-1D-111617 MSD Grab Groundwater**
**Lockheed Martin, Burlington**

**Project Name:** **Lockheed Martin - Burlington, MA**

Submittal Date/Time: 11/17/2017 09:45
Collection Date/Time: 11/16/2017 11:30
SDG#: LMB09-01MSD

**Tetra Tech, Inc.**
**ELLE Sample #: WW 9324690**
**ELLE Group #: 1876931**
**Matrix: Groundwater**

| CAT No. | Analysis Name | CAS Number | Result | Method Detection Limit* | Limit of Quantitation | Dilution Factor |
|---|---|---|---|---|---|---|
| The client specified list is reported. | | | | | | |
| **GC Miscellaneous** | | **RSKSOP-175 modified** | **ug/l** | **ug/l** | **ug/l** | |
| 07105 | **Methane** | 74-82-8 | **76** | 3.0 | 5.0 | 1 |

## Sample Comments

State of Massachusetts Laboratory Non-Potable Water Certification M-PA009

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name | Method | Trial# | Batch# | Analysis Date and Time | Analyst | Dilution Factor |
|---|---|---|---|---|---|---|---|
| 11996 | VOCs- 25ml Water by 8260C | SW-846 8260C | 1 | I173332AA | 11/29/2017 15:21 | Kevin A Sposito | 1 |
| 01163 | GC/MS VOA Water Prep | SW-846 5030C | 1 | I173332AA | 11/29/2017 15:21 | Kevin A Sposito | 1 |
| 14244 | SIM SVOAs 8270D MINI | SW-846 8270D SIM | 1 | 17325WAI026 | 11/23/2017 04:06 | William H Saadeh | 1 |
| 10466 | BNA Water Extraction SIM | SW-846 3510C | 1 | 17325WAI026 | 11/22/2017 08:00 | Bradley W VanLeuven | 1 |
| 07105 | Volatile Headspace Hydrocarbon | RSKSOP-175 modified | 1 | 173220016A | 11/18/2017 13:58 | Johanna C Kennedy | 1 |

*=This limit was used in the evaluation of the final result

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# Analysis Report

**Sample Description:** **EMW-1D-111617 DUP Grab Groundwater**
**Lockheed Martin, Burlington**

**Project Name:** **Lockheed Martin - Burlington, MA**

Submittal Date/Time: 11/17/2017 09:45
Collection Date/Time: 11/16/2017 11:30
SDG#: LMB09-01DUP

**Tetra Tech, Inc.**
**ELLE Sample #: WW 9324691**
**ELLE Group #: 1876931**
**Matrix: Groundwater**

| CAT No. | Analysis Name | CAS Number | Result | Method Detection Limit* | Limit of Quantitation | Dilution Factor |
|---|---|---|---|---|---|---|
| **Wet Chemistry** | **EPA 300.0** | | **mg/l** | **mg/l** | **mg/l** | |
| 00368 | Nitrate Nitrogen | 14797-55-8 | N.D. | 0.25 | 0.50 | 5 |
| 00228 | **Sulfate** | 14808-79-8 | **26.8** | 1.5 | 5.0 | 5 |
| | **SM 5310 C-2000** | | **mg/l** | **mg/l** | **mg/l** | |
| 00273 | **Total Organic Carbon** | n.a. | **1.3** | 0.50 | 1.0 | 1 |

## Sample Comments

State of Massachusetts Laboratory Non-Potable Water Certification M-PA009

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name | Method | Trial# | Batch# | Analysis Date and Time | Analyst | Dilution Factor |
|---|---|---|---|---|---|---|---|
| 00368 | Nitrate Nitrogen | EPA 300.0 | 1 | 17321987115A | 11/17/2017 21:21 | Clinton M Wilson | 5 |
| 00228 | Sulfate | EPA 300.0 | 1 | 17321987115A | 11/17/2017 21:21 | Clinton M Wilson | 5 |
| 00273 | Total Organic Carbon | SM 5310 C-2000 | 1 | 17324667606A | 11/21/2017 08:59 | Drew M Gerhart | 1 |

*=This limit was used in the evaluation of the final result

**Sample Description:** **TTMW-7(R)-111617 Grab Groundwater Lockheed Martin, Burlington**

**Project Name:** **Lockheed Martin - Burlington, MA**

Submittal Date/Time: 11/17/2017 09:45
Collection Date/Time: 11/16/2017 13:20
SDG#: LMB09-02

**Tetra Tech, Inc.**
**ELLE Sample #: WW 9324692**
**ELLE Group #: 1876931**
**Matrix: Groundwater**

| CAT No. | Analysis Name | CAS Number | Result | | Method Detection Limit* | Limit of Quantitation | Dilution Factor |
|---|---|---|---|---|---|---|---|
| **GC/MS Volatiles** | **SW-846 8260C** | | **ug/l** | | **ug/l** | **ug/l** | |
| 11996 | Acetone | 67-64-1 | N.D. | | 3.0 | 5.0 | 1 |
| 11996 | t-Amyl methyl ether | 994-05-8 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Benzene | 71-43-2 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Bromobenzene | 108-86-1 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Bromochloromethane | 74-97-5 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Bromodichloromethane | 75-27-4 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Bromoform | 75-25-2 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Bromomethane | 74-83-9 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 2-Butanone | 78-93-3 | N.D. | | 1.0 | 5.0 | 1 |
| 11996 | n-Butylbenzene | 104-51-8 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | sec-Butylbenzene | 135-98-8 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | tert-Butylbenzene | 98-06-6 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Carbon Disulfide | 75-15-0 | N.D. | | 0.4 | 1.0 | 1 |
| 11996 | Carbon Tetrachloride | 56-23-5 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Chlorobenzene | 108-90-7 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Chloroethane | 75-00-3 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | **Chloroform** | 67-66-3 | **0.1** | **J** | 0.1 | 0.5 | 1 |
| 11996 | Chloromethane | 74-87-3 | N.D. | | 0.2 | 0.5 | 1 |
| 11996 | 2-Chlorotoluene | 95-49-8 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 4-Chlorotoluene | 106-43-4 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dibromo-3-chloropropane | 96-12-8 | N.D. | | 0.2 | 0.5 | 1 |
| 11996 | Dibromochloromethane | 124-48-1 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dibromoethane | 106-93-4 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Dibromomethane | 74-95-3 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dichlorobenzene | 95-50-1 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,3-Dichlorobenzene | 541-73-1 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,4-Dichlorobenzene | 106-46-7 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | Dichlorodifluoromethane | 75-71-8 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,1-Dichloroethane | 75-34-3 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dichloroethane | 107-06-2 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,1-Dichloroethene | 75-35-4 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | cis-1,2-Dichloroethene | 156-59-2 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | trans-1,2-Dichloroethene | 156-60-5 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,2-Dichloropropane | 78-87-5 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,3-Dichloropropane | 142-28-9 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 2,2-Dichloropropane | 594-20-7 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,1-Dichloropropene | 563-58-6 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | cis-1,3-Dichloropropene | 10061-01-5 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | trans-1,3-Dichloropropene | 10061-02-6 | N.D. | | 0.1 | 0.5 | 1 |
| 11996 | 1,4-Dioxane | 123-91-1 | N.D. | | 20 | 100 | 1 |
| 11996 | Ethyl ether | 60-29-7 | N.D. | | 0.1 | 0.5 | 1 |

*=This limit was used in the evaluation of the final result

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# Analysis Report

**Sample Description:** **TTMW-7(R)-111617 Grab Groundwater Lockheed Martin, Burlington**

**Project Name:** **Lockheed Martin - Burlington, MA**

Submittal Date/Time: 11/17/2017 09:45
Collection Date/Time: 11/16/2017 13:20
SDG#: LMB09-02

**Tetra Tech, Inc.**
**ELLE Sample #: WW 9324692**
**ELLE Group #: 1876931**
**Matrix: Groundwater**

| CAT No. | Analysis Name | CAS Number | Result | Method Detection Limit* | Limit of Quantitation | Dilution Factor |
|---|---|---|---|---|---|---|
| **GC/MS Volatiles** | **SW-846 8260C** | | **ug/l** | **ug/l** | **ug/l** | |
| 11996 | Ethyl t-butyl ether | 637-92-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Ethylbenzene | 100-41-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Hexachlorobutadiene | 87-68-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 2-Hexanone | 591-78-6 | N.D. | 1.0 | 5.0 | 1 |
| 11996 | di-Isopropyl Ether | 108-20-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Isopropylbenzene | 98-82-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | p-Isopropyltoluene | 99-87-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Methyl Tertiary Butyl Ether | 1634-04-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 4-Methyl-2-Pentanone | 108-10-1 | N.D. | 1.0 | 5.0 | 1 |
| 11996 | Methylene Chloride | 75-09-2 | N.D. | 0.2 | 0.5 | 1 |
| 11996 | Naphthalene | 91-20-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | n-Propylbenzene | 103-65-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Styrene | 100-42-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1,1,2-Tetrachloroethane | 630-20-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1,2,2-Tetrachloroethane | 79-34-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Tetrachloroethene | 127-18-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Tetrahydrofuran | 109-99-9 | N.D. | 2.0 | 5.0 | 1 |
| 11996 | Toluene | 108-88-3 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2,3-Trichlorobenzene | 87-61-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2,4-Trichlorobenzene | 120-82-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1,1-Trichloroethane | 71-55-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,1,2-Trichloroethane | 79-00-5 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | **Trichloroethene** | 79-01-6 | **0.1 J** | 0.1 | 0.5 | 1 |
| 11996 | Trichlorofluoromethane | 75-69-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,2,3-Trichloropropane | 96-18-4 | N.D. | 0.3 | 1.0 | 1 |
| 11996 | 1,2,4-Trimethylbenzene | 95-63-6 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | 1,3,5-Trimethylbenzene | 108-67-8 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | Vinyl Chloride | 75-01-4 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | m+p-Xylene | 179601-23-1 | N.D. | 0.1 | 0.5 | 1 |
| 11996 | o-Xylene | 95-47-6 | N.D. | 0.1 | 0.5 | 1 |

The percent drift for the following is >20% in the continuing calibration verification standard associated with this sample: Dichlorodifluoromethane, Bromomethane, Chloroethane, 1,4-Dioxane.

The percent recovery for Dichlorodifluoromethane is outside of the 70 - 130% QC windows in the LCS and/or LCSD associated with this sample. Dichlorodifluoromethane is considered a difficult analyte and the percent recovery is within the allowed 40 - 160% window.

A Method Detection Limit (MDL) standard is analyzed to confirm sensitivity of the instrument for samples with non-detect analytes associated with a continuing calibration verification standard exhibiting low response (outside the 20%D criteria). The MDL standard shows adequate sensitivity at or below

*=This limit was used in the evaluation of the final result

**Sample Description:** **TTMW-7(R)-111617 Grab Groundwater Lockheed Martin, Burlington**

**Project Name:** **Lockheed Martin - Burlington, MA**

Submittal Date/Time: 11/17/2017 09:45
Collection Date/Time: 11/16/2017 13:20
SDG#: LMB09-02

**Tetra Tech, Inc.**
**ELLE Sample #: WW 9324692**
**ELLE Group #: 1876931**
**Matrix: Groundwater**

| CAT No. | Analysis Name | CAS Number | Result | Method Detection Limit* | Limit of Quantitation | Dilution Factor |
|---|---|---|---|---|---|---|
| | the reporting limit. | | | | | |
| | This analysis was performed from a previously opened container with headspace. | | | | | |
| **GC/MS Semivolatiles** | | **SW-846 8270D SIM** | **ug/l** | **ug/l** | **ug/l** | |
| 14244 | 1,4-Dioxane | 123-91-1 | N.D. | 0.050 | 0.20 | 1 |
| | The MA MCP analyte list requirement was not met for Method 8270D. The client specified list is reported. | | | | | |

## Sample Comments

State of Massachusetts Laboratory Non-Potable Water Certification M-PA009

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Sample Analysis Record

| CAT No. | Analysis Name | Method | Trial# | Batch# | Analysis Date and Time | Analyst | Dilution Factor |
|---|---|---|---|---|---|---|---|
| 11996 | VOCs- 25ml Water by 8260C | SW-846 8260C | 1 | I173332AA | 11/29/2017 17:50 | Kevin A Sposito | 1 |
| 01163 | GC/MS VOA Water Prep | SW-846 5030C | 1 | I173332AA | 11/29/2017 17:50 | Kevin A Sposito | 1 |
| 14244 | SIM SVOAs 8270D MINI | SW-846 8270D SIM | 1 | 17325WAI026 | 11/23/2017 04:34 | William H Saadeh | 1 |
| 10466 | BNA Water Extraction SIM | SW-846 3510C | 1 | 17325WAI026 | 11/22/2017 08:00 | Bradley W VanLeuven | 1 |

*=This limit was used in the evaluation of the final result

# Quality Control Summary

Client Name: Tetra Tech, Inc.
Reported: 12/01/2017 17:18

Group Number: 1876931

Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

All Inorganic Initial Calibration and Continuing Calibration Blanks met acceptable method criteria unless otherwise noted on the Analysis Report.

## Method Blank

| Analysis Name | Result | MDL** | LOQ |
|---|---|---|---|
| | ug/l | ug/l | ug/l |
| Batch number: I173332AA | Sample number(s): 9324688-9324690,9324692 | | |
| Acetone | N.D. | 3.0 | 5.0 |
| t-Amyl methyl ether | N.D. | 0.1 | 0.5 |
| Benzene | N.D. | 0.1 | 0.5 |
| Bromobenzene | N.D. | 0.1 | 0.5 |
| Bromochloromethane | N.D. | 0.1 | 0.5 |
| Bromodichloromethane | N.D. | 0.1 | 0.5 |
| Bromoform | N.D. | 0.1 | 0.5 |
| Bromomethane | N.D. | 0.1 | 0.5 |
| 2-Butanone | N.D. | 1.0 | 5.0 |
| n-Butylbenzene | N.D. | 0.1 | 0.5 |
| sec-Butylbenzene | N.D. | 0.1 | 0.5 |
| tert-Butylbenzene | N.D. | 0.1 | 0.5 |
| Carbon Disulfide | N.D. | 0.4 | 1.0 |
| Carbon Tetrachloride | N.D. | 0.1 | 0.5 |
| Chlorobenzene | N.D. | 0.1 | 0.5 |
| Chloroethane | N.D. | 0.1 | 0.5 |
| Chloroform | N.D. | 0.1 | 0.5 |
| Chloromethane | N.D. | 0.2 | 0.5 |
| 2-Chlorotoluene | N.D. | 0.1 | 0.5 |
| 4-Chlorotoluene | N.D. | 0.1 | 0.5 |
| 1,2-Dibromo-3-chloropropane | N.D. | 0.2 | 0.5 |
| Dibromochloromethane | N.D. | 0.1 | 0.5 |
| 1,2-Dibromoethane | N.D. | 0.1 | 0.5 |
| Dibromomethane | N.D. | 0.1 | 0.5 |
| 1,2-Dichlorobenzene | N.D. | 0.1 | 0.5 |
| 1,3-Dichlorobenzene | N.D. | 0.1 | 0.5 |
| 1,4-Dichlorobenzene | N.D. | 0.1 | 0.5 |
| Dichlorodifluoromethane | N.D. | 0.1 | 0.5 |
| 1,1-Dichloroethane | N.D. | 0.1 | 0.5 |
| 1,2-Dichloroethane | N.D. | 0.1 | 0.5 |
| 1,1-Dichloroethene | N.D. | 0.1 | 0.5 |
| cis-1,2-Dichloroethene | N.D. | 0.1 | 0.5 |
| trans-1,2-Dichloroethene | N.D. | 0.1 | 0.5 |
| 1,2-Dichloropropane | N.D. | 0.1 | 0.5 |
| 1,3-Dichloropropane | N.D. | 0.1 | 0.5 |
| 2,2-Dichloropropane | N.D. | 0.1 | 0.5 |
| 1,1-Dichloropropene | N.D. | 0.1 | 0.5 |
| cis-1,3-Dichloropropene | N.D. | 0.1 | 0.5 |
| trans-1,3-Dichloropropene | N.D. | 0.1 | 0.5 |

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.
P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

# Quality Control Summary

Client Name: Tetra Tech, Inc.
Reported: 12/01/2017 17:18

Group Number: 1876931

## Method Blank (continued)

| Analysis Name | Result | MDL** | LOQ |
|---|---|---|---|
| | ug/l | ug/l | ug/l |
| 1,4-Dioxane | N.D. | 20 | 100 |
| Ethyl ether | N.D. | 0.1 | 0.5 |
| Ethyl t-butyl ether | N.D. | 0.1 | 0.5 |
| Ethylbenzene | N.D. | 0.1 | 0.5 |
| Hexachlorobutadiene | N.D. | 0.1 | 0.5 |
| 2-Hexanone | N.D. | 1.0 | 5.0 |
| di-Isopropyl Ether | N.D. | 0.1 | 0.5 |
| Isopropylbenzene | N.D. | 0.1 | 0.5 |
| p-Isopropyltoluene | N.D. | 0.1 | 0.5 |
| Methyl Tertiary Butyl Ether | N.D. | 0.1 | 0.5 |
| 4-Methyl-2-Pentanone | N.D. | 1.0 | 5.0 |
| Methylene Chloride | N.D. | 0.2 | 0.5 |
| Naphthalene | N.D. | 0.1 | 0.5 |
| n-Propylbenzene | N.D. | 0.1 | 0.5 |
| Styrene | N.D. | 0.1 | 0.5 |
| 1,1,1,2-Tetrachloroethane | N.D. | 0.1 | 0.5 |
| 1,1,2,2-Tetrachloroethane | N.D. | 0.1 | 0.5 |
| Tetrachloroethene | N.D. | 0.1 | 0.5 |
| Tetrahydrofuran | N.D. | 2.0 | 5.0 |
| Toluene | N.D. | 0.1 | 0.5 |
| 1,2,3-Trichlorobenzene | N.D. | 0.1 | 0.5 |
| 1,2,4-Trichlorobenzene | N.D. | 0.1 | 0.5 |
| 1,1,1-Trichloroethane | N.D. | 0.1 | 0.5 |
| 1,1,2-Trichloroethane | N.D. | 0.1 | 0.5 |
| Trichloroethene | N.D. | 0.1 | 0.5 |
| Trichlorofluoromethane | N.D. | 0.1 | 0.5 |
| 1,2,3-Trichloropropane | N.D. | 0.3 | 1.0 |
| 1,2,4-Trimethylbenzene | N.D. | 0.1 | 0.5 |
| 1,3,5-Trimethylbenzene | N.D. | 0.1 | 0.5 |
| Vinyl Chloride | N.D. | 0.1 | 0.5 |
| m+p-Xylene | N.D. | 0.1 | 0.5 |
| o-Xylene | N.D. | 0.1 | 0.5 |
| Batch number: 17325WAI026 | Sample number(s): 9324688-9324690,9324692 | | |
| 1,4-Dioxane | N.D. | 0.050 | 0.20 |
| Batch number: 173220016A | Sample number(s): 9324688-9324690 | | |
| Methane | N.D. | 3.0 | 5.0 |
| | mg/l | mg/l | mg/l |
| Batch number: 17321987115A | Sample number(s): 9324688-9324689,9324691 | | |
| Nitrate Nitrogen | N.D. | 0.050 | 0.10 |
| Sulfate | N.D. | 0.30 | 1.0 |
| Batch number: 17324667606A | Sample number(s): 9324688-9324689,9324691 | | |
| Total Organic Carbon | N.D. | 0.50 | 1.0 |

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.
P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

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# Quality Control Summary

Client Name: Tetra Tech, Inc.
Reported: 12/01/2017 17:18

Group Number: 1876931

## LCS/LCSD

| Analysis Name | LCS Spike Added ug/l | LCS Conc ug/l | LCSD Spike Added ug/l | LCSD Conc ug/l | LCS %REC | LCSD %REC | LCS/LCSD Limits | RPD | RPD Max |
|---|---|---|---|---|---|---|---|---|---|
| Batch number: I173332AA | Sample number(s): 9324688-9324690,9324692 | | | | | | | | |
| Acetone | 37.5 | 45.85 | | | 122 | | 70-130 | | |
| t-Amyl methyl ether | 5.00 | 4.71 | | | 94 | | 70-130 | | |
| Benzene | 5.00 | 5.40 | | | 108 | | 70-130 | | |
| Bromobenzene | 5.00 | 4.86 | | | 97 | | 70-130 | | |
| Bromochloromethane | 5.00 | 5.19 | | | 104 | | 70-130 | | |
| Bromodichloromethane | 5.00 | 5.34 | | | 107 | | 70-130 | | |
| Bromoform | 5.00 | 4.74 | | | 95 | | 70-130 | | |
| Bromomethane | 5.00 | 3.70 | | | 74 | | 70-130 | | |
| 2-Butanone | 37.5 | 46.43 | | | 124 | | 70-130 | | |
| n-Butylbenzene | 5.00 | 5.47 | | | 109 | | 70-130 | | |
| sec-Butylbenzene | 5.00 | 5.40 | | | 108 | | 70-130 | | |
| tert-Butylbenzene | 5.00 | 5.01 | | | 100 | | 70-130 | | |
| Carbon Disulfide | 5.00 | 5.35 | | | 107 | | 70-130 | | |
| Carbon Tetrachloride | 5.00 | 5.43 | | | 109 | | 70-130 | | |
| Chlorobenzene | 5.00 | 5.13 | | | 103 | | 70-130 | | |
| Chloroethane | 5.00 | 3.84 | | | 77 | | 70-130 | | |
| Chloroform | 5.00 | 5.35 | | | 107 | | 70-130 | | |
| Chloromethane | 5.00 | 4.07 | | | 81 | | 70-130 | | |
| 2-Chlorotoluene | 5.00 | 5.17 | | | 103 | | 70-130 | | |
| 4-Chlorotoluene | 5.00 | 5.14 | | | 103 | | 70-130 | | |
| 1,2-Dibromo-3-chloropropane | 5.00 | 5.87 | | | 117 | | 70-130 | | |
| Dibromochloromethane | 5.00 | 5.24 | | | 105 | | 70-130 | | |
| 1,2-Dibromoethane | 5.00 | 5.39 | | | 108 | | 70-130 | | |
| Dibromomethane | 5.00 | 5.56 | | | 111 | | 70-130 | | |
| 1,2-Dichlorobenzene | 5.00 | 5.03 | | | 101 | | 70-130 | | |
| 1,3-Dichlorobenzene | 5.00 | 4.93 | | | 99 | | 70-130 | | |
| 1,4-Dichlorobenzene | 5.00 | 4.87 | | | 97 | | 70-130 | | |
| Dichlorodifluoromethane | 5.00 | 3.00 | | | 60* | | 70-130 | | |
| 1,1-Dichloroethane | 5.00 | 5.41 | | | 108 | | 70-130 | | |
| 1,2-Dichloroethane | 5.00 | 5.06 | | | 101 | | 70-130 | | |
| 1,1-Dichloroethene | 5.00 | 5.58 | | | 112 | | 70-130 | | |
| cis-1,2-Dichloroethene | 5.00 | 5.51 | | | 110 | | 70-130 | | |
| trans-1,2-Dichloroethene | 5.00 | 5.63 | | | 113 | | 70-130 | | |
| 1,2-Dichloropropane | 5.00 | 5.66 | | | 113 | | 70-130 | | |
| 1,3-Dichloropropane | 5.00 | 5.41 | | | 108 | | 70-130 | | |
| 2,2-Dichloropropane | 5.00 | 5.63 | | | 113 | | 70-130 | | |
| 1,1-Dichloropropene | 5.00 | 5.22 | | | 104 | | 70-130 | | |
| cis-1,3-Dichloropropene | 5.00 | 5.11 | | | 102 | | 70-130 | | |
| trans-1,3-Dichloropropene | 5.00 | 5.31 | | | 106 | | 70-130 | | |
| 1,4-Dioxane | 125 | 123.59 | | | 99 | | 70-130 | | |
| Ethyl ether | 5.00 | 5.27 | | | 105 | | 70-130 | | |

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.
P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

# Quality Control Summary

Client Name: Tetra Tech, Inc.
Reported: 12/01/2017 17:18

Group Number: 1876931

## LCS/LCSD (continued)

| Analysis Name | LCS Spike Added ug/l | LCS Conc ug/l | LCSD Spike Added ug/l | LCSD Conc ug/l | LCS %REC | LCSD %REC | LCS/LCSD Limits | RPD | RPD Max |
|---|---|---|---|---|---|---|---|---|---|
| Ethyl t-butyl ether | 5.00 | 4.60 | | | 92 | | 70-130 | | |
| Ethylbenzene | 5.00 | 5.20 | | | 104 | | 70-130 | | |
| Hexachlorobutadiene | 5.00 | 4.81 | | | 96 | | 70-130 | | |
| 2-Hexanone | 25 | 29.29 | | | 117 | | 70-130 | | |
| di-Isopropyl Ether | 5.00 | 5.09 | | | 102 | | 70-130 | | |
| Isopropylbenzene | 5.00 | 5.07 | | | 101 | | 70-130 | | |
| p-Isopropyltoluene | 5.00 | 5.26 | | | 105 | | 70-130 | | |
| Methyl Tertiary Butyl Ether | 5.00 | 4.85 | | | 97 | | 70-130 | | |
| 4-Methyl-2-Pentanone | 25 | 30.83 | | | 123 | | 70-130 | | |
| Methylene Chloride | 5.00 | 5.58 | | | 112 | | 70-130 | | |
| Naphthalene | 5.00 | 5.44 | | | 109 | | 70-130 | | |
| n-Propylbenzene | 5.00 | 5.49 | | | 110 | | 70-130 | | |
| Styrene | 5.00 | 5.31 | | | 106 | | 70-130 | | |
| 1,1,1,2-Tetrachloroethane | 5.00 | 5.33 | | | 107 | | 70-130 | | |
| 1,1,2,2-Tetrachloroethane | 5.00 | 5.43 | | | 109 | | 70-130 | | |
| Tetrachloroethene | 5.00 | 4.91 | | | 98 | | 70-130 | | |
| Tetrahydrofuran | 25 | 33.58 | | | 134* | | 70-130 | | |
| Toluene | 5.00 | 5.20 | | | 104 | | 70-130 | | |
| 1,2,3-Trichlorobenzene | 5.00 | 5.10 | | | 102 | | 70-130 | | |
| 1,2,4-Trichlorobenzene | 5.00 | 4.67 | | | 93 | | 70-130 | | |
| 1,1,1-Trichloroethane | 5.00 | 5.34 | | | 107 | | 70-130 | | |
| 1,1,2-Trichloroethane | 5.00 | 5.75 | | | 115 | | 70-130 | | |
| Trichloroethene | 5.00 | 5.33 | | | 107 | | 70-130 | | |
| Trichlorofluoromethane | 5.00 | 4.17 | | | 83 | | 70-130 | | |
| 1,2,3-Trichloropropane | 5.00 | 5.46 | | | 109 | | 70-130 | | |
| 1,2,4-Trimethylbenzene | 5.00 | 5.38 | | | 108 | | 70-130 | | |
| 1,3,5-Trimethylbenzene | 5.00 | 5.30 | | | 106 | | 70-130 | | |
| Vinyl Chloride | 5.00 | 4.14 | | | 83 | | 70-130 | | |
| m+p-Xylene | 10 | 10.29 | | | 103 | | 70-130 | | |
| o-Xylene | 5.00 | 4.91 | | | 98 | | 70-130 | | |
| | **ug/l** | **ug/l** | **ug/l** | **ug/l** | | | | | |
| Batch number: 17325WAI026 | Sample number(s): 9324688-9324690,9324692 | | | | | | | | |
| 1,4-Dioxane | 1.00 | 0.433 | | | 43 | | 25-72 | | |
| | **ug/l** | **ug/l** | **ug/l** | **ug/l** | | | | | |
| Batch number: 173220016A | Sample number(s): 9324688-9324690 | | | | | | | | |
| Methane | 59.8 | 64.83 | | | 108 | | 85-115 | | |
| | **mg/l** | **mg/l** | **mg/l** | **mg/l** | | | | | |
| Batch number: 17321987115A | Sample number(s): 9324688-9324689,9324691 | | | | | | | | |
| Nitrate Nitrogen | 0.750 | 0.713 | 0.750 | 0.702 | 95 | 94 | 90-110 | 2 | 20 |
| Sulfate | 7.50 | 7.14 | 7.50 | 7.02 | 95 | 94 | 90-110 | 2 | 20 |

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.
P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

# Quality Control Summary

Client Name: Tetra Tech, Inc.
Reported: 12/01/2017 17:18

Group Number: 1876931

## LCS/LCSD (continued)

| Analysis Name | LCS Spike Added mg/l | LCS Conc mg/l | LCSD Spike Added mg/l | LCSD Conc mg/l | LCS %REC | LCSD %REC | LCS/LCSD Limits | RPD | RPD Max |
|---|---|---|---|---|---|---|---|---|---|
| Batch number: 17324667606A | Sample number(s): 9324688-9324689,9324691 | | | | | | | | |
| Total Organic Carbon | 25 | 26.57 | | | 106 | | 91-113 | | |

## MS/MSD

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike

| Analysis Name | Unspiked Conc ug/l | MS Spike Added ug/l | MS Conc ug/l | MSD Spike Added ug/l | MSD Conc ug/l | MS %Rec | MSD %Rec | MS/MSD Limits | RPD | RPD Max |
|---|---|---|---|---|---|---|---|---|---|---|
| Batch number: I173332AA | Sample number(s): 9324688-9324690,9324692 UNSPK: 9324688 | | | | | | | | | |
| Acetone | N.D. | 37.5 | 37.57 | 37.5 | 38.44 | 100 | 103 | 70-130 | 2 | 20 |
| t-Amyl methyl ether | N.D. | 5.00 | 4.51 | 5.00 | 4.61 | 90 | 92 | 70-130 | 2 | 20 |
| Benzene | N.D. | 5.00 | 5.74 | 5.00 | 5.72 | 115 | 114 | 70-130 | 0 | 20 |
| Bromobenzene | N.D. | 5.00 | 4.85 | 5.00 | 4.93 | 97 | 99 | 70-130 | 2 | 20 |
| Bromochloromethane | N.D. | 5.00 | 5.29 | 5.00 | 5.32 | 106 | 106 | 70-130 | 1 | 20 |
| Bromodichloromethane | N.D. | 5.00 | 5.59 | 5.00 | 5.54 | 112 | 111 | 70-130 | 1 | 20 |
| Bromoform | N.D. | 5.00 | 4.75 | 5.00 | 4.72 | 95 | 94 | 70-130 | 1 | 20 |
| Bromomethane | N.D. | 5.00 | 4.16 | 5.00 | 4.14 | 83 | 83 | 70-130 | 1 | 20 |
| 2-Butanone | N.D. | 37.5 | 52.34 | 37.5 | 43.34 | 140* | 116 | 70-130 | 19 | 20 |
| n-Butylbenzene | N.D. | 5.00 | 5.76 | 5.00 | 5.78 | 115 | 116 | 70-130 | 0 | 20 |
| sec-Butylbenzene | N.D. | 5.00 | 5.65 | 5.00 | 5.71 | 113 | 114 | 70-130 | 1 | 20 |
| tert-Butylbenzene | N.D. | 5.00 | 5.10 | 5.00 | 5.21 | 102 | 104 | 70-130 | 2 | 20 |
| Carbon Disulfide | N.D. | 5.00 | 5.84 | 5.00 | 5.89 | 117 | 118 | 70-130 | 1 | 20 |
| Carbon Tetrachloride | N.D. | 5.00 | 5.93 | 5.00 | 5.92 | 119 | 118 | 70-130 | 0 | 20 |
| Chlorobenzene | N.D. | 5.00 | 5.42 | 5.00 | 5.38 | 108 | 108 | 70-130 | 1 | 20 |
| Chloroethane | N.D. | 5.00 | 4.06 | 5.00 | 4.22 | 81 | 84 | 70-130 | 4 | 20 |
| Chloroform | N.D. | 5.00 | 5.65 | 5.00 | 5.61 | 113 | 112 | 70-130 | 1 | 20 |
| Chloromethane | N.D. | 5.00 | 4.49 | 5.00 | 4.50 | 90 | 90 | 70-130 | 0 | 20 |
| 2-Chlorotoluene | N.D. | 5.00 | 5.27 | 5.00 | 5.37 | 105 | 107 | 70-130 | 2 | 20 |
| 4-Chlorotoluene | N.D. | 5.00 | 5.21 | 5.00 | 5.31 | 104 | 106 | 70-130 | 2 | 20 |
| 1,2-Dibromo-3-chloropropane | N.D. | 5.00 | 6.95 | 5.00 | 5.39 | 139* | 108 | 70-130 | 25* | 20 |
| Dibromochloromethane | N.D. | 5.00 | 5.29 | 5.00 | 5.29 | 106 | 106 | 70-130 | 0 | 20 |
| 1,2-Dibromoethane | N.D. | 5.00 | 5.37 | 5.00 | 5.36 | 107 | 107 | 70-130 | 0 | 20 |
| Dibromomethane | N.D. | 5.00 | 5.61 | 5.00 | 5.58 | 112 | 112 | 70-130 | 1 | 20 |
| 1,2-Dichlorobenzene | N.D. | 5.00 | 5.14 | 5.00 | 5.18 | 103 | 104 | 70-130 | 1 | 20 |
| 1,3-Dichlorobenzene | N.D. | 5.00 | 5.03 | 5.00 | 5.05 | 101 | 101 | 70-130 | 0 | 20 |
| 1,4-Dichlorobenzene | N.D. | 5.00 | 4.98 | 5.00 | 4.98 | 100 | 100 | 70-130 | 0 | 20 |
| Dichlorodifluoromethane | N.D. | 5.00 | 3.23 | 5.00 | 3.37 | 65* | 67* | 70-130 | 4 | 20 |
| 1,1-Dichloroethane | 0.416 | 5.00 | 6.05 | 5.00 | 6.12 | 113 | 114 | 70-130 | 1 | 20 |
| 1,2-Dichloroethane | N.D. | 5.00 | 5.17 | 5.00 | 5.12 | 103 | 102 | 70-130 | 1 | 20 |
| 1,1-Dichloroethene | 0.841 | 5.00 | 6.80 | 5.00 | 7.01 | 119 | 123 | 70-130 | 3 | 20 |

*- Outside of specification
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# Quality Control Summary

Client Name: Tetra Tech, Inc.
Reported: 12/01/2017 17:18

Group Number: 1876931

## MS/MSD (continued)

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike

| Analysis Name | Unspiked Conc ug/l | MS Spike Added ug/l | MS Conc ug/l | MSD Spike Added ug/l | MSD Conc ug/l | MS %Rec | MSD %Rec | MS/MSD Limits | RPD | RPD Max |
|---|---|---|---|---|---|---|---|---|---|---|
| cis-1,2-Dichloroethene | 1.76 | 5.00 | 7.86 | 5.00 | 7.94 | 122 | 124 | 70-130 | 1 | 20 |
| trans-1,2-Dichloroethene | N.D. | 5.00 | 5.96 | 5.00 | 5.96 | 119 | 119 | 70-130 | 0 | 20 |
| 1,2-Dichloropropane | N.D. | 5.00 | 5.85 | 5.00 | 5.84 | 117 | 117 | 70-130 | 0 | 20 |
| 1,3-Dichloropropane | N.D. | 5.00 | 5.41 | 5.00 | 5.41 | 108 | 108 | 70-130 | 0 | 20 |
| 2,2-Dichloropropane | N.D. | 5.00 | 5.98 | 5.00 | 6.11 | 120 | 122 | 70-130 | 2 | 20 |
| 1,1-Dichloropropene | N.D. | 5.00 | 5.64 | 5.00 | 5.64 | 113 | 113 | 70-130 | 0 | 20 |
| cis-1,3-Dichloropropene | N.D. | 5.00 | 5.06 | 5.00 | 5.17 | 101 | 103 | 70-130 | 2 | 20 |
| trans-1,3-Dichloropropene | N.D. | 5.00 | 5.28 | 5.00 | 5.35 | 106 | 107 | 70-130 | 1 | 20 |
| 1,4-Dioxane | N.D. | 125 | 95.47 | 125 | 112.07 | 76 | 90 | 70-130 | 16 | 20 |
| Ethyl ether | N.D. | 5.00 | 5.24 | 5.00 | 5.32 | 105 | 106 | 70-130 | 1 | 20 |
| Ethyl t-butyl ether | N.D. | 5.00 | 4.36 | 5.00 | 4.53 | 87 | 91 | 70-130 | 4 | 20 |
| Ethylbenzene | N.D. | 5.00 | 5.50 | 5.00 | 5.41 | 110 | 108 | 70-130 | 2 | 20 |
| Hexachlorobutadiene | N.D. | 5.00 | 4.89 | 5.00 | 5.08 | 98 | 102 | 70-130 | 4 | 20 |
| 2-Hexanone | N.D. | 25 | 34.44 | 25 | 27.37 | 138* | 109 | 70-130 | 23* | 20 |
| di-Isopropyl Ether | N.D. | 5.00 | 5.02 | 5.00 | 5.15 | 100 | 103 | 70-130 | 3 | 20 |
| Isopropylbenzene | N.D. | 5.00 | 5.36 | 5.00 | 5.35 | 107 | 107 | 70-130 | 0 | 20 |
| p-Isopropyltoluene | N.D. | 5.00 | 5.47 | 5.00 | 5.55 | 109 | 111 | 70-130 | 1 | 20 |
| Methyl Tertiary Butyl Ether | 0.156 | 5.00 | 4.79 | 5.00 | 5.02 | 93 | 97 | 70-130 | 5 | 20 |
| 4-Methyl-2-Pentanone | N.D. | 25 | 35.75 | 25 | 28.12 | 143* | 112 | 70-130 | 24* | 20 |
| Methylene Chloride | N.D. | 5.00 | 5.68 | 5.00 | 5.76 | 114 | 115 | 70-130 | 1 | 20 |
| Naphthalene | N.D. | 5.00 | 5.14 | 5.00 | 5.33 | 103 | 107 | 70-130 | 4 | 20 |
| n-Propylbenzene | N.D. | 5.00 | 5.74 | 5.00 | 5.76 | 115 | 115 | 70-130 | 0 | 20 |
| Styrene | N.D. | 5.00 | 5.53 | 5.00 | 5.45 | 111 | 109 | 70-130 | 1 | 20 |
| 1,1,1,2-Tetrachloroethane | N.D. | 5.00 | 5.46 | 5.00 | 5.44 | 109 | 109 | 70-130 | 0 | 20 |
| 1,1,2,2-Tetrachloroethane | N.D. | 5.00 | 5.33 | 5.00 | 5.51 | 107 | 110 | 70-130 | 3 | 20 |
| Tetrachloroethene | 1.97 | 5.00 | 6.97 | 5.00 | 6.98 | 100 | 100 | 70-130 | 0 | 20 |
| Tetrahydrofuran | N.D. | 25 | 37 | 25 | 30.07 | 148* | 120 | 70-130 | 21* | 20 |
| Toluene | N.D. | 5.00 | 5.46 | 5.00 | 5.46 | 109 | 109 | 70-130 | 0 | 20 |
| 1,2,3-Trichlorobenzene | N.D. | 5.00 | 5.06 | 5.00 | 5.08 | 101 | 102 | 70-130 | 1 | 20 |
| 1,2,4-Trichlorobenzene | N.D. | 5.00 | 4.65 | 5.00 | 4.70 | 93 | 94 | 70-130 | 1 | 20 |
| 1,1,1-Trichloroethane | N.D. | 5.00 | 5.76 | 5.00 | 5.76 | 115 | 115 | 70-130 | 0 | 20 |
| 1,1,2-Trichloroethane | N.D. | 5.00 | 5.61 | 5.00 | 5.68 | 112 | 114 | 70-130 | 1 | 20 |
| Trichloroethene | 9.60 | 5.00 | 15.85 | 5.00 | 15.94 | 125 | 127 | 70-130 | 1 | 20 |
| Trichlorofluoromethane | N.D. | 5.00 | 4.89 | 5.00 | 4.62 | 98 | 92 | 70-130 | 6 | 20 |
| 1,2,3-Trichloropropane | N.D. | 5.00 | 5.34 | 5.00 | 5.37 | 107 | 107 | 70-130 | 1 | 20 |
| 1,2,4-Trimethylbenzene | N.D. | 5.00 | 5.46 | 5.00 | 5.50 | 109 | 110 | 70-130 | 1 | 20 |
| 1,3,5-Trimethylbenzene | N.D. | 5.00 | 5.48 | 5.00 | 5.51 | 110 | 110 | 70-130 | 1 | 20 |
| Vinyl Chloride | 0.103 | 5.00 | 4.80 | 5.00 | 4.79 | 94 | 94 | 70-130 | 0 | 20 |
| m+p-Xylene | N.D. | 10 | 10.85 | 10 | 10.75 | 108 | 108 | 70-130 | 1 | 20 |
| o-Xylene | N.D. | 5.00 | 5.13 | 5.00 | 5.11 | 103 | 102 | 70-130 | 0 | 20 |
| | ug/l | ug/l | ug/l | ug/l | ug/l | | | | | |

Batch number: 17325WAI026 Sample number(s): 9324688-9324690,9324692 UNSPK: 9324688

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.
P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

# Quality Control Summary

Client Name: Tetra Tech, Inc.
Reported: 12/01/2017 17:18

Group Number: 1876931

## MS/MSD (continued)

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike

| Analysis Name | Unspiked Conc ug/l | MS Spike Added ug/l | MS Conc ug/l | MSD Spike Added ug/l | MSD Conc ug/l | MS %Rec | MSD %Rec | MS/MSD Limits | RPD | RPD Max |
|---|---|---|---|---|---|---|---|---|---|---|
| 1,4-Dioxane | 0.101 | 1.01 | 0.525 | 1.01 | 0.485 | 42 | 38 | 25-72 | 8 | 30 |
| | **ug/l** | **ug/l** | **ug/l** | **ug/l** | **ug/l** | | | | | |
| Batch number: 173220016A | Sample number(s): 9324688-9324690 UNSPK: 9324688 | | | | | | | | | |
| Methane | 9.32 | 59.8 | 75.48 | 59.8 | 75.54 | 111 | 111 | 73-125 | 0 | 30 |
| | **mg/l** | **mg/l** | **mg/l** | **mg/l** | **mg/l** | | | | | |
| Batch number: 17321987115A | Sample number(s): 9324688-9324689,9324691 UNSPK: 9324688 | | | | | | | | | |
| Nitrate Nitrogen | N.D. | 2.50 | 2.63 | | | 105 | | 90-110 | | |
| Sulfate | 27.46 | 25 | 51.59 | | | 97 | | 90-110 | | |
| Batch number: 17324667606A | Sample number(s): 9324688-9324689,9324691 UNSPK: 9324688 | | | | | | | | | |
| Total Organic Carbon | 1.39 | 10 | 11.83 | | | 104 | | 91-113 | | |

## Laboratory Duplicate

Background (BKG) = the sample used in conjunction with the duplicate

| Analysis Name | BKG Conc mg/l | DUP Conc mg/l | DUP RPD | DUP RPD Max |
|---|---|---|---|---|
| Batch number: 17321987115A | Sample number(s): 9324688-9324689,9324691 BKG: 9324688 | | | |
| Nitrate Nitrogen | N.D. | N.D. | 0 (1) | 15 |
| Sulfate | 27.46 | 26.82 | 2 | 15 |
| Batch number: 17324667606A | Sample number(s): 9324688-9324689,9324691 BKG: 9324688 | | | |
| Total Organic Carbon | 1.39 | 1.29 | 8 (1) | 9 |

## Surrogate Quality Control

Surrogate recoveries which are outside of the QC window are confirmed unless attributed to dilution or otherwise noted on the Analysis Report. For dual column analyses, the surrogate (at least one surrogate for multi-surrogate tests) must be within the acceptance limits on at least one of the two columns.

Analysis Name: VOCs- 25ml Water by 8260C
Batch number: I173332AA

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
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P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

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# Quality Control Summary

Client Name: Tetra Tech, Inc.
Reported: 12/01/2017 17:18

Group Number: 1876931

## Surrogate Quality Control

Surrogate recoveries which are outside of the QC window are confirmed unless attributed to dilution or otherwise noted on the Analysis Report. For dual column analyses, the surrogate (at least one surrogate for multi-surrogate tests) must be within the acceptance limits on at least one of the two columns.

Analysis Name: VOCs- 25ml Water by 8260C
Batch number: I173332AA

| | Dibromofluoromethane | 1,2-Dichloroethane-d4 | Toluene-d8 | 4-Bromofluorobenzene |
|---|---|---|---|---|
| 9324688 | 101 | 103 | 121 | 91 |
| 9324689 | 98 | 99 | 101 | 100 |
| 9324690 | 98 | 100 | 100 | 100 |
| 9324692 | 103 | 102 | 101 | 93 |
| Blank | 102 | 101 | 103 | 94 |
| LCS | 97 | 100 | 100 | 99 |
| MS | 98 | 99 | 101 | 100 |
| MSD | 98 | 100 | 100 | 100 |
| Limits: | 70-130 | 70-130 | 70-130 | 70-130 |

Analysis Name: SIM SVOAs 8270D MINI
Batch number: 17325WAI026

| | Fluoranthene-d10 | Benzo(a)pyrene-d12 | 1-Methylnaphthalene-d10 |
|---|---|---|---|
| 9324688 | 87 | 69 | 84 |
| 9324689 | 93 | 60 | 90 |
| 9324690 | 94 | 67 | 87 |
| 9324692 | 94 | 72 | 90 |
| Blank | 87 | 82 | 80 |
| LCS | 88 | 90 | 87 |
| MS | 93 | 60 | 90 |
| MSD | 94 | 67 | 87 |
| Limits: | 44-115 | 25-125 | 33-112 |

Analysis Name: Volatile Headspace Hydrocarbon
Batch number: 173220016A

| | Propene |
|---|---|
| 9324688 | 85 |
| 9324689 | 91 |
| 9324690 | 89 |
| Blank | 109 |
| LCS | 107 |
| MS | 91 |
| MSD | 89 |
| Limits: | 44-123 |

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.
P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

# Environmental Analysis Request/Chain of Custody

eurofins

Lancaster Laboratories Environmental

For Eurofins Lancaster Laboratories Environmental use only

Acct. # 19999 Group # 1876931 Sample # 9324688-92

**COC #** 557713

## Client Information

Client: TETRA TECH

Acct. #:

Project Name/#: LMC BURLINGTON 117-0507550

PWSID #:

Project Manager: ED DOLAN

P.O. #: 117-0507550

Sampler: JAKE PLANTO

Quote #:

State where samples were collected: MA

For Compliance: Yes ☐ No ☐

For Lab Use Only

FSC:

SCR#:

## Preservation Codes

H=HCl T=Thiosulfate
N=$HNO_3$ B=NaOH
S=$H_2SO_4$ P=$H_3PO_4$
F=Field Filtered O=Other

## Remarks

MCP SITE ANALYZE 1,4 DIOXANE TO 0.3 MG/L RL

| Sample Identification | Collected Date | Collected Time | Grab | Composite | Soil | Sediment | Tissue | Potable | Ground | Surface | NPDES | Water | Other: | Total # of Containers | VOC 8260 | 1,4 DIOXANE | NITRATE NITROGEN NO3N | METHANE | TOC | $H_3PO_4$ | HCl |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EMW-10-111617 | 11/16/17 | 1130 | X | | | | | | X | | | GW | | 33 | 9 | 6 | 6 | 6 | 6 | | |
| TMW-7(R)-111617 | 11/16/17 | 1320 | X | | | | | | | | | GW | | 5 | 3 | 2 | | | | | |

**Turnaround Time (TAT) Requested** (please circle)

Standard Rush

(Rush TAT is subject to laboratory approval and surcharge.)

Date results are needed: _____

E-mail address: _____

**Data Package Options** (circle if required)

Type I (EPA Level 3 Equivalent/non-CLP) Type VI (Raw Data Only)

Type III (Reduced non-CLP) NJ DKQP TX TRRP-13

NYSDEC Category A or B MA MCP CT RCP

| Relinquished by | Date | Time | Received by | Date | Time |
|---|---|---|---|---|---|
| JAKE PLANTO | 11/16/17 | 1430 | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

EDD Required? Yes No

If yes, format: PDF/EXCEL

Site-Specific QC (MS/MSD/Dup)? Yes No

(If yes, indicate QC sample and submit triplicate sample volume.)

Relinquished by Commercial Carrier: UPS _____ FedEx _____ Other _____

Temperature upon receipt 4.2 °C

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Lancaster Laboratories Environmental

# Sample Administration Receipt Documentation Log

Doc Log ID: 201480

Group Number(s): 1876931

Client: TETRA TECH

## Delivery and Receipt Information

| | | | |
|---|---|---|---|
| Delivery Method: | Fed Ex | Arrival Timestamp: | 11/17/2017 9:45 |
| Number of Packages: | 1 | Number of Projects: | 1 |
| State/Province of Origin: | MA | | |

## Arrival Condition Summary

| | | | |
|---|---|---|---|
| Shipping Container Sealed: | Yes | Sample IDs on COC match Containers: | Yes |
| Custody Seal Present: | Yes | Sample Date/Times match COC: | Yes |
| Custody Seal Intact: | Yes | VOA Vial Headspace ≥ 6mm: | N/A |
| Samples Chilled: | Yes | Total Trip Blank Qty: | 0 |
| Paperwork Enclosed: | Yes | Air Quality Samples Present: | No |
| Samples Intact: | No | | |
| Missing Samples: | No | | |
| Extra Samples: | No | | |
| Discrepancy in Container Qty on COC: | No | | |

*Unpacked by Wendy Wakeley (1669) at 10:32 on 11/17/2017*

## Samples Chilled Details

*Thermometer Types: DT = Digital (Temp. Bottle) IR = Infrared (Surface Temp) All Temperatures in °C.*

| Cooler # | Thermometer ID | Corrected Temp | Therm. Type | Ice Type | Ice Present? | Ice Container | Elevated Temp? |
|---|---|---|---|---|---|---|---|
| 1 | DT42-01 | 4.2 | DT | Wet | Y | Bagged | N |

## Samples Not Intact Details

| Sample ID on Label | Bottle Code | Bottle Quantity | Container Salvageable? | Comments |
|---|---|---|---|---|
| EMW-ID-111617 | 250 ml round amber glass - None | 1 | N | |
| TTMW7R 111617 | 40 ml glass vial (GC/MS) - HCl | 1 | N | |



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F 717-656-2681
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# Explanation of Symbols and Abbreviations

*The following defines common symbols and abbreviations used in reporting technical data:*

| | | | |
|---|---|---|---|
| **BMQL** | Below Minimum Quantitation Level | **mg** | milligram(s) |
| **C** | degrees Celsius | **mL** | milliliter(s) |
| **cfu** | colony forming units | **MPN** | Most Probable Number |
| **CP Units** | cobalt-chloroplatinate units | **N.D.** | non-detect |
| **F** | degrees Fahrenheit | **ng** | nanogram(s) |
| **g** | gram(s) | **NTU** | nephelometric turbidity units |
| **IU** | International Units | **pg/L** | picogram/liter |
| **kg** | kilogram(s) | **RL** | Reporting Limit |
| **L** | liter(s) | **TNTC** | Too Numerous To Count |
| **lb.** | pound(s) | **µg** | microgram(s) |
| **m3** | cubic meter(s) | **µL** | microliter(s) |
| **meq** | milliequivalents | **umhos/cm** | micromhos/cm |

| | |
|---|---|
| **<** | less than |
| **>** | greater than |
| **ppm** | parts per million - One ppm is equivalent to one milligram per kilogram (mg/kg) or one gram per million grams. For aqueous liquids, ppm is usually taken to be equivalent to milligrams per liter (mg/l), because one liter of water has a weight very close to a kilogram. For gases or vapors, one ppm is equivalent to one microliter per liter of gas. |
| **ppb** | parts per billion |
| **Dry weight basis** | Results printed under this heading have been adjusted for moisture content. This increases the analyte weight concentration to approximate the value present in a similar sample without moisture. All other results are reported on an as-received basis. |

**Analytical test results meet all requirements of the associated regulatory program (i.e., NELAC (TNI), DoD, and ISO 17025) unless otherwise noted under the individual analysis.**

Measurement uncertainty values, as applicable, are available upon request.

Tests results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff.

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Times are local to the area of activity. Parameters listed in the 40 CFR Part 136 Table II as “analyze immediately” are not performed within 15 minutes.

**WARRANTY AND LIMITS OF LIABILITY** - In accepting analytical work, we warrant the accuracy of test results for the sample as submitted. THE FOREGOING EXPRESS WARRANTY IS EXCLUSIVE AND IS GIVEN IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED. WE DISCLAIM ANY OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING A WARRANTY OF FITNESS FOR PARTICULAR PURPOSE AND WARRANTY OF MERCHANTABILITY. IN NO EVENT SHALL EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL, LLC BE LIABLE FOR INDIRECT, SPECIAL, CONSEQUENTIAL, OR INCIDENTAL DAMAGES INCLUDING, BUT NOT LIMITED TO, DAMAGES FOR LOSS OF PROFIT OR GOODWILL REGARDLESS OF (A) THE NEGLIGENCE (EITHER SOLE OR CONCURRENT) OF EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL AND (B) WHETHER EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL HAS BEEN INFORMED OF THE POSSIBILITY OF SUCH DAMAGES. We accept no legal responsibility for the purposes for which the client uses the test results. No purchase order or other order for work shall be accepted by Eurofins Lancaster Laboratories Environmental which includes any conditions that vary from the Standard Terms and Conditions, and Eurofins Lancaster Laboratories Environmental hereby objects to any conflicting terms contained in any acceptance or order submitted by client.

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# Data Qualifiers

| Qualifier | Definition |
|---|---|
| C | Result confirmed by reanalysis |
| D1 | Indicates for dual column analyses that the result is reported from column 1 |
| D2 | Indicates for dual column analyses that the result is reported from column 2 |
| E | Concentration exceeds the calibration range |
| J (or G, I, X) | Estimated value >= the Method Detection Limit (MDL or DL) and < the Limit of Quantitation (LOQ or RL) |
| P | Concentration difference between the primary and confirmation column >40%. The lower result is reported. |
| U | Analyte was not detected at the value indicated |
| V | Concentration difference between the primary and confirmation column >100%. The reporting limit is raised due to this disparity and evident interference. |
| W | The dissolved oxygen uptake for the unseeded blank is greater than 0.20 mg/L. |
| Z | Laboratory Defined - see analysis report |

Additional Organic and Inorganic CLP qualifiers may be used with Form 1 reports as defined by the CLP methods.
Qualifiers specific to Dioxin/Furans and PCB Congeners are detailed on the individual Analysis Report.

# APPENDIX B

# WATER QUALITY VALIDATION REPORTS

**Analytical Data Validation Report**

**Performed by: Chris Coner, Tetra Tech, Inc.**

**Date: December 12, 2017**

*Data Package Evaluated:* Eurofins Analysis Report Group Nos. 1875060, 1876333 and 1877597 – 3G-11, 3G-12, 3G-12-D, 3H-1D, 3H-1S, 3H-1S, 3H-2, 3H-3, 3H-5, A-1, A-1D, EMW-1D, EMW-2D(R), EMW-3R, EMW-7, EMW-10D, EMW-11R, EMW-12R, TTMW-1, TTMW-7(R), Trip Blank Grab Water and Trip Blank Water (2);

The following is an evaluation of the quality control (QC) parameters associated with the testing of 20 groundwater samples, and three trip blank using Method 8260C for volatile organic compounds (VOCs) from the Former RCA Facility in Burlington, Massachusetts. The groundwater samples were also analyzed for 1,4-dioxane (Method 8270D SIM), nitrate/sulfate (Method 300.0), methane (Method RSK 175) and total organic carbon (Method 5310C). The VOC groundwater samples were collected between November 12 and 17, 2017. All samples were analyzed by Eurofins in Lancaster, Pennsylvania. All groundwater, and quality control data are reported in Eurofins Analysis Report Group No. 1875060, SDG: LMB08-01, submitted November 14, 2017, Group No. 1876333, SDG: LMB08-08, submitted November 16, 2017 and Group No.1877597, SDG: LMB09-03, submitted November 17 and 18, 2017.

All quality assurance/quality control (QA/QC) procedures required for methods 8260C, and Method 8270D SIM as per Section B of the Massachusetts Department of Environmental Protection (MassDEP) Massachusetts Contingency Plan (MCP) Compendium of Analytical Methods (CAM), were performed. Based upon the MADEP MCP Analytical Method Report Certification Form, "Presumptive Certainty" was achieved for all CAM Methods except for data packages 1875060 and 1876333, where the certification forms indicated "No" for Section B[1]. Since the Laboratory Control Sample recoveries in both sample groups were below the lower limit of the acceptance criteria, the data is considered to be biased low. However the data is considered usable for the purposes of this monitoring.

## Preservation

VOC groundwater samples were collected between November 12 and 17, 2017. Samples requiring VOC analysis (14 day hold time) were analyzed on November 19, 28 and 29, 2017. Samples requiring 1,4-dioxane analysis were collected between August 12 and 17, 2017 and analyzed on November 22 and 23, 2017, within the 14 day hold time. All VOC and SVOC (1,4-dioxane) analyses were within the required holding time of 14 days between sampling and analysis.

The case laboratory narrative indicates that appropriate preservatives were used for the tests requested, and the chain-of-custody (COC) indicates that the appropriate preservative was added to each sample for VOCs. The sample receipt forms and the case narrative indicate that all samples were received within the acceptable temperature range of 2±4°C. Upon receipt, samples were stored at 1-6°C. For the discussion below the relevant QC results for target VOCs (chlorinated

[1] Note that Tetra Tech has questioned this response on the MCP Certification Form, and the lab has not replied to our inquiries in a complete manner.

compounds that are derivatives of tetrachloroethene, trichloroethene and 1,4-dioxane) are discussed.

**Blanks**

- *Method 8260C* - Four VOC method blanks were analyzed on November 19, 28 and 29, 2017 and all target analytes were non-detect.
- The trip blank samples submitted with the VOC groundwater samples were analyzed on November 19, 28 and 29, 2017. Samples Trip Blank Grab Water and Trip Blank Water (2) showed no detections of any 8260C analytes.
- *Method 8270D SIM* - Method blank results were detected in one sample for 1,4-dioxane. Blank actions were required on sample EMW-7 which was detected below the method blank value and was flagged with a "J" qualifier as estimated.
- *EPA Method 300.0* -Method blank results were non-detect for nitrate and sulfate.
- *Method RSK-175* - Method blank results were non-detect for methane.
- *Method SM 5310C* -Method blank results were non-detect for TOC.

**Calibrations**

The laboratory case narrative indicates that all the initial calibration criteria were met for all analytes. All continuing calibration criteria were met for all relevant analytes with the exceptions of Dichlorodifluoromethane, Bromomethane, Chloromethane, Chloroethane, Trichlorofluoromethane and Vinyl chloride. Method detection limit standards were analyzed to verify instrument sensitivity at or below the detection limit and were confirmed to be adequate. Only Vinyl chloride was detected in samples 3G-11-111417, EMW-1D-111617 and EMW-11R-111217 at 0.1 J ug/L.

**Laboratory Control Sample (LCS) Recoveries**

- *Method 8260C* - Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD) results were within QC limits for relevant analytes, with the exceptions of Chloromethane (68%), Dichlorodifluoromethane (44-68%) and Tetrahyrdofuran (134%). The results of all samples in the associated batches were flagged with a "J" as estimated with the exception of Tetrahydrofuran which was not-detected in any samples.
- *Method 8270D SIM* - All LCS/LCSD results were within QC limits for 1,4-dioxane.
- *EPA Method 300.0* - All LCS/LCSD results were within QC limits for nitrate and sulfate.
- *Method RSK-175* - All LCS/LCSD results were within QC limits for methane.
- *Method SM 5310C* - All LCS/LCSD results were within QC limits for TOC.

**Surrogate Recoveries**

Surrogate recoveries were within laboratory-derived QC limits for all analyses.

**Matrix Spike/Matrix Spike Duplicate**

*Method 8260C* – The MS/MSD criteria were met for all relevant analytes with six exceptions. With the exception of Dichlorodifluoromethane the percent recoveries were all above the upper

crieteria limit indicating a positive bias. There were no detections for any of these compounds in sample EMW-1D.

- *Method 8270D SIM* - All MS/MSD results were within QC limits for 1,4-dioxane.
- *EPA Method 300.0* – All MS/MSD results were within QC limits for nitrate and sulfate.
- *Method RSK-175* - All MS/MSD results were within QC limits for methane.
- *Method SM 5310C* - All MS/MSD results were within QC limits for TOC.

**Internal Standard Response**

All Internal Standard Areas and retention times were within QC limits as described in the Case Narrative.

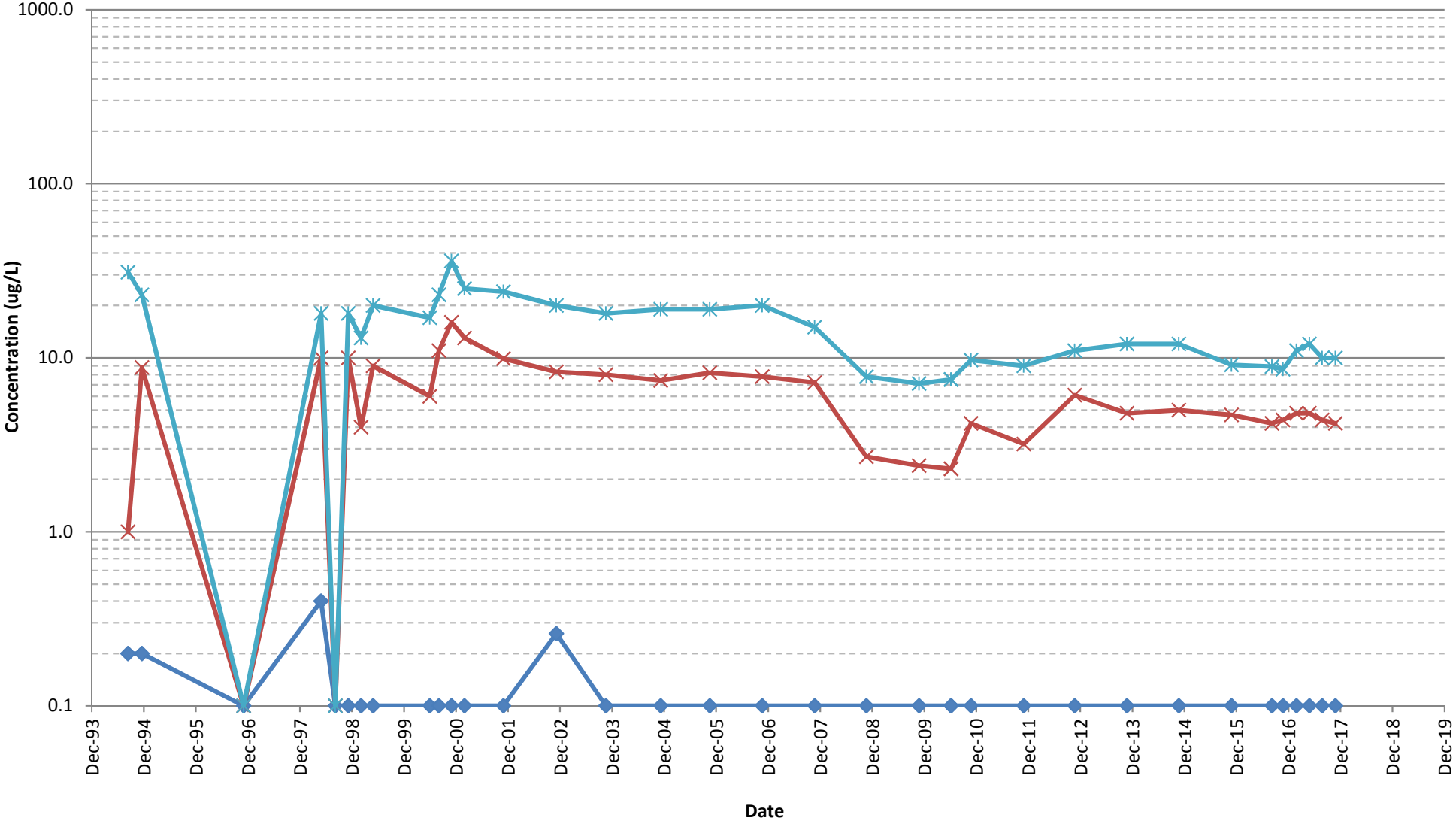
**Field Duplicate Precision**

For groundwater field duplicate pair 3G-12 and 3G-12-D, analyzed for VOCs by 8260C, all results were within the RPD limit of 30%. The precision is considered acceptable. All RPDs for 1,4-dioxane, methane, TOC, sulfate and nitrate were below 5% and the precision is acceptable.

# APPENDIX C

## CVOC CONCENTRATION VERSES TIME GRAPHS

# 3G-11 Concentration vs Time Plot




Notes:

Compounds reported as ND are shown at detection limit

PCE GW-1 Standard= 5 *ug*/L : TCE GW-1 Standard= 5 *ug*/L : 1,1 DCE GW-1 Standard= 7 *ug*/L

PCE TCE 1,1-DCE

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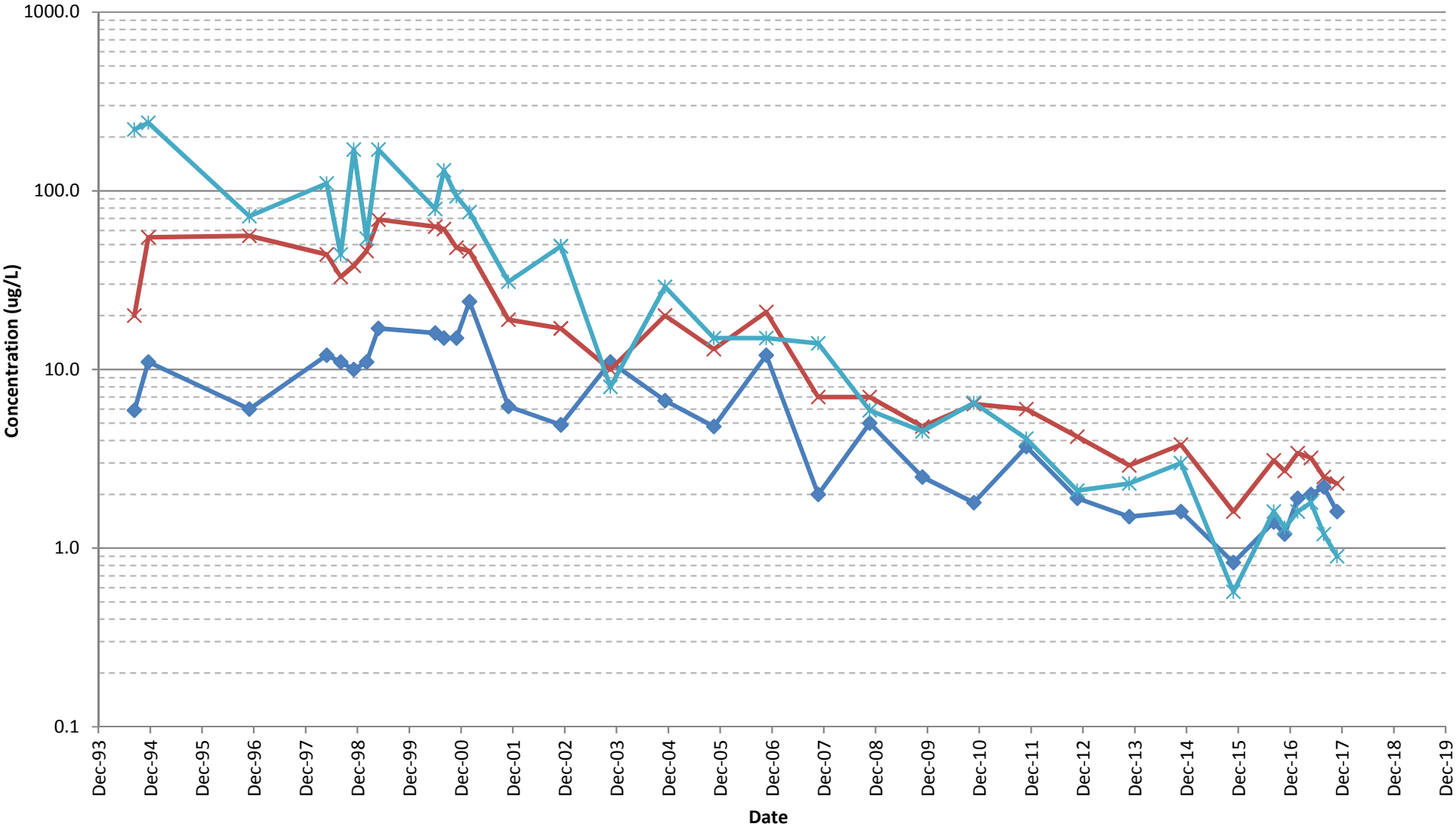
# 3G-12 Concentration vs Time Plot




Notes:

Compounds reported as ND are shown at detection limit

PCE GW-1 Standard= 5 *ug*/L : TCE GW-1 Standard= 5 *ug*/L : 1,1 DCE GW-1 Standard= 7 *ug*/L

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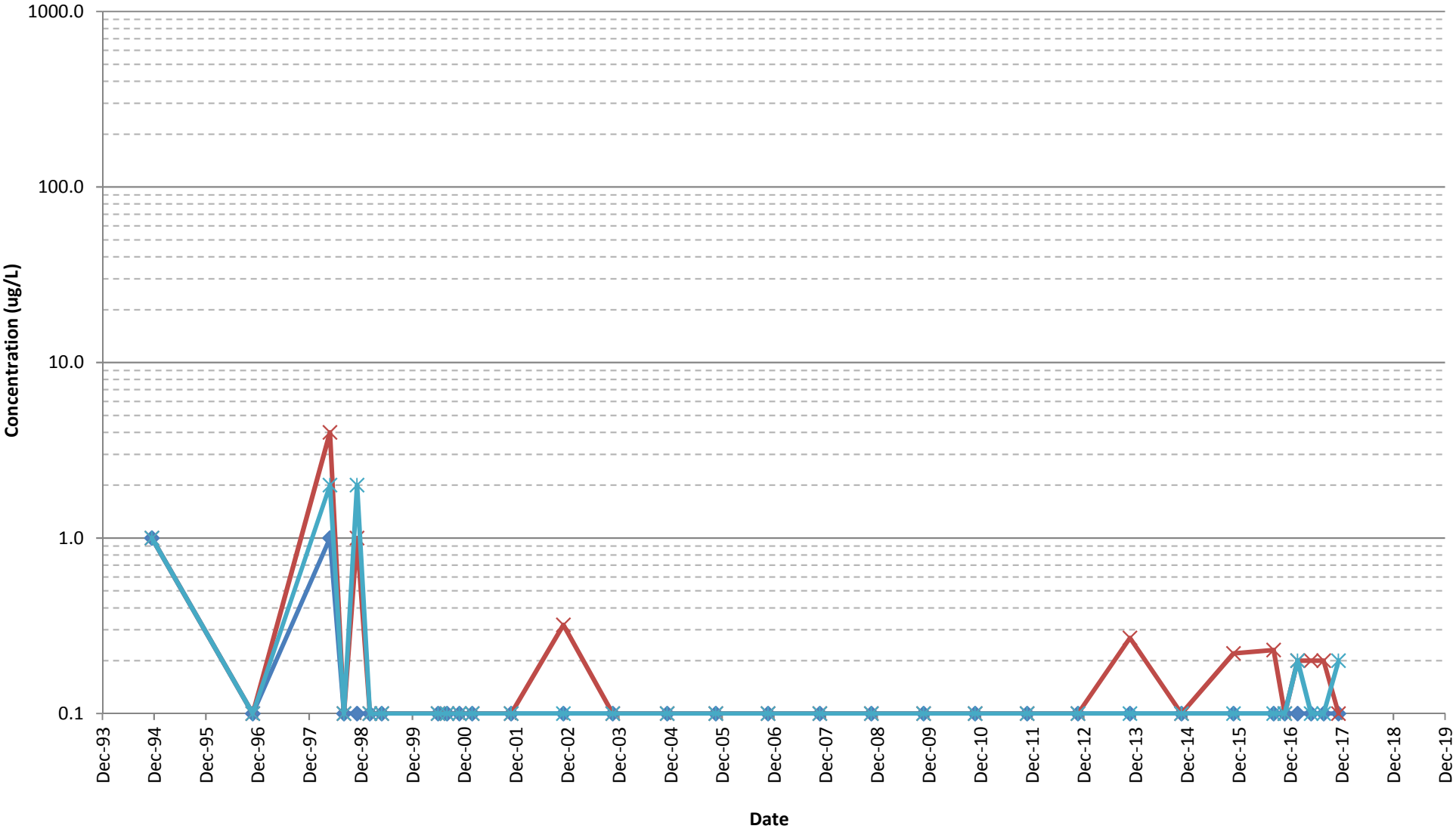
# 3H-1D Concentration vs Time Plot




Notes:

Compounds reported as ND are shown at detection limit

PCE GW-1 Standard= 5 *u*g/L : TCE GW-1 Standard= 5 *u*g/L : 1,1 DCE GW-1 Standard= 7 *u*g/L

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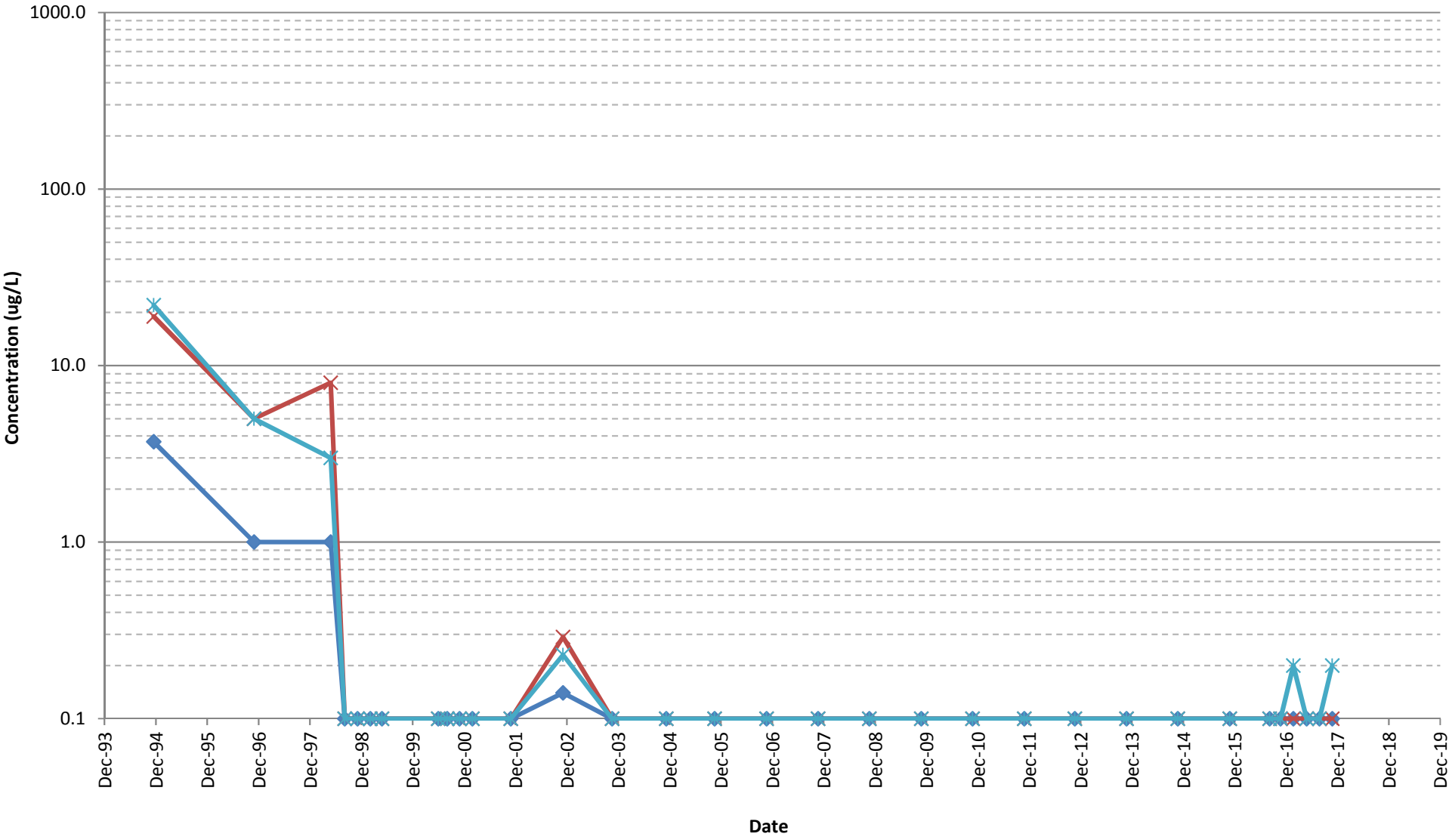
# 3H-1S Concentration vs Time Plot




Notes:

Compounds reported as ND are shown at detection limit

PCE GW-1 Standard= 5 *ug*/L : TCE GW-1 Standard= 5 *ug*/L : 1,1 DCE GW-1 Standard= 7 *ug*/L

PCE TCE 1,1-DCE

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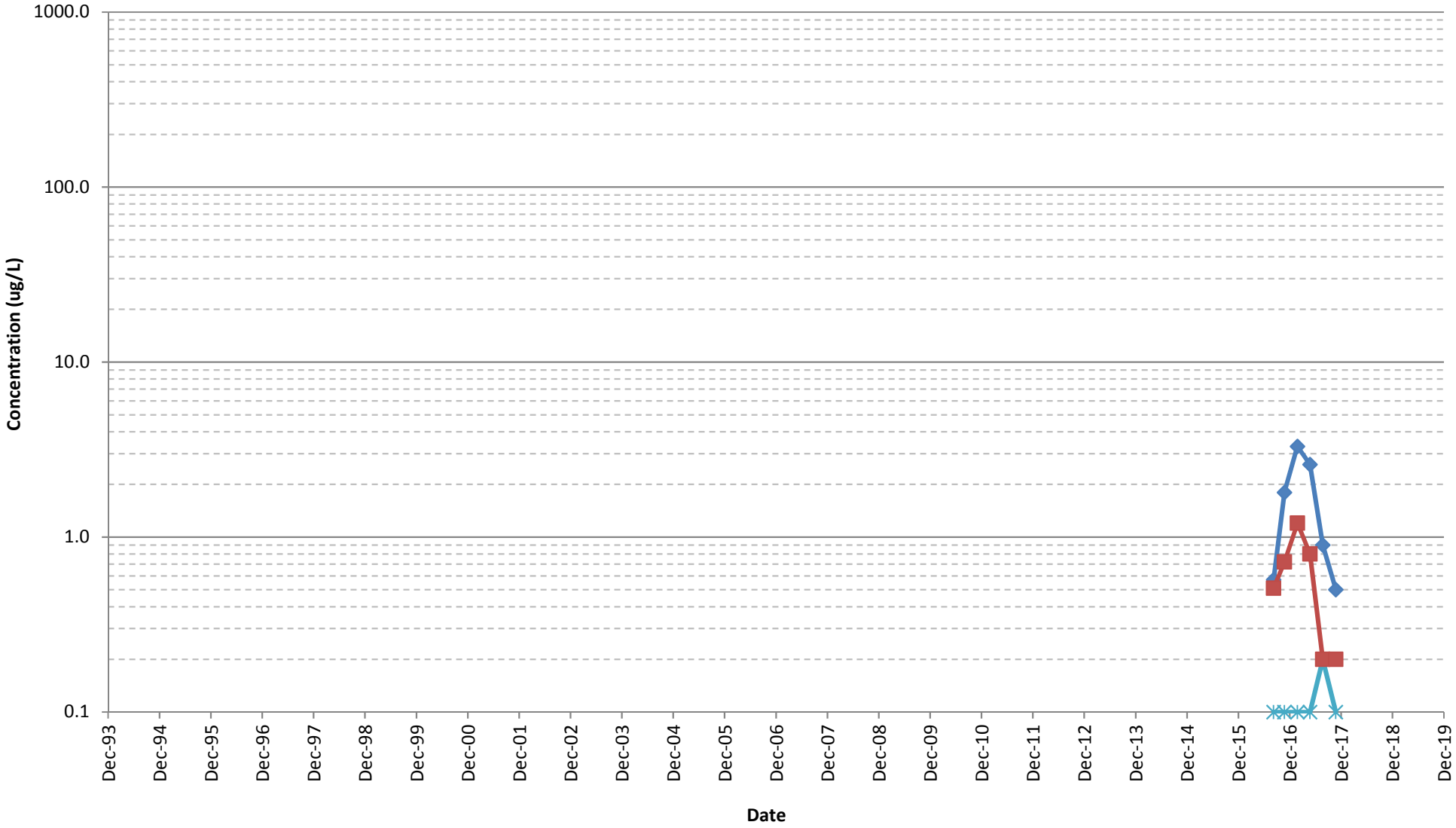
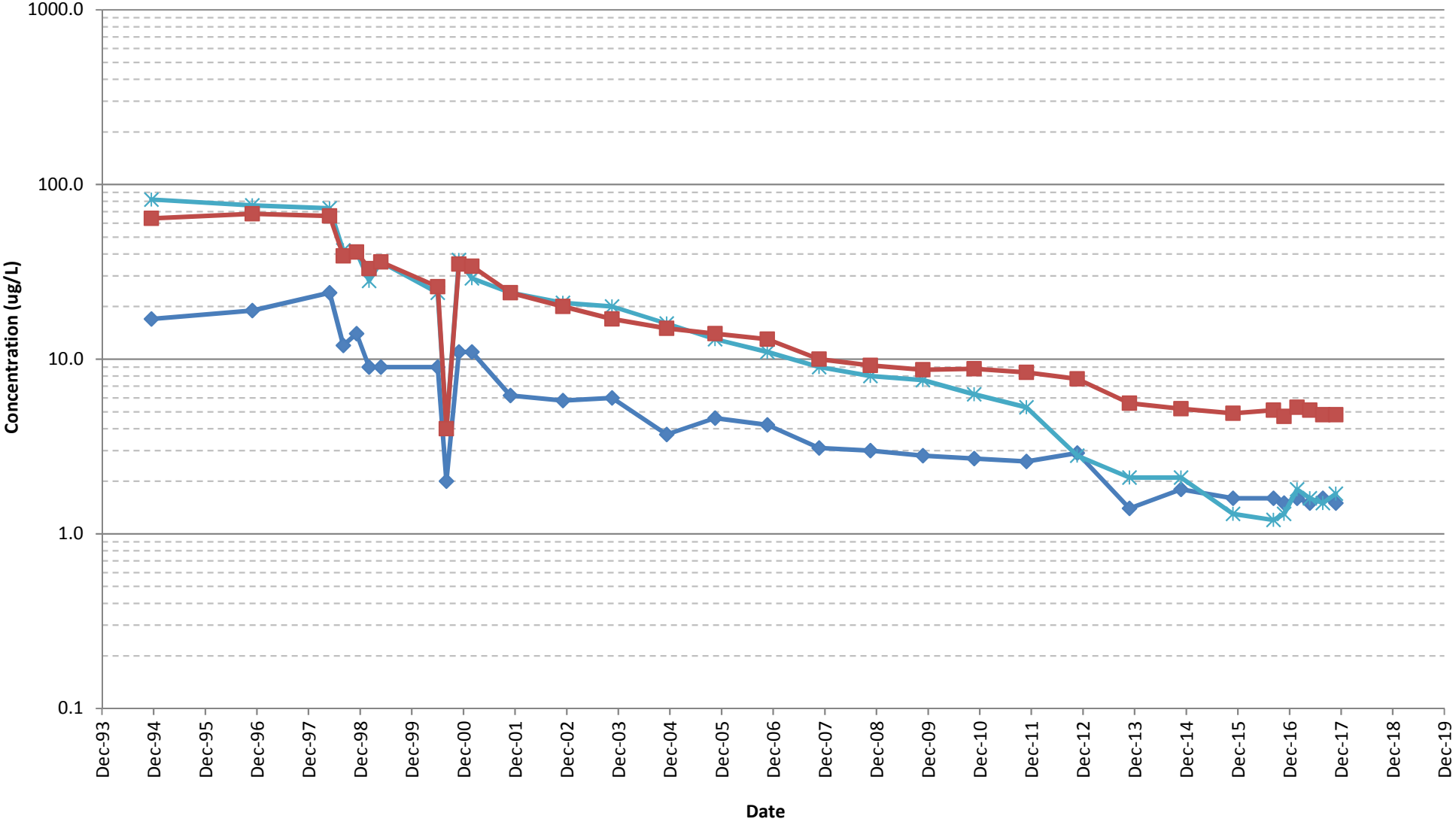
# A-1 Concentration vs Time Plot




Notes:
Compounds reported as ND are shown at detection limit
PCE GW-1 Standard= 5 *ug*/L : TCE GW-1 Standard= 5 *ug*/L : 1,1 DCE GW-1 Standard= 7 *ug*/L

M:\DOCs\Lockheed\Burlington\ebd_TimeConcPlots_BurlingtonWells_2018_PCE_TCE_DCE\A-1

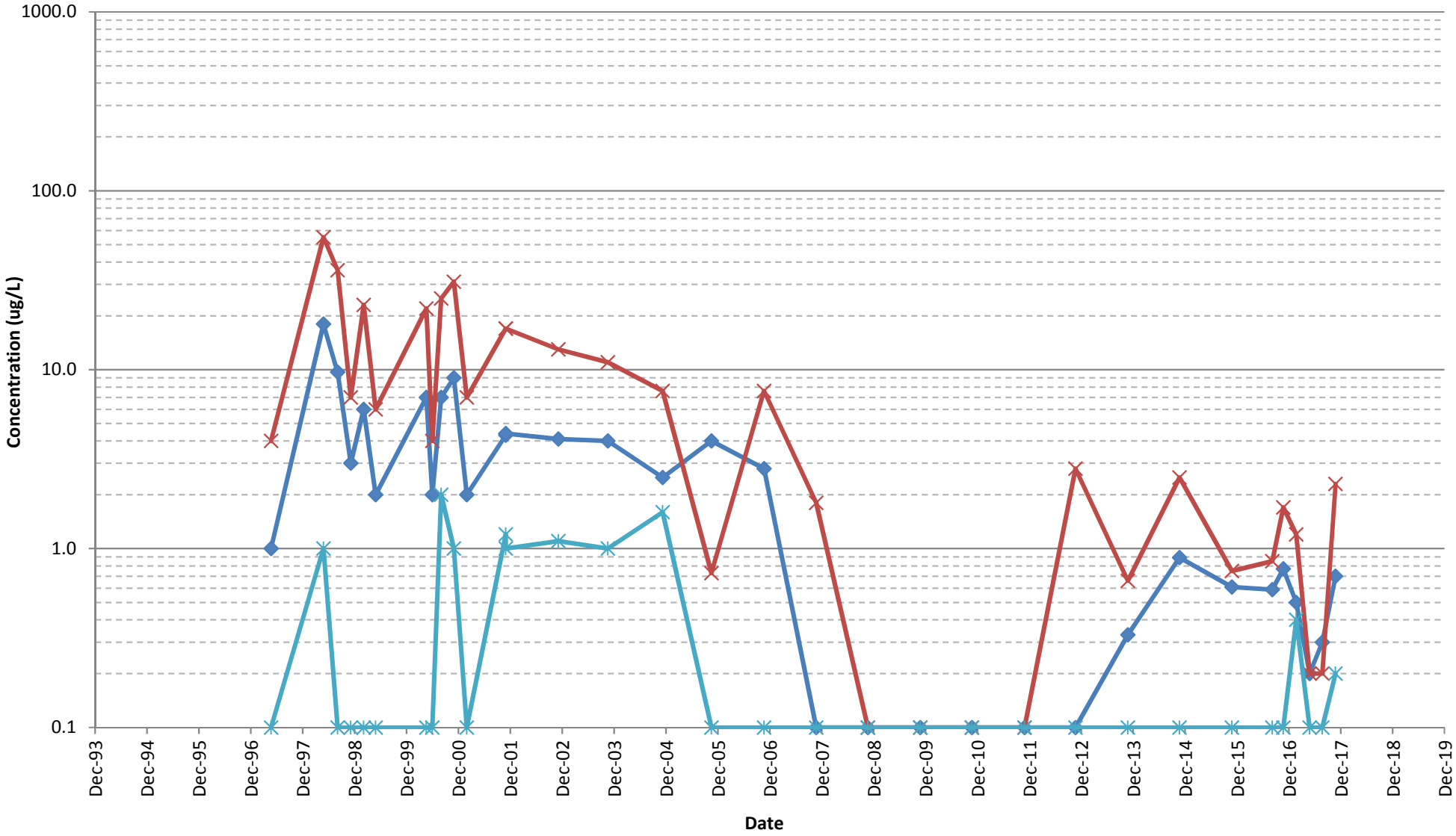
# A-1D Concentration vs Time Plot




Notes:
Compounds reported as ND are shown at detection limit
PCE GW-1 Standard= 5 *ug*/L : TCE GW-1 Standard= 5 *ug*/L : 1,1 DCE GW-1 Standard= 7 *ug*/L

M:\DOCs\Lockheed\Burlington\ebd_TimeConcPlots_BurlingtonWells_2018_PCE_TCE_DCE\A-1D

# EMW-10D Concentration vs Time Plot



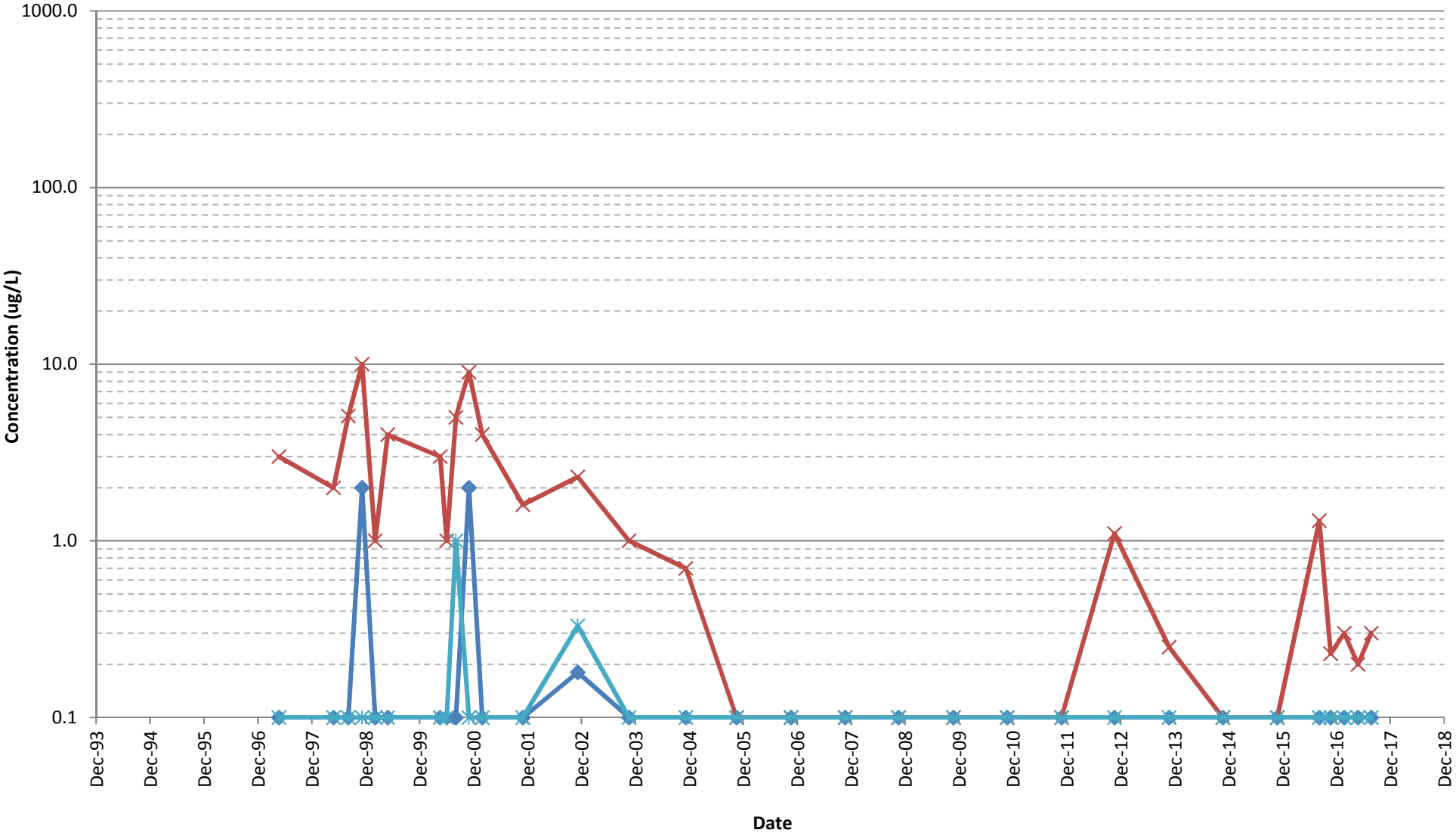

Notes:

Compounds reported as ND are shown at detection limit

PCE GW-1 Standard= 5 *ug*/L : TCE GW-1 Standard= 5 *ug*/L : 1,1 DCE GW-1 Standard= 7 *ug*/L

M:\DOCs\Lockheed\Burlington\ebd_TimeConcPlots_BurlingtonWells_2018_PCE_TCE_DCE\EMW-10D

# EMW-10R Concentration vs Time Plot




Notes:

Compounds reported as ND are shown at detection limit

PCE GW-1 Standard= 5 *u*g/L : TCE GW-1 Standard= 5 *u*g/L : 1,1 DCE GW-1 Standard= 7 *u*g/L

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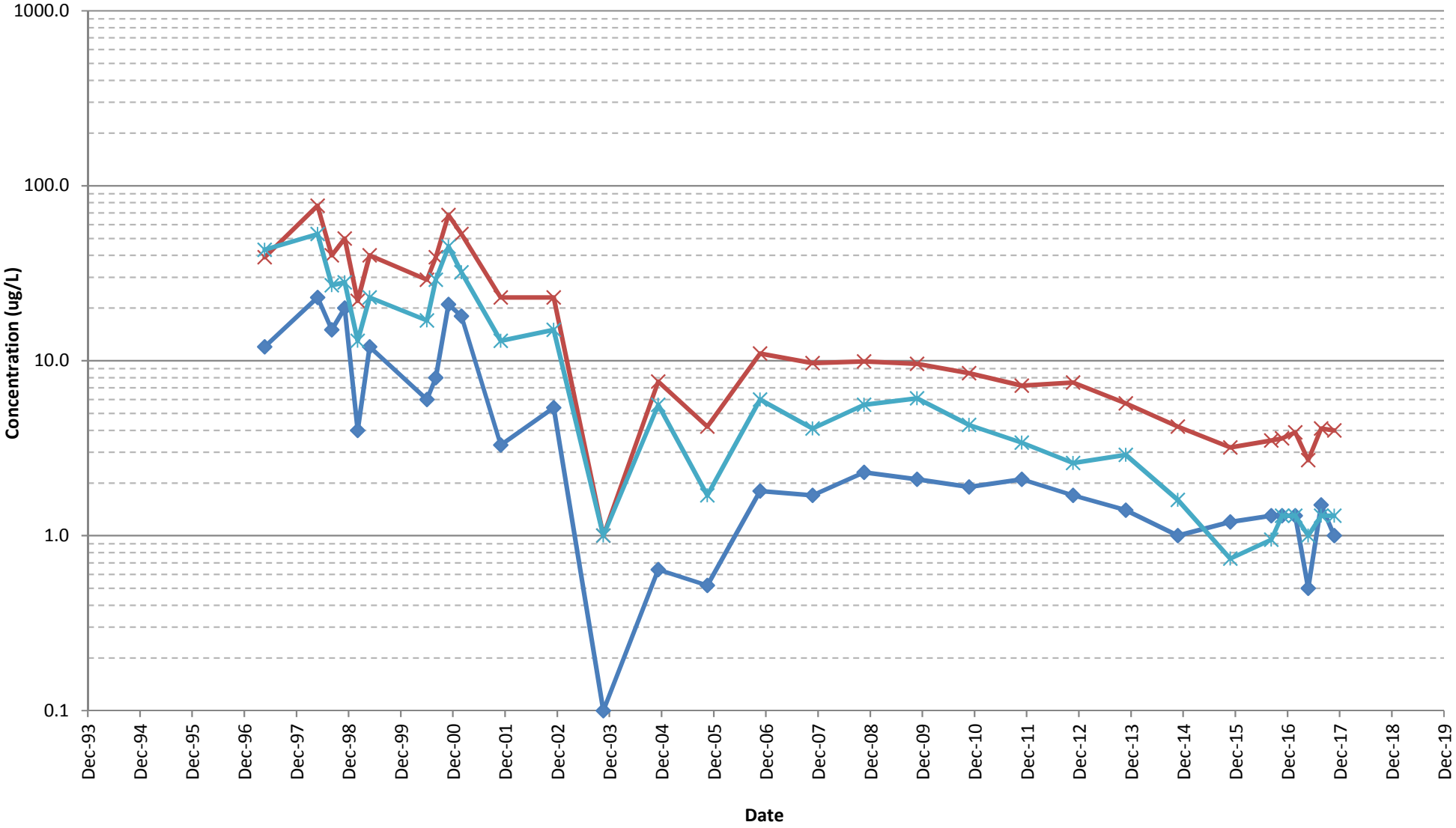
# EMW-11R Concentration vs Time Plot



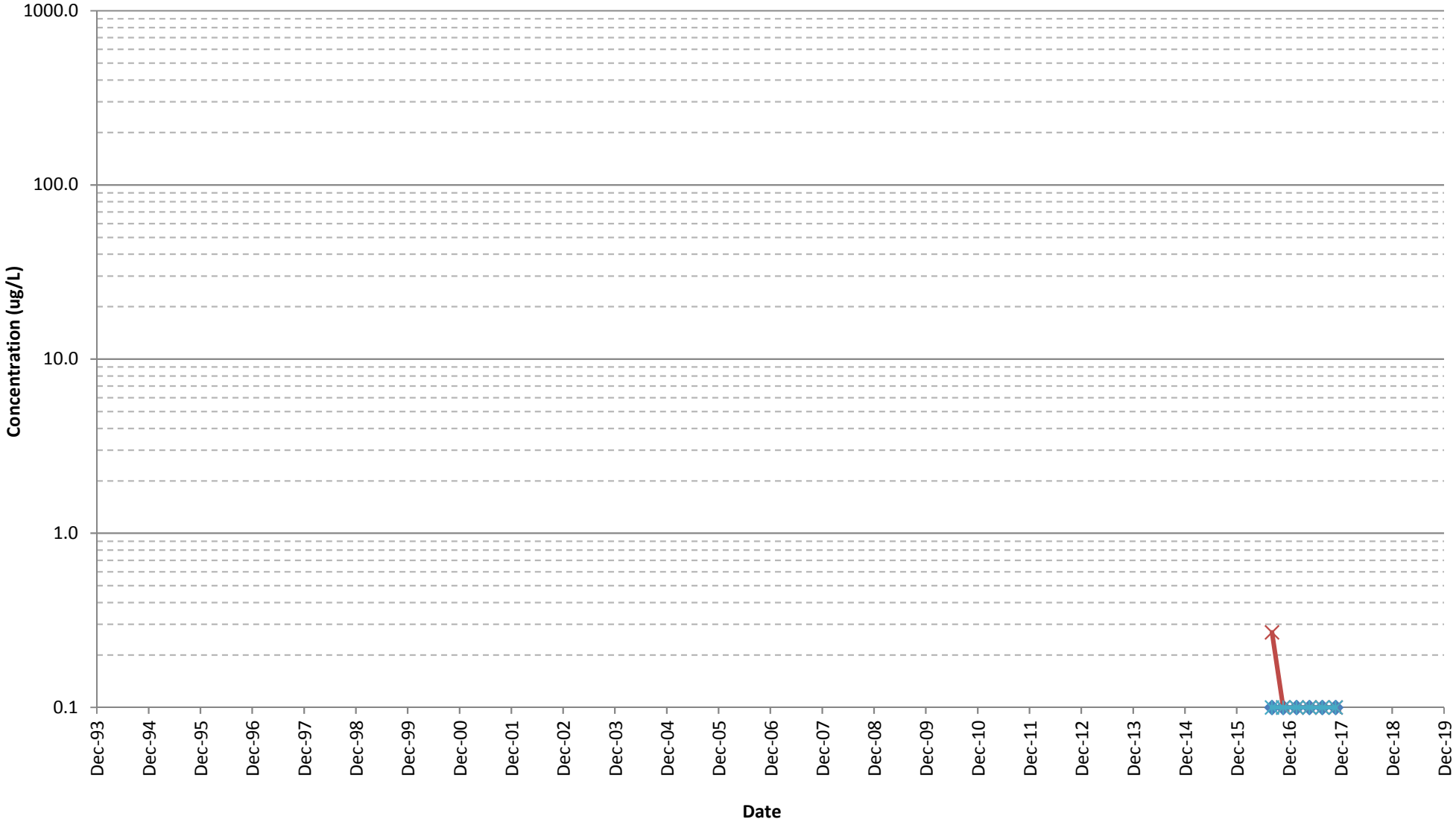

Notes:

Compounds reported as ND are shown at detection limit

PCE GW-1 Standard= 5 *ug*/L : TCE GW-1 Standard= 5 *ug*/L : 1,1 DCE GW-1 Standard= 7 *ug*/L

M:\DOCs\Lockheed\Burlington\ebd_TimeConcPlots_BurlingtonWells_2018_PCE_TCE_DCE\EMW-11R

# EMW-12R Concentration vs Time Plot




Notes:

Compounds reported as ND are shown at detection limit

PCE GW-1 Standard= 5 *u*g/L : TCE GW-1 Standard= 5 *u*g/L : 1,1 DCE GW-1 Standard= 7 *u*g/L

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# EMW-1D Concentration vs Time Plot

Notes:

Compounds reported as ND are shown at detection limit

PCE GW-1 Standard= 5 *ug*/L : TCE GW-1 Standard= 5 *ug*/L : 1,1 DCE GW-1 Standard= 7 *ug*/L

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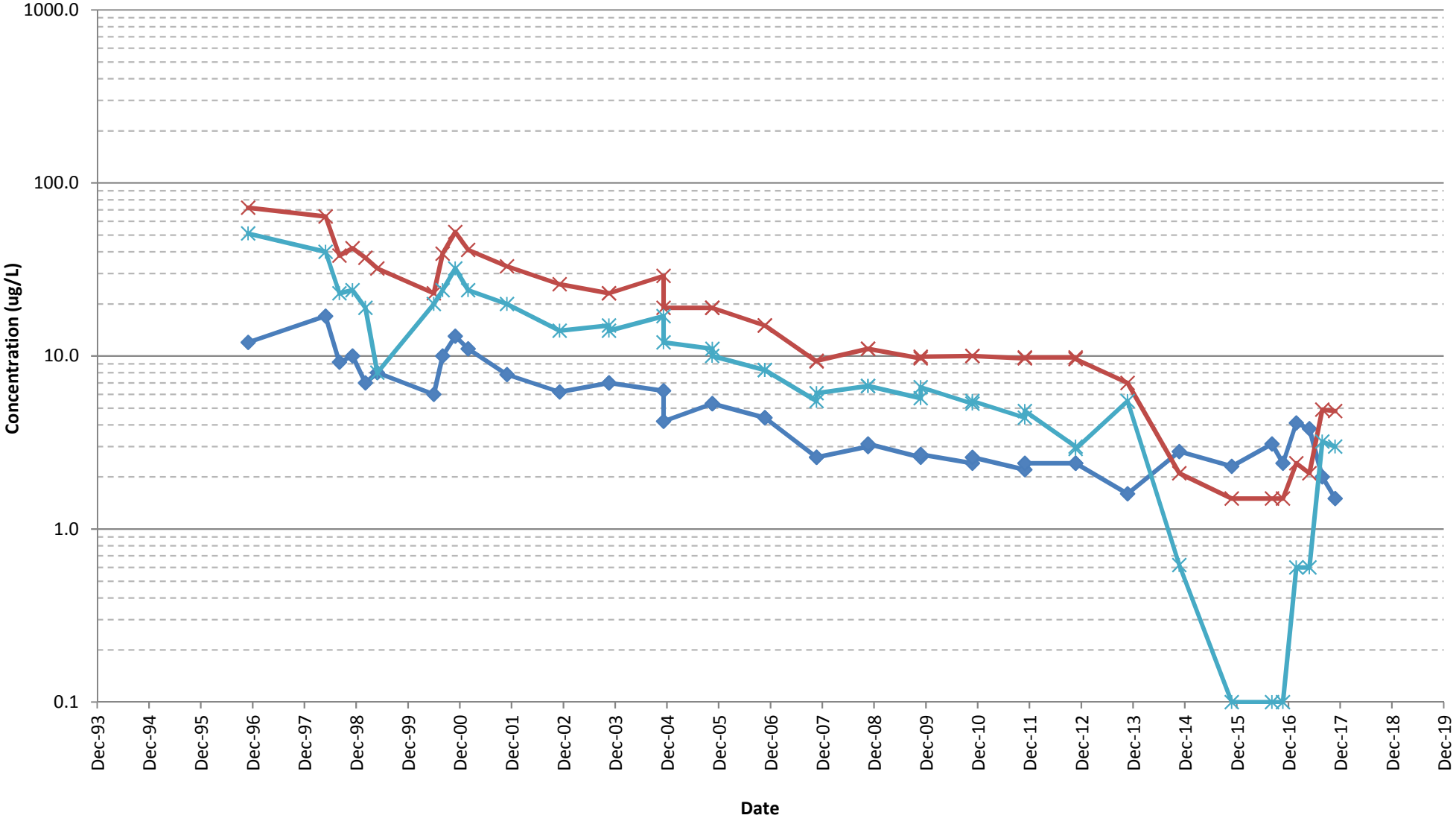
# EMW-2D/2D(R) Concentration vs Time Plot




Notes:

Compounds reported as ND are shown at detection limit

PCE GW-1 Standard= 5 *ug*/L : TCE GW-1 Standard= 5 *ug*/L : 1,1 DCE GW-1 Standard= 7 *ug*/L

PCE TCE 1,1-DCE

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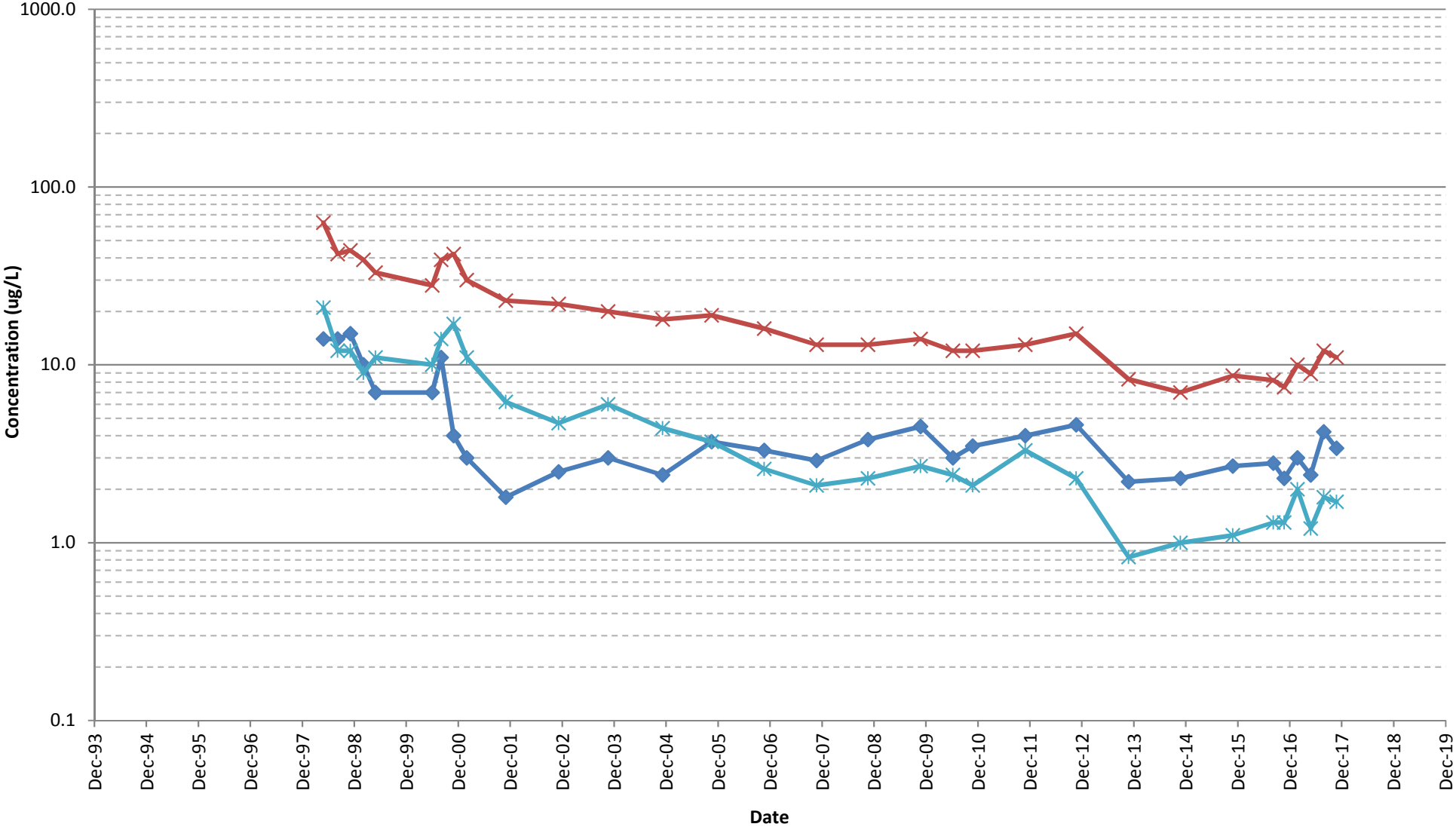
# EMW-3R Concentration vs Time Plot




Notes:

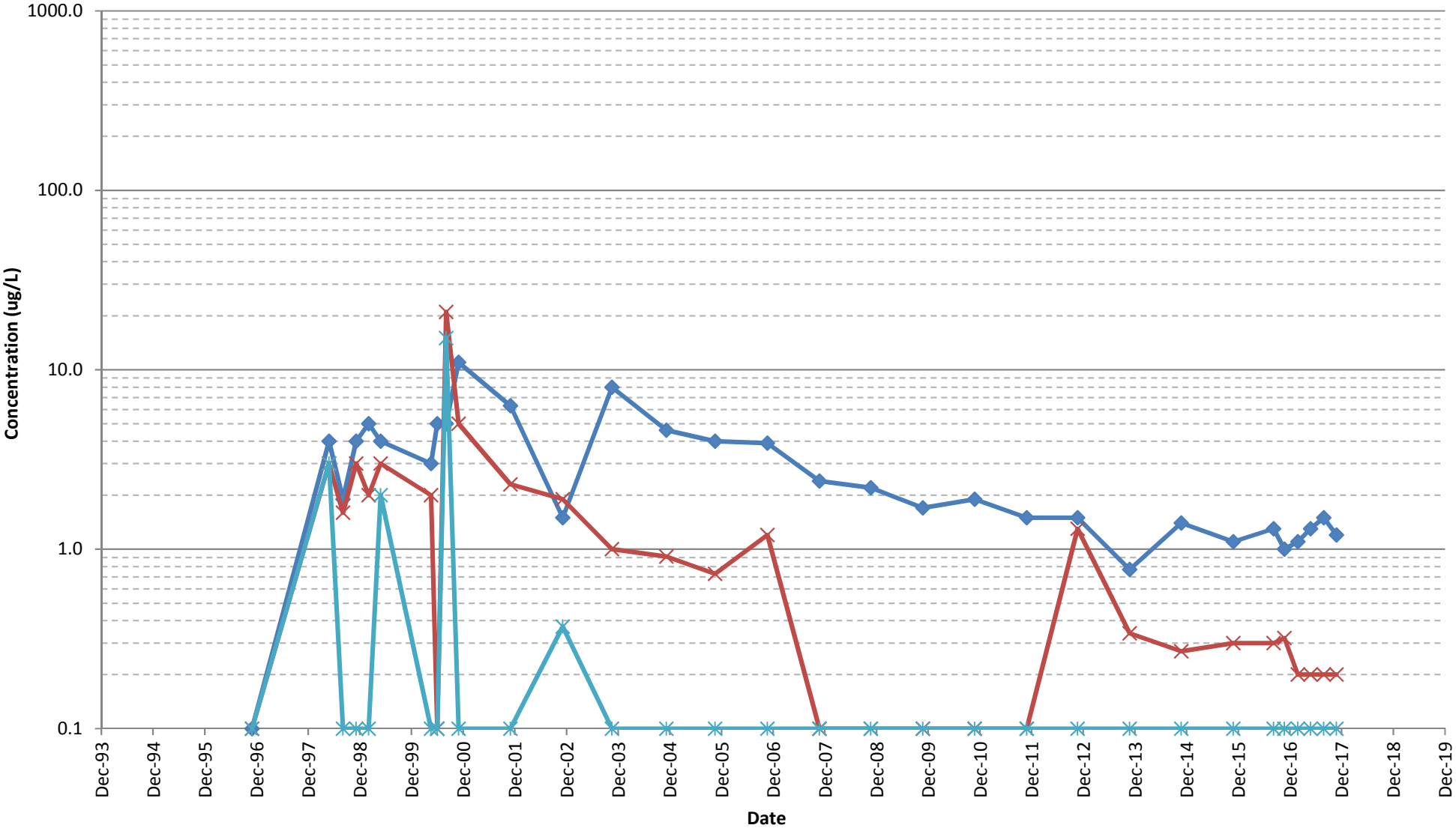
Compounds reported as ND are shown at detection limit

PCE GW-1 Standard= 5 *ug*/L : TCE GW-1 Standard= 5 *ug*/L : 1,1 DCE GW-1 Standard= 7 *ug*/L

PCE TCE 1,1-DCE

M:\DOCs\Lockheed\Burlington\ebd_TimeConcPlots_BurlingtonWells_2018_PCE_TCE_DCE\EMW-3R

# EMW-7 Concentration vs Time Plot



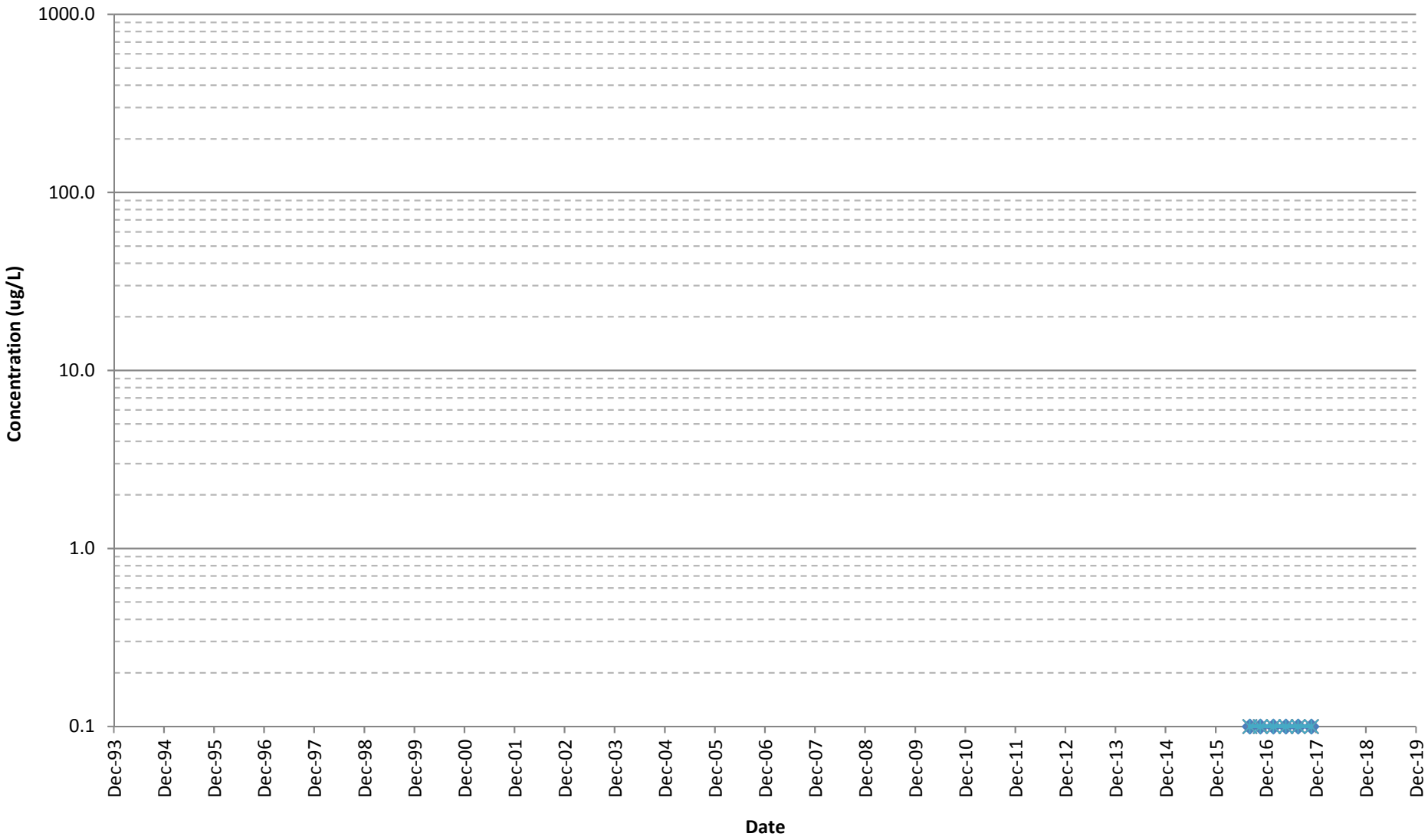

Notes:

Compounds reported as ND are shown at detection limit

PCE GW-1 Standard= 5 *ug*/L : TCE GW-1 Standard= 5 *ug*/L : 1,1 DCE GW-1 Standard= 7 *ug*/L

M:\DOCs\Lockheed\Burlington\ebd_TimeConcPlots_BurlingtonWells_2018_PCE_TCE_DCE\EMW-7

# 3H-2 Concentration vs Time Plot



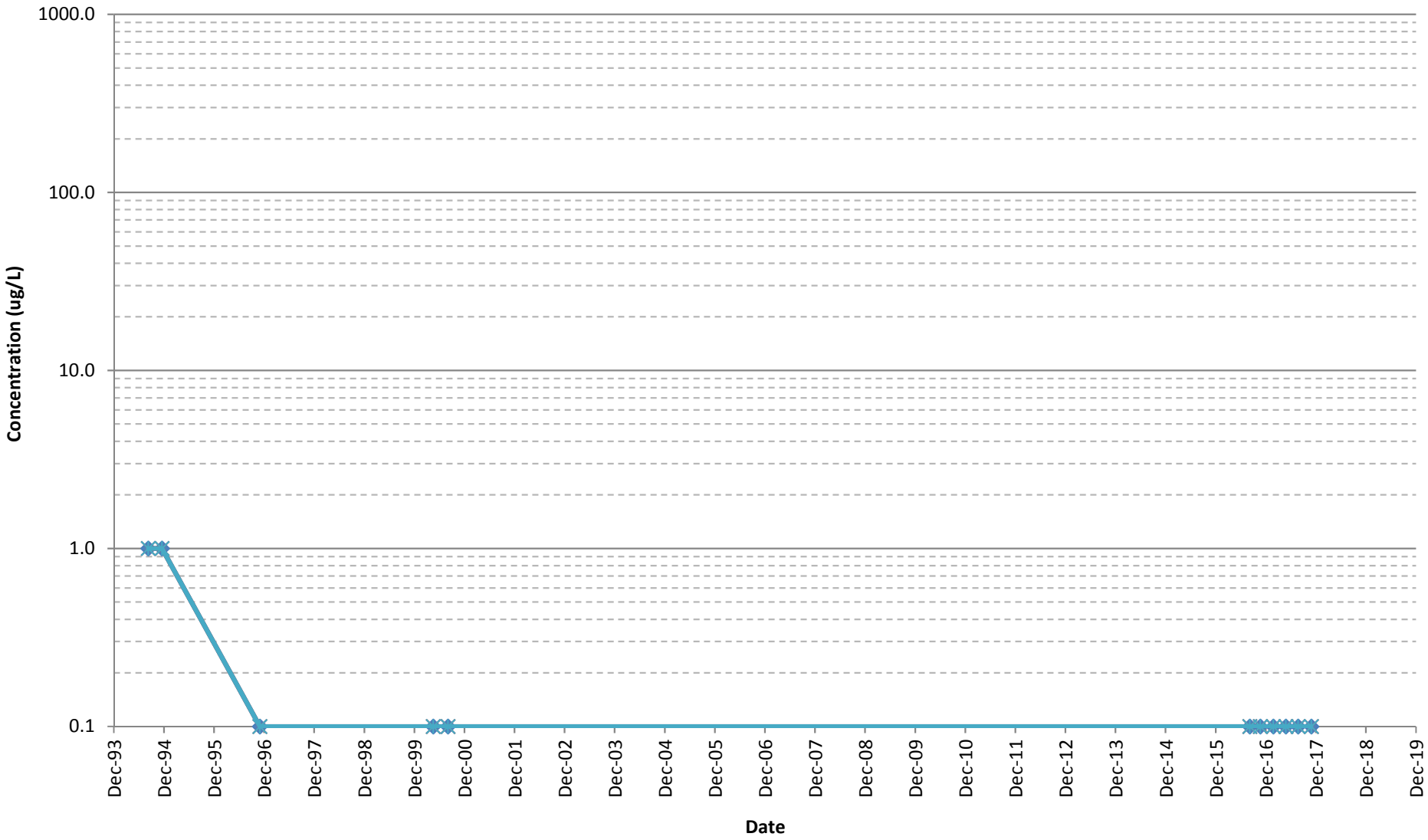

Notes:

Compounds reported as ND are shown at detection limit

PCE GW-1 Standard= 5 *ug*/L : TCE GW-1 Standard= 5 *ug*/L : 1,1 DCE GW-1 Standard= 7 *ug*/L

M:\DOCs\Lockheed\Burlington\ebd_TimeConcPlots_BurlingtonWells_2018_PCE_TCE_DCE\3H-2

# 3H-3 Concentration vs Time Plot



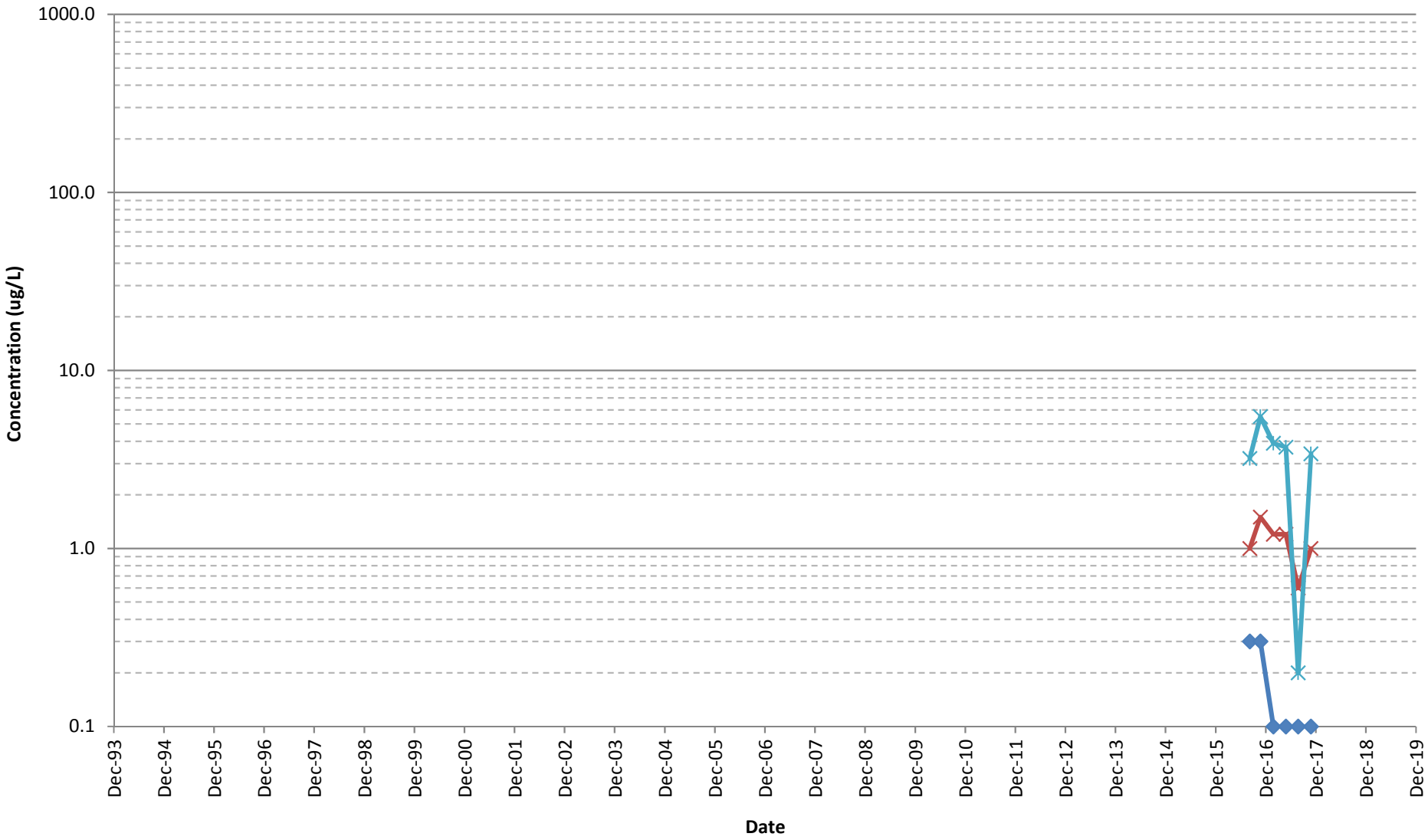

Notes:

Compounds reported as ND are shown at detection limit

PCE GW-1 Standard= 5 *ug*/L : TCE GW-1 Standard= 5 *ug*/L : 1,1 DCE GW-1 Standard= 7 *ug*/L

M:\DOCs\Lockheed\Burlington\ebd_TimeConcPlots_BurlingtonWells_2018_PCE_TCE_DCE\3H-3

# 3H-5 Concentration vs Time Plot



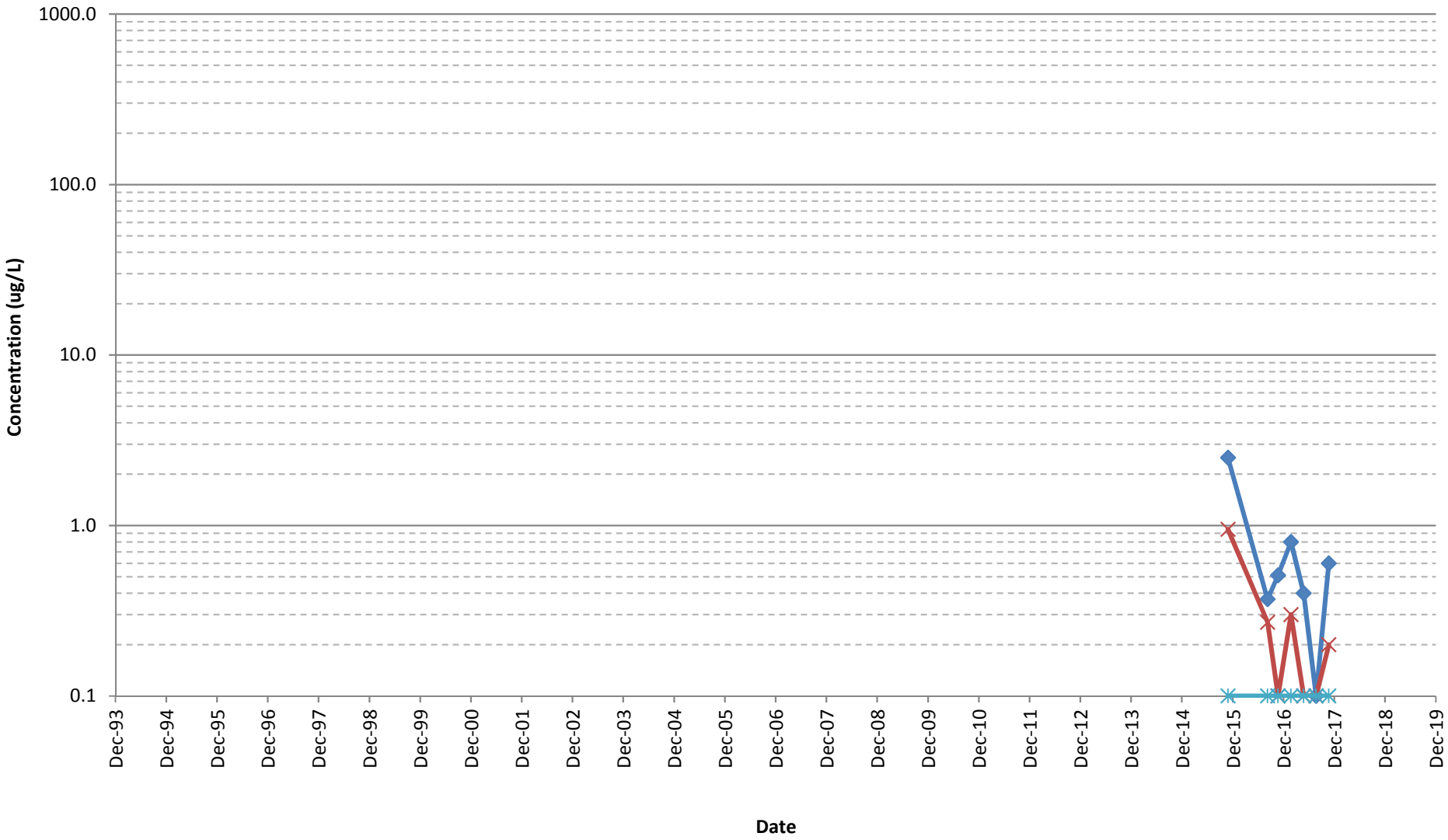

Notes:

Compounds reported as ND are shown at detection limit

PCE GW-1 Standard= 5 *ug*/L : TCE GW-1 Standard= 5 *ug*/L : 1,1 DCE GW-1 Standard= 7 *ug*/L

M:\DOCs\Lockheed\Burlington\ebd_TimeConcPlots_BurlingtonWells_2018_PCE_TCE_DCE\3H-5

# TTMW-1 Concentration vs Time Plot




Notes:

Compounds reported as ND are shown at detection limit

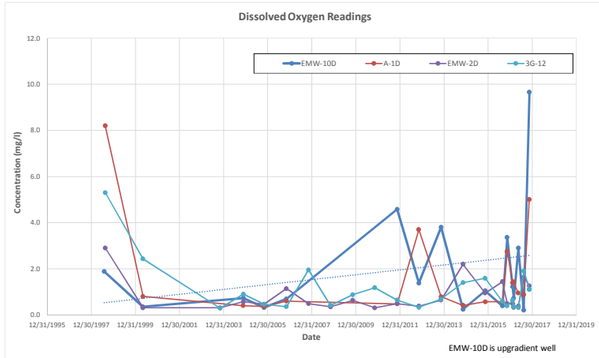
PCE GW-1 Standard= 5 *u*g/L : TCE GW-1 Standard= 5 *u*g/L : 1,1 DCE GW-1 Standard= 7 *u*g/L

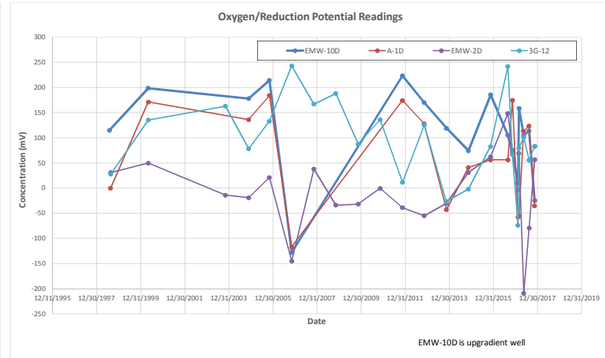
M:\DOCs\Lockheed\Burlington\ebd_TimeConcPlots_BurlingtonWells_2018_PCE_TCE_DCE\TTMW-1

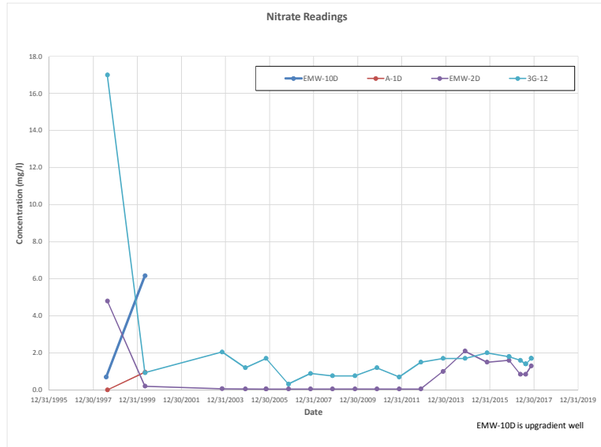
# APPENDIX D

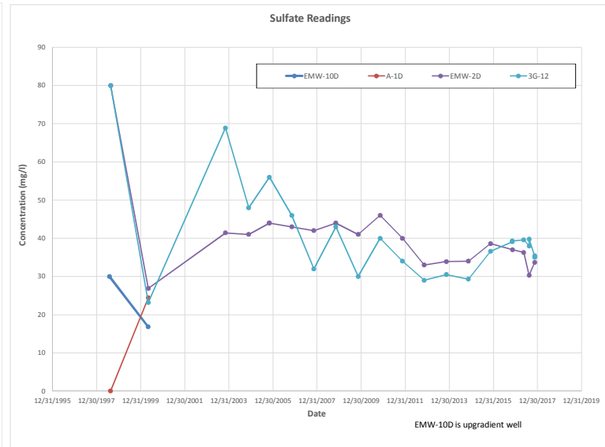
# MNA DATA VERSUS TIME GRAPHS

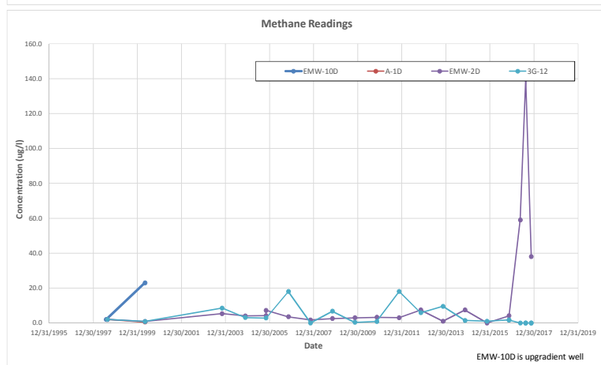
Appendix D
Natural Attenuation Parameter Data vs Time Graphs
Monitoring Report and ROS Statement
Former RCA Facility, Burlington, Massachusetts

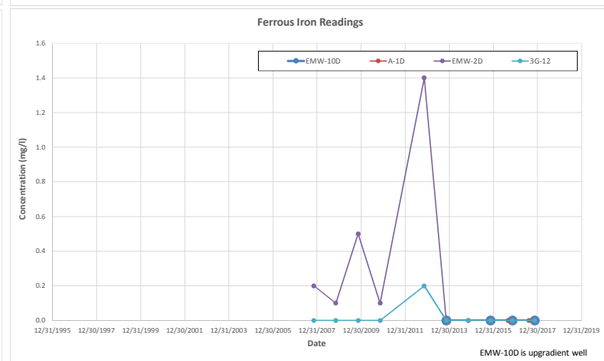


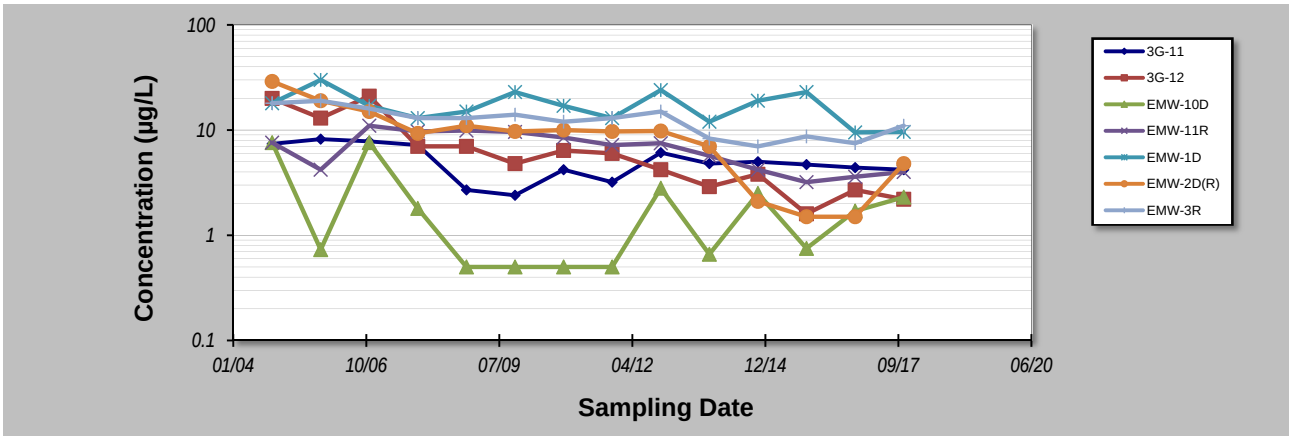
# APPENDIX E

# MANN-KENDALL ANALYSIS FOR 1,4-DIOXANE

# GSI MANN-KENDALL TOOLKIT
## for Constituent Trend Analysis

| | | | |
|---|---|---|---|
| Evaluation Date: | **2-May-18** | Job ID: | **117-0507550** |
| Facility Name: | **LMC Burlington** | Constituent: | **TCE** |
| Conducted By: | **Tetra Tech** | Concentration Units: | **µg/L** |

| Sampling Point ID: | | 3G-11 | 3G-12 | EMW-10D | EMW-11R | EMW-1D | EMW-2D(R) | EMW-3R |
|---|---|---|---|---|---|---|---|---|
| Sampling Event | Sampling Date | TCE CONCENTRATION (µg/L) | | | | | | |
| 1 | Nov-04 | 7.4 | 20 | 7.6 | 7.6 | 18 | 29 | 18 |
| 2 | Nov-05 | 8.2 | 13 | 0.73 | 4.2 | 30 | 19 | 19 |
| 3 | Nov-06 | 7.8 | 21 | 7.6 | 11 | 17 | 15 | 16 |
| 4 | Nov-07 | 7.2 | 7 | 1.8 | 9.7 | 13 | 9.3 | 13 |
| 5 | Nov-08 | 2.7 | 7 | 0.5 | 9.9 | 15 | 11 | 13 |
| 6 | Nov-09 | 2.4 | 4.8 | 0.5 | 9.6 | 23 | 9.7 | 14 |
| 7 | Nov-10 | 4.2 | 6.4 | 0.5 | 8.5 | 17 | 10 | 12 |
| 8 | Nov-11 | 3.2 | 6 | 0.5 | 7.2 | 13 | 9.7 | 13 |
| 9 | Nov-12 | 6.1 | 4.2 | 2.8 | 7.5 | 24 | 9.8 | 15 |
| 10 | Nov-13 | 4.8 | 2.9 | 0.66 | 5.7 | 12 | 7 | 8.3 |
| 11 | Nov-14 | 5 | 3.8 | 2.5 | 4.2 | 19 | 2.1 | 7 |
| 12 | Nov-15 | 4.7 | 1.6 | 0.75 | 3.2 | 23 | 1.5 | 8.7 |
| 13 | Nov-16 | 4.4 | 2.7 | 1.7 | 3.6 | 9.5 | 1.5 | 7.5 |
| 14 | Nov-17 | 4.2 | 2.2 | 2.3 | 4 | 9.6 | 4.8 | 11 |
| 15 | | | | | | | | |
| 16 | | | | | | | | |
| 17 | | | | | | | | |
| 18 | | | | | | | | |
| 19 | | | | | | | | |
| 20 | | | | | | | | |
| Coefficient of Variation: | | 0.37 | 0.86 | 1.12 | 0.39 | 0.34 | 0.74 | 0.30 |
| Mann-Kendall Statistic (S): | | -30 | -76 | -2 | -54 | -26 | -67 | -56 |
| Confidence Factor: | | 94.4% | >99.9% | 52.2% | 99.9% | 91.3% | >99.9% | 99.9% |
| Concentration Trend: | | Prob. Decreasing | Decreasing | No Trend | Decreasing | Prob. Decreasing | Decreasing | Decreasing |




**Notes:**

1. At least four independent sampling events per well are required for calculating the trend. *Methodology is valid for 4 to 40 samples.*
2. Confidence in Trend = Confidence (in percent) that constituent concentration is increasing (S>0) or decreasing (S<0): >95% = Increasing or Decreasing; ≥ 90% = Probably Increasing or Probably Decreasing; < 90% and S>0 = No Trend; < 90%, S≤0, and COV ≥ 1 = No Trend; < 90% and COV < 1 = Stable.
3. Methodology based on "MAROS: A Decision Support System for Optimizing Monitoring Plans", J.J. Aziz, M. Ling, H.S. Rifai, C.J. Newell, and J.R. Gonzales, *Ground Water* , 41(3):355-367, 2003.
4. Non-detect results are in shaded cells with a value of half the detection limit.

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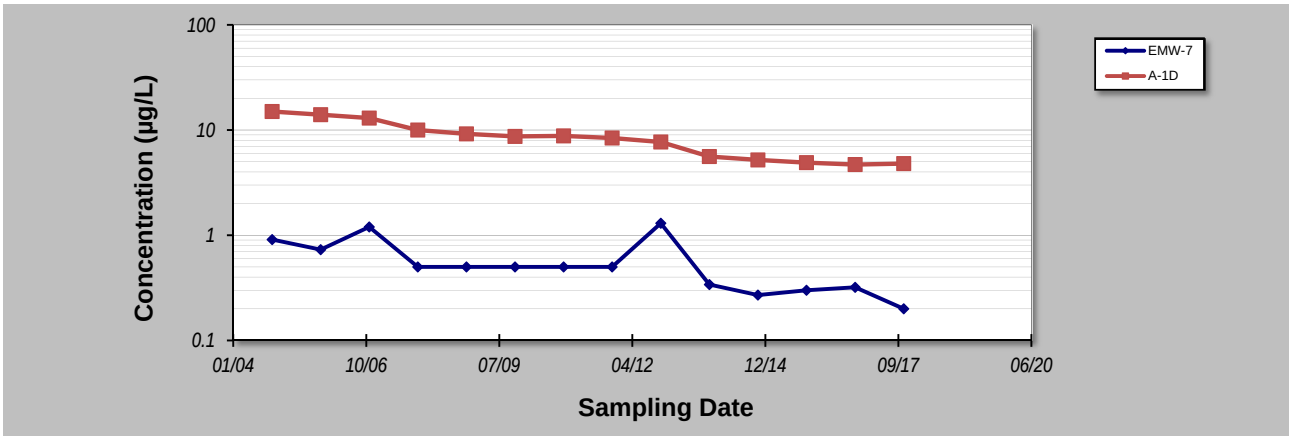
# GSI MANN-KENDALL TOOLKIT
## for Constituent Trend Analysis

| | | | |
|---|---|---|---|
| Evaluation Date: | 2-May-18 | Job ID: | 117-0507550 |
| Facility Name: | LMC Burlington | Constituent: | TCE |
| Conducted By: | Tetra Tech | Concentration Units: | µg/L |

| Sampling Point ID: | | EMW-7 | A-1D | | | | | |
|---|---|---|---|---|---|---|---|---|
| Sampling Event | Sampling Date | TCE CONCENTRATION (µg/L) | | | | | | |
| 1 | Nov-04 | 0.91 | 15 | | | | | |
| 2 | Nov-05 | 0.73 | 14 | | | | | |
| 3 | Nov-06 | 1.2 | 13 | | | | | |
| 4 | Nov-07 | 0.5 | 10 | | | | | |
| 5 | Nov-08 | 0.5 | 9.2 | | | | | |
| 6 | Nov-09 | 0.5 | 8.7 | | | | | |
| 7 | Nov-10 | 0.5 | 8.8 | | | | | |
| 8 | Nov-11 | 0.5 | 8.4 | | | | | |
| 9 | Nov-12 | 1.3 | 7.7 | | | | | |
| 10 | Nov-13 | 0.34 | 5.6 | | | | | |
| 11 | Nov-14 | 0.27 | 5.2 | | | | | |
| 12 | Nov-15 | 0.3 | 4.9 | | | | | |
| 13 | Nov-16 | 0.32 | 4.7 | | | | | |
| 14 | Nov-17 | 0.2 | 4.8 | | | | | |
| 15 | | | | | | | | |
| 16 | | | | | | | | |
| 17 | | | | | | | | |
| 18 | | | | | | | | |
| 19 | | | | | | | | |
| 20 | | | | | | | | |
| Coefficient of Variation: | | 0.59 | 0.40 | | | | | |
| Mann-Kendall Statistic (S): | | -55 | -87 | | | | | |
| Confidence Factor: | | 99.9% | >99.9% | | | | | |
| Concentration Trend: | | Decreasing | Decreasing | | | | | |




**Notes:**

1. At least four independent sampling events per well are required for calculating the trend. *Methodology is valid for 4 to 40 samples.*
2. Confidence in Trend = Confidence (in percent) that constituent concentration is increasing (S>0) or decreasing (S<0): >95% = Increasing or Decreasing; ≥ 90% = Probably Increasing or Probably Decreasing; < 90% and S>0 = No Trend; < 90%, S≤0, and COV ≥ 1 = No Trend; < 90% and COV < 1 = Stable.
3. Methodology based on "MAROS: A Decision Support System for Optimizing Monitoring Plans", J.J. Aziz, M. Ling, H.S. Rifai, C.J. Newell, and J.R. Gonzales, *Ground Water* , 41(3):355-367, 2003.
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# GSI MANN-KENDALL TOOLKIT
## for Constituent Trend Analysis

| | | | |
|---|---|---|---|
| Evaluation Date: | **2-May-18** | Job ID: | **117-0507550** |
| Facility Name: | **LMC Burlington** | Constituent: | **TCE** |
| Conducted By: | **Tetra Tech** | Concentration Units: | **µg/L** |

| Sampling Point ID: | | A-1 | 3H-5 | TTMW-1 | | | | |
|---|---|---|---|---|---|---|---|---|
| Sampling Event | Sampling Date | TCE CONCENTRATION (µg/L) | | | | | | |
| 1 | Aug-16 | 0.51 | 1 | 0.27 | | | | |
| 2 | Nov-16 | 0.72 | 1.5 | 0.11 | | | | |
| 3 | Feb-17 | 1.2 | 1.2 | 0.3 | | | | |
| 4 | May-17 | 0.8 | 1.2 | 0.1 | | | | |
| 5 | Aug-17 | 0.2 | 0.6 | 0.5 | | | | |
| 6 | Nov-17 | 0.2 | 1 | 0.2 | | | | |
| 7 | | | | | | | | |
| 8 | | | | | | | | |
| 9 | | | | | | | | |
| 10 | | | | | | | | |
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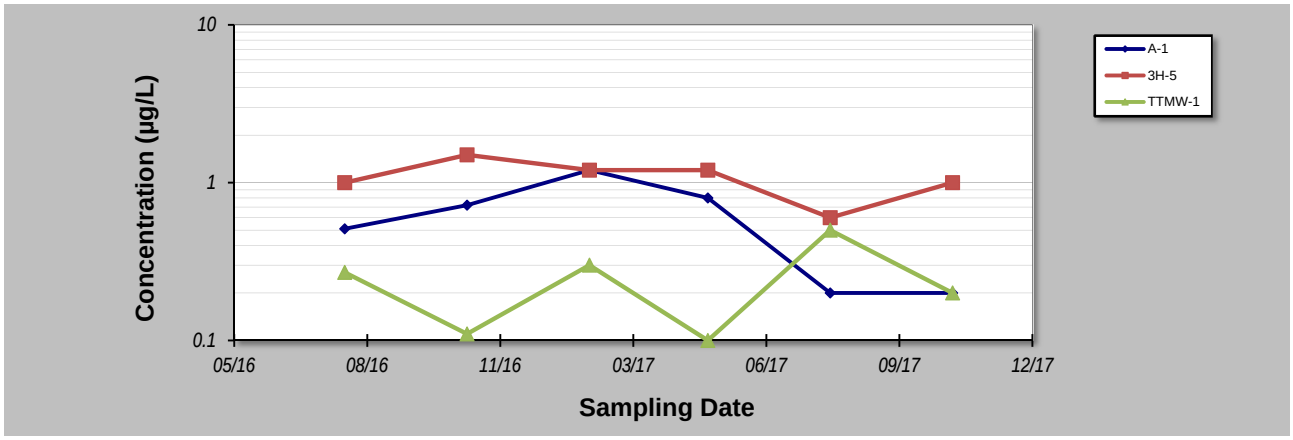
| 17 | | | | | | | | |
| 18 | | | | | | | | |
| 19 | | | | | | | | |
| 20 | | | | | | | | |
| Coefficient of Variation: | | **0.64** | **0.28** | **0.60** | | | | |
| Mann-Kendall Statistic (S): | | **-4** | **-5** | **1** | | | | |
| Confidence Factor: | | **70.3%** | **76.5%** | **50.0%** | | | | |
| Concentration Trend: | | Stable | Stable | No Trend | | | | |




**Notes:**

1. At least four independent sampling events per well are required for calculating the trend. *Methodology is valid for 4 to 40 samples.*
2. Confidence in Trend = Confidence (in percent) that constituent concentration is increasing (S>0) or decreasing (S<0): >95% = Increasing or Decreasing; ≥ 90% = Probably Increasing or Probably Decreasing; < 90% and S>0 = No Trend; < 90%, S≤0, and COV ≥ 1 = No Trend; < 90% and COV < 1 = Stable.
3. Methodology based on "MAROS: A Decision Support System for Optimizing Monitoring Plans", J.J. Aziz, M. Ling, H.S. Rifai, C.J. Newell, and J.R. Gonzales, *Ground Water* , 41(3):355-367, 2003.
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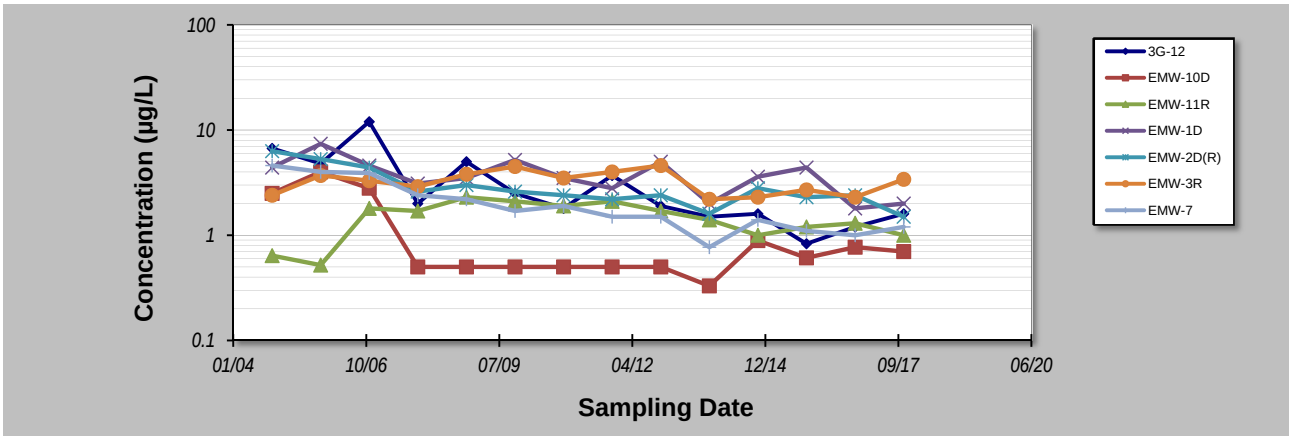
# GSI MANN-KENDALL TOOLKIT
## for Constituent Trend Analysis

| | | | |
|---|---|---|---|
| Evaluation Date: | **2-May-18** | Job ID: | **117-0507550** |
| Facility Name: | **LMC Burlington** | Constituent: | **PCE** |
| Conducted By: | **Tetra Tech** | Concentration Units: | **µg/L** |

| Sampling Point ID: | | 3G-12 | EMW-10D | EMW-11R | EMW-1D | EMW-2D(R) | EMW-3R | EMW-7 |
|---|---|---|---|---|---|---|---|---|
| Sampling Event | Sampling Date | PCE CONCENTRATION (µg/L) | | | | | | |
| 1 | Nov-04 | 6.7 | 2.5 | 0.64 | 4.4 | 6.3 | 2.4 | 4.6 |
| 2 | Nov-05 | 4.8 | 4 | 0.52 | 7.4 | 5.3 | 3.7 | 4 |
| 3 | Nov-06 | 12 | 2.8 | 1.8 | 4.6 | 4.4 | 3.3 | 3.9 |
| 4 | Nov-07 | 2 | 0.5 | 1.7 | 3.1 | 2.6 | 2.9 | 2.4 |
| 5 | Nov-08 | 5 | 0.5 | 2.3 | 3.5 | 3 | 3.8 | 2.2 |
| 6 | Nov-09 | 2.5 | 0.5 | 2.1 | 5.2 | 2.6 | 4.5 | 1.7 |
| 7 | Nov-10 | 1.8 | 0.5 | 1.9 | 3.5 | 2.4 | 3.5 | 1.9 |
| 8 | Nov-11 | 3.7 | 0.5 | 2.1 | 2.8 | 2.2 | 4 | 1.5 |
| 9 | Nov-12 | 1.9 | 0.5 | 1.7 | 5 | 2.4 | 4.6 | 1.5 |
| 10 | Nov-13 | 1.5 | 0.33 | 1.4 | 2 | 1.6 | 2.2 | 0.77 |
| 11 | Nov-14 | 1.6 | 0.89 | 1 | 3.6 | 2.8 | 2.3 | 1.4 |
| 12 | Nov-15 | 0.83 | 0.61 | 1.2 | 4.4 | 2.3 | 2.7 | 1.1 |
| 13 | Nov-16 | 1.2 | 0.77 | 1.3 | 1.8 | 2.4 | 2.3 | 1 |
| 14 | Nov-17 | 1.6 | 0.7 | 1 | 2 | 1.5 | 3.4 | 1.2 |
| 15 | | | | | | | | |
| 16 | | | | | | | | |
| 17 | | | | | | | | |
| 18 | | | | | | | | |
| 19 | | | | | | | | |
| 20 | | | | | | | | |
| Coefficient of Variation: | | 0.90 | 1.01 | 0.38 | 0.40 | 0.46 | 0.25 | 0.59 |
| Mann-Kendall Statistic (S): | | -62 | -12 | -16 | -36 | -61 | -8 | -76 |
| Confidence Factor: | | >99.9% | 72.3% | 79.1% | 97.3% | >99.9% | 64.6% | >99.9% |
| Concentration Trend: | | Decreasing | No Trend | Stable | Decreasing | Decreasing | Stable | Decreasing |




**Notes:**

1. At least four independent sampling events per well are required for calculating the trend. *Methodology is valid for 4 to 40 samples.*
2. Confidence in Trend = Confidence (in percent) that constituent concentration is increasing (S>0) or decreasing (S<0): >95% = Increasing or Decreasing; ≥ 90% = Probably Increasing or Probably Decreasing; < 90% and S>0 = No Trend; < 90%, S≤0, and COV ≥ 1 = No Trend; < 90% and COV < 1 = Stable.
3. Methodology based on "MAROS: A Decision Support System for Optimizing Monitoring Plans", J.J. Aziz, M. Ling, H.S. Rifai, C.J. Newell, and J.R. Gonzales, *Ground Water* , 41(3):355-367, 2003.
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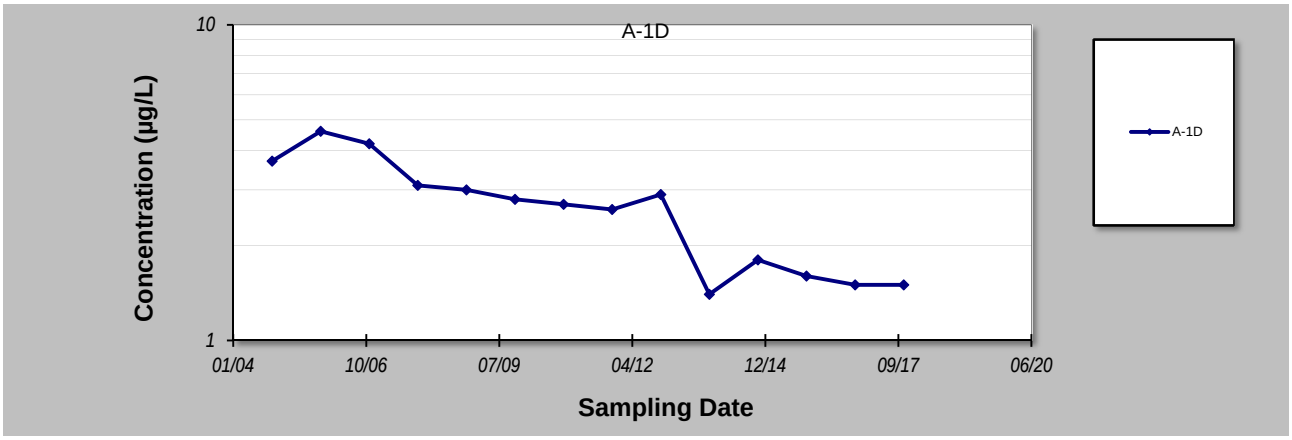
# GSI MANN-KENDALL TOOLKIT
## for Constituent Trend Analysis

| | | | |
|---|---|---|---|
| Evaluation Date: | **2-May-18** | Job ID: | **117-0507550** |
| Facility Name: | **LMC Burlington** | Constituent: | **PCE** |
| Conducted By: | **Tetra Tech** | Concentration Units: | **µg/L** |

| Sampling Point ID: | A-1D | | | | | | |
|---|---|---|---|---|---|---|---|
| **Sampling Event** | **Sampling Date** | **PCE CONCENTRATION (µg/L)** | | | | | |
| 1 | Nov-04 | 3.7 | | | | | |
| 2 | Nov-05 | 4.6 | | | | | |
| 3 | Nov-06 | 4.2 | | | | | |
| 4 | Nov-07 | 3.1 | | | | | |
| 5 | Nov-08 | 3 | | | | | |
| 6 | Nov-09 | 2.8 | | | | | |
| 7 | Nov-10 | 2.7 | | | | | |
| 8 | Nov-11 | 2.6 | | | | | |
| 9 | Nov-12 | 2.9 | | | | | |
| 10 | Nov-13 | 1.4 | | | | | |
| 11 | Nov-14 | 1.8 | | | | | |
| 12 | Nov-15 | 1.6 | | | | | |
| 13 | Nov-16 | 1.5 | | | | | |
| 14 | Nov-17 | 1.5 | | | | | |
| 15 | | | | | | | |
| 16 | | | | | | | |
| 17 | | | | | | | |
| 18 | | | | | | | |
| 19 | | | | | | | |
| 20 | | | | | | | |
| Coefficient of Variation: | | **0.38** | | | | | |
| Mann-Kendall Statistic (S): | | **-72** | | | | | |
| Confidence Factor: | | **>99.9%** | | | | | |
| Concentration Trend: | | Decreasing | | | | | |




**Notes:**

1. At least four independent sampling events per well are required for calculating the trend. *Methodology is valid for 4 to 40 samples.*
2. Confidence in Trend = Confidence (in percent) that constituent concentration is increasing (S>0) or decreasing (S<0): >95% = Increasing or Decreasing; ≥ 90% = Probably Increasing or Probably Decreasing; < 90% and S>0 = No Trend; < 90%, S≤0, and COV ≥ 1 = No Trend; < 90% and COV < 1 = Stable.
3. Methodology based on "MAROS: A Decision Support System for Optimizing Monitoring Plans", J.J. Aziz, M. Ling, H.S. Rifai, C.J. Newell, and J.R. Gonzales, *Ground Water* , 41(3):355-367, 2003.
4. Non-detect results are in shaded cells with a value of half the detection limit.

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# GSI MANN-KENDALL TOOLKIT
## for Constituent Trend Analysis

| | | | |
|---|---|---|---|
| Evaluation Date: | **2-May-18** | Job ID: | **117-0507550** |
| Facility Name: | **LMC Burlington** | Constituent: | **PCE** |
| Conducted By: | **Tetra Tech** | Concentration Units: | **µg/L** |

| Sampling Point ID: | A-1 | TTMW-1 | | | | | |
|---|---|---|---|---|---|---|---|
| **Sampling Event** | **Sampling Date** | **PCE CONCENTRATION (µg/L)** | | | | | | |
| 1 | Aug-16 | 0.57 | 0.37 | | | | | |
| 2 | Nov-16 | 1.8 | 0.51 | | | | | |
| 3 | Feb-17 | 3.3 | 0.8 | | | | | |
| 4 | May-17 | 2.6 | 0.4 | | | | | |
| 5 | Aug-17 | 0.9 | 0.1 | | | | | |
| 6 | Nov-17 | 0.5 | 0.6 | | | | | |
| 7 | | | | | | | | |
| 8 | | | | | | | | |
| 9 | | | | | | | | |
| 10 | | | | | | | | |
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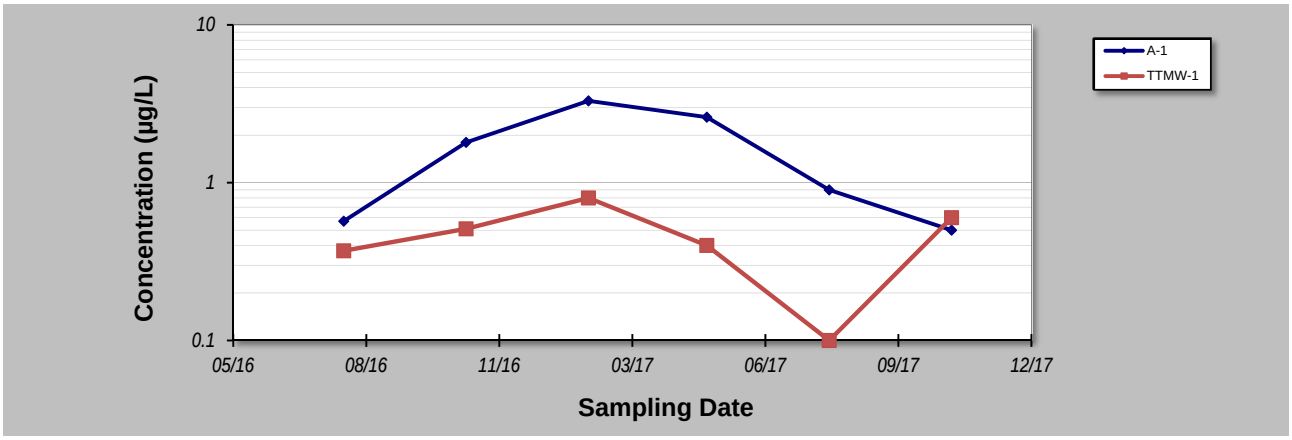
| 17 | | | | | | | | |
| 18 | | | | | | | | |
| 19 | | | | | | | | |
| 20 | | | | | | | | |
| Coefficient of Variation: | | **0.72** | **0.51** | | | | | |
| Mann-Kendall Statistic (S): | | **-3** | **1** | | | | | |
| Confidence Factor: | | **64.0%** | **50.0%** | | | | | |
| Concentration Trend: | | Stable | No Trend | | | | | |




**Notes:**

1. At least four independent sampling events per well are required for calculating the trend. *Methodology is valid for 4 to 40 samples.*
2. Confidence in Trend = Confidence (in percent) that constituent concentration is increasing (S>0) or decreasing (S<0): >95% = Increasing or Decreasing; ≥ 90% = Probably Increasing or Probably Decreasing; < 90% and S>0 = No Trend; < 90%, S≤0, and COV ≥ 1 = No Trend; < 90% and COV < 1 = Stable.
3. Methodology based on "MAROS: A Decision Support System for Optimizing Monitoring Plans", J.J. Aziz, M. Ling, H.S. Rifai, C.J. Newell, and J.R. Gonzales, *Ground Water* , 41(3):355-367, 2003.
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# GSI MANN-KENDALL TOOLKIT
## for Constituent Trend Analysis

| | | | |
|---|---|---|---|
| Evaluation Date: | 2-May-18 | Job ID: | 117-0507550 |
| Facility Name: | LMC Burlington | Constituent: | 1,1-DCE |
| Conducted By: | Tetra Tech | Concentration Units: | µg/L |

| Sampling Point ID: | | 3G-11 | 3G-12 | EMW-11R | EMW-1D | EMW-2D(R) | EMW-3R | A-1D |
|---|---|---|---|---|---|---|---|---|
| Sampling Event | Sampling Date | 1,1-DCE CONCENTRATION (µg/L) | | | | | | |
| 1 | Nov-04 | 19 | 29 | 5.6 | 6.3 | 17 | 4.4 | 16 |
| 2 | Nov-05 | 19 | 15 | 1.7 | 7 | 11 | 3.7 | 13 |
| 3 | Nov-06 | 20 | 15 | 6 | 5.2 | 8.3 | 2.6 | 11 |
| 4 | Nov-07 | 15 | 14 | 4.1 | 3.6 | 5.5 | 2.1 | 9 |
| 5 | Nov-08 | 7.8 | 5.9 | 5.6 | 4.6 | 6.7 | 2.3 | 8 |
| 6 | Nov-09 | 7.1 | 4.5 | 6.1 | 5.2 | 5.7 | 2.7 | 7.6 |
| 7 | Nov-10 | 9.7 | 6.5 | 4.3 | 3.2 | 5.3 | 2.1 | 6.3 |
| 8 | Nov-11 | 9 | 4.1 | 3.4 | 2.5 | 4.4 | 3.3 | 5.3 |
| 9 | Nov-12 | 11 | 2.1 | 2.6 | 2.5 | 3 | 2.3 | 2.8 |
| 10 | Nov-13 | 12 | 2.3 | 2.9 | 1.6 | 5.5 | 0.83 | 2.1 |
| 11 | Nov-14 | 12 | 3 | 1.6 | 2.2 | 0.62 | 1 | 2.1 |
| 12 | Nov-15 | 9.1 | 0.57 | 0.74 | 2 | 0.5 | 1.1 | 1.3 |
| 13 | Nov-16 | 8.6 | 1.3 | 1.3 | 0.95 | 0.5 | 1.3 | 1.3 |
| 14 | Nov-17 | 10 | 0.9 | 1.3 | 0.4 | 3 | 1.7 | 1.7 |
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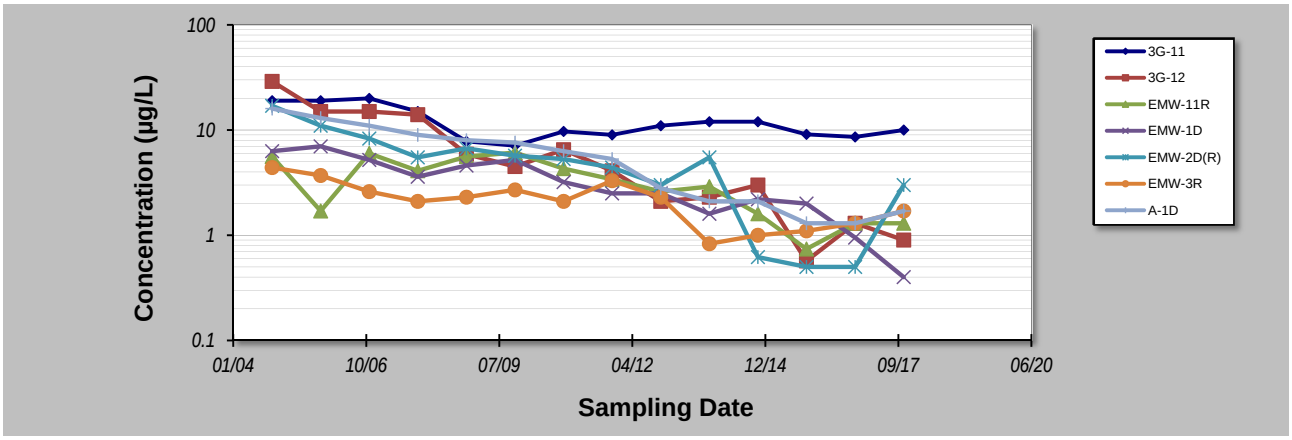
| Coefficient of Variation: | | 0.36 | 1.09 | 0.57 | 0.60 | 0.81 | 0.47 | 0.76 |
| Mann-Kendall Statistic (S): | | -27 | -76 | -53 | -77 | -72 | -47 | -85 |
| Confidence Factor: | | 92.1% | >99.9% | 99.8% | >99.9% | >99.9% | 99.5% | >99.9% |
| Concentration Trend: | | Prob. Decreasing | Decreasing | Decreasing | Decreasing | Decreasing | Decreasing | Decreasing |




**Notes:**

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# GSI MANN-KENDALL TOOLKIT
## for Constituent Trend Analysis

| | | | |
|---|---|---|---|
| Evaluation Date: | **2-May-18** | Job ID: | **117-0507550** |
| Facility Name: | **LMC Burlington** | Constituent: | **1,1-DCE** |
| Conducted By: | **Tetra Tech** | Concentration Units: | **µg/L** |

| Sampling Point ID: | 3H-5 | | | | | | |
|---|---|---|---|---|---|---|---|
| **Sampling Event** | **Sampling Date** | **1,1-DCE CONCENTRATION (µg/L)** | | | | | |
| 1 | Aug-16 | 3.2 | | | | | |
| 2 | Nov-16 | 5.5 | | | | | |
| 3 | Feb-17 | 3.9 | | | | | |
| 4 | May-17 | 3.7 | | | | | |
| 5 | Aug-17 | 0.1 | | | | | |
| 6 | Nov-17 | 3.4 | | | | | |
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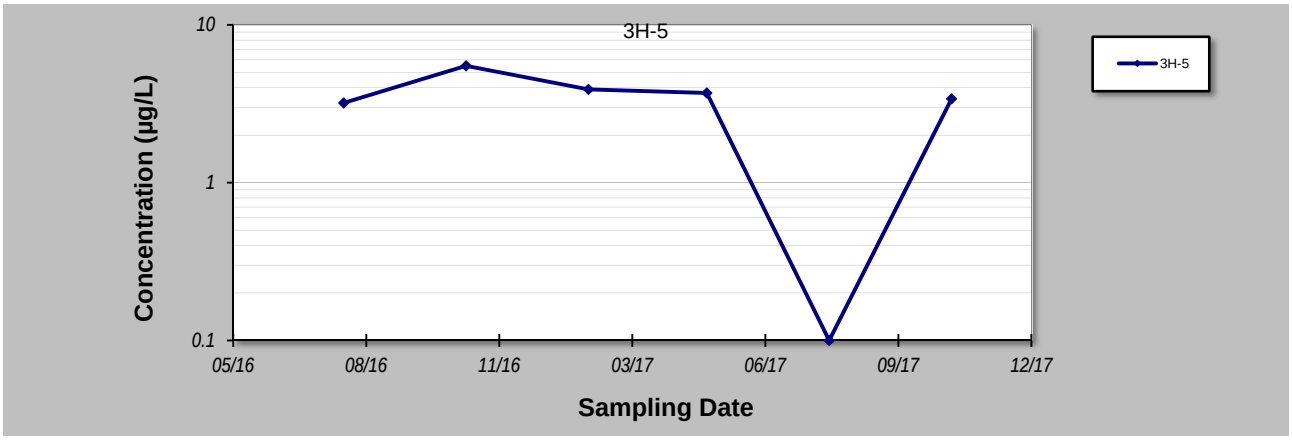
| Coefficient of Variation: | **0.54** | | | | | | |
| Mann-Kendall Statistic (S): | **-5** | | | | | | |
| Confidence Factor: | **76.5%** | | | | | | |
| Concentration Trend: | Stable | | | | | | |




**Notes:**

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2. Confidence in Trend = Confidence (in percent) that constituent concentration is increasing (S>0) or decreasing (S<0): >95% = Increasing or Decreasing; ≥ 90% = Probably Increasing or Probably Decreasing; < 90% and S>0 = No Trend; < 90%, S≤0, and COV ≥ 1 = No Trend; < 90% and COV < 1 = Stable.
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# GSI MANN-KENDALL TOOLKIT
## for Constituent Trend Analysis

| | | | |
|---|---|---|---|
| Evaluation Date: | **2-May-18** | Job ID: | **117-0507550** |
| Facility Name: | **LMC Burlington** | Constituent: | **1,4-Dioxane** |
| Conducted By: | **Tetra Tech** | Concentration Units: | **µg/L** |

| Sampling Point ID: | | 3G-11 | EMW-11R | EMW-1D | EMW-3R | A-1D | | |
|---|---|---|---|---|---|---|---|---|
| Sampling Event | Sampling Date | 1,4-DIOXANE CONCENTRATION (µg/L) | | | | | | |
| 1 | Nov-14 | 2.2 | 0.91 | 0.38 | 0.41 | 0.11 | | |
| 2 | Nov-15 | 1.5 | 0.64 | 0.31 | 0.31 | 0.11 | | |
| 3 | Aug-16 | 1.65 | 0.742 | 0.191 | 0.376 | 0.124 | | |
| 4 | Nov-16 | 1.76 | 0.78 | 0.26 | 0.405 | 0.131 | | |
| 5 | Feb-17 | 0.87 | 0.37 | 0.074 | 0.12 | 0.065 | | |
| 6 | May-17 | 0.82 | 0.3 | 0.081 | 0.23 | 0.11 | | |
| 7 | Aug-17 | 0.63 | 0.3 | 0.0255 | 0.18 | 0.08 | | |
| 8 | Nov-17 | 0.69 | 0.19 | 0.1 | 0.2 | 0.025 | | |
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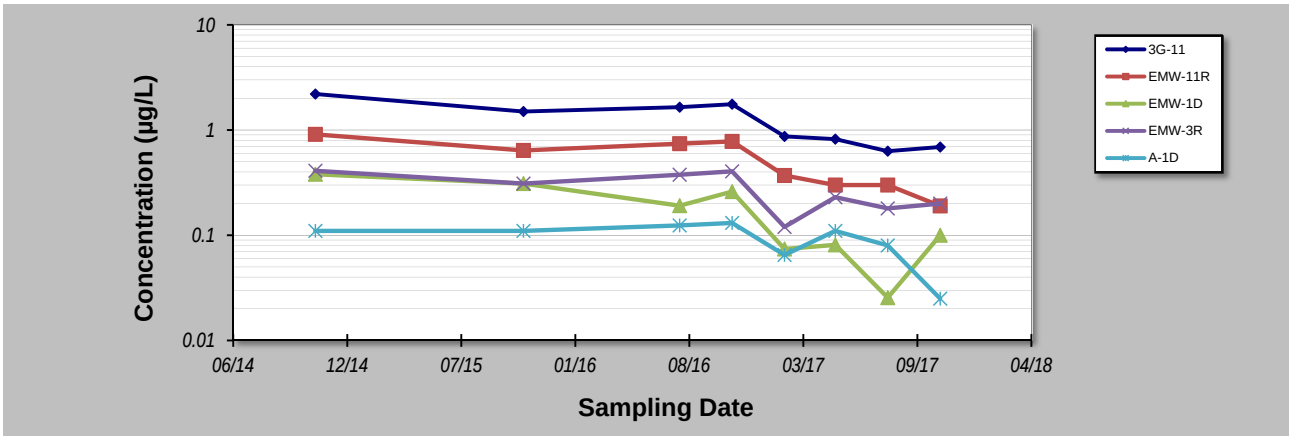
| Coefficient of Variation: | | **0.46** | **0.51** | **0.72** | **0.40** | **0.38** | | |
| Mann-Kendall Statistic (S): | | **-20** | **-21** | **-18** | **-14** | **-11** | | |
| Confidence Factor: | | **99.3%** | **99.6%** | **98.4%** | **94.6%** | **88.7%** | | |
| Concentration Trend: | | Decreasing | Decreasing | Decreasing | Prob. Decreasing | Stable | | |




**Notes:**

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# GSI MANN-KENDALL TOOLKIT
## for Constituent Trend Analysis

| | | | |
|---|---|---|---|
| Evaluation Date: | **2-May-18** | Job ID: | **117-0507550** |
| Facility Name: | **LMC Burlington** | Constituent: | **1,4-Dioxane** |
| Conducted By: | **Tetra Tech** | Concentration Units: | **µg/L** |

| Sampling Point ID: | 3G-12 | | | | | | |
|---|---|---|---|---|---|---|---|
| **Sampling Event** | **Sampling Date** | **1,4-DIOXANE CONCENTRATION (µg/L)** | | | | | |
| 1 | Nov-15 | 0.31 | | | | | |
| 2 | Aug-16 | 0.21 | | | | | |
| 3 | Nov-16 | 0.223 | | | | | |
| 4 | Feb-17 | 0.07 | | | | | |
| 5 | May-17 | 0.076 | | | | | |
| 6 | Aug-17 | 0.072 | | | | | |
| 7 | Nov-17 | 0.11 | | | | | |
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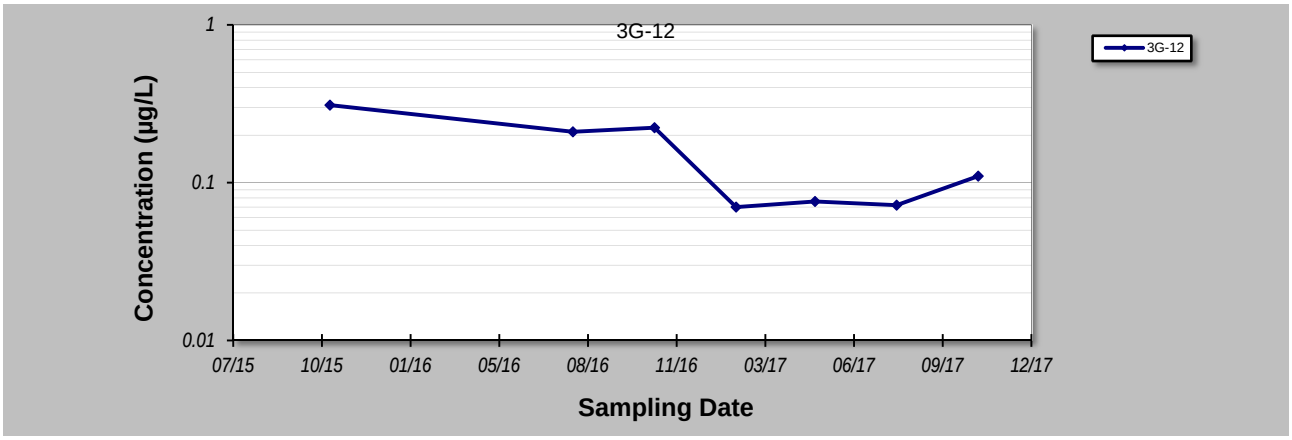
| Coefficient of Variation: | **0.62** | | | | | | |
| Mann-Kendall Statistic (S): | **-9** | | | | | | |
| Confidence Factor: | **88.1%** | | | | | | |
| Concentration Trend: | Stable | | | | | | |




**Notes:**

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# GSI MANN-KENDALL TOOLKIT
## for Constituent Trend Analysis

| | | | |
|---|---|---|---|
| Evaluation Date: | **2-May-18** | Job ID: | **117-0507550** |
| Facility Name: | **LMC Burlington** | Constituent: | **1,4-Dioxane** |
| Conducted By: | **Tetra Tech** | Concentration Units: | **µg/L** |

| Sampling Point ID: | EMW-2D(R) | EMW-7 | 3H-1D | 3H-1S | | | |
|---|---|---|---|---|---|---|---|
| **Sampling Event** | **Sampling Date** | **1,4-DIOXANE CONCENTRATION (µg/L)** | | | | | |
| 1 | Nov-14 | 0.085 | 0.026 | 0.11 | 0.071 | | |
| 2 | Aug-16 | 0.0352 | 0.023 | 0.0914 | 0.059 | | |
| 3 | Nov-16 | 0.0418 | 0.032 | 0.105 | 0.0678 | | |
| 4 | Feb-17 | 0.0255 | 0.0255 | 0.0255 | 0.025 | | |
| 5 | May-17 | 0.025 | 0.026 | 0.071 | 0.059 | | |
| 6 | Aug-17 | 0.025 | 0.0255 | 0.058 | 0.05 | | |
| 7 | Nov-17 | 0.07 | 0.057 | 0.025 | 0.025 | | |
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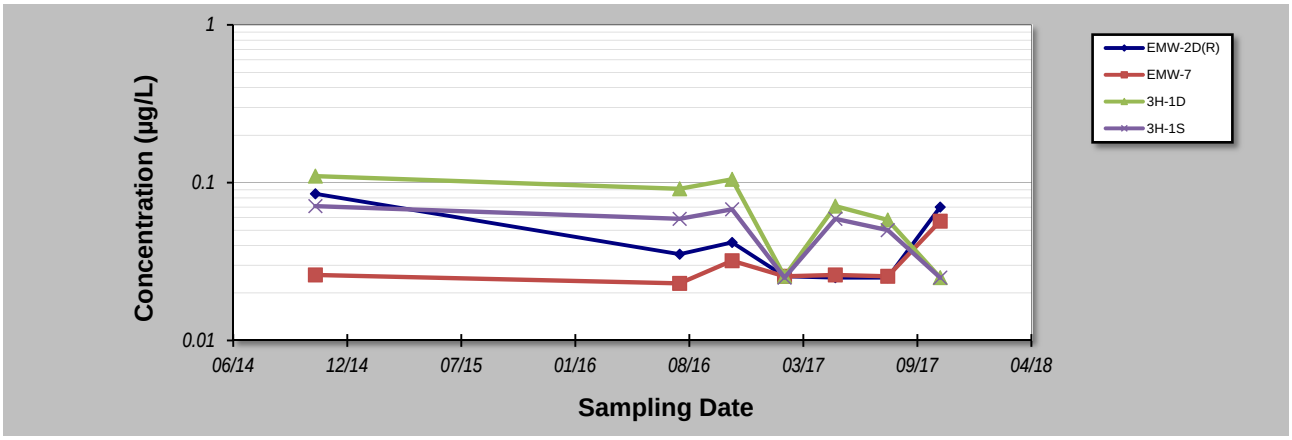
| Coefficient of Variation: | | **0.55** | **0.39** | **0.51** | **0.37** | | |
| Mann-Kendall Statistic (S): | | **-8** | **5** | **-15** | **-13** | | |
| Confidence Factor: | | **84.5%** | **71.9%** | **98.5%** | **96.5%** | | |
| Concentration Trend: | | Stable | No Trend | Decreasing | Decreasing | | |




**Notes:**

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# GSI MANN-KENDALL TOOLKIT
## for Constituent Trend Analysis

| | | | |
|---|---|---|---|
| Evaluation Date: | **2-May-18** | Job ID: | **117-0507550** |
| Facility Name: | **LMC Burlington** | Constituent: | **1,4-Dioxane** |
| Conducted By: | **Tetra Tech** | Concentration Units: | **µg/L** |

| Sampling Point ID: | | 3H-2 | 3H-5 | | | | | |
|---|---|---|---|---|---|---|---|---|
| Sampling Event | Sampling Date | 1,4-DIOXANE CONCENTRATION (µg/L) | | | | | | |
| 1 | Aug-16 | 0.0532 | 0.769 | | | | | |
| 2 | Nov-16 | 0.055 | 1.02 | | | | | |
| 3 | Feb-17 | 0.025 | 0.44 | | | | | |
| 4 | May-17 | 0.051 | 0.29 | | | | | |
| 5 | Aug-17 | 0.1 | 0.17 | | | | | |
| 6 | Nov-17 | 0.076 | 0.3 | | | | | |
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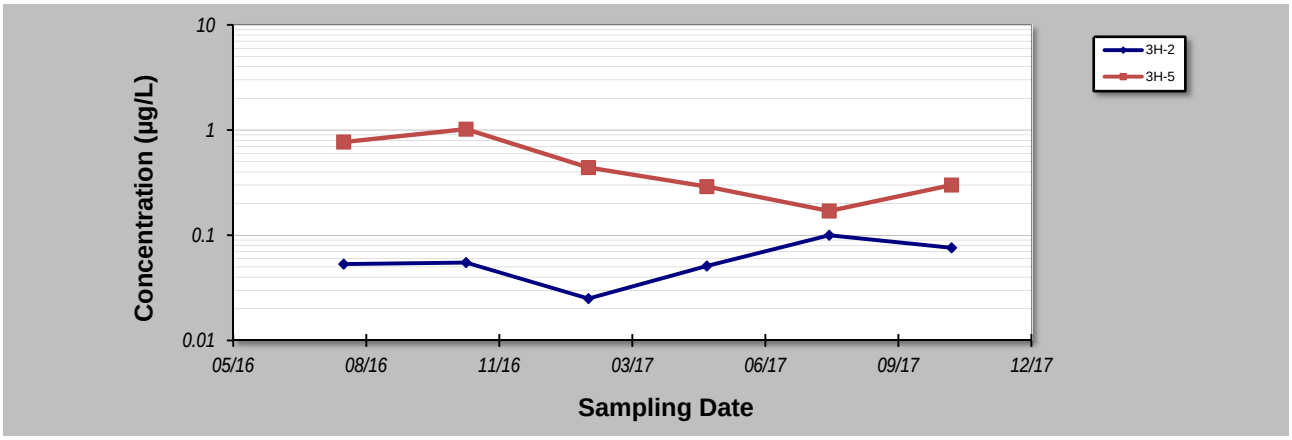
| 20 | | | | | | | | |
| Coefficient of Variation: | | **0.42** | **0.66** | | | | | |
| Mann-Kendall Statistic (S): | | **5** | **-9** | | | | | |
| Confidence Factor: | | **76.5%** | **93.2%** | | | | | |
| Concentration Trend: | | No Trend | Prob. Decreasing | | | | | |




**Notes:**

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# GSI MANN-KENDALL TOOLKIT
## for Constituent Trend Analysis

| | | | |
|---|---|---|---|
| Evaluation Date: | **2-May-18** | Job ID: | **117-0507550** |
| Facility Name: | **LMC Burlington** | Constituent: | **1,4-Dioxane** |
| Conducted By: | **Tetra Tech** | Concentration Units: | **µg/L** |

| Sampling Point ID: | EMW-10R | | | | | | |
|---|---|---|---|---|---|---|---|
| **Sampling Event** | **Sampling Date** | **1,4-DIOXANE CONCENTRATION (µg/L)** | | | | | |
| 1 | Nov-14 | 0.14 | | | | | |
| 2 | Aug-16 | 0.21 | | | | | |
| 3 | Nov-16 | 0.0354 | | | | | |
| 4 | Feb-17 | 0.055 | | | | | |
| 5 | May-17 | 0.025 | | | | | |
| 6 | Aug-17 | 0.058 | | | | | |
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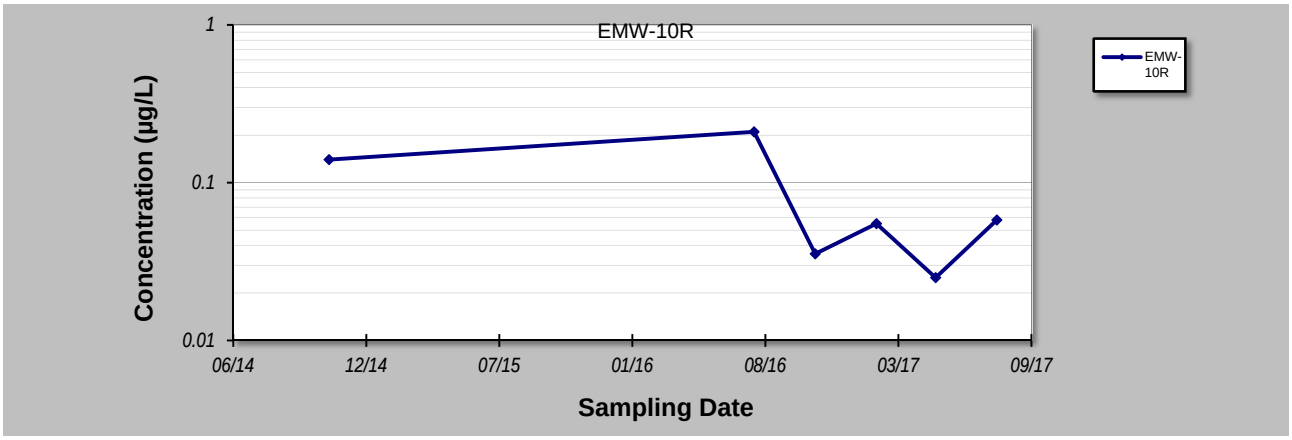
| Coefficient of Variation: | | **0.83** | | | | | |
| Mann-Kendall Statistic (S): | | **-5** | | | | | |
| Confidence Factor: | | **76.5%** | | | | | |
| Concentration Trend: | | Stable | | | | | |




**Notes:**

1. At least four independent sampling events per well are required for calculating the trend. *Methodology is valid for 4 to 40 samples.*
2. Confidence in Trend = Confidence (in percent) that constituent concentration is increasing (S>0) or decreasing (S<0): >95% = Increasing or Decreasing; ≥ 90% = Probably Increasing or Probably Decreasing; < 90% and S>0 = No Trend; < 90%, S≤0, and COV ≥ 1 = No Trend; < 90% and COV < 1 = Stable.
3. Methodology based on "MAROS: A Decision Support System for Optimizing Monitoring Plans", J.J. Aziz, M. Ling, H.S. Rifai, C.J. Newell, and J.R. Gonzales, *Ground Water* , 41(3):355-367, 2003.
4. Non-detect results are in shaded cells with a value of half the detection limit.

*DISCLAIMER: The GSI Mann-Kendall Toolkit is available "as is". Considerable care has been exercised in preparing this software product; however, no party, including without limitation GSI Environmental Inc., makes any representation or warranty regarding the accuracy, correctness, or completeness of the information contained herein, and no such party shall be liable for any direct, indirect, consequential, incidental or other damages resulting from the use of this product or the information contained herein. Information in this publication is subject to change without notice. GSI Environmental Inc., disclaims any responsibility or obligation to update the information contained herein.*

*GSI Environmental Inc., www.gsi-net.com*

# APPENDIX F

# NATURAL ATTENUATION RATE CALCULATIONS

## First-Order Decay Rate Calculation
## for Monitored Natural Attenuation

**Facility Name:** Example from EPA Issue Paper (Newell, Rifai Wilson, Connor, Aziz and Suarez, November 2002)

**Facility ID:** _____

**Release ID:** _____

**Facility Location and Address:** _____

**Date:** _____

**Type of cleanup system:** _____

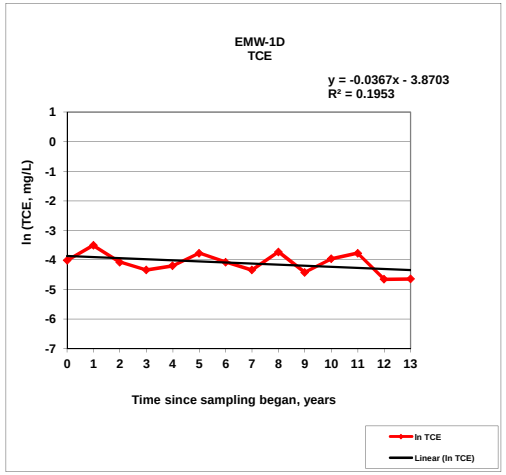
**State Project Manager:** _____

**Dates of cleanup system operation:** _____

**Effectiveness of cleanup system for contaminant mass removal:** _____

**Location of well (source area, down-gradient, perimeter or cross-gradient, in ROI of cleanup system, other):** _____

| Sampling Date | Depth to Ground Water feet | TCE EMW-1D mg/L | TCE ug/L | ln TCE mg/L | Elapsed time since 11/1/04 years |
|---|---|---|---|---|---|
| 11/1/04 | | 0.018 | 18 | -4.017 | 0.00 |
| 11/1/05 | | 0.030 | 30 | -3.507 | 0.99 |
| 11/1/06 | | 0.017 | 17 | -4.075 | 1.99 |
| 11/1/07 | | 0.013 | 13 | -4.343 | 2.99 |
| 11/1/08 | | 0.015 | 15 | -4.200 | 3.99 |
| 11/1/09 | | 0.023 | 23 | -3.772 | 4.99 |
| 11/1/10 | | 0.017 | 17 | -4.075 | 5.99 |
| 11/1/11 | | 0.013 | 13 | -4.343 | 6.99 |
| 11/1/12 | | 0.024 | 24 | -3.730 | 8.00 |
| 11/1/13 | | 0.012 | 12 | -4.423 | 9.00 |
| 11/1/14 | | 0.019 | 19 | -3.963 | 10.00 |
| 11/1/15 | | 0.023 | 23 | -3.772 | 11.00 |
| 11/1/16 | | 0.010 | 10 | -4.656 | 12.00 |
| 11/1/17 | | 0.010 | 10 | -4.646 | 13.00 |
| | | | | | |
| | | | | | |
| *GW-1* | | *0.005* | *5* | *-5.298317367* | |
| *GW-2* | | *0.05* | *50* | *-2.995732274* | |




**Formula**

$t = -[\ln(C_{CL}/C_o)] / k_{point}$

*where:*

$t$ = Time to achieve cleanup levels, years

$C_{CL}$ = Cleanup level for contaminant of concern, mg/L

$C_o$ = Initial concentration of contaminant of concern, mg/L

$k_{point}$ = First-order decay rate constant at one monitoring point, years$^{-1}$

= slope of the line, y

**Solutions**

| **EMW-1D TCE** | | | | |
|---|---|---|---|---|
| Enter $C_{CL}$ | ⇨ | 0.005 | | |
| Enter $C_o$ | ⇨ | 0.01 | | |
| Enter $k_{point}$ | ⇨ | 0.0367 | | |
| Time to reach cleanup level | | | 18.9 | years |

## First-Order Decay Rate Calculation
## for Monitored Natural Attenuation

**Facility Name:** **Example from EPA Issue Paper (Newell, Rifai Wilson, Connor, Aziz and Suarez, November 2002)**

**Facility ID:** _____

**Release ID:** _____

**Facility Location and Address:** _____

**Date:** _____

**Type of cleanup system:** _____

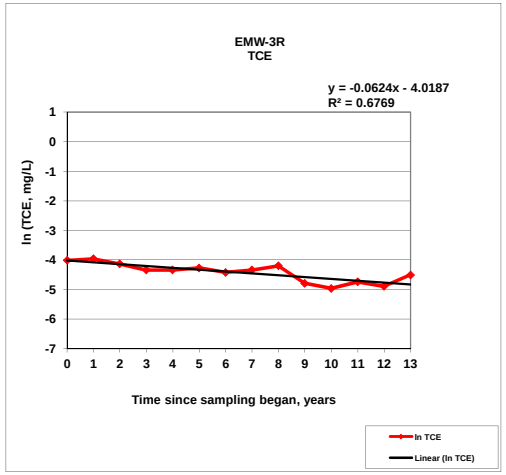
**State Project Manager:** _____

**Dates of cleanup system operation:** _____

**Effectiveness of cleanup system for contaminant mass removal:** _____

**Location of well (source area, down-gradient, perimeter or cross-gradient, in ROI of cleanup system, other):** _____

| Sampling Date | Depth to Ground Water feet | TCE EMW-3R mg/L | TCE ug/L | ln TCE mg/L | Elapsed time since 11/1/04 years |
|---|---|---|---|---|---|
| 11/1/04 | | 0.018 | 18 | -4.017 | 0.00 |
| 11/1/05 | | 0.019 | 19 | -3.963 | 0.99 |
| 11/1/06 | | 0.016 | 16 | -4.135 | 1.99 |
| 11/1/07 | | 0.013 | 13 | -4.343 | 2.99 |
| 11/1/08 | | 0.013 | 13 | -4.343 | 3.99 |
| 11/1/09 | | 0.014 | 14 | -4.269 | 4.99 |
| 11/1/10 | | 0.012 | 12 | -4.423 | 5.99 |
| 11/1/11 | | 0.013 | 13 | -4.343 | 6.99 |
| 11/1/12 | | 0.015 | 15 | -4.200 | 8.00 |
| 11/1/13 | | 0.008 | 8 | -4.791 | 9.00 |
| 11/1/14 | | 0.007 | 7 | -4.962 | 10.00 |
| 11/1/15 | | 0.009 | 9 | -4.744 | 11.00 |
| 11/1/16 | | 0.008 | 8 | -4.893 | 12.00 |
| 11/1/17 | | 0.011 | 11 | -4.510 | 13.00 |
| | | | | | |
| | | | | | |
| *GW-1* | | *0.005* | *5* | *-5.298317367* | |
| *GW-2* | | *0.05* | *50* | *-2.995732274* | |




**Formula**

$t = -[\ln(C_{CL}/C_o)] / k_{point}$

*where:*

$t$ = Time to achieve cleanup levels, years

$C_{CL}$ = Cleanup level for contaminant of concern, mg/L

$C_o$ = Initial concentration of contaminant of concern, mg/L

$k_{point}$ = First-order decay rate constant at one monitoring point, $years^{-1}$

= slope of the line, y

**Solutions**

| | | | | |
|---|---|---|---|---|
| **EMW-3R TCE** | | | | |
| **Enter $C_{CL}$** | ⇨ | **0.005** | | |
| **Enter $C_o$** | ⇨ | **0.011** | | |
| **Enter $k_{point}$** | ⇨ | **0.0624** | | |
| **Time to reach cleanup level** | | | **12.6** | **years** |

## First-Order Decay Rate Calculation
## for Monitored Natural Attenuation

**Facility Name:** **Example from EPA Issue Paper (Newell, Rifai Wilson, Connor, Aziz and Suarez, November 2002)**

**Facility ID:** _____

**Release ID:** _____

**Facility Location and Address:** _____

**Date:** _____

**Type of cleanup system:** _____

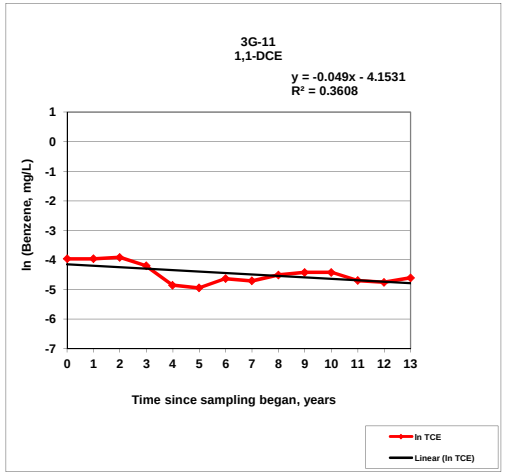
**State Project Manager:** _____

**Dates of cleanup system operation:** _____

**Effectiveness of cleanup system for contaminant mass removal:** _____

**Location of well (source area, down-gradient, perimeter or cross-gradient, in ROI of cleanup system, other):** _____

| Sampling Date | Depth to Ground Water feet | 1,1-DCE 3G-11 mg/L | 11,-DCE 3G-11 ug/L | ln 1,1-DCE 3G-11 mg/L | Elapsed time since 11/1/04 years |
|---|---|---|---|---|---|
| 11/1/04 | | 0.019 | 19 | -3.963 | 0.00 |
| 11/1/05 | | 0.019 | 19 | -3.963 | 0.99 |
| 11/1/06 | | 0.020 | 20 | -3.912 | 1.99 |
| 11/1/07 | | 0.015 | 15 | -4.200 | 2.99 |
| 11/1/08 | | 0.008 | 8 | -4.854 | 3.99 |
| 11/1/09 | | 0.007 | 7 | -4.948 | 4.99 |
| 11/1/10 | | 0.010 | 10 | -4.636 | 5.99 |
| 11/1/11 | | 0.009 | 9 | -4.711 | 6.99 |
| 11/1/12 | | 0.011 | 11 | -4.510 | 8.00 |
| 11/1/13 | | 0.012 | 12 | -4.423 | 9.00 |
| 11/1/14 | | 0.012 | 12 | -4.423 | 10.00 |
| 11/1/15 | | 0.009 | 9 | -4.699 | 11.00 |
| 11/1/16 | | 0.009 | 9 | -4.756 | 12.00 |
| 11/1/17 | | 0.010 | 10 | -4.605 | 13.00 |
| | | | | | |
| | | | | | |
| *GW-1* | | *0.005* | *5* | *-5.298317367* | |
| *GW-2* | | *0.05* | *50* | *-2.995732274* | |




**Formula**

$t = -[\ln(C_{CL}/C_o)] / k_{point}$

*where:*

$t$ = Time to achieve cleanup levels, years

$C_{CL}$ = Cleanup level for contaminant of concern, mg/L

$C_o$ = Initial concentration of contaminant of concern, mg/L

$k_{point}$ = First-order decay rate constant at one monitoring point, $years^{-1}$

= slope of the line, y

**Solutions**

| **3G-11 1,1-DCE** | | | | |
|---|---|---|---|---|
| **Enter $C_{CL}$** | ⇨ | **0.005** | | |
| **Enter $C_o$** | ⇨ | **0.01** | | |
| **Enter $k_{point}$** | ⇨ | **0.049** | | |
| **Time to reach cleanup level** | | | **14.1** | **years** |

# APPENDIX G

# NOTIFICATION AND TRANSMITTAL FORMS

TETRA TECH

P.N. 117-0507550

November 1, 2017

Mr. Stephen Logan
Nordblom Management Company, Inc.
71 Third Avenue
Burlington, MA 01803-4470

**Re: Notification of Environmental Sampling**
**Former RCA Facility**
**1 Network Drive, Burlington, MA 01803**
**RTNs 3-0265, and 3-33535**

Dear Mr. Logan,

On behalf of Lockheed Martin Corporation (Lockheed Martin), Tetra Tech, Inc. (Tetra Tech) is providing this notification of sampling activities to fulfill the requirements of the Massachusetts Contingency Plan (MCP) 310 CMR 40.1403(10). The MCP requires that any time samples are taken at a property on behalf of someone other than the owner of the property, that the property owner be notified more than 72-hours prior to such activities. Tetra Tech will be collecting groundwater samples at 1 Network Drive between November 11 and 14, 2017. In accordance with the MCP, the results of the sample analysis will be provided to you within 30 days of the date the sample results are issued by the laboratory.

If you have any questions regarding this submittal, please feel free to call Ed Dolan at (978) 952-0120 or Stephen Parker at (603) 328-1469.

Sincerely,
Tetra Tech, Inc.

Stephen S. Parker,
LSP Client Program

Sincerely,
Tetra Tech, Inc.

Edward B. Dolan,
Associate Geologist-Operations Manager

Enclosures: BWSC-123 Forms (2)
cc: G. Clark (Lockheed Martin) – w/encl.
M. Hanley (Isosceles Group) – w/encl.

TETRA TECH
One Monarch Drive, Suite 202, Littleton, MA 01460
Tel 978.952.0120 Fax 978.952.0122 www.tetratechgeo.com www.tetratech.com

**Massachusetts Department of Environmental Protection**
*Bureau of Waste Site Cleanup*

**BWSC123**

This Notice is Related to:
Release Tracking Number

3 - 0265

# NOTICE OF ENVIRONMENTAL SAMPLING

As required by 310 CMR 40.1403(10) of the Massachusetts Contingency Plan

**A. The address of the disposal site related to this Notice and Release Tracking Number (provided above):**

1. Street Address: 1 Network Drive

City/Town: Burlington Zip Code: 01803

**B. This notice is being provided to the following party:**

1. Name: Nordblom Management Company, Inc.
2. Street Address: 71 Third Avenue

City/Town: Burlington Zip Code: 01803

**C. This notice is being given to inform its recipient (the party listed in Section B):**

☑ 1. That environmental sampling will be/has been conducted at property owned by the recipient of this notice.

☐ 2. Of the results of environmental sampling conducted at property owned by the recipient of this notice.

☐ 3. Check to indicate if the analytical results are attached. (If item 2. above is checked, the analytical results from the environmental sampling must be attached to this notice.)

**D. Location of the property where the environmental sampling will be/has been conducted:**

1. Street Address: 1 Network Drive

City/Town: Burlington Zip Code: 01803

2. MCP phase of work during which the sampling will be/has been conducted:

☐ Immediate Response Action
☐ Release Abatement Measure
☐ Utility-related Abatement Measure
☐ Phase I Initial Site Investigation
☐ Phase II Comprehensive Site Assessment
☐ Phase III Feasibility Evaluation
☐ Phase IV Remedy Implementation Plan
☑ Phase V/Remedy Operation Status
☐ Post-Temporary Solution Operation, Maintenance and Monitoring
☐ Other _____ (specify)

3. Description of property where sampling will be/has been conducted:

☐ residential ☑ commercial ☐ industrial ☐ school/playground ☐ Other _____ (specify)

4. Description of the sampling locations and types (e.g., soil, groundwater, indoor air, soil gas) to the extent known at the time of this notice.

Groundwater collected from up to fifteen monitoring wells identified as follows: 3G-11, 3G-12, 3H-1D, 3H-1S, 3H-2, 3H-3, 3H-5, EMW-1D, EMW-2D(R), EMW-3R, EMW-7, EMW-10D, EMW-10R, EMW-12R and TTMW-7(R).

**E. Contact information related to the party providing this notice:**

Contact Name: Ed Dolan, Tetra Tech
Street Address: One Monarch Drive, Suite 202
City/Town: Littleton Zip Code: 01460
Telephone: (978) 952-0120 Email: Ed.Dolan@tetratech.com

**Massachusetts Department of Environmental Protection**
*Bureau of Waste Site Cleanup*

**BWSC123**

This Notice is Related to:
Release Tracking Number

3 - 0265

# NOTICE OF ENVIRONMENTAL SAMPLING

As required by 310 CMR 40.1403(10) of the Massachusetts Contingency Plan

## MASSACHUSETTS REGULATIONS THAT REQUIRE THIS NOTICE

This notice is being provided pursuant to the Massachusetts Contingency Plan and the notification requirement at 310 CMR 40.1403(10). The Massachusetts Contingency Plan is a state regulation that specifies requirements for parties who are taking actions to address releases of chemicals (oil or hazardous material) to the environment.

## THE PERSON(S) PROVIDING THIS NOTICE

This notice has been sent to you by the party who is addressing a release of oil or hazardous material to the environment at the location listed in **Section A** on the reverse side of this form. (The regulations refer to the area where the oil or hazardous material is present as the "disposal site".)

## PURPOSE OF THIS NOTICE

When environmental samples are taken as part of an investigation of a release for which a notification to MassDEP has been made under the Massachusetts Contingency Plan (310 CMR 40.0300) on behalf of someone other than the owner of the property, the regulations require that the property owner (listed in **Section B** on the reverse side of this form) be given notice of the environmental sampling. The regulations also require that the property owner subsequently receive the analytical results following the analysis of the environmental samples.

**Section C** on the reverse side of this form indicates the circumstance under which you are receiving this notice at this time. If you are receiving this notice to inform you of the analytical results following the analysis of the environmental samples, you should also have received, as an attachment, a copy of analytical results. These results should indicate the number and type(s) of samples (e.g., soil, groundwater) analyzed, any chemicals identified, and the measured concentrations of those chemicals.

**Section D** on the reverse side of this form identifies the property where the environmental sampling will be/has been conducted, provides a description of the sampling locations within the property, and indicates the phase of work under the Massachusetts Contingency Plan regulatory process during which the samples will be/were collected.

## FOR MORE INFORMATION

Information about the general process for addressing releases of oil or hazardous material under the Massachusetts Contingency Plan and related public involvement opportunities may be found at http://www.mass.gov/eea/agencies/massdep/cleanup. For more information regarding this notice, you may contact the party listed in **Section E** on the reverse side of this form. Information about the disposal site identified in Section A is also available in files at the Massachusetts Department of Environmental Protection. See http://public.dep.state.ma.us/SearchableSites2/Search.aspx to view site-specific files on-line or http://mass.gov/eea/agencies/massdep/about/contacts/conduct-a-file-review.html if you would like to make an appointment to see these files in person. Please reference the **Release Tracking Number** listed in the upper right hand corner on the reverse side of this form when making file review appointments.

**Massachusetts Department of Environmental Protection**
*Bureau of Waste Site Cleanup*

**BWSC123**

This Notice is Related to:
Release Tracking Number

3 - 33535

# NOTICE OF ENVIRONMENTAL SAMPLING

As required by 310 CMR 40.1403(10) of the Massachusetts Contingency Plan

**A. The address of the disposal site related to this Notice and Release Tracking Number (provided above):**

1. Street Address: 1 Network Drive

City/Town: Burlington Zip Code: 01803

**B. This notice is being provided to the following party:**

1. Name: Nordblom Management Company, Inc.
2. Street Address: 71 Third Avenue

City/Town: Burlington Zip Code: 01803

**C. This notice is being given to inform its recipient (the party listed in Section B):**

☑ 1. That environmental sampling will be/has been conducted at property owned by the recipient of this notice.

☐ 2. Of the results of environmental sampling conducted at property owned by the recipient of this notice.

☐ 3. Check to indicate if the analytical results are attached. (If item 2. above is checked, the analytical results from the environmental sampling must be attached to this notice.)

**D. Location of the property where the environmental sampling will be/has been conducted:**

1. Street Address: 1 Network Drive

City/Town: Burlington Zip Code: 01803

2. MCP phase of work during which the sampling will be/has been conducted:

☐ Immediate Response Action
☐ Release Abatement Measure
☐ Utility-related Abatement Measure
☐ Phase I Initial Site Investigation
☑ Phase II Comprehensive Site Assessment
☐ Phase III Feasibility Evaluation
☐ Phase IV Remedy Implementation Plan
☐ Phase V/Remedy Operation Status
☐ Post-Temporary Solution Operation, Maintenance and Monitoring
☐ Other _____ (specify)

3. Description of property where sampling will be/has been conducted:

☐ residential ☑ commercial ☐ industrial ☐ school/playground ☐ Other _____ (specify)

4. Description of the sampling locations and types (e.g., soil, groundwater, indoor air, soil gas) to the extent known at the time of this notice.

Groundwater collected from up to fifteen monitoring wells identified as follows: 3G-11, 3G-12, 3H-1D, 3H-1S, 3H-2, 3H-3, 3H-5, EMW-1D, EMW-2D(R), EMW-3R, EMW-7, EMW-10D, EMW-10R, EMW-12R and TTMW-7(R).

**E. Contact information related to the party providing this notice:**

Contact Name: Ed Dolan, Tetra Tech
Street Address: One Monarch Drive, Suite 202
City/Town: Littleton Zip Code: 01460
Telephone: (978) 952-0120 Email: Ed.Dolan@tetratech.com

**Massachusetts Department of Environmental Protection**
*Bureau of Waste Site Cleanup*

**BWSC123**

This Notice is Related to:
Release Tracking Number

3 - 33535

## NOTICE OF ENVIRONMENTAL SAMPLING

As required by 310 CMR 40.1403(10) of the Massachusetts Contingency Plan

### MASSACHUSETTS REGULATIONS THAT REQUIRE THIS NOTICE

This notice is being provided pursuant to the Massachusetts Contingency Plan and the notification requirement at 310 CMR 40.1403(10). The Massachusetts Contingency Plan is a state regulation that specifies requirements for parties who are taking actions to address releases of chemicals (oil or hazardous material) to the environment.

### THE PERSON(S) PROVIDING THIS NOTICE

This notice has been sent to you by the party who is addressing a release of oil or hazardous material to the environment at the location listed in **Section A** on the reverse side of this form. (The regulations refer to the area where the oil or hazardous material is present as the "disposal site".)

### PURPOSE OF THIS NOTICE

When environmental samples are taken as part of an investigation of a release for which a notification to MassDEP has been made under the Massachusetts Contingency Plan (310 CMR 40.0300) on behalf of someone other than the owner of the property, the regulations require that the property owner (listed in **Section B** on the reverse side of this form) be given notice of the environmental sampling. The regulations also require that the property owner subsequently receive the analytical results following the analysis of the environmental samples.

**Section C** on the reverse side of this form indicates the circumstance under which you are receiving this notice at this time. If you are receiving this notice to inform you of the analytical results following the analysis of the environmental samples, you should also have received, as an attachment, a copy of analytical results. These results should indicate the number and type(s) of samples (e.g., soil, groundwater) analyzed, any chemicals identified, and the measured concentrations of those chemicals.

**Section D** on the reverse side of this form identifies the property where the environmental sampling will be/has been conducted, provides a description of the sampling locations within the property, and indicates the phase of work under the Massachusetts Contingency Plan regulatory process during which the samples will be/were collected.

### FOR MORE INFORMATION

Information about the general process for addressing releases of oil or hazardous material under the Massachusetts Contingency Plan and related public involvement opportunities may be found at http://www.mass.gov/eea/agencies/massdep/cleanup. For more information regarding this notice, you may contact the party listed in **Section E** on the reverse side of this form. Information about the disposal site identified in Section A is also available in files at the Massachusetts Department of Environmental Protection. See http://public.dep.state.ma.us/SearchableSites2/Search.aspx to view site-specific files on-line or http://mass.gov/eea/agencies/massdep/about/contacts/conduct-a-file-review.html if you would like to make an appointment to see these files in person. Please reference the **Release Tracking Number** listed in the upper right hand corner on the reverse side of this form when making file review appointments.

TETRA TECH

P.N. 117-0507550

November 1, 2017

Mr. Curt Van Emon
Primrose School of Burlington
21 Meriam Street
Lexington, MA 02420

**Re: Notification of Environmental Sampling**
**Former RCA Facility**
**10 Greenleaf Way, Burlington, MA 01803**
**RTNs 3-0265, and 3-33535**

Dear Mr. Van Emon,

On behalf of Lockheed Martin Corporation (Lockheed Martin), Tetra Tech, Inc. (Tetra Tech) is providing this notification of sampling activities to fulfill the requirements of the Massachusetts Contingency Plan (MCP) 310 CMR 40.1403(10). The MCP requires that any time samples are taken at a property on behalf of someone other than the owner of the property, that the property owner be notified more than 72-hours prior to such activities. Tetra Tech will be collecting groundwater samples at 10 Greenleaf Way between November 11 and 12, 2017. In accordance with the MCP, the results of the sample analysis will be provided to you within 30 days of the date the sample results are issued by the laboratory.

If you have any questions regarding this submittal, please feel free to call Ed Dolan at (978) 952-0120 or Stephen Parker at (603) 328-1469.

Sincerely,
Tetra Tech, Inc.

Stephen S. Parker,
LSP Client Program

Sincerely,
Tetra Tech, Inc.

Edward B. Dolan,
Associate Geologist-Operations Manager

Enclosures: BWSC-123 Forms (2)

cc: G. Clark (Lockheed Martin) – w/encl.

TETRA TECH
One Monarch Drive, Suite 202, Littleton, MA 01460
Tel 978.952.0120 Fax 978.952.0122 www.tetratechgeo.com www.tetratech.com

**Massachusetts Department of Environmental Protection**
*Bureau of Waste Site Cleanup*

**BWSC123**

This Notice is Related to:
Release Tracking Number

3 - 0265

# NOTICE OF ENVIRONMENTAL SAMPLING

As required by 310 CMR 40.1403(10) of the Massachusetts Contingency Plan

**A. The address of the disposal site related to this Notice and Release Tracking Number (provided above):**

1. Street Address: 1 Network Drive

City/Town: Burlington Zip Code: 01803

**B. This notice is being provided to the following party:**

1. Name: Primrose School c/o Curt Van Emon
2. Street Address: 21 Meriam Street

City/Town: Lexington Zip Code: 02421

**C. This notice is being given to inform its recipient (the party listed in Section B):**

- [x] 1. That environmental sampling will be/has been conducted at property owned by the recipient of this notice.
- [ ] 2. Of the results of environmental sampling conducted at property owned by the recipient of this notice.
- [ ] 3. Check to indicate if the analytical results are attached. (If item 2. above is checked, the analytical results from the environmental sampling must be attached to this notice.)

**D. Location of the property where the environmental sampling will be/has been conducted:**

1. Street Address: 10 Greenleaf Way

City/Town: Burlington Zip Code: 01803

2. MCP phase of work during which the sampling will be/has been conducted:

- [ ] Immediate Response Action
- [ ] Release Abatement Measure
- [ ] Utility-related Abatement Measure
- [ ] Phase I Initial Site Investigation
- [ ] Phase II Comprehensive Site Assessment
- [ ] Phase III Feasibility Evaluation
- [ ] Phase IV Remedy Implementation Plan
- [x] Phase V/Remedy Operation Status
- [ ] Post-Temporary Solution Operation, Maintenance and Monitoring
- [ ] Other _____ (specify)

3. Description of property where sampling will be/has been conducted:

- [ ] residential
- [ ] commercial
- [ ] industrial
- [x] school/playground
- [ ] Other _____ (specify)

4. Description of the sampling locations and types (e.g., soil, groundwater, indoor air, soil gas) to the extent known at the time of this notice.

Groundwater collected from up to four monitoring wells identified as follows: A-1, A-1D, EMW-11R and TTMW-1.

**E. Contact information related to the party providing this notice:**

Contact Name: Ed Dolan, Tetra Tech

Street Address: One Monarch Drive, Suite 202

City/Town: Littleton Zip Code: 01460

Telephone: (978) 952-0120 Email: Ed.Dolan@tetratech.com

**Massachusetts Department of Environmental Protection**
*Bureau of Waste Site Cleanup*

**BWSC123**

This Notice is Related to:
Release Tracking Number

3 - 0265

# NOTICE OF ENVIRONMENTAL SAMPLING

As required by 310 CMR 40.1403(10) of the Massachusetts Contingency Plan

## MASSACHUSETTS REGULATIONS THAT REQUIRE THIS NOTICE

This notice is being provided pursuant to the Massachusetts Contingency Plan and the notification requirement at 310 CMR 40.1403(10). The Massachusetts Contingency Plan is a state regulation that specifies requirements for parties who are taking actions to address releases of chemicals (oil or hazardous material) to the environment.

## THE PERSON(S) PROVIDING THIS NOTICE

This notice has been sent to you by the party who is addressing a release of oil or hazardous material to the environment at the location listed in **Section A** on the reverse side of this form. (The regulations refer to the area where the oil or hazardous material is present as the "disposal site".)

## PURPOSE OF THIS NOTICE

When environmental samples are taken as part of an investigation of a release for which a notification to MassDEP has been made under the Massachusetts Contingency Plan (310 CMR 40.0300) on behalf of someone other than the owner of the property, the regulations require that the property owner (listed in **Section B** on the reverse side of this form) be given notice of the environmental sampling. The regulations also require that the property owner subsequently receive the analytical results following the analysis of the environmental samples.

**Section C** on the reverse side of this form indicates the circumstance under which you are receiving this notice at this time. If you are receiving this notice to inform you of the analytical results following the analysis of the environmental samples, you should also have received, as an attachment, a copy of analytical results. These results should indicate the number and type(s) of samples (e.g., soil, groundwater) analyzed, any chemicals identified, and the measured concentrations of those chemicals.

**Section D** on the reverse side of this form identifies the property where the environmental sampling will be/has been conducted, provides a description of the sampling locations within the property, and indicates the phase of work under the Massachusetts Contingency Plan regulatory process during which the samples will be/were collected.

## FOR MORE INFORMATION

Information about the general process for addressing releases of oil or hazardous material under the Massachusetts Contingency Plan and related public involvement opportunities may be found at http://www.mass.gov/eea/agencies/massdep/cleanup. For more information regarding this notice, you may contact the party listed in **Section E** on the reverse side of this form. Information about the disposal site identified in Section A is also available in files at the Massachusetts Department of Environmental Protection. See http://public.dep.state.ma.us/SearchableSites2/Search.aspx to view site-specific files on-line or http://mass.gov/eea/agencies/massdep/about/contacts/conduct-a-file-review.html if you would like to make an appointment to see these files in person. Please reference the **Release Tracking Number** listed in the upper right hand corner on the reverse side of this form when making file review appointments.

**Massachusetts Department of Environmental Protection**
*Bureau of Waste Site Cleanup*

**BWSC123**

This Notice is Related to:
Release Tracking Number

3 - 33535

# NOTICE OF ENVIRONMENTAL SAMPLING

As required by 310 CMR 40.1403(10) of the Massachusetts Contingency Plan

**A. The address of the disposal site related to this Notice and Release Tracking Number (provided above):**

1. Street Address: 1 Network Drive

City/Town: Burlington Zip Code: 01803

**B. This notice is being provided to the following party:**

1. Name: Primrose School c/o Curt Van Emon
2. Street Address: 21 Meriam Street

City/Town: Lexington Zip Code: 02421

**C. This notice is being given to inform its recipient (the party listed in Section B):**

☑ 1. That environmental sampling will be/has been conducted at property owned by the recipient of this notice.

☐ 2. Of the results of environmental sampling conducted at property owned by the recipient of this notice.

☐ 3. Check to indicate if the analytical results are attached. (If item 2. above is checked, the analytical results from the environmental sampling must be attached to this notice.)

**D. Location of the property where the environmental sampling will be/has been conducted:**

1. Street Address: 10 Greenleaf Way

City/Town: Burlington Zip Code: 01803

2. MCP phase of work during which the sampling will be/has been conducted:

☐ Immediate Response Action
☐ Release Abatement Measure
☐ Utility-related Abatement Measure
☐ Phase I Initial Site Investigation
☑ Phase II Comprehensive Site Assessment
☐ Phase III Feasibility Evaluation
☐ Phase IV Remedy Implementation Plan
☐ Phase V/Remedy Operation Status
☐ Post-Temporary Solution Operation, Maintenance and Monitoring
☐ Other _____ (specify)

3. Description of property where sampling will be/has been conducted:

☐ residential ☐ commercial ☐ industrial ☑ school/playground ☐ Other _____ (specify)

4. Description of the sampling locations and types (e.g., soil, groundwater, indoor air, soil gas) to the extent known at the time of this notice.

Groundwater collected from up to four monitoring wells identified as follows: A-1, A-1D, EMW-11R and TTMW-1.

**E. Contact information related to the party providing this notice:**

Contact Name: Ed Dolan, Tetra Tech
Street Address: One Monarch Drive, Suite 202
City/Town: Littleton Zip Code: 01460
Telephone: (978) 952-0120 Email: Ed.Dolan@tetratech.com

**Massachusetts Department of Environmental Protection**
*Bureau of Waste Site Cleanup*

**BWSC123**

This Notice is Related to:
Release Tracking Number

3 - 33535

## NOTICE OF ENVIRONMENTAL SAMPLING

As required by 310 CMR 40.1403(10) of the Massachusetts Contingency Plan

### MASSACHUSETTS REGULATIONS THAT REQUIRE THIS NOTICE

This notice is being provided pursuant to the Massachusetts Contingency Plan and the notification requirement at 310 CMR 40.1403(10). The Massachusetts Contingency Plan is a state regulation that specifies requirements for parties who are taking actions to address releases of chemicals (oil or hazardous material) to the environment.

### THE PERSON(S) PROVIDING THIS NOTICE

This notice has been sent to you by the party who is addressing a release of oil or hazardous material to the environment at the location listed in **Section A** on the reverse side of this form. (The regulations refer to the area where the oil or hazardous material is present as the "disposal site".)

### PURPOSE OF THIS NOTICE

When environmental samples are taken as part of an investigation of a release for which a notification to MassDEP has been made under the Massachusetts Contingency Plan (310 CMR 40.0300) on behalf of someone other than the owner of the property, the regulations require that the property owner (listed in **Section B** on the reverse side of this form) be given notice of the environmental sampling. The regulations also require that the property owner subsequently receive the analytical results following the analysis of the environmental samples.

**Section C** on the reverse side of this form indicates the circumstance under which you are receiving this notice at this time. If you are receiving this notice to inform you of the analytical results following the analysis of the environmental samples, you should also have received, as an attachment, a copy of analytical results. These results should indicate the number and type(s) of samples (e.g., soil, groundwater) analyzed, any chemicals identified, and the measured concentrations of those chemicals.

**Section D** on the reverse side of this form identifies the property where the environmental sampling will be/has been conducted, provides a description of the sampling locations within the property, and indicates the phase of work under the Massachusetts Contingency Plan regulatory process during which the samples will be/were collected.

### FOR MORE INFORMATION

Information about the general process for addressing releases of oil or hazardous material under the Massachusetts Contingency Plan and related public involvement opportunities may be found at http://www.mass.gov/eea/agencies/massdep/cleanup. For more information regarding this notice, you may contact the party listed in **Section E** on the reverse side of this form. Information about the disposal site identified in Section A is also available in files at the Massachusetts Department of Environmental Protection. See http://public.dep.state.ma.us/SearchableSites2/Search.aspx to view site-specific files on-line or http://mass.gov/eea/agencies/massdep/about/contacts/conduct-a-file-review.html if you would like to make an appointment to see these files in person. Please reference the **Release Tracking Number** listed in the upper right hand corner on the reverse side of this form when making file review appointments.

TETRA TECH

P.N. 117-0507550

December 20, 2017

Mr. Stephen Logan
Nordblom Management Company, Inc.
71 Third Avenue
Burlington, MA 01803-4470

**Re: Environmental Sampling Results**
**Former RCA Facility**
**1 Network Drive, Burlington, MA 01803**
**RTN 3-0265**

Dear Mr. Logan,

On behalf of Lockheed Martin Corporation (Lockheed Martin), Tetra Tech, Inc. (Tetra Tech) is providing to you the analytical results of the November 13-17, 2017 groundwater sampling event. This information is being provided to fulfill the requirements of the Massachusetts Contingency Plan (MCP) 310 CMR 40.1403(10). This section of the MCP requires that any time samples are taken at a property on behalf of someone other than the owner of the property, the sample analysis will be provided to the property owner within 30 days of the date the sample results are issued by the laboratory.

Therefore, please find attached the following documentation: 1) BWSC-123 Form, 2) a figure showing the sample locations, and 3) the analytical data reports issued on November 27 and 30 and December 1 and 4, 2017. Summary tables of the groundwater data, field chemistry data, and natural attenuation parameters are also attached for your information.

These data were collected to satisfy the requirements of an ongoing monitoring program referred to by the Mass DEP as a Phase V Remedy Operating Status (ROS), which has been ongoing at this location since 2008. Note that groundwater is not currently used for drinking water at this Site. Overall, the resulting data from this recent sampling included in this submittal are consistent with recent and long term trends, showing no unexpected results. A full data analysis and summary will be included in the next semi-annual Phase V Monitoring Report, anticipated in June 2018.

If you have any questions regarding this submittal, please feel free to call Mr. Edward Dolan or Mr. Thomas Nunno at (978) 952-0120.

Sincerely,
Tetra Tech, Inc.

Thomas J. Nunno, LSP
Principal Engineer

Sincerely,
Tetra Tech, Inc.

Edward B. Dolan,
Associate Geologist-Operations Manager

**TETRA TECH**
One Monarch Drive, Suite 202, Littleton, MA 01460
Tel 978.952.0120 Fax 978.952.0122 www.tetratechgeo.com www.tetratech.com

**Enclosures:** BWSC-123 Form

Table 1: Summary of Groundwater Sampling Results for VOCs

Table 2: Groundwater Field Chemistry Parameters

Table 3: Summary of Natural Attenuation Parameters

Figure 1 – Well Location Map

11/27, 11/30, 12/1 and 12/4 Eurofins Environmental Data Reports

**cc:** G. Clark (Lockheed Martin) – w/encl.
M. Hanley (Isosceles Group) – w/encl.

**TETRA TECH**
One Monarch Drive, Suite 202, Littleton, MA 01460
Tel 978.952.0120 Fax 978.952.0122 www.tetratechgeo.com www.tetratech.com

**Massachusetts Department of Environmental Protection**
*Bureau of Waste Site Cleanup*

**BWSC123**

This Notice is Related to:
Release Tracking Number

3 - 0265

# NOTICE OF ENVIRONMENTAL SAMPLING

As required by 310 CMR 40.1403(10) of the Massachusetts Contingency Plan

**A. The address of the disposal site related to this Notice and Release Tracking Number (provided above):**

1. Street Address: 1 Network Drive

City/Town: Burlington Zip Code: 01803

**B. This notice is being provided to the following party:**

1. Name: Nordblom Management Company, Inc.
2. Street Address: 15 Third Avenue

City/Town: Burlington Zip Code: 01803

**C. This notice is being given to inform its recipient (the party listed in Section B):**

☑ 1. That environmental sampling will be/has been conducted at property owned by the recipient of this notice.

☑ 2. Of the results of environmental sampling conducted at property owned by the recipient of this notice.

☑ 3. Check to indicate if the analytical results are attached. (If item 2. above is checked, the analytical results from the environmental sampling must be attached to this notice.)

**D. Location of the property where the environmental sampling will be/has been conducted:**

1. Street Address: 1 Network Drive

City/Town: Burlington Zip Code: 01803

2. MCP phase of work during which the sampling will be/has been conducted:

☐ Immediate Response Action
☐ Release Abatement Measure
☐ Utility-related Abatement Measure
☐ Phase I Initial Site Investigation
☐ Phase II Comprehensive Site Assessment
☐ Phase III Feasibility Evaluation
☐ Phase IV Remedy Implementation Plan
☑ Phase V/Remedy Operation Status
☐ Post-Temporary Solution Operation, Maintenance and Monitoring
☐ Other _____ (specify)

3. Description of property where sampling will be/has been conducted:

☐ residential ☑ commercial ☐ industrial ☐ school/playground ☐ Other _____ (specify)

4. Description of the sampling locations and types (e.g., soil, groundwater, indoor air, soil gas) to the extent known at the time of this notice.

Groundwater collected from fifteen monitoring wells identified as follows: 3G-11, 3G-12, 3H-1D, 3H-1S, 3H-2, 3H-3, 3H-5, EMW-1D, EMW-2D(R), EMW-3R, EMW-7, EMW-10D, EMW-10R, EMW-12R, and TTMW-7(R).

**E. Contact information related to the party providing this notice:**

Contact Name: Ed Dolan, Tetra Tech
Street Address: One Monarch Drive, Suite 202
City/Town: Littleton Zip Code: 01460
Telephone: (978) 952-0120 Email: Ed.Dolan@tetratech.com

**Massachusetts Department of Environmental Protection**
*Bureau of Waste Site Cleanup*

**BWSC123**

This Notice is Related to:
Release Tracking Number

3 - 0265

# NOTICE OF ENVIRONMENTAL SAMPLING

As required by 310 CMR 40.1403(10) of the Massachusetts Contingency Plan

## MASSACHUSETTS REGULATIONS THAT REQUIRE THIS NOTICE

This notice is being provided pursuant to the Massachusetts Contingency Plan and the notification requirement at 310 CMR 40.1403(10). The Massachusetts Contingency Plan is a state regulation that specifies requirements for parties who are taking actions to address releases of chemicals (oil or hazardous material) to the environment.

## THE PERSON(S) PROVIDING THIS NOTICE

This notice has been sent to you by the party who is addressing a release of oil or hazardous material to the environment at the location listed in **Section A** on the reverse side of this form. (The regulations refer to the area where the oil or hazardous material is present as the "disposal site".)

## PURPOSE OF THIS NOTICE

When environmental samples are taken as part of an investigation of a release for which a notification to MassDEP has been made under the Massachusetts Contingency Plan (310 CMR 40.0300) on behalf of someone other than the owner of the property, the regulations require that the property owner (listed in **Section B** on the reverse side of this form) be given notice of the environmental sampling. The regulations also require that the property owner subsequently receive the analytical results following the analysis of the environmental samples.

**Section C** on the reverse side of this form indicates the circumstance under which you are receiving this notice at this time. If you are receiving this notice to inform you of the analytical results following the analysis of the environmental samples, you should also have received, as an attachment, a copy of analytical results. These results should indicate the number and type(s) of samples (e.g., soil, groundwater) analyzed, any chemicals identified, and the measured concentrations of those chemicals.

**Section D** on the reverse side of this form identifies the property where the environmental sampling will be/has been conducted, provides a description of the sampling locations within the property, and indicates the phase of work under the Massachusetts Contingency Plan regulatory process during which the samples will be/were collected.

## FOR MORE INFORMATION

Information about the general process for addressing releases of oil or hazardous material under the Massachusetts Contingency Plan and related public involvement opportunities may be found at http://www.mass.gov/eea/agencies/massdep/cleanup. For more information regarding this notice, you may contact the party listed in **Section E** on the reverse side of this form. Information about the disposal site identified in Section A is also available in files at the Massachusetts Department of Environmental Protection. See http://public.dep.state.ma.us/SearchableSites2/Search.aspx to view site-specific files on-line or http://mass.gov/eea/agencies/massdep/about/contacts/conduct-a-file-review.html if you would like to make an appointment to see these files in person. Please reference the **Release Tracking Number** listed in the upper right hand corner on the reverse side of this form when making file review appointments.

**Table 3-1**
**Summary of Groundwater Sampling Results for VOCs**
**Phase V Monitoring Report and ROS Statement**
**Former RCA Facility**
**Burlington, Massachusetts**

| | | | COMPOUNDS OF INTEREST | | | | | | Related COCs | OTHER COMPOUNDS IN VOC SCAN | | | | | | | | | | | COMPOUNDS WITH NO STANDARDS ESTABLISHED | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Monitoring Well Number | Sample Type | Date Sampled | 1,1-Dichloroethene | Tetrachloroethene | Trichloroethene | cis-1,2-Dichloroethene | 1,1-Dichloroethane | 1,4-Dioxane | 1,1,1-Trichloroethane | Benzene | Chloroform | Ethyl-benzene | Methylene Chloride | Methyl tert-butyl ether | Toluene | 1,1,2-Trichloroethane | Xylene (total) | Vinyl Chloride | 1,2-Dichloroethane | Chloro-benzene | Trichlorofluoromethane | Dichlorodifluoromethane | Chloromethane | Total VOCs |
| GW-1 Criteria | | | 7 | 5 | 5 | 70 | 70 | 0.3000 | 200 | 5 | 70 | 700 | 5 | 70 | 1,000 | 5 | 10,000 | 2 | 5 | 100 | NE | NE | NE | NE |
| GW-2 Criteria | | | 80 | 50 | 5 | 100 | 1,000 | 6,000 | 4,000 | 2,000 | 50 | 20,000 | 10,000 | 50,000 | 50,000 | 900 | 9,000 | 2 | 5 | 200 | NE | NE | NE | NE |
| GW-3 Criteria | | | 30,000 | 30,000 | 5,000 | 50,000 | 20,000 | 50,000 | 20,000 | 10,000 | 20,000 | 5,000 | 50,000 | 50,000 | 40,000 | 50,000 | 5,000 | 50,000 | 20,000 | 1,000 | NE | NE | NE | NE |
| UCL Criteria | | | 100,000 | 100,000 | 50,000 | 100,000 | 100,000 | | 100,000 | 100,000 | 100,000 | 100,000 | 100,000 | 100,000 | 100,000 | 100,000 | 100,000 | 100,000 | 100,000 | 10,000 | NE | NE | NE | NE |
| 3G-11 | | 8/25/1994 | 31 | ND | ND | 3.5 | 29 | NS | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | NA | NA | NA | 63.5 |
| 3G-11 | | 11/30/1994 | 23 | ND | 8.8 | 3.4 | 25 | NS | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | NA | NA | NA | 60.2 |
| 3G-11 | | 11/14/1996 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <5 | <1 | <1 | <1 | <3 | <1 | NA | NA | <1 | <1 | <1 | 0 |
| 3G-11 | | 5/13/1998 | 18 | <0.4 | 10 | 3 | 20 | NS | <0.4 | <0.2 | <0.3 | <0.2 | <0.4 | <0.3 | <0.2 | <0.5 | <0.3 | <0.3 | <0.5 | <0.3 | <0.3 | <0.3 | <0.4 | 51 |
| 3G-11 | | 8/20/1998 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | NS | <1.0 | <2.0 | <1.0 | <2.0 | <1.0 | <1.0 | <2.0 | <2.0 | <1.0 | <2.0 | <1.0 | <2.0 | <1.0 | <1 | <5 | 0 |
| 3G-11 | | 11/19/1998 | 18 | <1 | 10 | 3 | 21 | NS | <1 | <1 | <1 | 1 | <1 | <1 | <1 | <1 | 12 | <1 | <1 | <1 | <1 | <1 | <1 | 65 |
| 3G-11 | | 2/18/1999 | 13 | <1 | 4 | 1 | 13 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 31 |
| 3G-11 | | 5/13/1999 | 20 | <1 | 9 | 2 | 19 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 50 |
| 3G-11 | | 6/15/2000 | 17 | <1 | 6 | 3 | 19 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 45 |
| 3G-11 | | 8/17/2000 | 23 | <1 | 11 | 3 | 22 | NS | <1 | <1 | <1 | <1 | 3 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 62 |
| 3G-11 | | 11/14/2000 | 36 | <1 | 16 | 5 | 34 | NS | <1 | <1 | <1 | <1 | <5 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 91 |
| 3G-11 | | 2/13/2001 | 25 | <1 | 13 | 4 | 25 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <5 | <1 | 67 |
| 3G-11 | | 11/14/2001 | 24 | <1 | 9.9 | 3 | 19 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | 12 | <5 | <1 | 67.9 |
| 3G-11 | | 11/20/2002 | 20 | 0.26 J | 8.3 | 2.7 | 16 | NS | <1 | <1 | <1 | <1 | <5 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | 6.5 | <5 | <1 | 53.8 J |
| 3G-11 | | 11/3/2003 | 18 | <1 | 8 | 3 | 17 | NS | <1 | <1 | <1 | <1 | <1 | NA | <1 | <1 | <2 | <1 | <1 | <1 | NA | 40 | <1 | 86 |
| 3G-11 | | 11/22/2004 | 19 | <1.0 | 7.4J | 2 J | 16 J | NS | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | 12 | <2.0 | 31 |
| 3G-11 | | 11/2/2005 | 19 | <1.0 | 8.2 | 2.5 | 15 | NS | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | 45 |
| 3G-11 | | 11/6/2006 | 20 | <1.0 | 7.8 | 2.8 | 15 | NS | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | <1.0 | <1.0 | <1.0 | <3.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | 46 |
| 3G-11 | | 11/9/2007 | 15 | <1 | 7.2 | 2.8 | 14 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <3 | <0.5 | <1 | <1 | <1 | <1 | <2 | 39 |
| 3G-11 | | 11/7/2008 | 7.8 | <1 | 2.7 | 1.1 | 6 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5* | <1 | <1 | <1 | <1 | <2 | 18* |
| 3G-11 | | 11/11/2009 | 7.1 | <1 | 2.4 | <1 | 5.5 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | 2.9 | <2 | 17.9 |
| 3G-11 | | 6/25/2010 | 7.5 | <1 | 2.3 | <1 | 5.6 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 15 |
| 3G-11 | | 6/25/2010 | 7.5 | <1 | 2.3 | 1 J | 5.5 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 16.3 J |
| 3G-11 | | 11/12/2010 | 9.7 | <1 | 4.2 | 1.7 | 8.2 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1* | <2 | 23.8* |
| 3G-11 | | 11/17/2011 | 9 | <1 | 3.2 | 1.4 | 6.8 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 20.4 |
| 3G-11 | | 11/9/2012 | 11 | <1 | 6.1 | 2.1 | 8.5 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1* | <2 | 27.7 |
| 3G-11 | | 11/11/2013 | 12 | <1 | 4.8 | 1.8 J | 7.9 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 26.5 |
| 3G-11 | | 11/11/2014 | 12 | <1 | 5.0 | 1.5 | 7 | 2.2 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 25.5 |
| 3G-11 | | 11/13/2015 | 9.1 | <1 | 4.7 | 1.7 | 7.8 | 1.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 23.3 |
| 3G-11 | | 8/26/2016 | 8.9 | <1 | 4.2 | 1.7 | 6.8 | 1.65 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 23.25 |
| 3G-11 | | 11/11/2016 | 8.6 | <1 | 4.4 | 1.8 | 7.2 | 1.76 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 23.76 |
| 3G-11 | | 2/14/2017 | 11 | 0.1 J | 4.8 | 1.8 | 7.7 | 0.87 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 0.2 J | <0.1 | <0.1 | <0.1 | 0.1 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | |
| 3G-11 | | 5/16/2017 | 12 | 0.1 J | 4.8 | 1.9 | 8.2 | 0.82 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 0.2 J | <0.1 | <0.1 | <0.1 | 0.1 J | <0.1 | <0.1 | <0.1 | <0.1 J | <0.1 | 26.9 |
| 3G-11 | | 8/14/2017 | 10 | 0.1 J | 4.4 | 1.7 | 7.6 | 0.63 | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | 0.2 J | <0.1 | <0.1 | <0.1 | 0.1 J | <0.1 | <0.1 | <0.1 | <0.2 | <0.2 | 24.73 |
| 3G-11 | | 11/14/2017 | 10 | 0.1 J | 4.2 | 1.6 | 6.9 | 0.69 | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | 0.1 J | <0.1 | <0.1 | <0.1 | 0.1 J | <0.1 | <0.1 | <0.1 | <0.2 UJ | <0.2 | 23.69 |
| 3G-12 | | 8/25/1994 | 220 | 5.9 | 20 | 3.7 | 46 | NS | 36 | ND | ND | ND | 2.9 | ND | ND | 5.6 | ND | ND | ND | ND | ND | NA | NA | 340.1 |
| 3G-12 | | 12/1/1994 | 240 | 11 | 55 | 8.1 | 65 | NS | 55 | ND | ND | ND | ND | ND | ND | 7.6 | ND | ND | ND | ND | ND | NA | NA | 441.7 |
| 3G-12 | | 11/13/1996 | 72 | 6 | 56 | <1 | 18 | NS | 14 | <1 | <1 | <1 | <5 | <1 | <1 | <1 | <3 | <1 | NA | NA | <1 | <1 | <1 | 166 |
| 3G-12 | | 5/13/1998 | 110 | 12 | 44 | 5 | 24 | NS | 20 | <0.2 | <0.3 | <0.2 | <0.4 | <0.3 | <0.2 | <0.5 | <0.3 | <0.3 | <0.5 | <0.3 | <0.3 | <0.3 | <0.4 | 215 |
| 3G-12 | | 8/20/1998 | 44 | 11 | 33 | 5.5 | 9.6 | NS | 9.5 | <2.0 | <1.0 | <2.0 | <1.0 | <1.0 | <2.0 | <2.0 | <1.0 | <2.0 | <1.0 | <2.0 | 1.4 | <1 | <5 | 114 |
| 3G-12 | | 11/19/1998 | 170 | 10 | 38 | 5 | 45 | NS | 45 | <1 | <1 | <1 | <1 | <1 | <1 | 4 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 317 |
| 3G-12 | | 2/18/1999 | 54 | 11 | 46 | 5 | 41 | NS | 36 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 193 |
| 3G-12 | | 5/13/1999 | 170 | 17 | 69 | 10 | 45 | NS | 52 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 363 |
| 3G-12 | | 6/16/2000 | 79 | 16 | 63 | 12 | 22 | NS | 25 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | 1 | <1 | <1 | <1 | <1 | <1 | 218 |
| 3G-12 | | 8/17/2000 | 130 | 15 | 61 | 9 | 27 | NS | 64 | <1 | <1 | <1 | <1 | 1 | <1 | 1 | <3 | 2 | <1 | <1 | <1 | <1 | <1 | 310 |
| 3G-12 | | 11/13/2000 | 93 | 15 | 48 | 8 | 31 | NS | 61 | <1 | <1 | <1 | <5 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 256 |
| 3G-12 | | 2/13/2001 | 76 | 24 | 46 | 14 | 25 | NS | 41 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | 2 | <1 | <1 | <1 | <5 | <1 | 228 |
| 3G-12 | | 11/14/2001 | 31 J | 6.2 | 19 | 4.5 | 9.5 | NS | 15 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | 1.6 J | <5 | <1 | 86.8 J |
| 3G-12 | | 11/20/2002 | 49 J | 4.9 | 17 | 3.2 | 15 | NS | 29 | <1 | 0.13 J | <1 | <5 | 1.6 | <1 | 0.41 J | <3 | <1 | <1 | <1 | 0.83 J | <5 | <1 | 121.1 J |
| 3G-12 | Duplicate | 11/20/2002 | 49 J | 4.9 | 17 | 3.1 | 14 | NS | 28 | <1 | 0.12 J | <1 | <5 | 1.6 | 0.21 J | 0.41 J | <3 | <1 | 0.26 J | <1 | 0.74 J | <5 | <1 | 119.3 J |
| 3G-12 | | 11/4/2003 | 8 | 11 | 10 | 10 | 3 | NS | 1 | <1 | <1 | <1 | <1 | NA | <1 | <1 | <2 | 1 | <1 | <1 | NA | <1 | 1 | 45 |
| 3G-12 | | 11/23/2004 | 29 | 6.7J | 20J | 4.1J | 7 J | NS | 5.4 | <1.0 | <1.0 | <1.0 | <2.0 | 5.8 | <1.0 | <1.0 | <1.0 | 0.63 J | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | 79 J |
| 3G-12 | | 11/2/2005 | 15 | 4.8 | 13 | 2.5 | 4.2 | NS | 2.7 | <1.0 | <1.0 | <1.0 | <2.0 | 1.2 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | 43.4 |
| 3G-12 | | 11/7/2006 | 15 | 12 | 21 | 7.2 | 4.8 | NS | 1.3 | <1.0 | <1.0 | <1.0 | <2.0 | 1.1 | <1.0 | <1.0 | <3.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | 62.4 |
| 3G-12 | | 11/8/2007 | 14 | 2 | 7 | 1.1 | 2.5 | NS | 2.1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <3 | <0.5 | <1 | <1 | <1 | <1 | <2 | 28.7 |
| 3G-12 | | 11/5/2008 | 5.9 | 5 | 7 | 2.1 | 1.5 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 21.5 |
| 3G-12 | | 11/12/2009 | 4.5 | 2.5 | 4.8 | 1 | 1.3 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 14.1 |

**Table 3-1**
**Summary of Groundwater Sampling Results for VOCs**
**Phase V Monitoring Report and ROS Statement**
**Former RCA Facility**
**Burlington, Massachusetts**

| Monitoring Well Number | Sample Type | Date Sampled | 1,1-Dichloroethene | Tetrachloroethene | Trichloroethene | cis-1,2-Dichloroethene | 1,1-Dichloroethane | 1,4-Dioxane | 1,1,1-Trichloroethane | Benzene | Chloroform | Ethyl-benzene | Methylene Chloride | Methyl tert-butyl ether | Toluene | 1,1,2-Trichloroethane | Xylene (total) | Vinyl Chloride | 1,2-Dichloroethane | Chloro-benzene | Trichlorofluoromethane | Dichlorodifluoromethane | Chloromethane | Total VOCs |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GW-1 Criteria | | | 7 | 5 | 5 | 70 | 70 | 0.3000 | 200 | 5 | 70 | 700 | 5 | 70 | 1,000 | 5 | 10,000 | 2 | 5 | 100 | NE | NE | NE | NE |
| GW-2 Criteria | | | 80 | 50 | 5 | 100 | 1,000 | 6,000 | 4,000 | 2,000 | 50 | 20,000 | 10,000 | 50,000 | 50,000 | 900 | 9,000 | 2 | 5 | 200 | NE | NE | NE | NE |
| GW-3 Criteria | | | 30,000 | 30,000 | 5,000 | 50,000 | 20,000 | 50,000 | 20,000 | 10,000 | 20,000 | 5,000 | 50,000 | 50,000 | 40,000 | 50,000 | 5,000 | 50,000 | 20,000 | 1,000 | NE | NE | NE | NE |
| UCL Criteria | | | 100,000 | 100,000 | 50,000 | 100,000 | 100,000 | | 100,000 | 100,000 | 100,000 | 100,000 | 100,000 | 100,000 | 100,000 | 100,000 | 100,000 | 100,000 | 100,000 | 10,000 | NE | NE | NE | NE |
| 3G-12 | | 11/11/2010 | 6.5 | 1.8 | **6.4** | 1.2 | 1.7 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 17.6 |
| 3G-12 | | 11/16/2011 | 4.1 | 3.7 | **6** | 1.8 | 1.1 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 16.7 |
| 3G-12 | | 11/9/2012 | 2.1 | 1.9 | 4.2 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 8.2 |
| 3G-12 | | 11/11/2013 | 2.3 | 1.5 J | 2.9 | 0.58 J | 0.61 J | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 7.89 |
| 3G-12 | | 11/11/2014 | 3 | 1.6 | 3.8 | 0.93 J | 0.68 J | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 10.01 |
| 3G-12 | | 11/13/2015 | 0.57 J | 0.83 J | 1.6 | <1 | <1 | **0.3100** | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 3 |
| 3G-12 | Duplicate | 11/13/2015 | 0.61 J | 0.92 J | 1.5 | 0.32 J | 0.34 J | 0.10 J | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 3.69 |
| 3G-12 | | 8/26/2016 | 1.6 | 1.4 | 3.1 | 0.91 | 0.55 | 0.210 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 7.77 |
| 3G-12 | Duplicate | 8/26/2016 | 1.7 | 1.5 | 3.3 | 0.99 | 0.6 | 0.201 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 8.291 |
| 3G-12 | | 11/11/2016 | 1.3 | 1.2 | 2.7 | 0.68J | 0.50 J | 0.2230 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 5.423 |
| 3G-12 | Duplicate | 11/11/2016 | 1.2 | 1.2 | 2.5 | 0.64J | 0.48 J | 0.165 J | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 4.9 |
| 3G-12 | | 2/10/2017 | 1.6 | 1.9 | 3.4 | 1 | 0.5 J | 0.070 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 0.1 J | <0.1 | <0.1 | <0.1 | 0.1 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 7.9 |
| 3G-12 | | 5/16/2017 | 1.8 | 2.0 | 3.2 | 0.9 | 0.6 | 0.076 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 0.1 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 8.5 |
| 3G-12 | Duplicate | 5/16/2017 | 1.7 | 2.0 | 3.2 | 1 | 0.6 | 0.066 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 0.1 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 J | <0.1 | 8.5 |
| 3G-12 | | 8/14/2017 | 1.2 | 2.2 | 2.5 | 0.8 | 0.4 J | 0.072 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 0.1 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | 7.27 |
| 3G-12 | Duplicate | 8/14/2017 | 1.2 | 2.2 | 2.5 | 0.8 | 0.4 J | 0.053 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 0.1 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | 7.25 |
| 3G-12 | | 11/15/2017 | 0.9 | 1.6 | 2.2 | 0.5 | 0.3 J | 0.11 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 UJ | <0.2 | 5.61 |
| 3G-12 | Duplicate | 11/15/2017 | 0.9 | 1.6 | 2.3 | 0.5 | 0.3 J | <0.051 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 UJ | <0.2 | 5.6 |
| EMW-10D | | 5/6/1997 | <1 | 1 | 3 | 3 | <1 | NS | <1 | <1 | <1 | <1 | <5 | <1 | <1 | <1 | <3 | <1 | NA | NA | <1 | <1 | <1 | 7 |
| EMW-10D | | 5/11/1998 | 1 | **18** | **55** | 10 | <1 | NS | <1 | <1 | <1 | <1 | <5 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 84 |
| EMW-10D | | 8/18/1998 | <1.0 | **9.7** | **36** | 6.3 | <1.0 | NS | 1 | <2.0 | <1.0 | <2.0 | <1.0 | <1.0 | <2.0 | <2.0 | <1.0 | <2.0 | <1.0 | <2.0 | <1.0 | <1 | <5 | 53 |
| EMW-10D | | 11/18/1998 | <1 | 3 | **7** | <1 | <1 | NS | <1 | <1 | <1 | 3 | <1 | <1 | 4 | <1 | 29 | <1 | <1 | <1 | <1 | <1 | <1 | 46 |
| EMW-10D | | 2/17/1999 | <1 | **6** | **23** | 2 | <1 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 31 |
| EMW-10D | | 5/12/1999 | <1 | 2 | **6** | 2 | 1 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 11 |
| EMW-10D | | 5/3/2000 | <1 J | 7 J | 22 J | 4 J | <1 J | NS | 2 J | <1 J | <1 J | <1 J | <1 J | <1 J | <1 J | <1 J | <3 J | <1 J | <1 J | <1 J | <1 J | <1 | <1 | 35 |
| EMW-10D | | 6/15/2000 | <1 | 2 | 4 | 2 | <1 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 8 |
| EMW-10D | | 8/17/2000 | 2 | **7** | **25** | 5 | 1 | NS | 3 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 43 |
| EMW-10D | | 11/13/2000 | 1 | **9** | **31** | 6 | <1 | NS | 2 | <1 | <1 | <1 | <5 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 49 |
| EMW-10D | | 2/12/2001 | <1 | 2 | **7** | <1 | <1 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <5 | <1 | 9 |
| EMW-10D | | 11/14/2001 | 1.2 | 4.3 | **17** | 3.1 | 0.87 J | NS | 1.9 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | 1.2 J | <5 | <1 | 29.6 J |
| EMW-10D | Duplicate | 11/14/2001 | 1 | 4.4 | **17** | 3.2 | 0.90 J | NS | 1.9 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | 1.2 J | <5 | <1 | 29.6 J |
| EMW-10D | | 11/20/2002 | 1.1 | 4.1 | **13** | 2.4 | 0.33 J | NS | 5.6 | <1 | 0.21 J | <1 | <5 | 14 | <1 | <1 | <3 | <1 | <1 | <1 | 0.57 J | <5 | <1 | 41.3 J |
| EMW-10D | | 11/3/2003 | 1 | 4 | **11** | 2 | <1 | NS | 6 | <1 | <1 | <1 | <1 | NA | <1 | <1 | <2 | <1 | <1 | <1 | NA | <1 | 20 | 44 |
| EMW-10D | | 11/23/2004 | 1.6 | 2.5 J | 7.6 J | 0.98J | <1.0 | NS | 4.4 | <1.0 | <1.0 | <1.0 | <2.0 | 11 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | 2.2 | <2.0 | 30 J |
| EMW-10D | | 11/1/2005 | <1.0 | 4 | 0.73 J | <1.0 | <1.0 | NS | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | 1 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | 5 |
| EMW-10D | | 11/7/2006 | <1.0 | 2.8 | **7.6** | 1.6 | <1.0 | NS | 3.6 | <1.0 | <1.0 | <1.0 | <2.0 | 2.5 | <1.0 | <1.0 | <3.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | 18.1 |
| EMW-10D | | 11/9/2007 | <1 | <1 | 1.8 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <3 | <0.5 | <1 | <1 | <1 | <1 | <2 | 1.8 |
| EMW-10D | | 11/7/2008 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5* | <1 | <1 | <1 | <1 | <2 | 0 |
| EMW-10D | | 11/11/2009 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 0 |
| EMW-10D | | 11/10/2010 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 0 |
| EMW-10D | | 11/15/2011 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1* | <2 | 0 |
| EMW-10D | | 11/9/2012 | <1 | <1 | 2.8 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 2.8 |
| EMW-10D | | 11/12/2013 | <1 | 0.33 J | 0.66 J | <1 | <1 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 0.99 |
| EMW-10D | | 11/11/2014 | <1 | 0.89 J | 2.5 | 0.47 J | <1 | 0.088 J | 0.37 J | <1 | <1 | <1 | <1 | 0.42 J | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 4.65 |
| EMW-10D | | 11/16/2015 | <1 | 0.61 J | 0.75 J | <1 | <1 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <2 | <2 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 1.36 |
| EMW-10D | | 8/26/2016 | <1.0 | 0.59 | 0.85 | <1.0 | <1.0 | <0.02 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 1.44 |
| EMW-10D | | 11/11/2016 | <1.0 | 0.77 J | 1.7 | 0.45 J | <1.0 | 0.0824 J | <1 | <1 | <1 | <1 | <1 | 0.38 J | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 1.7 |
| EMW-10D | | 2/10/2017 | 0.4 J | 0.5 J | 1.2 | 0.2 J | <0.1 | <0.05 | 0.1 J | <0.1 | <0.1 | <0.1 | <0.1 | 0.1 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | |
| EMW-10D | | 5/16/2017 | <0.1 | 0.2 J | 0.2 J | <0.1 | <0.1 | <0.051 | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 J | <0.2 | |
| EMW-10D | | 8/12/2017 | <0.1 | 0.3 J | 0.2 J | <0.1 | <0.1 | <0.050 | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 0.5 |
| EMW-10D | | 11/14/2017 | 0.2 J | 0.7 | 2.3 | 0.4 J | 0.2 J | 0.1 J | 0.2 J | <0.1 | <0.1 | <0.1 | <0.2 | 0.3 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 UJ | <0.1 | 4.4 |
| EMW-10R | | 5/6/1997 | <1 | <1 | 3 | <1 | <1 | NS | <1 | <1 | 5 | <1 | <5 | <1 | <1 | <1 | <3 | <1 | NA | NA | <1 | <1 | <1 | 8 |
| EMW-10R | | 5/12/1998 | <1 | <1 | 2 | <1 | <1 | NS | <1 | **5** | <1 | <1 | <5 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <5 | 7 |
| EMW-10R | | 8/19/1998 | <1.0 | <1.0 | **5.1** | <1.0 | <1.0 | NS | <1.0 | <2.0 | <1.0 | <2.0 | <1.0 | <1.0 | <2.0 | <2.0 | <1.0 | <2.0 | <1.0 | <2.0 | <1.0 | <1 | <1 | 5.1 |
| EMW-10R | | 11/20/1998 | <1 | 2 | **10** | 1 | <1 | NS | <1 | 2 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 15 |
| EMW-10R | | 2/17/1999 | <1 | <1 | 1 | <1 | <1 | NS | <1 | 3 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 4 |
| EMW-10R | | 5/13/1999 | <1 | <1 | 4 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 4 |
| EMW-10R | | 5/3/2000 | <1 | <1 | 3 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 3 |

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**Former RCA Facility**
**Burlington, Massachusetts**

| Monitoring Well Number | Sample Type | Date Sampled | 1,1-Dichloroethene | Tetrachloroethene | Trichloroethene | cis-1,2-Dichloroethene | 1,1-Dichloroethane | 1,4-Dioxane | 1,1,1-Trichloroethane | Benzene | Chloroform | Ethyl-benzene | Methylene Chloride | Methyl tert-butyl ether | Toluene | 1,1,2-Trichloroethane | Xylene (total) | Vinyl Chloride | 1,2-Dichloroethane | Chloro-benzene | Trichlorofluoromethane | Dichlorodifluoromethane | Chloromethane | Total VOCs |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **GW-1 Criteria** | | | **7** | **5** | **5** | **70** | **70** | **0.3000** | **200** | **5** | **70** | **700** | **5** | **70** | **1,000** | **5** | **10,000** | **2** | **5** | **100** | **NE** | **NE** | **NE** | **NE** |
| **GW-2 Criteria** | | | **80** | **50** | **5** | **100** | **1,000** | **6,000** | **4,000** | **2,000** | **50** | **20,000** | **10,000** | **50,000** | **50,000** | **900** | **9,000** | **2** | **5** | **200** | **NE** | **NE** | **NE** | **NE** |
| **GW-3 Criteria** | | | **30,000** | **30,000** | **5,000** | **50,000** | **20,000** | **50,000** | **20,000** | **10,000** | **20,000** | **5,000** | **50,000** | **50,000** | **40,000** | **50,000** | **5,000** | **50,000** | **20,000** | **1,000** | **NE** | **NE** | **NE** | **NE** |
| **UCL Criteria** | | | **100,000** | **100,000** | **50,000** | **100,000** | **100,000** | | **100,000** | **100,000** | **100,000** | **100,000** | **100,000** | **100,000** | **100,000** | **100,000** | **100,000** | **100,000** | **100,000** | **10,000** | **NE** | **NE** | **NE** | **NE** |
| EMW-10R | | 6/16/2000 | <1 | <1 | 1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 1 |
| EMW-10R | | 8/17/2000 | 1 | <1 | 5 | <1 | <1 | NS | 2 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 8 |
| EMW-10R | | 11/14/2000 | <1 | 2 | 9 | <1 | <1 | NS | 6 | <1 | <1 | <1 | <5 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 17 |
| EMW-10R | | 2/13/2001 | <1 | <1 | 4 | <1 | <1 | NS | 2 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <5 | <1 | 6 |
| EMW-10R | | 11/15/2001 | <1 | <1 | 1.6 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <5 | <5 | <1 | 1.6 |
| EMW-10R | | 11/21/2002 | 0.33 J | 0.18 J | 2.3 | 0.31 J | <1 | NS | 1.3 | <1 | <1 | <1 | <5 | 0.88 J | <1 | <1 | <3 | <1 | <1 | <1 | <5 | <5 | <1 | 5.3 |
| EMW-10R | | 11/4/2003 | <1 | <1 | 1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <1 | NA | <1 | <1 | <2 | <1 | <1 | <1 | NA | <1 | <1 | 1 |
| EMW-10R | | 11/23/2004 | <1.0 | <1.0 | 0.70 J | <1.0 | <1.0 | NS | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | 0.70 J |
| EMW-10R | | 11/2/2005 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | NS | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | 0 |
| EMW-10R | | 11/7/2006 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | NS | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | <1.0 | <1.0 | <1.0 | <3.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | 0 |
| EMW-10R | | 11/9/2007 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <3 | <0.5 | <1 | <1 | <1 | <1 | <2 | 0 |
| EMW-10R | | 11/5/2008 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 0 |
| EMW-10R | | 11/12/2009 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | ND |
| EMW-10R | | 11/11/2010 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1* | <2 | ND |
| EMW-10R | | 11/15/2011 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1* | <2 | 0 |
| EMW-10R | | 11/8/2012 | <1 | <1 | 1.1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 1.1 |
| EMW-10R | | 11/12/2013 | <1 | <1 | 0.25 J | <1 | <1 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 12.25 |
| EMW-10R | | 11/12/2014 | <1 | <1 | <1 | <1 | <1 | 0.14 J | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 9 |
| EMW-10R | | 11/16/2015 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 1.9 |
| EMW-10R | | 8/26/2016 | <1 | <1 | 1.3 | 0.47 | <1 | 0.210 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 1.98 |
| EMW-10R | | 11/11/2016 | <1.0 | <1.0 | 0.23 J | <1.0 | <1.0 | 0.0354 J | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 0.26J |
| EMW-10R | | 2/11/2017 | <0.1 | <0.1 | 0.3 J | <0.1 | <0.1 | 0.055 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | |
| EMW-10R | | 5/16/2017 | <0.1 | <0.1 | 0.2 J | <0.1 | <0.1 | <0.050 | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 J | <0.2 | |
| EMW-10R | | 8/13/2017 | <0.1 | <0.1 | 0.3 J | <0.1 | <0.1 | 0.058 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <.01 | <0.1 | <.02 | 5.00 |
| EMW-1D | | 11/13/1996 | **94** | **12** | **62** | <1 | 14 | NS | <1 | <1 | <1 | <1 | <5 | <1 | <1 | <1 | <3 | 1 | NA | NA | <1 | <1 | <1 | 183 |
| EMW-1D | | 5/12/1998 | **120** | **30** | **160** | 33 | 23 | NS | 3 | <0.2 | <0.3 | <0.2 | <0.4 | <0.3 | <0.2 | <0.5 | 5 | **3** | <0.5 | <0.3 | <0.3 | <0.3 | <0.4 | 377 |
| EMW-1D | | 8/18/1998 | **61** | **22** | **92** | 22 | 12 | NS | 1.1 | <2.0 | <1.0 | <2.0 | <1.0 | <1.0 | <2.0 | <2.0 | <1.0 | **2.2** | <1.0 | <2.0 | <1.0 | <1 | <5 | 212.3 |
| EMW-1D | | 11/20/1998 | **20** | **11** | **46** | 9 | 5 | NS | <1 | <1 | <1 | <1 | <1 | 4 | <1 | <1 | 7 | **2** | <1 | <1 | <1 | <1 | <1 | 104 |
| EMW-1D | | 5/13/1999 | **22** | **10** | **39** | 9 | 6 | NS | **210** | <1 | <1 | <1 | <1 | 2 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 298 |
| EMW-1D | | 6/16/2000 | **22** | **16** | **69** | 19 | 5 | NS | 34 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | **2** | <1 | <1 | <1 | <1 | <1 | 167 |
| EMW-1D | | 8/17/2000 | <1 | 4 | 1 | 2 | 3 | NS | 7 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 17 |
| EMW-1D | | 11/13/2000 | **12** | 3 | **9** | 2 | 5 | NS | 72 | <1 | <1 | <1 | <5 | 3 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 106 |
| EMW-1D | | 2/12/2001 | **8** | 2 | **6** | 1 | 3 | NS | 53 | <1 | <1 | <1 | <1 | 3 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <5 | <1 | 76 |
| EMW-1D | | 11/15/2001 | 4.6 | 1.1 | 2.6 | 0.52 J | 2.9 | NS | 22 | <1 | <1 | <1 | <1 | 0.96 J | <1 | <1 | <3 | <1 | <1 | <1 | 1.3 J | <5 | <1 | 36 J |
| EMW-1D | | 11/20/2002 | **31** | **19** | 73 J | 20 | 5.8 | NS | 13 | 0.14 J | <1 | <1 | <5 | 0.72 J | <1 | <1 | <3 | **2** | <1 | 0.44 J | 0.64 J | <5 | <1 | 165.7 J |
| EMW-1D | | 1/23/2003 | **7.8** | **5.1** | **17** | 3.1 | 2.5 | NS | 24 | <1.0 | <1.0 | <1.0 | <5.0 | <1.0 | <1.0 | <1.0 | <3.0 | <1.0 | <1.0 | <1.0 | <1.0 | <5 | <1 | 59.5 |
| EMW-1D | Duplicate | 1/23/2003 | **11** | 4.9 | **18** | 3.4 | 2.8 | NS | 24 | <1.0 | <1.0 | <1.0 | <5.0 | <1.0 | <1.0 | <1.0 | <3.0 | <1.0 | <1.0 | <1.0 | <1.0 | <5 | <1 | 64.1 |
| EMW-1D | | 11/4/2003 | **16** | **12** | **44** | 11 | 3 | NS | 17 | <1 | <1 | <1 | <1 | NA | <1 | <1 | <2 | 1 | <1 | <1 | NA | <1 | <1 | 104 |
| EMW-1D | | 11/23/2004 | 6.3 | 4.4 J | 18 J | 2.6 J | 2.8 J | NS | 7.6 | <1.0 | <1.0 | <1.0 | <2.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | 13.9 |
| EMW-1D | | 11/2/2005 | **7** | **7.4** | **30** | 5.9 | 3.5 | NS | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | <1.0 | <1.0 | 3.3 | <1.0 | 0.57 J | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | 57.1 |
| EMW-1D | | 11/7/2006 | 5.2 | 4.6 | **17** | 3.9 | 3.3 | NS | 2.4 | <1.0 | <1.0 | <1.0 | <2.0 | <1.0 | <1.0 | <1.0 | <3.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | 36.4 |
| EMW-1D | | 11/8/2007 | 3.6 | 3.1 | **13** | 2.9 | 2.1 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <3 | <0.5 | <1 | <1 | <1 | <1 | <2 | 24.7 |
| EMW-1D | | 11/5/2008 | 4.6 | 3.5 | **15** | 3 | 2.2 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 28.3 |
| EMW-1D | | 11/12/2009 | 5.2 | **5.2** | **23** | 4.5 | 2.3 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | 0.55 | <1 | <1 | <1 | <1 | <2 | 40.75 |
| EMW-1D | | 6/25/2010 | 4.8 | 3.5 | **18** | 3.4 J | 1.9 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 31.6 J |
| EMW-1D | | 11/11/2010 | 3.2 | 3.5 | **17** | 3.5 | 1.4 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 28.6 |
| EMW-1D | | 11/16/2011 | 2.5 | 2.8 | **13** | 2.7 | <1 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 21 |
| EMW-1D | | 11/9/2012 | 2.5 | **5** | **24** | 4.4 | 1.1 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 37 |
| EMW-1D | | 11/12/2013 | 1.6 J | 2 | **12** | 2.1 | 0.59 J | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 18.29 |
| EMW-1D | | 11/12/2014 | 2.2 | 3.6 | **19** | 3.2 | 0.72 J | **0.38** | <1 | <1 | <1 | <1 | <1 | 0.29 J | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 29.01 |
| EMW-1D | | 11/16/2015 | 2 | 4.4 | **23** | 4.3 | 0.89 J | **0.31** | <1 | <1 | <1 | <1 | <1 | 0.52 J | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 35.11 |
| EMW-1D | | 8/26/2016 | 0.73 | 1.5 | **7.1** | 1.6 | 0.36 | 0.191 J | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 11.29 |
| EMW-1D | | 11/11/2016 | 0.95 J | 1.8 | **9.5** | 2.3 | 0.43 J | 0.26 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 13.86 |
| EMW-1D | | 2/10/2017 | 1.2 | 2.2 | **12** | 2.2 | 0.4 J | 0.074 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 0.2 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | |
| EMW-1D | | 5/15/2017 | 0.7 | 1.7 | **7.9** | 1.4 | 0.4 J | 0.081 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 0.2 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 J | <0.2 | 11.7 |
| EMW-1D | | 8/15/2017 | 0.8 | 1.7 | **7.7** | 1.5 | 0.4 J | <0.051 | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | 0.2 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | 12.3 |
| EMW-1D | | 11/16/2017 | 0.4 J | 2 | **9.6** | 1.8 | 0.4 J | 0.1 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | 0.2 J | <0.1 | <0.1 | <0.1 | 0.1 J | <0.1 | <0.1 | <0.1 | <0.1 UJ | <0.2 | 12.3 |
| EMW-2D | | 11/13/1996 | **51** | **12** | **72** | <1 | 14 | NS | <1 | <1 | <1 | <1 | **13** | <1 | <1 | <1 | <3 | <1 | NA | NA | <1 | <1 | <1 | 162 |

**Table 3-1**
**Summary of Groundwater Sampling Results for VOCs**
**Phase V Monitoring Report and ROS Statement**
**Former RCA Facility**
**Burlington, Massachusetts**

| Monitoring Well Number | Sample Type | Date Sampled | 1,1-Dichloroethene | Tetrachloroethene | Trichloroethene | cis-1,2-Dichloroethene | 1,1-Dichloroethane | 1,4-Dioxane | 1,1,1-Trichloroethane | Benzene | Chloroform | Ethyl-benzene | Methylene Chloride | Methyl tert-butyl ether | Toluene | 1,1,2-Trichloroethane | Xylene (total) | Vinyl Chloride | 1,2-Dichloroethane | Chloro-benzene | Trichlorofluoromethane | Dichlorodifluoromethane | Chloromethane | Total VOCs |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **GW-1 Criteria** | | | **7** | **5** | **5** | **70** | **70** | **0.3000** | **200** | **5** | **70** | **700** | **5** | **70** | **1,000** | **5** | **10,000** | **2** | **5** | **100** | **NE** | **NE** | **NE** | **NE** |
| **GW-2 Criteria** | | | **80** | **50** | **5** | **100** | **1,000** | **6,000** | **4,000** | **2,000** | **50** | **20,000** | **10,000** | **50,000** | **50,000** | **900** | **9,000** | **2** | **5** | **200** | **NE** | **NE** | **NE** | **NE** |
| **GW-3 Criteria** | | | **30,000** | **30,000** | **5,000** | **50,000** | **20,000** | **50,000** | **20,000** | **10,000** | **20,000** | **5,000** | **50,000** | **50,000** | **40,000** | **50,000** | **5,000** | **50,000** | **20,000** | **1,000** | **NE** | **NE** | **NE** | **NE** |
| **UCL Criteria** | | | **100,000** | **100,000** | **50,000** | **100,000** | **100,000** | | **100,000** | **100,000** | **100,000** | **100,000** | **100,000** | **100,000** | **100,000** | **100,000** | **100,000** | **100,000** | **100,000** | **10,000** | **NE** | **NE** | **NE** | **NE** |
| EMW-2D | | 5/13/1998 | **40** | **17** | **64** | 11 | 13 | NS | 2 | <0.2 | <0.3 | <0.2 | <0.4 | <0.3 | <0.2 | <0.5 | <0.3 | <0.3 | <0.5 | <0.3 | <0.3 | <0.3 | <0.4 | 147 |
| EMW-2D | | 8/20/1998 | **23** | **9.2** | **38** | 6.2 | 7 | NS | <1.0 | <2.0 | <1.0 | <2.0 | <1.0 | <1.0 | <2.0 | <2.0 | <1.0 | <2.0 | <1.0 | <2.0 | <1.0 | <1 | <5 | 83.4 |
| EMW-2D | | 11/19/1998 | **24** | **10** | **42** | 6 | 7 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 7 | <1 | <1 | <1 | <1 | <1 | <1 | 96 |
| EMW-2D | | 2/18/1999 | **19** | **7** | **37** | 4 | 6 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 73 |
| EMW-2D | | 5/13/1999 | **8** | **8** | **32** | 5 | 7 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 60 |
| EMW-2D | | 6/15/2000 | **20** | **6** | **23** | 5 | 7 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 61 |
| EMW-2D | | 8/17/2000 | **24** | **10** | **39** | 7 | 8 | NS | 2 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 90 |
| EMW-2D | | 11/13/2000 | **32** | **13** | **52** | 8 | 9 | NS | 2 | <1 | <1 | <1 | <5 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 116 |
| EMW-2D | | 2/13/2001 | **24** | **11** | **41** | 6 | 7 | NS | 1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <5 | <1 | 90 |
| EMW-2D | | 11/14/2001 | **20** | **7.8** | **33** | 5 | 5.1 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | 0.4 J | <5 | <1 | 71.3 J |
| EMW-2D | | 11/20/2002 | 14 J | 6.2 J | 26 J | 4.4 J | 3.8 J | NS | <1 J | <1 J | <1 J | <1 J | <5 J | <1 J | <1 J | <1 J | <3 J | <1 J | <1 J | <1 J | 0.45 J | <5 | <1 | 54.9 J |
| EMW-2D | | 11/4/2003 | **15** | **7** | **23** | 4 | 3 | NS | <1 | <1 | <1 | <1 | <1 | NA | <1 | <1 | <2 | <1 | <1 | <1 | NA | <1 | <1 | 52 |
| EMW-2D | Duplicate | 11/4/2003 | **14** | **7** | **23** | 4 | 3 | NS | <1 | <1 | <1 | <1 | <1 | NA | <1 | <1 | <2 | <1 | <1 | <1 | NA | <1 | <1 | 51 |
| EMW-2D | | 11/23/2004 | **17** | 6.3 J | 29 J | 3.7 J | 4.3 J | NS | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | 0.74 J | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | 112 J |
| EMW-2D | Duplicate | 11/23/2004 | **12** | 4.2 J | 19 J | 2.5 J | 3 J | NS | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | 0.50 J | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | 41 J |
| EMW-2D | | 11/2/2005 | **11** | **5.3** | **19** | 2.9 | 2.6 | NS | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | 1.3 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | 42.1 |
| EMW-2D | Duplicate | 11/1/2005 | **10** | **5.3** | **19** | 2.8 | 2.6 | NS | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | 1.4 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | 41.1 |
| EMW-2D | | 11/7/2006 | **8.3** | 4.4 | **15** | 2.8 | 2.1 | NS | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | 1.9 | <1.0 | <1.0 | <3.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | 34.5 |
| EMW-2D | Duplicate | 11/7/2006 | **8.3** | 4.4 | **15** | 2.7 | 2.1 | NS | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | 1.8 | <1.0 | <1.0 | <3.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | 34.3 |
| EMW-2D | | 11/8/2007 | 5.5 | 2.6 | **9.3** | 1.8 | 1.3 | NS | <1 | <1 | <1 | <1 | <2 | 2.3 | <1 | <1 | <3 | <0.5 | <1 | <1 | <1 | <1 | <2 | 22.8 |
| EMW-2D | Duplicate | 11/8/2007 | 6.1 | 2.6 | **9.4** | 1.9 | 1.5 | NS | <1 | <1 | <1 | <1 | <2 | 1.9 | <1 | <1 | <3 | <0.5 | <1 | <1 | <1 | <1 | <2 | 23.4 |
| EMW-2D | | 11/5/2008 | 6.7 | 3 | **11** | 1.8 | 1.3 | NS | <1 | <1 | <1 | <1 | <2 | 1.8 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 25.6 |
| EMW-2D | Duplicate | 11/5/2008 | 6.7 | 3.1 | **11** | 1.8 | 1.3 | NS | <1 | <1 | <1 | <1 | <2 | 1.9 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 25.8 |
| EMW-2D | | 11/12/2009 | 5.7 | 2.6 | **9.7** | 1.6 | 1.1 | NS | <1 | <1 | <1 | <1 | <2 | 1.2 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 21.9 |
| EMW-2D | Duplicate | 11/12/2009 | 6.6 | 2.7 | **9.9** | 1.5 | 1 | NS | <1 | <1 | <1 | <1 | <2 | 1.2 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 22.9 |
| EMW-2D | | 11/11/2010 | 5.3 | 2.4 | **10** | 1.8 | <1 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 19.5 |
| EMW-2D | Duplicate | 11/11/2010 | 5.5 | 2.6 | **10** | 1.8 | 1 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 20.9 |
| EMW-2D | | 11/16/2011 | 4.4 | 2.2 | **9.7** | 1.7 | <1 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 18 |
| EMW-2D | Duplicate | 11/16/2011 | 4.8 | 2.4 | **9.8** | 1.7 | <1 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 18.7 |
| EMW-2D | | 11/9/2012 | 3 | 2.4 | **9.8** | 1.4 | <1 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 16.6 |
| EMW-2D | Duplicate | 11/9/2012 | 2.9 | 2.4 | **9.6** | 1.6 | <1 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1* | <2 | 16.5 |
| EMW-2D(R) | | 11/11/2013 | 5.5 | 1.6 J | **7** | 1.6 J | 1.3 J | NS | <1 | <1 | <1 | <1 | <1 | 0.43 J | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 17.43 |
| EMW-2D(R) | Duplicate | 11/11/2013 | 5.9 | 1.6 J | **6.8** | 1.6 J | 1.3 J | NS | <1 | <1 | <1 | <1 | <1 | 0.39 J | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 17.59 |
| EMW-2D(R) | | 11/11/2014 | 0.62 J | 2.8 | 2.1 | 0.54 J | 0.26 J | 0.085 J | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 6.32 |
| EMW-2D(R) | Duplicate | 11/11/2014 | 0.64 J | 2.5 | 2.2 | 0.59J | 0.29 J | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 6.22 |
| EMW-2D(R) | | 11/13/2015 | <1 | 2.3 | 1.5 | 0.46 J | <1 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 4.26 |
| EMW-2D(R) | | 8/26/2016 | <1 | 3.1 | 1.5 | 0.54 | <1 | 0.0352 J | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 5.14 |
| EMW-2D(R) | | 11/11/2016 | <1.0 | 2.4 | 1.5 | 0.62 J | <1.0 | 0.0418 J | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 3.9 |
| EMW-2D(R) | | 2/14/2017 | 0.6 | 4.1 | 2.4 | 0.8 | 0.2 J | <0.051 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 0.1 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | |
| EMW-2D(R) | | 5/16/2017 | 0.6 | 3.8 | 2.1 | 0.9 | 0.2 J | <0.050 | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 J | <0.2 | 7.4 |
| EMW-2D(R) | | 8/15/2017 | 3.2 | 2 | 4.9 | 4.1 | 0.8 | <0.050 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 0.4 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | 15.4 |
| EMW-2D(R) | | 11/15/2017 | 3 | 1.5 | 4.8 | 4 | 0.8 | 0.07 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 0.3 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 UJ | <0.2 | 14.47 |
| EMW-3R | | 5/13/1998 | **21** | **14** | **63** | 18 | 6 | NS | 6 | <0.2 | <0.3 | <0.2 | <0.4 | <0.3 | <0.2 | <0.5 | <0.3 | <0.3 | <0.5 | <0.3 | <0.3 | <0.3 | <0.4 | 128 |
| EMW-3R | | 8/20/1998 | **12** | **14** | **42** | 9.8 | 3.5 | NS | 3.4 | <2.0 | <1.0 | <2.0 | <1.0 | <1.0 | <2.0 | <2.0 | <1.0 | <2.0 | <1.0 | <2.0 | <1.0 | <1 | <5 | 84.7 |
| EMW-3R | | 11/19/1998 | **12** | **15** | **44** | 10 | 4 | NS | 3 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 88 |
| EMW-3R | | 2/18/1999 | **9** | **10** | **39** | 7 | 2 | NS | 2 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 69 |
| EMW-3R | | 5/13/1999 | **11** | **7** | **33** | 10 | 4 | NS | 2 | 1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 68 |
| EMW-3R | | 6/16/2000 | **10** | **7** | **28** | 10 | 4 | NS | 2 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 61 |
| EMW-3R | | 8/17/2000 | **14** | **11** | **39** | 11 | 5 | NS | 4 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 84 |
| EMW-3R | | 11/14/2000 | **17** | 4 | **42** | 15 | 6 | NS | 5 | 1 | <1 | <1 | <5 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 90 |
| EMW-3R | | 2/13/2001 | **11** | 3 | **30** | 10 | 4 | NS | 3 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <5 | <1 | 61 |
| EMW-3R | | 11/15/2001 | 6.2 | 1.8 | **23** | 6.1 | 2.6 | NS | 1.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <5 | <5 | <1 | 41.2 |
| EMW-3R | | 11/21/2002 | 4.7 | 2.5 | **22** | 5.6 | 2.7 | NS | 0.34 J | <1 | <1 | <1 | <5 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | 0.39 J | <5 | <1 | 38.2 J |
| EMW-3R | | 11/4/2003 | 6 | 3 | **20** | 6 | 2 | NS | <1 | <1 | <1 | <1 | <1 | NA | <1 | <1 | <2 | <1 | <1 | <1 | NA | <1 | <1 | 37 |
| EMW-3R | | 11/23/2004 | 4.4 | 2.4 J | 18 J | 3.4 J | 2.2 J | NS | 1 | <1.0 | <1.0 | <1.0 | <2.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | 5 |
| EMW-3R | | 11/2/2005 | 3.7 | 3.7 | **19** | 3.3 | 2 | NS | 0.91 | <1.0 | <1.0 | <1.0 | <2.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | 32.6 |
| EMW-3R | | 11/7/2006 | 2.6 | 3.3 | **16** | 3.4 | 1.9 | NS | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | <1.0 | <1.0 | <1.0 | <3.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | 27.2 |
| EMW-3R | | 11/9/2007 | 2.1 | 2.9 | **13** | 2.7 | 1.3 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <3 | <0.5 | <1 | <1 | <1 | <1 | <2 | 22 |

**Table 3-1**
**Summary of Groundwater Sampling Results for VOCs**
**Phase V Monitoring Report and ROS Statement**
**Former RCA Facility**
**Burlington, Massachusetts**

| Monitoring Well Number | Sample Type | Date Sampled | 1,1-Dichloroethene | Tetrachloroethene | Trichloroethene | cis-1,2-Dichloroethene | 1,1-Dichloroethane | 1,4-Dioxane | 1,1,1-Trichloroethane | Benzene | Chloroform | Ethyl-benzene | Methylene Chloride | Methyl tert-butyl ether | Toluene | 1,1,2-Trichloroethane | Xylene (total) | Vinyl Chloride | 1,2-Dichloroethane | Chloro-benzene | Trichlorofluoromethane | Dichlorodifluoromethane | Chloromethane | Total VOCs |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **GW-1 Criteria** | | | **7** | **5** | **5** | **70** | **70** | **0.3000** | **200** | **5** | **70** | **700** | **5** | **70** | **1,000** | **5** | **10,000** | **2** | **5** | **100** | **NE** | **NE** | **NE** | **NE** |
| **GW-2 Criteria** | | | **80** | **50** | **5** | **100** | **1,000** | **6,000** | **4,000** | **2,000** | **50** | **20,000** | **10,000** | **50,000** | **50,000** | **900** | **9,000** | **2** | **5** | **200** | **NE** | **NE** | **NE** | **NE** |
| **GW-3 Criteria** | | | **30,000** | **30,000** | **5,000** | **50,000** | **20,000** | **50,000** | **20,000** | **10,000** | **20,000** | **5,000** | **50,000** | **50,000** | **40,000** | **50,000** | **5,000** | **50,000** | **20,000** | **1,000** | **NE** | **NE** | **NE** | **NE** |
| **UCL Criteria** | | | **100,000** | **100,000** | **50,000** | **100,000** | **100,000** | | **100,000** | **100,000** | **100,000** | **100,000** | **100,000** | **100,000** | **100,000** | **100,000** | **100,000** | **100,000** | **100,000** | **10,000** | **NE** | **NE** | **NE** | **NE** |
| EMW-3R | | 11/5/2008 | 2.3 | 3.8 | **13** | 2.4 | 1.4 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 22.9 |
| EMW-3R | | 11/11/2009 | 2.7 | 4.5 | **14** | 3 | 1.6 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 25.8 |
| EMW-3R | | 6/25/2010 | 2.4 | 3 | **12** | 2.8 J | 1.3 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 21.5 J |
| EMW-3R | | 11/11/2010 | 2.1 | 3.5 | **12** | 3 | 1.2 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 21.8 |
| EMW-3R | | 11/16/2011 | 3.3 | 4 | **13** | 4.5 | 1.4 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 26.2 |
| EMW-3R | | 11/9/2012 | 2.3 | 4.6 | **15** | 3.7 | 1.2 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 26.8 |
| EMW-3R | | 11/12/2013 | 0.83 J | 2.2 | **8.3** | 1.6 J | 0.75 J | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 13.68 |
| EMW-3R | | 11/12/2014 | 1 | 2.3 | **7** | 2.3 | 0.75 J | **0.41** | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 13.35 |
| EMW-3R | | 11/16/2015 | 1.1 | 2.7 | **8.7** | 2.3 | 0.79 J | **0.31** | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 15.59 |
| EMW-3R | | 8/26/2016 | 1.3 | 2.8 | **8.2** | 2.5 | 0.65 | **0.376** | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 15.826 |
| EMW-3R | | 11/11/2016 | 1.3 | 2.3 | **7.5** | 3.3 | 0.99 J | **0.405** | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 14.805 |
| EMW-3R | | 2/11/2017 | 2 | 3 | **10** | 4 | 1 | 0.12 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 0.2 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | |
| EMW-3R | | 5/16/2017 | 1.2 | 2.4 | **8.9** | 3.3 | 0.8 | 0.23 | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | 0.1 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 J | <0.2 | 16.83 |
| EMW-3R | | 8/15/2017 | 1.8 | 4.2 | **12** | 3.5 | 0.9 | 0.18 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | 22.58 |
| EMW-3R | | 11/14/2017 | 1.7 | 3.4 | **11** | 3.6 | 0.8 | 0.2 | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | 0.2 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 UJ | <0.2 | 20.9 |
| EMW-7 | | 11/13/1996 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <5 | <1 | <1 | <1 | <3 | <1 | NA | NA | <1 | <1 | <1 | 0 |
| EMW-7 | | 5/12/1998 | 3 | 4 | 3 | <0.4 | <0.5 | NS | <0.4 | <0.2 | <0.3 | <0.2 | <0.4 | <0.3 | <0.2 | <0.5 | <0.3 | <0.3 | <0.5 | <0.3 | <0.3 | <0.3 | <0.4 | 10 |
| EMW-7 | | 8/18/1998 | <1.0 | 1.9 | 1.6 | <1.0 | <1.0 | NS | 1.5 | <2.0 | <1.0 | <2.0 | <1.0 | <1.0 | <2.0 | <2.0 | <1.0 | <2.0 | <1.0 | <2.0 | <1.0 | <1 | <5 | 5 |
| EMW-7 | | 11/20/1998 | <1 | 4 | 3 | <1 | <1 | NS | 5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 9 | <1 | <1 | <1 | <1 | <1 | <1 | 21 |
| EMW-7 | | 2/17/1999 | <1 | **5** | 2 | 1 | 2 | NS | 11 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 21 |
| EMW-7 | | 5/13/1999 | 2 | 4 | 3 | 2 | 2 | NS | 19 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 32 |
| EMW-7 | | 5/3/2000 | <1 | 3 | 2 | 1 | 1 | NS | 3 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 10 |
| EMW-7 | | 6/16/2000 | <1 | **5** | <1 | 3 | 2 | NS | 7 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 17 |
| EMW-7 | | 8/17/2000 | **15** | **5** | **21** | 5 | 6 | NS | 66 | <1 | <1 | <1 | <1 | 9 | <1 | <1 | <3 | 1 | <1 | <1 | <1 | <1 | <1 | 128 |
| EMW-7 | | 11/13/2000 | <1 | **11** | **5** | 7 | 7 | NS | 10 | <1 | <1 | <1 | <5 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 40 |
| EMW-7 | | 11/15/2001 | <1 | **6.3** | 2.3 | 4.3 | 4.2 | NS | 3.1 | <1 | <1 | <1 | <1 | 0.59 J | <1 | <1 | <3 | 0.3 J | <1 | <1 | 3.7 J | <5 | <1 | 24.8 J |
| EMW-7 | | 11/20/2002 | 0.37 J | 1.5 | 1.9 | 2.2 | 1.3 | NS | 0.58 J | <1 | <1 | <1 | <5 | 2.1 | <1 | <1 | <3 | <1 | <1 | <1 | 1.5 J | <5 | <1 | 11.5 J |
| EMW-7 | | 11/3/2003 | <1 | **8** | 1 | 2 | 2 | NS | <1 | <1 | <1 | <1 | <1 | NA | <1 | <1 | <2 | <1 | <1 | <1 | NA | <1 | 4 | 17 |
| EMW-7 | | 11/23/2004 | <1.0 | 4.6 J | 0.91 J | 0.60 J | 0.88 J | NS | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | 1.2 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | 0.54 J | <2.0 | 9J |
| EMW-7 | | 11/2/2005 | <1.0 | 4 | 0.73 J | <1.0 | <1.0 | NS | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | 1 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | 5 |
| EMW-7 | | 11/7/2006 | <1.0 | 3.9 | 1.2 | <1.0 | <1.0 | NS | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | <1.0 | <1.0 | <1.0 | <3.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | 5.1 |
| EMW-7 | | 11/9/2007 | <1 | 2.4 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <3 | <0.5 | <1 | <1 | <1 | <1 | <2 | 2.4 |
| EMW-7 | | 11/7/2008 | <1 | 2.2 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 2.2 |
| EMW-7 | | 11/11/2009 | <1 | 1.7 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 1.7 |
| EMW-7 | | 11/12/2010 | <1 | 1.9 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 1.9 |
| EMW-7 | | 11/15/2011 | <1 | 1.5 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 1.5 |
| EMW-7 | | 11/8/2012 | <1 | 1.5 | 1.3 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 2.8 |
| EMW-7 | | 11/12/2013 | <1 | 0.77J | 0.34 J | <1 | <1 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 1.11 |
| EMW-7 | | 11/12/2014 | <1 | 1.4 | 0.27 J | <1 | <1 | 0.026 J | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 1.67 |
| EMW-7 | | 11/13/2015 | <1 | 1.1 | 0.3 J | <1 | <1 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 1.4 |
| EMW-7 | | 8/26/2016 | <1 | 1.3 | 0.3 | <1 | <1 | 0.0230 J | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 1.6 |
| EMW-7 | | 11/11/2016 | <1.0 | 1 | 0.32 J | <1.0 | <1.0 | 0.0320 J | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 1 |
| EMW-7 | | 2/14/2017 | <0.1 | 1.1 | 0.2 J | 0.1 J | <0.1 | <0.051 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | |
| EMW-7 | | 5/15/2017 | <0.1 | 1.3 | 0.2 J | <0.1 | <0.1 | <0.052 | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 J | <0.2 | 1.3 |
| EMW-7 | | 8/15/2017 | <0.1 | 1.5 | 0.2 J | 0.1 J | <0.1 | <0.051 | <0.1 | <0.1 | <.01 | <.01 | <.02 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | 1.8 |
| EMW-7 | | 11/14/2017 | <0.1 | 1.2 | 0.2 J | 0.1 J | <0.1 | 0.057 J | <0.1 | <0.1 | <.01 | <.01 | <.02 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 UJ | <0.2 | 1.557 |
| OA-1 | | 11/29/1994 | ND | ND | ND | ND | ND | NS | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | NA | NA | ND | NA | NA | ND |
| OA-1 | | 8/19/1998 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | NS | <1.0 | <2.0 | <1.0 | <2.0 | <1.0 | <1.0 | <2.0 | <2.0 | <1.0 | <2.0 | <1.0 | <2.0 | <1.0 | NA | <5 | 0 |
| 3H-1D | | 11/29/1994 | ND | ND | ND | ND | ND | NS | ND | ND | 4.2 | ND | ND | ND | ND | ND | ND | ND | NA | NA | ND | NA | NA | 4.2 |
| 3H-1D | | 11/12/1996 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <5 | <1 | <1 | <1 | <3 | <1 | NA | NA | <1 | <1 | <1 | 0 |
| 3H-1D | | 5/12/1998 | 2 | 1 | 4 | <0.4 | <0.5 | NS | <0.4 | <0.2 | <0.3 | <0.2 | <0.4 | <0.3 | <0.2 | <0.5 | <0.3 | <0.3 | <0.5 | <0.3 | <0.3 | <0.3 | <0.4 | 7 |
| 3H-1D | | 8/20/1998 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | NS | <1.0 | <2.0 | <1.0 | <2.0 | <1.0 | <1.0 | <2.0 | <2.0 | <1.0 | <2.0 | <1.0 | <2.0 | <1.0 | <1 | <5 | 0 |
| 3H-1D | | 11/19/1998 | 2 | <1 | 1 | <1 | <1 | NS | <1 | <1 | <1 | 1 | <1 | <1 | <1 | <1 | 11 | <1 | <1 | <1 | <1 | <1 | <1 | 15 |
| 3H-1D | | 2/19/1999 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 0 |
| 3H-1D | | 5/13/1999 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 0 |
| 3H-1D | | 6/16/2000 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 0 |
| 3H-1D | | 8/17/2000 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 0 |
| 3H-1D | | 11/13/2000 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <5 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 0 |

**Table 3-1**
**Summary of Groundwater Sampling Results for VOCs**
**Phase V Monitoring Report and ROS Statement**
**Former RCA Facility**
**Burlington, Massachusetts**

| Monitoring Well Number | Sample Type | Date Sampled | 1,1-Dichloroethene | Tetrachloroethene | Trichloroethene | cis-1,2-Dichloroethene | 1,1-Dichloroethane | 1,4-Dioxane | 1,1,1-Trichloroethane | Benzene | Chloroform | Ethyl-benzene | Methylene Chloride | Methyl tert-butyl ether | Toluene | 1,1,2-Trichloroethane | Xylene (total) | Vinyl Chloride | 1,2-Dichloroethane | Chloro-benzene | Trichlorofluoromethane | Dichlorodifluoromethane | Chloromethane | Total VOCs |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GW-1 Criteria | | | 7 | 5 | 5 | 70 | 70 | 0.3000 | 200 | 5 | 70 | 700 | 5 | 70 | 1,000 | 5 | 10,000 | 2 | 5 | 100 | NE | NE | NE | NE |
| GW-2 Criteria | | | 80 | 50 | 5 | 100 | 1,000 | 6,000 | 4,000 | 2,000 | 50 | 20,000 | 10,000 | 50,000 | 50,000 | 900 | 9,000 | 2 | 5 | 200 | NE | NE | NE | NE |
| GW-3 Criteria | | | 30,000 | 30,000 | 5,000 | 50,000 | 20,000 | 50,000 | 20,000 | 10,000 | 20,000 | 5,000 | 50,000 | 50,000 | 40,000 | 50,000 | 5,000 | 50,000 | 20,000 | 1,000 | NE | NE | NE | NE |
| UCL Criteria | | | 100,000 | 100,000 | 50,000 | 100,000 | 100,000 | | 100,000 | 100,000 | 100,000 | 100,000 | 100,000 | 100,000 | 100,000 | 100,000 | 100,000 | 100,000 | 100,000 | 10,000 | NE | NE | NE | NE |
| 3H-1D | | 2/12/2001 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <5 | <1 | 0 |
| 3H-1D | | 11/14/2001 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <5 | <5 | <1 | 0 |
| 3H-1D | | 11/20/2002 | <1 | <1 | 0.32 J | <1 | <1 | NS | <1 | <1 | <1 | <1 | <5 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <5 | <5 | <1 | 0.32 J |
| 3H-1D | | 11/4/2003 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <1 | NA | <1 | <1 | <2 | <1 | <1 | <1 | NA | <1 | <1 | ND |
| 3H-1D | | 11/23/2004 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | NS | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | 0 |
| 3H-1D | | 11/2/2005 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | NS | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | 0 |
| 3H-1D | | 11/7/2006 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | NS | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | <1.0 | <1.0 | <1.0 | <3.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | 0 |
| 3H-1D | | 11/9/2007 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <3 | <0.5 | <1 | <1 | <1 | <1 | <2 | 0 |
| 3H-1D | | 11/7/2008 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 0 |
| 3H-1D | | 11/11/2009 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 0 |
| 3H-1D | | 11/12/2010 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 0 |
| 3H-1D | | 11/14/2011 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 0 |
| 3H-1D | | 11/8/2012 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 0 |
| 3H-1D | | 11/11/2013 | <1 | <1 | 0.27 J | <1 | <1 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 0.27 |
| 3H-1D | | 11/11/2014 | <1 | <1 | <1 | <1 | <1 | 0.11 J | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 0 |
| 3H-1D | | 11/13/2015 | <1 | <1 | 0.22 J | <1 | <1 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 0.22 |
| 3H-1D | | 8/26/2016 | <1 | <1 | 0.23 | <1 | <1 | 0.0914 J | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 0.23 |
| 3H-1D | | 11/11/2016 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | 0.105 J | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 0 |
| 3H-1D | | 2/10/2017 | 0.2 J | <0.1 | 0.2 J | <0.1 | <0.1 | <0.051 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 0.1 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | |
| 3H-1D | | 5/16/2017 | 0.1 J | <0.1 | 0.2 J | <0.1 | <0.1 | 0.071 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 J | <0.2 | 0 |
| 3H-1D | | 8/14/2017 | <0.1 | <0.1 | 0.2 J | <0.1 | <0.1 | 0.058 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | 0.1 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | 0.358 |
| 3H-1D | | 11/27/2017 | 0.2J | <0.1 | 0.1 J | <0.1 | <0.1 | <0.050 | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 UJ | <0.2 UJ | 0.358 |
| 3H-1S | | 11/29/1994 | 22 | 3.7 | 19 | 3.1 | 5.4 | NS | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | NA | NA | NA | NA | NA | 53.2 |
| 3H-1S | | 11/12/1996 | 5 | 1 | 5 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <5 | <1 | <1 | <1 | <3 | <1 | NA | NA | <1 | <1 | <1 | 11 |
| 3H-1S | | 5/12/1998 | 3 | 1 | 8 | <0.4 | <0.5 | NS | <0.4 | <0.2 | <0.3 | <0.2 | <0.4 | <0.3 | <0.2 | <0.5 | <0.3 | <0.3 | <0.5 | <0.3 | <0.3 | <0.3 | <0.4 | 12 |
| 3H-1S | | 8/19/1998 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | NS | <1.0 | <2.0 | <1.0 | <2.0 | <1.0 | <1.0 | <2.0 | <2.0 | <1.0 | <2.0 | <1.0 | <2.0 | <1.0 | <1 | <5 | 0 |
| 3H-1S | | 11/19/1998 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | 1 | <1 | <1 | 1 | <1 | 12 | <1 | <1 | <1 | <1 | <1 | <1 | 14 |
| 3H-1S | | 2/18/1999 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 0 |
| 3H-1S | | 5/12/1999 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 0 |
| 3H-1S | | 6/16/2000 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 0 |
| 3H-1S | | 8/17/2000 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 0 |
| 3H-1S | | 11/13/2000 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <5 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 0 |
| 3H-1S | | 2/12/2001 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <5 | <1 | 0 |
| 3H-1S | | 11/14/2001 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <5 | <5 | <1 | 0 |
| 3H-1S | | 11/20/2002 | 0.23 J | 0.14 J | 0.29 J | <1 | <1 | NS | <1 | <1 | <1 | <1 | <5 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | 0.3 J | <5 | <1 | 0.96 J |
| 3H-1S | | 11/4/2003 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <1 | NA | <1 | <1 | <2 | <1 | <1 | <1 | NA | <1 | <1 | ND |
| 3H-1S | | 11/23/2004 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | NS | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | 0 |
| 3H-1S | | 11/2/2005 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | NS | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | 0 |
| 3H-1S | | 11/7/2006 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | NS | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | <1.0 | <1.0 | <1.0 | <3.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | 0 |
| 3H-1S | | 11/9/2007 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <3 | <0.5 | <1 | <1 | <1 | <1 | <2 | 0 |
| 3H-1S | | 11/7/2008 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 0 |
| 3H-1S | | 11/11/2009 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 0 |
| 3H-1S | | 11/12/2010 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 0 |
| 3H-1S | | 11/14/2011 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 0 |
| 3H-1S | | 11/8/2012 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 0 |
| 3H-1S | | 11/11/2013 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 0 |
| 3H-1S | | 11/11/2014 | <1 | <1 | <1 | <1 | <1 | 0.071 J | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 0 |
| 3H-1S | | 11/13/2015 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 0 |
| 3H-1S | | 8/26/2016 | <1 | <1 | <1 | <1 | <1 | 0.0590 J | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 0 |
| 3H-1S | | 11/11/2016 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | 0.06780 J | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 0 |
| 3H-1S | | 2/10/2017 | 0.2 J | <0.1 | 0.1 J | <0.1 | <0.1 | <0.05 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | |
| 3H-1S | | 5/16/2017 | 0.1 J | <0.1 | <0.1 | <0.1 | <0.1 | 0.059 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 J | <0.2 | 0 |
| 3H-1S | | 8/14/2017 | <0.1 | <0.1 | 0.1 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | 0.1 |
| 3H-1S | | 11/13/2017 | 0.2J | <0.1 | <0.1 | <0.1 | <0.1 | <0.050 | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 UJ | <0.2 UJ | 0.1 |
| 3H-3 | | 8/23/1994 | ND | ND | ND | ND | ND | NS | ND | ND | ND | ND | 12 | ND | 2.4 | ND | 2.8 | ND | NA | NA | ND | NA | NA | 17.2 |
| 3H-3 | | 12/1/1994 | ND | ND | ND | ND | ND | NS | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | NA | NA | ND | NA | NA | ND |
| 3H-3 | | 11/14/1996 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <5 | <1 | <1 | <1 | <3 | <1 | NA | NA | <1 | <1 | <1 | 0 |
| 3H-3 | | 5/3/2000 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 0 |

**Table 3-1**
**Summary of Groundwater Sampling Results for VOCs**
**Phase V Monitoring Report and ROS Statement**
**Former RCA Facility**
**Burlington, Massachusetts**

| Monitoring Well Number | Sample Type | Date Sampled | 1,1-Dichloroethene | Tetrachloroethene | Trichloroethene | cis-1,2-Dichloroethene | 1,1-Dichloroethane | 1,4-Dioxane | 1,1,1-Trichloroethane | Benzene | Chloroform | Ethyl-benzene | Methylene Chloride | Methyl tert-butyl ether | Toluene | 1,1,2-Trichloroethane | Xylene (total) | Vinyl Chloride | 1,2-Dichloroethane | Chloro-benzene | Trichlorofluoromethane | Dichlorodifluoromethane | Chloromethane | Total VOCs |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **GW-1 Criteria** | | | **7** | **5** | **5** | **70** | **70** | **0.3000** | **200** | **5** | **70** | **700** | **5** | **70** | **1,000** | **5** | **10,000** | **2** | **5** | **100** | **NE** | **NE** | **NE** | **NE** |
| **GW-2 Criteria** | | | **80** | **50** | **5** | **100** | **1,000** | **6,000** | **4,000** | **2,000** | **50** | **20,000** | **10,000** | **50,000** | **50,000** | **900** | **9,000** | **2** | **5** | **200** | **NE** | **NE** | **NE** | **NE** |
| **GW-3 Criteria** | | | **30,000** | **30,000** | **5,000** | **50,000** | **20,000** | **50,000** | **20,000** | **10,000** | **20,000** | **5,000** | **50,000** | **50,000** | **40,000** | **50,000** | **5,000** | **50,000** | **20,000** | **1,000** | **NE** | **NE** | **NE** | **NE** |
| **UCL Criteria** | | | **100,000** | **100,000** | **50,000** | **100,000** | **100,000** | | **100,000** | **100,000** | **100,000** | **100,000** | **100,000** | **100,000** | **100,000** | **100,000** | **100,000** | **100,000** | **100,000** | **10,000** | **NE** | **NE** | **NE** | **NE** |
| 3H-3 | | 8/17/2000 | <1 | <1 | <1 | <1 | <1 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 0 |
| 3H-3 | | 8/26/2016 | <1 | <1 | <1 | <1 | <1 | 0.0568 J | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 0 |
| 3H-3 | | 11/11/2016 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | 0.0848 J | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 0 |
| 3H-3 | | 2/14/2017 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.061 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | |
| 3H-3 | | 5/16/2017 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.050 | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | 0.1 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 J | <0.2 | 0 |
| 3H-3 | | 8/14/2017 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <.050 | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | 0 |
| 3H-3 | | 11/17/2017 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.051 | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 UJ | <0.2 | 0 |
| EMW-12R | | 8/25/2016 | <0.57 | <0.3 | 0.27 J | <0.3 | 0.29 J | 0.0730 J | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | |
| EMW-12R | | 11/11/2016 | <0.57 | <0.3 | <0.2 | <0.3 | 0.39 J | 0.0704 J | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | |
| EMW-12R | | 2/14/2017 | <0.1 | <0.1 | <0.1 | <0.1 | 0.1 J | <0.051 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | |
| EMW-12R | | 5/16/2017 | <0.1 | <0.1 | 0.1 J | <0.1 | 0.3 J | <0.050 | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 J | <0.2 | |
| EMW-12R | | 8/14/2017 | <0.1 | <0.1 | <0.1 | <0.1 | 0.2 J | <0.050 | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | 0.2 |
| EMW-12R | | 8/14/2017 | <0.1 | <0.1 | <0.1 | <0.1 | 0.2 J | <0.05 | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | 0.2 |
| EMW-12R | | 11/17/2017 | <0.1 | <0.1 | <0.1 | <0.1 | 0.2 J | <0.05 | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 UJ | <0.2 | 0.2 |
| 3H-2 | | 8/25/2016 | <0.57 | <0.30 | <0.20 | <0.30 | <0.20 | 0.0532 J | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | |
| 3H-2 | | 11/11/2016 | <0.57 | <0.30 | <0.20 | <0.30 | <0.20 | 0.0550 J | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | |
| 3H-2 | | 2/14/2017 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.050 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | |
| 3H-2 | | 5/16/2017 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 0.051 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | 0.1 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 J | <0.2 | |
| 3H-2 | | 8/14/2017 | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | | | | | | | | | | | | | | | | | 0 |
| 3H-2 | | 11/17/2017 | <0.1 | <0.1 | <0.1 | 0.1 J | <0.1 | 0.076 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 UJ | <0.2 | 0 |
| 3H-5 | | 8/25/2016 | 3.2 | 1.0 | 1.0 | 0.30 J | 0.90 J | **0.769** | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | |
| 3H-5 | | 11/11/2016 | 5.5 | <0.3 | 1.5 | 0.55 J | 1.3 | **1.02** | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | |
| 3H-5 | | 2/14/2017 | 3.9 | <0.1 | 1.2 | 0.3 J | 1 | **0.44** | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | |
| 3H-5 | | 5/16/2017 | 3.7 | <0.1 | 1.2 | 0.3 J | 1.2 | 0.29 | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 J | <0.2 | |
| 3H-5 | | 8/14/2017 | <0.2 | <0.1 | 0.6 | 0.1 J | 0.7 | 0.17 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | 3.57 |
| 3H-5 | | 11/15/2017 | 3.4 | <0.1 | 1 | 0.2 J | 1.4 | **0.3** | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 UJ | <0.2 | 6.3 |
| TTMW-7R | | 11/16/2017 | <0.1 | <0.1 | 0.1 J | <0.1 | <0.1 | <0.050 | <0.1 | <0.1 | 0.1 J | <0.1 | <0.2 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 UJ | | |

Notes:
< Less than method detection limit. Concentration reported is the detection limit.
J = Estimated concentration, according to data validation protocol. Green highlighted
* = LCS or LCSD did not meet QC criteria.

NS = Not sampled or analyzed for
ND = Not detected in the sampl Concentrations in ug/L
NE = MCP Method 1 GW-1 Standard not established

**Bold and orange highlighted** denotes concentration above MCP Method 1 GW-1 Standard

**Table 2-1**
**Groundwater Field Chemistry Parameters**
**Lockheed Martin Corporation**
**Former RCA Facility, Burlington, Massachusetts**
**November 2017**

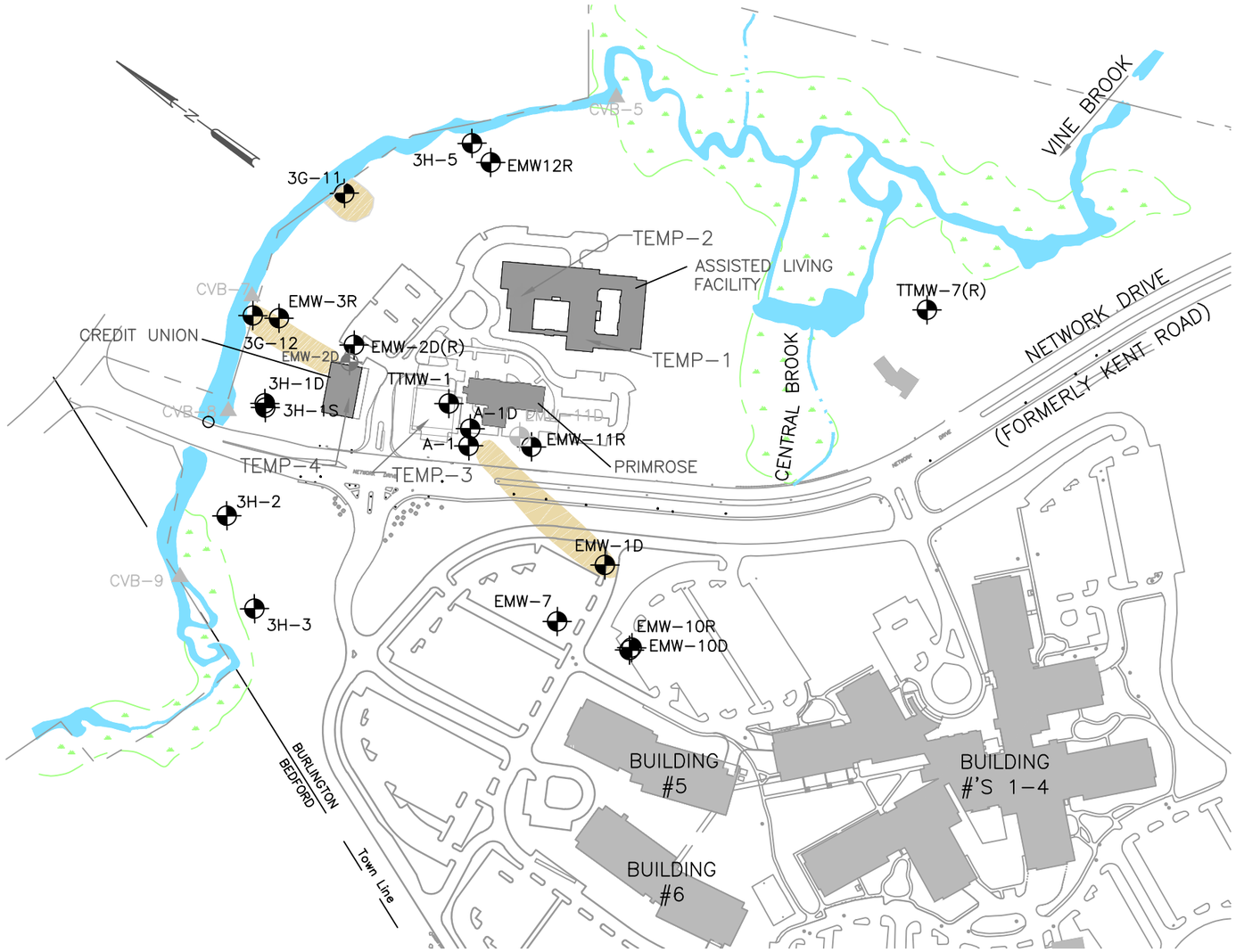
| Monitoring Well | Groundwater Field Chemistry Parameters - November 2017 Annual Sampling Event | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Date | Time | pH (Standard Units) | Specific Conductivity (mS/cm) | Dissolved Oxygen (mg/L) | Turbidity (NTU) | Oxidation Reduction Potential (mV) | Temperature (°C) | Ferrous Iron (mg/L) |
| 3G-11 | 11/14/17 | 16:20 | 7.57 | 0.313 | 2.61 | 1.42 | -140.6 | 10.38 | 0.0 |
| 3G-12 | 11/15/17 | 12:05 | 7.09 | 2.266 | 1.10 | 0.84 | 83.3 | 12.06 | 0.0 |
| 3H-1D | 11/13/17 | 11:35 | 7.00 | 1.018 | 1.71 | 1.39 | -49.4 | 12.00 | 0.0 |
| 3H-1S | 11/13/17 | 11:55 | 6.59 | 0.890 | NA | 1.21 | -64.2 | 11.90 | 0.5 |
| 3H-2 | 11/17/17 | 10:45 | 6.71 | 2.228 | 4.26 | 2.94 | 43.2 | 10.55 | 1.5 |
| 3H-3 | 11/17/17 | 11:17 | 6.62 | 0.519 | 2.64 | 10.48 | 81.4 | 10.48 | 0.0 |
| 3H-5 | 11/14/17 | 10:45 | 6.50 | 0.996 | 2.32 | 11.80 | 91.7 | 10.85 | 0.0 |
| EMW-1D | 11/16/17 | 11:30 | 6.62 | 0.945 | 3.03 | 1.21 | 68.5 | 13.64 | 0.5 |
| EMW-2D (R) | 11/15/17 | 14:45 | 7.15 | 1.704 | 1.26 | 4.81 | 56.8 | 13.64 | 0.0 |
| EMW-3R | 11/14/17 | 11:45 | 7.17 | 0.590 | 4.81 | 2.75 | -84.8 | 12.02 | 0.0 |
| EMW-7 | 11/14/17 | 14:35 | 6.19 | 4.343 | 2.30 | 0.73 | -26.1 | 15.27 | 0.0 |
| EMW-10D | 11/14/17 | 13:10 | 6.51 | 0.261 | 9.66 | 0.56 | -24.9 | 12.78 | 0.0 |
| EMW-10R [(2)] | 11/14/17 | NA | NA | NA | NA | NA | NA | NA | NA |
| EMW-12R | 11/17/17 | 13:25 | 8.19 | 0.204 | 2.34 | 1.89 | -31.6 | 10.91 | 0.0 |
| TTMW-7 (R) | 11/16/17 | 13:20 | 6.24 | 2.921 | 4.84 | 5.68 | 92.1 | 13.25 | 0.0 |

Notes:
mS/cm = millisiemens per centimeter
mg/L = milligrams per liter
NTUs = Nephelometric Turbidity Units
mV = millivolt
°C = degrees Celsius
[(1)]Not enough volume in well to collect parameters
[(2)]Not enough volume in well to collect parameters or sample
NA=not analyzed

Table 3
Summary of Natural Attenuation Parameter Data
Monitoring Report and ROS Statement
Former RCA Facility, Burlington, Massachusetts

| Sample Location Identifier | Date Sampled | Oxygen (field) (mg/L) | Methane (ug/L) | Nitrate (as Nitrogen) (mg/L) | Oxygen Reduction Potential (field) (mV) | pH (field) (Standard Units) | Sulfate (as SO4) (mg/L) | Temperature (field) (°C) | Total Organic Carbon (mg/L) | Ferrous Iron (field) (mg/L) |
|---|---|---|---|---|---|---|---|---|---|---|
| EMW-10D | 8/18/1998 | 1.88 | <2 | 0.70 | 114.90 | 6.30 | 30.00 | 22.40 | <1 | - |
| EMW-10D | 5/3/2000 | 0.35 | 23.00 | 6.16 | 198.50 | 6.35 | 16.80 | 15.30 | 1.27 | - |
| EMW-10D | 11/23/2004 | 0.73 | - | - | 178.00 | 6.37 | - | 12.73 | - | - |
| EMW-10D | 11/1/2005 | 0.32 | - | - | 214.00 | 5.94 | - | 16.52 | - | - |
| EMW-10D | 11/7/2006 | 0.69 | - | - | -128.00 | 6.81 | - | 12.53 | - | - |
| EMW-10D | 11/15/2011 | 4.58 | - | - | 223.40 | 5.78 | - | 14.34 | - | - |
| EMW-10D | 11/9/2012 | 1.38 | - | - | 169.80 | 6.33 | - | 13.26 | - | - |
| EMW-10D | 11/12/2013 | 3.80 | - | - | 118.90 | 6.31 | - | 13.31 | - | 0.00 |
| EMW-10D | 11/11/2014 | 0.24 | - | - | 74.40 | 5.51 | - | 15.05 | - | - |
| EMW-10D | 11/16/2015 | 1.05 | - | - | 185.40 | 7.74 | - | 14.23 | - | 0.00 |
| EMW-10D | 8/26/2016 | 0.39 | - | - | 105.10 | 7.32 | - | 17.21 | - | - |
| EMW-10D | 11/12/2016 | 3.36 | - | - | 71.20 | 8.20 | - | 14.67 | - | 0.00 |
| EMW-10D | 2/10/2017 | 1.23 | - | - | 9.60 | 5.74 | - | 11.58 | - | - |
| EMW-10D | 2/28/2017 | 0.72 | - | - | 158.60 | 6.27 | - | 12.81 | - | - |
| EMW-10D | 5/16/2017 | 2.90 | - | - | 105.00 | 7.11 | - | 12.40 | - | - |
| EMW-10D | 8/12/2017 | 0.21 | - | - | 113.70 | 6.62 | - | 16.30 | - | - |
| EMW-10D | 11/14/2017 | 9.66 | - | - | -24.90 | 6.51 | - | 12.78 | - | 0.00 |
| | | | | | | | | | | |
| EMW-1D | 8/18/1998 | 2.41 | 210.00 | 4.60 | -124.00 | 6.08 | 80.00 | 19.60 | 2.50 | - |
| EMW-1D | 5/5/2000 | 5.48 | 9.50 | <0.2 | 117.00 | 6.41 | 3.25 | 17.84 | 1.51 | - |
| EMW-1D (DUP) | 5/5/2000 | 5.48 | 11.00 | <0.2 | 117.00 | 6.41 | 2.82 | 17.84 | 1.54 | - |
| EMW-1D | 11/4/2003 | 0.53 | 2.4 J | <0.05 | 58.00 | 6.25 | 37.40 | 13.47 | 2.10 | - |
| EMW-1D | 11/23/2004 | 1.60 | 73.00 | <0.05 | 99.00 | 6.00 | 44.00 | 13.45 | 1.60 | - |
| EMW-1D | 11/2/2005 | 1.23 | 50.00 | <0.05 | 132.00 | 6.47 | 35.00 | 14.82 | 2.10 | - |
| EMW-1D | 11/7/2006 | 0.61 | 58.00 | <.050 | -149.00 | 6.45 | 36.00 | 14.35 | 2.40 | - |
| EMW-1D | 11/8/2007 | 0.15 | 35.00 | <0.05 | 1.30 | 6.73 | 33.00 | 13.75 | 2.20 | 1.50 |
| EMW-1D | 11/5/2008 | 0.55 | 25.00 | <0.05 | 28.00 | 6.54 | 34.00 | 15.83 | 1.60 | 0.90 |
| EMW-1D | 11/12/2009 | 0.65 | 26.00 | <0.05 | 48.10 | 6.51 | 31.00 | 11.91 | 1.30 | 0.20 |
| EMW-1D | 11/11/2010 | 0.45 | 18.00 | <0.05 | 74.00 | 6.58 | 36.00 | 14.37 | 2.30 | 0.70 |
| EMW-1D | 11/16/2011 | 0.54 | 15.00 | <0.05 | 47.90 | 6.54 | 30.00 | 13.82 | 2.50 | - |
| EMW-1D | 11/9/2012 | 0.37 | 11.00 | <0.05 | 64.40 | 6.71 | 25.00 | 13.67 | 1.60 | 0.40 |
| EMW-1D | 11/12/2013 | 1.04 | 6.60 | <1.0 | -37.70 | 7.29 | 28.80 | 13.88 | 1.60 | 0.50 |
| EMW-1D | 11/12/2014 | 0.45 | 4.80 | <1.0 | 49.10 | 8.19 | 27.50 | 14.98 | 1.30 | 0.50 |
| EMW-1D | 11/16/2015 | 0.76 | 5.50 | <1.0 | 54.90 | 8.18 | 33.40 | 13.05 | 1.30 | 0.50 |
| EMW-1D | 8/26/2016 | 0.91 | - | - | 56.90 | 8.16 | - | 12.90 | - | - |
| EMW-1D | 11/11/2016 | 0.89 | 6.30 | <1.0 | 63.10 | 8.15 | 29.70 | 12.71 | 2.40 | 0.00 |
| EMW-1D | 2/10/2017 | 4.22 | - | - | 85.10 | 6.49 | - | 11.21 | - | - |
| EMW-1D | 2/27/2017 | 0.32 | - | - | 65.10 | 6.87 | - | 13.46 | - | - |
| EMW-1D | 5/15/2017 | 0.37 | 4.7 J | <0.25 | 46.30 | 6.66 | 29.80 | 11.70 | 1.40 | - |
| EMW-1D | 8/15/2017 | 0.43 | 4.7 J | <0.25 | 11.20 | 6.43 | 29.70 | 14.80 | 1.40 | - |
| EMW-1D | 11/16/2017 | 3.03 | 9.30 | <0.25 | 68.50 | 6.62 | 27.50 | 13.64 | 1.40 | 0.50 |
| | | | | | | | | | | |
| EMW-2D | 8/20/1998 | 2.90 | <2 | 4.80 | 30.80 | 7.26 | 80.00 | 13.30 | <1 | - |
| EMW-2D | 5/4/2000 | 0.31 | 0.82 | <0.2 | 49.70 | 7.37 | 26.90 | 14.17 | <1 | - |
| EMW-2D (DUP) | 5/4/2000 | 0.31 | 0.89 | <0.2 | 49.70 | 7.37 | 26.80 | 14.17 | <1 | - |
| EMW-2D | 11/4/2003 | 0.31 | 5.3 J | 0.07 | -14.00 | 7.22 | 41.40 | 12.38 | 1.30 | - |
| EMW-2D (DUP) | 11/4/2003 | 0.31 | 3.8 J | 0.07 | -14.00 | 7.22 | 41.60 | 12.38 | 1.10 | - |
| EMW-2D | 11/23/2004 | 0.57 | 4.00 | <0.05 | -19.00 | 6.93 | 41.00 | 14.00 | <1.0 | - |
| EMW-2D (DUP) | 11/23/2004 | 0.57 | 3.50 | 0.08 | -19.00 | 6.93 | 42.00 | 14.00 | <1.0 | - |
| EMW-2D | 11/2/2005 | 0.46 | 7.20 | <0.05 | 21.00 | 7.20 | 44.00 | 13.51 | 1.40 | - |
| EMW-2D | 11/1/2005 | - | 4.20 | <0.05 | - | - | 44.00 | - | 1.40 | - |
| EMW-2D | 11/7/2006 | 1.14 | 3.50 | <0.050 | -145.00 | 7.04 | 43.00 | 13.27 | 1.60 | - |
| EMW-2D (DUP) | 11/7/2006 | 1.14 | 2.30 | <0.050 | -145.00 | 7.04 | 43.00 | 13.27 | 1.80 | - |
| EMW-2D | 11/8/2007 | 0.49 | 1.70 | <0.05 | 38.00 | 7.01 | 42.00 | 13.39 | 1.90 | 0.20 |
| EMW-2D (DUP) | 11/8/2007 | - | 1.80 | <0.05 | - | - | 42.00 | - | 1.70 | - |
| EMW-2D | 11/5/2008 | 0.35 | 2.50 | <0.05 | -34.00 | 7.14 | 44.00 | 13.69 | 1.50 | 0.10 |
| EMW-2D (DUP) | 11/5/2008 | - | 5.40 | <0.05 | - | - | 44.00 | - | 1.40 | - |
| EMW-2D | 11/12/2009 | 0.63 | 2.90 | <0.05 | -32.00 | 7.09 | 41.00 | 10.58 | 1.60 | 0.50 |
| EMW-2D (DUP) | 11/12/2009 | - | 3.30 | <0.05 | - | - | 41.00 | - | 1.40 | - |
| EMW-2D | 11/11/2010 | 0.31 | 3.20 | <0.05 | -0.40 | 7.09 | 46.00 | 13.15 | 1.10 | 0.10 |
| EMW-2D (DUP) | 11/11/2010 | - | 3.10 | <0.05 | - | - | 46.00 | - | 1.20 | - |
| EMW-2D | 11/16/2011 | 0.49 | 3.00 | <0.05 | -39.00 | 7.09 | 40.00 | 12.44 | 2.50 | - |
| EMW-2D (DUP) | 11/16/2011 | - | 2.80 | <0.05 | - | - | 40.00 | - | 2.20 | - |
| EMW-2D | 11/9/2012 | 0.38 | 7.40 | <0.05 | -55.00 | 7.17 | 33.00 | 13.86 | 2.30 | 1.40 |
| EMW-2D (DUP) | 11/9/2012 | - | 2.20 | <0.05 | - | - | 33.00 | - | 1.80 | - |
| EMW-2D(R) | 11/11/2013 | 0.64 | <1.0 | <1.0 | -30.30 | 6.30 | 33.90 | 13.15 | 2.10 | 0.00 |
| EMW-2D(R) (DUP) | 11/11/2013 | - | <1.0 | <1.0 | - | - | 33.10 | - | 2.10 | - |
| EMW-2D(R) | 11/11/2014 | 2.20 | 7.40 | 2.10 | 31.10 | 6.91 | 34.00 | 14.47 | 3.70 | 0.00 |
| EMW-2D(R) (DUP) | 11/11/2014 | - | 7.90 | 2.10 | - | - | 33.70 | - | 3.60 | - |
| EMW-2D(R) | 11/13/2015 | 0.95 | 0.91J | 1.50 | 61.90 | 6.92 | 38.60 | 14.26 | 3.80 | 0.00 |
| EMW-2D(R) | 8/26/2016 | 1.44 | - | - | 148.40 | 6.51 | - | 18.34 | - | - |
| EMW-2D(R) | 11/11/2016 | 0.49 | 4.10 | 1.60 | 75.70 | 6.74 | 37.00 | 15.11 | 6.70 | 0.00 |
| EMW-2D(R) | 2/14/2017 | 0.48 | - | - | -4.00 | 5.96 | - | 12.55 | - | - |
| EMW-2D(R) | 2/27/2017 | 0.33 | - | - | 69.00 | 6.69 | - | 13.71 | - | - |
| EMW-2D(R) | 5/16/2017 | 0.38 | 59.00 | 0.85 | -209.00 | 6.95 | 36.30 | 14.40 | 13.50 | - |
| EMW-2D(R) | 8/15/2017 | 1.63 | 140.00 | 0.84 | -79.20 | 6.71 | 30.30 | 15.50 | 7.90 | - |
| EMW-2D(R) | 11/15/2017 | 1.26 | 38.00 | 1.30 | 56.80 | 7.15 | 33.70 | 13.64 | 3.10 | 0.00 |
| | | | | | | | | | | |
| 3G-12 | 8/20/1998 | 5.30 | <2 | 17.00 | 27.90 | 6.40 | 80.00 | 12.60 | 1.20 | - |
| 3G-12 | 5/4/2000 | 2.43 | 0.86 | 0.93 | 135.20 | 6.50 | 23.20 | 11.19 | <1.0 | - |
| 3G-12 | 11/4/2003 | 0.29 | 8.5 J | 2.05 | 163.00 | 6.29 | 68.90 | 11.95 | 3.60 | - |
| 3G-12 | 11/23/2004 | 0.90 | 3.10 | 1.20 | 78.00 | 6.07 | 48.00 | 11.51 | 1.30 | - |
| 3G-12 | 11/2/2005 | 0.46 | 2.80 | 1.70 | 133.00 | 6.29 | 56.00 | 12.55 | 2.60 | - |
| 3G-12 | 11/7/2006 | 0.36 | 18.00 | 0.32 | 242.90 | 6.40 | 46.00 | 12.26 | 3.50 | - |
| 3G-12 | 11/8/2007 | 1.95 | 0.048J | 0.89 | 167.00 | 6.49 | 32.00 | 12.01 | 2.10 | 0.00 |
| 3G-12 | 11/5/2008 | 0.41 | 6.70 | 0.76 | 188.00 | 6.38 | 43.00 | 13.14 | 2.90 | 0.00 |
| 3G-12 | 11/12/2009 | 0.88 | 0.34 | 0.76 | 87.40 | 6.53 | 30.00 | 9.87 | 3.00 | 0.00 |
| 3G-12 | 11/11/2010 | 1.18 | 0.85 | 1.20 | 136.00 | 6.39 | 40.00 | 11.39 | 1.80 | 0.00 |
| 3G-12 | 11/16/2011 | 0.64 | 18.00 | 0.70 | 11.57 | 6.40 | 34.00 | 11.51 | 3.10 | - |
| 3G-12 | 11/9/2012 | 0.33 | 5.80 | 1.50 | 125.20 | 6.57 | 29.00 | 12.02 | 2.30 | 0.20 |
| 3G-12 | 11/11/2013 | 0.68 | 9.50 | 1.70 | -26.60 | 7.21 | 30.50 | 12.52 | 2.30 | 0.00 |
| 3G-12 | 11/11/2014 | 1.40 | 1.40 | 1.70 | -1.90 | 7.68 | 29.30 | 12.40 | 2.30 | 0.00 |
| 3G-12 | 11/13/2015 | 1.59 | <1.0 | 2.00 | 82.90 | 7.67 | 36.60 | 11.61 | 2.20 | 0.00 |
| 3G-12 | 11/13/2015 | 1.59 | <1.0 | 2.00 | 82.90 | 7.67 | 36.60 | 11.61 | 2.20 | 0.00 |
| 3G-12 | 8/26/2016 | 0.59 | - | - | 242.00 | 6.51 | - | 14.45 | - | - |
| 3G-12 | 11/10/2016 | 0.39 | 1.70 | 1.80 | 66.80 | 6.46 | 39.10 | 12.84 | 3.40 | 0.00 |
| 3G-12 (DUP) | 11/10/2016 | - | 1.60 | 1.80 | - | - | 39.30 | - | 3.10 | - |
| 3G-12 | 2/10/2017 | 0.63 | - | - | -73.70 | 5.67 | - | 9.34 | - | - |
| 3G-12 | 2/27/2017 | 0.36 | - | - | 79.60 | 6.69 | - | 12.06 | - | - |
| 3G-12 | 5/16/2017 | 0.32 | <3.0 | 1.60 | 101.10 | 6.37 | 39.60 | 12.20 | 3.10 | - |
| 3G-12 | 8/14/2017 | 1.91 | <3.0 | 1.40 | 55.60 | 6.36 | 38.00 | 13.80 | 2.9 J | |
| 3G-12 (DUP) | 8/14/2017 | 1.91 | <3.0 | 1.40 | 55.60 | 6.36 | 39.80 | 13.80 | 10.1 J | - |
| 3G-12 | 11/15/2017 | 1.10 | <3.0 | 1.70 | 83.30 | 7.09 | 35.40 | 12.06 | 2.60 | 0.00 |
| 3G-12 (DUP) | 11/15/2017 | 1.10 | <3.0 | 1.70 | 83.30 | 7.09 | 35.00 | 12.06 | 2.60 | - |

Notes:
J = Concentration estimated base on data validation.
< Less than method detection limit. Concentration reported is the detection limit.




LEGEND

- PROPERTY LINE
- BUILDING
- PAVED ROAD
- LIMITS OF SWAMP
- WETLANDS
- BODY OF WATER/STREAM
- EMW-1D — MONITORING WELL AND IDENTIFIER
- CVB-1 — FORMER SURFACE WATER SAMPLING LOCATION AND IDENTIFIER
- TEMP-1 — TEMPORARY WELL OR ABANDONED WELL AND IDENTIFIER
- CHLORINATED VOC PLUME BASED ON AUGUST 2017 WATER QUALITY DATA
- SURFACE WATER MEASUREMENT LOCATION

NOTE: BUILDINGS 1 THROUGH 6 ARE COMMERCIAL OFFICE SPACE

0 300 600

SCALE IN FEET

BASE MAP SOURCES: VANASSE HANGEN BRUSTIN, INC., MAP, DRAWING #C-3, SHEET 3 OF 11 PROJECT #06830, 1/18/00, AND EMCON DRAWING #1, PROJECT #86075-001.000, 1/10/97. THE ISOSCELES GROUP MAY 2014.

TITLE: **SITE PLAN WITH PHASE V SAMPLING LOCATIONS**

LOCATION: **Former RCA Facility**
**One Network Drive, Burlington, Massachusetts**

TETRA TECH

| | | |
|---|---|---|
| APPROVED | CC ED | FIGURE |
| DRAFTED | JML | 1 |
| PROJECT# | 117-0507550 | |
| DATE | NOV 2017 | |

G:\LOCKHEADY 2017\WL-MAP_NOV2017.DWG

TETRA TECH

December 20, 2017

Mr. Curt Van Emon
Primrose School of Burlington
21 Meriam Street
Lexington, MA 02420

**Re: Environmental Sampling Results**
**Former RCA Facility**
**10 Greenleaf Way, Burlington, MA 01803**
**RTN 3-0265**

Dear Mr. Van Emon,

On behalf of Lockheed Martin Corporation (Lockheed Martin), Tetra Tech, Inc. (Tetra Tech) is providing to you the analytical results of the November 11 and 12, 2017 groundwater sampling event. This information is being provided to fulfill the requirements of the Massachusetts Contingency Plan (MCP) 310 CMR 40.1403(10). This section of the MCP requires that any time samples are taken at a property on behalf of someone other than the owner of the property, the sample analysis will be provided to the property owner within 30 days of the date the sample results are issued by the laboratory.

Therefore, please find attached the following documentation: 1) BWSC-123 Form, 2) a figure showing the sample locations, and 3) the analytical data report issued on November 27, 2017. Summary tables of the groundwater data, field chemistry data, and natural attenuation parameters are also attached for your information.

These data were collected to satisfy the requirements of an ongoing monitoring program referred to by the Mass DEP as a Phase V Remedy Operating Status (ROS), which has been ongoing at this location since 2008. Note that groundwater is not currently used for drinking water at this Site. Overall, the resulting data from this recent sampling included in this submittal are consistent with recent and long term trends, showing no unexpected results. A full data analysis and summary will be included in the next semi-annual Phase V Monitoring Report, anticipated in June 2018.

If you have any questions regarding this submittal, please feel free to call Mr. Edward Dolan or Mr. Thomas Nunno at (978) 952-0120.

Sincerely,
Tetra Tech, Inc.

Thomas J. Nunno, LSP
Principal Engineer

Sincerely,
Tetra Tech, Inc.

Edward B. Dolan,
Associate Geologist-Operations Manager

TETRA TECH
One Monarch Drive, Suite 202, Littleton, MA 01460
Tel 978.952.0120 Fax 978.952.0122 www.tetratechgeo.com www.tetratech.com

**Enclosures:** BWSC-123 Form

Table 1: Summary of Groundwater Sampling Results for VOCs

Table 2: Groundwater Field Chemistry Parameters

Table 3: Summary of Natural Attenuation Parameters

Figure 1 – Well Location Map

November 27, 2017 Eurofins Environmental Data Report

**cc:** G. Clark (Lockheed Martin) – w/encl.
E. Parsons (CDM Smith) – w/encl.

**TETRA TECH**
One Monarch Drive, Suite 202, Littleton, MA 01460
Tel 978.952.0120 Fax 978.952.0122 www.tetratechgeo.com www.tetratech.com

**Massachusetts Department of Environmental Protection**
*Bureau of Waste Site Cleanup*

**BWSC123**

This Notice is Related to:
Release Tracking Number

3 - 0265

# NOTICE OF ENVIRONMENTAL SAMPLING

As required by 310 CMR 40.1403(10) of the Massachusetts Contingency Plan

**A. The address of the disposal site related to this Notice and Release Tracking Number (provided above):**

1. Street Address: 1 Network Drive

City/Town: Burlington Zip Code: 01803

**B. This notice is being provided to the following party:**

1. Name: Primrose School c/o Curt Van Emon
2. Street Address: 21 Meriam Street

City/Town: Lexington Zip Code: 02420

**C. This notice is being given to inform its recipient (the party listed in Section B):**

☑ 1. That environmental sampling will be/has been conducted at property owned by the recipient of this notice.

☑ 2. Of the results of environmental sampling conducted at property owned by the recipient of this notice.

☑ 3. Check to indicate if the analytical results are attached. (If item 2. above is checked, the analytical results from the environmental sampling must be attached to this notice.)

**D. Location of the property where the environmental sampling will be/has been conducted:**

1. Street Address: 10 Greenleaf Way

City/Town: Burlington Zip Code: 01803

2. MCP phase of work during which the sampling will be/has been conducted:

☐ Immediate Response Action
☐ Release Abatement Measure
☐ Utility-related Abatement Measure
☐ Phase I Initial Site Investigation
☐ Phase II Comprehensive Site Assessment
☐ Phase III Feasibility Evaluation
☐ Phase IV Remedy Implementation Plan
☑ Phase V/Remedy Operation Status
☐ Post-Temporary Solution Operation, Maintenance and Monitoring
☐ Other _____ (specify)

3. Description of property where sampling will be/has been conducted:

☐ residential ☐ commercial ☐ industrial ☑ school/playground ☐ Other _____ (specify)

4. Description of the sampling locations and types (e.g., soil, groundwater, indoor air, soil gas) to the extent known at the time of this notice.

Groundwater collected from four monitoring wells as follows: A-1, A-1D, EMW-11R, and TTMW-1.

**E. Contact information related to the party providing this notice:**

Contact Name: Ed Dolan, Tetra Tech, Inc.
Street Address: One Monarch Drive, Suite 202
City/Town: Littleton Zip Code: 01460
Telephone: (978) 952-0120 Email: Ed.Dolan@tetratech.com

**Massachusetts Department of Environmental Protection**
*Bureau of Waste Site Cleanup*

**BWSC123**

This Notice is Related to:
Release Tracking Number

3 - 0265

# NOTICE OF ENVIRONMENTAL SAMPLING

As required by 310 CMR 40.1403(10) of the Massachusetts Contingency Plan

## MASSACHUSETTS REGULATIONS THAT REQUIRE THIS NOTICE

This notice is being provided pursuant to the Massachusetts Contingency Plan and the notification requirement at 310 CMR 40.1403(10). The Massachusetts Contingency Plan is a state regulation that specifies requirements for parties who are taking actions to address releases of chemicals (oil or hazardous material) to the environment.

## THE PERSON(S) PROVIDING THIS NOTICE

This notice has been sent to you by the party who is addressing a release of oil or hazardous material to the environment at the location listed in **Section A** on the reverse side of this form. (The regulations refer to the area where the oil or hazardous material is present as the "disposal site".)

## PURPOSE OF THIS NOTICE

When environmental samples are taken as part of an investigation of a release for which a notification to MassDEP has been made under the Massachusetts Contingency Plan (310 CMR 40.0300) on behalf of someone other than the owner of the property, the regulations require that the property owner (listed in **Section B** on the reverse side of this form) be given notice of the environmental sampling. The regulations also require that the property owner subsequently receive the analytical results following the analysis of the environmental samples.

**Section C** on the reverse side of this form indicates the circumstance under which you are receiving this notice at this time. If you are receiving this notice to inform you of the analytical results following the analysis of the environmental samples, you should also have received, as an attachment, a copy of analytical results. These results should indicate the number and type(s) of samples (e.g., soil, groundwater) analyzed, any chemicals identified, and the measured concentrations of those chemicals.

**Section D** on the reverse side of this form identifies the property where the environmental sampling will be/has been conducted, provides a description of the sampling locations within the property, and indicates the phase of work under the Massachusetts Contingency Plan regulatory process during which the samples will be/were collected.

## FOR MORE INFORMATION

Information about the general process for addressing releases of oil or hazardous material under the Massachusetts Contingency Plan and related public involvement opportunities may be found at http://www.mass.gov/eea/agencies/massdep/cleanup. For more information regarding this notice, you may contact the party listed in **Section E** on the reverse side of this form. Information about the disposal site identified in Section A is also available in files at the Massachusetts Department of Environmental Protection. See http://public.dep.state.ma.us/SearchableSites2/Search.aspx to view site-specific files on-line or http://mass.gov/eea/agencies/massdep/about/contacts/conduct-a-file-review.html if you would like to make an appointment to see these files in person. Please reference the **Release Tracking Number** listed in the upper right hand corner on the reverse side of this form when making file review appointments.

**Table 3-1**
**Summary of Groundwater Sampling Results for VOCs**
**Phase V Monitoring Report and ROS Statement**
**Former RCA Facility**
**Burlington, Massachusetts**

| | | | COMPOUNDS OF INTEREST | | | | | | Related COCs | OTHER COMPOUNDS IN VOC SCAN | | | | | | | | | | | COMPOUNDS WITH NO STANDARDS ESTABLISHED | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Monitoring Well Number | Sample Type | Date Sampled | 1,1-Dichloroethene | Tetrachloroethene | Trichloroethene | cis-1,2-Dichloroethene | 1,1-Dichloroethane | 1,4-Dioxane | 1,1,1-Trichloroethane | Benzene | Chloroform | Ethyl-benzene | Methylene Chloride | Methyl tert-butyl ether | Toluene | 1,1,2-Trichloroethane | Xylene (total) | Vinyl Chloride | 1,2-Dichloroethane | Chloro-benzene | Trichlorofluoromethane | Dichlorodifluoromethane | Chloromethane | Total VOCs |
| GW-1 Criteria | | | 7 | 5 | 5 | 70 | 70 | 0.3000 | 200 | 5 | 70 | 700 | 5 | 70 | 1,000 | 5 | 10,000 | 2 | 5 | 100 | NE | NE | NE | NE |
| GW-2 Criteria | | | 80 | 50 | 5 | 100 | 1,000 | 6,000 | 4,000 | 2,000 | 50 | 20,000 | 10,000 | 50,000 | 50,000 | 900 | 9,000 | 2 | 5 | 200 | NE | NE | NE | NE |
| GW-3 Criteria | | | 30,000 | 30,000 | 5,000 | 50,000 | 20,000 | 50,000 | 20,000 | 10,000 | 20,000 | 5,000 | 50,000 | 50,000 | 40,000 | 50,000 | 5,000 | 50,000 | 20,000 | 1,000 | NE | NE | NE | NE |
| UCL Criteria | | | 100,000 | 100,000 | 50,000 | 100,000 | 100,000 | | 100,000 | 100,000 | 100,000 | 100,000 | 100,000 | 100,000 | 100,000 | 100,000 | 100,000 | 100,000 | 100,000 | 10,000 | NE | NE | NE | NE |
| EMW-11D | | 5/6/1997 | 51 | 10 | 31 | 4 | 11 | NS | 9 | <1 | <1 | <1 | <5 | <1 | <1 | <1 | <3 | <1 | NA | NA | <1 | <1 | <1 | 116 |
| EMW-11D | | 5/12/1998 | 82 | 18 | 56 | 9 | 18 | NS | 55 | <0.2 | <0.3 | <0.2 | <0.4 | <0.3 | <0.2 | <0.5 | <0.3 | <0.3 | <0.5 | <0.3 | <0.3 | <0.3 | <0.4 | 238 |
| EMW-11D | | 8/19/1998 | 37 | 6.7 | 24 | 4.2 | 8.2 | NS | 27 | <2.0 | <1.0 | <2.0 | <1.0 | <1.0 | <2.0 | <2.0 | <1.0 | <2.0 | <1.0 | <2.0 | <1.0 | <1 | <5 | 107.1 |
| EMW-11D | | 11/19/1998 | 33 | 7 | 27 | 4 | 8 | NS | 26 | <1 | <1 | 2 | <1 | <1 | 3 | <1 | 27 | <1 | <1 | <1 | <1 | <1 | <1 | 137 |
| EMW-11D | | 2/17/1999 | 30 | 6 | 23 | 3 | 6 | NS | 21 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 89 |
| EMW-11D | | 5/12/1999 | 29 | 6 | 23 | 4 | 7 | NS | 31 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 100 |
| EMW-11R | | 5/6/1997 | 43 | 12 | 39 | 9 | 10 | NS | 5 | <1 | <1 | <1 | <5 | <1 | <1 | <1 | <3 | <1 | NA | NA | <1 | <1 | <1 | 118 |
| EMW-11R | | 5/13/1998 | 53 | 23 | 77 | 28 | 22 | NS | 10 | <1 | <1 | <1 | <5 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 213 |
| EMW-11R | | 8/20/1998 | 27 | 15 | 40 | 14 | 11 | NS | 4.6 | <2.0 | <1.0 | <2.0 | <1.0 | <1.0 | <2.0 | <2.0 | <1.0 | <2.0 | <1.0 | <2.0 | <1.0 | <1 | <5 | 111.6 |
| EMW-11R | | 11/19/1998 | 28 | 20 | 50 | 16 | 13 | NS | 6 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 133 |
| EMW-11R | | 2/17/1999 | 13 | 4 | 22 | 9 | 9 | NS | 2 | 1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 60 |
| EMW-11R | | 5/12/1999 | 23 | 12 | 40 | 14 | 12 | NS | 10 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 111 |
| EMW-11R | | 6/16/2000 | 17 | 6 | 29 | 15 | 11 | NS | 3 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 81 |
| EMW-11R | | 8/17/2000 | 29 | 8 | 39 | 17 | 14 | NS | 5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 112 |
| EMW-11R | | 11/14/2000 | 45 | 21 | 68 | 26 | 20 | NS | 10 | <1 | <1 | <1 | <5 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 190 |
| EMW-11R | | 2/13/2001 | 32 | 18 | 53 | 18 | 14 | NS | 7 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <5 | <1 | 142 |
| EMW-11R | | 11/15/2001 | 13 | 3.3 | 23 | 9.6 | 7 | NS | 2 | 0.56 J | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <5 | <5 | <1 | 58.5 J |
| EMW-11R | | 11/21/2002 | 15 | 5.4 | 23 | 11 | 7.7 | NS | 1.7 | 0.36 J | <1 | <1 | <5 | <1 | 1.3 | <1 | <3 | <1 | <1 | <1 | <5 | <5 | <1 | 65.5 J |
| EMW-11R | | 11/4/2003 | 1 | <1 | 1 | 2 | 1 | NS | <1 | <1 | <1 | <1 | <1 | NA | <1 | <1 | <2 | <1 | <1 | <1 | NA | <1 | <1 | 5 |
| EMW-11R | | 11/23/2004 | 5.6 | 0.64 J | 7.6 J | 4.3 J | 4.4 J | NS | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | 22.5 J |
| EMW-11R | | 11/2/2005 | 1.7 | 0.52 J | 4.2 | 3.8 | 3.3 | NS | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | 0.71 J | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | 13 |
| EMW-11R | | 11/7/2006 | 6 | 1.8 | 11 | 7.5 | 5.5 | NS | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | <1.0 | <1.0 | <1.0 | <3.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | 31.8 |
| EMW-11R | | 11/9/2007 | 4.1 | 1.7 | 9.7 | 5 | 3.8 | NS | <1 | <1 | <1 | <1 | <2 | 1.2 | <1 | <1 | <3 | <0.5 | <1 | <1 | <1 | <1 | <2 | 25.5 |
| EMW-11R | | 11/5/2008 | 5.6 | 2.3 | 9.9 | 6.1 | 4.5 | NS | <1 | <1 | <1 | <1 | <2 | 1.5 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 29.9 |
| EMW-11R | | 11/11/2009 | 6.1 | 2.1 | 9.6 | 6.2 | 4.8 | NS | <1 | <1 | <1 | <1 | <2 | 1.3 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 30.1 |
| EMW-11R | | 11/11/2010 | 4.3 | 1.9 | 8.5 | 5.6 | 4 | NS | <1 | <1 | <1 | <1 | <2 | 1.3 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 25.6 |
| EMW-11R | | 11/15/2011 | 3.4 | 2.1 | 7.2 | 5.5 | 3.2 | NS | <1 | <1 | <1 | <1 | <2 | 1.3 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1* | <2 | 22.7 |
| EMW-11R | | 11/8/2012 | 2.6 | 1.7 | 7.5 | 4.4 | 2.5 | NS | <1 | <1 | <1 | <1 | <1 | 1.1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 19.8 |
| EMW-11R | | 11/12/2013 | 2.9 | 1.4 J | 5.7 | 4.6 | 2.8 | NS | <1 | <1 | <1 | <1 | <1 | 1.1 J | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 20 |
| EMW-11R | | 11/12/2014 | 1.6 | 1 | 4.2 | 3.7 | 2.4 | 0.910 | <1 | <1 | <1 | <1 | <1 | 0.86 J | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 13.76 |
| EMW-11R | | 11/15/2015 | 0.74 J | 1.2 | 3.2 | 1.6 | 1.3 | 0.640 | <1 | <1 | <1 | <1 | <1 | 0.87 J | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 11.71 |
| EMW-11R | | 8/26/2016 | 0.95 | 1.3 | 3.5 | 2.9 | 1.6 | 0.742 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 10.992 |
| EMW-11R | | 11/11/2016 | 1.3 | 1.3 | 3.6 | 3.2 | 1.8 | 0.780 | <1 | <1 | <1 | <1 | <1 | 0.75 J | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 11.98 |
| EMW-11R | | 2/12/2017 | 1.3 | 1.3 | 3.9 | 3.1 | 1.6 | 0.370 | <1 | 0.2 J | <1 | <1 | <1 | 0.7 | <1 | <1 | <1 | 0.1 J | <1 | <1 | <1 | <1 | <1 | |
| EMW-11R | | 5/13/2017 | 1.0 | 0.5 J | 2.7 | 3.1 | 1.7 | 0.300 | <0.1 | 0.1 J | <0.1 | <0.1 | <0.2 | 0.6 | <0.1 | <0.1 | <0.1 | 0.1 J | <0.1 | <0.1 | <0.1 | <0.1 J | <0.2 | 9.4 |
| EMW-11R | | 8/13/2017 | 1.3 | 1.5 | 4.1 | 3.3 | 1.7 | 0.300 | <0.1 | 0.1 J | <0.1 | <0.1 | <0.2 | 0.8 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | 13.1 |
| EMW-11R | | 11/12/2017 | 1.3 | 1 | 4 | 3.2 | 1.6 | 0.19 J | <0.1 | 0.1 J | <0.1 | <0.1 | <0.2 | 0.4 J | <0.1 | <0.1 | <0.1 | 0.1 J | <0.1 | <0.1 | <0.1 | <0.1 UJ | <0.2 UJ | 13.1 |
| A-1 | | 8/27/2016 | <0.57 | 0.57 J | 0.51 J | 0.39 J | 0.38 J | 0.229 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | |
| A-1 | | 11/11/2016 | <0.57 | 1.8 | 0.72 J | <0.30 | <0.20 | 0.0376 J | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | |
| A-1 | | 2/12/2017 | <0.1 | 3.3 | 1.2 | 0.2 J | <0.1 | <0.051 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | |
| A-1 | | 5/13/2017 | <0.1 | 2.6 | 0.8 | 0.1 J | <0.1 | <0.051 | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 J | <0.2 | 3.4 |
| A-1 | | 8/12/2017 | 0.2 | 0.9 | 0.2 J | 0.1 J | 0.1 J | <0.050 | <.0.1 | <0.1 | <.0.1 | <0.1 | <0.2 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | 1.3 |
| A-1 | | 11/12/2017 | <0.1 | 0.5 | 0.2 J | <0.1 | 0.1 J | <0.050 | <.0.1 | <0.1 | <.0.1 | <0.1 | <0.2 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 UJ | <0.2 UJ | 1.3 |
| A-1D | | 11/29/1994 | 82 | 17 | 64 | 7.6 | 16 | NS | 27 | ND | 2.4 | ND | ND | ND | ND | ND | ND | ND | NA | NA | NA | NA | NA | 216 |
| A-1D | | 11/12/1996 | 76 | 19 | 68 | <1 | 11 | NS | 13 | <1 | <1 | <1 | <5 | <1 | <1 | <1 | <3 | <1 | NA | NA | <1 | <1 | <1 | 187 |
| A-1D | | 5/13/1998 | 73 | 24 | 66 | 11 | 17 | NS | 26 | <0.2 | <0.3 | <0.2 | <0.4 | <0.3 | <0.2 | <0.5 | <0.3 | <0.3 | <0.5 | <0.3 | <0.3 | <0.3 | <0.4 | 217 |
| A-1D | | 8/19/1998 | 42 | 12 | 39 | 6.2 | 9.4 | NS | 17 | <2.0 | <1.0 | <2.0 | <1.0 | <1.0 | <2.0 | <2.0 | <1.0 | <2.0 | <1.0 | <2.0 | <1.0 | <1 | <5 | 125.6 |
| A-1D | | 11/20/1998 | 41 | 14 | 41 | 6 | 10 | NS | 22 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 8 | <1 | <1 | <1 | <1 | <1 | <1 | 142 |
| A-1D | | 2/17/1999 | 28 | 9 | 33 | 4 | 8 | NS | 17 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 99 |
| A-1D | | 5/12/1999 | 36 | 9 | 36 | 6 | 9 | NS | 30 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 126 |
| A-1D | | 6/16/2000 | 24 | 9 | 26 | 5 | 6 | NS | 17 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 87 |
| A-1D | | 8/17/2000 | 4 | 2 | 4 | 2 | 3 | NS | 3 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 18 |
| A-1D | | 11/13/2000 | 37 | 11 | 35 | 6 | 9 | NS | 21 | <1 | <1 | <1 | <5 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <1 | <1 | 119 |
| A-1D | | 2/13/2001 | 29 | 11 | 34 | 5 | 7 | NS | 17 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <5 | <1 | 103 |
| A-1D | | 11/14/2001 | 24 | 6.2 | 24 | 3.6 | 4.7 | NS | 8.9 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | 0.4 J | <5 | <1 | 71.8 J |
| A-1D | | 11/20/2002 | 21 | 5.8 | 20 | 3.4 | 3.7 | NS | 6 | <1 | 0.11 J | <1 | <5 | 0.59 J | <1 | <1 | <3 | <1 | <1 | <1 | 0.6 J | <5 | <1 | 61.2 J |
| A-1D | | 11/3/2003 | 20 | 6 | 17 | 3 | 3 | NS | 3 | <1 | <1 | <1 | <1 | NA | <1 | <1 | <2 | <1 | <1 | <1 | NA | <1 | 3 | 55 |

**Table 3-1**
**Summary of Groundwater Sampling Results for VOCs**
**Phase V Monitoring Report and ROS Statement**
**Former RCA Facility**
**Burlington, Massachusetts**

| Monitoring Well Number | Sample Type | Date Sampled | 1,1-Dichloroethene | Tetrachloroethene | Trichloroethene | cis-1,2-Dichloroethene | 1,1-Dichloroethane | 1,4-Dioxane | 1,1,1-Trichloroethane | Benzene | Chloroform | Ethyl-benzene | Methylene Chloride | Methyl tert-butyl ether | Toluene | 1,1,2-Trichloroethane | Xylene (total) | Vinyl Chloride | 1,2-Dichloroethane | Chloro-benzene | Trichlorofluoromethane | Dichlorodifluoromethane | Chloromethane | Total VOCs |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **GW-1 Criteria** | | | **7** | **5** | **5** | **70** | **70** | **0.3000** | **200** | **5** | **70** | **700** | **5** | **70** | **1,000** | **5** | **10,000** | **2** | **5** | **100** | **NE** | **NE** | **NE** | **NE** |
| **GW-2 Criteria** | | | **80** | **50** | **5** | **100** | **1,000** | **6,000** | **4,000** | **2,000** | **50** | **20,000** | **10,000** | **50,000** | **50,000** | **900** | **9,000** | **2** | **5** | **200** | **NE** | **NE** | **NE** | **NE** |
| **GW-3 Criteria** | | | **30,000** | **30,000** | **5,000** | **50,000** | **20,000** | **50,000** | **20,000** | **10,000** | **20,000** | **5,000** | **50,000** | **50,000** | **40,000** | **50,000** | **5,000** | **50,000** | **20,000** | **1,000** | **NE** | **NE** | **NE** | **NE** |
| **UCL Criteria** | | | **100,000** | **100,000** | **50,000** | **100,000** | **100,000** | | **100,000** | **100,000** | **100,000** | **100,000** | **100,000** | **100,000** | **100,000** | **100,000** | **100,000** | **100,000** | **100,000** | **10,000** | **NE** | **NE** | **NE** | **NE** |
| A-1D | | 11/23/2004 | **16** | 3.7 J | 15 J | 2.1 J | 2.5 J | NS | 2.6 | <1.0 | <1.0 | <1.0 | <2.0 | 7.9 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | 1 | <2.0 | 27.5 |
| A-1D | | 11/1/2005 | **13** | 4.6 | **14** | 2.5 | 2.1 | NS | 1.9 | <1.0 | <1.0 | <1.0 | <2.0 | 7.5 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1 | <2.0 | 45.6 |
| A-1D | | 11/6/2006 | **11** | 4.2 | **13** | 2.4 | 1.7 | NS | 1.5 | <1.0 | <1.0 | <1.0 | <2.0 | 3.7 | <1.0 | <1.0 | <3.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <2.0 | 37.5 |
| A-1D | | 11/8/2007 | **9** | 3.1 | **10** | 2.1 | 1.4 | NS | <1 | <1 | <1 | <1 | <2 | 2.4 | <1 | <1 | <3 | <0.5 | <1 | <1 | <1 | <1 | <2 | 28 |
| A-1D | | 11/5/2008 | **8** | 3 | **9.2** | 1.7 | <1 | NS | <1 | <1 | <1 | <1 | <2 | 1.4 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 23.3 |
| A-1D | | 11/12/2009 | **7.6** | 2.8 | **8.7** | 1.5 | <1 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 20.6 |
| A-1D | | 11/10/2010 | 6.3 | 2.7 | **8.8** | 1.7 | <1 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 19.5 |
| A-1D | | 11/15/2011 | 5.3 | 2.6 | **8.4** | 1.5 | <1 | NS | <1 | <1 | <1 | <1 | <2 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1* | <2 | 17.8 |
| A-1D | | 11/8/2012 | 2.8 | 2.9 | **7.7** | 1.4 | <1 | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <2 | <0.5 | <1 | <1 | <1 | <1 | <2 | 14.8 |
| A-1D | | 11/12/2013 | 2.1 | 1.4 J | **5.6** | 1 J | 0.4 J | NS | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 10.5 |
| A-1D | | 11/12/2014 | 2.1 | 1.8 | **5.2** | 0.87 J | 0.33 J | 0.11 J | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 10.3 |
| A-1D | | 11/15/2015 | 1.3 | 1.6 | 4.9 | 0.95 J | 0.33 J | 0.11 J | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 9.08 |
| A-1D | | 8/26/2016 | 1.2 | 1.6 | **5.1** | 0.91 | 0.32 | 0.124 J | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 9.13 |
| A-1D | | 11/11/2016 | 1.3 | 1.5 | 4.7 | 1 | 0.45 J | 0.131 J | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 8.5 |
| A-1D | | 2/11/2017 | 1.8 | 1.6 | **5.3** | 1 | 0.4 J | 0.065 J | 0.1 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | |
| A-1D | | 5/13/2017 | 1.6 | 1.5 | **5.1** | 0.9 | 0.4 J | 0.110 J | 0.1 J | <0.1 | <0.1 | <0.1 | <0.2 | 0.2 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 J | <0.2 | 9.1 |
| A-1D | | 8/12/2017 | 1.5 | 1.6 | 4.8 | 0.9 | 0.4 J | 0.080 J | 0.1 J | <0.1 | <0.1 | <0.1 | <.02 | 0.2 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | 9.58 |
| A-1D | | 11/12/2017 | 1.7 | 1.5 | 4.8 | 0.7 | 0.3J | <0.050 | 0.1 J | <0.1 | <0.1 | <0.1 | <.02 | 0.1 J | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 UJ | <0.2 UJ | 9.58 |
| TTMW-1 | | 11/15/2015 | <1 | 2.5 | 0.95 J | 0.32 J | <1 | <0.20 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 5.17 |
| TTMW-1 | | 8/26/2016 | <0.57 | 0.37 | 0.27 | <0.30 | <0.20 | 0.0588 J | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 0.64 |
| TTMW-1 | | 11/11/2016 | <0.57 | 0.51 J | <0.22 | <0.30 | <0.20 | 0.0398 J | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 0 |
| TTMW-1 | | 2/11/2017 | <0.1 | 0.8 | 0.3 J | <0.1 | <0.1 | <0.050 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | |
| TTMW-1 | | 5/13/2017 | <0.1 | 0.4 J | 0.1 J | <0.1 | <0.1 | <0.050 | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 J | <0.2 | 0 |
| TTMW-1 | | 8/12/2017 | 0.1 | 0.1 J | <0.1 | <0.1 | <0.1 | <0.050 | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | 3.8 |
| TTMW-1 | | 11/11/2-17 | <0.1 | 0.6 | 0.2J | <0.1 | <0.1 | <0.050 | <0.1 | <0.1 | <0.1 | <0.1 | <0.2 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 UJ | <0.2 UJ | 3.8 |

Notes:
< Less than method detection limit. Concentration reported is the detection limit.
J = Estimated concentration, according to data validation protocol. Green highlighted
* = LCS or LCSD did not meet QC criteria.

NS = Not sampled or analyzed for
ND = Not detected in the samp|Concentrations in ug/L
NE = MCP Method 1 GW-1 Standard not established

**Bold and orange highlighted** denotes concentration above MCP Method 1 GW-1 Standard

**Table 2-1**
**Groundwater Field Chemistry Parameters**
**Lockheed Martin Corporation**
**Former RCA Facility, Burlington, Massachusetts**
**November 2017**

| Monitoring Well | Groundwater Field Chemistry Parameters - November 2017 Annual Sampling Event | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Date | Time | pH (Standard Units) | Specific Conductivity (mS/cm) | Dissolved Oxygen (mg/L) | Turbidity (NTU) | Oxidation Reduction Potential (mV) | Temperature (°C) | Ferrous Iron (mg/L) |
| A-1 | 11/12/17 | 13:35 | 6.42 | 1.419 | 2.74 | 0.62 | 153.1 | 16.70 | 0.0 |
| A-1D | 11/12/17 | 11:25 | 6.19 | 0.760 | 5.00 | 1.03 | -35.5 | 14.10 | 0.0 |
| EMW-11R | 11/11/17 | 10:25 | 9.66 | 0.730 | 3.71 | -43.00 | -49.5 | 12.70 | 0.0 |
| TTMW-1 | 11/12/17 | 13:05 | 5.63 | 5.440 | 1.44 | 2.10 | 173.1 | 16.60 | 0.0 |

Notes:
mS/cm = millisiemens per centimeter
mg/L = milligrams per liter
NTUs = Nephelometric Turbidity Units
mV = millivolt
°C = degrees Celsius
(1)Not enough volume in well to collect parameters
(2)Not enough volume in well to collect parameters or sample
NA=not analyzed

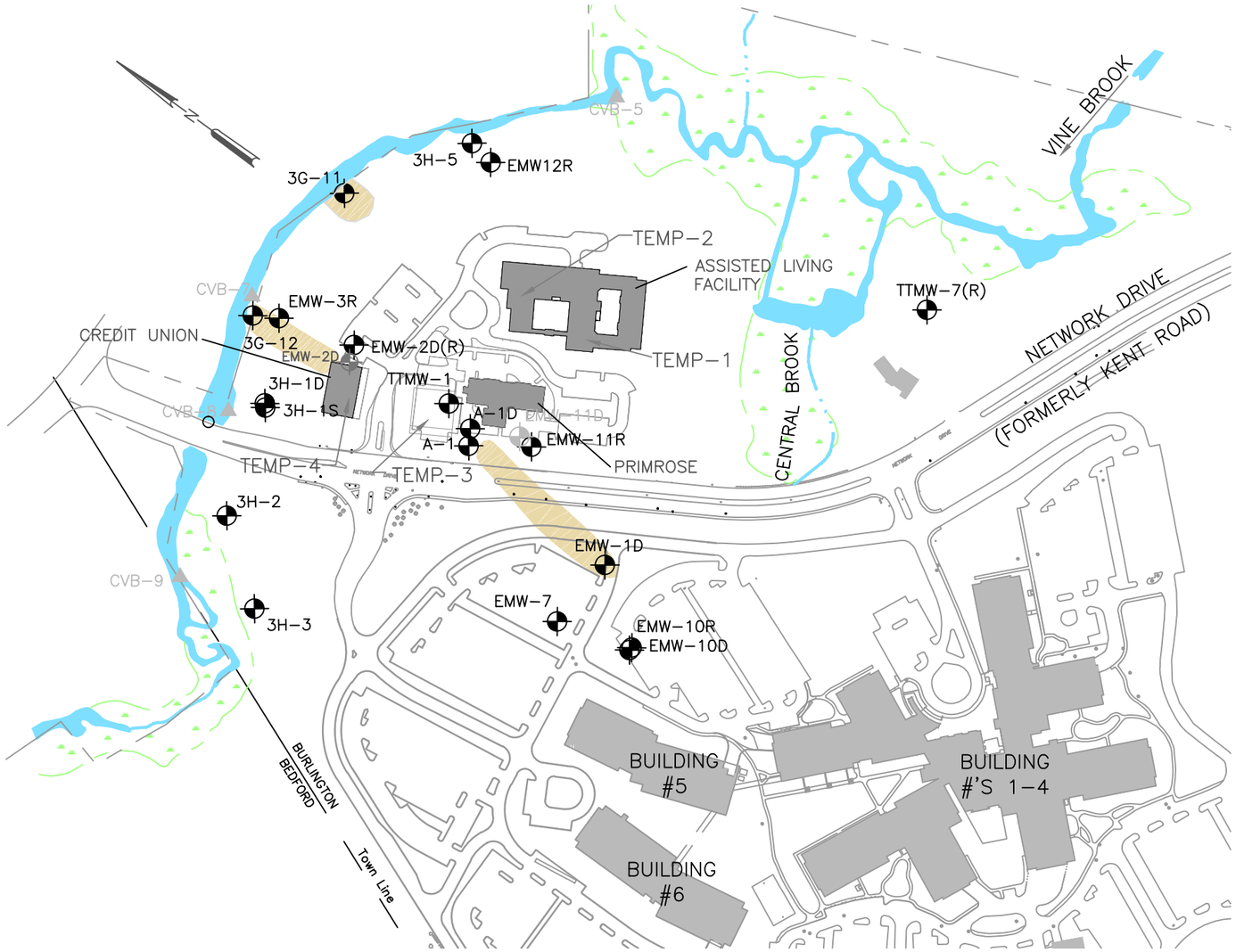
Table 3
Summary of Natural Attenuation Parameter Data
Monitoring Report and ROS Statement
Former RCA Facility, Burlington, Massachusetts

| Sample Location Identifier | Date Sampled | Oxygen (field) (mg/L) | Methane (ug/L) | Nitrate (as Nitrogen) (mg/L) | Oxygen Reduction Potential (field) (mV) | pH (field) (Standard Units) | Sulfate (as SO4) (mg/L) | Temperature (field) (°C) | Total Organic Carbon (mg/L) | Ferrous Iron (field) (mg/L) |
|---|---|---|---|---|---|---|---|---|---|---|
| **EMW-11D** | **8/19/1998** | 3.19 | <2 | 1.30 | -18.90 | 6.40 | 39.00 | 14.40 | <1 | |
| **EMW-11D (Dup)** | **8/19/1998** | - | <2 | - | - | - | - | - | <1 | |
| **EMW-11D** | **5/5/2000** | 1.19 | 0.80 | 1.24 | 149.60 | 6.52 | 21.90 | 13.29 | <1 | |
| | | | | | | | | | | |
| **MWA-1D** | **8/19/1998** | 8.20 | <2 | 0.00 | -0.20 | 6.33 | 0.00 | 15.30 | <1 | - |
| **MWA-1D** | **5/4/2000** | 0.80 | <0.5 | 0.96 | 171.10 | 6.59 | 24.40 | 15.70 | <1 | - |
| **MWA-1D** | **11/22/2004** | 0.40 | - | - | 136.00 | 6.48 | | 14.98 | - | - |
| **MWA-1D** | **11/1/2005** | 0.36 | - | - | 184.00 | 6.31 | | 16.95 | - | - |
| **MWA-1D** | **11/6/2006** | 0.60 | - | - | -117.00 | 6.36 | | 16.43 | - | - |
| **MWA-1D** | **11/15/2011** | 0.48 | - | - | 174.10 | 6.37 | - | 13.96 | - | - |
| **MWA-1D** | **11/8/2012** | 3.70 | - | - | 127.90 | 6.55 | - | 13.60 | - | - |
| **MWA-1D** | **11/12/2013** | 0.79 | - | - | -42.60 | 6.74 | - | 13.78 | - | 0.00 |
| **MWA-1D** | **11/12/2014** | 0.41 | - | - | 40.90 | 8.19 | - | 15.13 | - | - |
| **MWA-1D** | **11/15/2015** | 0.57 | - | - | 56.20 | 8.11 | - | 13.42 | - | 0.00 |
| **MWA-1D** | **8/28/2016** | 0.57 | - | - | 56.20 | 8.11 | - | 13.42 | - | 0.00 |
| **MWA-1D** | **11/12/2016** | 2.75 | - | - | 174.60 | 7.02 | - | 12.51 | - | 0.00 |
| **MWA-1D** | **2/11/2017** | 1.39 | - | - | -58.10 | 5.98 | - | 11.83 | - | - |
| **MWA-1D** | **2/26/2017** | 1.43 | - | - | -55.10 | 5.95 | - | 11.73 | - | - |
| **MWA-1D** | **5/13/2017** | 0.95 | - | - | 113.20 | 6.41 | - | 11.10 | - | - |
| **MWA-1D** | **8/12/2017** | 0.87 | - | - | 123.60 | 6.27 | - | 15.80 | - | 0.00 |

Notes:

J = Concentration estimated base on data validation.

< Less than method detection limit. Concentration reported is the detection limit.




LEGEND

- PROPERTY LINE
- BUILDING
- PAVED ROAD
- LIMITS OF SWAMP
- WETLANDS
- BODY OF WATER/STREAM
- EMW-1D — MONITORING WELL AND IDENTIFIER
- CVB-1 — FORMER SURFACE WATER SAMPLING LOCATION AND IDENTIFIER
- TEMP-1 — TEMPORARY WELL OR ABANDONED WELL AND IDENTIFIER
- CHLORINATED VOC PLUME BASED ON AUGUST 2017 WATER QUALITY DATA
- SURFACE WATER MEASUREMENT LOCATION

NOTE: BUILDINGS 1 THROUGH 6 ARE COMMERCIAL OFFICE SPACE

0 300 600

SCALE IN FEET

BASE MAP SOURCES: VANASSE HANGEN BRUSTIN, INC., MAP, DRAWING #C-3, SHEET 3 OF 11 PROJECT #06830, 1/18/00, AND EMCON DRAWING #1, PROJECT #86075-001.000, 1/10/97. THE ISOSCELES GROUP MAY 2014.

TITLE: **SITE PLAN WITH PHASE V SAMPLING LOCATIONS**

LOCATION: **Former RCA Facility**
**One Network Drive, Burlington, Massachusetts**

TETRA TECH

| | | |
|---|---|---|
| APPROVED | CC ED | FIGURE |
| DRAFTED | JML | 1 |
| PROJECT# | 117-0507550 | |
| DATE | NOV 2017 | |

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