BOEING RENTON FACILITY
QUARTERLY MONITORING REPORTS
RCRA CORRECTIVE ACTION PROGRAM, 2018

BOEING RENTON FACILITY
Quarterly Monitoring Report
RCRA Corrective Action Program
First Quarter 2018
Renton, Washington

May 15, 2018
Project No. 0088880100.2018

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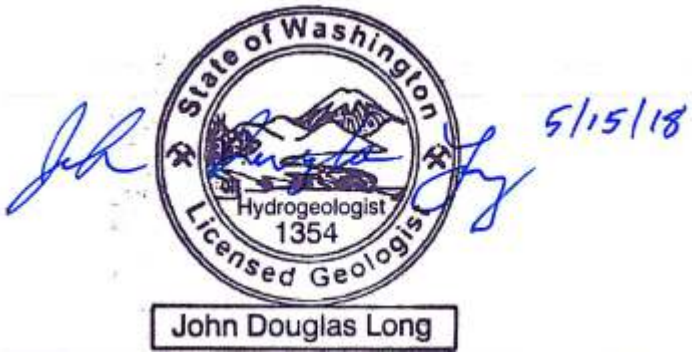

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QUARTERLY MONITORING REPORT
RCRA CORRECTIVE ACTION PROGRAM
FIRST QUARTER 2018

Boeing Renton Facility

Renton, Washington

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TABLE OF CONTENTS

TABLE OF CONTENTS
(Continued)

TABLE OF CONTENTS
(Continued)

TABLES

wood.

TABLE OF CONTENTS
(Continued)

FIGURES

TABLE OF CONTENTS
(Continued)

APPENDICES

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QUARTERLY REPORT
RCRA CORRECTIVE ACTION PROGRAM
FIRST QUARTER 2018
Boeing Renton Facility
Renton, Washington

1.0 INTRODUCTION

This report provides progress reporting in conformance with Section VII.B.1 of Agreed Order No. 8191 (Order) and summarizes cleanup actions and monitoring conducted at the Boeing Renton Facility (the Facility) during the first quarter 2018. This work is required under the Resource Conservation and Recovery Act (RCRA) Corrective Action Program being performed at the Boeing Renton Facility in Renton, Washington. Corrective action activities are performed for those solid waste management units (SWMUs), areas of concern (AOCs), and other areas where cleanup actions are ongoing. Monitoring, cleanup activities, and reporting are being conducted as part of the final remedy implementation described in the Engineering Design Report (EDR) (AMEC, 2014). The groundwater monitoring program is detailed in the Addendum to the Compliance Monitoring Plan (Amec Foster Wheeler, 2017a) which contains changes to the revised Compliance Monitoring Plan (Amec Foster Wheeler, 2016a) that superseded the original plan presented in Appendix D of the EDR (AMEC, 2014).

Groundwater monitoring and final cleanup action implementation are being conducted at the following areas (the ongoing remedies for each of these areas are noted in parentheses):

- SWMU-168: (monitored natural attenuation [MNA]);
- SWMU-172 and SWMU-174: (bioremediation, soil vapor extraction [SVE] and monitored attenuation [MA]);
- Building 4-78/79 SWMU/AOC Group: (bioremediation, SVE, MNA, and MA);
- Former Fuel Farm AOC Group: (MNA);
- AOC-001 and AOC-002: (bioremediation and MA);
- AOC-003: (bioremediation and MA);
- AOC-004: (bioremediation and MA);
- AOC-034 and AOC-035: (MNA);

- AOC-060: (bioremediation and MA);
- AOC-090: (bioremediation and MA);
- Building 4-70: (bioremediation and MA);
- Lot 20/Former Building 10-71 Parcel: (bioremediation and MA); and
- Apron A: (bioremediation and MA).

The background and investigation history for each affected unit or group of units is described in the Cleanup Action Plan (CAP) (AMEC, 2012) and/or EDR (AMEC, 2014). It should be noted that monitoring for the Building 10-71 area and Building 4-70 area is included in this monitoring report to maintain continuity with the monitoring program that has been conducted for these areas for several years and as approved by the Washington State Department of Ecology (Ecology); these two areas are not addressed explicitly in the Compliance Monitoring Plan but are being addressed per Ecology's December 30, 2015, email to Boeing with comments on the revised Compliance Monitoring Plan. Monitoring for Apron A is also included, as semiannual monitoring began in this area starting in the fourth quarter of 2016, as reported in the Apron A Investigation Results report (Amec Foster Wheeler, 2016b).

This quarterly report:

- Describes work completed during the reporting quarter;
- Describes any deviations from corrective action tasks required under the Order and/or CAP;
- Describes revisions to the corrective action schedule;
- Describes work projected to occur during the next quarter, including any planned deviation from the CAP;
- Discusses remediation operation and maintenance activities conducted at the Facility during the reporting period;
- Documents monitoring activities conducted during the quarter;
- Describes and discusses trends in monitoring data;
- Assesses remediation at each area; and
- Assesses attainment of cleanup levels (CULs) at the conditional points of compliance (CPOCs).

This report presents this information for the first quarter of 2018—the period from January through March 2018.

1.1 QUARTERLY PROGRESS REPORTING

In accordance with the requirements of the Order, corrective action activities were conducted at the Facility, as described in this report. As approved by Ecology in their letter dated November 18, 2015, progress reporting is conducted on a quarterly basis in conjunction with monitoring, operations, and maintenance activities conducted under the CAP.

1.1.1 Work Completed in the First Quarter 2018

The following work was completed during the first quarter of 2018—the period of January through March 2018:

- On behalf of Boeing, Amec Foster Wheeler submitted the fourth quarter 2017 report to Ecology on February 15, 2018.
- Groundwater monitoring for the first quarter of 2018 was completed during March 2018.
- A second round of nitrate/sulfate injections was completed in Building 4-78/79 injection wells B78-11, B78-13, B78-17 through B78-21 in January 2018. Groundwater samples were collected from these injection wells and from monitoring wells GW244S and GW031S in February 2018. These injection and sampling events are described in a memorandum submitted to Ecology on April 13, 2018.
- SVE rebound vapor sampling was conducted at SWMU-172/174 and the Building 4-78/79 Area as described in Appendix D.

1.1.2 Deviations from Required Tasks

No deviations from tasks required in the Order occurred during this activity period.

1.1.3 Deviations from CAP

There were no deviations from the CAP during this activity period, and there are no planned deviations from the CAP expected for the next activity period.

1.1.4 Schedule Revisions

There were no significant revisions to the schedule for this reporting period and no revisions are expected for the next activity period.

1.1.5 Work Projected for the Next Quarter

The following work is projected for the second quarter of 2018:

- Reporting will be completed in accordance with the Order, CAP, EDR, Addendum to the Compliance Monitoring Plan, and any changes approved by Ecology.
- Groundwater sampling and analysis for the second quarter of 2018 will be completed.
- Calibre will perform additional substrate injections as detailed in the Remedial Optimization of Benzene Plume Treatment, their technical memorandum submitted to Ecology on April 13, 2018.
- Calibre will perform additional rebound testing for the Building 4-78/79 and SWMU-172/174 SVE systems, as detailed in Appendix D.
- Additional substrate injections may be performed for selected areas at SWMU-172/174, Building 4-78/79, AOC-001/002, AOC-60, and AOC-90, as detailed in Appendix D.

2.0 GROUNDWATER SAMPLING METHODOLOGY

Groundwater was sampled and analyzed as described in Appendix A. These procedures are in accordance with the methods specified in the soil and groundwater sampling methodology, which is described in more detail in the revised Compliance Monitoring Plan (Amec Foster Wheeler, 2016a). Table A-1 summarizes the current groundwater monitoring program and constituents of concern (COCs) specified in the CAP and revised in the Addendum to the Compliance Monitoring Plan (Amec Foster Wheeler, 2017a) for all Facility corrective action areas. Table A-1 also includes Building 4-70, Lot 20/Former Building 10-71, and Apron A, which were not included in the CAP. Table A-2 summarizes the current groundwater monitoring program for the corrective action areas that include MNA or MA as part of the cleanup remedy specified in the CAP. Table A-2 also includes Building 4-70 and Apron A, which were not specified in the CAP. Any changes or exceptions to the sampling or analytical methods cited in Appendix A during the quarter are described in the applicable subsections in Section 3. The field data sheets, which document the groundwater sample collection and field parameter monitoring for each well sampled during this quarter, are included in Appendix B.

The analytical methods, field duplicate, lab duplicate, and matrix spike/matrix spike duplicate frequencies are specified in the Quality Assurance Project Plan (Amec Foster Wheeler, 2016c). The full analytical reports provided by the laboratory are provided separately on compact disc. The data validation memoranda are included in Appendix C.

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3.0 CORRECTIVE ACTION ACTIVITIES COMPLETED DURING QUARTER

This section describes the corrective action activities conducted at the Facility during the first quarter of 2018. Rebound evaluation of of the SVE systems at the SWMU-172/174 area and the Building 4-78/79 SWMU/AOC Group continued during the first quarter. Quarterly compliance monitoring was also conducted in accordance with the Addendum to the Compliance Monitoring Plan (Amec Foster Wheeler, 2017a).

3.1 SWMU-168

This section describes corrective action activities conducted at this SWMU. Figure 1 shows the location of the groundwater monitoring wells at SWMU-168, as well as the groundwater elevations measured during this monitoring event. The cleanup remedy for SWMU-168 is MNA; therefore, cleanup activities consist of monitoring only.

3.1.1 Cleanup Action Activities

No installation/construction activities were conducted for this cleanup action area during the first quarter.

3.1.2 Compliance Monitoring Plan Deviations

No deviations from the Compliance Monitoring Plan occurred for this area during the first quarter.

3.1.3 Water Levels

Groundwater elevations measured during the first quarter 2018 groundwater monitoring event at SWMU-168 are summarized in Table 1 and shown on Figure 1. Groundwater elevation contours are not shown due to the limited number of shallow groundwater monitoring wells.

3.1.4 Groundwater Monitoring Results

Results for primary geochemical indicators are presented in Table 2; results for the SWMU-168 COCs are presented in Table 3. Groundwater in this area is monitored following the schedule presented in Tables A-1 and A-2 in Appendix A, which includes semiannual monitoring at the CPOC for both the area COCs and the primary geochemical indicators listed in Table A-2.

3.1.4.1 Natural Attenuation/Geochemical Indicators

The geochemical indicator results are presented in Table 2. Data from the CPOC wells indicate that conditions are conducive to natural attenuation of vinyl chloride (VC) in this SWMU. The results for

dissolved oxygen (DO) and oxidation reduction potential (ORP) measurements indicate reducing conditions. The pH values measured in all wells were near neutral.

3.1.4.2 COC Results for Source Area

Groundwater samples were not collected from the source area well for SWMU-168, following the sampling schedule presented in Tables A-1 and A-2.

3.1.4.3 COC Results for Conditional Point of Compliance

Monitoring results for the CPOC area monitoring wells are shown in Table 3. VC was detected in the groundwater collected from all three CPOC wells at concentrations ranging from 0.0273 micrograms per liter (µg/L) to 0.0393 µg/L, below the CUL of 0.11 µg/L.

3.2 SWMU-172 AND SWMU-174

This section describes corrective action activities conducted at these two SWMUs. The cleanup remedy for SWMU-172 and SWMU-174 is a combination of SVE, bioremediation, and MA. Figure 2 shows the layout of the groundwater monitoring and remediation system for these SWMUs.

3.2.1 Cleanup Action Activities

3.2.1.1 Installation/Construction Activities

No installation/construction activities were conducted for these SWMUs during the first quarter.

3.2.1.2 Soil Vapor Extraction and Bioremediation Operations

Rebound testing of the SVE system at SWMU-172 and SWMU-174 was implemented during the first quarter. Details for system operations/tests are included in the SVE operations and monitoring report prepared by Calibre and included as Appendix D.

3.2.2 Compliance Monitoring Plan Deviations

No deviations from the Compliance Monitoring Plan occurred for this area during the first quarter.

3.2.3 Water Levels

Groundwater elevations for the SWMU-172 and SWMU-174 area measured during the first quarter 2018 are summarized in Table 4 and shown on Figure 2. The contoured data for March 2018 show that groundwater is generally flowing east from SWMU-172 and SWMU-174, toward the Cedar River Waterway, with an approximate horizontal gradient of 0.01.

3.2.4 Groundwater Monitoring Results

Groundwater at this area is monitored following the schedules presented in Tables A-1 and A-2 in Appendix A. Results for primary geochemical indicators are presented in Table 5; results for the SWMU-172 and SWMU-174 area COCs are presented in Table 6.

3.2.4.1 Monitored Attenuation/Geochemical Indicators

The geochemical indicator results are presented in Table 5. Total organic carbon (TOC) concentrations ranged from 1.38 milligrams per liter (mg/L) to 8.48 mg/L for all SWMU-172 and SWMU-174 monitoring wells. The other natural attenuation parameter results indicate that geochemical conditions were generally uniform and appropriate for reductive dechlorination of chlorinated volatile organic compounds (VOCs); the pH in all monitoring wells were near neutral and the DO and ORP indicate reducing conditions were present.

3.2.4.2 COC Results for Source and Downgradient Plume Areas

Table 6 lists first quarter 2018 analytical results for the SWMU-172 and SWMU-174 COCs. Figure 3 shows historical trend plots for tetrachloroethene (PCE), trichloroethene (TCE), vinyl chloride (VC), and *cis*-1,2-dichloroethene (*cis*-1,2-DCE) in source area wells GW152S and GW153S. Historical trend plots for PCE, TCE, VC, and *cis*-1,2-DCE in downgradient plume area wells GW172S and GW173S are shown in Figure 4. Flow generally moves from the vicinity of source area well GW152S to downgradient plume area well GW172S, and from source area well GW153S to downgradient plume area well GW173S. PCE and TCE are the chlorinated solvents that were used at the Facility, and *cis*-1,2-DCE and VC are breakdown products resulting from biodegradation processes.

As shown in Table 6, *cis*-1,2-DCE, TCE, PCE, and VC concentrations exceeded the CULs in the groundwater collected from both source area and downgradient plume area wells. As shown in Figure 3, the concentrations of COCs in groundwater from source area wells have continued to generally decrease since the substrate injections were completed during the second quarter of 2016, except for VC in groundwater collected from source area well GW153S, which increased during the first quarter to 0.22 ug/L. As shown in Figure 4, COC concentrations increased in the groundwater samples collected from downgradient plume area wells GW172S and GW173S during the first quarter. Except for the *cis*-1,2-DCE and VC concentrations in the groundwater collected from downgradient plume well GW173S, the COC concentrations in the groundwater samples collected from the downgradient plume have increased, but are within the range of concentrations observed over the last two years.

Arsenic was detected above the CUL in all source area and downgradient plume area wells. As shown in Figure 5, the arsenic concentrations in the groundwater from both source area and downgradient wells were stable during the first quarter sampling event. Copper was detected at concentration above the CUL in the groundwater from downgradient well GW173S, and lead was detected above the CUL in the groundwater from source area well GW152S. The observed variations for metals concentrations may be influenced by the naturally occurring reducing conditions. The conditions created to support reductive dechlorination of the chlorinated solvents could impact these processes but the sampling from nearby well GW171S (which has not been impacted by ERD treatment) show similar conditions in regards to dissolved oxygen and measured redox (see Tables 5 and 6). Dissolved arsenic was analyzed in groundwater samples collected from select downgradient and CPOC area monitoring wells, as well as injection wells and inactive monitoring well GW171S, during the first quarter 2018 sampling event to compare total and dissolved concentrations of arsenic in groundwater with the local and/or regional naturally occurring background concentrations of arsenic in groundwater. Arsenic occurs naturally in soil and groundwater; and is known to be regionally elevated; therefore, evaluations of total and dissolved arsenic in background concentrations may be warranted. As shown in Table 6, total and dissolved arsenic are below the background arsenic concentration for arsenic in groundwater of 5.0 µg/L (Ecology, 2016), except for in groundwater from GW172S and GW173S, which at total arsenic concentrations of 5.47 and 5.01 µg/L, respectively, which only slightly exceed the background concentration. All of the arsenic values shown in Table 6 are below the SDWA MCL of 10 µg/L (see footnote 1).

3.2.4.3 COC Results for Conditional Point of Compliance

Results from the CPOC area wells are presented in Table 6 and trend charts for cis-1,2-DCE, TCE, and VC for all CPOC area wells are presented in Figure 6. As shown in Table 6, *cis*-1,2-DCE was detected at concentrations above the CUL, ranging from 0.0348 to 0.309 µg/L, in the groundwater collected from all CPOC area wells; TCE was detected above the CUL in the groundwater from monitoring wells GW234S and GW235I; and VC was detected above the CUL in the groundwater from monitoring well GW232S. Concentrations of VC in well GW232S are expected to decrease over time, as concentrations in the immediate upgradient well GW173S continue to decrease. One option under consideration would be to convert GW173S to an injection well to more rapidly reduce VOCs at this location. PCE was not detected in the groundwater collected from the CPOC wells and is not

1 The site-specific cleanup level (CUL) for arsenic is 1.0 µg/L. Recently, Ecology reverted to a surface water criteria for arsenic of 10 µg/L, which is the Safe Drinking Water Act (SDWA) maximum contaminant level (MCL) for groundwater (Ecology 2016). This was done for three primary reasons: 1) there are elevated natural background concentrations of arsenic in groundwater in many areas of Washington state (Ecology 2016, page 70); 2) EPA has acknowledged that the cancer slope factor (CSF) for arsenic is unreliable (Ecology 2016, page 73); and 3) EPA's bioaccumulation factor (BCF) for arsenic should be based on inorganic arsenic (the toxic portion) rather than total arsenic (Ecology 2016, page 73).

shown in Figure 6. As shown on Figure 6, concentrations of cis-1,2-DCE have exceeded the CUL in the CPOC wells since compliance monitoring began, but are generally stable and are of low concern due to the low toxicity of cis-1,2-DCE and associated lack of surface water quality standard for this constituent. The concentrations of TCE and VC in the CPOC wells also generally appear to be stable.

Arsenic was detected above the CUL in the groundwater from CPOC area wells GW232S, GW234S, and GW236S. Copper and lead were detected above their respective CULs in the groundwater from monitoring well GW236S (Table 6). Figure 7 shows arsenic, copper, and lead trends since the beginning of compliance monitoring in groundwater from CPOC wells. As shown in Figure 7, though arsenic, copper and lead concentrations appear to vary over time, there are no increasing trends in the groundwater collected from CPOC wells.

3.3 BUILDING 4-78/79 SWMU/AOC GROUP

This section describes corrective action activities conducted at the Building 4-78/79 SWMU/AOC Group during the first quarter of 2018. The cleanup remedy for this SMWU/AOC group is bioremediation, SVE, MNA, and MA. Figure 8 shows the location of groundwater monitoring wells, bioremediation wells, and SVE wells for this area.

3.3.1 Cleanup Action Activities

3.3.1.1 Installation/Construction Activities

No installation/construction activities were conducted for this cleanup action area during the first quarter.

3.3.1.2 Soil Vapor Extraction and Bioremediation Operations

Rebound testing of the SVE system at Building 4-78/79 SWMU/AOC Group was implemented during the first quarter. Details for system operations/testing are included in the SVE operations and monitoring report prepared by Calibre and included as Appendix D.

3.3.2 Compliance Monitoring Plan Deviations

No deviations from the Compliance Monitoring Plan occurred for this area during the first quarter.

3.3.3 Water Levels

Table 7 presents the groundwater elevations measured during the first quarter 2018 groundwater monitoring event at the Building 4-78/79 SWMU/AOC group. The approximate direction of groundwater flow from the source area is generally to the west, with a hydraulic gradient of 0.003.

3.3.4 Groundwater Monitoring Results

Results for primary geochemical indicators are presented in Table 8; results for the COCs for Building 4-78/79 SWMU/AOC Group are presented in Table 9. Groundwater at this area is monitored following the schedule presented in Tables A-1 and A-2 in Appendix A.

3.3.4.1 Natural Attenuation/Geochemical Indicators

The geochemical indicator results are presented in Table 8. In general, source area, downgradient, and CPOC area wells had low levels of DO and ORP, indicating that reducing conditions are present over the area and are generally favorable for reductive dechlorination of chlorinated VOCs. The pH in all monitoring wells was near 6 standard units during the first quarter monitoring period. Results for the other primary geochemical indicators were fairly consistent throughout this area.

3.3.4.2 COC Results for Source and Downgradient Plume Areas

Table 9 lists first quarter 2018 analytical results for the Building 4-78/79 SWMU/AOC Group COCs. The CULs established in the CAP are also presented on Table 9. Figures 9 and 10 are trend charts showing historical trends for COCs for in source and downgradient plume area groundwater monitoring wells that have a history of frequent detections. Trend charts have not been prepared for groundwater monitoring wells or COCs that do not have a history of frequent detections.

As shown in Table 9, benzene, *cis*-1,2-DCE, TCE, and VC were detected in groundwater samples from several source area wells at concentrations above their respective CULs, except for groundwater from source area well GW039S, which had concentrations below CULs for all COCs. Total petroleum hydrocarbons in the gasoline range (TPH-G) was detected in the groundwater from source area well GW031S, at a concentration of 3,450 µg/L (the field duplicate concentration was 3,490 µg/L). TPH-G was also detected in the groundwater from source area wells GW033S and GW243I, at concentrations below the CUL.

Benzene was detected at a concentration of 1.12 µg/L in the groundwater collected from downgradient plume area well GW210S and VC was detected in the groundwater collected from downgradient plume area well GW209S at a concentration 0.23 µg/L. Benzene has been sporadically detected in the groundwater samples from GW210S and the concentration observed during the first quarter is consistent with historical concentrations of benzene in the groundwater from this well. The remaining COCs were below detection in the groundwater collected from downgradient plume area wells.

Figure 9 shows trends for selected COCs for source area wells GW031S and GW033S and Figure 10 shows trends for selected COCs for source area well GW034S and downgradient plume area well GW209S. COC concentrations in the groundwater collected from GW031S are generally consistent with historical results and trends. While the concentration of benzene in the groundwater collected from source area well GW033S is generally consistent with historical results, the concentrations of *cis*-1,2-DCE, TCE, and VC decreased during the first quarter 2018 sampling event. Groundwater samples from GW033S historically had the highest concentrations of cis-1,2-DCE and VC prior to the Duct Bank dewatering project. COC concentrations in groundwater samples collected from source area well GW034S (Figure 10) are stable. Nitrate and sulfate injections described in Appendix D are continuing to be performed to address elevated benzene present between GW210S and GW031S.

Figure 10 shows a trend chart for downgradient plume area well GW209S, which was installed in 2008 and is located west of Building 4-79. Monitoring results for all COCs are stable in the groundwater collected from GW209S with concentrations either not detected or detected at concentrations just above the reporting limit of 0.2 µg/L.

3.3.4.3 COC Results for Conditional Point of Compliance Area

Groundwater monitoring results from the first quarter for the CPOC area are summarized in Table 9. Trends for CPOC wells GW143S, GW237S and GW240D are shown in Figures 11 through 13. Benzene was detected above the CUL at a concentration of 3.58 µg/L in the groundwater sample from CPOC well GW237S; all other benzene results for the CPOC area were below detection except for a detection below the CUL in the sample collected from CPOC well GW238I. As shown in Figure 11, benzene has been sporadically detected in the groundwater from CPOC well GW237S but has not been detected in the groundwater samples from any other CPOC wells at concentrations above the CUL. VC was detected the groundwater samples collected from CPOC wells GW238I and GW240D above the CUL at concentrations of 0.21 and 0.24 µg/L, respectively. As shown in Figure 12, the VC concentrations in the CPOC area wells have decreased since compliance monitoring began. The only other COC detected in the groundwater samples from the CPOC area during the first quarter was TPH-G at a concentration of 444 µg/L in the sample from CPOC well GW237S. As shown in Figure 13, TPH-G has been detected in the groundwater sample from CPOC GW237S well at sporadic concentrations since the fourth quarter of 2015.

3.4 FORMER FUEL FARM AOC GROUP

The final remedy for the Former Fuel Farm is MNA. The Former Fuel Farm AOC group is monitored semiannually in May and November; therefore, no monitoring was conducted for this area during the first quarter of 2018.

3.5 AOC-001 AND AOC-002

This section describes corrective action activities conducted at these AOCs during first quarter of 2018. The cleanup remedy for this corrective action area is bioremediation and MA. Bioremediation commenced for this area in late 2004, following source area excavation. Figure 14 shows the location of groundwater monitoring wells and the bioremediation injection system for AOC-001 and AOC-002, as well as the groundwater elevations measured during this monitoring event.

3.5.1 Cleanup Action Activities

No construction or operations work was conducted for these AOCs during the first quarter.

3.5.2 Compliance Monitoring Plan Deviations

No deviations from the Compliance Monitoring Plan occurred for this area during the first quarter.

3.5.3 Water Levels

Table 10 presents the groundwater elevations measured during the first quarter 2018 monitoring event at AOC-001 and AOC-002. Figure 14 shows the groundwater elevations from this event. The average elevation of Lake Washington was not available from the U.S. Army Corps of Engineers Northwestern Division website. First quarter 2018 data indicate that groundwater in the vicinity of these AOCs was flowing west, toward Lake Washington, with an approximate horizontal hydraulic gradient of 0.001.

3.5.4 Groundwater Monitoring Results

Groundwater in this area is monitored following the schedule presented in Tables A-1 and A-2 in Appendix A. Results for primary geochemical indicators are presented in Table 11; results for the AOC-001 and AOC-002 COCs are presented in Table 12.

3.5.4.1 Monitored Attenuation/Geochemical Indicators

The geochemical indicator results are presented in Table 11. The pH was near neutral in all CPOC wells and is conducive to microbial activity. Table 11 also suggests that geochemical conditions are appropriate for reductive dechlorination of the COCs in the AOC-001 and AOC-002 CPOC area, as indicated by the reducing conditions, low DO levels, and generally appropriate TOC concentrations.

3.5.4.2 COC Results for Source and Downgradient Plume Areas

The analytical results for the AOC-001 and -002 COCs are summarized in Table 12. Concentrations of 1,1-DCE and benzene were below CULs in all AOC-001/002 source area and downgradient plume monitoring wells in the first quarter. *Cis*-1,2-DCE was detected at concentrations above the CUL in the

groundwater collected from all source and downgradient wells, at concentrations ranging from 0.0276 µg/L to 0.704 µg/L. VC was also detected at concentrations above the CUL in the groundwater collected from all source and downgradient wells at concentrations ranging from 0.0824 µg/L to 0.526 µg/L. TCE was detected in the groundwater collected from source area well GW193S at a concentration of 0.0272 µg/L, above the CUL, but was either not detected or below the CUL in groundwater samples from the downgradient plume area wells.

Trend plots for TCE, VC, and *cis*-1,2-DCE in source area well GW193S, and cis-1,2-DCE and VC in downgradient plume well GW190S are shown in Figure 15. The concentrations of the COCs in the groundwater from these wells decreased during the first quarter monitoring event. Figure 16 presents the trends for VC and *cis*-1,2-DCE in downgradient plume wells GW192S, and TCE, VC, and *cis*-1,2-DCE in downgradient plume well GW246S. In general, concentrations of COCs in groundwater samples from GW192S and GW246S remained stable during the first quarter.

3.5.4.3 COC Results for the Conditional Point of Compliance Area

As shown in Table 12, 1,1-dichloroethene and TCE concentrations in the groundwater samples collected from CPOC wells were either below detection or below the CUL. Concentrations of *cis*-1,2-DCE was above the CUL in the groundwater samples from all CPOC area wells except for GW194S and VC was above the CUL in the groundwater samples from all CPOC area wells except for GW194S and GW245S. Concentrations of *cis*-1,2-DCE in groundwater from the CPOC wells ranged from 0.0216 µg/L to 0.234 µg/L, all above the CUL of 0.02 µg/L. VC was detected above the CUL of 0.05 µg/L at concentrations ranging from 0.0567 to 0.287 µg/L. Benzene was detected in the groundwater collected from CPOC well GW197S at a concentration above the CUL of 1.21 µg/L. Benzene had previously been detected in the groundwater from this CPOC well at concentrations exceeding the CUL during the first quarter 2016 sampling event.

As shown in Figure 17, aside from the increase in concentrations of *cis*-1,2-DCE and VC observed in the in the groundwater samples collected from GW185S in the second and third quarters of 2016; concentrations of cis-1,2-DCE and VC in the CPOC area monitoring wells have been generally stable since compliance monitoring began. COPC area wells GW194S and GW245S are not shown on Figure 17 because COCs are generally not detected in the groundwater samples from these wells. Similarly, the remaining COCs are generally below the CUL in the CPOC area monitoring wells and are not included on Figure 17.

3.6 AOC-003

This section describes corrective action activities conducted at AOC-003 for the first quarter of 2018. The cleanup remedy for this AOC is bioremediation and MA. Figure 18 shows the location of groundwater monitoring and bioremediation wells at AOC-003, as well as the groundwater elevations measured during this monitoring event.

3.6.1 Cleanup Action Activities

No installation/construction activities were conducted for this cleanup action area during the first quarter.

3.6.2 Compliance Monitoring Plan Deviations

No deviations from the Compliance Monitoring Plan for this area occurred during the first quarter.

3.6.3 Water Levels

Table 13 presents the groundwater elevations measured during the first quarter 2018 monitoring event at AOC-003. Figure 18 shows the groundwater elevations from this event. Groundwater elevation contours are not shown due to the limited number of shallow groundwater monitoring wells. The first quarter 2018 groundwater elevation data indicate that the groundwater table is fairly flat and that groundwater generally flows north-northwest toward Lake Washington.

3.6.4 Groundwater Monitoring Results

Groundwater at this area is monitored following the schedule presented in Tables A-1 and A-2 in Appendix A. Results for primary geochemical indicators are presented in Table 14; results for the AOC-003 COCs are presented in Table 15.

3.6.4.1 Monitored Attenuation//Geochemical Indicators

The geochemical indicator results are presented in Table 14. Results in Table 14 indicate that geochemical conditions are generally consistent throughout this AOC. The data indicate that conditions are generally conducive to biodegradation of the COCs for this AOC.

3.6.4.2 COC Results for the Source and Downgradient Plume Areas

Table 15 lists first quarter 2018 analytical results for the AOC-003 COCs. Trend plots have not been prepared for the AOC-003 source area well, since groundwater analyses for source area well GW249S have been generally below reporting limits. During the first quarter sampling event, PCE was detected above the CUL in a groundwater sample from the source area well and VC was

detected above the CUL in a groundwater sample from the downgradient well, GW188S. All other COCs were either not detected or were detected at concentrations below the CUL.

3.6.4.3 COC Results for the Conditional Point of Compliance Area

Groundwater collected from the two CPOC monitoring wells did not have detections of PCE, TCE or *cis*-1,2-DCE above their respective CULs. VC was detected at concentrations above the CUL in the groundwater samples collected from both CPOC wells, as shown in Table 15.

3.7 AOC-004

This section describes corrective action activities conducted at AOC-004. The cleanup remedy for this AOC is bioremediation and MA. Figure 19 shows the layout of the groundwater monitoring and bioremediation injection wells for this AOC.

3.7.1 Cleanup Action Activities

No construction or operations work was conducted for this AOC during the first quarter.

3.7.2 Compliance Monitoring Plan Deviations

No deviations from the Compliance Monitoring Plan occurred for this area during the first quarter.

3.7.3 Water Levels

Table 16 presents the groundwater elevations measured during the first quarter 2018 monitoring event at AOC-004. Figure 19 shows the groundwater elevations. Because there are only two groundwater elevation monitoring locations for AOC-004, groundwater contours are not shown on Figure 19.

3.7.4 Groundwater Monitoring Results

Groundwater at this area is monitored following the schedule presented in Tables A-1 and A-2 in Appendix A. Results for primary geochemical indicators are presented in Table 17; results for COCs are presented in Table 18.

3.7.4.1 Monitored Attenuation/Geochemical Indicators

The geochemical indicator results are presented in Table 17. The primary geochemical indicators were generally uniform across the AOC. Geochemical indicators will continue to be monitored to assess attenuation of AOC-004 COCs.

3.7.4.2 COC Results for the Source Area

Table 18 lists first quarter 2018 analytical results for lead, the sole AOC-004 COC. Lead was detected at a concentration of 0.00094 mg/L, below the CUL of 0.001 mg/L, in the groundwater sample from the source area well. Trend plots have not been created for the AOC-004 source area well, since COCs have not been detected consistently at concentrations above the CUL since monitoring began in 2015.

3.7.4.3 COC Results for the Conditional Point of Compliance Area

As shown in Table 18, lead was detected below the CUL at a concentration of 0.000449 mg/L in the groundwater from CPOC well GW174S.

3.8 AOC-034 AND AOC-035

AOC-034 and AOC-035 are monitored semiannually in May and November; therefore, no monitoring was conducted for this area during the first quarter of 2018.

3.9 AOC-060

This section describes corrective action activities conducted at AOC-060 during the first quarter of 2018. The cleanup remedy for this AOC is bioremediation and MA. Figure 20 shows the locations of the groundwater monitoring and bioremediation injection wells at AOC-060, as well as the groundwater elevations measured during the first quarter sampling event.

3.9.1 Cleanup Action Activities

There were no installation, construction, or operations activities conducted at AOC-060 during the first quarter.

3.9.2 Compliance Monitoring Plan Deviations

No deviations from the Compliance Monitoring Plan for this area occurred during this quarter.

3.9.3 Water Levels

Table 19 presents the groundwater elevations measured during the first quarter 2018 groundwater monitoring event at AOC-060. Figure 20 shows the groundwater elevations measured during this event. Groundwater flow was toward the Cedar River with a hydraulic gradient of 0.001.

3.9.4 Groundwater Monitoring Results

Groundwater at this area is monitored following the schedule presented in Tables A-1 and A-2 in Appendix A. Results for primary geochemical indicators are presented in Table 20; results for COCs are presented in Table 21.

3.9.4.1 Monitored Attenuation/Geochemical Indicators

The geochemical indicator results are presented in Table 20. The primary geochemical indicators show general uniform conditions in source and downgradient plume areas, with slightly higher TOC concentrations detected in the groundwater from downgradient plume area well GW012S. These data indicate that conditions are generally conducive to biodegradation of the COCs for this AOC.

3.9.4.2 COC Results for Source and Downgradient Plume Areas

Table 21 presents first quarter 2018 analytical results for the AOC-060 groundwater COCs. Figures 21 and 22 present trend plots for the COCs in selected source area and downgradient plume area wells. Trend charts are not shown for groundwater monitoring wells for which COCs are not commonly detected.

As shown in Table 21 and Figures 21 and 22, concentrations of *cis*-1,2-DCE and TCE exceeded the CUL in the groundwater collected from source area well GW009S as well as all of the downgradient plume area wells. VC was also detected in the groundwater from downgradient plume area wells GW012S and GW014S at concentrations above the CUL. The concentrations of COCs in the groundwater from source area well GW009S and downgradient plume well GW014S are generally stable (Figures 21 and 22), while the concentrations of COCs in the groundwater from downgradient plume well GW012S decreased during the first quarter monitoring event (Figure 21). The COC concentrations in the groundwater from downgradient plume area well GW147S appear to vary seasonally (Figure 22).

3.9.4.3 COC Results for the Conditional Point of Compliance Area

As shown in Table 21, the only COC detected at a concentration above the CUL was *cis*-1,2-DCE in the groundwater collected from CPOC well GW253I. The remaining COCs were either below detection or below the CULs in the groundwater collected from the remaining CPOC wells. Figures 23 and 24 present trends for the COCs in the CPOC wells. As shown in Figures 23 and 24, the COC concentrations in the groundwater from the CPOC wells are generally stable with cis-1,2-DCE and TCE the most consistently detected at concentrations above the CUL.

3.10 AOC-090

This section describes corrective action activities conducted at AOC-090 during the first quarter of 2018. The cleanup remedy for this AOC is bioremediation and MA. Figure 25 shows the locations of the groundwater monitoring wells and the bioremediation injection system at AOC-090, as well as the groundwater elevations measured during the first quarter.

3.10.1 Cleanup Action Activities

There were no installation, construction, or operations activities conducted at this AOC this quarter.

3.10.2 Compliance Monitoring Plan Deviations

No deviations from the Compliance Monitoring Plan occurred for this area during the first quarter.

3.10.3 Water Levels

Table 22 presents the groundwater elevations measured during the first quarter 2018 groundwater monitoring event at AOC-090. Figure 25 shows the groundwater elevations measured during this event. Based on these measurements, groundwater in the vicinity of AOC-090 flow directions could not be accurately determined. The cause of variations in water levels is not known.

3.10.4 Groundwater Monitoring Results

Groundwater at this area is monitored following the schedule presented in Tables A-1 and A-2 in Appendix A. Results for primary geochemical indicators are presented in Table 23; results for COCs are presented in Table 24.

3.10.4.1 Monitored Attenuation/Geochemical Indicators

The geochemical indicator results are presented in Table 23. TOC concentrations in the groundwater from source area well GW189S have continued to stabilize through the first quarter to concentrations below those observed prior to the substrate injection event in the second quarter of 2016 (Figure 26). The pH was neutral in all source area and downgradient plume area wells. The other geochemical indicators show that conditions are generally uniform in AOC-090 groundwater and in general, primary geochemical indicators show that conditions support biological degradation of chlorinated VOCs.

3.10.4.2 COC Results for Source and Downgradient Plume Areas

Table 24 presents first quarter 2018 analytical results for the AOC-090 groundwater COCs. As shown in Table 24, TCE, VC, and TPH in the gasoline range were the only COCs detected at concentrations above their respective CULs in the groundwater sample collected from GW189S. VC was also detected in the groundwater collected from downgradient plume area well GW176S at a concentration

of 0.208 µg/L, above the CUL. There were no other COCs detected at concentrations above the CUL in the groundwater samples collected from downgradient plume area wells.

Figure 26 presents trends for selected COCs in source area well GW189S. As shown in Figure 26; concentrations of cis-1,2-DCE, TCE, and VC show stable trends for the last three sampling events. In general, COC concentrations in the groundwater sample from this source area well have been declining over the past several years and concentrations during the first quarter are within the ranges observed historically.

3.10.4.3 COC Results for Conditional Point of Compliance Areas

VC was detected at concentrations above the CUL in the shallow zone CPOC wells, but not in the intermediate zone CPOC wells. No other COCs in were detected above the CULs in groundwater from either the shallow or intermediate zone CPOC wells. This is the eighth consecutive sampling event that neither 1,1,2-trichloroethane, acetone, benzene, carbon tetrachloride, chloroform, cis-1,2-DCE, methylene chloride, toluene, trans-1,2-dichloroethene, nor any of the TPH fractions were detected above CULs in any of the CPOC area wells.

3.11 BUILDING 4-70 AREA

This section describes corrective action activities conducted at this area during first quarter 2018. The cleanup remedy for the Building 4-70 Area is bioremediation and MA. Figure 27 shows the locations of the groundwater monitoring and bioremediation injection wells for this area.

3.11.1 Cleanup Action Activities

No installation or construction activities took place at the Building 4-70 Area during the first quarter.

3.11.2 Compliance Monitoring Plan Deviations

TOC was not collected from the groundwater monitoring wells according to the schedule presented in Table A-2 due to field oversight. TOC will be collected during the third quarter monitoring event.

3.11.3 Water Levels

Table 25 presents the groundwater elevations measured during the first quarter 2018 monitoring event at Building 4-70. Figure 27 shows the groundwater elevations in the two monitoring wells for this area. These groundwater elevation data (only two wells) do not support development of elevation contours. However, the flow direction is expected to be similar to the flow observed at the Building 4-78/79 Area, which is generally to the west, toward the Cedar River Waterway.

3.11.4 Groundwater Monitoring Results

Groundwater in this area is monitored following the schedules presented in Tables A-1 and A-2 in Appendix A. Results for primary geochemical indicators are presented in Table 26; results for the Building 70 Area COCs are presented in Table 27.

3.11.4.1 Monitored Attenuation/Geochemical Indicators

The geochemical indicator results are presented in Table 26. The primary geochemical indicators show that reducing conditions were present and that conditions were conducive to biological degradation of the chlorinated VOCs. Geochemical indicators will continue to be monitored following the schedule presented in Table A-2 in Appendix A.

3.11.4.2 COC Results for Conditional Point of Compliance Area

All of the groundwater monitoring wells for the Building 4-70 Area are located along the CPOC (Figure 27). Groundwater monitoring results for the CPOC area wells are shown in Table 27. VC was detected in the groundwater from monitoring well GW260S at a concentration just above the CUL. No other COCs were detected in the groundwater at concentrations above the CUL.

3.12 LOT 20/FORMER BUILDING 10-71 PARCEL

The Lot 20/Former Building 10-71 Parcel is monitored semiannually in May and November; therefore, no monitoring was conducted for this area during the first quarter of 2018.

3.13 APRON A AREA

The Apron A Area is monitored semiannually in May and November; therefore, no monitoring was conducted for this area during the first quarter of 2018.

4.0 REFERENCES

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TABLES

TABLE 1

SWMU-168 GROUNDWATER ELEVATION DATA
MARCH 5, 2018
Boeing Renton Facility
Renton, Washington

Well ID[1]	Screen Interval Depth (feet bgs)	TOC Elevation (feet)[2]	Depth to Groundwater (feet below TOC)	Groundwater Elevation (feet)[2]
GW229S	5 to 10	25.42	7.70	17.72
GW230I	4 to 14	24.86	6.90	17.96
GW231S	5 to 10	24.65	6.69	17.96

Notes
1. S = shallow well; I = intermediate well.
2. Elevations in feet relative to National Geodetic Vertical Datum of 1929.

Abbreviations
bgs = below ground surface
TOC = top of casing

TABLE 2

SWMU-168 CONCENTRATIONS OF PRIMARY GEOCHEMICAL INDICATORS [1]
MARCH 5, 2018
Boeing Renton Facility
Renton, Washington

	Well ID [2]		
	CPOC Area		
	GW229S	GW230I	GW231S
Temperature (degrees C)	8.60	10.50	9.80
Specific Conductivity (µS/cm)	183	209	192
Dissolved Oxygen (mg/L)	1.30	1.36	1.12
pH (standard units)	5.95	6.36	6.41
Oxidation/Reduction Potential (mV)	-13.0	-86.5	-25.5

Notes
1. Primary geochemical indicators are measured in the field.
2. S = shallow well; I = intermediate well.

Abbreviations
µS/cm = microsiemens per centimeter
CPOC = conditional point of compliance
degrees C = degrees Celsius
mg/L = milligrams per liter
mV = millivolts

TABLE 3

SWMU-168 CONCENTRATIONS OF CONSTITUENTS OF CONCERN 1[1]
MARCH 5, 2018
Boeing Renton Facility
Renton, Washington

	Cleanup Level [2]	Well ID [1]		
		CPOC Area		
		GW229S	GW230I	GW231S
Volatile Organic Compounds (µg/L)				
Vinyl Chloride	0.11	0.0273	0.0873	0.0393

Notes
1. S = shallow well; I = intermediate well.
2. Cleanup levels obtained from Table 2 of the Cleanup Action Plan.

Abbreviations
µg/L = micrograms per liter
CPOC = conditional point of compliance

TABLE 4

SWMU-172 AND SWMU-174 GROUP GROUNDWATER ELEVATION DATA
MARCH 5, 2018

Boeing Renton Facility
Renton, Washington

Well ID[1]	Screen Interval Depth (feet bgs)	TOC Elevation (feet)[3]	Depth to Groundwater (feet below TOC)	Groundwater Elevation (feet)[3]
GW081S	5 to 20[2]	25.91	8.21	17.70
GW152S	5 to 20[2]	26.98	8.68	18.30
GW153S	5 to 20[2]	27.47	8.96	18.51
GW172S	8 to 18[2]	26.44	8.92	17.52
GW173S	8 to 18[2]	26.51	8.92	17.59
GW226S	5 to 20[2]	26.86	8.59	18.27
GW232S	4 to 14	24.45	7.44	17.01
GW233I	15 to 25	24.35	7.04	17.31
GW234S	3 to 13	24.95	7.51	17.44
GW235I	15 to 25	24.90	7.26	17.64
GW236S	5 to 15	24.36	6.75	17.61

Notes
1. S = shallow well; I = intermediate well.
2. Screen intervals are approximate and based on database listings of the screen interval depths for these wells.
3. Elevations in feet relative to National Geodetic Vertical Datum of 1929.

Abbreviations
bgs = below ground surface
TOC = top of casing

TABLE 5

SWMU-172 AND SWMU-174 GROUP CONCENTRATIONS OF PRIMARY GEOCHEMICAL INDICATORS [1]
MARCH 5, 2018
Boeing Renton Facility
Renton, Washington

	Well ID [2]																
	Source Area			Downgradient Plume Area				CPOC Area					Injection Wells				Inactive Monitoring Well
	GW152S	GW152S (field dup.)	GW153S	GW081S	GW172S	GW173S	GW226S	GW232S	GW233I	GW234S	GW235I	GW236S	B172-11	B172-12	B172-13	B172-14	GW171S
Temperature (degrees C)	12.30	12.30	13.40	12.90	12.00	10.50	11.80	8.20	7.00	11.60	10.20	11.20	12.90	12.20	14.00	14.20	12.90
Specific Conductivity (µS/cm)	131	131	208	192	209	210	209	375	152.1	200	123.4	269.8	132	172.3	166.7	142.3	140.4
Dissolved Oxygen (mg/L)	1.12	1.12	1.25	0.46	0.48	0.96	1.22	2.31	1.25	1.33	0.96	0.89	1.34	0.14	0.18	0.53	0.52
pH (standard units)	6.27	6.27	6.51	6.54	6.53	6.60	6.54	6.20	5.87	6.30	6.59	6.40	6.06	6.52	6.43	6.38	6.43
Oxidation/Reduction Potential (mV)	-22.5	-22.5	-53	-31	-43	-37	-51	-27	55.5	-21.2	-20.5	-40.5	108	-58.9	-34.5	7.5	-17.9
Total Organic Carbon (mg/L)	1.88	2	5.81	4.83	4.01	4.14	8.48	7.38	4.48	1.38	1.43	1.56	2.1	2.32	4.63	2.13	3.86

Notes
1. Primary geochemical indicators are measured in the field, with the exception of total organic carbon, which is measured in the laboratory.
2. S = shallow well; I = intermediate well.

Abbreviations
µS/cm = microsiemens per centimeter
CPOC = conditional point of compliance
degrees C = degrees Celsius
field dup. = field duplicate
mg/L = milligrams per liter
mV = millivolts

TABLE 6

SWMU-172 AND SWMU-174 GROUP CONCENTRATIONS OF CONSTITUENTS OF CONCERN [1,2]
MARCH 5, 2018
Boeing Renton Facility
Renton, Washington

		Well ID [3]																
		Source Area			Downgradient Plume Area				CPOC Area					Injection Wells				Inactive Monitoring Well
	Cleanup Level [4]	GW152S	GW152S (field dup.)	GW153S	GW081S	GW172S	GW173S	GW226S	GW232S	GW233I	GW234S	GW235I	GW236S	B172-11	B172-12	B172-13	B172-14	GW171S
Volatile Organic Compounds (µg/L)																		
cis-1,2-Dichloroethene	0.03	**0.226**	**0.232**	**0.0564**	**0.0341**	**1.44**	**0.0359**	**0.0408**	**0.309**	**0.0739**	**0.0587**	**0.170**	**0.0348**	**0.797**	**0.0329**	**0.0923**	**0.0724**	**0.0527**
Tetrachloroethene	0.02	**0.938**	**0.945**	**0.169**	0.020 U	**0.040**	**0.249**	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	**5.14**	0.020 U	**0.270**	**0.458**	**0.0296**
Trichloroethene	0.02	**0.163**	**0.163**	**0.0375**	0.020 U	**0.234**	**0.160**	0.020 U	0.020 U	0.020 U	**0.0297**	**0.0316**	0.020 U	**0.921**	0.020 U	**0.149**	**0.146**	**0.0202**
Vinyl Chloride	0.11	0.0373	0.0404 J	**0.220**	0.020 U	**1.41**	0.020 U	0.0428	**0.379 J**	0.020 U	0.020 U	0.020 U	0.020 U	0.040 U	0.020 U	0.020 U	0.0209 J	0.020 U
Total Metals (µg/L)																		
Arsenic	1.0	**1.85**	**1.64**	**2.15**	**1.98**	**5.47**	**5.01**	**4.14**	**4.85**	0.495	**1.30**	0.341	**1.44**	**1.34**	0.896	**1.64**	0.860	**3.48**
Copper	3.5	2.43	3.02	0.675	0.500 U	1.30	**4.57**	2.60	0.676	0.500 U	1.13	0.591	**4.03**	NA	NA	NA	NA	NA
Lead	1.0	**1.22**	**1.12**	0.100 U	0.100 U	0.877	0.643	0.297	0.179	0.100 U	0.477	0.143	**4.61**	NA	NA	NA	NA	NA
Dissolved Metals (µg/L)																		
Arsenic	NA	NA	NA	NA	NA	NA	0.768	NA	4.25	NA	NA	NA	0.200 U	0.756	0.706	1.56	0.596	1.53

Notes
1. Data qualifiers are as follows:
U = The analyte was not detected at the reporting limit indicated.
J = This result is estimated.
2. **Bolded** values exceed the cleanup levels.
3. S = shallow well; I = intermediate well.
4. Cleanup levels obtained from Table 2 of the Cleanup Action Plan.

Abbreviations
µg/L = micrograms per liter
CPOC = conditional point of compliance
field dup. = field duplicate

TABLE 7

BUILDING 4-78/79 SWMU/AOC GROUP
GROUNDWATER ELEVATION DATA
MARCH 5 and 6, 2018
Boeing Renton Facility
Renton, Washington

Well ID[1]	Screen Interval Depth (feet bgs)	TOC Elevation (feet)[2]	Depth to Groundwater (feet below TOC)	Groundwater Elevation (feet)[2]
GW031S	5 to 25	19.44	5.05	14.39
GW033S	5 to 25	19.49	5.15	14.34
GW034S[3]	5 to 25	19.65	5.30	14.42
GW038S	5 to 25	19.68	5.42	14.26
GW039S	3.5 to 13.5	19.30	5.07	14.23
GW143S	10 to 15	19.81	5.95	13.86
GW209S	3.5 to 13.3	19.37	5.11	14.26
GW210S	3.5 to 13.3	19.19	4.66	14.53
GW237S	5 to 15	18.85	4.64	14.21
GW238I	5 to 20	18.94	4.74	14.20
GW239I	15 to 20	19.69	5.48	14.21
GW240D	22 to 27	19.81	5.88	13.93
GW241S	4 to 14	20.28	6.03	14.25
GW242I	15 to 20	20.44	6.19	14.25
GW243I	5 to 20	19.49	5.17	14.32
GW244S	5 to 15	19.53	5.15	14.38

Notes
1. S = shallow well; I = intermediate well; D = deep well.
2. Elevations in feet relative to National Geodetic Vertical Datum of 1929.
3. GW034S was measured on March 24, 2017, becaue it was inaccessible during the March 2 and 3 sampling event.

Abbreviations
AOC = Area of Concern
bgs = below ground surface
TOC = top of casing

TABLE 8

BUILDING 4-78/79 SWMU/AOC GROUP CONCENTRATIONS
OF PRIMARY GEOCHEMICAL INDICATORS [1]
MARCH 5 and 6, 2018
Boeing Renton Facility
Renton, Washington

	Well ID [2]						
	Source Area						
	GW031S	GW031S (field dup.)	GW033S	GW034S	GW039S	GW243I	GW244S
Temperature (degrees C)	17.30	17.3	15.10	12.60	15.10	14.40	12.80
Specific Conductivity (µS/cm)	322	322	322	287	134	312	390
Dissolved Oxygen (mg/L)	0.89	0.89	0.62	0.71	0.7	0.19	1.0
pH (standard units)	6.24	6.24	6.09	6.36	6.28	6.32	6.22
Oxidation/Reduction Potential (mV)	-30	-30	-30	-67	20.1	-82	-55
Total Organic Carbon (mg/L)	14.90	15.50	33.00	9.37	7.17	13.18	19.86

	Well ID [2]		
	Downgradient Plume Area		
	GW038S	GW209S	GW210S
Temperature (degrees C)	11.20	15.1	13.4
Specific Conductivity (µS/cm)	238	339	206
Dissolved Oxygen (mg/L)	0.48	0.43	0.03
pH (standard units)	6.43	6.37	6.42
Oxidation/Reduction Potential (mV)	-99	-78	-5
Total Organic Carbon (mg/L)	8.88	11.61	59.05

	Well ID [2]						
	CPOC Area						
	GW143S	GW237S	GW238I	GW239I	GW240D	GW241S	GW242I
Temperature (degrees C)	13.2	12.00	14.4	10.50	12.40	13.20	13.30
Specific Conductivity (µS/cm)	261	112	341	261	333	292	293
Dissolved Oxygen (mg/L)	0.15	0.26	0.20	0.46	0.23	0.17	0.17
pH (standard units)	6.39	6.47	6.37	6.37	6.48	6.35	6.36
Oxidation/Reduction Potential (mV)	-85	-25	-94	-98	-109	-90	-89
Total Organic Carbon (mg/L)	8.89	7.36	10.69	10.40	6.29	13.18	19.86

Notes
1. Primary geochemical indicators are measured in the field, with the exception of total organic carbon, which is measured in the laboratory.
2. S = shallow well; I = intermediate well; D = deep well.

Abbreviations
µS/cm = microsiemens per centimeter
CPOC = conditional point of compliance
degrees C = degrees Celsius
field dup. = field duplicate
mg/L = milligrams per liter
mV = millivolts

TABLE 9

BUILDING 4-78/79 SWMU/AOC GROUP CONCENTRATIONS OF CONSTITUENTS OF CONCERN [1,2]
MARCH 5 and 6, 2018
Boeing Renton Facility
Renton, Washington

	Cleanup Level [4]	Well ID [3]						
		Source Area						
		GW031S	GW031S (field dup.)	GW033S	GW034S	GW039S	GW243I	GW244S
Volatile Organic Compounds (µg/L)								
Benzene	0.80	**60.3**	**58.3**	**9.60**	0.20 U	0.20 U	**2.56**	**6.86**
cis-1,2-Dichloroethene	0.70	**1.18 J**	**1.13 J**	**12.8**	0.20	0.20 U	0.20 U	**2.00**
Trichloroethene	0.23	0.20 U	0.20 U	0.20 U	0.21	0.20 U	0.20 U	**1.26**
Vinyl Chloride	0.20	0.20 U	0.20 U	**26.0**	**0.25**	0.20 U	0.20 U	**1.56**
Total Petroleum Hydrocarbons (µg/L)								
NWTPH-Gx (C7-C12)	800	**3,450**	**3,490**	229	100 U	100 U	110	100 U

	Cleanup Level [4]	Well ID [3]		
		Downgradient Plume Area		
		GW038S	GW209S	GW210S
Volatile Organic Compounds (µg/L)				
Benzene	0.80	0.20 U	0.20 U	**1.12**
cis-1,2-Dichloroethene	0.70	0.20 U	0.20 U	0.20 U
Trichloroethene	0.23	0.20 U	0.20 U	0.20 U
Vinyl Chloride	0.20	0.20 U	**0.23**	0.20 U
Total Petroleum Hydrocarbons (µg/L)				
NWTPH-Gx (C7-C12)	800	100 U	100 U	100 U

	Cleanup Level [4]	Well ID [3]						
		CPOC Area						
		GW143S	GW237S	GW238I	GW239I	GW240D	GW241S	GW242I
Volatile Organic Compounds (µg/L)								
Benzene	0.80	0.20 U	**3.58**	0.28	0.20 U	0.20 U	0.20 U	0.20 U
cis-1,2-Dichloroethene	0.70	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Trichloroethene	0.23	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Vinyl Chloride	0.20	0.20 U	0.20 U	**0.21**	0.20 U	**0.24**	0.20 U	0.20 U
Total Petroleum Hydrocarbons (µg/L)								
NWTPH-Gx (C7-C12)	800	100 U	444	100 U	100 U	100 U	100 U	100 U

Notes
1. Data qualifiers are as follows:
   U = The analyte was not detected at the reporting limit indicated.
   J = This result is estimated.
2. **Bolded** values exceed the cleanup levels.
3. S = shallow well; I = intermediate well; D = deep well.
4. Cleanup levels obtained from Table 2 of the Cleanup Action Plan.

Abbreviations
µg/L = micrograms per liter
CPOC = conditional point of compliance
field dup. = field duplicate
NWTPH-Gx = total petroleum hydrocarbons in gasoline range

TABLE 10

AOC-001 AND -002 GROUNDWATER ELEVATION DATA
MARCH 7, 2018
Boeing Renton Facility
Renton, Washington

Well ID[1]	Screen Interval Depth (feet bgs)	TOC Elevation (feet)[2]	Depth to Groundwater (feet below TOC)	Groundwater Elevation (feet)[2]
GW185S	4.5 to 14.5	16.27	2.05	14.22
GW190S	3.0 to 13.0	17.30	3.05	14.25
GW191D	26.5 to 36.0	17.53	2.88	14.65
GW192S	5.0 to 9.5	17.54	3.32	14.22
GW193S	3.0 to 12.8	18.67	4.47	14.20
GW194S	7.3 to 12.0	16.79	2.76	14.03
GW195S	7.3 to 12.0	16.34	2.24	14.10
GW196D	26.8 to 36.8	16.46	2.22	14.24
GW197S	7.8 to 12.5	16.52	1.93	14.59
GW245S	3.0 to 13.0	16.08	2.04	14.04
GW246S	4.0 to 14.0	16.53	2.41	14.12

Notes
1. S = shallow well; D = deep well.
2. Elevations in feet relative to National Geodetic Vertical Datum of 1929.

Abbreviations
AOC = Area of Concern
bgs = below ground surface
TOC = top of casing

TABLE 11

AOC-001, AOC-002, AND AOC-093 CONCENTRATIONS OF PRIMARY GEOCHEMICAL INDICATORS [1]
MARCH 7, 2018
Boeing Renton Facility
Renton, Washington

	Well ID [2]														
	Source Area	Downgradient Plume Area				CPOC Area [3]							Inactive Monitoring Well	Injection Wells	
	GW193S	GW190S	GW191D[4]	GW192S	GW246S	GW185S	GW185S (field dup.)	GW194S	GW195S	GW196D[5]	GW197S	GW245S	GW050S	GW213S	GW214S
Temperature (degrees C)	10.20	11.20	11.70	10.00	10.60	11.10	11.10	11.20	9.90	10.70	9.90	8.60	9.00	9.40	7.90
Specific Conductivity (µS/cm)	1,040	133	272	280	164	546	546	484	580	298	558	259	568	475	371
Dissolved Oxygen (mg/L)	1.38	0.35	0.48	1.33	0.33	2.09	2.09	1.18	1.71	1.49	0.66	0.40	2.07	2.72	2.74
pH (standard units)	6.46	6.43	6.49	6.11	6.39	6.44	6.44	6.27	6.37	6.37	7.08	6.77	6.29	6.28	5.91
Oxidation/Reduction Potential (mV)	-36	-11	-64	-28	-41	-86	-86	-45	-77	-60	138	-76	-49	-21	4
Total Organic Carbon (mg/L)	38.33	12.69	6.02	7.78	3.71	13.39	13.15	15.94	17.67	8.66	12.87	8.09	15.49	9.93	8.88

Notes
1. Primary geochemical indicators are measured in the field, with the exception of total organic carbon, which is measured in the laboratory.
2. S = shallow well; D = deep well.
3. Wells GW185S through GW197S and GW246S are associated with the AOC-001 and AOC-002 cleanup action area.
4. GW191D is installed in a cluster with GW192S, and GW191D is screened below a silt layer at 26.5 to 36 feet in depth.
5. GW196D is installed in a cluster with GW195S, and GW196D is screened below a silt layer at 26.8 to 36.8 feet in depth.

Abbreviations
µS/cm = microsiemens per centimeter
CPOC = conditional point of compliance
degrees C = degrees Celsius
field dup. = field duplicate
mg/L = milligrams per liter
mV = millivolts

TABLE 12

AOC-001 AND AOC-002 CONCENTRATIONS OF CONSTITUENTS OF CONCERN [1,2]
MARCH 7, 2018
Boeing Renton Facility
Renton, Washington

	Cleanup Level [4]	Well ID [3]														
		Source Area	Downgradient Plume Area				CPOC Area							Inactive Monitoring Well	Injection Wells	
		GW193S	GW190S	GW191D [5]	GW192S	GW246S	GW185S	GW185S (field dup.)	GW194S	GW195S	GW196D [6]	GW197S	GW245S	GW050S	GW213S	GW214S
Volatile Organic Compounds (µg/L)																
1,1-Dichloroethene	0.057	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Benzene	0.8	0.20 U	0.20 U	0.20 U	0.20 U	0.20	0.31	0.30	0.20 U	0.20 U	0.20 U	**1.21**	0.20 U	0.20 U	0.20 U	0.20
cis-1,2-Dichloroethene	0.02	**0.704**	**0.309**	**0.0276**	**0.676**	**0.166**	**0.234**	**0.236**	0.020 U	**0.0528**	**0.0323**	**0.208**	**0.0216**	**0.0644**	**0.0889**	**0.165**
Trichloroethene	0.02	**0.0272**	0.020 U	0.020 U	0.0417	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Vinyl Chloride	0.05	**0.0824 J**	**0.444 J**	**0.147 J**	**0.526 J**	**0.506 J**	**0.219 J**	**0.231 J**	0.020 U	**0.0815 J**	**0.0567 J**	**0.287 J**	0.020 U	**0.0719 J**	**0.214 J**	0.020 U

Notes
1. Data qualifiers are as follows:
   U = The analyte was not detected at the reporting limit indicated.
   J = This result is estimated.
2. **Bolded** values exceed the cleanup levels.
3. S = shallow well; D = deep well.
4. Cleanup levels obtained from Table 2 of the Cleanup Action Plan.
5. GW191D is installed in a cluster with GW192S, and GW191D is screened below a silt layer at 26.5 to 36 feet in depth.
6. GW196D is installed in a cluster with GW195S, and GW196D is screened below a silt layer at 26.8 to 36.8 feet in depth.

Abbreviations
µg/L = micrograms per liter
CPOC = conditional point of compliance
field dup. = field duplicate

TABLE 13

AOC-003 GROUNDWATER ELEVATION DATA
MARCH 7, 2018
Boeing Renton Facility
Renton, Washington

Well ID[1]	Screen Interval Depth (feet bgs)	TOC Elevation (feet)[2]	Depth to Groundwater (feet below TOC)	Groundwater Elevation (feet)[2]
GW188S	3.5 to 13.5	18.78	3.80	14.98
GW247S	4 to 14	18.91	3.80	15.11
GW248I	10 to 20	18.78	3.72	15.06
GW249S	4 to 14	18.85	3.60	14.85

Notes
1. S = shallow well; I = intermediate well.
2. Elevations in feet relative to National Geodetic Vertical Datum of 1929.

Abbreviations
AOC = Area of Concern
bgs = below ground surface
TOC = top of casing

TABLE 14

AOC-003 CONCENTRATIONS OF PRIMARY GEOCHEMICAL INDICATORS [1]
MARCH 7, 2018

Boeing Renton Facility
Renton, Washington

	Well ID [2]			
	Source Area	Downgradient Plume Area	CPOC Area	
	GW249S	GW188S	GW247S	GW248I
Temperature (degrees C)	9.60	12.90	11.00	11.70
Specific Conductivity (µS/cm)	344	404	344	401
Dissolved Oxygen (mg/L)	1.26	1.23	0.15	0.96
pH (standard units)	6.40	6.35	6.35	6.34
Oxidation/Reduction Potential (mV)	-37	-53	1	-46
Total Organic Carbon (mg/L)	14.85	10.97	10.38	13.41

Notes
1. Primary geochemical indicators are measured in the field, with the exception of total organic carbon, which is measured in the laboratory.
2. S = shallow well; I = intermediate well.

Abbreviations
µS/cm = microsiemens per centimeter
CPOC = conditional point of compliance
degrees C = degrees Celsius
mg/L = milligrams per liter
mV = millivolts

TABLE 15

AOC-003 CONCENTRATIONS OF CONSTITUENTS OF CONCERN [1,2]
MARCH 7, 2018
Boeing Renton Facility
Renton, Washington

	Cleanup Level [4]	Well ID [3]			
		Source Area	Downgradient Plume Area	CPOC Area	
		GW249S	GW188S	GW247S	GW248I
Volatile Organic Compounds (µg/L)					
cis-1,2-Dichloroethene	0.78	0.102	0.0606	0.0965	0.020 U
Tetrachloroethene	0.02	**0.0496**	0.020 U	0.020 U	0.020 U
Trichloroethene	0.16	0.0475	0.020 U	0.0258	0.020 U
Vinyl Chloride	0.24	0.114 J	**0.443 J**	**0.453 J**	**0.647 J**

Notes
1. Data qualifiers are as follows:
   U = The analyte was not detected at the reporting limit indicated.
   J = This result is estimated.
2. **Bolded** values exceed the cleanup levels.
3. S = shallow well; I = intermediate well.
4. Cleanup levels obtained from Table 2 of the Cleanup Action Plan.

Abbreviations
µg/L = micrograms per liter
CPOC = conditional point of compliance

TABLE 16

AOC-004 GROUNDWATER ELEVATION DATA
MARCH 6, 2018
Boeing Renton Facility
Renton, Washington

Well ID[1]	Screen Interval Depth (feet bgs)	TOC Elevation (feet)[2]	Depth to Groundwater (feet below TOC)	Groundwater Elevation (feet)[2]
GW174S	4 to 14	19.56	4.55	15.01
GW250S	4 to 14	19.31	3.69	15.62

Notes
1. S = shallow well.
2. Elevations in feet relative to National Geodetic Vertical Datum of 1929.

Abbreviations
AOC = Area of Concern
bgs = below ground surface
TOC = top of casing

TABLE 17

AOC-004 CONCENTRATIONS OF PRIMARY GEOCHEMICAL INDICATORS [1]
MARCH 6, 2018
Boeing Renton Facility
Renton, Washington

	Well ID [2]	
	Source Area	CPOC Area
	GW250S	GW174S
Temperature (degrees C)	12.20	12.70
Specific Conductivity (µS/cm)	113	146
Dissolved Oxygen (mg/L)	0.79	0.04
pH (standard units)	6.77	6.76
Oxidation/Reduction Potential (mV)	-21	-121

Notes
1. Primary geochemical indicators are measured in the field.
2. S = shallow well

Abbreviations
µS/cm = microsiemens per centimeter
CPOC = conditional point of compliance
degrees C = degrees Celsius
mg/L = milligrams per liter
mV = millivolts

TABLE 18

AOC-004 CONCENTRATIONS OF CONSTITUENTS OF CONCERN

MARCH 6, 2018
Boeing Renton Facility
Renton, Washington

	Cleanup Level [2]	Well ID [1]	
		Source Area	CPOC Area
		GW250S	GW174S
Metals (mg/L)			
Lead	0.001	0.00094	0.000449

Notes
1. S = shallow well.
2. Cleanup levels obtained from Table 2 of the Cleanup Action Plan.

Abbreviations
CPOC = conditional point of compliance
mg/L = milligrams per liter

TABLE 19

AOC-060 GROUNDWATER ELEVATION DATA
MARCH 6, 2018
Boeing Renton Facility
Renton, Washington

Well ID[1]	Screen Interval Depth (feet bgs)	TOC Elevation (feet)[2]	Depth to Groundwater (feet below TOC)	Groundwater Elevation (feet)[2]
GW009S	4.5 to 14.5	19.36	5.06	14.30
GW010S	4.5 to 14.5	19.47	5.19	14.28
GW011D	29 to 39	19.49	4.97	14.52
GW012S	4.5 to 14.5	19.11	4.88	14.23
GW014S	4.5 to 14.5	19.24	4.94	14.30
GW147S	5 to 15	18.73	4.52	14.21
GW149S	5 to 15	19.19	4.97	14.22
GW150S	5 to 15	19.10	4.91	14.19
GW252S	4 to 14	19.01	4.85	14.16
GW253I	10 to 20	19.02	4.86	14.16
GW254S	4 to 14	19.16	5.01	14.15

Notes
1. S = shallow well; D = deep well; I = intermediate well.
2. Elevations in feet relative to National Geodetic Vertical Datum of 1929.

Abbreviations
AOC = Area of Concern
bgs = below ground surface
TOC = top of casing

TABLE 20

AOC-060 CONCENTRATIONS OF PRIMARY GEOCHEMICAL INDICATORS [1]
MARCH 6, 2018
Boeing Renton Facility
Renton, Washington

	Well ID [2]									
	Source Area	Downgradient Plume Area				CPOC Area				
	GW009S	GW012S	GW014S	GW014S (field dup.)	GW147S	GW149S	GW150S	GW252S	GW253I	GW254S
Temperature (degrees C)	19.80	20.60	16.80	16.80	7.10	9.30	8.30	9.10	11.50	8.00
Specific Conductivity (µS/cm)	385	708	351	351	105	140	244	421	277	391
Dissolved Oxygen (mg/L)	1.44	3.43	1.25	1.25	3.2	0.23	0.66	0.54	0.30	0.35
pH (standard units)	6.40	6.12	6.40	6.40	5.18	6.37	6.62	6.64	6.57	6.62
Oxidation/Reduction Potential (mV)	-88	-105	-83	-83	139	-57	-28	-106	-42	-8
Total Organic Carbon (mg/L)	6.89	10.86	3.18	3.15	1.23	4.79	5.10	5.51	4.70	8.45

Notes
1. Primary geochemical indicators are measured in the field, with the exception of total organic carbon, which is measured in the laboratory.
2. S = shallow well; I = intermediate well.

Abbreviations
µS/cm = microsiemens per centimeter
CPOC = conditional point of compliance
degrees C = degrees Celsius
field dup. = field duplicate
mg/L = milligrams per liter
mV = millivolts

TABLE 21

AOC-060 CONCENTRATIONS OF CONSTITUENTS OF CONCERN [1,2]
MARCH 6, 2018
Boeing Renton Facility
Renton, Washington

	Cleanup Levels [4]	Well ID [3]									
		Source Area	Downgradient Plume Area				CPOC Area				
		GW009S	GW012S	GW014S	GW014S (field dup.)	GW147S	GW149S	GW150S	GW252S	GW253I	GW254S
Volatile Organic Compounds (µg/L)											
cis-1,2-Dichloroethene	0.08	**0.0948**	**0.609**	**0.134**	**0.139**	**0.211**	0.0565	0.0388	0.0215	**0.0991**	0.0589
Trichloroethene	0.02	**0.0252**	**0.0568**	**0.0347**	**0.0372**	**1.91**	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Vinyl Chloride	0.26	0.241 J	**0.586**	**0.266**	**0.283**	0.020 U	0.0854	0.0596 J	0.020 U	0.132 J	0.0303

Notes
1. Data qualifiers are as follows:
   U = The analyte was not detected at the reporting limit indicated.
   J = This result is estimated.
2. **Bolded** values exceed the cleanup levels.
3. S = shallow well; I = intermediate well.
4. Cleanup levels obtained from Table 2 of the Cleanup Action Plan.

Abbreviations
µg/L = micrograms per liter
CPOC = conditional point of compliance
field dup. = field duplicate

TABLE 22

AOC-090 GROUNDWATER ELEVATION DATA
MARCH 5, 2018

Boeing Renton Facility
Renton, Washington

Well ID[1]	Screen Interval Depth (feet bgs)	TOC Elevation (feet)[2]	Depth to Groundwater (feet below TOC)	Groundwater Elevation (feet)[2]
GW163I	25 to 35	21.27	6.30	14.97
GW165I	25 to 35	21.14	12.55	8.59
GW175I	21.2 to 26.1	20.57	6.81	13.76
GW176S	10 to 14.3	20.15	5.38	14.77
GW177I	21.7 to 26	22.51	7.51	15.00
GW178S	11.2 to 15.5	22.73	7.99	14.74
GW179I	21.5 to 26	20.47	6.10	14.37
GW180S	10.5 to 15	20.56	6.35	14.21
GW189S	4 to 14	22.01	7.08	14.93
GW207S	7.3 to 12	21.12	6.31	14.81
GW208S	6.3 to 11	22.45	7.74	14.71

Notes
1. S = shallow well; I = intermediate well.
2. Elevations in feet relative to National Geodetic Vertical Datum of 1929.

Abbreviations
AOC = Area of Concern
bgs = below ground surface
TOC = top of casing

TABLE 23

AOC-090 CONCENTRATIONS OF PRIMARY GEOCHEMICAL INDICATORS [1]
MARCH 5, 2018
Boeing Renton Facility
Renton, Washington

	Well ID [2]											
	Source Area	Downgradient Plume Area		Shallow Zone CPOC Area					Intermediate Zone CPOC Area			
	GW189S [3]	GW175I	GW176S	GW178S	GW180S	GW180s (field dup.)	GW207S	GW208S	GW163I	GW165I	GW177I	GW179I
Temperature (degrees C)	10.90	11.60	10.90	10.60	10.40	10.40	11.10	11.00	10.00	11.50	11.50	10.80
Specific Conductivity (µS/cm)	609	428	574	339	185	185	279	427	343	299	508	361
Dissolved Oxygen (mg/L)	2.31	1.97	2.50	1.25	1.69	1.69	0.21	1.51	2.03	0.86	2.15	1.22
pH (standard units)	6.30	6.28	6.28	6.29	6.37	6.37	6.76	6.27	6.37	6.27	6.29	6.32
Oxidation/Reduction Potential (mV)	-32	-77	-89	-88	-51	-51	-103	-64	-108	-90	-76	-88
Total Organic Carbon (mg/L)	13.74	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes
1. Primary geochemical indicators are measured in the field, with the exception of total organic carbon, which is measured in the laboratory.
2. S = shallow well; I = intermediate well.
3. GW189S is the replacement well for GW168S.

Abbreviations
µS/cm = microsiemens per centimeter
CPOC = conditional point of compliance
degrees C = degrees Celsius
field dup. = field duplicate

TABLE 24

AOC-090 CONCENTRATIONS OF CONSTITUENTS OF CONCERN [1,2]
MARCH 5, 2018
Boeing Renton Facility
Renton, Washington

		Well ID [3]											
		Source Area	Downgradient Plume Area		Shallow Zone CPOC Area					Intermediate Zone CPOC Area			
	Cleanup Levels [4]	GW189S [5]	GW175I	GW176S	GW178S	GW180S	GW180S (field dup.)	GW207S	GW208S	GW163I	GW165I	GW177I	GW179I
Volatile Organic Compounds (µg/L)													
1,1,2,2-Tetrachloroethane	0.17	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
1,1,2-Trichloroethane	0.2	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
1,1-Dichloroethene	0.057	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Acetone	300	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U
Benzene	0.8	0.55	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Carbon Tetrachloride	0.23	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Chloroform	2	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
cis-1,2-Dichloroethene	2.4	1.74	0.20 U	0.26	0.20 U	0.20 U	0.20 U	0.20 U	0.20	0.20 U	0.20 U	0.20 U	0.20 U
Methylene Chloride	2	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
Tetrachloroethene	0.05	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Toluene	75	6.34	0.20 U	0.42	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.25	0.20 U
trans-1,2-Dichloroethene	53.9	0.48	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Trichloroethene	0.08	**0.224**	0.02 U	0.02 U	0.0214	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Vinyl Chloride	0.13	**0.508 J**	0.02 U	**0.208**	**0.409**	0.02 U	0.0212 J	0.0300	**0.388**	0.02 U	0.02 U	0.0454	0.0332
Total Petroleum Hydrocarbons (µg/L)													
NWTPH-Gx (C7-C12)	800	**1,860**	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U
DRO (C12-C24)	500	200	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U
HRO (C24-C40)	500	298	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U

Notes
1. Data qualifiers are as follows:
   U = The analyte was not detected at the reporting limit indicated.
   J = This result is estimated.
2. **Bolded** values exceed the cleanup levels.
3. S = shallow well; I = well in intermediate zone.
4. Cleanup levels obtained from Table 2 of the Cleanup Action Plan.
5. GW189S is the replacement well for GW168S.

Abbreviations
µg/L = micrograms per liter
CPOC = conditional point of compliance
DRO = diesel range organics
HRO = heavy range organics in the motor oil range
NWTPH-Gx = total petroleum hydrocarbons in gasoline range

TABLE 25

BUILDING 4-70 GROUNDWATER ELEVATION DATA
MARCH 5, 2018
Boeing Renton Facility
Renton, Washington

Well ID[1]	Screen Interval Depth (feet bgs)	TOC Elevation (feet)[2]	Depth to Groundwater (feet below TOC)	Groundwater Elevation (feet)[2]
GW259S	5 to 15	19.72	5.28	14.44
GW260S	5 to 15	19.83	5.31	14.52

Notes
1. S = shallow well.
2. Elevations in feet relative to National Geodetic Vertical Datum of 1929.

Abbreviations
bgs = below ground surface
TOC = top of casing

TABLE 26

BUILDING 4-70 CONCENTRATIONS OF PRIMARY GEOCHEMICAL INDICATORS [1]
MARCH 5, 2018
Boeing Renton Facility
Renton, Washington

	Well ID [2]	
	CPOC Area	
	GW259S	GW260S
Temperature (degrees C)	6.00	5.80
Specific Conductivity (µS/cm)	96	188
Dissolved Oxygen (mg/L)	2.59	0.84
pH (standard units)	6.59	5.97
Oxidation/Reduction Potential (mV)	-9	-84

Notes
1. Primary geochemical indicators are measured in the field, with the exception of total organic carbon, which is measured in the laboratory.
2. S = shallow well

Abbreviations
µS/cm = microsiemens per centimeter
CPOC = conditional point of compliance
degrees C = degrees Celsius
mg/L = milligrams per liter
mV = millivolts

TABLE 27

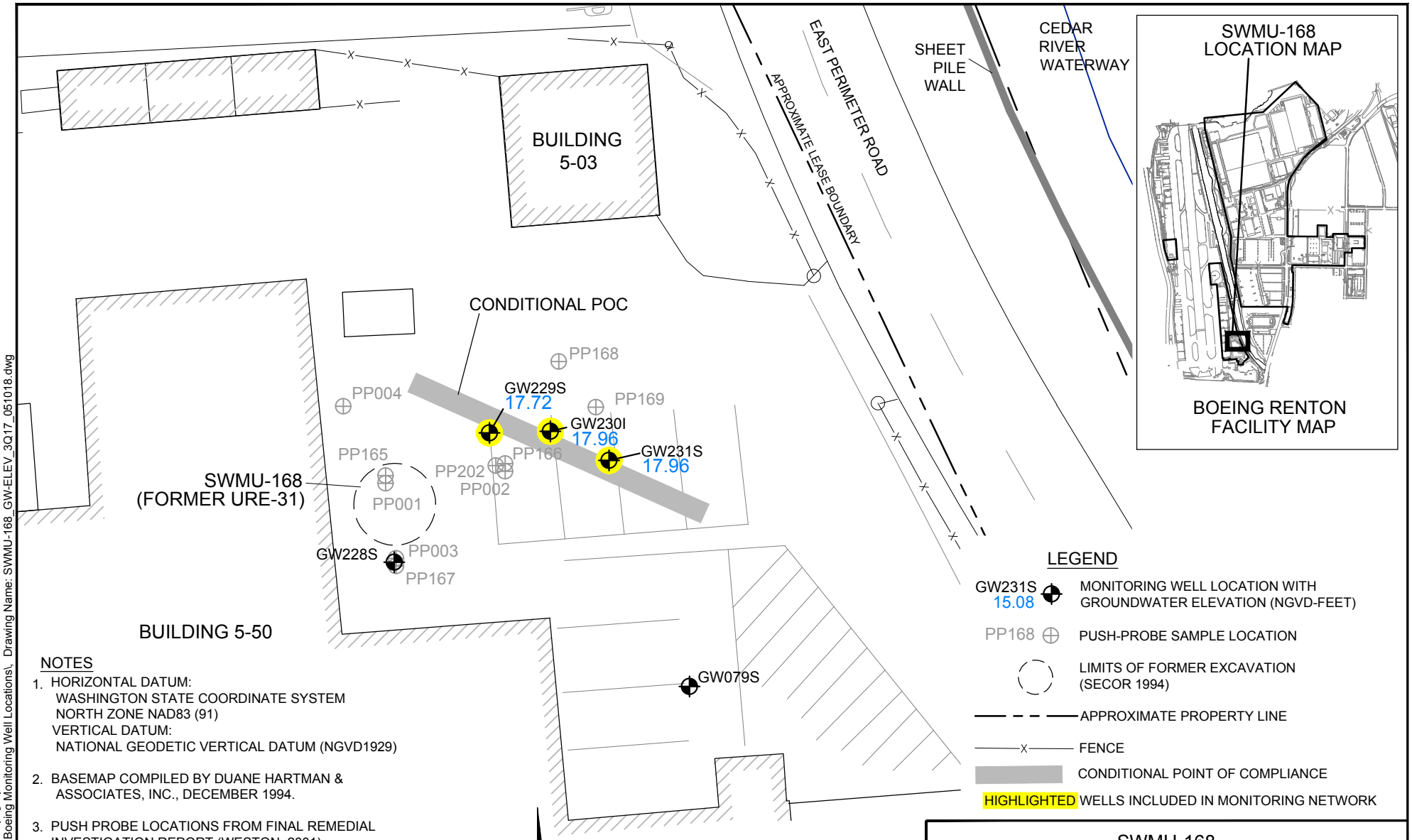
BUILDING 4-70 CONCENTRATIONS OF CONSTITUENTS OF CONCERN [1, 2]
MARCH 5, 2018
Boeing Renton Facility
Renton, Washington

	Cleanup Level [4]	Well ID [3]	
		CPOC Area	
		GW259S	GW260S
Volatile Organic Compounds (µg/L)			
cis-1,2-Dichloroethene	16	0.20 U	0.20 U
Trichloroethene	0.54	0.26	0.53
Vinyl Chloride	0.2	0.20 U	**0.22**

Notes
1. Data qualifiers are as follows:
   U = The analyte was not detected at the reporting limit indicated.
2. **Bolded** values exceed the cleanup levels.
3. S = shallow well
4. Cleanup levels obtained from Washington State Department of Ecology email to Boeing on December 30, 2015.

Abbreviations
µg/L = micrograms per liter

FIGURES



NOTES

1. HORIZONTAL DATUM:
   WASHINGTON STATE COORDINATE SYSTEM
   NORTH ZONE NAD83 (91)
   VERTICAL DATUM:
   NATIONAL GEODETIC VERTICAL DATUM (NGVD1929)
2. BASEMAP COMPILED BY DUANE HARTMAN & ASSOCIATES, INC., DECEMBER 1994.
3. PUSH PROBE LOCATIONS FROM FINAL REMEDIAL INVESTIGATION REPORT (WESTON, 2001).
4. 'S' DESIGNATION INDICATES WELL SCREENED LESS THAN 10 FEET IN DEPTH.
   "I" DESIGNATION INDICATES WELL SCREENED GREATER THAN 10 FEET IN DEPTH.

0 10 20
APPROXIMATE SCALE IN FEET

SWMU-168 MONITORING WELL LOCATIONS AND GROUNDWATER ELEVATIONS MARCH 5, 2018 Boeing Renton Facility Renton, Washington

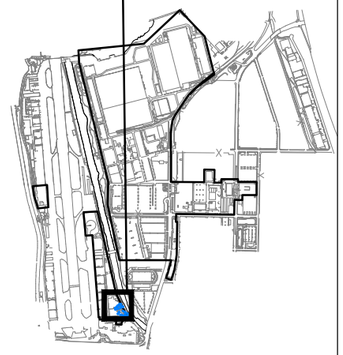
By: APS	Date: 05/10/18	Project No. 8888
Wood Environment & Infrastructure Solutions, Inc.	Figure	1

Plot Date: 05/10/18 - 2:02pm, Plotted by: gary.maxwell2
Drawing Path: P:\BOEING RENTON\Boeing Monitoring Well Locations\, Drawing Name: SWMU-168_GW-ELEV_3Q17_051018.dwg

GW079S
SHEET PILE WALL
CEDAR RIVER WATERWAY
GW136S
BUILDING 5-50
AOC-049 (FORMER URE-30)
17.70
17.50
17.30
17.90
PP175
PP088
GW080S
GW081S 17.70
GW233I 17.31 *
GW232S 17.01
18.10
18.30
GW173S 17.59
GW083S
GW082S
B172-13
B172-01
GW226S 18.27
B172-14
EAST PERIMETER ROAD
PP087
GW084S
GW153S 18.51
PP063
SVE-01
PP008
B172-02
PP170
PP110
PP089
SWMU-174 (FORMER URE-73)
B172-03
SVE-02
PP171
B172-06
B172-08
B172-04
B172-05
GW152S 18.30
PP006
PP061
PP173
PP172
B172-09
B172-10
B172-07
PP005
SVE-03
B172-11
BUILDING 5-08
SWMU-172 (FORMER URE-66)
BUILDING 5-09
18.50
18.30
18.10
CONDITIONAL POC
PP062
PP174
B172-12
GW171S
17.99
17.70
PP077
APPROXIMATE LEASE BOUNDARY
PP176
GW172S 17.52
GW234S 17.44
GW235I 17.64 *
PP086
PP177
17.30
17.50
GW236S 17.61

0 20 40
APPROXIMATE SCALE IN FEET

SWMU-172 AND SWMU-174 LOCATION MAP



BOEING RENTON FACILITY MAP

LEGEND

- GW172S 17.64 — MONITORING WELL LOCATION WITH GROUNDWATER ELEVATION (NGVD-FEET)
- * — WELL SCREENED IN UPPER AND LOWER PORTION OF AQUIFER, SO WATER LEVEL IS NOT USED FOR CONTOURING.
- GW082S — ABANDONED MONITORING WELL
- APPROXIMATE PROPERTY LINE
- FENCE
- CONDITIONAL POINT OF COMPLIANCE
- HIGHLIGHTED WELLS INCLUDED IN MONITORING NETWORK
- SVE-02 — SVE WELL
- B172-10 — BIOREMEDIATION INJECTION WELL
- PP171 — PUSH PROBE SAMPLING LOCATION
- 17.75 — GROUNDWATER ELEVATION CONTOUR (IN FEET) (DASHED WHERE INFERRED)
- GENERAL DIRECTION OF GROUNDWATER FLOW

NOTES

1. HORIZONTAL DATUM: WASHINGTON STATE COORDINATE SYSTEM NORTH ZONE NAD83 (91)
   VERTICAL DATUM: NATIONAL GEODETIC VERTICAL DATUM (NGVD1929)
2. BASEMAP COMPILED BY DUANE HARTMAN & ASSOCIATES, INC., DECEMBER 1994.
3. 'S' DESIGNATION INDICATES WELL SCREENED LESS THAN 20 FEET IN DEPTH.
   'I' DESIGNATION INDICATES WELL SCREENED GREATER THAN 20 FEET IN DEPTH.

SWMU-172 AND SWMU-174 MONITORING WELL LOCATIONS AND GROUNDWATER ELEVATIONS MARCH 5, 2018 Boeing Renton Facility Renton, Washington

By: APS	Date: 05/10/18	Project No. 8888
Wood Environment & Infrastructure Solutions, Inc.		Figure 2

Plot Date: 05/10/18 - 12:00pm, Plotted by: gary.maxwell2
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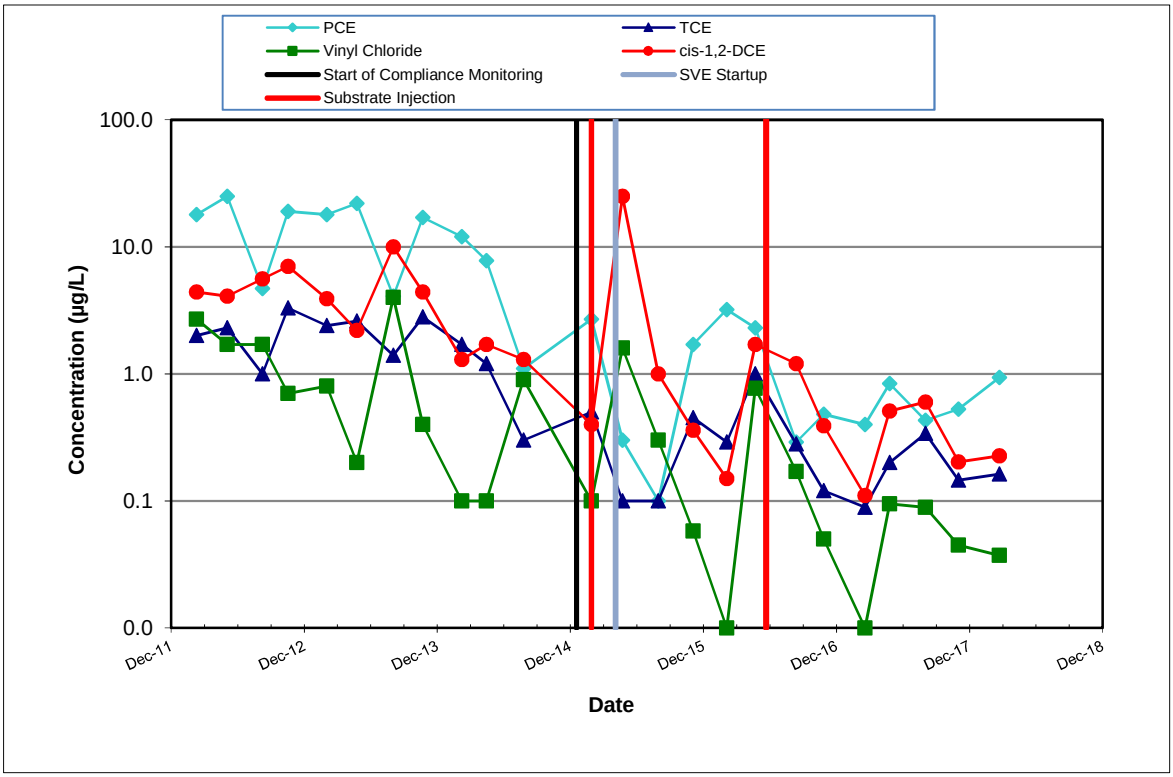
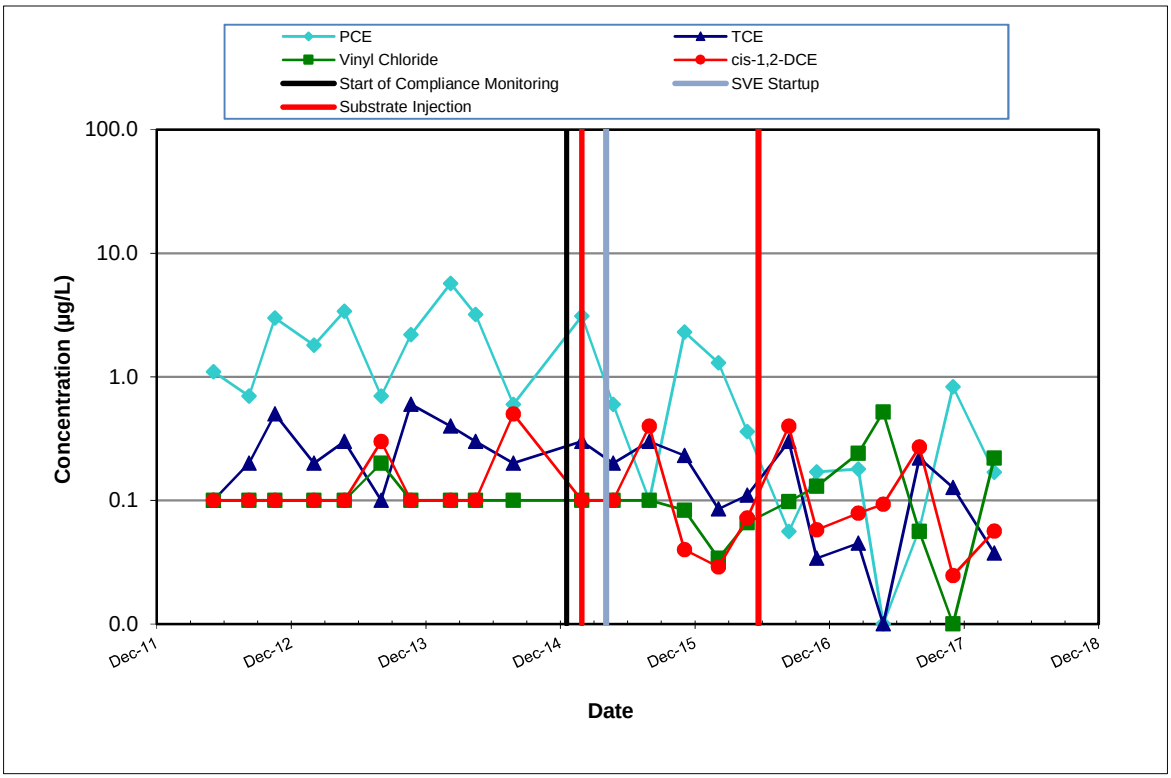


SOURCE AREA WELL GW152S

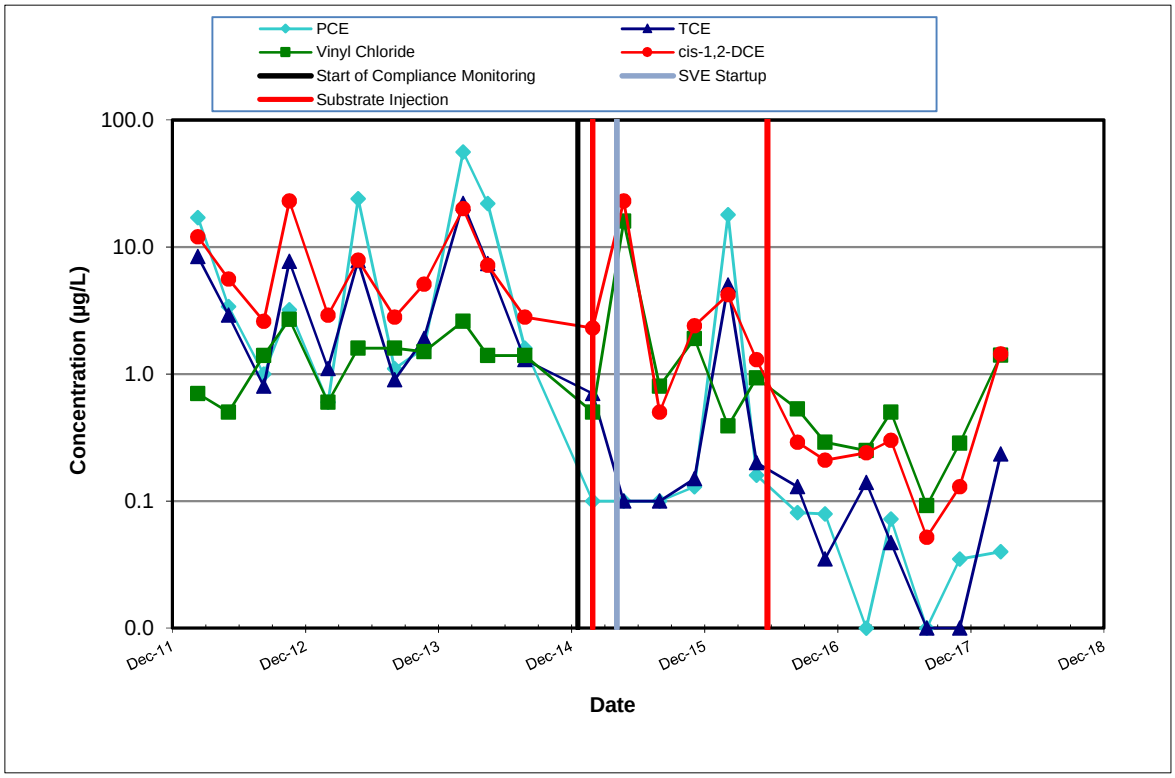


Note: non-detected values shown at one-half the reporting limit

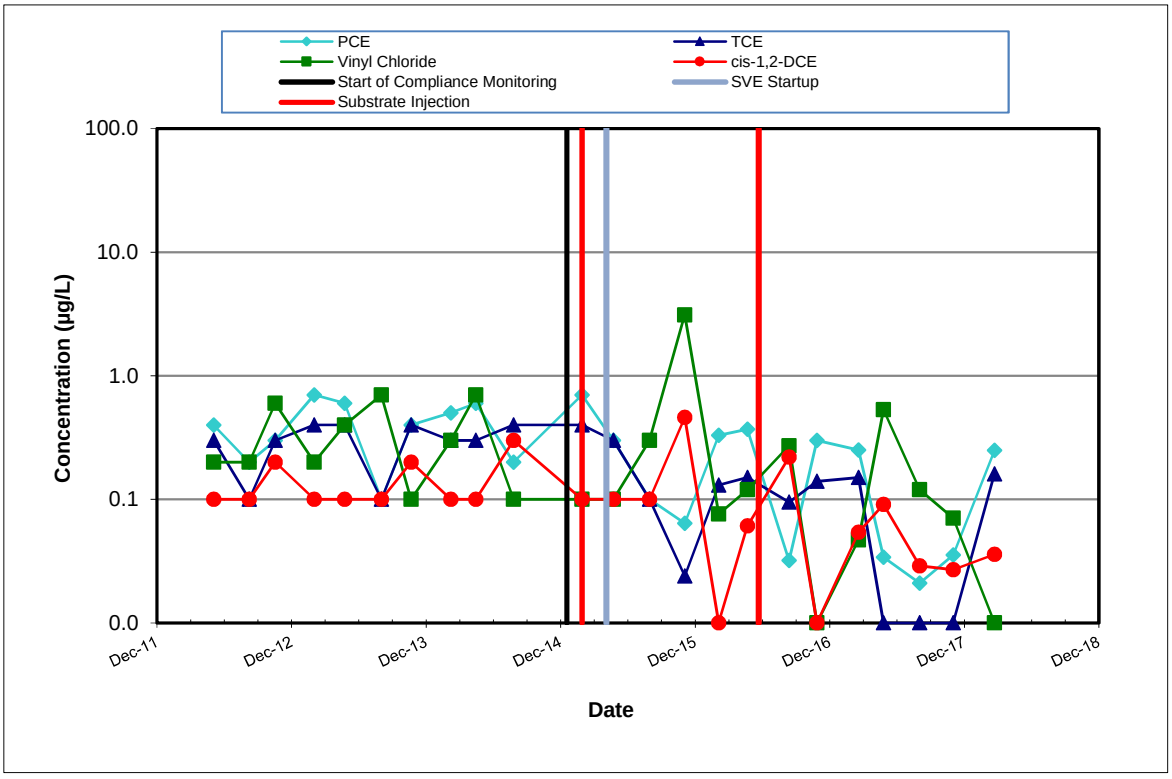
SOURCE AREA WELL GW153S

wood.	SWMU-172 AND SWMU-174 TREND PLOTS FOR SOURCE AREA WELLS GW152S AND GW153S Boeing Renton Facility Renton, Washington	Project No. 8888 Figure 3

P:\8888 - Boeing Renton\02 Data Management\Grapher and Excel Figure Files\excel\Figures 3 & 4_ SWMU_172-174 Trend Plots.xls



DOWNGRADIENT PLUME AREA WELL GW172S

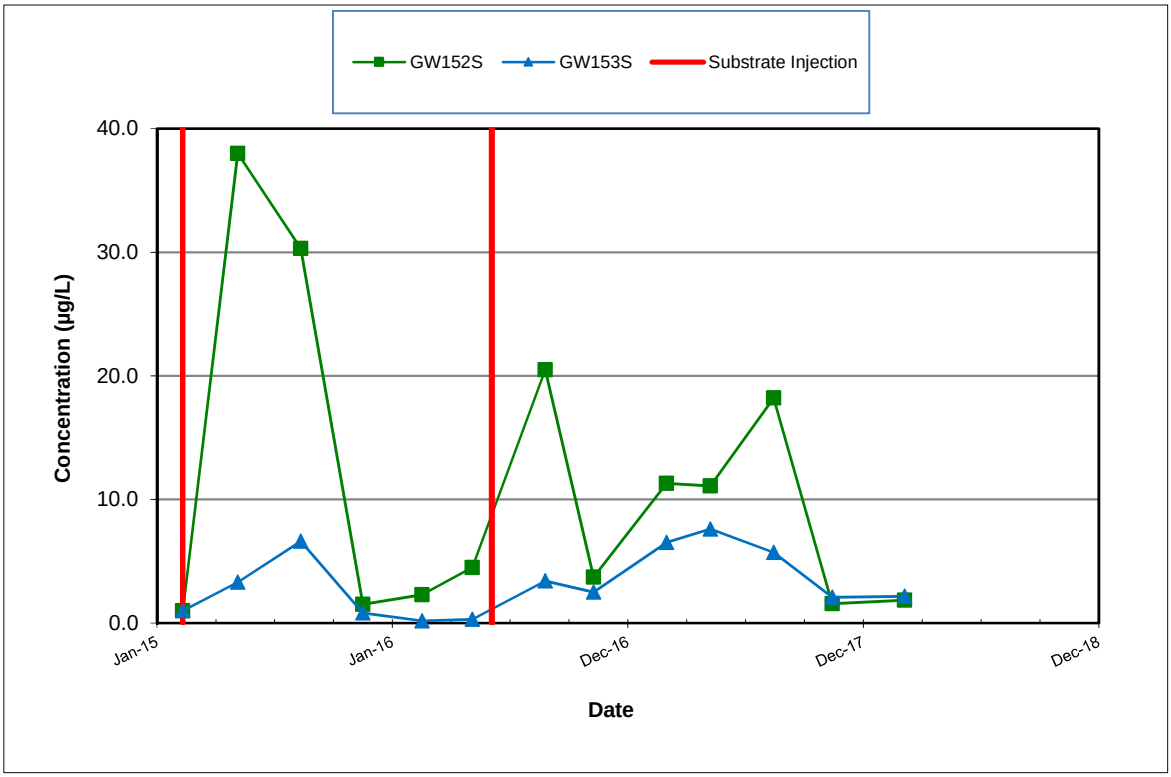


Note: non-detected values shown at one-half the reporting limit

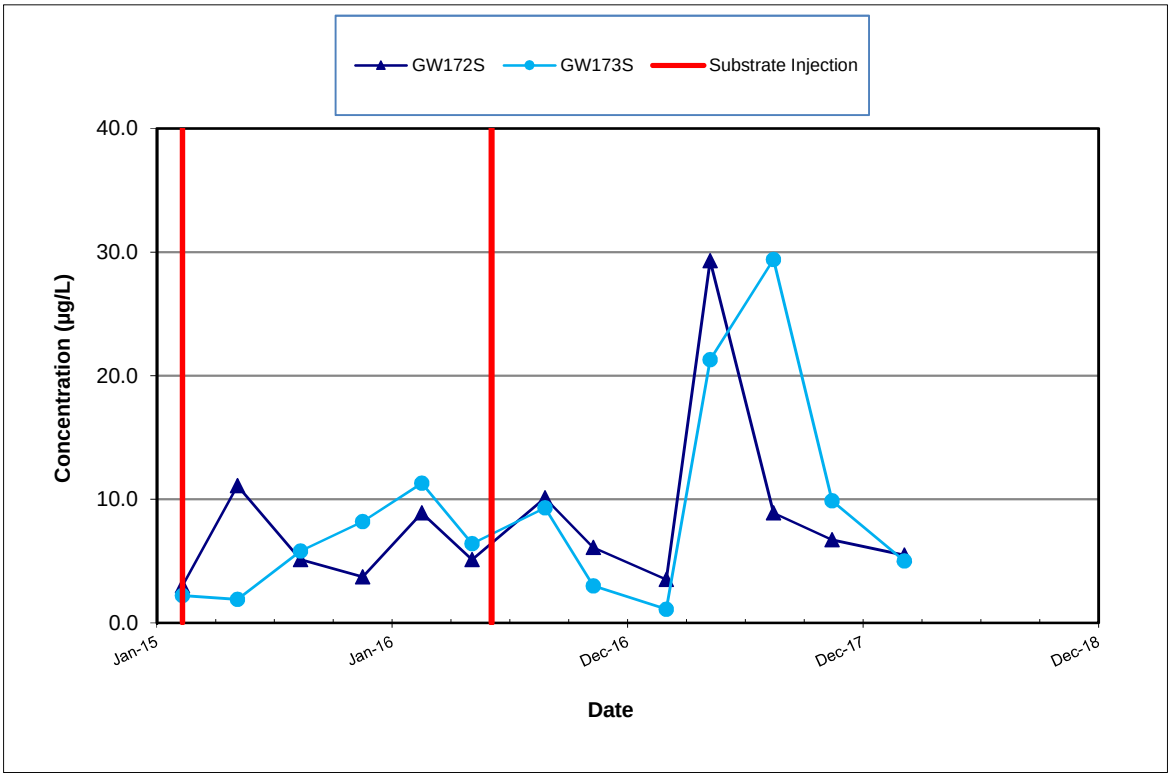
DOWNGRADIENT PLUME AREA WELL GW173S

wood.	SWMU-172 AND SWMU-174 TREND PLOTS FOR DOWNGRADIENT PLUME AREA WELLS GW172S AND GW173S Boeing Renton Facility Renton, Washington	Project No. 8888 Figure 4

P:\8888 - Boeing Renton\02 Data Management\Grapher and Excel Figure Files\excel\Figures 3 & 4_ SWMU_172-174 Trend Plots.xls



TOTAL ARSENIC IN SOURCE AREA WELLS

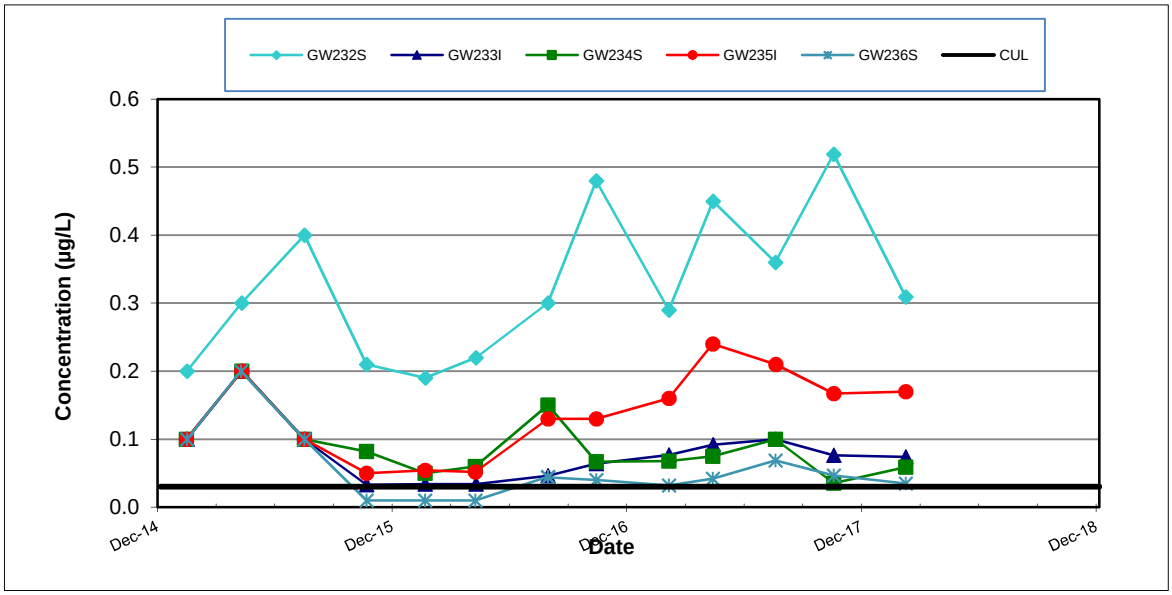


TOTAL ARSENIC IN DOWNGRADIENT PLUME AREA WELLS

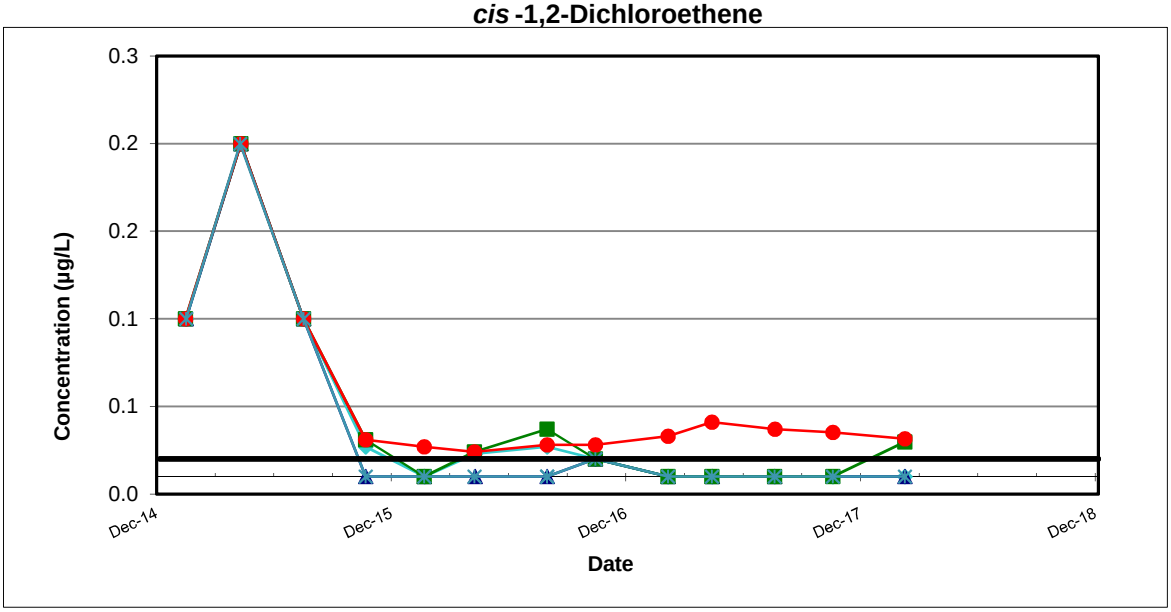
Note: non-detected values shown at one-half the reporting limit

P:\8888 - Boeing Renton\02 Data Management\Grapher and Excel Figure Files\excel\Figures 3 & 4_ SWMU_172-174 Trend Plots.xls

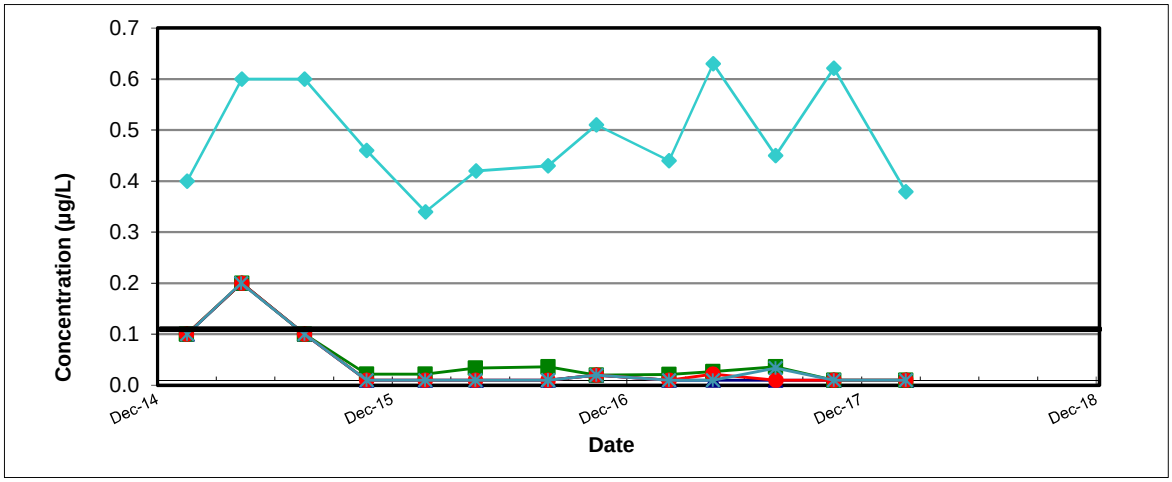
wood.	SWMU-172 AND SWMU-174 TREND PLOTS FOR ARSENIC IN SELECT SOURCE AREA AND DOWNGRADIENT PLUME AREA WELLS Boeing Renton Facility Renton, Washington	Project No. 8888 Figure 5



***cis* -1,2-Dichloroethene**



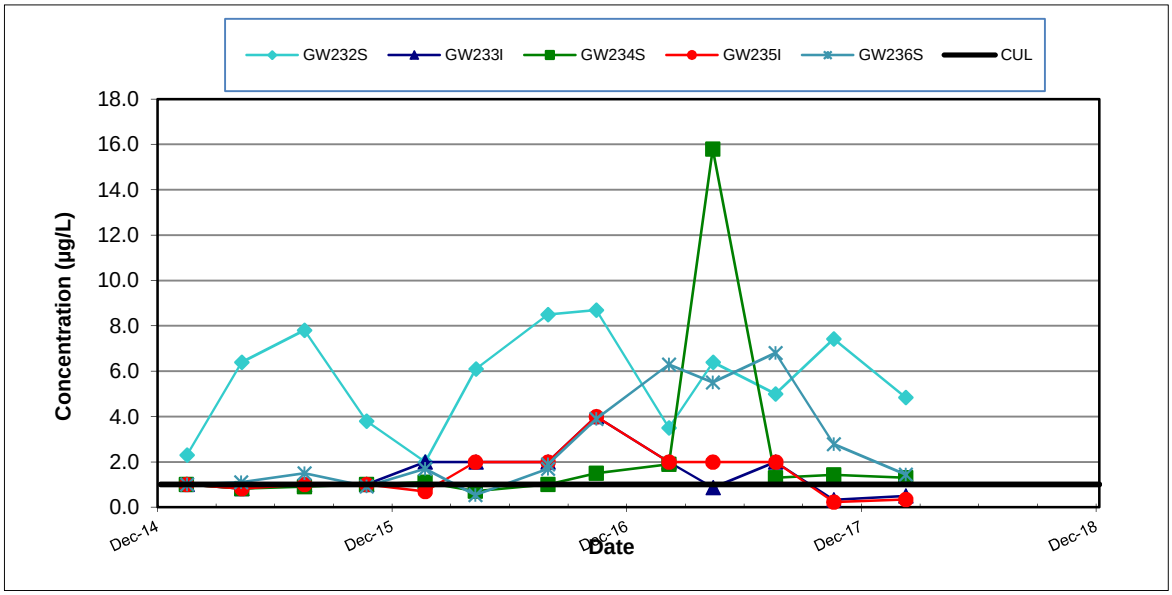
Trichloroethene



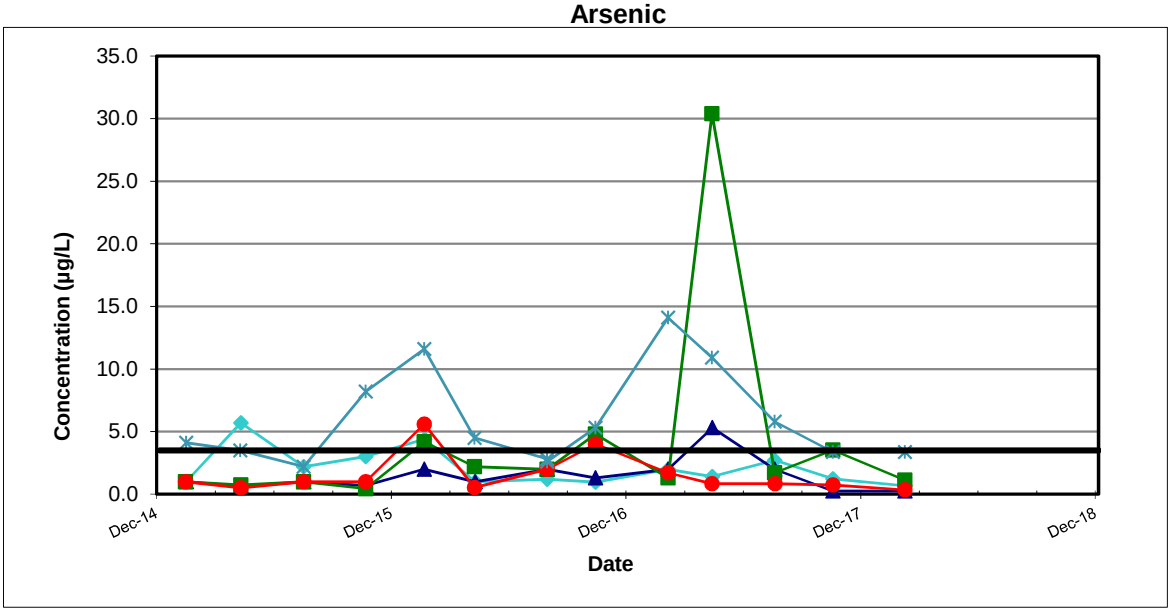
Vinyl Chloride

P:\8888 - Boeing Renton\02 Data Management\Grapher and Excel Figure Files\excel\Figures 3 & 4_ SWMU_172-174 Trend Plots.xls

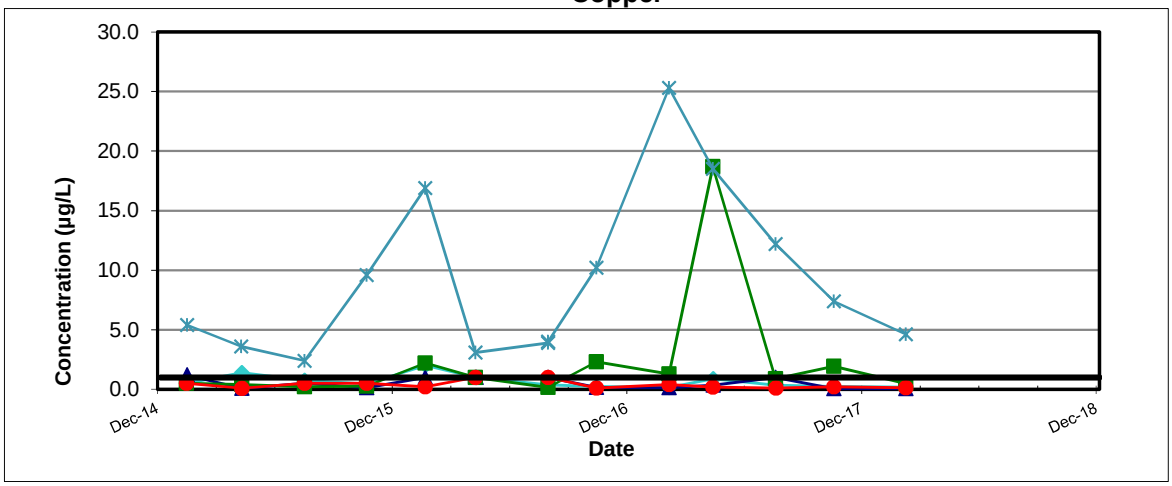
wood.	SWMU-172 AND SWMU-174 TREND PLOTS FOR DCE, TCE, AND VC IN CPOC AREA WELLS Boeing Renton Facility Renton, Washington	Project No. 8888 Figure 6



Arsenic



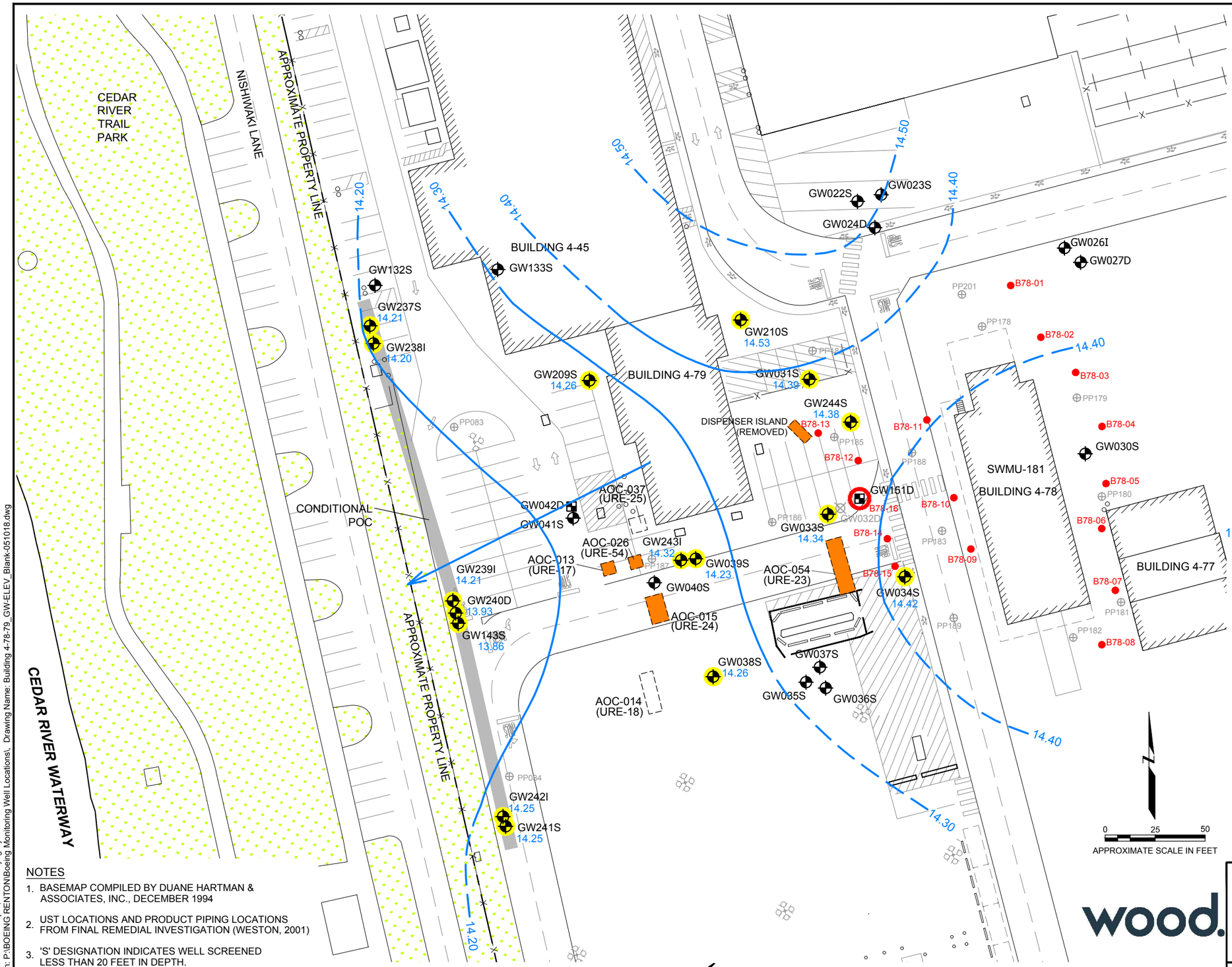
Copper



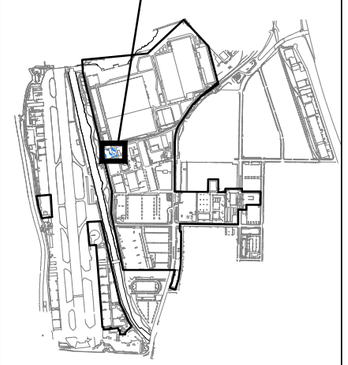
Lead

P:\8888 - Boeing Renton\02 Data Management\Grapher and Excel Figure Files\excel\Figures 3 & 4_ SWMU_172-174 Trend Plots.xls

wood.	SWMU-172 AND SWMU-174 TREND PLOTS FOR ARSENIC, COPPER AND LEAD IN CPOC WELLS Boeing Renton Facility Renton, Washington	Project No. 8888 Figure 7



4-78/79 SWMU/AOC GROUP LOCATION MAP



BOEING RENTON FACILITY MAP

LEGEND

GW033S 14.34 — MONITORING WELL LOCATION WITH GROUNDWATER ELEVATION (NGVD-FEET)

* ONLY WELL SCREENED IN SHALLOW AQUIFER USED FOR CONTOURING.

- GW042D — EXTRACTION WELL
- 15.30 — GROUNDWATER ELEVATION CONTOUR (IN FEET) (DASHED WHERE INFERRED)
- GENERAL DIRECTION OF GROUNDWATER FLOW
- GW032D — ABANDONED MONITORING WELL
- SVE-15 — HORIZONTAL SVE WELL
- B78-12 — BIOREMEDIATION INJECTION WELL
- EXTRACTION WELL CONVERTED TO INJECTION WELL
- PP083 — PUSH-PROBE SAMPLE LOCATION
- FENCE
- APPROXIMATE FUEL AND NON-CHLORINATED VOC SOURCE AREAS
- REMOVED UST (WESTON, 2001)
- CONDITIONAL POINT OF COMPLIANCE
- HIGHLIGHTED WELLS INCLUDED IN MONITORING NETWORK

NOTES

1. BASEMAP COMPILED BY DUANE HARTMAN & ASSOCIATES, INC., DECEMBER 1994
2. UST LOCATIONS AND PRODUCT PIPING LOCATIONS FROM FINAL REMEDIAL INVESTIGATION (WESTON, 2001)
3. 'S' DESIGNATION INDICATES WELL SCREENED LESS THAN 20 FEET IN DEPTH.
   'I' DESIGNATION INDICATES WELL SCREENED BETWEEN 20 AND 25 FEET IN DEPTH.
   'D' DESIGNATION INDICATES WELL SCREENED GREATER THAN 25 FEET IN DEPTH.

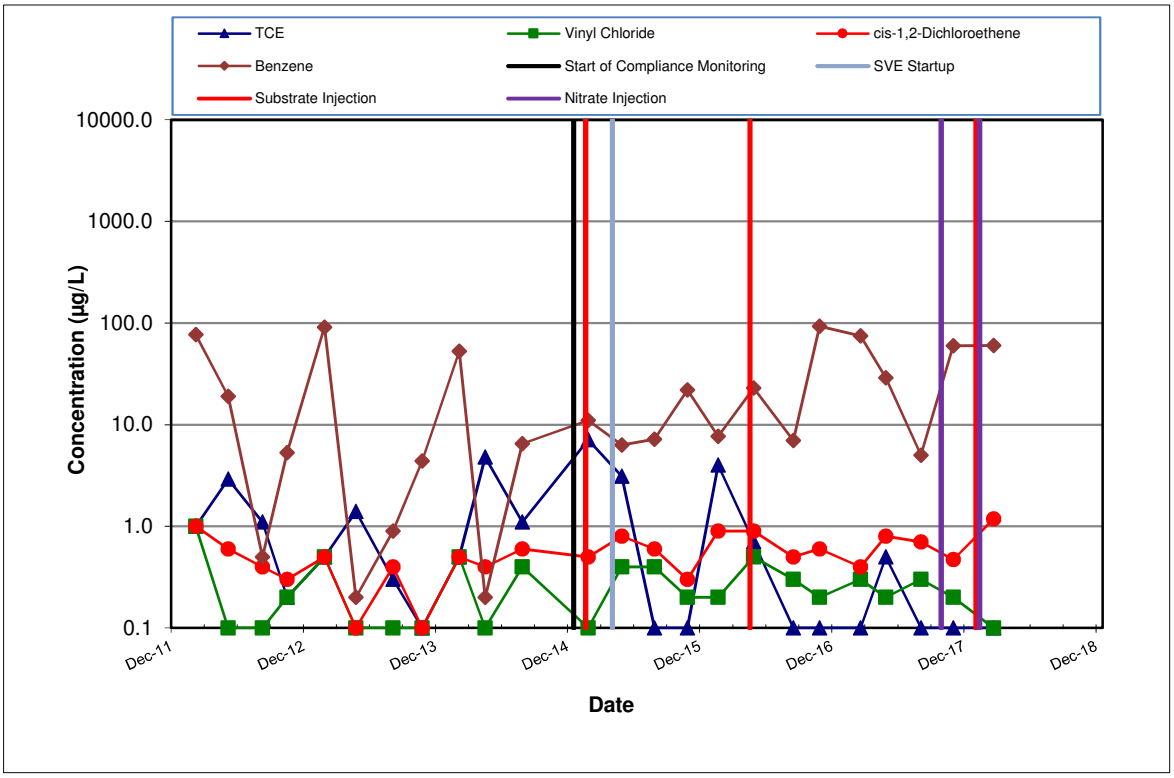
BOEING

wood.

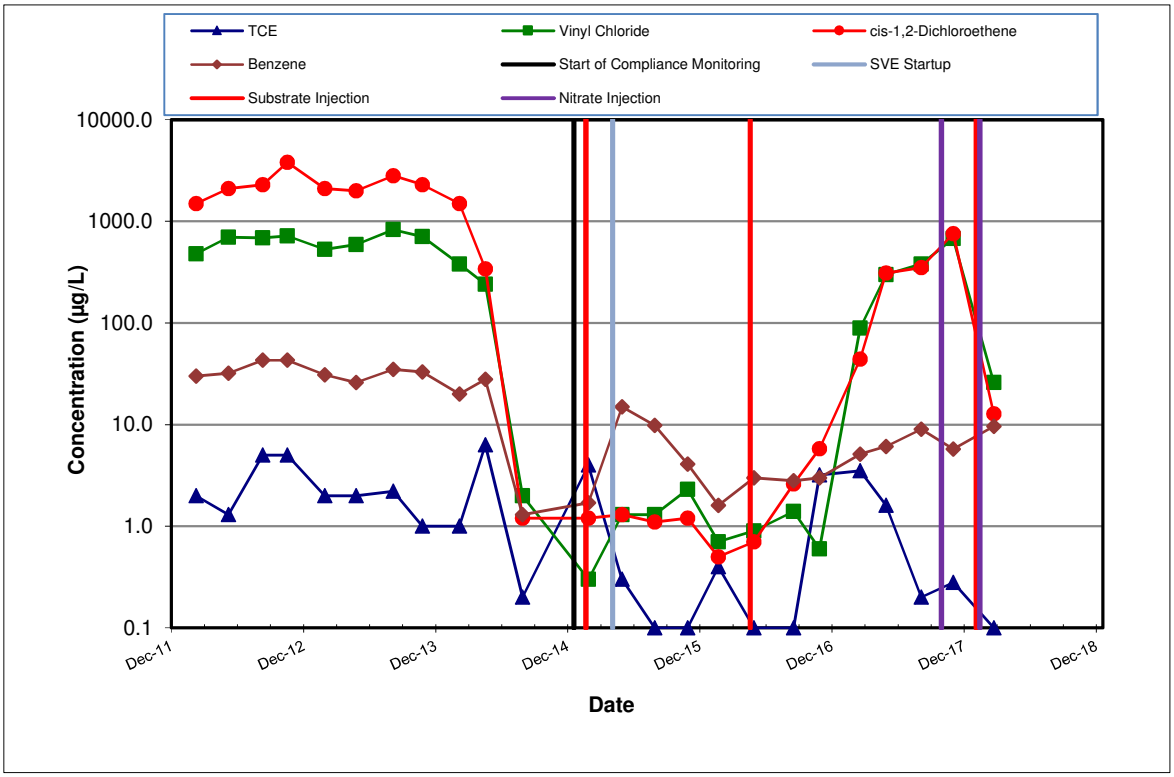
BUILDING 4-78/79 SWMU/AOC GROUP MONITORING WELL LOCATIONS AND GROUNDWATER ELEVATIONS MARCH 5 & 6, 2018 Boeing Renton Facility Renton, Washington

By: APS	Date: 05/10/18	Project No. 8888
Wood Environment & Infrastructure Solutions, Inc.		Figure 8

Plot Date: 05/10/18 - 1:55pm Plotted by: gary.maxwell2
Drawing Path: P:\BOEING RENTON\Boeing Monitoring Well Locations\ Drawing Name: Building 4-78-79_GW-ELEV_Blank-051018.dwg



SOURCE AREA WELL GW031S

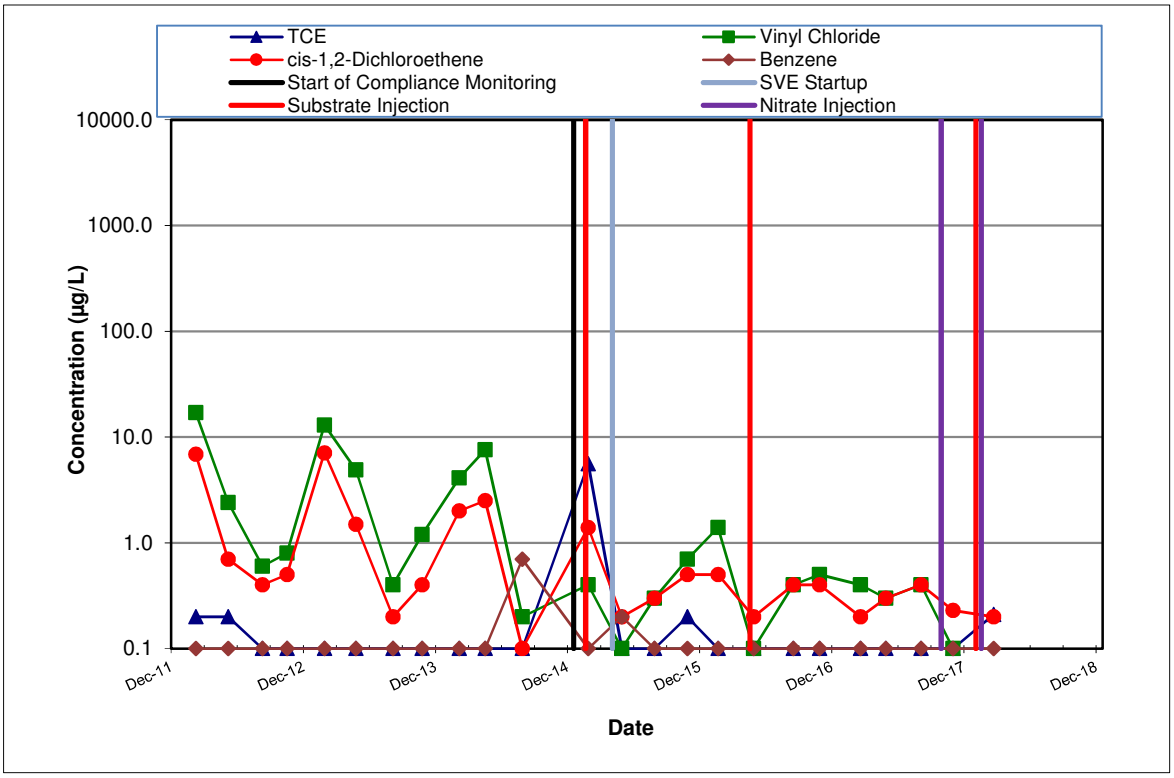


Note: non-detected values shown at one-half the reporting limit

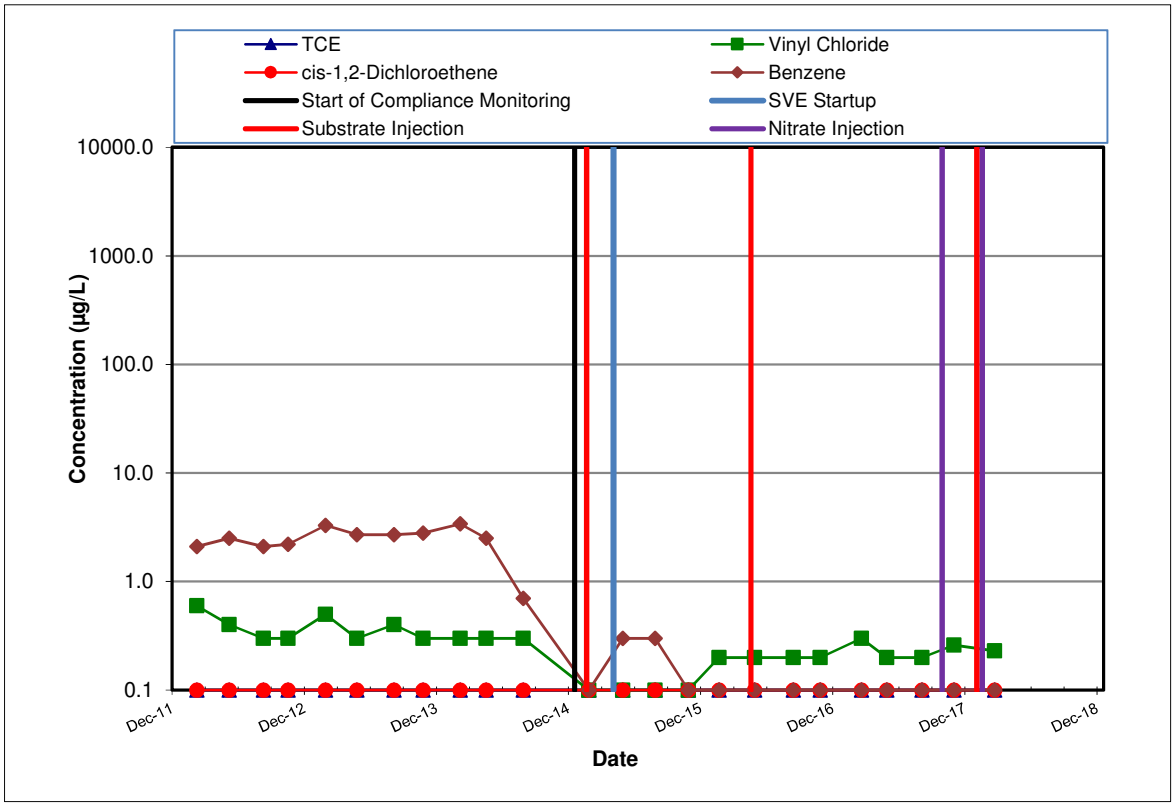
SOURCE AREA WELL GW033S

wood.	BUILDING 4-78/79 SWMU/AOC GROUP TREND PLOTS FOR SOURCE AREA WELLS GW031S AND GW033S Boeing Renton Facility Renton, Washington	Project No. 8888 Figure 9

P:\8888 - Boeing Renton\02 Data Management\Grapher and Excel Figure Files\excel\Figures 7 & 8_ Bldg 4-78-79 Trend Plots.xls



SOURCE AREA WELL GW034S

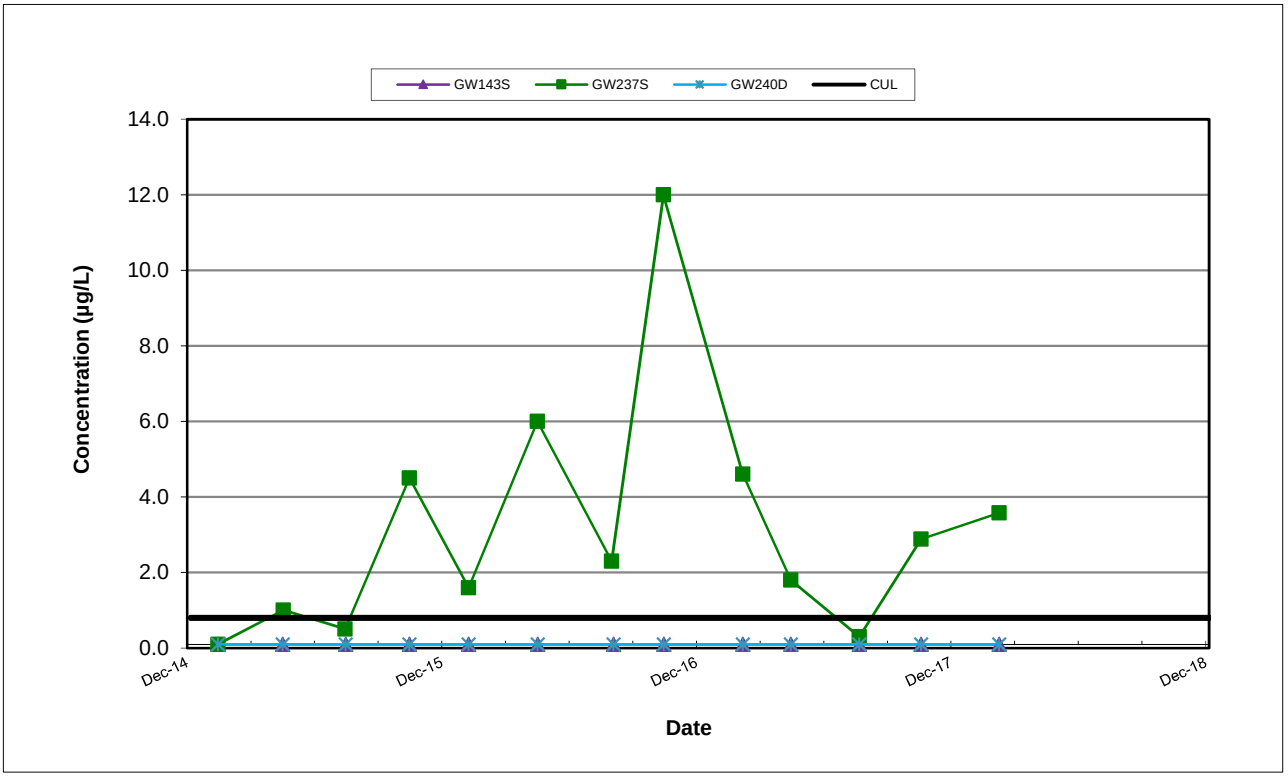


Note: non-detected values shown at one-half the reporting limit

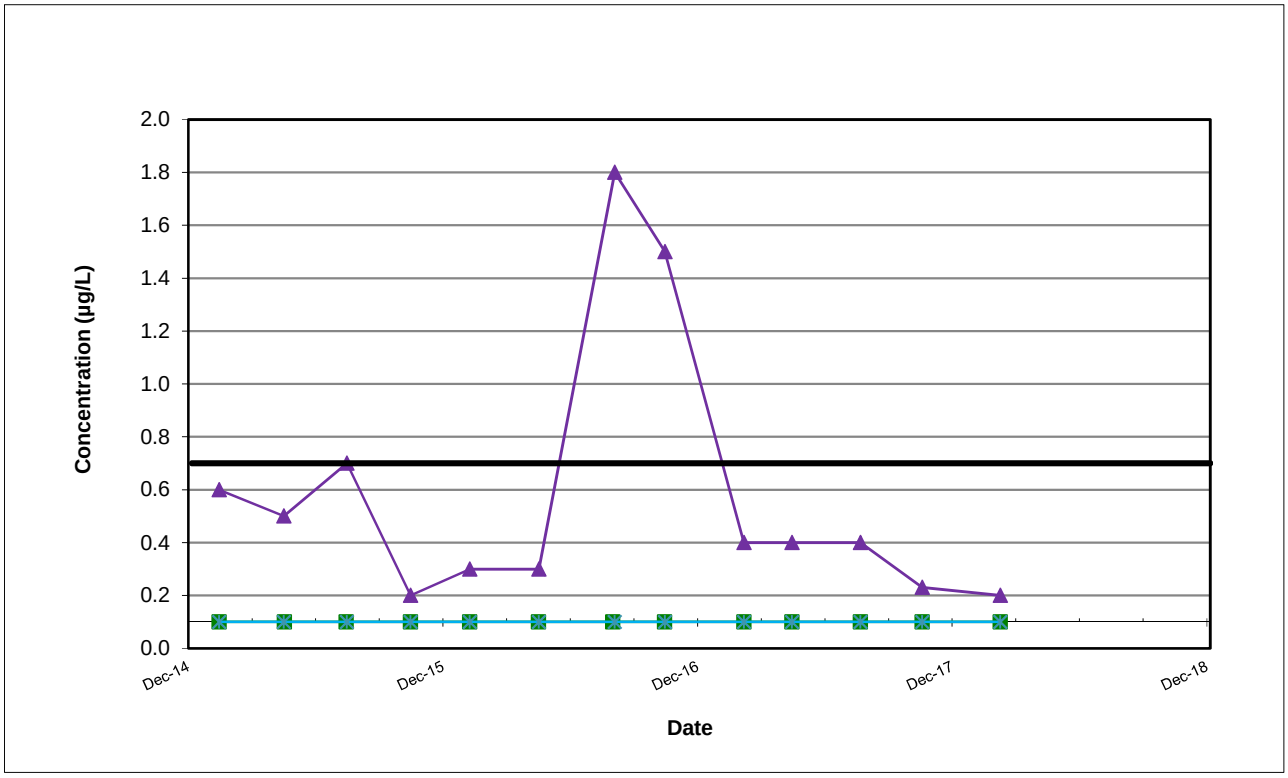
DOWNGRADIENT PLUME AREA WELL GW209S

P:\8888 - Boeing Renton\02 Data Management\Grapher and Excel Figure Files\excel\Figures 7 & 8_ Bldg 4-78-79 Trend Plots.xls

wood.	BLDG 4-78/79 SWMU/AOC GROUP TREND PLOTS FOR SOURCE AREA WELL GW034S AND DOWNGRADIENT PLUME AREA WELL GW209S Boeing Renton Facility Renton, Washington	Project No. 8888 Figure 10



Benzene



non-detected values shown at one-half the reporting limit

cis-1,2-Dichloroethene

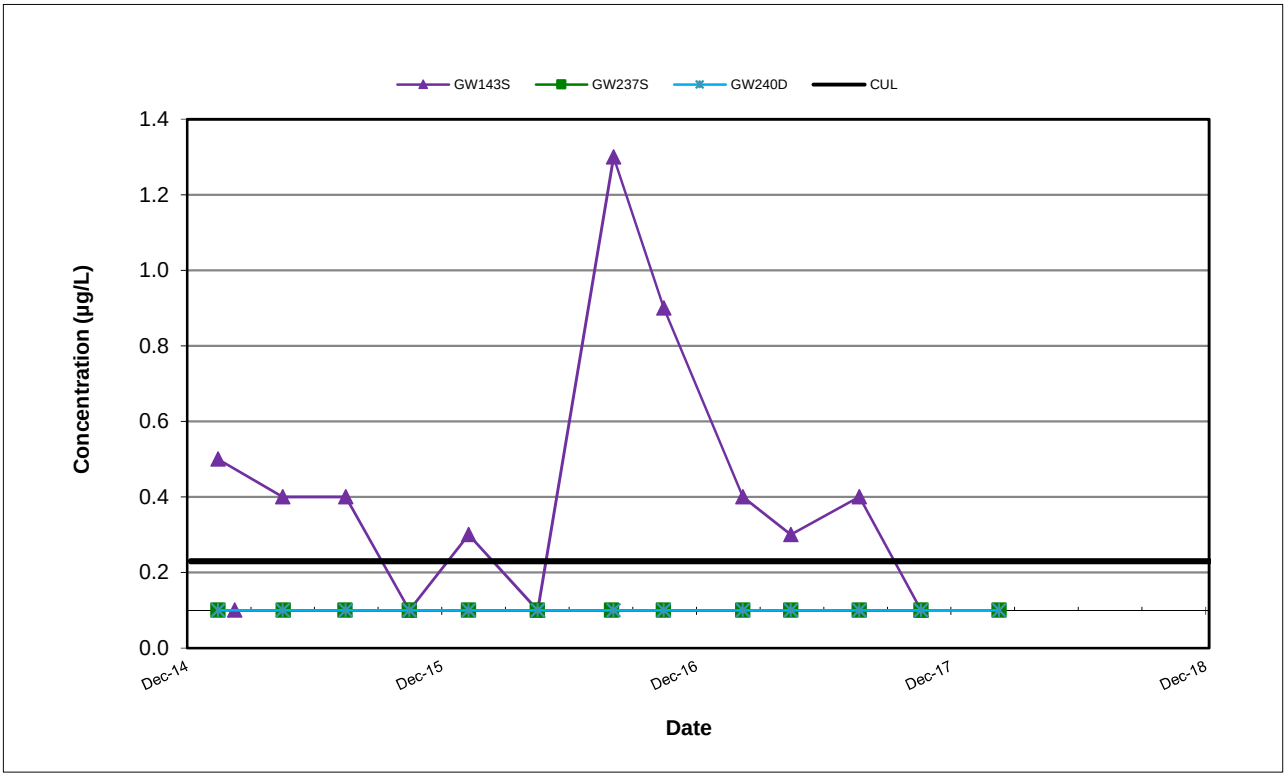
P:\8888 - Boeing Renton\02 Data Management\Grapher and Excel Figure Files\excel\Figures 7 & 8_ Bldg 4-78-79 Trend Plots.xls

wood.

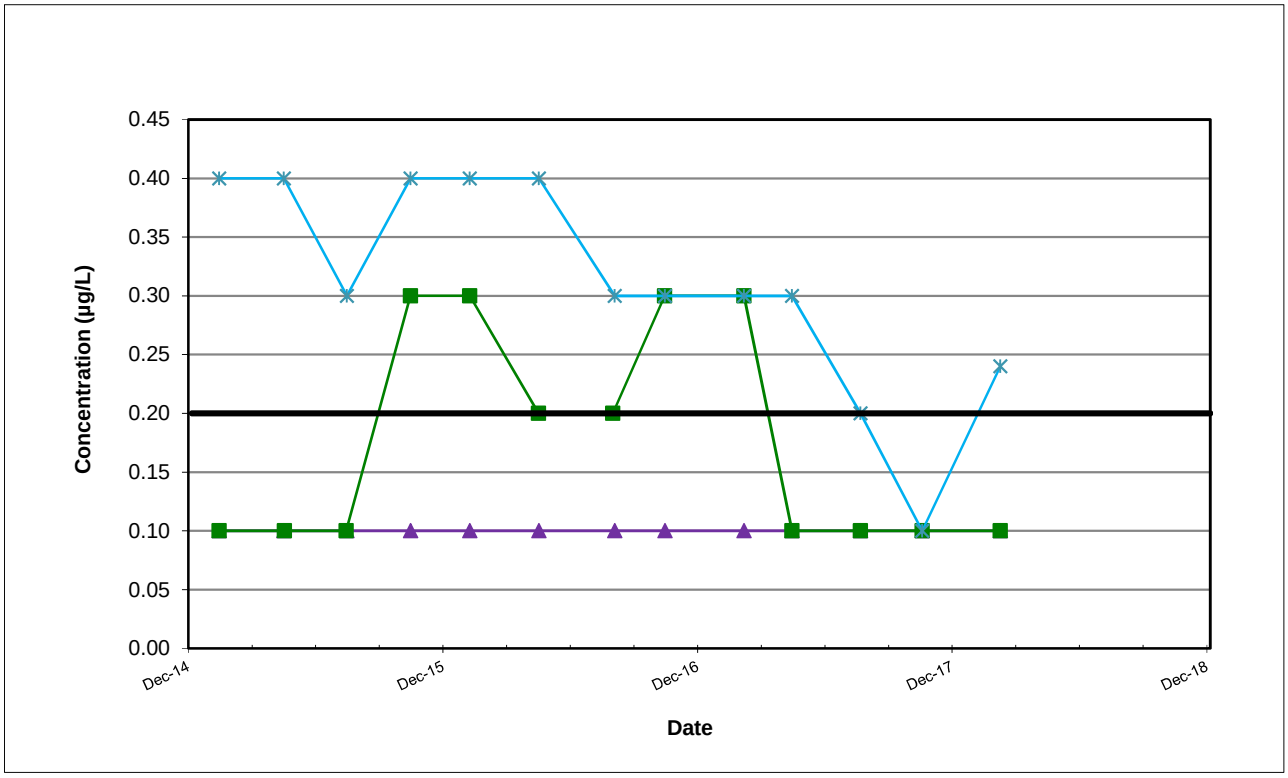
BUILDING 4-78/79 SWMU/AOC GROUP TREND PLOTS FOR BENZENE AND cis-1,2-DICHLOROETHENE IN CPOC AREA WELLS
Boeing Renton Facility
Renton, Washington

Project No. 8888

Figure 11



Trichloroethene



non-detected values shown at one-half the reporting limit

Vinyl Chloride

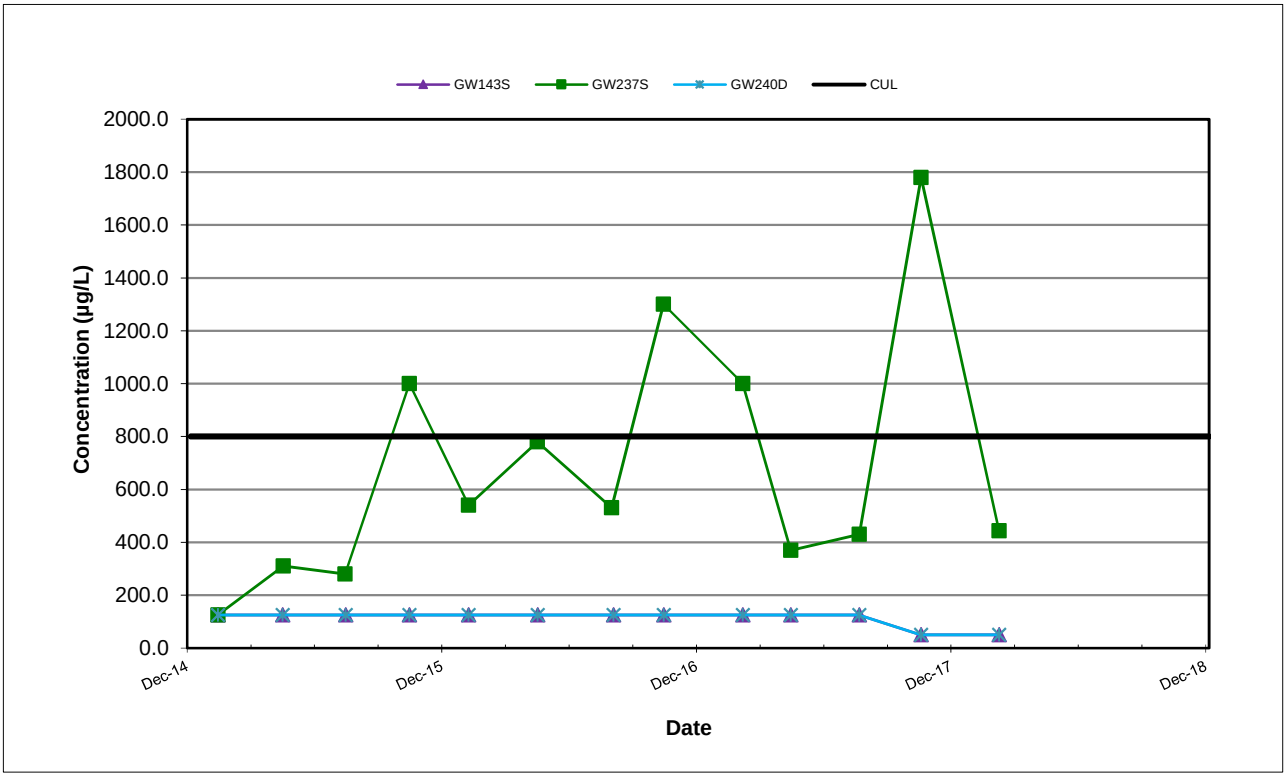
P:\8888 - Boeing Renton\02 Data Management\Grapher and Excel Figure Files\excel\Figures 7 & 8_ Bldg 4-78-79 Trend Plots.xls

wood.

BUILDING 4-78/79 SWMU/AOC GROUP TREND PLOTS FOR
TRICHLOROETHENE AND VINYL CHLORIDE IN CPOC AREA WELLS
Boeing Renton Facility
Renton, Washington

Project No. 8888

Figure 12



TPH as Gasoline

non-detected values shown at one-half the reporting limit

wood.	BUILDING 4-78/79 SWMU/AOC GROUP TREND PLOTS FOR TPH AS GASOLINE IN CPOC AREA WELLS Boeing Renton Facility Renton, Washington	Project No. 8888 Figure 13

P:\8888 - Boeing Renton\02 Data Management\Grapher and Excel Figure Files\excel\Figures 7 & 8_ Bldg 4-78-79 Trend Plots.xls

LAKE WASHINGTON

14.10

14.20

PP119

PP118

PP129

GW185S
14.22

GW187S

PP130

PP117

GW049S

GW197S
14.59 **

PP098

PP099

PP192

PP081

GW245S
14.04

GW196D
14.24

GW195S
14.10

PP097

PP132

STORM WATER
WET VAULT

GW050S

PP011

PP013

GW213S

GW215S

GW214S

PP012

AOC-001

AOC-002
(SECONDARY
SOURCE AREA)

STORM WATER
DIVERSION STRUCTURE

GW051S

PP116

PP066

PP131

GW186S

PP133

GW246S
14.12

GW194S
14.03

CONDITIONAL POC
FOR AOC-001/AOC-002
60' FROM SHORELINE

GW190S
14.25

PP135

PP113

PP114

PP115

GW191D
14.65 *

PP136

PP112

PP145

GW192S
14.22

PP150

PP111

PP138

PP096

PP137

PP151

PP147

PP141

PP152

PP134

GW193S
14.20

IPR1

IPR2

PP146

PP153

PP140

PP143

PP091

PP144

PP094

14.20

PP139

PP095

14.10

PP065

PP090

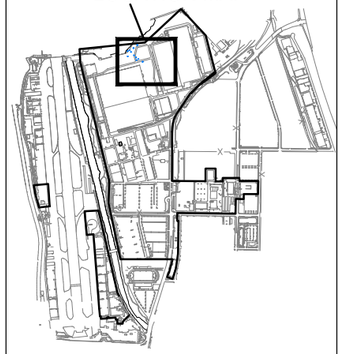
N

wood.

BOEING

0 30 60
APPROXIMATE SCALE IN FEET

AOC-001, AOC-002 AND AOC-093
LOCATION MAP



BOEING RENTON
FACILITY MAP

LEGEND

GW195S 14.15 — MONITORING WELL LOCATION WITH GROUNDWATER ELEVATION (NGVD-FEET)

NM — NOT MEASURED

* — WELL SCREENED IN LOWER PORTION OF AQUIFER, SO WATER LEVEL IS NOT USED FOR CONTOURING.

** — WATER LEVEL IS ANOMALOUS, NOT USED FOR CONTOURING

14.00 — GROUNDWATER ELEVATION CONTOUR (IN FEET) (DASHED WHERE INFERRED)

GENERAL DIRECTION OF GROUNDWATER FLOW

GW227S — ABANDONED MONITORING WELL

GW215S — EXISTING ELECTRON DONOR INJECTION WELL

IPR1 — EXISTING INJECTION PIPE RISER

PP011 — PUSH PROBE SAMPLING LOCATION

APPROXIMATE PROPERTY LINE

FENCE LINE

APPROXIMATE LIMIT OF NOVEMBER 2005 SOURCE AREA EXCAVATION

AOC-001, AOC-002 CONDITIONAL POINT OF COMPLIANCE

HIGHLIGHTED WELLS INCLUDED IN MONITORING NETWORK

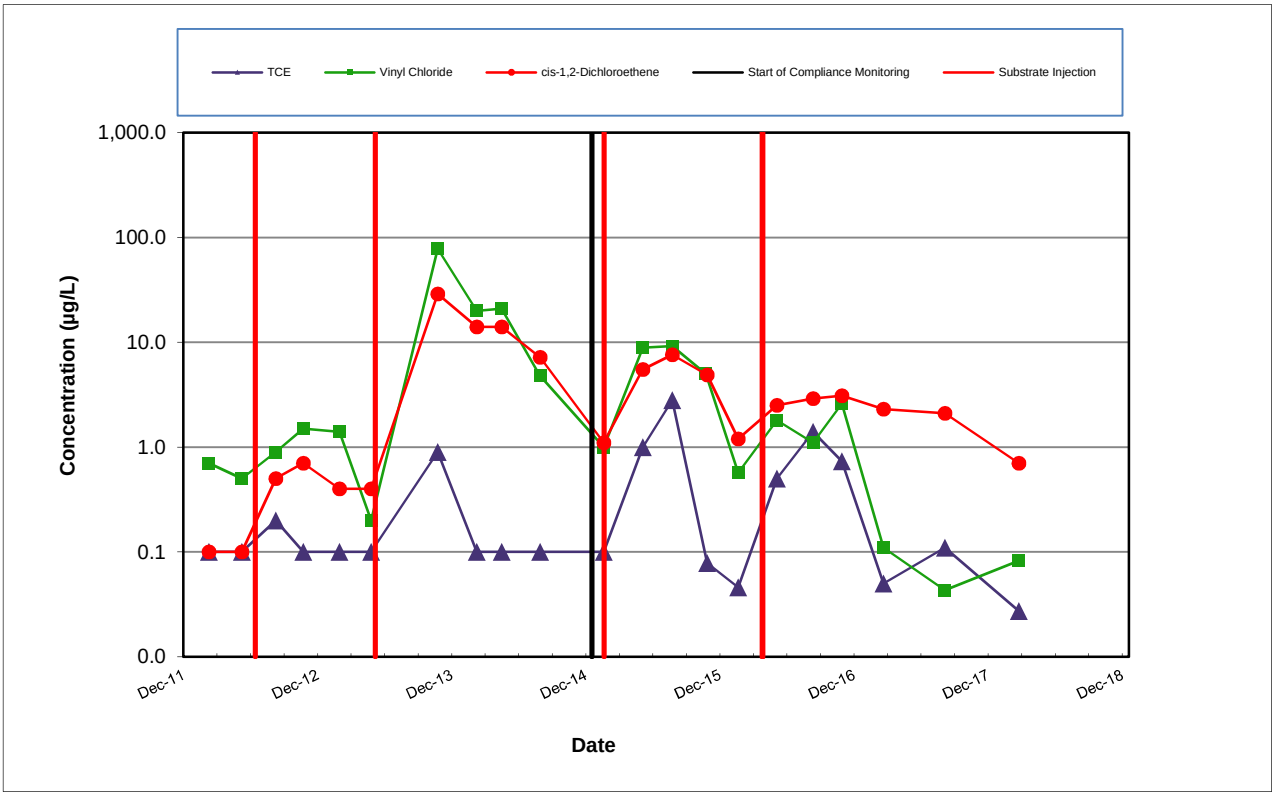
NOTES

1. HORIZONTAL DATUM:
   WASHINGTON STATE COORDINATE SYSTEM
   NORTH ZONE NAD83 (91)
   VERTICAL DATUM:
   NATIONAL GEODETIC VERTICAL DATUM (NGVD1929)
2. BASEMAP COMPILED BY DUANE HARTMAN & ASSOCIATES, INC., DECEMBER 1994.
3. 'S' DESIGNATION INDICATES WELL SCREENED LESS THAN 25 FEET IN DEPTH.
   'D' DESIGNATION INDICATES WELL SCREENED GREATER THAN 25 FEET IN DEPTH.

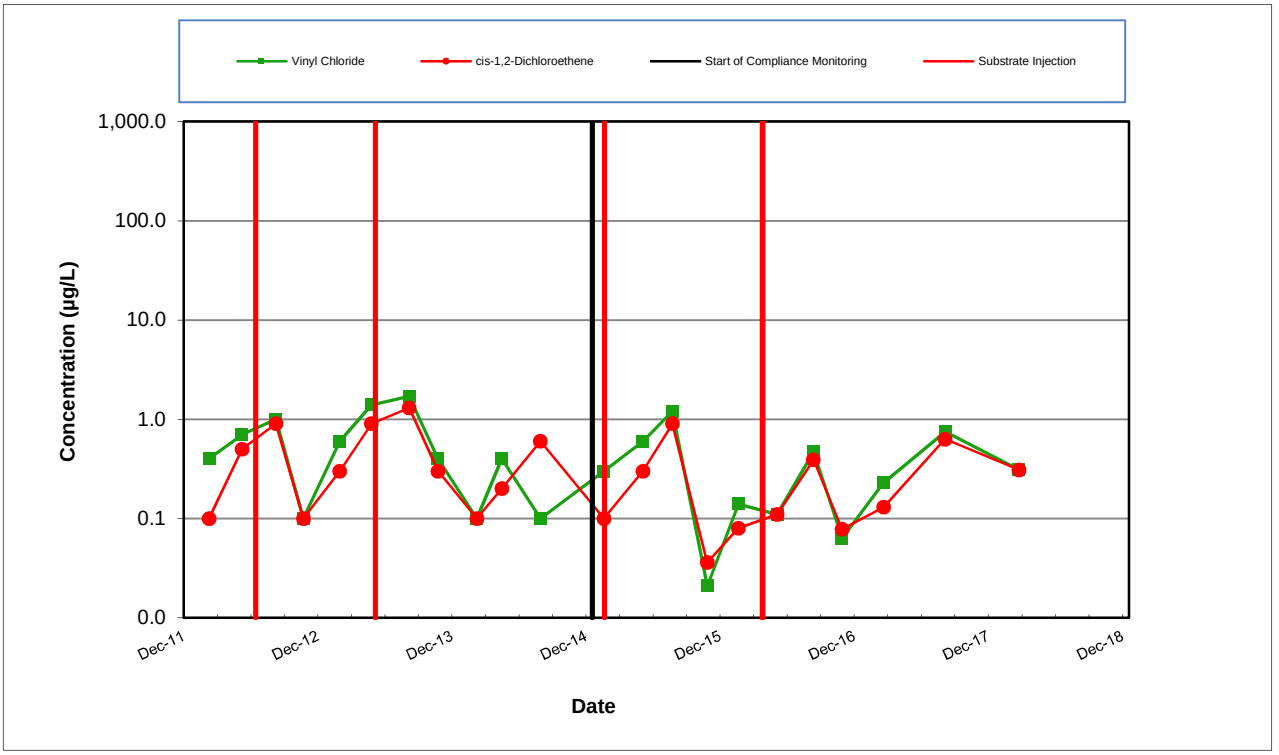
AOC-001 AND AOC-002
MONITORING WELL LOCATIONS
AND GROUNDWATER ELEVATIONS
MARCH 7, 2018
Boeing Renton Facility
Renton, Washington

By: APS	Date: 05/10/18	Project No. 8888
Wood Environment & Infrastructure Solutions, Inc.		Figure 14

Plot Date: 05/10/18 - 11:57am Plotted by: gary.maxwell2
Drawing Path: P:\BOEING RENTON\Boeing Monitoring Well Locations\ Drawing Name: AOC-001-002_GW-ELEV_Blank_051018.dwg



SOURCE AREA WELL GW193S

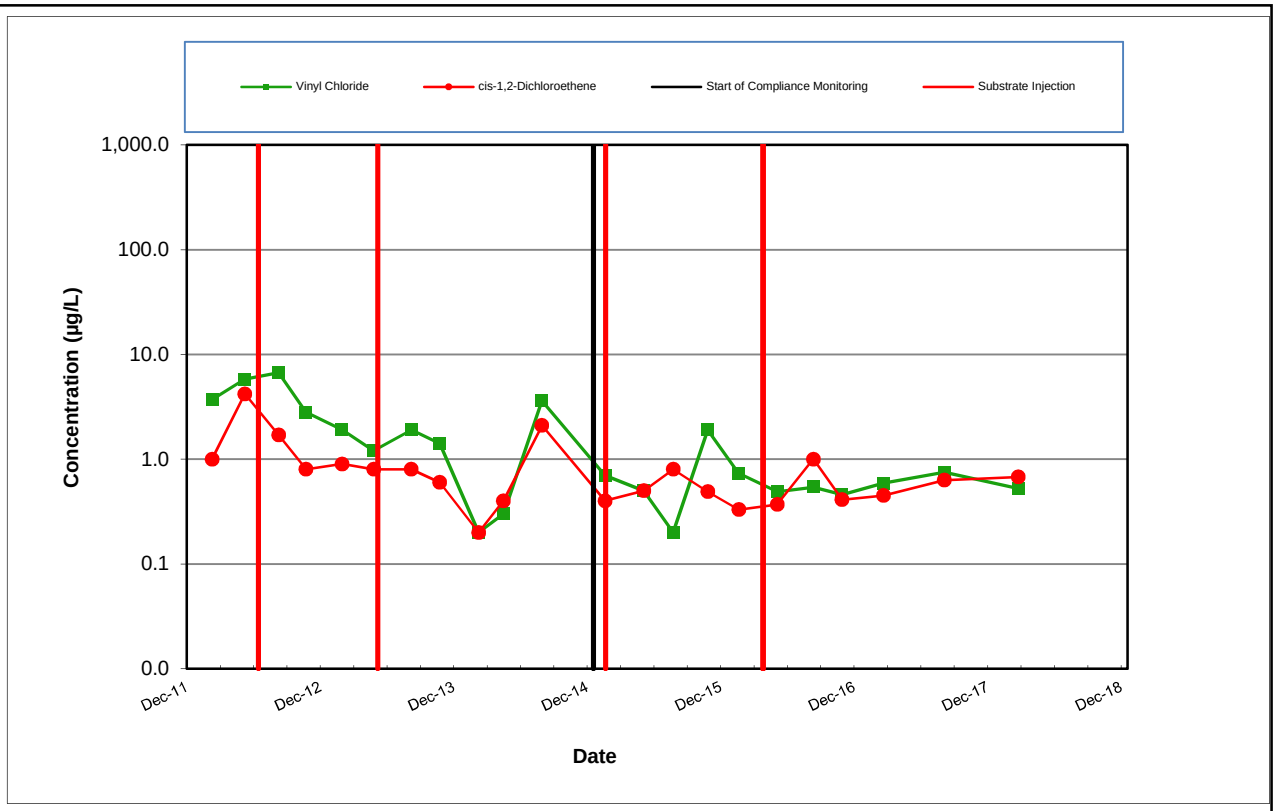


DOWNGRADIENT PLUME AREA WELL GW190S

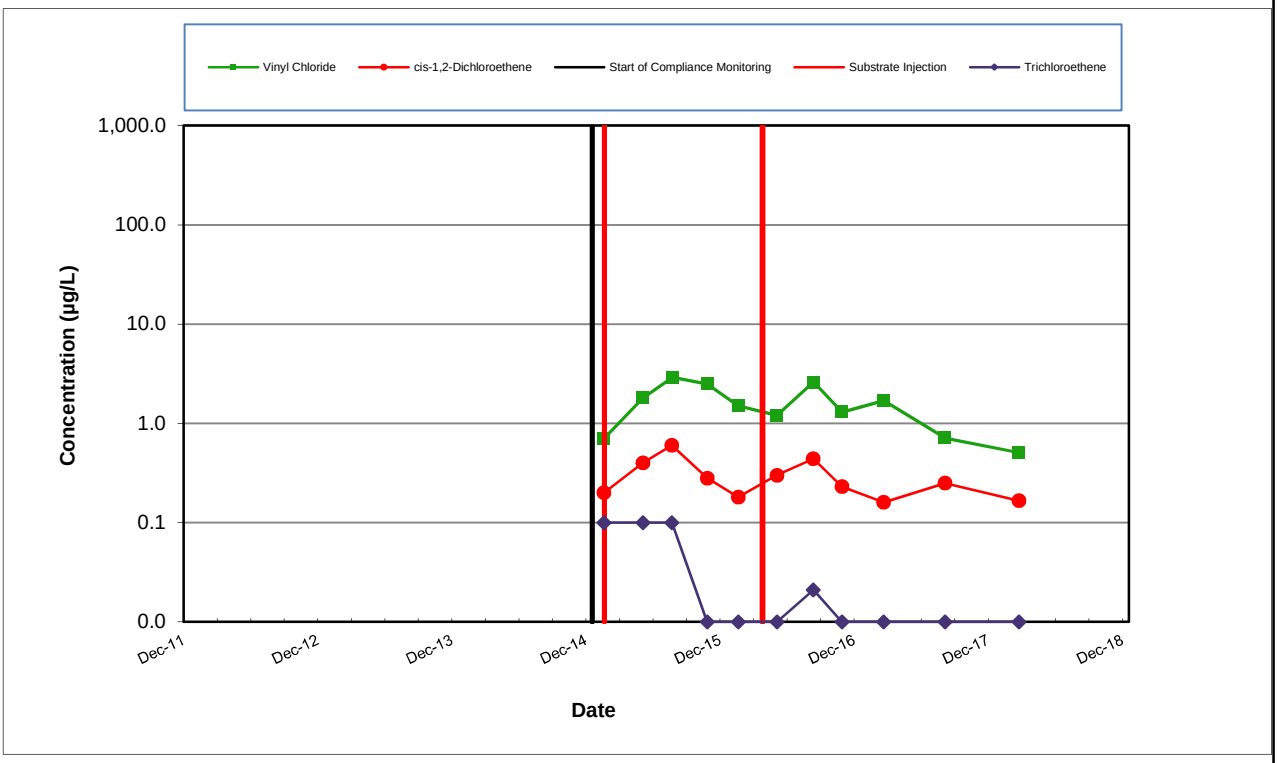
Note: non-detected values shown at one-half the reporting limit

wood.	AOC-001 AND 002 TREND PLOTS FOR SOURCE AREA WELL GW193S AND DOWNGRADIENT PLUME AREA WELL GW190S Boeing Renton Facility Renton, Washington	Project No. 8888 Figure 15

P:\8888 - Boeing Renton\02 Data Management\Grapher and Excel Figure Files\excel\Figures 12, 13. and 14_AOC 1-2 Trend Plots.xls



DOWNGRADIENT PLUME AREA WELL GW192S

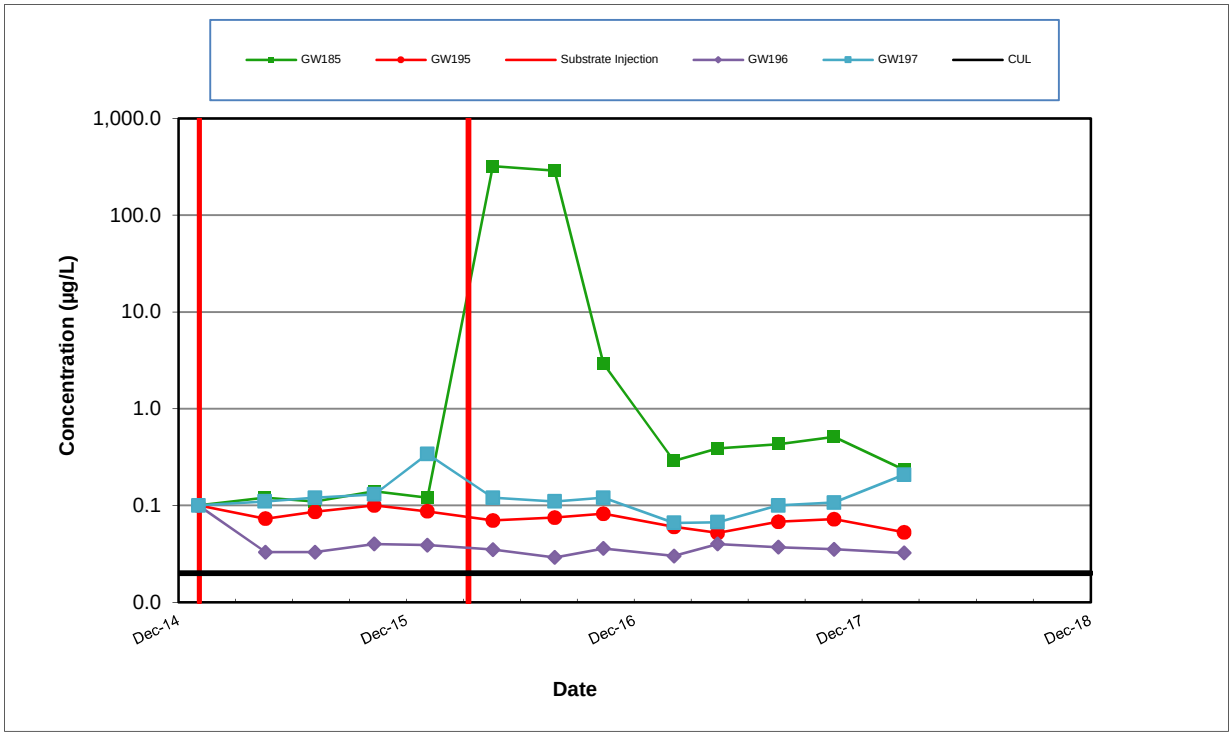


DOWNGRADIENT PLUME AREA WELL GW246S

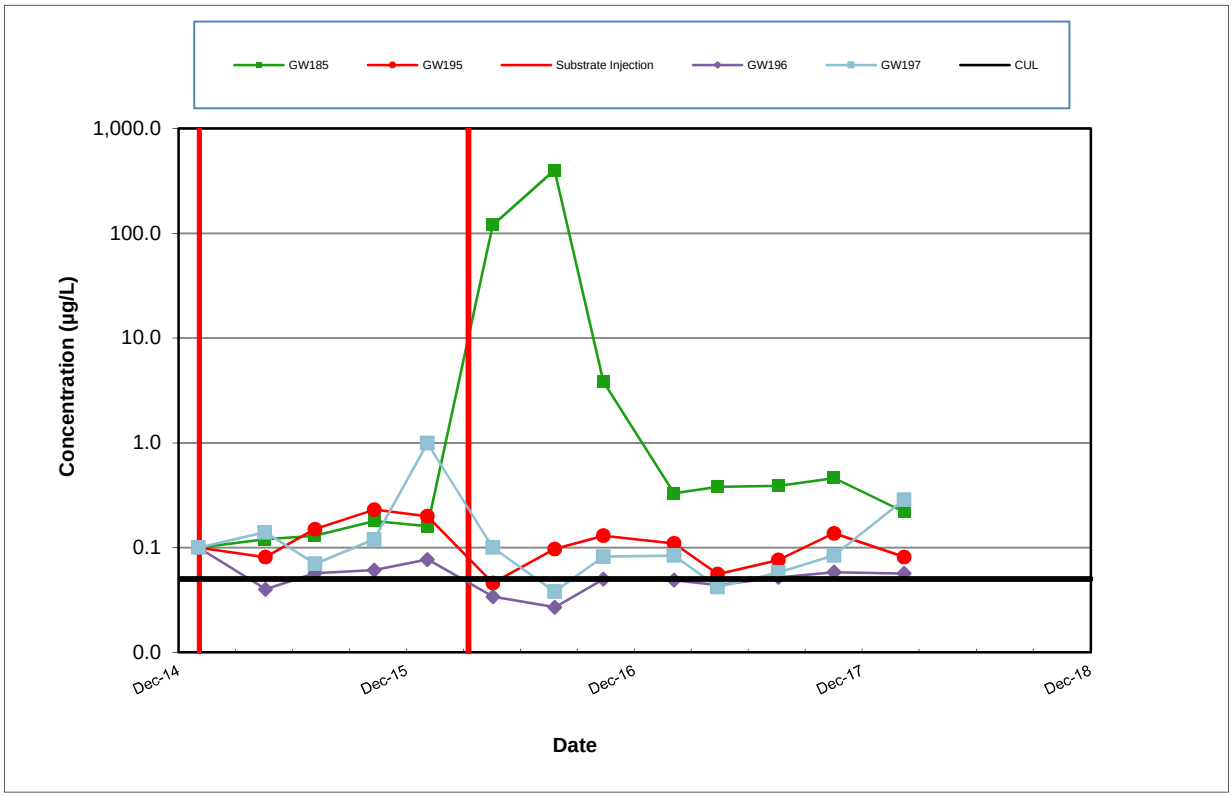
Note: non-detected values shown at one-half the reporting limit

wood.	AOC-001 AND 002 TREND PLOTS FOR DOWNGRADIENT PLUME AREA WELLS GW192S AND GW246S Boeing Renton Facility Renton, Washington	Project No. 8888 Figure 16

P:\8888 - Boeing Renton\02 Data Management\Grapher and Excel Figure Files\excel\Figures 12, 13. and 14_AOC 1-2 Trend Plots.xls



cis-1,2-Dichloroethene

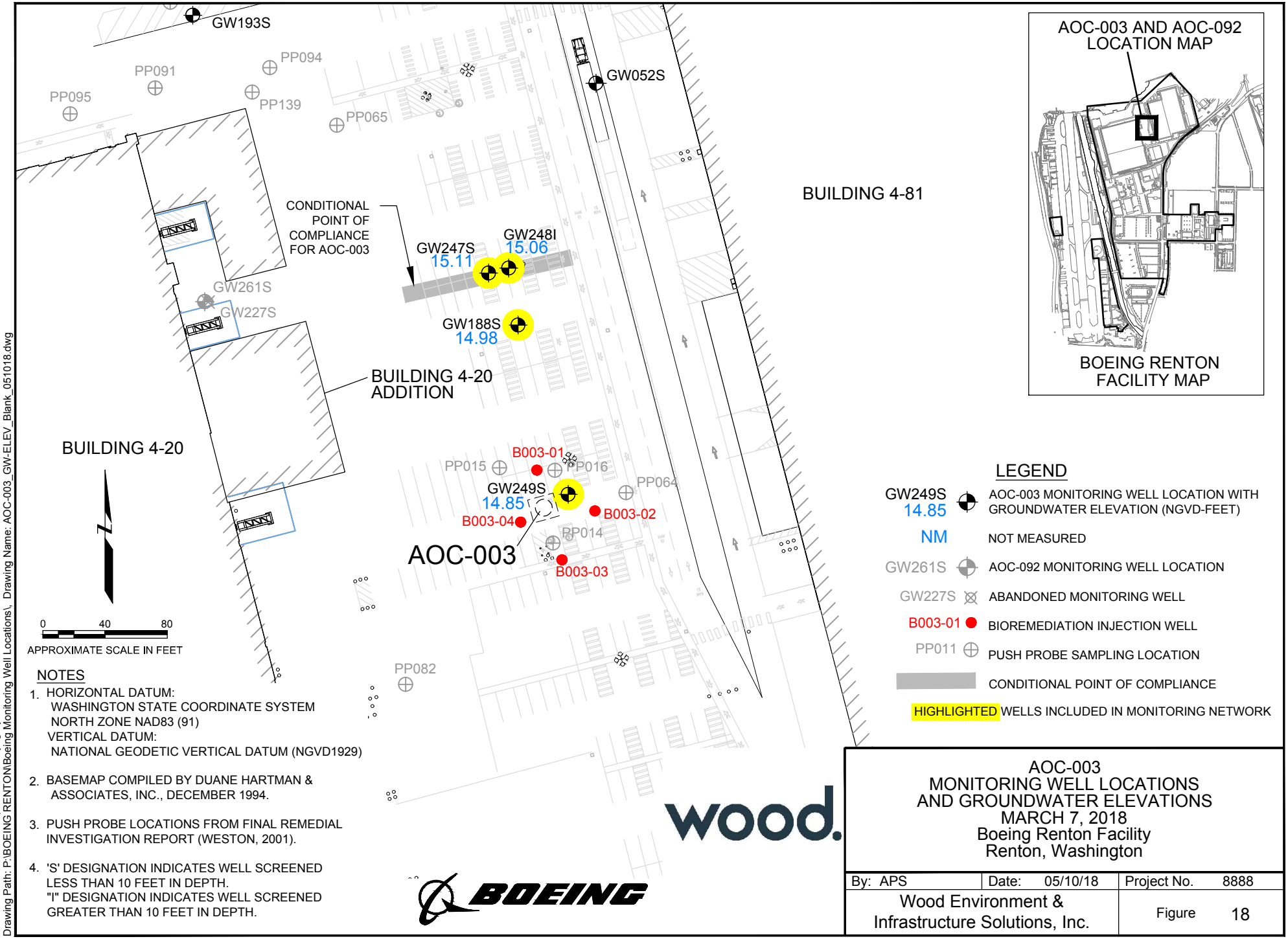


Vinyl Chloride

Note: non-detected values shown at one-half the reporting limit

wood.	AOC-001 AND 002 TREND PLOTS FOR *cis*-1,2-DICHLOROETHENE AND VINYL CHLORIDE IN CPOC AREA WELLS Boeing Renton Facility Renton, Washington	Project No. 8888 Figure 17

P:\8888 - Boeing Renton\02 Data Management\Grapher and Excel Figure Files\excel\Figures 12, 13. and 14_AOC 1-2 Trend Plots.xls



LEGEND

GW249S 14.85	AOC-003 MONITORING WELL LOCATION WITH GROUNDWATER ELEVATION (NGVD-FEET)
NM	NOT MEASURED
GW261S	AOC-092 MONITORING WELL LOCATION
GW227S	ABANDONED MONITORING WELL
B003-01	BIOREMEDIATION INJECTION WELL
PP011	PUSH PROBE SAMPLING LOCATION
	CONDITIONAL POINT OF COMPLIANCE
HIGHLIGHTED	WELLS INCLUDED IN MONITORING NETWORK

NOTES

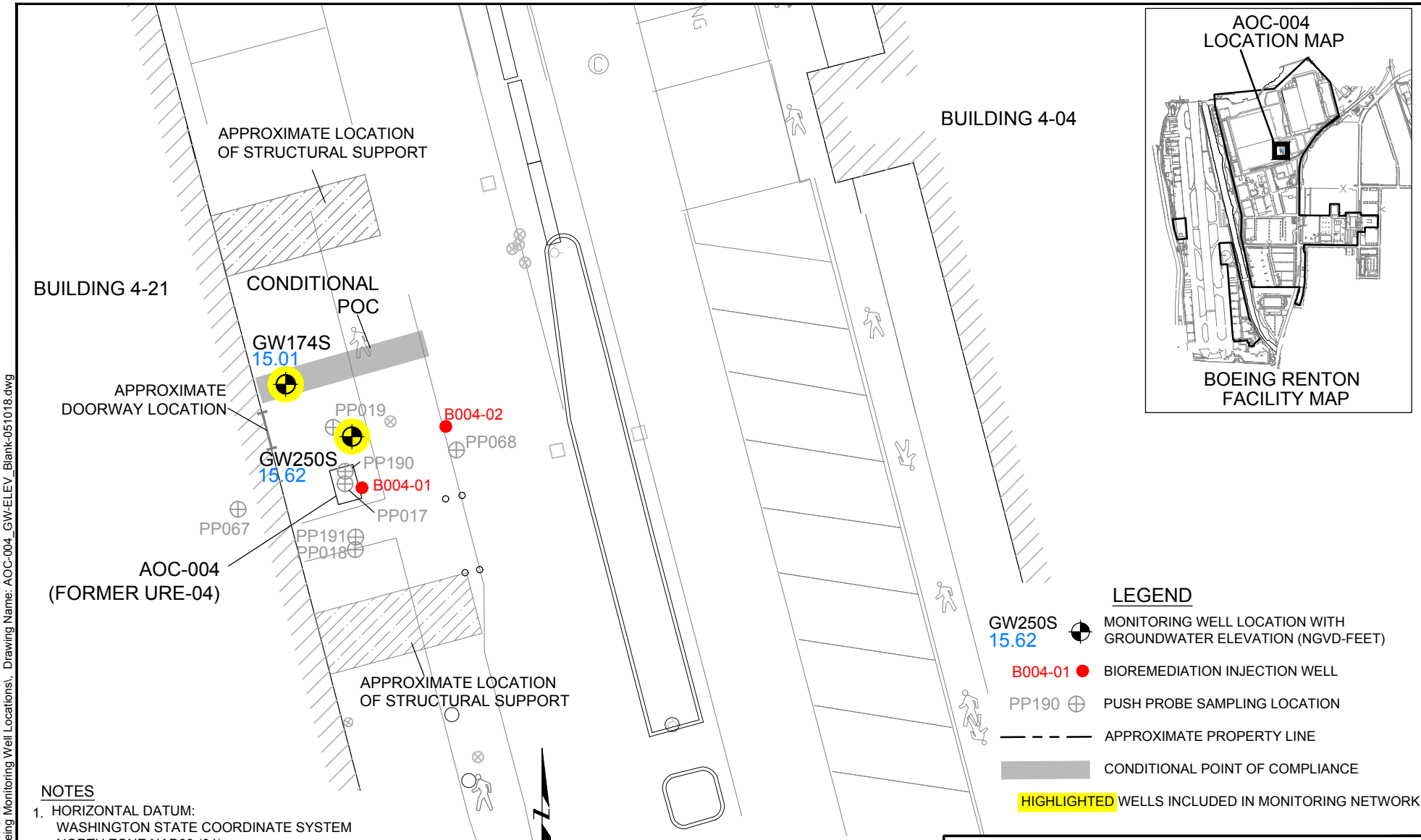
1. HORIZONTAL DATUM:
   WASHINGTON STATE COORDINATE SYSTEM
   NORTH ZONE NAD83 (91)
   VERTICAL DATUM:
   NATIONAL GEODETIC VERTICAL DATUM (NGVD1929)
2. BASEMAP COMPILED BY DUANE HARTMAN & ASSOCIATES, INC., DECEMBER 1994.
3. PUSH PROBE LOCATIONS FROM FINAL REMEDIAL INVESTIGATION REPORT (WESTON, 2001).
4. 'S' DESIGNATION INDICATES WELL SCREENED LESS THAN 10 FEET IN DEPTH.
   "I" DESIGNATION INDICATES WELL SCREENED GREATER THAN 10 FEET IN DEPTH.

wood.

BOEING

AOC-003 MONITORING WELL LOCATIONS AND GROUNDWATER ELEVATIONS MARCH 7, 2018 Boeing Renton Facility Renton, Washington

By: APS	Date: 05/10/18	Project No.	8888
Wood Environment & Infrastructure Solutions, Inc.		Figure	18



LEGEND

- GW250S 15.62 — MONITORING WELL LOCATION WITH GROUNDWATER ELEVATION (NGVD-FEET)
- B004-01 — BIOREMEDIATION INJECTION WELL
- PP190 — PUSH PROBE SAMPLING LOCATION
- APPROXIMATE PROPERTY LINE
- CONDITIONAL POINT OF COMPLIANCE
- HIGHLIGHTED WELLS INCLUDED IN MONITORING NETWORK

NOTES

1. HORIZONTAL DATUM:
   WASHINGTON STATE COORDINATE SYSTEM
   NORTH ZONE NAD83 (91)
   VERTICAL DATUM:
   NATIONAL GEODETIC VERTICAL DATUM (NGVD1929)
2. BASEMAP COMPILED BY DUANE HARTMAN & ASSOCIATES, INC., DECEMBER 1994
3. PUSH PROBE LOCATIONS FROM FINAL REMEDIAL INVESTIGATION REPORT (WESTON, 2001)
4. 'S' DESIGNATION INDICATES WELL SCREENED LESS THAN 10 FEET IN DEPTH.

wood.

BOEING

AOC-004
MONITORING WELL LOCATIONS AND GROUNDWATER ELEVATIONS
MARCH 6, 2018
Boeing Renton Facility
Renton, Washington

By: APS	Date: 05/10/18	Project No. 8888
Wood Environment & Infrastructure Solutions, Inc.		Figure 19

Plot Date: 05/10/18 - 2:27pm, Plotted by: gary.maxwell2
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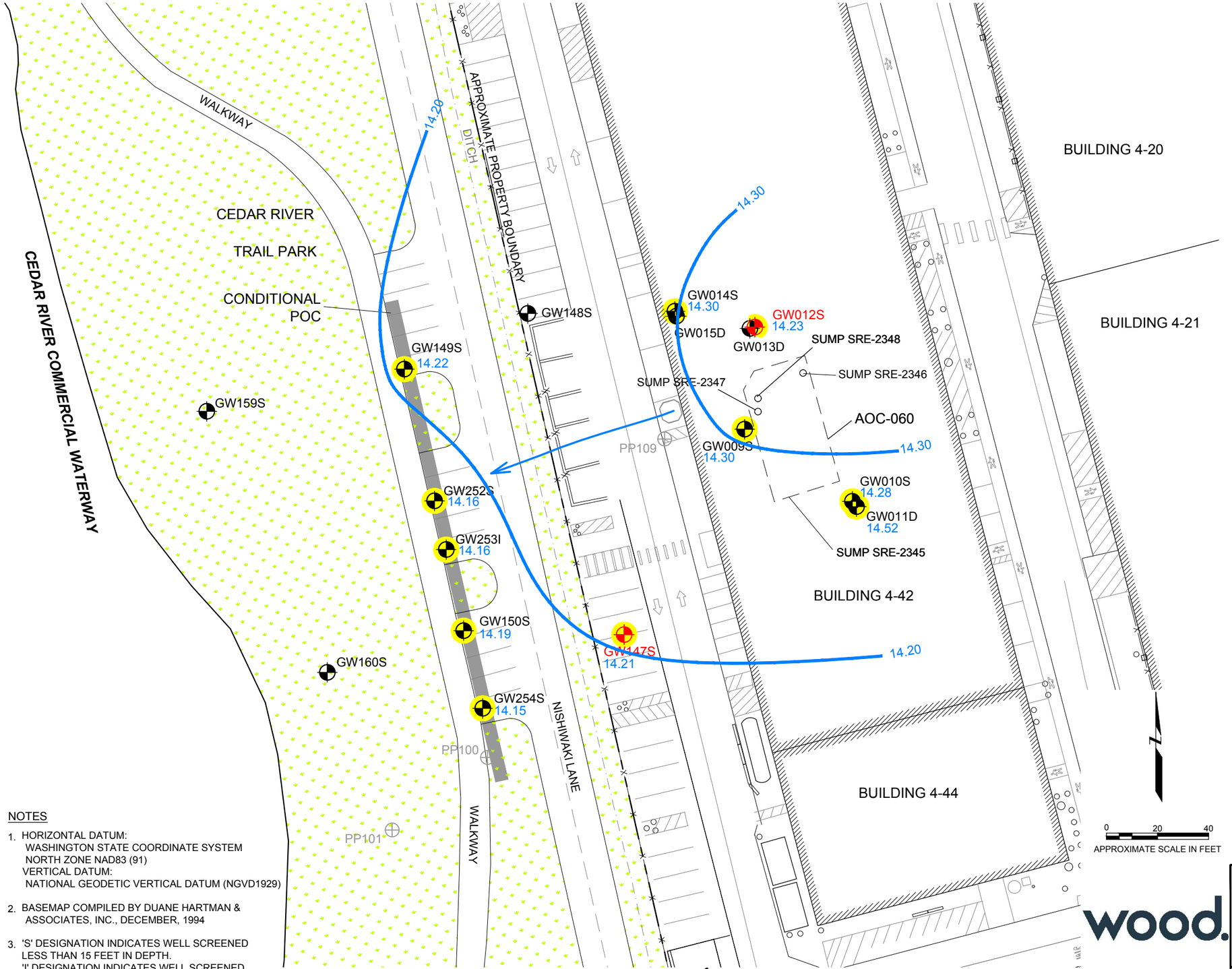
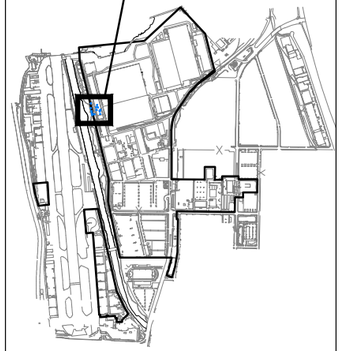


AOC-060
LOCATION MAP



BOEING RENTON
FACILITY MAP

LEGEND

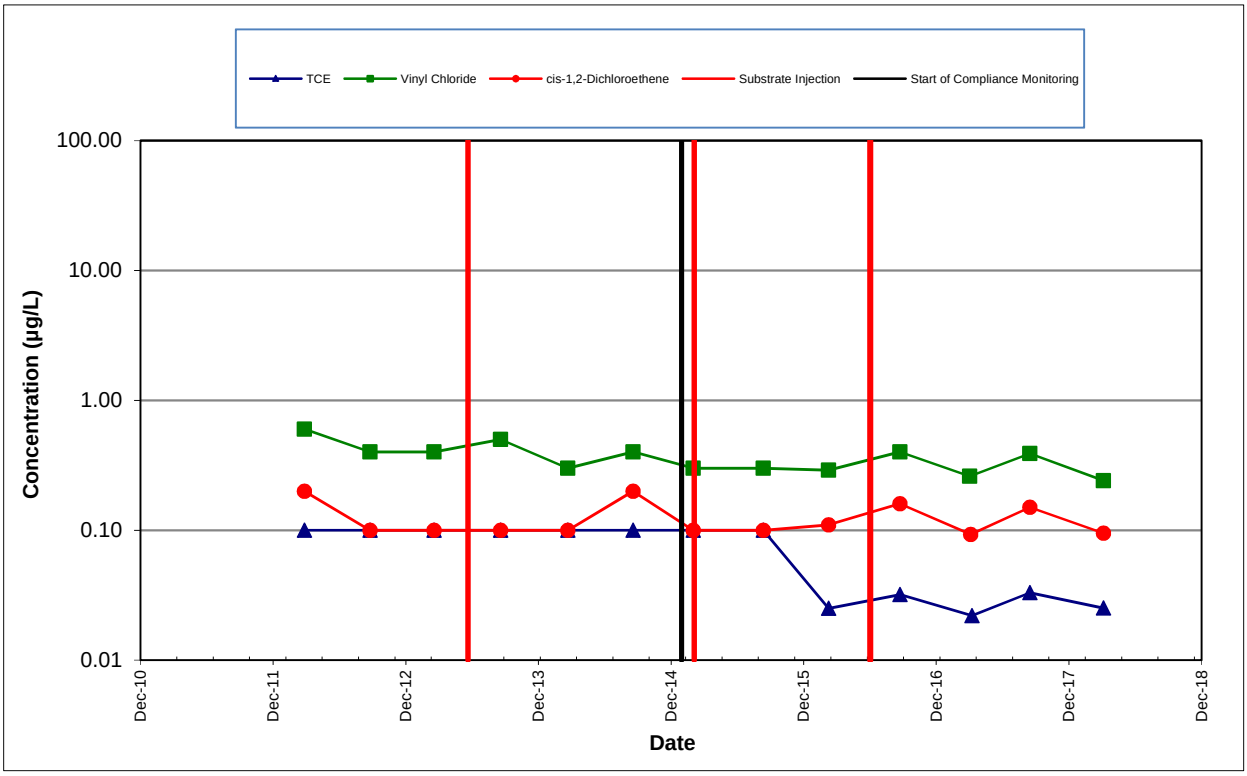
- GW252S 14.52 — MONITORING WELL LOCATION WITH GROUNDWATER ELEVATION (NGVD-FEET)
- ONLY WELL SCREENED IN SHALLOW AQUIFER USED FOR CONTOURING.
- ** GROUNDWATER ELEVATION NOT INCLUDED IN CONTOURING
- GW147S — ELECTRON DONOR INJECTION WELL AND MONITORING WELL
- 15.30 — GROUNDWATER ELEVATION CONTOUR (IN FEET) (DASHED WHERE INFERRED)
- GENERAL DIRECTION OF GROUNDWATER FLOW
- PP109 — PUSH PROBE SAMPLING LOCATION
- APPROXIMATE PROPERTY LINE
- FENCE LINE
- CONDITIONAL POINT OF COMPLIANCE
- HIGHLIGHTED WELLS INCLUDED IN MONITORING NETWORK

NOTES

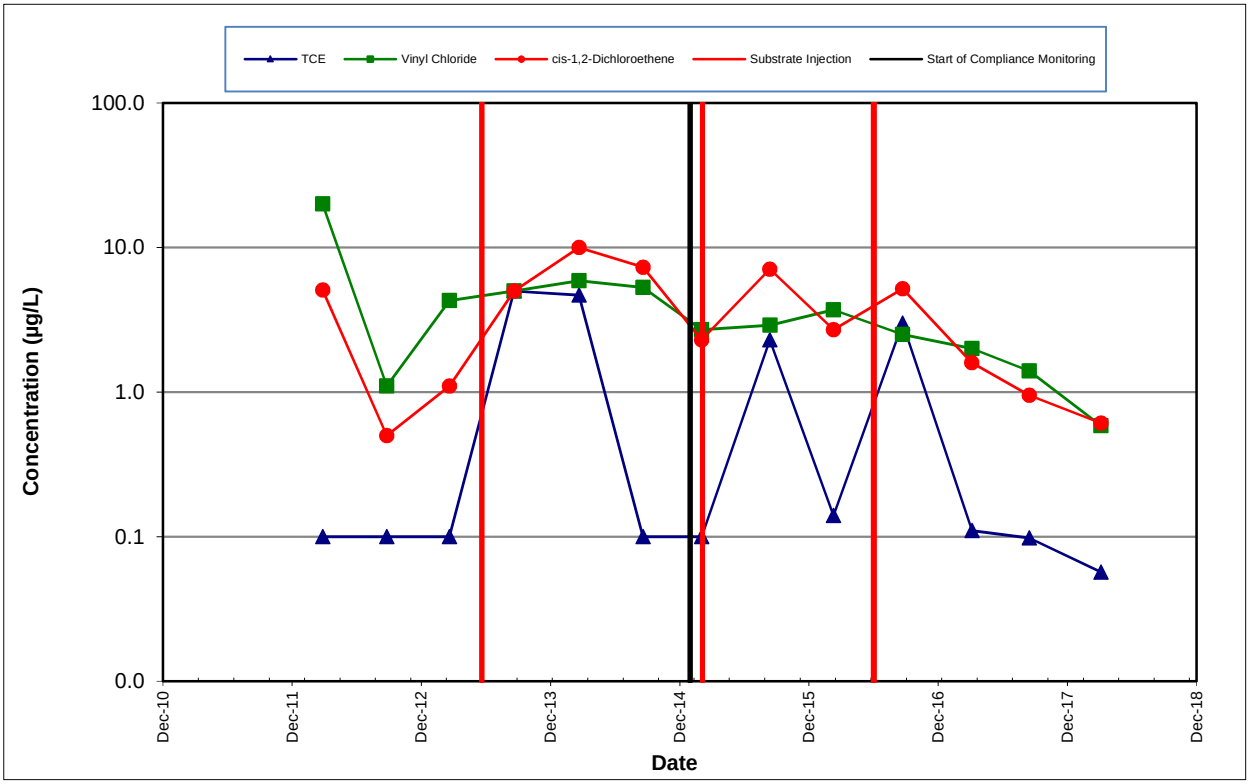
1. HORIZONTAL DATUM:
   WASHINGTON STATE COORDINATE SYSTEM
   NORTH ZONE NAD83 (91)
   VERTICAL DATUM:
   NATIONAL GEODETIC VERTICAL DATUM (NGVD1929)
2. BASEMAP COMPILED BY DUANE HARTMAN & ASSOCIATES, INC., DECEMBER, 1994
3. 'S' DESIGNATION INDICATES WELL SCREENED LESS THAN 15 FEET IN DEPTH.
   'I' DESIGNATION INDICATES WELL SCREENED BETWEEN 15 AND 29 FEET.
   'D' DESIGNATION INDICATES WELL SCREENED GREATER THAN 29 FEET IN DEPTH.

AOC-060
MONITORING WELL LOCATIONS AND GROUNDWATER ELEVATIONS
MARCH 6, 2018
Boeing Renton Facility
Renton, Washington

By: APS	Date: 05/10/18	Project No. 8888
Wood Environment & Infrastructure Solutions, Inc.		Figure 20



SOURCE AREA WELL GW009S

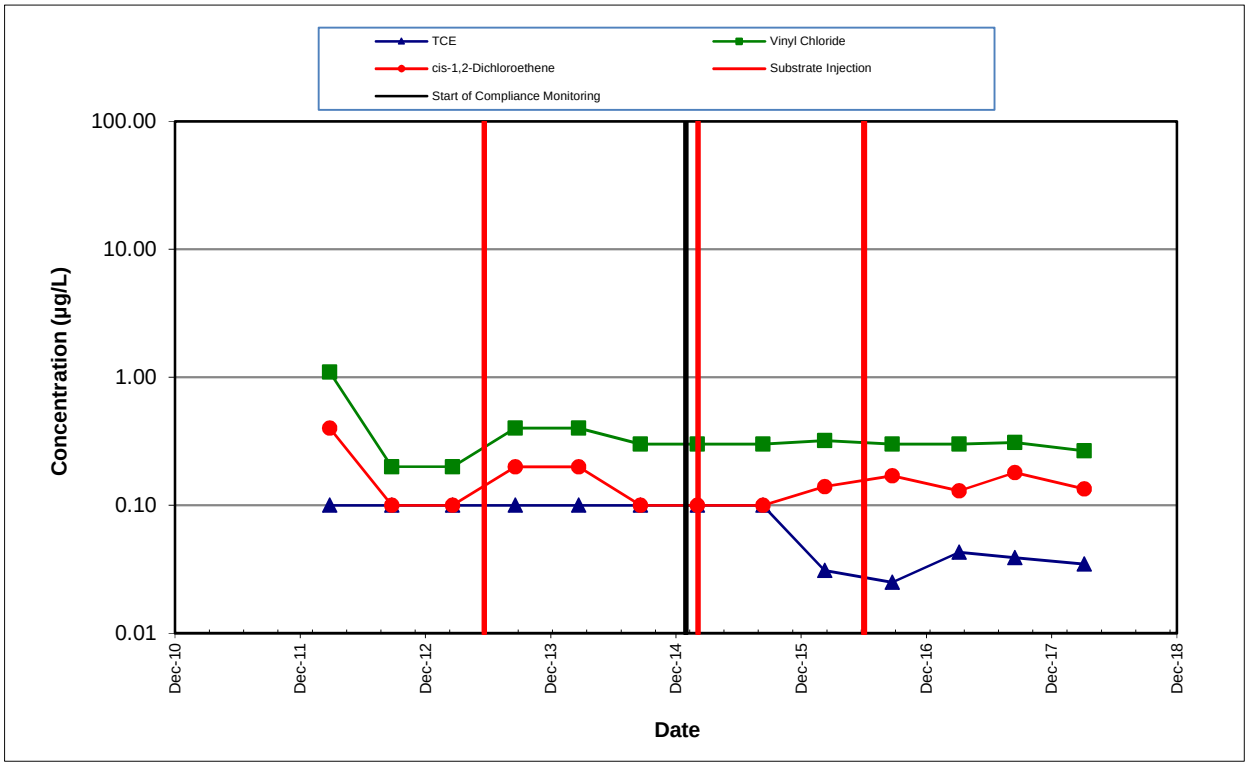


Note: non-detected values shown at one-half the reporting limit. TCE reporting limit raised in August 2013 due to sample dilution.

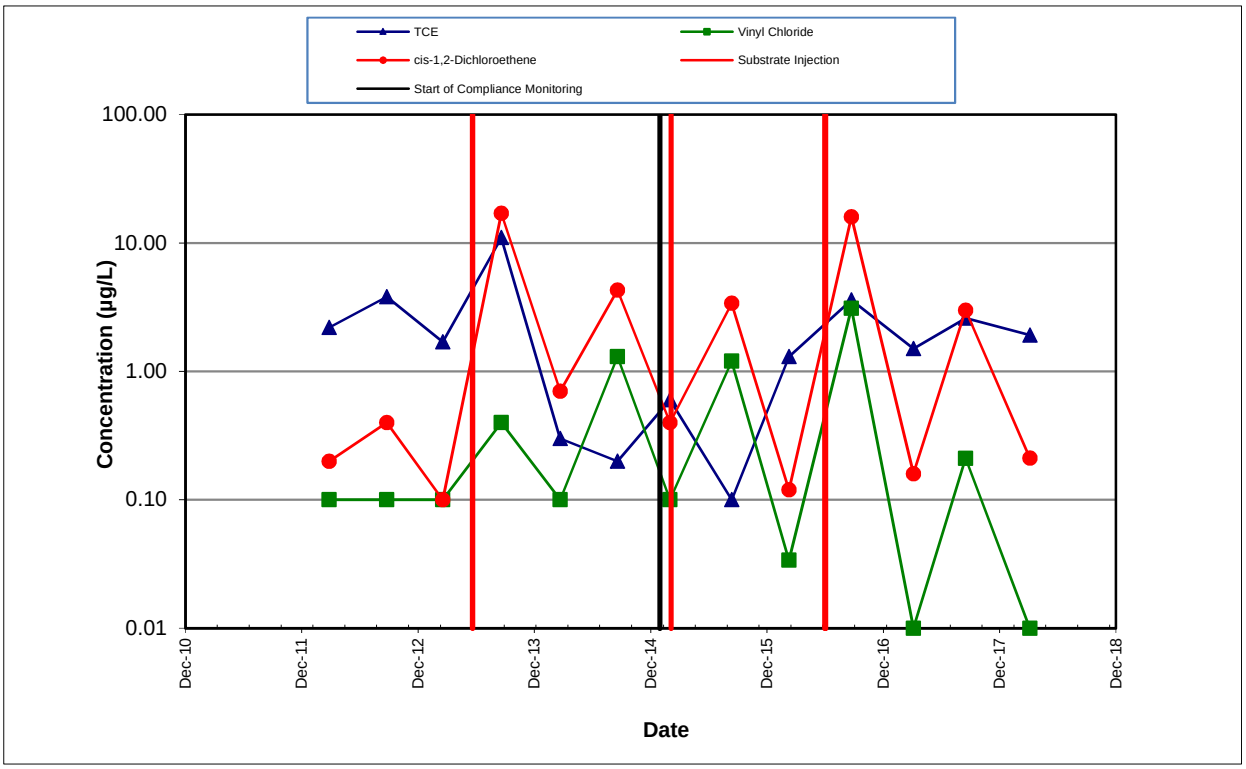
DOWNGRADIENT PLUME AREA WELL GW012S

wood.	AOC-060 TREND PLOTS FOR SOURCE AREA WELL GW009S AND DOWNGRADIENT PLUME AREA WELL GW012S Boeing Renton Facility Renton, Washington	Project No. 8888 Figure **21**

P:\8888 - Boeing Renton\02 Data Management\Grapher and Excel Figure Files\excel\Figures 15 to 17 AOC 60.xls



DOWNGRADIENT PLUME AREA WELL GW014S

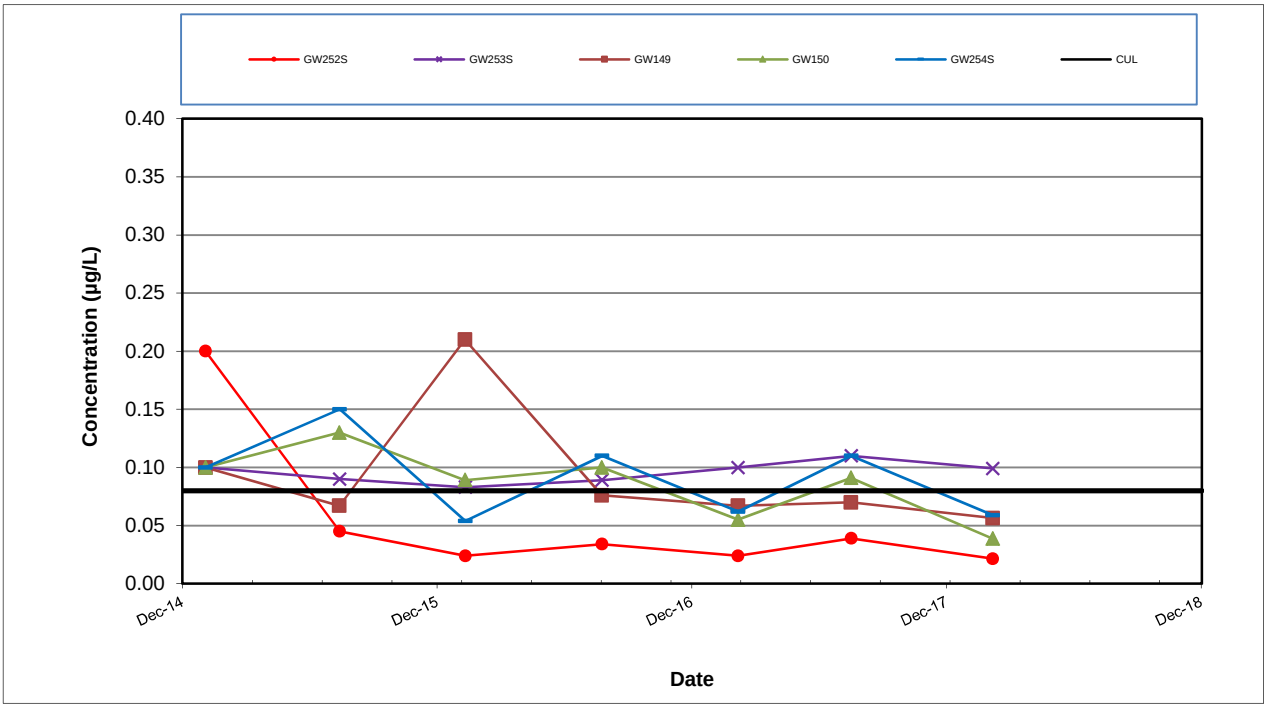


Note: non-detected values shown at one-half the reporting limit

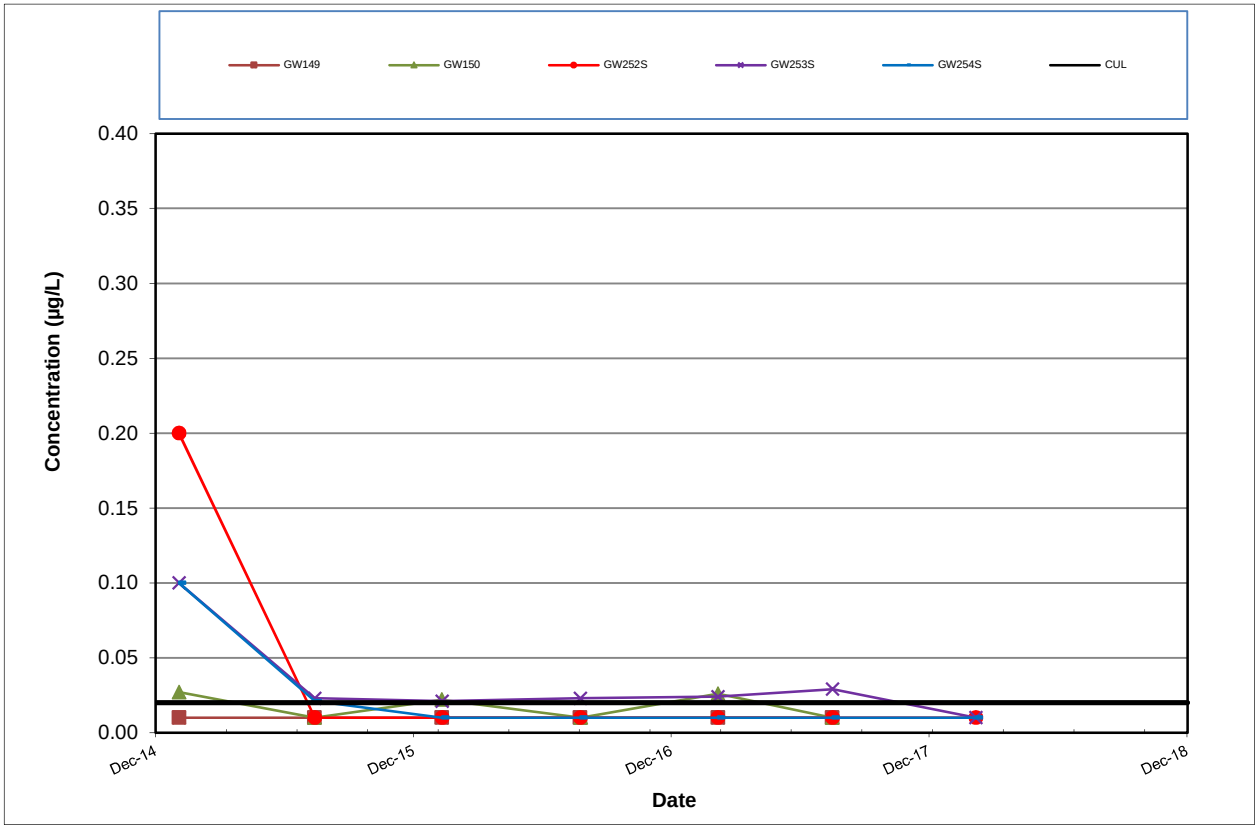
DOWNGRADIENT PLUME AREA WELL GW147S

wood.	AOC-060 TREND PLOTS FOR DOWNGRADIENT PLUME AREA WELLS GW014S AND GW147S Boeing Renton Facility Renton, Washington	Project No. 8888 Figure **22**

P:\8888 - Boeing Renton\02 Data Management\Grapher and Excel Figure Files\excel\Figures 15 to 17 AOC 60.xls



cis-1,2-Dichloroethene

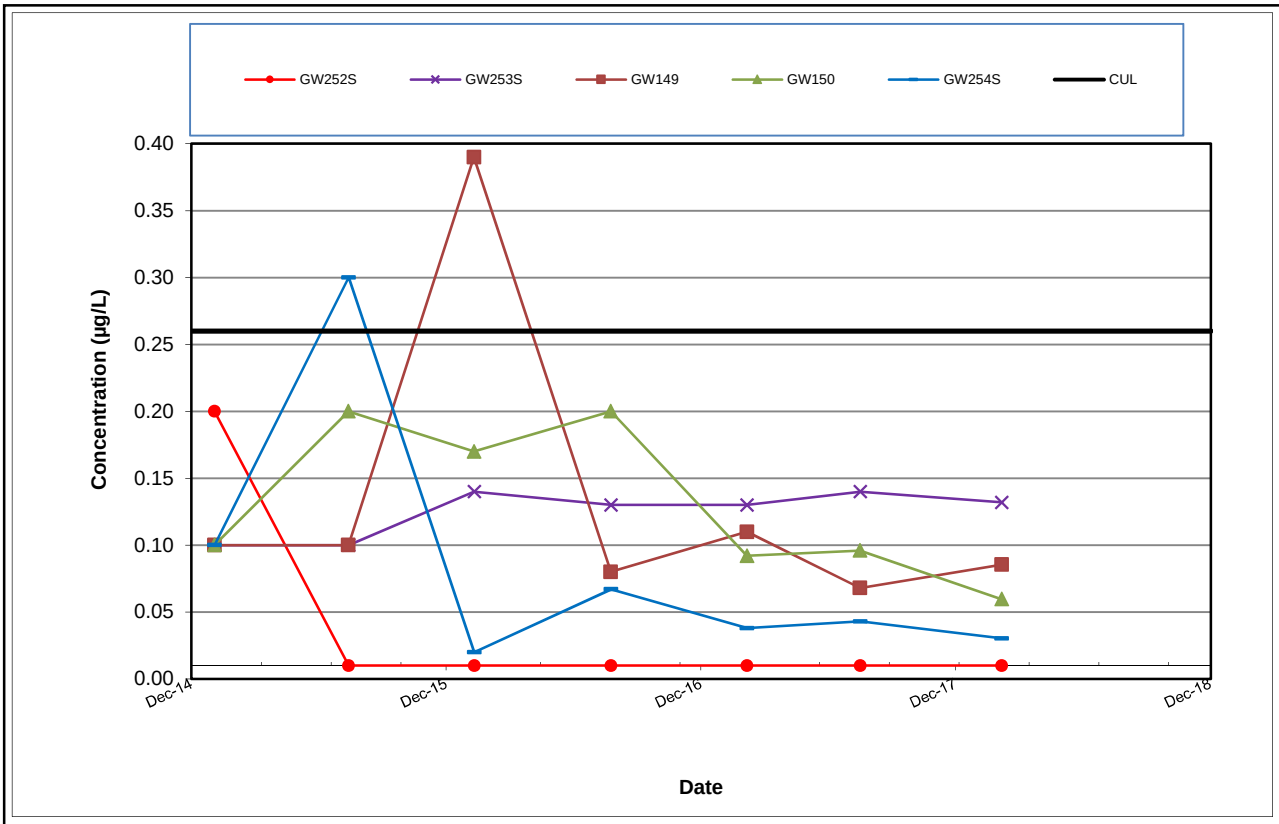


Trichloroethene

wood.	AOC-060 TREND PLOTS FOR *cis*-1,2-DICHLOROETHENE AND TRICHLOROETHENE IN CPOC WELLS Boeing Renton Facility Renton, Washington	Project No. 8888 Figure **23**

Note: CPOC = conditional point of compliance

P:\8888 - Boeing Renton\02 Data Management\Grapher and Excel Figure Files\excel\Figures 15 to 17 AOC 60.xls

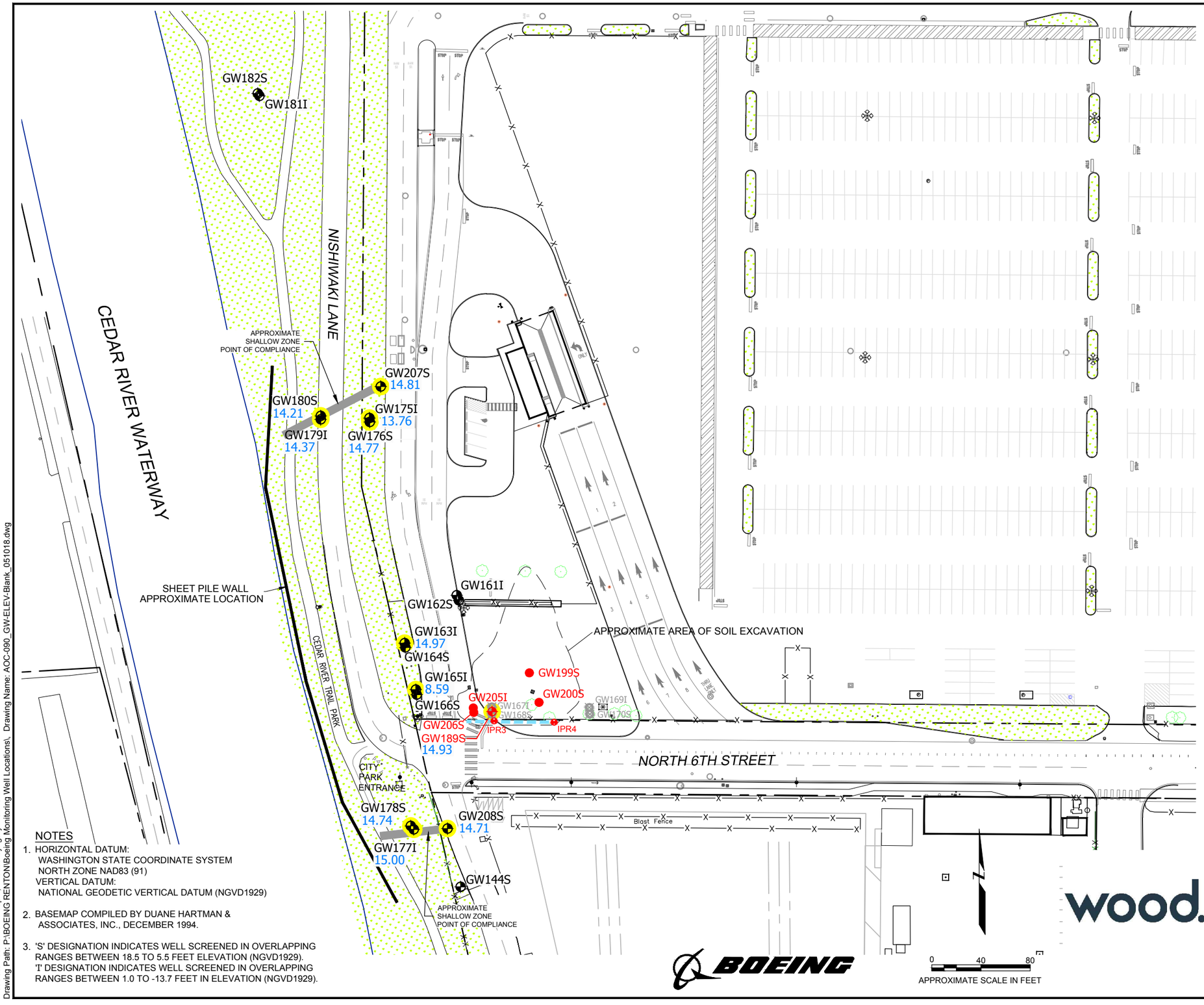


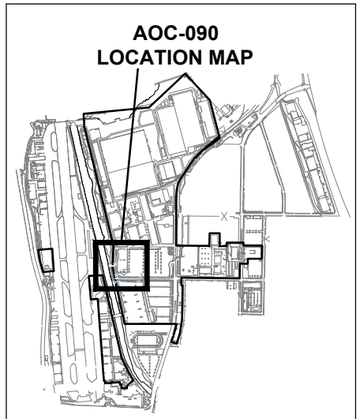
Vinyl Chloride

P:\8888 - Boeing Renton\02 Data Management\Grapher and Excel Figure Files\excel\Figures 15 to 17 AOC 60.xls

wood.	AOC-060 TREND PLOTS FOR CPOC AREA WELLS GW149S AND GW150S Boeing Renton Facility Renton, Washington	Project No. 8888 Figure **24**

Note: CPOC = conditional point of compliance





LEGEND

GW208S 14.97 — MONITORING WELL LOCATION WITH GROUNDWATER ELEVATION (NGVD-FEET)

GROUNDWATER ELEVATION CONTOUR (IN FEET) (DASHED WHERE INFERRED)

GENERAL DIRECTION OF GROUNDWATER FLOW

GW201S — EXISTING ELECTRON DONOR INJECTION WELL

GW189S — EXISTING ELECTRON DONOR INJECTION WELL AND MONITORING WELL

IPR4 — EXISTING INJECTION PIPE RISER

GW170S — ABANDONED MONITORING WELL

APPROXIMATE PROPERTY LINE

FENCE

APPROXIMATE LOCATION OF 4-INCH DIAMETER PERFORATED PIPE

CONDITIONAL POINT OF COMPLIANCE

HIGHLIGHTED WELLS INCLUDED IN MONITORING NETWORK

NOTES

1. HORIZONTAL DATUM:
   WASHINGTON STATE COORDINATE SYSTEM
   NORTH ZONE NAD83 (91)
   VERTICAL DATUM:
   NATIONAL GEODETIC VERTICAL DATUM (NGVD1929)

2. BASEMAP COMPILED BY DUANE HARTMAN & ASSOCIATES, INC., DECEMBER 1994.

3. 'S' DESIGNATION INDICATES WELL SCREENED IN OVERLAPPING RANGES BETWEEN 18.5 TO 5.5 FEET ELEVATION (NGVD1929).
   'I' DESIGNATION INDICATES WELL SCREENED IN OVERLAPPING RANGES BETWEEN 1.0 TO -13.7 FEET IN ELEVATION (NGVD1929).

AOC-090
MONITORING WELL LOCATIONS AND GROUNDWATER ELEVATIONS
MARCH 5, 2018
Boeing Renton Facility
Renton, Washington

By: APS	Date: 05/10/18	Project No. 8888
Wood Environment & Infrastructure Solutions, Inc.		Figure 25

Plot Date: 05/10/18 - 1:19pm Plotted by: gary.maxwell2
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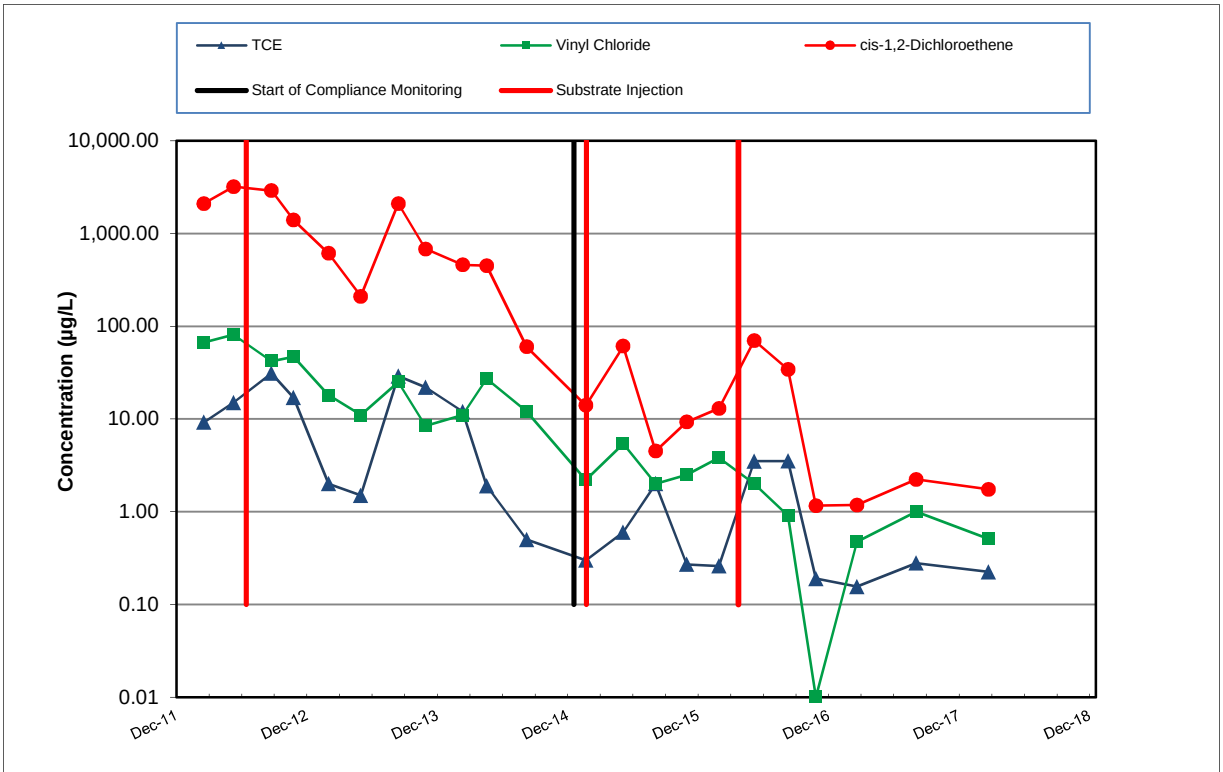
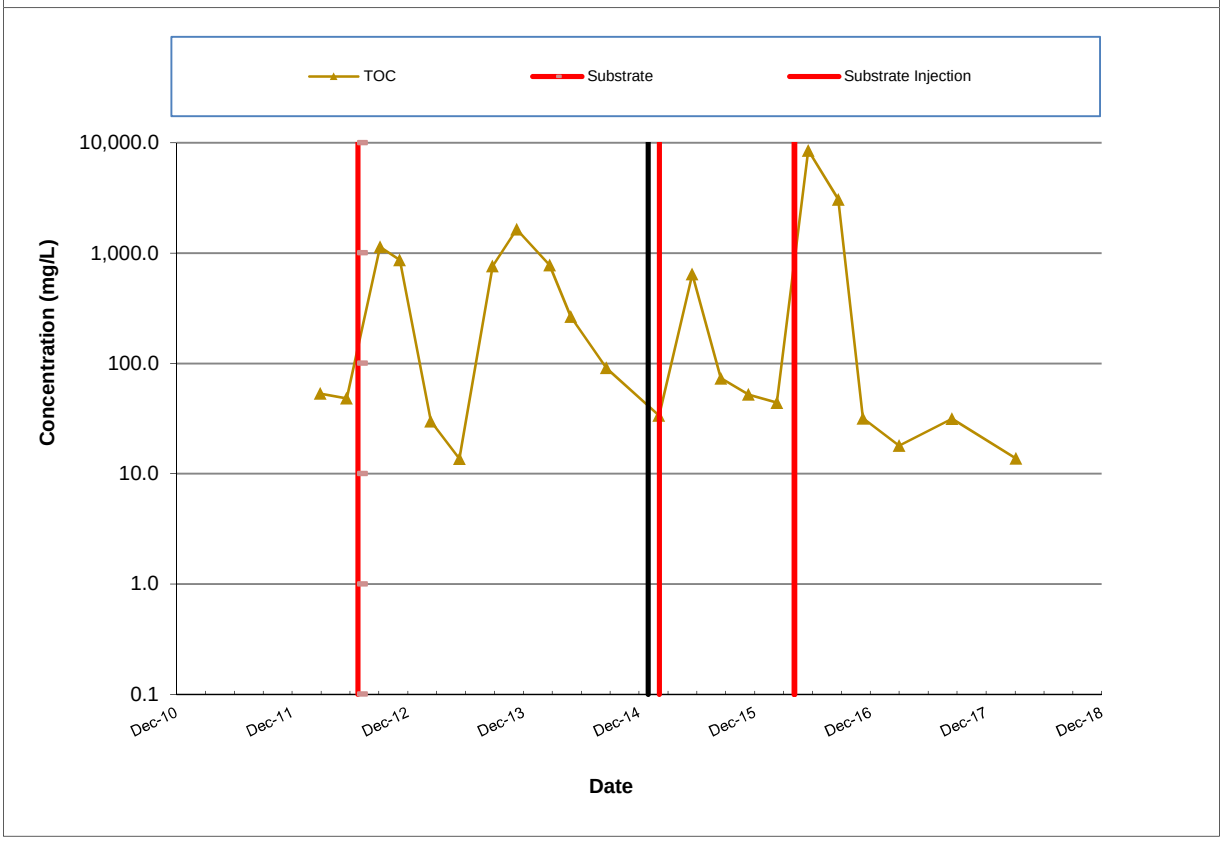
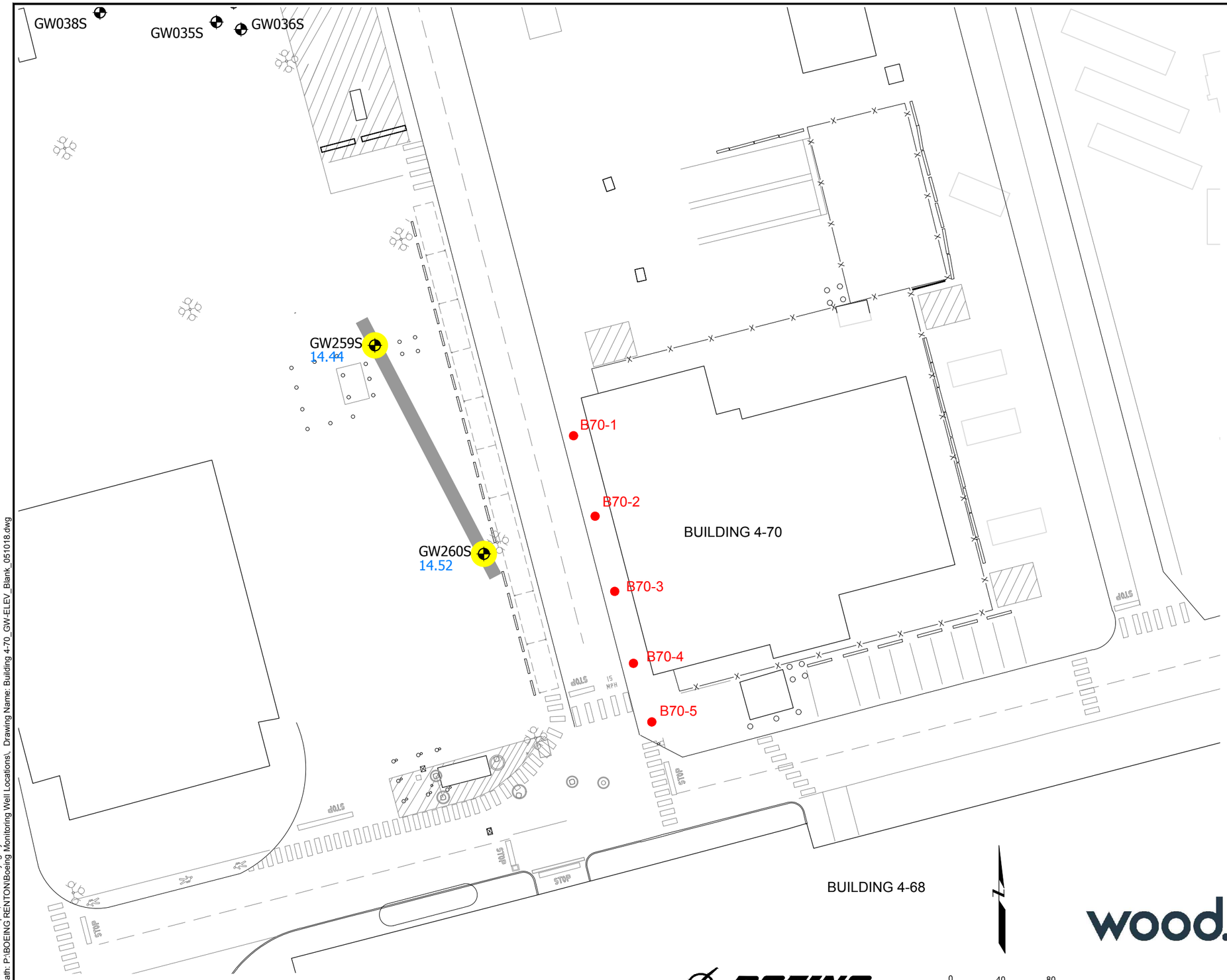


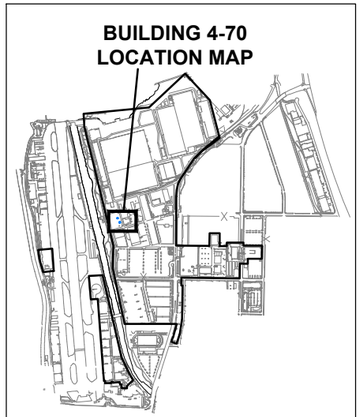


Note: non-detected values shown at one-half the reporting limit

wood.	AOC-090 TREND PLOTS FOR SOURCE AREA WELL GW189S Boeing Renton Facility Renton, Washington	Project No. 8888 Figure 26

P:\8888 - Boeing Renton\02 Data Management\Grapher and Excel Figure Files\excel\Figure 20 AOC-90 Trend Plots.xls





LEGEND

- GW259S 14.52 — MONITORING WELL LOCATION WITH GROUNDWATER ELEVATION (NGVD-FEET)
- B70-2 — ELECTRON DONOR INJECTION WELL
- APPROXIMATE PROPERTY LINE
- FENCE
- CONDITIONAL POINT OF COMPLIANCE

HIGHLIGHTED WELLS INCLUDED IN MONITORING NETWORK

NOTES

1. HORIZONTAL DATUM:
   WASHINGTON STATE COORDINATE SYSTEM
   NORTH ZONE NAD83 (91)
   VERTICAL DATUM:
   NATIONAL GEODETIC VERTICAL DATUM (NGVD1929)
2. BASEMAP COMPILED BY DUANE HARTMAN & ASSOCIATES, INC., DECEMBER 1994.
3. 'S' DESIGNATION INDICATES WELL SCREENED IN OVERLAPPING RANGES BETWEEN 18.5 TO 5.5 FEET ELEVATION (NGVD1929). 'I' DESIGNATION INDICATES WELL SCREENED IN OVERLAPPING RANGES BETWEEN 1.0 TO -13.7 FEET IN ELEVATION (NGVD1929). SEE TABLE 12 FOR ADDITIONAL INFORMATION.

APPROXIMATE SCALE IN FEET: 0 40 80

BUILDING 4-70 MONITORING WELL LOCATIONS AND GROUNDWATER ELEVATIONS MARCH 5, 2018 Boeing Renton Facility Renton, Washington

By: APS	Date: 05/10/18	Project No. 8888
Wood Environment & Infrastructure Solutions, Inc.		Figure 27

Plot Date: 05/10/18 - 2:35pm Plotted by: gary.maxwell2
Drawing Path: P:\BOEING RENTON\Boeing Monitoring Well Locations\ Drawing Name: Building 4-70_GW-ELEV_Blank_051018.dwg

APPENDIX A

Summary of Groundwater Sampling Methodology

TABLE A-1

GROUNDWATER COMPLIANCE MONITORING SCHEDULE
Boeing Renton Facility
Renton, Washington

Cleanup Action Area	Monitoring Frequency[1]		Groundwater Monitoring Wells[2]				Additional Water Level Monitoring Wells[3]	Constituents of Concern[4]	Analyses[5]
	Quarterly	Semiannual	Cross-Gradient Wells	Source Area Wells	Downgradient Plume Wells	CPOC Wells			
SWMU-168		X (1,3)	NA	GW228S[7]	NA	GW229S, GW230I, and GW231S		VC	SW8260C SIM
SWMU-172/SWMU-174	X		NA	GW152S and GW153S	GW081S, GW172S, GW173S, and GW226S	GW232S, GW233I, GW234S, GW235I, and GW236S		*cis*-1,2-DCE, PCE, TCE, VC	SW8260C SIM[6]
								Arsenic, copper, and lead	EPA 6020A
Building 4-78/79 SWMU/AOC Group	X		NA	GW031S, GW033S, GW034S, GW039S, GW243I, and GW244S	GW038S, GW209S, and GW210S	GW143S, GW237S, GW238I, GW239I, GW240D, GW241S, and GW242I		VC, TCE, *cis*-1,2-DCE, benzene	SW8260C[6]
								TPH-gasoline	NWTPH-Gx
Former Fuel Farm SWMU/AOC Group		X (2,4)	NA	GW255S, GW256S, and GW257S	NA	GW183S, GW184S, GW211S,GW212S, GW221S, GW224S, and GW258S		TPH-jet fuel, TPH-diesel	NWTPH-Dx
AOC-001/AOC-002	X (CPOC wells)	X (1,3) (all other wells)	NA	GW193S	GW190S, GW191D, GW192S, and GW246S	GW185S, GW194S, GW195S, GW196D, GW197S, and GW245S		Benzene	SW8260C[6]
								TCE, *cis*-1,2-DCE, 1,1-dichloroethene, VC	SW8260C SIM[6]
AOC-003	X (CPOC wells)	X (1,3) (all other wells)	NA	GW249S	GW188S	GW247S and GW248I		PCE, TCE	SW8260C SIM[6]
								cis-1,2-DCE, VC	
AOC-004		X (1,3)	NA	GW250S	NA	GW174S		Lead	EPA 6020A
AOC-034/AOC-035		X (2,4)	GW216S	GW217S	NA	GW218S and GW251S	GW001S, GW004S, and GW005S	VC, *cis*-1,2-DCE	SW8260C[6]
AOC-060		X (1,3)	GW012S and GW014S	GW009S	GW147S	GW149S, GW150S, GW252S, GW253I, and GW254S	GW010S and GW011D	VC	SW8260C SIM[6]
								TCE, *cis*-1,2-DCE	
AOC-090		X (1,3)	NA	GW189S	GW175I and GW176S	GW163I, GW165I, GW177I, GW178S, GW179I, GW180S, GW207S, and GW208S		1,1,2-Trichloroethane, acetone, benzene, toluene, carbon tetrachloride, chloroform, *cis*-1,2-DCE, *trans*-1,2-DCE, methylene chloride	SW8260C[6]
								1,1-Dichloroethene, 1,1,2,2-tetrachloroethane, VC, PCE, TCE	SW8260C SIM[6]
								TPH-gasoline	NWPTH-Gx
								TPH-diesel, TPH-motor oil	NWTPH-Dx
Building 4-70 Area		X (1,3)	NA	NA	NA	GW259S and GW260S		TCE, *cis*-1,2-DCE, VC	SW8260C[6]
Lot 20/Former Building 10-71		X (2,4)	NA	10-71-MW1, 10-71-MW2, and 10-71-MW4	NA	NA		Toluene, cis-1,2-DCE, TCE, VC	SW8260C[6]
Apron A		X (2,4)	NA	GW262S and GW264S	NA	NA		*cis*-1,2-DCE and VC	SW8260C[6]

Notes:
1. The EDR presents the groundwater monitoring frequency for each SWMU/AOC. For sites with semiannual monitoring frequency, specific quarters when monitoring will be conducted is indicated by 1 for quarter 1, 2 for quarter 2, etc.
2. Groundwater monitoring wells are also monitored for groundwater levels.
3. Additional wells are monitored for groundwater levels only.
4. In addition to COCs, primary geochemical indicators will be monitored during each regular monitoring event. Geochemical indicators are listed in Table A-2.
5. Details of analytical methods are specified in the Quality Assurance Project Plan, which is Appendix E to the Cleanup Action Plan (AMEC, 2012).
6. SIM methods will be used if the cleanup level is lower than the reporting limit achieved by the conventional 8021, 8260 or 8270 method. If cleanup levels become higher or if the conventional 8021, 8260 or 8270 methods are updated and able to achieve reporting limits below the cleanup levels, then the conventional method rather than the SIM method will be used.
7. GW228S will not be monitored on a semiannual basis - only the CPOC wells will be monitored on a semiannual basis for SWMU-168.

Abbreviations:
AOC = area of concern
cis-1,2-DCE = *cis*-1,2 dichloroethene
COCs = constituents of concern
CPOC = conditional point of compliance
Cr = chromium
EDR = Engineering Design Report
EPA = Environmental Protection Agency
NA = not applicable
PCE = tetrachloroethene
SIM = selected ion monitoring
SWMU = solid waste management unit
TCE = trichloroethene
TPH = total petroleum hydrocarbons
trans-1,2-DCE = *trans*-1,2 dichloroethene
VC = vinyl chloride
VOCs = volatile organic compounds

TABLE A-2

MONITORED NATURAL ATTENUATION/MONITORED ATTENUATION SCHEDULE
Boeing Renton Facility
Renton, Washington

Cleanup Action Area	Groundwater Monitoring Wells				Primary Geochemical Parameters[2]		
					Indicators	Monitoring Frequency[3]	
	Cross-Gradient Wells	Source Area Wells	Downgradient Plume Wells	CPOC Wells		Quarterly	Semiannual
SWMU-168	NA	GW228S[4]	NA	GW229S, GW230I, and GW231S	Dissolved oxygen, pH, ORP, temperature, specific conductance		X (1,3)
SWMU-172/SWMU-174	NA	GW152S and GW153S	GW081S, GW172S, GW173S, and GW226S	GW232S, GW233I, GW234S, GW235I, and GW236S	Dissolved oxygen, pH, ORP, temperature, specific conductance, TOC	X	
Building 4-78/79 SWMU/AOC Group	NA	GW031S, GW033S, GW034S, GW039S, GW243I, and GW244S	GW038S, GW209S, and GW210S	GW143S, GW237S, GW238I, GW239I, GW240D, GW241S, and GW242I	Dissolved oxygen, pH, ORP, temperature, specific conductance in all wells, TOC in all wells except GW241S and GW242I	X	
Former Fuel Farm SWMU/AOC Group	NA	GW255S, GW256S, and GW257S	NA	GW183S, GW184S, GW211S,GW212S, GW221S, GW224S, and GW258S	Dissolved oxygen, pH, ORP, temperature, specific conductance		X (2,4)
AOC-001/AOC-002	NA	GW193S	GW190S, GW191D, GW192S, and GW246S	GW185S, GW194S, GW195S, GW196D, GW197S, and GW245S	Dissolved oxygen, pH, ORP, temperature, specific conductance, TOC	X (CPOC wells)	X (1,3) (all other wells)
AOC-003	NA	GW249S	GW188S	GW247S and GW248I	Dissolved oxygen, pH, ORP, temperature, specific conductance, TOC	X (CPOC wells)	X (1,3) (all other wells)
AOC-004	NA	GW250S	NA	GW174S	Dissolved oxygen, pH, ORP, temperature, specific conductance		X (1,3)
AOC-034/AOC-035	GW216S	GW217S	NA	GW218S and GW251S	Dissolved oxygen, pH, ORP, temperature, specific conductance		X (2,4)
AOC-060	GW012S and GW014S	GW009S	GW147S	GW149S, GW150S, GW252S, GW253I, and GW254S	Dissolved oxygen, pH, ORP, temperature, specific conductance, TOC		X (1,3)
AOC-090	NA	GW189S	GW175I and GW176S	GW163I, GW165I, GW177I, GW178S, GW179I, GW180S, GW207S, and GW208S	Dissolved oxygen, pH, ORP, temperature, specific conductance, TOC [5]		X (1,3)
Building 4-70 Area	NA	NA	NA	GW259S and GW260S	Dissolved oxygen, pH, ORP, temperature, specific conductance, TOC		X (1,3)
Apron A	NA	GW262S and GW264S	NA	NA	Dissolved oxygen, pH, ORP, temperature, specific conductance, TOC		X (2,4)

Notes:
1. In addition to COCs listed in Table A-1, primary geochemical indicators will be monitored during each regular monitoring event.
2. All primary geochemical indicators except TOC are monitored in the field during sampling. TOC is analyzed in the laboratory following methods specified in the Quality Assurance Project Plan, which is Appendix E to the Cleanup Action Plan (AMEC, 2012).
   The primary geochemical indicators differ slightly depending on whether the site is a fuel-related site or a solvent-related site.
   At a fuel related site, TOC is not necessary; at a solvent-related site, TOC is a measure of how much electron donor remains present.
3. The EDR presents the groundwater monitoring frequency for each SWMU/AOC. For sites with semiannual monitoring frequency, specific quarters when monitoring will be conducted is indicated by 1 for quarter 1, 2 for quarter 2, etc.
4. Primary geochemical parameters will not be collected at GW228S - only at CPOC wells that are sampled semiannually.

Abbreviations:
AOC = area of concern
COCs = constituents of concern
CPOC = conditional point of compliance
EDR = Engineering Design Report
NA = not applicable
ORP = oxidation reduction potential
SWMU = solid waste management unit
TOC = total organic carbon

APPENDIX B

Field Forms

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly March 2018 | Date/Time: 3/ 5 /2018@ 730
Sample Number: RGW229S- 180305 | Weather: 40s Cloudy
Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES or NO) | Damaged (YES or NO) | Describe:
DTW Before Purging (ft) 7.7 | Time: 700 | Flow through cell vol. | GW Meter No.(s HERON2
Begin Purge: Date/Time: 3/ /2018 @ 703 | End Purge: Date/Time: 3/ 5 /2018 @ 726 | Gallons Purged: 0.5
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
706	8.9	211.6	0.81	5.6	38	LOW-MED			
709	8.9	206.2	0.54	5.65	29.3				
712	8.9	202	0.45	5.73	17.4				
715	8.7	194.1	0.76	5.86	-0.2				
718	8.6	186	1.12	5.92	-7.9				
721	8.6	190.4	1.15	5.93	-10				
724	8.6	182.6	1.3	5.95	-13				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☐ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): GRAY SLIGHTLY TURBID NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	8.7	191	1.31	5.96	-14.1				
2	8.6	185.9	1.35	5.97	-14.9				
3	8.7	195.4	1.38	5.97	-15.7				
4	8.7	189	1.4	5.98	-16.5				
Average:	8.7	190.3	1.36	5.97	-15.3	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
3	(8260C SIM VC) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
	(COD) (TOC SM5310C) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):
Comments: DTW BEYOND PUMP
Signature: SRB | Date: 3/5/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly March 2018 | Date/Time: 3/ 5 /2018@ 800
Sample Number: RGW230I- 180305 | Weather: 40s Cloudy
Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES or NO) | Damaged (YES or NO) | Describe:
DTW Before Purging (ft) 6.9 | Time: 715 | Flow through cell vol. | GW Meter No.(s HERON2
Begin Purge: Date/Time: 3/ 5 /2018 @ 734 | End Purge: Date/Time: 3/ 5 /2018 @ 755 | Gallons Purged: 0.5
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
737	10.3	214.5	0.64	6.34	-74	LOW	6.9		
740	10.2	213.8	0.78	6.36	-76.6		6.9		
743	10.5	208.5	1.23	6.37	-84.4		6.9		
746	10.4	208.7	1.14	6.36	-84.6				
749	10.5	208.7	1.36	6.36	-86.5				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☐ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): CLEAR COLORLESS NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	10.5	208.9	1.32	6.35	-86.6				
2	10.5	209	1.41	6.37	-87.5				
3	10.5	208	1.51	6.36	-88.1				
4	10.5	208	1.61	6.37	-88.6				
Average:	10.5	208.5	1.46	6.36	-87.7	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
3	(8260C SIM VC) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
	(COD) (TOC SM5310C) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):
Comments:

Signature: SRB | Date: 3/5/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly March 2018 | Date/Time: 3/ 5 /2018@ 830
Sample Number: RGW231S- 180305 | Weather: 40s Cloudy
Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES or NO) | Damaged (YES or NO) | Describe:
DTW Before Purging (ft) 6.69 | Time: 745 | Flow through cell vol. | GW Meter No.(s HERON2
Begin Purge: Date/Time: 3/ /2018 @ 800 | End Purge: Date/Time: 3/ 5 /2018 @ 818 | Gallons Purged: 0.5
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
803	9.5	200	1.7	6.35	-7.3	MED	6.69		
806	9.5	193.3	1.3	6.37	-18.7	LOW-MED	6.69		
809	9.7	191.6	1.1	6.39	-24.2		6.69		
812	9.8	191.7	1.09	6.41	-25.6				
815	9.8	191.7	1.12	6.41	-25.5				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☐ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): GRAY SLIGHTLY TURBID NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	9.8	191.6	1.14	6.4	-25				
2	9.8	191.7	1.14	6.41	-25.3				
3	9.8	191.7	1.15	6.41	-25				
4	9.8	191.7	1.15	6.4	-25				
Average:	9.8	191.7	1.15	6.41	-25.1	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
3	(8260C SIM VC) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
	(COD) (TOC SM5310C) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):
Comments:

Signature: SRB | Date: 3/5/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly March 2018 | Date/Time: 3/ 5 /2018@ 911
Sample Number: RGW081S- 180305 | Weather: 30'S, CLOUDY
Landau Representative: JHA/JKG

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES or NO) | Damaged (YES or NO) | Describe:
DTW Before Purging (ft) 8.21 | Time: 843 | Flow through cell vol. | GW Meter No.(s HERON 3
Begin Purge: Date/Time: 3/ 5 /2018 @ 844 | End Purge: Date/Time: 3/ 5 /2018 @ 905 | Gallons Purged: 0.25
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
847	11.8	169.6	1.94	6.48	-0.6		8.21		
850	12.2	183.1	0.74	6.46	-3.1		8.21		
853	12.4	188.2	0.46	6.51	-9.3		8.21		
856	12.6	190.3	0.36	6.53	-16.6				
859	12.6	190.5	0.33	6.53	-23.0				
902	12.8	191.1	0.39	6.53	-27.7				
904	12.9	191.9	0.46	6.54	-31.3				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): CLEAR WITH A FEW PARTICULATES, COLORLESS, NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	12.9	192.1	0.48	6.53	-32.3				
2	12.9	192.1	0.47	6.53	-32.6				
3	12.9	192.1	0.47	6.53	-32.9				
4	12.9	192.0	0.47	6.53	-33.1				
Average:	12.9	192.1	0.47	6.53	-32.7	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
3	(8260-SIM) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX) WA ☐ OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) WA ☐ OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)
1	(COD) (TOC5310C) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)
1	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):
Comments:

Signature: JHA | Date: 3/5/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly March 2018 | Date/Time: 3/ 5 /2018@ 1051
Sample Number: RGW152S- 180305 | Weather: 30'S, CLOUDY
Landau Representative: JHA/JKG

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES or NO) | Damaged (YES or NO) | Describe:
DTW Before Purging (ft): 8.68 | Time: 1021 | Flow through cell vol. | GW Meter No.(s HERON 3
Begin Purge: Date/Time: 3/ 5 /2018 @ 1029 | End Purge: Date/Time: 3/ 5 /2018 @ 1042 | Gallons Purged: 0.25
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
1032	12.1	130.1	1.66	6.30	-23.2	LOW	8.68	<0.25	
1035	12.3	132.0	1.14	6.30	-24.8		8.68		
1038	12.3	131.5	1.11	6.29	-23.7		8.68		
1041	12.3	131.1	1.12	6.27	-22.5				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): CLOUDY, COLORLESS, NO.NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	12.3	131.0	1.12	6.27	-22.0				
2	12.2	131.0	1.13	6.26	-21.8				
3	12.3	131.0	1.12	6.27	-21.7				
4	12.3	131.0	1.11	6.26	-21.4				
Average:	12.3	131.0	1.12	6.27	-21.7	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
3	(8260-SIM) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
1	(COD) (TOC5310C) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
1	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s): Duplicate Location (DUP1)
Comments:

Signature: JHA | Date: 3/5/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly March 2018 | Date/Time: 3/ 5 /2018@ 800
Sample Number: RGWDUP1 180305 | Weather: 30'S, CLOUDY
Landau Representative: JHA/JKG

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES or NO) | Damaged (YES or NO) | Describe:
DTW Before Purging (ft) | Time: | Flow through cell vol. | GW Meter No.(s HERON 3
Begin Purge: Date/Time: 3/ 5 /2018 @ | End Purge: Date/Time: 3/ 5 /2018 @ | Gallons Purged:
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
	Purge Goals: Stablization of Parameters for three consecutive readings within the following limits							**>/= 1 flow through cell**	
	+/- 3%	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**		

DUPLICATE TO RGW152S

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ☐ Pump/Pump Type
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ☐ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☐ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.):

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	12.4	131.0	1.13	6.26	-21.3				
2	12.4	131.0	1.15	6.27	-21.0				
3	12.4	131.0	1.15	6.27	-21.1				
4	12.4	131.0	1.14	6.26	-20.9				
Average:	12.4	131.0	1.14	6.27	-21.1	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
3	(8260-SIM) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
1	(COD) (TOC5310C) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
1	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s): Duplicate to RGW152S
Comments:

Signature: JHA | Date: 3/5/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly March 2018 | Date/Time: 3/ 5 /2018@ 1026
Sample Number: RGW153S- 180305 | Weather: 30'S, CLOUDY
Landau Representative: JHA/JKG

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES or NO) | Damaged (YES or NO) | Describe:
DTW Before Purging (ft): 8.96 | Time: 956 | Flow through cell vol. | GW Meter No.(s HERON 3
Begin Purge: Date/Time: 3/ 5 /2018 @ 1004 | End Purge: Date/Time: 3/ 5 /2018 @ 1025 | Gallons Purged: 0.5
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
1007	13.2	210.1	1.32	6.38	-24.8		8.96		
1010	13.5	223.1	1.02	6.51	-35.6		8.97		
1013	13.5	220.8	1.07	6.53	-42.9		8.99		
1016	13.5	216.8	1.13	6.53	-47.1				
1019	13.4	213.4	1.19	6.53	-50.4				
1022	13.5	209.9	1.23	6.53	-52.4				
1024	13.4	207.6	1.25	6.51	-52.7				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): CLOUDY, COLORLESS, NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	13.4	207.2	1.25	6.51	-52.7				
2	13.4	206.7	1.27	6.51	-53.1				
3	13.5	206.4	1.26	6.51	-53.3				
4	13.5	206.2	1.25	6.51	-53.3				
Average:	13.5	206.6	1.26	6.51	-53.1	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
3	(8260-SIM) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
1	(COD) (TOC5310C) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
1	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):
Comments:

Signature: JHA | Date: 3/5/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name:	Boeing Renton	Project Number:	0025217.099.099
Event:	Quarterly March 2018	Date/Time:	3/ 5 /2018@ 1126
Sample Number:	RGW172S- 180305	Weather:	40'S, PARTLY SUNNY
Landau Representative:	JHA/JKG		

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES or NO) Damaged (YES or NO) Describe:

DTW Before Purging (ft) 8.92 Time: 1051 Flow through cell vol. GW Meter No.(s HERON 3

Begin Purge: Date/Time: 3/ 5 /2018 @ 1103 End Purge: Date/Time: 3/ 5 /2018 @ 1124 Gallons Purged: 0.25

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
1106	12.4	218.6	0.45	6.36	8.0		8.92		
1109	12.0	215.6	0.29	6.39	-5.4		8.92		
1112	12.1	214.8	0.26	6.44	-16.3				
1115	12.2	213.8	0.30	6.49	-27.6				
1118	12.1	212.3	0.34	6.51	-33.5				
1121	12.1	210.3	0.41	6.52	-39.4				
1123	12.0	208.6	0.48	6.53	-42.6				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): CLOUDY WITH SOME PARTICULATES, COLORLESS, NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	12.0	208.6	0.50	6.53	-43.0				
2	12.1	208.4	0.48	6.53	-43.4				
3	12.1	208.4	0.49	6.52	-43.6				
4	12.0	207.7	0.52	6.53	-44.3				
Average:	12.1	208.3	0.50	6.53	-43.6	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
3	(8260-SIM) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
1	(COD) (TOC5310C) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
1	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):

Comments:

Signature: JHA Date: 3/5/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly March 2018 | Date/Time: 3/ 5 /2018@ 936
Sample Number: RGW173S- 180305 | Weather: 30'S, CLOUDY
Landau Representative: JHA/JKG

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES or NO) | Damaged (YES or NO) | Describe:
DTW Before Purging (ft) 8.92 | Time: 912 | Flow through cell vol. | GW Meter No.(s HERON 3
Begin Purge: Date/Time: 3/ 5 /2018 @ 913 | End Purge: Date/Time: 3/ 5 /2018 @ 934 | Gallons Purged: 0.25
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
916	10.9	289.5	1.40	6.52	-24.2	MEDIUM	8.92		
919	10.1	234.0	0.94	6.56	-29.3				
922	9.8	225.4	0.89	6.58	-31.2		8.93		
925	9.1	218.0	1.01	6.57	-32.2				
928	9.9	214.7	0.90	6.57	-33.5		8.95		
931	10.4	212.6	0.93	6.60	-35.5				
933	10.5	210.3	0.96	6.60	-36.8				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): TURBOD, ORANGE TINT, NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	10.5	210.0	0.96	6.60	-37.0				
2	10.5	209.8	0.96	6.60	-37.3				
3	10.5	209.4	0.97	6.61	-37.2				
4	10.5	209.2	0.98	6.60	-37.2				
Average:	10.5	209.6	0.97	6.60	-37.2	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
3	(8260-SIM) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
1	(COD) (TOC5310C) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
1	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
1	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):
Comments:

Signature: JHA | Date: 3/5/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly March 2018 | Date/Time: 3/ 5 /2018@ 1001
Sample Number: RGW226S- 180305 | Weather: 30'S, CLOUDY
Landau Representative: JHA/JKG

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES or NO) | Damaged (YES or NO) | Describe:
DTW Before Purging (ft): 8.59 | Time: 932 | Flow through cell vol. | GW Meter No.(s HERON 3
Begin Purge: Date/Time: 3/ 5 /2018 @ 936 | End Purge: Date/Time: 3/ 5 /2018 @ 957 | Gallons Purged: 0.25
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
939	11.8	233.2	1.62	6.35	-11.6	LOW		<0.25	
942	11.6	233.6	1.43	6.41	-20.7		8.62		
945	11.5	234.9	1.10	6.52	-33.4				
948	11.6	223.5	1.13	6.54	-40.7		8.62	0.25	
951	11.5	215.8	1.17	6.54	-45.3				
954	11.6	210.5	1.20	6.54	-48.8		8.59		
956	11.8	209.0	1.22	6.54	-50.8				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): CLEAR WITH SOME PARTICULATES, COLORLESS, NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	11.8	208.5	1.21	6.54	-50.9				
2	11.8	208.5	1.22	6.54	-51.2				
3	11.8	208.1	1.23	6.54	-51.3				
4	11.8	208.0	1.23	6.54	-51.7				
Average:	11.8	208.3	1.22	6.54	-51.3	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
3	(8260-SIM) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX) WA ☐ OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) WA ☐ OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)
1	(COD) (TOC5310C) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)
1	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):
Comments:

Signature: JHA | Date: 3/5/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name:	Boeing Renton	Project Number:	0025217.099.099
Event:	Quarterly March 2018	Date/Time:	3/ 5 /2018@ 751
Sample Number:	RGW232S- 180305	Weather:	30'S, CLOUDY
Landau Representative:	JHA/JKG		

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES or NO) Damaged (YES or NO) Describe:

DTW Before Purging (ft) 7.44 Time: 716 Flow through cell vol. GW Meter No.(s HERON 3

Begin Purge: Date/Time: 3/ 5 /2018 @ 730 End Purge: Date/Time: 3/ 5 /2018 @ 746 Gallons Purged: 0.25

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
733	9.4	405.1	1.65	6.16	14.3	LOW	7.54	<0.25	AT LOWEST SETTING
736	8.6	384.4	1.89	6.21	-10.0			<0.25	
739	8.4	378.6	2.11	6.21	-19.0		7.86		TURN PUMP OFF
742	8.4	377.6	2.17	6.21	-21.6		7.86	<0.25	PUMP ON
745	8.2	375.3	2.31	6.20	-26.5		7.88		

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): CLEAR WITH SOME SUSPENDED SOLIDS, COLORLESS, NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	8.2	375.0	2.33	6.20	-27.1				
2	8.2	374.8	2.33	6.20	-27.4				
3	8.2	374.6	2.34	6.19	-27.7				
4	8.2	374.5	2.34	6.19	-27.9				
Average:	8.2	374.7	2.34	6.20	-27.5	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
3	(8260-SIM) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
1	(COD) (TOC5310C) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
1	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
1	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):

Comments: HORRIBLE DRAWDOWN AND RECHARGE. PUMPING AT PUMP'S LOWEST SETTING.

Signature: JHA Date: 3/5/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly March 2018 | Date/Time: 3/ 5 /2018@ 726
Sample Number: RGW233I- 180305 | Weather: 30'S, CLOUDY
Landau Representative: JHA/JKG

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES or NO) | Damaged (YES or NO) | Describe:
DTW Before Purging (ft) 7.04 | Time: 658 | Flow through cell vol. | GW Meter No.(s HERON 3
Begin Purge: Date/Time: 3/ 5 /2018 @ 703 | End Purge: Date/Time: 3/ 5 /2018 @ 725 | Gallons Purged: 0.25
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
706	11.3	177.3	0.44	6.36	120.9	LOW		<0.25	
709	10.6	171.5	0.43	5.82	120.9		7.04		
712	9.6	168.4	0.55	5.81	103.9		7.04	<0.25	
715	8.4	161.4	0.75	5.85	78.0				
718	7.7	156.7	0.95	5.85	66.7		7.04		
721	7.2	153.8	1.12	5.85	61.0				
724	7.0	152.1	1.25	5.87	55.5				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): CLEAR, COLORLESS, NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	6.9	151.9	1.23	5.87	54.5				
2	6.9	151.8	1.23	5.87	53.9				
3	6.9	151.7	1.20	5.88	53.4				
4	6.8	151.6	1.20	5.88	53.0				
Average:	6.9	151.8	1.22	5.88	53.7	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
3	(8260-SIM) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
1	(COD) (TOC5310C) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
1	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s): MSMSD Location
Comments:

Signature: JHA | Date: 3/5/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name:	Boeing Renton	Project Number:	0025217.099.099
Event:	Quarterly March 2018	Date/Time:	3/ 5 /2018@ 1151
Sample Number:	RGW234S- 180305	Weather:	40'S, PARTLY SUNNY
Landau Representative:	JHA/JKG		

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES or NO) Damaged (YES or NO) Describe:

DTW Before Purging (ft) 7.51 Time: 1114 Flow through cell vol. GW Meter No.(s HERON 3

Begin Purge: Date/Time: 3/ 5 /2018 @ 1129 End Purge: Date/Time: 3/ 5 /2018 @ 1150 Gallons Purged: 0.75

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
1132	11.6	202.4	0.91	6.30	-22.6	MED	7.51	<0.25	
1135	11.7	208.1	0.87	6.32	-24.0		7.51		
1138	11.7	208.1	0.94	6.32	-23.7		7.51	0.25	
1141	11.7	205.1	1.06	6.32	-23.4				
1144	11.7	201.6	1.18	6.31	-22.7		7.51	0.5	
1147	11.7	200.7	1.23	6.30	-22.1				
1149	11.6	200.0	1.33	6.30	-21.2				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): CLOUDY, COLORLESS, NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	11.6	199.9	1.34	6.30	-21.3				
2	11.6	199.9	1.33	6.30	-21.1				
3	11.6	199.8	1.34	6.30	-21.3				
4	11.6	199.8	1.35	6.30	-21.1				
Average:	11.6	199.9	1.34	6.30	-21.2	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
3	(8260-SIM) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
1	(COD) (TOC5310C) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
1	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):

Comments:

Signature: JHA Date: 3/5/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly March 2018 | Date/Time: 3/ 5 /2018 @ 1221
Sample Number: RGW235I- 180305 | Weather: 40'S, CLOUDY
Landau Representative: JHA/JKG

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES or NO) | Damaged (YES or NO) | Describe:
DTW Before Purging (ft) 7.26 | Time: 1146 | Flow through cell vol. | GW Meter No.(s HERON 3
Begin Purge: Date/Time: 3/ 5 /2018 @ 1159 | End Purge: Date/Time: 3/ 5 /2018 @ 1220 | Gallons Purged: 0.5
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
1202	10.4	117.9	2.55	6.60	-15.5		7.26		
1205	10.3	120.2	2.11	6.54	-14.5				
1208	10.2	125.8	1.79	6.51	-12.9		7.26		
1211	10.2	126.5	1.37	6.51	-13.8				
1214	10.2	124.8	1.04	6.56	-17.0				
1217	10.2	124.0	0.99	6.58	-18.9		7.26		
1219	10.2	123.4	0.96	6.59	-20.5				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): CLOUDY, LIGHT BROWN TINT, NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	10.2	123.3	0.95	6.59	-20.7				
2	10.2	123.2	0.94	6.59	-20.9				
3	10.2	123.1	0.95	6.60	-21.1				
4	10.2	123.0	0.94	6.60	-21.2				
Average:	10.2	123.2	0.95	6.60	-21.0	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
3	(8260-SIM) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
1	(COD) (TOC5310C) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
1	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):
Comments:
Signature: JHA | Date: 3/5/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name:	Boeing Renton	Project Number:	0025217.099.099
Event:	Quarterly March 2018	Date/Time:	3/ 5 /2018@ 1300
Sample Number:	RGW236S- 180305	Weather:	40S CLOUDY
Landau Representative:	SRB		

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES or NO) Damaged (YES or NO) Describe:

DTW Before Purging (ft) 6.75 Time: 1200 Flow through cell vol. GW Meter No.(s HERON2

Begin Purge: Date/Time: 3/ 5 /2018 @ 1230 End Purge: Date/Time: 3/ 5 /2018 @ 1250 Gallons Purged: 0.5

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
1233	11	277.4	1.02	6.39	-38.5	LOW	6.75		
1236	11	274.3	0.89	6.39	-39		6.75		
1239	11.2	271.7	0.72	6.4	-41		6.75		
1242	11.1	270.6	0.83	6.41	-41.4				
1245	11.1	270	0.82	6.4	-41				
1248	11.2	269.8	0.89	6.4	-40.5				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☐ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): SLIGHTLY YELLOW AND TURBID NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	11.1	269.4	0.83	6.4	-40.7				
2	11.1	268.7	0.94	6.4	-40.3				
3	11.1	268.7	0.91	6.4	-40.5				
4	11.1	268.8	0.9	6.39	-40.1				
Average:	11.1	268.9	0.90	6.40	-40.4	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
3	(8260-SIM) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
1	(COD) (TOC5310C) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
1	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
1	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):

Comments:

Signature: SRB Date: 3.5.18

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly March 2018 | Date/Time: 3/ 5 /2018@ 1050
Sample Number: B172-11- 180305 | Weather: 40S CLOUDY
Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES or NO) | Damaged (YES or NO) | Describe:
DTW Before Purging (ft) 8.97 | Time: 1018 | Flow through cell vol. | GW Meter No.(s HERON2
Begin Purge: Date/Time: 3/ 5 /2018 @ 1020 | End Purge: Date/Time: 3/ 5 /2018 @ 1045 | Gallons Purged: 0.5
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
1023	13	135.4	0.72	6.25	77.4	LOW	9.1		
1026	12.7	133.2	0.6	6.14	90.2		9.1		
1029	12.9	133	0.82	6.1	99.8		9.1		
1032	12.8	133	0.87	6.1	100.3				
1035	12.7	132.4	1.04	6.08	104.4				
1038	12.8	132.2	1.29	6.07	107.3				
1041	12.9	132.4	1.34	6.06	107.6				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ☐ Pump/Pump Type PERI ND
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ☐ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☐ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): COLORLESS SLIGHTLY TURBID NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	12.9	132.3	1.35	6.07	107.9				
2	12.8	132.2	1.36	6.07	108.2				
3	12.8	132.1	1.37	6.07	108.5				
4	12.8	132	1.43	6.06	108.9				
Average:	12.8	132.2	1.38	6.07	108.4	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
3	(8260-SIM) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
1	(COD) (TOC5310C) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
1	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
1	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):
Comments:

Signature: SRB | Date: 3.5.18

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly March 2018 | Date/Time: 3/ 5 /2018@ 930
Sample Number: B172-12- 180305 | Weather: 40S CLOUDY
Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES or NO) | Damaged (YES or NO) | Describe:
DTW Before Purging (ft) 9.17 | Time: 900 | Flow through cell vol. | GW Meter No.(s HERON2
Begin Purge: Date/Time: 3/ 5 /2018 @ 901 | End Purge: Date/Time: 3/ 5 /2018 @ 920 | Gallons Purged: 0.5
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
904	12.9	171.4	0.41	6.69	-45	LOW	9.17		
907	12.6	173.2	0.15	6.55	-55.2		9.17		
910	12.6	173.2	0.14	6.53	-55.7		9.17		
913	12.2	172.3	0.14	6.52	-58.9				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ☐ Pump/Pump Type PERI ND
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ☐ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☐ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): CLEAR COLORLESS NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	12.2	172	0.14	6.52	-59.1				
2	12.2	172	0.14	6.51	-59.2				
3	12.2	171.9	0.14	6.51	-59.4				
4	12.2	171.8	0.15	6.51	-59.6				
Average:	12.2	171.9	0.14	6.51	-59.3	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)	
3	(8260-SIM) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐ OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐ OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)	
1	(COD) (TOC5310C) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)	
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)	
1	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)	
1	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica	
	VOC (Boeing short list)	
	Methane Ethane Ethene Acetylene	
	others	

Duplicate Sample No(s):
Comments:

Signature: SRB | Date: 3.5.18

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly March 2018 | Date/Time: 3/ 5 /2018@ 1220
Sample Number: B172-13- 180305 | Weather: 40S CLOUDY
Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES or NO) | Damaged (YES or NO) | Describe:
DTW Before Purging (ft): 8.6 | Time: 1148 | Flow through cell vol. | GW Meter No.(s HERON2
Begin Purge: Date/Time: 3/ 5 /2018 @ 1150 | End Purge: Date/Time: 3/ 5 /2018 @ 1205 | Gallons Purged: 0.5
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
1153	13.7	172.3	0.25	6.42	-25.3	LOW	8.6		
1156	14.1	169	0.17	6.44	-32.8		8.6		
1159	14.2	168	0.18	6.43	-33.1		8.6		
1202	14	166.7	0.18	6.43	-34.5				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ☐ Pump/Pump Type PERI ND
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ☐ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☐ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): CLEAR COLORLESS NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	13.8	166.8	0.18	6.43	-34.7				
2	13.8	167.8	0.2	6.44	-34.9				
3	13.8	167.2	0.23	6.43	-35.2				
4	13.8	167.3	0.25	6.43	-35.5				
Average:	13.8	167.3	0.22	6.43	-35.1	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
3	(8260-SIM) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
1	(COD) (TOC5310C) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
1	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
1	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):
Comments:
Signature: SRB | Date: 3.5.18

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name:	Boeing Renton	Project Number:	0025217.099.099
Event:	Quarterly March 2018	Date/Time:	3/ 5 /2018@ 1130
Sample Number:	B172-14- 180305	Weather:	40S CLOUDY
Landau Representative:	SRB		

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES or NO) Damaged (YES or NO) Describe:

DTW Before Purging (ft) 9.05 Time: 1100 Flow through cell vol. GW Meter No.(s HERON2

Begin Purge: Date/Time: 3/ 5 /2018 @ 1105 End Purge: Date/Time: 3/ 5 /2018 @ 1128 Gallons Purged: 0.5

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
1108	14.8	192.2	0.24	6.4	-65.4	LOW	9.11		
1111	14.8	171.8	0.19	6.43	-55.9		9.11		
1114	14.2	149.2	0.21	6.41	-27.6		9.11		
1117	14.3	147.2	0.23	6.4	-19				
1120	14.1	144.5	0.35	6.38	-9.4				
1123	14.1	143.6	0.42	6.39	-5.5				
1126	14.2	142.3	0.53	6.38	7.5				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ☐ Pump/Pump Type PERI ND

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ☐ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☐ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): CLEAR COLORLESS NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	14.1	142.2	0.55	6.38	8.8				
2	14.1	142.2	0.57	6.38	9.8				
3	14.1	142.3	0.58	6.37	10.5				
4	14.1	142.4	0.6	6.37	11				
Average:	14.1	142.3	0.58	6.38	10.0	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
3	(8260-SIM) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
1	(COD) (TOC5310C) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
1	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
1	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):

Comments:

Signature: SRB Date: 3.5.18

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly March 2018 | Date/Time: 3/ 5 /2018@ 1000
Sample Number: RGW171S- 180305 | Weather: 40S CLOUDY
Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES or NO) | Damaged (YES or NO) | Describe:
DTW Before Purging (ft) 9.11 | Time: 915 | Flow through cell vol. | GW Meter No.(s HERON2
Begin Purge: Date/Time: 3/ 5 /2018 @ 933 | End Purge: Date/Time: 3/ 5 /2018 @ 957 | Gallons Purged: 0.5
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
936	12	147.5	0.34	6.55	18.2	LOW	9.11		
939	12.6	151.2	0.18	6.48	-4.6		9.11		
942	12.6	151	0.17	6.47	-4.8		9.11		
945	12.8	138.8	0.24	6.45	-8.4				
948	12.8	140.8	0.35	6.44	-14				
951	12.8	140.1	0.37	6.43	-14.6				
954	12.9	140.4	0.52	6.43	-17.9				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ☐ Pump/Pump Type PERI ND
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ☐ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☐ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): SLIGHTLY ORANGE AND TURBID NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	13	140.9	0.55	6.43	-18				
2	13	139.7	0.56	6.43	-18				
3	12.9	141.4	0.57	6.43	-18				
4	12.9	141.9	0.58	6.43	-18.1				
Average:	13.0	141.0	0.57	6.4	-18.0	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
3	(8260-SIM) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
1	(COD) (TOC5310C) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
1	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
1	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):
Comments:

Signature: SRB | Date: 3.5.18

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly MARCH 2018 | Date/Time: 3/6 /2018@ 1337

Sample Number: RGW031S- 180306 | Weather: CLEAR

Landau Representative: JHA/SRB/DSB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES or NO) | Damaged (YES or NO) | Describe:

DTW Before Purging (ft) 5.05 | Time: 1311 | Flow through cell vol. | GW Meter No.(s 1

Begin Purge: Date/Time: 3/ 6 /2018 @ 1312 | End Purge: Date/Time: 3/ 6 /2018 @ 1331 | Gallons Purged: 0.25

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
1315	15.5	292	0.29	6.11	45.5		5.05		
1318	16.3	301.3	0.3	6.11	18.9		5.05		
1321	16.7	311	0.42	6.2	-13.6		5.05		
1324	16.9	314.7	0.62	6.21	-21.4				
1327	17.1	317.7	0.75	6.22	-25				
1330	17.3	321.7	0.89	6.24	-29.7				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ☐ Pump/Pump Type BLADDER

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ☒ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☒ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): COLORLESS LOW TURB NONS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	17.3	322.1	0.9	6.24	-30.4				
2	17.4	322.8	0.94	6.24	-31.6				
3	17.4	323.5	0.97	6.24	-32.7				
4	17.4	324.1	1.02	6.24	-33.9				
Average:	17.4	323.1	0.96	6.24	-32.2	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
5	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s): Duplicate Location (DUP2)

Comments:

Signature: DSB | Date: 3/6/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly MARCH 2018 | Date/Time: 3/ 6 /2018@ 800
Sample Number: RGWDUP2 180306 | Weather: CLEAR
Landau Representative: JHA/SRB/DSB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES or NO) | Damaged (YES or NO) | Describe:
DTW Before Purging (ft) | Time: | Flow through cell vol. | GW Meter No.(s)
Begin Purge: Date/Time: 3/ /2018 @ | End Purge: Date/Time: 3/ /2018 @ | Gallons Purged:
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ☐ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits								**>/= 1 flow through cell**	
	+/- 3%	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**		

DUPLICATE TO RGW031S

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ☐ Pump/Pump Type
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ☐ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☐ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.):

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	17.4	322.5	0.92	6.24	-30.9				
2	17.4	323.2	0.96	6.24	-32.1				
3	17.4	323.7	0.98	6.24	-33.3				
4	17.3	324.8	1.04	6.25	-34.7				
Average:	17.4	323.6	0.98	6.24	-32.8	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
5	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s): Duplicate to RGW031S
Comments:

Signature: DSB | Date: 3/6/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly MARCH 2018 | Date/Time: 3/ 6 /2018@ 1427
Sample Number: RGW033S- 180306 | Weather: CLEAR
Landau Representative: JHA/SRB/DSB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES or NO) | Damaged (YES or NO) | Describe:
DTW Before Purging (ft) 5.15 | Time: 1357 | Flow through cell vol. | GW Meter No.(s 1
Begin Purge: Date/Time: 3/ 6 /2018 @ 1357 | End Purge: Date/Time: 3/ 6 /2018 @ 1416 | Gallons Purged: 0.25
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
1400	14.5	306	0.17	6.09	16.7		5.15		
1403	15.1	309.2	0.2	6.09	-1.4		5.15		
1406	15.3	312.7	0.34	6.12	-13		5.15		
1409	16.1	320.3	0.47	6.12	-22.4				
1412	15	321	0.56	6.11	-28.9				
1415	15.1	322.3	0.62	6.09	-30.3				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ☐ Pump/Pump Type BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ☒ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☒ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): CLEAR COLORLESS NONS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	15.1	322.9	0.65	6.08	-31.1				
2	15.1	323.2	0.66	6.08	-31.4				
3	15.1	323.4	0.67	6.08	-31.8				
4	15.1	323.7	0.68	6.08	-32.2				
Average:	15.1	323.3	0.67	6.08	-31.6	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
5	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):
Comments:

Signature: DSB | Date: 3/6/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name:	Boeing Renton	Project Number:	0025217.099.099
Event:	Quarterly March 2018	Date/Time:	3/ 6 /2018@ 1500
Sample Number:	RGW034S- 180306	Weather:	40s SUNNY
Landau Representative:	SRB		

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES or NO) Damaged (YES or NO) Describe:

DTW Before Purging (ft) 5.3 Time: 1425 Flow through cell vol. GW Meter No.(s HERON2

Begin Purge: Date/Time: 3/ 6 /2018 @ 1430 End Purge: Date/Time: 3/ 6 /2018 @ 1455 Gallons Purged: 0.5

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
1433	12.4	288.9	0.27	6.32	-37	LOW	5.3		
1436	12.5	288.3	0.3	6.32	-43.7		5.3		
1439	12.7	287.9	0.47	6.34	-55.9		5.3		
1442	12.7	287.9	0.52	6.34	-58.2				
1445	12.7	287.7	0.59	6.35	-63.1				
1448	12.7	287	0.67	6.35	-65.4				
1451	12.6	286.7	0.71	6.36	-67.4				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☐ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): CLEAR COLORLESS NONS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	12.6	286.7	0.72	6.35	-68.3				
2	12.6	286.3	0.76	6.36	-68.9				
3	12.6	286.2	0.77	6.35	-69.2				
4	12.6	285.9	0.79	6.35	-69.9				
Average:	12.6	286.3	0.76	6.35	-69.1	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
5	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):

Comments:

Signature: SRB Date: 3.6.18

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly March 2018 | Date/Time: 3/ 6 /2018@ 851
Sample Number: RGW038S- 180306 | Weather: 30'S, SUNNY
Landau Representative: JHA/JKG

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES or NO) | Damaged (YES or NO) | Describe:
DTW Before Purging (ft) 5.42 | Time: 825 | Flow through cell vol. | GW Meter No.(s HERON 3
Begin Purge: Date/Time: 3/ 6 /2018 @ 828 | End Purge: Date/Time: 3/ 6 /2018 @ 846 | Gallons Purged: 0.25
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
831	11.8	226.5	0.65	6.40	-66.5	LOW	5.42		
834	11.5	230.6	0.52	6.42	-84.1		5.42		
837	11.2	234.9	0.48	6.42	-90.8		5.42		
840	11.1	236.2	0.50	6.43	-94.7				
843	11.2	237.6	0.48	6.43	-98.5				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): CLEAR, COLORLESS, NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	11.3	238.5	0.46	6.43	-100.4				
2	11.3	238.7	0.44	6.43	-100.7				
3	11.3	239.2	0.43	6.44	-100.8				
4	11.3	238.9	0.44	6.43	-101.1				
Average:	11.3	238.8	0.44	6.43	-100.8	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
5	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):
Comments:

Signature: JHA | Date: 3/6/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name:	Boeing Renton	Project Number:	0025217.099.099
Event:	Quarterly March 2018	Date/Time:	3/ 6 /2018 @ 1411
Sample Number:	RGW039S- 180306	Weather:	30'S, SUNNY
Landau Representative:	JHA/JKG		

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES or NO) Damaged (YES or NO) Describe:

DTW Before Purging (ft) 5.07 Time: 1343 Flow through cell vol. GW Meter No.(s HERON 3

Begin Purge: Date/Time: 3/ 6 /2018 @ 1344 End Purge: Date/Time: 3/ 6 /2018 @ 1405 Gallons Purged: 0.5

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
1347	14.7	118.8	3.93	6.36	4.0	LOW	5.09		
1350	14.9	127.5	1.89	6.30	8.3		5.09		
1353	15.0	131.5	1.08	6.29	11.9		5.09		
1356	14.9	132.1	0.95	6.29	13.5				
1359	15.1	133.0	0.85	6.28	16.2				
1402	15.1	133.6	0.77	6.28	18.6				
1404	15.1	133.9	0.73	6.28	20.1				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): CLEAR WITH SOME ORANGE PARTICULATES, COLORLESS, NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	15.1	134.0	0.73	6.28	20.5				
2	15.1	134.1	0.74	6.28	20.6				
3	15.1	134.1	0.71	6.27	21.1				
4	15.1	134.2	0.73	6.27	21.0				
Average:	15.1	134.1	0.73	6.28	20.8	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
5	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):

Comments:

Signature: JHA Date: 3/6/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly March 2018 | Date/Time: 3/ 6 /2018 @ 1021
Sample Number: RGW143S- 180306 | Weather: 30'S, SUNNY
Landau Representative: JHA/JKG

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES or NO) | Damaged (YES or NO) | Describe:
DTW Before Purging (ft): 5.95 | Time: 957 | Flow through cell vol. | GW Meter No.(s HERON 3
Begin Purge: Date/Time: 3/ 6 /2018 @ 959 | End Purge: Date/Time: 3/ 6 /2018 @ 1020 | Gallons Purged: 0.5
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
1002	12.8	242.9	0.28	6.33	-49.1	LOW	5.89		
1005	13.0	255.2	0.21	6.36	-63.2				
1008	13.1	258.6	0.20	6.38	-71.6		5.88		
1011	13.2	259.8	0.19	6.38	-77.0		5.66		
1014	13.2	261.2	0.23	6.39	-81.0				
1017	13.3	261.6	0.20	6.40	-83.4				
1019	13.2	261.4	0.15	6.39	-85.0				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): CLEAR, COLORLESS, NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	13.2	261.3	0.18	6.38	-85.2				
2	13.2	261.4	0.19	6.40	-85.4				
3	13.2	261.5	0.17	6.41	-85.5				
4	13.2	261.5	0.19	6.39	-85.8				
Average:	13.2	261.4	0.18	6.40	-85.5	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
5	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):
Comments: WATER LEVEL SEEMED TO BE COMING UP

Signature: JHA | Date: 3/6/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly March 2018 | Date/Time: 3/ 6 /2018 @ 1336
Sample Number: RGW209S- 180306 | Weather: 40'S, SUNNY
Landau Representative: JHA/JKG

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES or NO) | Damaged (YES or NO) | Describe:
DTW Before Purging (ft) 5.11 | Time: 1308 | Flow through cell vol. | GW Meter No.(s HERON 3
Begin Purge: Date/Time: 3/ 6 /2018 @ 1311 | End Purge: Date/Time: 3/ 6 /2018 @ 1332 | Gallons Purged: 0.75
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
1314	14.7	328.0	1.17	6.32	-23.3	LOW	5.11		
1317	14.5	330.8	0.88	6.33	-42.5		5.11		
1320	14.5	332.5	0.86	6.34	-54.8		5.11		
1323	14.6	334.5	0.78	6.35	-67.0				
1326	14.8	336.3	0.64	6.37	-71.1				
1329	14.9	337.9	0.45	6.37	-75.9				
1331	15.1	338.9	0.43	6.37	-78.2				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): CLEAR, COLORLESS, NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	15.0	339.0	0.40	6.37	-78.5				
2	15.0	339.1	0.41	6.37	-78.8				
3	15.0	339.1	0.40	6.37	-79.0				
4	15.1	339.2	0.39	6.37	-79.4				
Average:	15.0	339.1	0.40	6.37	-78.9	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
5	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):
Comments:

Signature: JHA | Date: 3/6/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly March 2018 | Date/Time: 3/ 6 /2018@ 1330
Sample Number: RGW210S- 180306 | Weather: 40s SUNNY
Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES or NO) | Damaged (YES or NO) | Describe:
DTW Before Purging (ft) 4.66 | Time: 1301 | Flow through cell vol. | GW Meter No.(s HERON2
Begin Purge: Date/Time: 3/ 6 /2018 @ 1305 | End Purge: Date/Time: 3/ 6 /2018 @ 1321 | Gallons Purged: 0.5
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
1304	12.9	190.7	5.01	6.44	28.1	MED-LOW	4.81		
1307	13.4	192.1	3.47	6.47	25		4.81		
1310	13.3	191.1	1.61	6.45	24.7	HIGH	4.85		
1313	13.1	208.4	0.03	6.38	10.3	HIGH	4.85		
1316	13.4	206.4	0.03	6.41	-3	HIGH	4.85		
1319	13.4	206.4	0.03	6.42	-5.3	HIGH			

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☐ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): DARK BROWN VERY TURBID NONS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	13.4	206.4	0.03	6.41	-6.2				
2	13.5	206.3	0.03	6.43	-7.4				
3	13.6	206.2	0.03	6.42	-7.9				
4	13.6	206.2	0.03	6.42	-8.7				
Average:	13.5	206.3	0.03	6.42	-7.6	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
5	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):
Comments: WATER VERY BROWN AFTER 6 MINS OF PURGE

Signature: SRB | Date: 3.6.18

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly March 2018 | Date/Time: 3/ 6 /2018 @ 1156
Sample Number: RGW237S- 180306 | Weather: 30'S, SUNNY
Landau Representative: JHA/JKG

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES or NO) | Damaged (YES or NO) | Describe:
DTW Before Purging (ft) 4.64 | Time: 1134 | Flow through cell vol. | GW Meter No.(s HERON 3
Begin Purge: Date/Time: 3/ 6 /2018 @ 1135 | End Purge: Date/Time: 3/ 6 /2018 @ 1156 | Gallons Purged: 0.5
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
1138	11.4	162.4	2.21	6.53	-9.3	LOW	4.64		
1141	11.2	167.0	0.94	6.54	-31.3				
1144	11.5	120.0	0.51	6.56	-35.4		4.64		
1147	11.9	107.4	0.30	6.56	-33.8				
1150	12.0	106.5	0.26	6.52	-29.6		4.64		
1153	11.9	108.8	0.27	6.47	-27.3				
1155	12.0	112.3	0.26	6.47	-24.8				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): CLOUDY, LIGHT BROWN TINT, NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	12.0	112.7	0.22	6.47	-24.7				
2	12.0	112.9	0.25	6.46	-24.5				
3	12.0	113.5	0.22	6.46	-24.3				
4	12.0	113.7	0.24	6.46	-24.3				
Average:	12.0	113.2	0.23	6.46	-24.5	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
5	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):
Comments:

Signature: JHA | Date: 3/6/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly March 2018 | Date/Time: 3/ 6 /2018 @ 1236
Sample Number: RGW238I- 180306 | Weather: 30'S, SUNNY
Landau Representative: JHA/JKG

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES or NO) | Damaged (YES or NO) | Describe:
DTW Before Purging (ft): 4.74 | Time: 1211 | Flow through cell vol. | GW Meter No.(s HERON 3
Begin Purge: Date/Time: 3/ 6 /2018 @ 1212 | End Purge: Date/Time: 3/ 6 /2018 @ 1233 | Gallons Purged: 0.5
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
1215	12.8	268.1	0.75	6.30	-12.4	LOW	4.74		
1218	14.0	318.5	0.62	6.33	-44.8		4.72		
1221	14.4	340.2	0.44	6.34	-68.9		4.72		
1224	14.2	343.6	0.39	6.36	-79.8				
1227	14.4	343.8	0.26	6.37	-87.7				
1230	14.4	342.8	0.22	6.37	-92.1				
1232	14.4	341.3	0.20	6.37	-93.6				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): CLOUDY, YELLOWISH/BROWN TINT, NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	14.3	341.0	0.23	6.37	-93.7				
2	14.3	340.9	0.19	6.37	-93.8				
3	14.4	340.9	0.20	6.37	-93.8				
4	14.4	340.6	0.19	6.37	-93.8				
Average:	14.4	340.9	0.20	6.37	-93.8	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
5	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s): MSMSD Location
Comments:

Signature: JHA | Date: 3/6/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly March 2018 | Date/Time: 3/ 6 /2018 @ 926
Sample Number: RGW239I- 180306 | Weather: 30'S, SUNNY
Landau Representative: JHA/JKG

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES or NO) | Damaged (YES or NO) | Describe:
DTW Before Purging (ft) 5.48 | Time: 902 | Flow through cell vol. | GW Meter No.(s HERON 3
Begin Purge: Date/Time: 3/ 6 /2018 @ 902 | End Purge: Date/Time: 3/ 6 /2018 @ 923 | Gallons Purged: 0.25
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
905	11.3	240.0	0.83	6.29	-58.7	LOW	5.48		
908	10.9	254.0	0.71	6.31	-76.2		5.48		
913	10.6	260.6	0.67	6.34	-90.6		5.48		
916	10.5	261.4	0.54	6.36	-94.7				
919	10.4	261.7	0.56	6.37	-96.7				
922	10.5	261.4	0.46	6.37	-98.1				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): CLEAR, COLORLESS, NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	10.5	261.3	0.47	6.37	-98.3				
2	10.6	261.3	0.49	6.37	-98.4				
3	10.6	261.5	0.47	6.37	-98.5				
4	10.6	261.6	0.46	6.37	-98.6				
Average:	10.6	261.4	0.47	6.37	-98.5	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
5	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):
Comments:

Signature: JHA | Date: 3/6/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly March 2018 | Date/Time: 3/ 6 /2018@ 951
Sample Number: RGW240D- 180306 | Weather: 30'S, SUNNY
Landau Representative: JHA/JKG

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES or NO) | Damaged (YES or NO) | Describe:
DTW Before Purging (ft) 5.88 | Time: 914 | Flow through cell vol. | GW Meter No.(s HERON 3
Begin Purge: Date/Time: 3/ 6 /2018 @ 929 | End Purge: Date/Time: 3/ 6 /2018 @ 950 | Gallons Purged: 0.25
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
932	11.6	311.5	0.58	6.39	-77.6	LOW	5.9		
935	12.5	345.5	0.35	6.45	-95.6		6.1		TURNED CPM DOWN
938	12.8	340.8	0.26	6.48	-102.2				
941	12.7	337.9	0.29	6.48	-105.8				
944	12.7	336.7	0.27	6.48	-107.5		5.91		
947	12.4	334.2	0.33	6.48	-108.5				
949	12.4	332.5	0.23	6.48	-109.2				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): TURBID, GREY, NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	12.4	332.9	0.26	6.48	-109.3				
2	12.4	332.9	0.23	6.48	-109.4				
3	12.3	332.6	0.25	6.48	-109.4				
4	12.4	332.7	0.26	6.48	-109.5				
Average:	12.4	332.8	0.25	6.48	-109.4	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
5	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):
Comments:

Signature: JHA | Date: 3/6/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly March 2018 | Date/Time: 3/ 6 /2018@ 1121
Sample Number: RGW241S- 180306 | Weather: 30'S, SUNNY
Landau Representative: JHA/JKG

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES or NO) | Damaged (YES or NO) | Describe:
DTW Before Purging (ft) 6.03 | Time: 1043 | Flow through cell vol. | GW Meter No.(s HERON 3
Begin Purge: Date/Time: 3/ 6 /2018 @ 1057 | End Purge: Date/Time: 3/ 6 /2018 @ 1118 | Gallons Purged: 0.25
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
1100	12.4	278.2	0.30	6.28	-60.0	LOW	6.03		
1103	12.7	285.0	0.25	6.31	-71.5		6.03		
1106	12.8	287.8	0.22	6.33	-78.7				
1109	12.9	289.4	0.19	6.35	-83.8				
1112	12.9	290.0	0.17	6.35	-87.1				
1115	13.1	290.8	0.15	6.35	-89.1				
1117	13.2	291.5	0.17	6.35	-90.3				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): CLEAR, COLORLESS, NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	13.2	291.6	0.22	6.35	-90.5				
2	13.2	291.6	0.18	6.35	-90.5				
3	13.2	291.6	0.18	6.35	-90.6				
4	13.2	291.9	0.17	6.36	-90.8				
Average:	13.2	291.7	0.19	6.35	-90.6	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)	
5	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐ OR ☐
	(8270) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐ OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)	
	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)	
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)	
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)	
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica	
	VOC (Boeing short list)	
	Methane Ethane Ethene Acetylene	
	others	

Duplicate Sample No(s):
Comments:

Signature: JHA | Date: 3/6/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly March 2018 | Date/Time: 3/ 6 /2018 @ 1051
Sample Number: RGW242I- 180306 | Weather: 30'S, SUNNY
Landau Representative: JHA/JKG

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES or NO) | Damaged (YES or NO) | Describe:
DTW Before Purging (ft) 6.19 | Time: 1029 | Flow through cell vol. | GW Meter No.(s HERON 3
Begin Purge: Date/Time: 3/ 6 /2018 @ 1030 | End Purge: Date/Time: 3/ 6 /2018 @ 1051 | Gallons Purged: 0.25
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
1033	12.5	278.6	0.42	6.29	-48.9	LOW	6.19		
1036	12.8	288.5	0.27	6.31	-64.9				
1039	12.9	290.2	0.18	6.34	-74.6		6.19		
1042	12.9	289.9	0.18	6.35	-81.0				
1045	13.0	291.0	0.16	6.35	-84.6				
1048	13.3	292.4	0.15	6.35	-87.9				
1050	13.3	292.7	0.17	6.36	-89.4				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): CLEAR, COLORLESS, NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	13.3	292.7	0.17	6.36	-89.6				
2	13.3	292.8	0.17	6.36	-89.8				
3	13.3	292.9	0.15	6.36	-90.0				
4	13.3	292.8	0.15	6.36	-90.1				
Average:	13.3	292.8	0.16	6.36	-89.9	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
5	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):
Comments:

Signature: JHA | Date: 3/6/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly March 2018 | Date/Time: 3/ 6 /2018 @ 1436
Sample Number: RGW243I- 180306 | Weather: 30'S, SUNNY
Landau Representative: JHA/JKG

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES or NO) | Damaged (YES or NO) | Describe:
DTW Before Purging (ft) 5.17 | Time: 1411 | Flow through cell vol. | GW Meter No.(s HERON 3
Begin Purge: Date/Time: 3/ 6 /2018 @ 1414 | End Purge: Date/Time: 3/ 6 /2018 @ 1435 | Gallons Purged: 0.5
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
1417	14.1	279.8	0.51	6.17	-14.7	LOW	5.18		
1420	14.3	297.5	0.29	6.24	-46.0		5.19		
1423	14.4	306.5	0.24	6.28	-63.9		5.19		
1426	14.4	310.1	0.22	6.30	-70.0				
1429	14.4	311.1	0.21	6.31	-76.6				
1432	14.4	311.7	0.19	6.31	-79.9				
1434	14.4	312.0	0.19	6.32	-81.9				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): CLEAR, COLORLESS, NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	14.4	312.0	0.18	6.31	-82.1				
2	14.4	311.9	0.20	6.31	-82.4				
3	14.4	312.0	0.20	6.32	-82.7				
4	14.4	312.0	0.18	6.32	-82.9				
Average:	14.4	312.0	0.19	6.32	-82.5	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
5	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):
Comments:

Signature: JHA | Date: 3/6/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly March 2018 | Date/Time: 3/ 6 /2018@ 1420
Sample Number: RGW-244S 180306 | Weather: 40s SUNNY
Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES or NO) | Damaged (YES or NO) | Describe:
DTW Before Purging (ft) 5.15 | Time: 1350 | Flow through cell vol. | GW Meter No.(s HERON2
Begin Purge: Date/Time: 3/ 6 /2018 @ 1352 | End Purge: Date/Time: 3/ 6 /2018 @ 1415 | Gallons Purged: 0.5
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
1355	13.4	429.3	0.22	6.11	-11.3	LOW	5.15		
1358	12.8	404.8	0.46	6.16	-32.5	LOW	5.15		
1401	12.8	403	0.55	6.16	-34.4	LOW	5.15		
1403	12.9	392.2	0.61	6.18	-44				
1406	12.9	392.3	0.68	6.19	-46.5				
1409	12.8	391.1	0.83	6.2	-51.3				
1412	12.8	389.9	1	6.22	-54.5				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☐ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): CLEAR COLORLESS NONS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	12.7	389.7	1.03	6.22	-55.2				
2	12.8	389.8	1.05	6.21	-55.6				
3	12.7	389.4	1.09	6.22	-56.4				
4	12.8	389.6	1.12	6.22	-56.8				
Average:	12.8	389.6	1.07	6.22	-56.0	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
5	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):
Comments:

Signature: SRB | Date: 3.6.18

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly MARCH 2018 | Date/Time: 3/ 7 /2018@ 857

Sample Number: RGW185S- 180307 | Weather: CLEAR

Landau Representative: JHA/SRB/DSB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES or NO) | Damaged (YES or NO) | Describe:

DTW Before Purging (ft) 2.05 | Time: 824 | Flow through cell vol. | GW Meter No.(s 1

Begin Purge: Date/Time: 3/ 6 /2018 @ 827 | End Purge: Date/Time: 3/ 6 /2018 @ 847 | Gallons Purged: 0.25

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
830	11.2	547	0.16	6.35	-5.9		2.04		
833	10.9	541	0.41	6.39	-36.5		2.04		
836	10.7	539	0.87	6.41	-55.4		2.04		
839	11.4	542	1.3	6.42	-68.4				
842	11.4	550	1.84	6.43	-80.9				
845	11.1	546	2.09	6.44	-85.6				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ☐ Pump/Pump Type BLADDER

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ☒ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☒ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): CLEAR COLORLESS NONS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	11.1	545	2.13	6.44	-86.2				
2	11	544	2.17	6.44	-87				
3	10.9	543	2.21	6.44	-87.8				
4	10.8	542	2.24	6.44	-88.6				
Average:	11.0	544	2.19	6.44	-87.4	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
5	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s): Duplicate Location (DUP3)

Comments:

Signature: DSB | Date: 3/7/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name:	Boeing Renton	Project Number:	0025217.099.099
Event:	Quarterly March 2018	Date/Time:	3/ 7 /2018@ 1236
Sample Number:	RGW190S- 180307	Weather:	40'S, PARTLY SUNNY
Landau Representative:	JHA		

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES or NO) Damaged (YES or NO) Describe:

DTW Before Purging (ft) 3.05 Time: 1210 Flow through cell vol. GW Meter No.(s HERON 3

Begin Purge: Date/Time: 3/ 7 /2018 @ 1211 End Purge: Date/Time: 3/ 7 /2018 @ 1232 Gallons Purged: 0.5

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
1214	12.0	262.8	1.89	6.68	-8.9	MED	3.07	<0.25	
1217	11.7	207.0	1.08	6.68	-13.7				
1220	11.2	161.1	0.65	6.56	-12.4		3.07	0.25	
1223	11.2	148.3	0.59	6.52	-11.8				
1226	11.1	142.5	0.51	6.49	-11.0				
1229	11.1	135.7	0.39	6.44	-10.7			0.5	
1231	11.2	132.8	0.35	6.43	-11.0				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): TURBID, BROWN/ORANGE COLOR, NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	11.1	131.6	0.33	6.42	-11.1				
2	11.1	131.5	0.32	6.42	-11.2				
3	11.1	131.5	0.32	6.42	-11.3				
4	11.2	131.5	0.31	6.42	-11.1				
Average:	11.1	131.5	0.32	6.42	-11.2	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
5	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):

Comments:

Signature: JHA Date: 3/7/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly MARCH 2018 | Date/Time: 3/ 7 /2018@ 1207

Sample Number: RGW191D- 180307 | Weather:

Landau Representative: JHA/SRB/DSB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES or NO) | Damaged (YES or NO) | Describe:

DTW Before Purging (ft) 2.88 | Time: 1139 | Flow through cell vol. | GW Meter No.(s 1

Begin Purge: Date/Time: 3/ 7 /2018 @ 1141 | End Purge: Date/Time: 3/ 7 /2018 @ 1200 | Gallons Purged: 0.25

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
1144	13.6	299.2	0.07	6.51	-19.5		2.89		
1147	12	280.3	0.06	6.5	-34.6		2.89		
1150	11.7	273.7	0.14	6.48	-43.8		2.89		
1153	11.7	273.1	0.26	6.48	-51.8				
1156	11.7	272.3	0.4	6.49	-59.9				
1159	11.7	272.1	0.48	6.49	-63.5				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ☐ Pump/Pump Type BLADDER

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ☒ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☒ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): CLEAR COLORLESS NONS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	11.8	272.1	0.5	6.49	-64.2				
2	11.8	272.3	0.51	6.49	-64.7				
3	11.8	272.4	0.53	6.49	-65.2				
4	11.8	272.4	0.54	6.49	-65.5				
Average:	11.8	272.3	0.52	6.49	-64.9	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
5	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX) WA ☐ OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) WA ☐ OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):

Comments:

Signature: DSB | Date: 3/7/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly MARCH 2018 | Date/Time: 3/ 7 /2018@ 1237
Sample Number: RGW192S- 180307 | Weather: OC
Landau Representative: JHA/SRB/DSB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES or NO) | Damaged (YES or NO) | Describe:
DTW Before Purging (ft) 3.32 | Time: 1209 | Flow through cell vol. | GW Meter No.(s 1
Begin Purge: Date/Time: 3/ 7 /2018 @ 1209 | End Purge: Date/Time: 3/ 7 /2018 @ 1228 | Gallons Purged: 0.25
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
1212	11.5	298.4	0.27	6.22	-16.6		3.31		
1215	11.1	295	0.52	6.16	-19.6		3.31		
1218	10.8	291.5	0.76	6.15	-22.2		3.31		
1221	10.4	286.3	1.09	6.13	-25.8				
1224	10.3	284.4	1.19	6.12	-26.8				
1227	10	280	1.33	6.11	-28.2				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ☐ Pump/Pump Type BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ☒ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☒ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): CLEAR COLORLESS NONS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	10	279.8	1.34	6.11	-28.3				
2	10	279.9	1.35	6.11	-28.4				
3	10	280	1.37	6.11	-28.5				
4	10	280.1	1.39	6.11	-28.5				
Average:	10	280.0	1.36	6.11	-28.4	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
5	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX) WA ☐ OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) WA ☐ OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):
Comments:

Signature: DSB | Date: 3/7/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name:	Boeing Renton	Project Number:	0025217.099.099
Event:	Quarterly March 2018	Date/Time:	3/ 7 /2018@ 1336
Sample Number:	RGW193S- 180307	Weather:	40'S, PARTLY SUNNY
Landau Representative:	JHA		

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES or NO) Damaged (YES or NO) Describe:

DTW Before Purging (ft) 4.47 Time: 1309 Flow through cell vol. GW Meter No.(s HERON 3

Begin Purge: Date/Time: 3/ 7 /2018 @ 1311 End Purge: Date/Time: 3/ 7 /2018 @ 1332 Gallons Purged: 0.5

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
1314	10.2	1088	0.27	6.48	4.1	LOW	4.47	<0.25	
1317	10.0	1056	0.55	6.47	-16.1				
1320	10.0	1054	0.66	6.47	-19.6		4.47	0.25	
1323	10.1	1046	0.82	6.46	-24.5				
1326	10.1	1041	1.15	6.46	-31.7				
1329	10.1	1040	1.36	6.46	-34.8			0.5	
1331	10.2	1040	1.38	6.46	-35.9				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): CLEAR, COLORLESS, SLIGHTEST INJECTION FLUID ODOR, NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	10.2	1039	1.44	6.46	-36.3				
2	10.2	1039	1.44	6.46	-36.5				
3	10.2	1039	1.46	6.46	-36.8				
4	10.2	1039	1.46	6.46	-36.9				
Average:	10.2	1039	1.45	6.46	-36.6	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
5	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):

Comments:

Signature: JHA Date: 3/7/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly March 2018 | Date/Time: 3/ 7 /2018@ 1101
Sample Number: RGW194S- 180307 | Weather: 30'S, PARTLY SUNNY
Landau Representative: JHA

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES or NO) | Damaged (YES or NO) | Describe:
DTW Before Purging (ft) 2.76 | Time: 1030 | Flow through cell vol. | GW Meter No.(s HERON 3
Begin Purge: Date/Time: 3/ 7 /2018 @ 1038 | End Purge: Date/Time: 3/ 7 /2018 @ 1059 | Gallons Purged: 0.75
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
1041	11.6	499.8	0.41	6.28	-1.9	LOW	2.76	<0.25	
1044	11.6	500.0	0.46	6.28	-5.4			0.25	
1047	11.6	500.0	0.50	6.28	-9.0		2.76		
1050	11.6	495.4	0.72	6.27	-22.8		2.76	0.5	
1053	11.3	491.2	0.87	6.27	-31.7				
1056	11.3	487.6	1.03	6.27	-39.2			0.75	
1058	11.2	484.3	1.18	6.27	-45.2				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): CLOUDY, COLORLESS, NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	11.2	483.9	1.19	6.27	-45.6				
2	11.2	483.9	1.21	6.27	-46.0				
3	11.2	483.9	1.22	6.27	-46.2				
4	11.2	483.6	1.23	6.27	-46.5				
Average:	11.2	483.8	1.21	6.27	-46.1	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
5	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):
Comments:

Signature: JHA | Date: 3/7/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly MARCH 2018 | Date/Time: 3/ 7 /2018@ 1057
Sample Number: RGW195S- 180307 | Weather: OC
Landau Representative: JHA/SRB/DSB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES or NO) | Damaged (YES or NO) | Describe:
DTW Before Purging (ft) 2.24 | Time: 1027 | Flow through cell vol. | GW Meter No.(s 1
Begin Purge: Date/Time: 3/ 7 /2018 @ 1028 | End Purge: Date/Time: 3/ 7 /2018 @ 1046 | Gallons Purged: 0.25
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ☒ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
1031	11.3	556	0.19	6.48	-14.9		2.25		
1034	10.3	571	0.28	6.44	-37		2.26		
1037	9.5	568	0.6	6.4	-52.1		2.26		
1040	9.6	534	0.99	6.38	-63.1				
1043	9.8	581	1.48	6.37	-73.2				
1046	9.9	580	1.71	6.37	-77				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ☐ Pump/Pump Type BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ☒ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☒ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): CLEAR COLORLESS NONS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	9.9	580	1.75	6.37	-77.6				
2	9.9	575	1.78	6.37	-78.1				
3	9.9	576	1.79	6.37	-78.6				
4	10	577	1.83	6.37	-79				
Average:	9.9	577	1.79	6.37	-78.3	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
5	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX) WA ☐ OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) WA ☐ OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):
Comments:

Signature: DSB | Date: 3/7/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly MARCH 2018 | Date/Time: 3/ 7 /2018@ 1127
Sample Number: RGW196D- 180307 | Weather: OC
Landau Representative: JHA/SRB/DSB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES or NO) | Damaged (YES or NO) | Describe:
DTW Before Purging (ft) 2.22 | Time: 1043 | Flow through cell vol. | GW Meter No.(s 1
Begin Purge: Date/Time: 3/ 7 /2018 @ 1058 | End Purge: Date/Time: 3/ 7 /2018 @ 1117 | Gallons Purged: 0.25
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ☒ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
1101	12.8	321.5	0.7	6.4	-39.9		2.22		
1104	12.4	312.7	0.85	6.39	-43.6		2.22		
1107	11.8	312.3	0.99	6.39	-46.6		2.22		
1110	11.1	308.8	1.18	6.38	-51.7				
1113	10.8	308.9	1.35	6.37	-56.3				
1116	10.7	298	1.49	6.37	-59.6				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ☐ Pump/Pump Type BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ☒ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☒ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): CLEAR COLORLESS NONS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	10.7	311.7	1.52	6.37	-60.1				
2	10.7	306.8	1.53	6.37	-60.5				
3	10.7	309.4	1.54	6.37	-60.9				
4	10.6	311.1	1.56	6.37	-61.2				
Average:	10.7	309.8	1.54	6.37	-60.7	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
5	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX) WA ☐ OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) WA ☐ OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):
Comments:

Signature: DSB | Date: 3/7/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly MARCH 2018 | Date/Time: 3/ 7 /2018@ 927

Sample Number: RGW197S- 180307 | Weather: CLEAR

Landau Representative: JHA/SRB/DSB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES or NO) | Damaged (YES or NO) | Describe:

DTW Before Purging (ft) 1.93 | Time: 901 | Flow through cell vol. | GW Meter No.(s 1

Begin Purge: Date/Time: 3/ 7 /2018 @ 903 | End Purge: Date/Time: 3/ 7 /2018 @ 922 | Gallons Purged: 0.25

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
906	11	698	0.24	6.94	-72		1.92		
909	10.2	652	0.31	7.01	-100.9		1.92		
912	10	614	0.4	7.03	-114.5		1.92		
915	10.2	579	0.53	7.06	-128.3				
918	10	568	0.59	7.07	-133.1				
921	9.9	558	0.66	7.08	137.8				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ☐ Pump/Pump Type BLADDER

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ☒ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☒ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): SLIGHT YELLOW COLOR CLEAR NONS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	9.9	557	0.66	7.08	-138.3				
2	9.9	557	0.67	7.08	-138.6				
3	9.9	558	0.67	7.08	-139.1				
4	9.9	558	0.68	7.08	-139.4				
Average:	9.9	558	0.67	7.08	-138.9	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
5	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):

Comments:

Signature: DSB | Date: 3/7/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly MARCH 2018 | Date/Time: 3/ 7 /2018@ 957

Sample Number: RGW245S- 180307 | Weather: OC

Landau Representative: JHA/SRB/DSB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES or NO) | Damaged (YES or NO) | Describe:

DTW Before Purging (ft) 2.04 | Time: 934 | Flow through cell vol. | GW Meter No.(s 1

Begin Purge: Date/Time: 3/ 7 /2018 @ 935 | End Purge: Date/Time: 3/ 7 /2018 @ 954 | Gallons Purged: 0.5

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
938	9.9	249	0.08	7	-65.1		2.05		
941	8.3	238.2	0.08	6.88	-66.7		2.05		
944	8.1	239.7	0.14	6.83	-68.2		2.05		
947	8.3	244.8	0.23	6.8	-70.8				
950	8.4	253.9	0.35	6.78	-74.3				
953	8.6	259	0.4	6.77	-76.2				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ☐ Pump/Pump Type BLADDER

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ☒ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☒ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): LIGHTLY CLOUDY NONS COLORLESS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	8.7	260	0.42	6.77	-76.7				
2	8.8	261.4	0.42	6.77	-77				
3	8.8	261.5	0.43	6.77	-77.3				
4	8.8	262.7	0.44	6.77	-77.6				
Average:	8.8	261	0.43	6.77	-77.2	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
5	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):

Comments:

Signature: DSB | Date: 3/7/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name:	Boeing Renton	Project Number:	0025217.099.099
Event:	Quarterly March 2018	Date/Time:	3/ 7 /2018@ 1146
Sample Number:	RGW246S- 180307	Weather:	30'S, PARTLY SUNNY
Landau Representative:	JHA		

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES or NO) Damaged (YES or NO) Describe:

DTW Before Purging (ft) 2.41 Time: 1123 Flow through cell vol. GW Meter No.(s HERON 3

Begin Purge: Date/Time: 3/ 7 /2018 @ 1124 End Purge: Date/Time: 3/ 7 /2018 @ 1145 Gallons Purged: 0.75

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
1127	11.3	222.3	0.20	6.57	-19.5	LOW	2.41	<0.25	
1130	10.8	183.9	0.21	6.47	-25.6			0.25	
1133	10.8	178.4	0.23	6.42	-33.4		2.41		
1136	10.5	165.3	0.26	6.40	-35.2			0.5	
1139	10.5	164.8	0.29	6.39	-36.8				
1142	10.6	164.6	0.29	6.39	-39.1			0.75	
1144	10.6	164.2	0.33	6.39	-41.2				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): SLIGHT CLOUDINESS, COLORLESS, NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	10.6	164.3	0.33	6.37	-40.4				
2	10.6	164.1	0.34	6.38	-40.9				
3	10.6	164.1	0.35	6.38	-41.6				
4	10.6	164.2	0.35	6.39	-42.0				
Average:	10.6	164.2	0.34	6.38	-41.2	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
5	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):

Comments:

Signature: JHA Date: 3/7/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name:	Boeing Renton	Project Number:	0025217.099.099
Event:	Quarterly March 2018	Date/Time:	3/ 7 /2018@ 1421
Sample Number:	RGW188S- 180307	Weather:	50'S, PARTLY SUNNY
Landau Representative:	JHA		

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES or NO) Damaged (YES or NO) Describe:

DTW Before Purging (ft) 3.8 Time: 1350 Flow through cell vol. GW Meter No.(s HERON 3

Begin Purge: Date/Time: 3/ 7 /2018 @ 1358 End Purge: Date/Time: 3/ 7 /2018 @ 1419 Gallons Purged: 0.5

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
1401	13.0	404.8	0.63	6.42	-34.3	LOW	3.82	<0.25	
1404	13.0	404.5	0.70	6.41	-39.4				
1407	13.0	403.4	0.87	6.38	-42.1		3.82	0.25	
1410	12.9	402.8	1.00	6.37	-46.2				
1413	13.0	403.2	1.08	6.36	-48.9				
1416	12.8	403.3	1.15	6.36	-50.9			0.5	
1418	12.9	403.8	1.23	6.35	-53.1				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): CLEAR WITH SUSPENDED PARTICLES, COLORLESS, NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	12.9	403.8	1.23	6.35	-53.3				
2	12.9	403.9	1.24	6.35	-53.4				
3	12.9	403.8	1.24	6.35	-53.6				
4	12.9	403.9	1.24	6.35	-53.8				
Average:	12.9	403.9	1.24	6.35	-53.5	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
3	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s): MSMSD LOCATION

Comments:

Signature: JHA Date: 3/7/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly MARCH 2018 | Date/Time: 3/ 7 /2018@ 1347
Sample Number: RGW247S- 180307 | Weather: OC
Landau Representative: JHA/SRB/DSB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES or NO) | Damaged (YES or NO) | Describe:
DTW Before Purging (ft) 3.8 | Time: 1322 | Flow through cell vol. | GW Meter No.(s 1
Begin Purge: Date/Time: 3/ 7 /2018 @ 1324 | End Purge: Date/Time: 3/ 7 /2018 @ 1135 | Gallons Purged: 0.25
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ☒ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
	Purge Goals: Stablization of Parameters for three consecutive readings within the following limits							>/= 1 flow through cell	
	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft		
1327	11.7	341.1	0.15	6.33	19.6		3.8		
1330	11.4	343.5	0.14	6.33	9.1		3.8		
1333	11	344.1	0.15	6.35	0.9		3.8		
1336									
1339									
1342									

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ☐ Pump/Pump Type BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ☒ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☒ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): CLEAR COLORLESS NONS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	11	343.8	0.2	6.35	-1.5				
2	10.9	343.7	0.23	6.35	-2.2				
3	10.9	343.6	0.25	6.35	-2.8				
4	10.9	343.5	0.28	6.35	-3.4				
Average:	10.9	343.7	0.24	6.35	-2.5	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
3	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):
Comments:

Signature: DSB | Date: 3/7/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly MARCH 2018 | Date/Time: 3/ 7 /2018@ 1417
Sample Number: RGW248I- 180307 | Weather: 0C
Landau Representative: JHA/SRB/DSB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES or NO) | Damaged (YES or NO) | Describe:
DTW Before Purging (ft) 3.72 | Time: 1347 | Flow through cell vol. | GW Meter No.(s 1
Begin Purge: Date/Time: 3/ 7 /2018 @ 1349 | End Purge: Date/Time: 3/ 7 /2018 @ 1408 | Gallons Purged: 0.25
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ☐ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
1352	11.9	372.5	0.16	6.38	-1.1		3.84		
1355	11.8	394.4	0.25	6.35	-14.7		3.76		
1358	11.4	397.8	0.42	6.34	-25.9		3.77		
1401	11.2	397	0.67	6.33	-36.5				
1404	11.5	398.6	0.78	6.33	-40.4				
1407	11.7	401.3	0.96	6.34	-45.9				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ☐ Pump/Pump Type BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ☒ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☒ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): CLEAR COLORLESS NONS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	11.8	401.6	0.97	6.34	-46.6				
2	11.8	401.9	1	6.34	-47.2				
3	11.8	402	1.02	6.34	-47.5				
4	11.8	402.2	1.04	6.34	-48				
Average:	11.8	401.9	1.01	6.34	-47.3	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
3	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX) WA ☐ OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) WA ☐ OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):
Comments:

Signature: DSB | Date: 3/7/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly MARCH 2018 | Date/Time: 3/ 7 /2018@ 1507
Sample Number: RGW249S- 180307 | Weather: OC
Landau Representative: JHA/SRB/DSB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES or NO) | Damaged (YES or NO) | Describe:
DTW Before Purging (ft) 3.6 | Time: 1442 | Flow through cell vol. | GW Meter No.(s 1
Begin Purge: Date/Time: 3/ 7 /2018 @ 1444 | End Purge: Date/Time: 3/ 7 /2018 @ 1502 | Gallons Purged: 0.25
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ☐ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
1447	10.5	367.7	1.41	6.37	-1.5		3.63		
1450	10	369.9	1.53	6.3	-3.4		3.64		
1453	9.4	365.4	1.34	6.29	-10.6		3.62		
1456	9.4	356.8	1.23	6.31	-18.7				
1459	9.5	345.4	1.19	6.37	-29.5				
1502	9.6	343.6	1.26	6.4	-36.9				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ☐ Pump/Pump Type BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ☒ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☒ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): HIGH TURBIDITY RED ORANGE NONS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	9.6	342.3	1.29	6.4	-40.1				
2	9.6	342	1.31	6.41	-41				
3	9.6	341.8	1.32	6.41	-41.6				
4	9.6	342	1.32	6.41	-42.2				
Average:	9.6	342.0	1.31	6.41	-41.2	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
3	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):
Comments:

Signature: DSB | Date: 3/7/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly March 2018 | Date/Time: 3/ 6 /2018@ 1130
Sample Number: RGW174S- 180306 | Weather: 40s SUNNY
Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES or NO) | Damaged (YES or NO) | Describe:
DTW Before Purging (ft) 4.55 | Time: 1103 | Flow through cell vol. | GW Meter No.(s HERON2
Begin Purge: Date/Time: 3/ 6 /2018 @ 1105 | End Purge: Date/Time: 3/ 6 /2018 @ 1128 | Gallons Purged: 0.5
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
1108	13.3	219.5	0.1	6.83	-82.1	LOW	4.3		
1111	12.7	173.3	0.1	6.84	-114.5		4.3		
1114	12.6	156.6	0.08	6.83	-120.2		4.3		
1117	12.5	148.7	0.06	6.8	-121				
1120	12.5	147.3	0.09	6.78	-120.8				
1123	12.6	146.6	0.07	6.79	-121.3				
1126	12.7	145.8	0.04	6.76	-121.4				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☐ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): CLEAR COLORLESS NONS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	12.7	145.7	0.04	6.77	-122.6				
2	12.7	145.6	0.04	6.78	-122.9				
3	12.7	145.6	0.07	6.75	-122				
4	12.7	145.6	0.07	6.77	-122.7				
Average:	12.7	145.6	0.06	6.77	-122.6	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
	(8260) (8010) (8021) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
1	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):
Comments:

Signature: SRB | Date: 3.6.18

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly MARCH 2018 | Date/Time: 3/ 6 /2018@ 1137
Sample Number: RGW250S- 180306 | Weather: CLEAR
Landau Representative: JHA/SRB/DSB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES or NO) | Damaged (YES or NO) | Describe:
DTW Before Purging (ft) 3.69 | Time: 1110 | Flow through cell vol. | GW Meter No.(s 1
Begin Purge: Date/Time: 3/ 6 /2018 @ 1111 | End Purge: Date/Time: 3/ 6 /2018 @ 1130 | Gallons Purged: 0.25
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ☐ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
1114	11.8	105.5	2.95	6.72	-0.3		3.91		
1117	11.2	111	1.57	6.68	0		3.91		
1120	11.4	111.9	0.99	6.7	-3.5		3.83		
1123	11.8	112.4	0.86	6.72	-8.7				
1126	12.1	112.8	0.95	6.75	-14.7				
1129	12.2	113.4	0.79	6.77	-21.4				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ☐ Pump/Pump Type BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ☒ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☒ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): CLEAR YELLOW NONS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	12.3	113.5	0.78	6.77	-22.2				
2	12.3	113.6	0.78	6.77	-22.8				
3	12.3	113.6	0.78	6.78	-23.6				
4	12.3	113.7	0.77	6.78	-24.3				
Average:	12.3	113.6	0.78	6.78	-23.2	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
	(8260) (8010) (8021) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
1	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):
Comments:

Signature: DSB | Date: 3/6/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly March 2018 | Date/Time: 3/ 6 /2018@ 1240
Sample Number: RGW009S- 180306 | Weather: 40s SUNNY
Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES or NO) | Damaged (YES or NO) | Describe:
DTW Before Purging (ft) 5.06 | Time: 1208 | Flow through cell vol. | GW Meter No.(s HERON2
Begin Purge: Date/Time: 3/ 6 /2018 @ 1210 | End Purge: Date/Time: 3/ 6 /2018 @ 1234 | Gallons Purged: 0.5
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ☐ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
1213	19.4	369.5	0.19	6.38	-40.8	LOW	5.07		
1216	19.4	371.1	0.23	6.4	-58.8	LOW	5.07		
1219	19.5	375.5	0.49	6.39	-70.7	LOW	5.07		
1222	19.7	378.2	0.78	6.39	-76.6	LOW			
1225	19.7	379.9	0.98	6.4	-80.5	LOW			
1228	19.8	383.9	1.27	6.4	-85.7				
1231	19.8	384.8	1.44	6.4	-88				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ☒ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ☒ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☐ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): CLEAR COLORLESS NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	19.9	385	1.45	6.41	-88.2				
2	19.9	385	1.47	6.4	-88.7				
3	19.9	385.1	1.49	6.41	-89.2				
4	19.9	385	1.51	6.4	-89.5				
Average:	19.9	385.0	1.48	6.41	-88.9	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
3	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):
Comments:

Signature: SRB | Date: 3.6.18

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly MARCH 2018 | Date/Time: 3/ 6 /2018@

Sample Number: RGW010S- 1803 | Weather:

Landau Representative: JHA/SRB/DSB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES or NO) | Damaged (YES or NO) | Describe:

DTW Before Purging (ft) 5.19 | Time: 712 | Flow through cell vol. | GW Meter No.(s)

Begin Purge: Date/Time: 3/ /2018 @ | End Purge: Date/Time: 3/ /2018 @ | Gallons Purged:

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ☐ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits								**>/= 1 flow through cell**	
	+/- 3%	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**		

WATER LEVEL ONLY

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ☐ Pump/Pump Type

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ☐ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☐ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.):

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1									
2									
3									
4									
Average:	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):

Comments:

Signature: Date:

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly MARCH 2018 | Date/Time: 3/ 6 /2018@

Sample Number: RGW011D- 1803 | Weather:

Landau Representative: JHA/SRB/DSB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES or NO) | Damaged (YES or NO) | Describe:

DTW Before Purging (ft) 4.97 | Time: 712 | Flow through cell vol. | GW Meter No.(s)

Begin Purge: Date/Time: 3/ /2018 @ | End Purge: Date/Time: 3/ /2018 @ | Gallons Purged:

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ☐ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits								**>/= 1 flow through cell**	
	+/- 3%	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**		

WATER LEVEL ONLY

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ☐ Pump/Pump Type

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ☐ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☐ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.):

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1									
2									
3									
4									
Average:	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):

Comments:

Signature: Date:

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly March 2018 | Date/Time: 3/ 6 /2018@ 840
Sample Number: RGW012S- 180306 | Weather: 40s SUNNY
Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES or NO) | Damaged (YES or NO) | Describe:
DTW Before Purging (ft) 4.88 | Time: 750 | Flow through cell vol. | GW Meter No.(s HERON2
Begin Purge: Date/Time: 3/ 6 /2018 @ 810 | End Purge: Date/Time: 3/ 6 /2018 @ 835 | Gallons Purged: 0.5
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
813	20.6	736	0.61	6.14	-80.5	LOW	4.9		
816	20.5	712	2.12	6.14	-95.5		4.9		
819	20.6	709	2.75	6.13	-97.9		4.9		
822	20.6	708	3.1	6.13	-99.8				
825	20.6	708	3.39	6.13	-103.2				
828	20.6	708	3.42	6.13	-104.6				
831	20.6	708	3.43	6.12	-105.2				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☐ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): CLEAR COLORLESS NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	20.6	708	3.45	6.12	-105.7				
2	20.6	708	3.44	6.12	-105.9				
3	20.6	708	3.45	6.12	-106.1				
4	20.6	707	3.45	6.12	-106.2				
Average:	20.6	707.8	3.45	6.12	-106.0	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
3	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):
Comments:

Signature: SRB | Date: 3.6.18

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly March 2018 | Date/Time: 3/ 6 /2018@ 805

Sample Number: RGW014S- 180306 | Weather: 40s SUNNY

Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES or NO) | Damaged (YES or NO) | Describe:

DTW Before Purging (ft) 4.94 | Time: 730 | Flow through cell vol. | GW Meter No.(s HERON2

Begin Purge: Date/Time: 3/ 6 /2018 @ 735 | End Purge: Date/Time: 3/ 6 /2018 @ 759 | Gallons Purged: 0.5

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
738	17.4	334.8	0.2	6.36	-54.4	LOW	4.95		
741	17.5	350	0.14	6.39	-72.1		4.97		
744	17.5	351.9	0.16	6.39	-74.4		4.97		
747	17.2	349	0.4	6.4	-78.4				
750	16.9	337.3	0.94	6.4	-81.6				
753	16.8	348	1.02	6.4	-82				
756	16.8	350.5	1.25	6.4	-82.6				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☐ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): CLEAR COLORLESS NO./NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	16.7	349	1.31	6.4	-82.8				
2	16.7	340	1.36	6.4	-82.7				
3	16.6	341.1	1.47	6.4	-82.8				
4	16.6	335.6	1.55	6.39	-82.7				
Average:	16.7	341.4	1.42	6.40	-82.8	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
3	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX) WA ☐ OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) WA ☐ OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s): Duplicate location (DUP4)

Comments:

Signature: SRB | Date: 3.6.18

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly March 2018 | Date/Time: 3/ 6 /2018@
Sample Number: RGWDUP4 180306 | Weather: 40s SUNNY
Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES or NO) | Damaged (YES or NO) | Describe:
DTW Before Purging (ft) | Time: | Flow through cell vol. | GW Meter No.(s HERON2
Begin Purge: Date/Time: 3/ 6 /2018 @ | End Purge: Date/Time: 3/ 6 /2018 @ | Gallons Purged: 0.5
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	

DUPLICATE TO RGW014S

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ☐ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ☐ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☐ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.):

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	16.7	341	1.33	6.4	-82.8				
2	16.7	341.1	1.45	6.4	-82.7				
3	16.6	351	1.52	6.4	-82.7				
4	16.6	345	1.6	6.4	-82.8				
Average:	16.7	344.5	1.48	6.40	-82.8	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
3	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s): Duplicate to RGW014S
Comments:

Signature: SRB | Date: 3.6.18

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly MARCH 2018 | Date/Time: 3/ 6 /2018@ 807

Sample Number: RGW147S- 180306 | Weather: clear

Landau Representative: JHA/SRB/DSB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES or NO) | Damaged (YES or NO) | Describe:

DTW Before Purging (ft) 4.52 | Time: 740 | Flow through cell vol. | GW Meter No.(s 1

Begin Purge: Date/Time: 3/ 6 /2018 @ 742 | End Purge: Date/Time: 3/ 6 /2018 @ 801 | Gallons Purged: 0.25

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
745	9.1	68.7	1.91	6.21	90.7		4.52		
748	8.4	72	1.9	5.95	98		4.52		
751	7.6	81.4	2.5	5.66	112.1		4.52		
754	7.2	98.2	3.15	5.22	135.1				
757	7.2	101.4	3.11	5.19	137.7				
800	7.1	105.2	3.23	5.18	139.1				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ☐ Pump/Pump Type BLADDER

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ☒ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☒ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): CLEAR COLORLESS NONS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	7.1	105.7	3.28	5.18	139.2				
2	7	106.1	3.33	5.19	139.3				
3	7	106.7	3.36	5.19	139.3				
4	7	107	3.38	5.19	139.2				
Average:	7.0	106.4	3.34	5.19	139.3	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
3	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX) WA ☐ OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) WA ☐ OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):

Comments:

Signature: DSB | Date: 3/6/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly March 2018 | Date/Time: 3/ 6 /2018@ 935
Sample Number: RGW149S- 180306 | Weather: 40s SUNNY
Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES or NO) | Damaged (YES or NO) | Describe:
DTW Before Purging (ft) 4.97 | Time: 903 | Flow through cell vol. | GW Meter No.(s HERON2
Begin Purge: Date/Time: 3/ 6 /2018 @ 905 | End Purge: Date/Time: 3/ 6 /2018 @ 928 | Gallons Purged: 0.5
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
908	11.4	136	0.22	6.47	6	LOW	4.97		
911	10.7	142.6	0.35	6.35	-9.6		4.97		
914	10.1	147.8	0.19	6.33	-21.8		4.97		
917	9.9	145	0.11	6.33	-32.2				
920	9.6	140.5	0.14	6.35	-44.7				
923	9.4	145	0.15	6.37	-55				
926	9.3	139.6	0.23	6.37	-57.4				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☐ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): CLEAR COLORLESS NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	9.3	124.3	0.25	6.38	-58				
2	9.3	166.9	0.25	6.38	-58.5				
3	9.3	142	0.23	6.38	-59				
4	9.3	138	0.23	6.38	-59.5				
Average:	9.3	142.8	0.24	6.38	-58.8	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
3	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):
Comments:

Signature: SRB | Date: 3.6.18

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly MARCH 2018 | Date/Time: 3/ 6 /2018@ 957

Sample Number: RGW150S- 180306 | Weather: CLEAR

Landau Representative: JHA/SRB/DSB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES or NO) | Damaged (YES or NO) | Describe:

DTW Before Purging (ft) 4.91 | Time: 931 | Flow through cell vol. | GW Meter No.(s 1

Begin Purge: Date/Time: 3/ 6 /2018 @ 934 | End Purge: Date/Time: 3/ 6 /2018 @ 953 | Gallons Purged: 0.25

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ☒ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
937	10.6	267	0.22	6.67	-20.6		4.92		
940	10.2	262.4	0.3	6.66	-22.5		4.92		
943	9.5	255.2	0.41	6.64	-25.3		4.93		
946	8.9	251.1	0.5	6.63	-26.1				
949	8.8	248.5	0.57	6.63	-26.9				
952	8.3	244.2	0.66	6.62	-28.4				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ☐ Pump/Pump Type BLADDER

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ☒ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☒ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): CLEAR COLORLESS NONS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	8.4	243.9	0.65	6.62	-28.6				
2	8.3	243.6	0.66	6.62	-28.7				
3	8.3	243.3	0.67	6.62	-28.7				
4	8.3	243	0.67	6.62	-28.8				
Average:	8.3	243.5	0.66	6.62	-28.7	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
3	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX) WA ☐ OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) WA ☐ OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):

Comments:

Signature: DSB | Date: 3/6/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name:	Boeing Renton	Project Number:	0025217.099.099
Event:	Quarterly March 2018	Date/Time:	3/ 6 /2018@ 1000
Sample Number:	RGW252S- 180306	Weather:	40s SUNNY
Landau Representative:	SRB		

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES or NO) Damaged (YES or NO) Describe:

DTW Before Purging (ft) 4.85 Time: 918 Flow through cell vol. GW Meter No.(s HERON2

Begin Purge: Date/Time: 3/ 6 /2018 @ 935 End Purge: Date/Time: 3/ 6 /2018 @ 958 Gallons Purged: 0.5

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
938	9.8	440	0.12	6.54	-69.7	low	4.85		
941	9.5	442	0.17	6.57	-84.6		4.85		
944	9	422.3	0.29	6.61	-95.3		4.85		
947	9	428.3	0.33	6.62	-98.1				
950	9	420.4	0.39	6.62	-100.3				
953	9.1	419.9	0.45	6.63	-102.9				
956	9.1	420.6	0.54	6.64	-105.5				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☐ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): CLEAR COLORLESS NONS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	9.1	427.4	0.54	6.65	-106.2				
2	9.1	421.6	0.56	6.64	-106.2				
3	9.1	419.5	0.57	6.65	-106.8				
4	9.1	424	0.6	6.65	-107				
Average:	9.1	423.1	0.57	6.65	-106.6	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
3	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX) WA ☐ OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) WA ☐ OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s): MSMSD Location

Comments:

Signature: SRB Date: 3.6.18

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly MARCH 2018 | Date/Time: 3/ 6 /2018@ 1037

Sample Number: RGW253I- 180306 | Weather: CLEAR

Landau Representative: JHA/SRB/DSB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES or NO) | Damaged (YES or NO) | Describe:

DTW Before Purging (ft) 4.86 | Time: 1009 | Flow through cell vol. | GW Meter No.(s 1

Begin Purge: Date/Time: 3/ 6 /2018 @ 1011 | End Purge: Date/Time: 3/ 6 /2018 @ 1030 | Gallons Purged: 0.25

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
1014	10.5	275	0.19	6.54	-5.7		4.87		
1017	10.6	272.8	0.14	6.56	-13.7		4.86		
1020	10.8	272.1	0.14	6.56	-19.2		4.86		
1023	11	273.3	0.19	6.56	-29				
1026	11.2	274.8	0.24	6.56	-35.2				
1029	11.5	276.5	0.3	6.57	-41.8				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ☐ Pump/Pump Type BLADDER

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ☒ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☒ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): CLEAR COLORLESS NONS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	11.5	276.6	0.31	6.57	-42.8				
2	11.5	276.9	0.33	6.57	-44.2				
3	11.6	277	0.35	6.58	-45.8				
4	11.6	277.2	0.36	6.57	-46.4				
Average:	11.6	276.9	0.34	6.57	-44.8	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
3	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):

Comments:

Signature: DSB | Date: 3/6/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly MARCH 2018 | Date/Time: 3/ 6 /2018@ 927

Sample Number: RGW254S- 180306 | Weather: CLEAR

Landau Representative: JHA/SRB/DSB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES or NO) | Damaged (YES or NO) | Describe:

DTW Before Purging (ft) 5.01 | Time: 902 | Flow through cell vol. | GW Meter No.(s 1

Begin Purge: Date/Time: 3/ 6 /2018 @ 905 | End Purge: Date/Time: 3/ 6 /2018 @ 920 | Gallons Purged: 0.25

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
908	9.5	418.4	0.23	6.48	79		5.01		
911	9.1	410.4	0.26	6.54	50.7		5.02		
914	8.6	404.8	0.29	6.58	29.8		5.02		
817	8.4	400.4	0.31	6.59	16.3				
920	8.4	397.5	0.31	6.61	4.5				
923	8	391.2	0.35	6.62	-7.7				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ☐ Pump/Pump Type BLADDER

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ☒ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☒ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): CLEAR COLORLESS NONS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	7.9	390.2	0.37	6.62	-10				
2	7.9	389.6	0.38	6.62	-11.2				
3	7.9	389.1	0.39	6.62	-12.5				
4	7.9	388.3	0.41	6.62	-14.2				
Average:	7.9	389.3	0.39	6.62	-12.0	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
3	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):

Comments:

Signature: DSB | Date: 3/6/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly March 2018 | Date/Time: 3/ 5 /2018@ 1440

Sample Number: RGW163I- 180305 | Weather: 40S CLOUDY

Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES or NO) | Damaged (YES or NO) | Describe:

DTW Before Purging (ft) 6.3 | Time: 1355 | Flow through cell vol. | GW Meter No.(s HERON2

Begin Purge: Date/Time: 3/ 5 /2018 @ 1410 | End Purge: Date/Time: 3/ 5 /2018 @ 1429 | Gallons Purged: 0.5

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
1413	12.1	376.4	1.43	6.41	-109.1		6.3		
1416	11.8	373.1	1.64	6.4	-110		6.3		
1419	10.2	359.3	2.08	6.38	-111.2		6.3		
1422	10.3	355.7	2.09	6.39	-110.6				
1425	10	343.3	2.03	6.37	-107.8				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ☐ Pump/Pump Type DED BLADDER

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ☐ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☐ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): CLEAR COLORLESS NONS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	10	335.3	2.04	6.35	-104				
2	10	335	2.03	6.35	-103.5				
3	10.1	335	2	6.34	-102.6				
4	10.2	331.5	1.99	6.33	-102				
Average:	10.1	334.2	2.02	6.34	-103.0	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
7	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
2	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):

Comments:

Signature: SRB | Date: 3.5.18

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly March 2018 | Date/Time: 3/ 5 /2018@ 1400
Sample Number: RGW165I- 180305 | Weather: 40S CLOUDY
Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES or NO) | Damaged (YES or NO) | Describe:
DTW Before Purging (ft) 12.55 | Time: 1330 | Flow through cell vol. | GW Meter No.(s HERON2
Begin Purge: Date/Time: 3/ 5 /2018 @ 1332 | End Purge: Date/Time: 3/ 5 /2018 @ 1355 | Gallons Purged: 0.5
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
1335	12.7	305.8	0.17	6.36	-69.9	LOW	12.5		
1338	11.7	302.6	0.19	6.3	-85		12.4		
1341	11.6	302	0.24	6.29	-85.6		12.4		
1344	11.5	300.1	0.44	6.28	-87.4				
1347	11.4	299	0.61	6.28	-88.7				
1350	11.4	298.9	0.77	6.28	-89.7				
1353	11.5	299	0.86	6.27	-90				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ☐ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ☐ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☐ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): COLORLESS VERY SLIGHT TURBIDITY NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	11.5	299.2	0.9	6.27	-90.2				
2	11.5	299.3	0.94	6.27	-90.3				
3	11.5	299.4	0.95	6.27	-90.5				
4	11.6	299.5	0.98	6.27	-90.7				
Average:	11.5	299.4	0.94	6.27	-90.4	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)	
7	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐ OR ☐
2	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐ OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)	
	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)	
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)	
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)	
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica	
	VOC (Boeing short list)	
	Methane Ethane Ethene Acetylene	
	others	

Duplicate Sample No(s):
Comments:

Signature: SRB | Date: 3.5.18

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly March 2018 | Date/Time: 3/ 5 /2018@ 1511
Sample Number: RGW175I- 180305 | Weather: 40'S, PARTLY SUNNY
Landau Representative: JHA/JKG

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES or NO) | Damaged (YES or NO) | Describe:
DTW Before Purging (ft) 6.81 | Time: 1443 | Flow through cell vol. | GW Meter No.(s HERON 3
Begin Purge: Date/Time: 3/ 5 /2018 @ 1448 | End Purge: Date/Time: 3/ 5 /2018 @ 1510 | Gallons Purged: 0.25
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
1451	12.6	425.8	0.65	6.32	-71.7	LOW	7.01	<0.25	TURN CPM DOWN
1454	12.0	429.3	0.94	6.30	-72.3		6.97		
1457	11.9	430.2	1.32	6.29	-73.2		6.95		
1500	11.8	429.2	1.53	6.28	-74.0				
1503	11.8	429.2	1.68	6.28	-75.0				
1506	11.7	428.6	1.88	6.28	-76.2		6.96		
1508	11.6	428.0	1.97	6.28	-76.6				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): CLEAR WITH A FEW PARTICULATES, COLORLESS, NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	11.6	427.8	1.98	6.28	-76.6				
2	11.6	427.6	1.99	6.28	-76.7				
3	11.6	427.5	1.99	6.28	-76.8				
4	11.6	427.4	2.00	6.28	-76.9				
Average:	11.6	427.6	1.99	6.28	-76.8	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)	
7	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐ OR ☐
2	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐ OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)	
	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)	
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)	
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)	
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica	
	VOC (Boeing short list)	
	Methane Ethane Ethene Acetylene	
	others	

Duplicate Sample No(s):
Comments:

Signature: JHA | Date: 3/5/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly March 2018 | Date/Time: 3/ 5 /2018@ 1536
Sample Number: RGW176S- 180305 | Weather: 40'S, PARTLY SUNNY
Landau Representative: JHA/JKG

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES or NO) | Damaged (YES or NO) | Describe:
DTW Before Purging (ft) 5.38 | Time: 1506 | Flow through cell vol. | GW Meter No.(s HERON 3
Begin Purge: Date/Time: 3/ 5 /2018 @ 1514 | End Purge: Date/Time: 3/ 5 /2018 @ 1528 | Gallons Purged: 0.25
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
1517	11.6	586.0	2.04	6.32	-79.6	LOW	5.46	<0.25	
1520	11.1	580.0	2.38	6.28	-85.2		5.46		
1523	11.0	577.0	2.43	6.28	-87.0		5.46		
1526	10.9	574.0	2.50	6.28	-88.8				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): CLEAR, YELLOWISH TINT, NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	10.9	574.0	2.53	6.28	-89.3				
2	10.8	573.0	2.54	6.28	-89.5				
3	10.8	570.0	2.55	6.28	-89.6				
4	10.8	573.0	2.55	6.28	-89.8				
Average:	10.8	572.5	2.54	6.28	-89.6	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)	
7	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐ OR ☐
2	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐ OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)	
	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)	
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)	
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)	
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica	
	VOC (Boeing short list)	
	Methane Ethane Ethene Acetylene	
	others	

Duplicate Sample No(s):
Comments:

Signature: JHA | Date: 3/5/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly March 2018 | Date/Time: 3/ 5 /2018@ 1651
Sample Number: RGW177I- 180305 | Weather: 40'S, PARTLY SUNNY
Landau Representative: JHA/JKG

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES or NO) | Damaged (YES or NO) | Describe:
DTW Before Purging (ft) 7.51 | Time: 1608 | Flow through cell vol. | GW Meter No.(s HERON 3
Begin Purge: Date/Time: 3/ 5 /2018 @ 1627 | End Purge: Date/Time: 3/ 5 /2018 @ 1648 | Gallons Purged: 0.25
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
1630	11.3	669.0	0.97	6.36	-46.0	LOW	7.51		
1633	11.0	614.0	1.26	6.36	-60.0		7.51		
1636	10.9	573.0	1.50	6.34	-66.1		7.51		
1639	11.1	541.0	1.67	6.32	-70.6				
1642	11.3	524.0	1.88	6.31	-73.4				
1645	11.4	514.0	2.05	6.30	-75.2				
1647	11.5	508.0	2.15	6.29	-76.2				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): CLEAR, COLORLESS, NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	11.5	509.0	2.14	6.29	-76.3				
2	11.5	509.0	2.15	6.29	-76.4				
3	11.5	508.0	2.15	6.29	-76.6				
4	11.5	508.0	2.16	6.29	-76.8				
Average:	11.5	508.5	2.15	6.29	-76.5	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
7	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX) WA ☐ OR ☐
2	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) WA ☐ OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)
	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):
Comments:

Signature: JHA | Date: 3/5/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly March 2018 | Date/Time: 3/ 5 /2018@ 1700
Sample Number: RGW178S- 180305 | Weather: 40S CLOUDY
Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES or NO) | Damaged (YES or NO) | Describe:
DTW Before Purging (ft) 7.99 | Time: 1634 | Flow through cell vol. | GW Meter No.(s HERON2
Begin Purge: Date/Time: 3/ 5 /2018 @ 1635 | End Purge: Date/Time: 3/ 5 /2018 @ 1658 | Gallons Purged: 0.5
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
1638	11	345	0.38	6.31	-81.5	LOW	8		
1641	10.9	343.8	0.82	6.3	-86		8.01		
1644	10.8	342.5	0.93	6.3	-86.6				
1647	10.7	341.6	1.02	6.3	-87				
1650	10.7	340.8	1.09	6.3	-87.4				
1653	10.6	339.9	1.2	6.29	-87.9				
1656	10.6	339.4	1.25	6.29	-88				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ☐ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ☐ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☐ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): CLEAR COLORLESS NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	10.6	338.6	1.4	6.28	-88.6				
2	10.6	338.4	1.43	6.28	-88.7				
3	10.6	338.3	1.45	6.28	-88.9				
4	10.6	338.1	1.5	6.28	-89				
Average:	10.6	338.4	1.45	6.28	-88.8	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
7	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
2	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):
Comments:

Signature: SRB | Date: 3.5.18

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly March 2018 | Date/Time: 3/ 5 /2018@ 1540
Sample Number: RGW179I- 180305 | Weather: 40S CLOUDY
Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES or NO) | Damaged (YES or NO) | Describe:
DTW Before Purging (ft) 6.1 | Time: 1509 | Flow through cell vol. | GW Meter No.(s HERON2
Begin Purge: Date/Time: 3/ 5 /2018 @ 1510 | End Purge: Date/Time: 3/ 5 /2018 @ 1535 | Gallons Purged: 0.5
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
1513	11.8	393.7	0.14	6.37	-78.8	LOW	6.05		
1516	11.5	391	0.17	6.37	-80.3		6.03		
1519	11.1	375.2	0.55	6.34	-84.7		6.03		
1522	11	371	0.79	6.33	-86				
1525	10.9	365.4	1.05	6.33	-87.3				
1528	10.8	363.7	1.14	6.32	-87.6				
1531	10.8	361.3	1.22	6.32	-87.7				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ☐ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ☐ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☐ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): CLEAR COLORLESS NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	10.8	361.1	1.24	6.32	-87.8				
2	10.8	359.6	1.28	6.31	-87.9				
3	10.8	359.4	1.29	6.31	-88.1				
4	10.8	359.3	1.31	6.31	-88.3				
Average:	10.8	359.9	1.28	6.31	-88.0	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
7	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
2	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):
Comments:

Signature: SRB | Date: 3.5.18

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name:	Boeing Renton	Project Number:	0025217.099.099
Event:	Quarterly March 2018	Date/Time:	3/ 5 /2018@ 1620
Sample Number:	RGW180S- 180305	Weather:	40S CLOUDY
Landau Representative:	SRB		

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES or NO) Damaged (YES or NO) Describe:

DTW Before Purging (ft) 6.35 Time: 1522 Flow through cell vol. GW Meter No.(s HERON2

Begin Purge: Date/Time: 3/ 5 /2018 @ 1550 End Purge: Date/Time: 3/ 5 /2018 @ 1610 Gallons Purged: 0.5

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
1553	10.6	213.4	1.7	6.42	-54.8	LOW	6		
1556	10.4	185.5	1.7	6.38	-51.2		6		
1559	10.4	185	1.69	6.37	-50.7		6		
1602									

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☐ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): SLIGHTLY TURBID COLORLESS NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	10.4	184	1.69	6.37	-50.6				
2	10.4	183.2	1.68	6.37	-50.1				
3	10.4	182.2	1.68	6.36	-50				
4	10.4	180	1.68	6.36	-49.8				
Average:	10.4	182.4	1.68	6.37	-50.1	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
7	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
2	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s): Duplicate Location (DUP5)

Comments:

Signature: SRB Date: 3.5.18

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly March 2018 | Date/Time: 3/ 5 /2018@
Sample Number: RGW180S- 180305 | Weather: 40S CLOUDY
Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES or NO) | Damaged (YES or NO) | Describe:
DTW Before Purging (ft) | Time: | Flow through cell vol. | GW Meter No.(s HERON2
Begin Purge: Date/Time: 3/ 5 /2018 @ | End Purge: Date/Time: 3/ 5 /2018 @ | Gallons Purged: 0.5
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits								**>/= 1 flow through cell**	
	+/- 3%	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**		

Duplicate to RGW180S

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ☐ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ☐ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☐ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.):

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	10.4	183.3	1.68	6.37	-50.4				
2	10.4	182.7	1.68	6.37	-50.3				
3	10.4	180.4	1.68	6.36	-50.1				
4	10.4	181.3	1.7	6.36	-50.2				
Average:	10.4	181.9	1.69	6.37	-50.3	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
7	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
2	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s): Duplicate to RGW180S
Comments:

Signature: SRB | Date: 3.5.18

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly March 2018 | Date/Time: 3/ 5 /2018@ 1326
Sample Number: RGW189S- 180305 | Weather: 40'S, PARTLY SUNNY
Landau Representative: JHA/JKG

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES or NO) | Damaged (YES or NO) | Describe:
DTW Before Purging (ft) 7.08 | Time: 1308 | Flow through cell vol. | GW Meter No.(s oil/h20 #1
Begin Purge: Date/Time: 3/ 5 /2018 @ 1300 | End Purge: Date/Time: 3/ 5 /2018 @ 1324 | Gallons Purged: 0.25
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
1303	11.6	643.0	0.43	6.21	8.5				TURNED CPM DOWN
1306	11.5	637.0	0.80	6.23	-5.0		7.26		
1309	11.4	632.0	1.13	6.24	-12.6		7.24		
1312	11.2	627.0	1.59	6.24	-18.7				
1315	11.0	618.0	1.93	6.24	-23.7		7.22		
1318	11.0	611.0	2.22	6.29	-29.9				
1321	10.9	609.0	2.31	6.30	-32.0				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ☐ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): CLEAR WITH SOME PARTICULATES, COLORLESS, SLIGHT INJECTION ODOR/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	10.9	609.0	2.32	6.30	-33.2				
2	10.9	609.0	2.33	6.30	-33.9				
3	10.9	606.0	2.36	6.30	-34.1				
4	10.8	607.0	2.37	6.30	-34.3				
Average:	10.9	607.8	2.35	6.30	-33.9	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
7	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
2	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s): MSMSD Location
Comments: No NAPL detected. Soak sock replaced.
Signature: JHA | Date: 3/5/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly March 2018 | Date/Time: 3/ 5 /2018@ 1621
Sample Number: RGW208S- 180305 | Weather: 40'S, PARTLY SUNNY
Landau Representative: JHA/JKG

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES or NO) | Damaged (YES or NO) | Describe:
DTW Before Purging (ft) 7.74 | Time: 1556 | Flow through cell vol. | GW Meter No.(s HERON 3
Begin Purge: Date/Time: 3/ 5 /2018 @ 1556 | End Purge: Date/Time: 3/ 5 /2018 @ 1617 | Gallons Purged: 0.25
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
1559	11.0	350.4	0.25	6.38	-14.2	LOW	7.79		
1602	10.9	399.6	0.49	6.27	-22.3		7.79		
1605	10.9	430.9	0.62	6.25	-33.9		7.79		
1608	10.9	434.9	0.90	6.25	-44.9				
1611	10.9	431.7	1.18	6.26	-54.5				
1614	10.9	428.3	1.42	6.26	-61.6				
1616	11.0	427.4	1.51	6.27	-64.1				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): CLEAR, COLORLESS, NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	11.0	427.3	1.53	6.27	-64.5				
2	11.0	427.2	1.54	6.27	-64.9				
3	11.0	427.1	1.55	6.27	-65.3				
4	11.0	427.0	1.57	6.27	-65.6				
Average:	11.0	427.2	1.55	6.27	-65.1	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)	
7	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐ OR ☐
2	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐ OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)	
	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)	
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)	
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)	
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica	
	VOC (Boeing short list)	
	Methane Ethane Ethene Acetylene	
	others	

Duplicate Sample No(s):
Comments:

Signature: JHA | Date: 3/5/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly March 2018 | Date/Time: 3/ 5 /2018@ 1451
Sample Number: RGW207S- 180305 | Weather: 40'S, PARTLY SUNNY
Landau Representative: JHA/JKG

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES or NO) | Damaged (YES or NO) | Describe:
DTW Before Purging (ft) 6.31 | Time: 1403 | Flow through cell vol. | GW Meter No.(s HERON 3
Begin Purge: Date/Time: 3/ 5 /2018 @ 1425 | End Purge: Date/Time: 3/ 5 /2018 @ 1446 | Gallons Purged: 0.25
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
1428	11.8	374.8	0.33	6.84	-61.4		6.31		
1431	11.3	336.2	0.25	6.80	-89.7				
1434	11.2	326.8	0.24	6.79	-94.8		6.31		
1437	11.1	308.0	0.23	6.78	-99.0				
1440	11.1	292.9	0.22	6.77	-101.6				
1443	11.1	283.2	0.22	6.76	-103.2				
1445	11.1	278.5	0.21	6.76	-103.3				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): CLEAR WITH SOME PARTICULTES, COLORLESS, NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	11.1	277.2	0.23	6.76	-103.4				
2	11.1	277.5	0.22	6.76	-103.5				
3	11.1	277.1	0.23	6.76	-103.6				
4	11.1	276.1	0.23	6.76	-103.6				
Average:	11.1	277.0	0.23	6.76	-103.5	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
7	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
2	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):
Comments:

Signature: JHA | Date: 3/5/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name:	Boeing Renton	Project Number:	0025217.099.099
Event:	Quarterly March 2018	Date/Time:	3/ 5 /2018@ 816
Sample Number:	RGW259S- 180305	Weather:	30'S, SUNNY
Landau Representative:	JHA/JKG		

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES or NO) Damaged (YES or NO) ■ Describe:

DTW Before Purging (ft) 5.28 Time: 751 Flow through cell vol. GW Meter No.(s HERON 3

Begin Purge: Date/Time: 3/ 5 /2018 @ 753 End Purge: Date/Time: 3/ 5 /2018 @ 814 Gallons Purged: 0.25

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ■ Ground Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
756	8.4	120.5	5.80	6.52	-50.7	LOW	5.53		
759	7.1	111.5	5.14	6.60	-40.4	MED	5.53		
802	6.7	107.5	4.92	6.59	-33.5				
805	6.3	101.7	4.01	6.60	-25.3		5.56		TURNED CPM DOWN
808	6.2	98.4	3.17	6.60	-16.3		5.56		
811	6.1	96.9	2.70	6.60	-11.4				
813	6.0	96.4	2.59	6.59	-8.9				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): SLIGHTLY TURBID, LIGHT BROWN TINT, NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	6.0	96.3	2.58	6.60	-8.4				
2	6.0	96.2	2.58	6.60	-7.9				
3	6.0	96.2	2.53	6.60	-7.5				
4	6.0	96.1	2.44	6.60	-7.1				
Average:	6.0	96.2	2.53	6.60	-7.7	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
3	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):

Comments: COLLECTED TWO EXTRA VIALS ON ACCIDENT (5 40mL VIALS IN TOTAL).

Signature: JHA Date: 3/6/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly March 2018 | Date/Time: 3/ 5 /2018@ 746
Sample Number: RGW260S- 180305 | Weather: 30'S, SUNNY
Landau Representative: JHA/JKG

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES or NO) | Damaged (YES or NO) | Describe:
DTW Before Purging (ft) 5.31 | Time: 718 | Flow through cell vol. | GW Meter No.(s HERON 3
Begin Purge: Date/Time: 3/ 5 /2018 @ 721 | End Purge: Date/Time: 3/ 5 /2018 @ 743 | Gallons Purged: 0.25
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
724	9.8	243.5	1.52	5.99	-75.3	LOW	5.33		
727	8.2	227.0	1.34	5.72	-74.6		5.33		
730	7.5	211.5	1.00	5.76	-77.5		5.33		
733	6.7	200.6	1.02	5.85	-80.1				
736	6.2	191.4	0.93	5.91	-82.1				
739	5.9	188.4	0.86	5.95	-83.2				
741	5.8	187.6	0.84	5.97	-83.7				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): CLOUDY, COLORLESS, NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	5.8	187.6	0.88	5.97	-83.6				
2	5.8	187.6	0.79	5.97	-83.7				
3	5.7	187.5	0.78	5.97	-83.8				
4	5.7	187.6	0.84	5.97	-83.9				
Average:	5.8	187.6	0.82	5.97	-83.8	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
3	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX) WA ☐ OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) WA ☐ OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)
	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):
Comments: COLLECTED TWO EXTRA VIALS ON ACCIDENT (5 40mL VIALS IN TOTAL).

Signature: JHA | Date: 3/6/2018

APPENDIX C

Data Validation Memos

Memo

To:	John Long, Project Manager	Project:	0088880100.2018
From:	Crystal Thimsen	cc:	Project File
Tel:	(206) 342-1760		
Fax:	(206) 342-1761		
Date:	March 26, 2018		

Subject: Summary Data Quality Review
March 2018 Boeing Renton Groundwater Sampling
SWMU-168
ARI Work Order Number: 18C0105

This memo presents the summary data quality review of three primary groundwater samples and one trip blank sample collected on March 5, 2018. The samples were submitted to Analytical Resources Inc. (ARI), located in Tukwila, Washington, a laboratory accredited by the Washington State Department of Ecology. The samples were analyzed for volatile organic compounds (VOCs) (vinyl chloride) by U.S. Environmental Protection Agency (EPA) Method 8260C with selected ion monitoring (SIM).

The samples and the analyses conducted on the samples are listed below.

Sample ID	Laboratory Sample ID	Requested Analyses
RGW229S-180305	18C0105-01	vinyl chloride
RGW230I-180305	18C0105-02	vinyl chloride
RGW231S-180305	18C0105-03	vinyl chloride
Trip Blank	18C0105-04	vinyl chloride

Data were reviewed in accordance with the appropriate method procedures and criteria documented in the Quality Assurance Project Plan (QAPP) (Amec Foster Wheeler, 2016). The control limits provided in the QAPP are advisory limits; therefore, the most current control limits provided by the laboratory were used to evaluate the quality control data. In cases where the laboratory did not track limits for an analyte, the limits in the QAPP were used.

Holding times, method/trip blanks, surrogate recoveries, laboratory control samples (LCS) and laboratory control sample duplicates (LCSD), matrix spike/matrix spike duplicates (MS/MSD), field duplicates, and reporting limits were reviewed where available to assess compliance with applicable methods. If qualification was required, data were qualified based on the definitions and use of qualifying flags outlined in the EPA guidance documents (EPA, 2014).

ARI received the samples on March 6, 2018. The temperature of the cooler was recorded upon receipt and was below the maximum acceptable temperature of 6 degrees Celsius (°C).

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600 University Street, Suite 600
Seattle, Washington
USA 98101-4107
Tel (206) 342-1760
Fax (206) 342-1761
www.woodplc.com

ORGANIC ANALYSES

Samples were analyzed for vinyl chloride. Laboratory data were evaluated for the following parameters:

1. Preservation and Holding Times – Acceptable
2. Blanks – Acceptable
3. Surrogates – Acceptable
4. LCS/LCSD – Acceptable
5. MS/MSD – Acceptable

   Extra volume was not submitted for analysis of MS/MSD samples. The project frequency requirement was achieved with MS/MSD analysis conducted at other sites included in this sampling event
6. Field Duplicates – Acceptable

   Field duplicates were not collected at this site during this sampling event. The project frequency requirement of one field duplicate for every 20 samples was achieved with field duplicate samples collected at other sites included in this sampling event.
7. Reporting Limits and Laboratory Flags – Acceptable

   The vinyl chloride result for sample RGW231S-180305 was flagged with an "M" by the laboratory to indicate an estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters. The result is reported as estimated and flagged with a "J."

OVERALL ASSESSMENT OF DATA

The table below summarizes the data assessment. The completeness of ARI work order number 18C0105 is 100 percent. The usefulness of these data was evaluated based on EPA guidance documents listed in the introduction to this report. Few problems were identified, and analytical performance was generally within specified limits.

Sample ID	Qualified Analyte	Qualified Result	Units	Qualifier Reason
RGW229S-180305	none			
RGW230I-180305	none			
RGW231S-180305	vinyl chloride	39.3 J	ng/L	flagged "M" by laboratory
Trip Blank	none			

Abbreviations:
J = the value is estimated
M = the value is estimated but with low spectral match parameters
ng/L = nanograms per liter

REFERENCES

Amec Foster Wheeler Environment & Infrastructure, Inc. (Amec Foster Wheeler), 2016, Quality Assurance Project Plan, Boeing Renton Facility, Renton, Washington: Prepared for the Boeing Company, February.

U.S. Environmental Protection Agency (EPA), 2014a, U.S. EPA National Functional Guidelines for Superfund Organic Methods Data Review: EPA 540-R-014-002, August.

Memo

To:	John Long, Project Manager	Project:	0088880100.2018
From:	Crystal Thimsen	cc:	Project File
Tel:	(206) 342-1760		
Fax:	(206) 342-1761		
Date:	March 30, 2018		

Subject: Summary Data Quality Review
March 2018 Boeing Renton Groundwater Sampling
SWMU-172/174
ARI Work Order Number: 18C0096

This memo presents the summary data quality review of 16 primary groundwater samples, one groundwater field duplicate, and one trip blank sample collected on March 5, 2018. The samples were submitted to Analytical Resources, Inc. (ARI), located in Tukwila, Washington, a laboratory accredited by the Washington State Department of Ecology. The samples were analyzed for the following:

- Volatile organic compounds (VOCs) (cis-1,2-dichloroethene, tetrachloroethene, trichloroethene, and vinyl chloride) by EPA Method 8260C with selected ion monitoring (SIM);
- Total organic carbon (TOC) by Standard Method (SM) 5310;
- Total metals (arsenic, copper, and lead) by EPA Method 6020A; and
- Dissolved arsenic by EPA Method 6020A.

The samples and the analyses conducted on the samples are listed below.

Sample ID	Laboratory Sample ID	Requested Analyses
RGW233I-180305	18C0096-01	all except dissolved arsenic
RGW232S-180305	18C0096-02 18C0096-03	all
RGWDup1-180305	18C0096-04	all except dissolved arsenic
RGW081S-180305	18C0096-05	all except dissolved arsenic
B172-12-180305	18C0096-06 18C0096-07	all
RGW173S-180305	18C0096-08 18C0096-09	all
RGW171S-180305	18C0096-10 18C0096-11	all
RGW226S-180305	18C0096-12	all except dissolved arsenic
RGW153S-180305	18C0096-13	all except dissolved arsenic

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Sample ID	Laboratory Sample ID	Requested Analyses
B172-11-180305	18C0096-14 18C0096-15	all
RGW152S-180305	18C0096-16	all except dissolved arsenic
RGW172S-180305	18C0096-17	all except dissolved arsenic
B172-14-180305	18C0096-18 18C0096-19	all
RGW234S-180305	18C0096-20	all except dissolved arsenic
B172-13-180305	18C0096-21 18C0096-22	all
RGW235I-180305	18C0096-23	all except dissolved arsenic
RGW236S-180305	18C0096-24 18C0096-25	all
Trip Blank	18C0096-26	VOCs

Data were reviewed in accordance with the appropriate method procedures and criteria documented in the Quality Assurance Project Plan (QAPP) (Amec Foster Wheeler, 2016). The control limits provided in the QAPP are advisory limits; therefore, the most current control limits provided by the laboratory were used to evaluate the quality control data. In cases where the laboratory did not track limits for an analyte, the limits in the QAPP were used.

Holding times, method/trip blanks, surrogate recoveries, laboratory control samples (LCS) and laboratory control sample duplicates (LCSD), matrix spike/matrix spike duplicates (MS/MSD), field duplicates, and reporting limits were reviewed where available to assess compliance with applicable methods. If qualification was required, data were qualified based on the definitions and use of qualifying flags outlined in the EPA guidance documents (EPA, 2014a and b).

ARI received the samples on March 6, 2018. The temperatures of the coolers were recorded upon receipt and were below the maximum acceptable temperature of 6 degrees Celsius (°C).

ORGANIC ANALYSES

Samples were analyzed for VOCs. Laboratory data were evaluated for the following parameters:

1. Preservation and Holding Times – Acceptable
2. Blanks – Acceptable
3. Surrogates – Acceptable
4. LCS/LCSD – Acceptable
5. MS/MSD – Acceptable
6. Field Duplicates – Acceptable

   One field duplicate was submitted for each analysis during this sampling event, meeting the project frequency requirement of five percent, or one for every 20 samples. Primary and

duplicate results are summarized in the table below. The project-specific control limit for field duplicate relative percent differences (RPDs) is 30 percent for concentrations greater than five times the reporting limit. The RPD is not calculated for results that are less than five times the reporting limit, as indicated on the table below by "NC." In these cases, the absolute value of the difference between the primary and duplicate result should not exceed the value of the reporting limit. The field duplicate RPDs were within the control limits.

Sample ID/ Field Duplicate ID	Analyte	Primary Result (µg/L)	Duplicate Result (µg/L)	Reporting Limit (µg/L)	RPD (%)
RGW152-180305/ RGWDup1-180305	cis-1,2-dichloroethene	0.226	0.232	0.020	3
	tetrachloroethene	0.938	0.945	0.020	1
	trichloroethene	0.163	0.163	0.020	0
	vinyl chloride	0.0373	0.0404	0.020	8

Notes
µg/L = micrograms per liter
RPD= relative percent difference

7. Reporting Limits and Laboratory Flags – Acceptable except as noted

   The laboratory flagged the vinyl chloride results in samples RGW232S-180305, RGWDup1-180305, and B172-14-180305 with an "M" to indicate an estimated value for the analyte was detected and confirmed by an analyst but with low spectral match parameters. The affected results are qualified as estimated and flagged with a "J."

   The laboratory flagged the tetrachloroethene result for sample B172-11-180305 with an "E" to indicate that the concentration was greater than the calibration range of the instrument. The sample was diluted and reanalyzed. Sample results are not qualified, and tetrachloroethene is reported from the diluted analysis and the remaining analytes are reported from the initial analysis.

INORGANIC ANALYSES

Samples were analyzed for total metals and hexavalent chromium. Laboratory data were evaluated for the following parameters:

1. Preservation and Holding Times – Acceptable
2. Blanks – Acceptable
3. LCS – Acceptable except as noted:
4. MS/MSD – Acceptable
5. Laboratory Duplicates – Acceptable
6. Field Duplicates – Acceptable

   One field duplicate was submitted for each analysis during this sampling event, meeting the project frequency requirement of five percent, or one for every 20 samples. Primary and duplicate results are summarized in the table below. The project-specific control limit for field

duplicate RPDs is 30 percent for concentrations greater than five times the reporting limit. The RPD is not calculated for results that are less than five times the reporting limit, as indicated on the table below by "NC." In these cases, the absolute value of the difference between the primary and duplicate result should not exceed the value of the reporting limit. The field duplicate RPDs were within the control limits.

Sample ID/ Field Duplicate ID	Analyte	Primary Result (mg/L)	Duplicate Result (mg/L)	Reporting Limit (mg/L)	RPD (%)
RGW152S-180305/ RGWDup-180305	TOC	1.88	2.00	0.50	NC
	total arsenic	1.85	1.64	0.200	12
	total copper	2.43	3.02	0.500	22
	total lead	1.22	1.12	0.100	9

Notes
mg/L = milligrams per liter
NC = not calculated
RPD= relative percent difference
TOC = total organic carbon

7. Reporting Limits and Laboratory Flags – Acceptable.

OVERALL ASSESSMENT OF DATA

The table below summarizes the data assessment. The completeness of ARI work order number 18C0096 is 100 percent. The usefulness of these data was evaluated based on EPA guidance documents listed in the introduction to this report. Few problems were identified, and analytical performance was generally within specified limits.

Sample ID	Qualified Analyte	Qualified Result	Units	Qualifier Reason
RGW233I-180305	none			
RGW232S-180305	vinyl chloride	379 J	ng/L	flagged "M" by the laboratory
RGWDup1-180305	vinyl chloride	40.4 J	ng/L	flagged "M" by the laboratory
RGW081S-180305	none			
B172-12-180305	none			
RGW173S-180305	none			
RGW171S-180305	none			
RGW226S-180305	none			
RGW153S-180305	none			
B172-11-180305	none			
RGW152S-180305	none			
RGW172S-180305	none			
B172-14-180305	vinyl chloride	20.9 J	ng/L	flagged "M" by the laboratory
RGW234S-180305	none			
B172-13-180305	none			
RGW235I-180305	none			
RGW236S-180305	none			
Trip Blank	none			

Abbreviations:
J = the value is estimated
M = the value is estimated but with low spectral match parameters
ng/L = nanograms per liter

REFERENCES

Amec Foster Wheeler Environment & Infrastructure, Inc. (Amec Foster Wheeler), 2016, Quality Assurance Project Plan, Boeing Renton Facility, Renton, Washington: Prepared for the Boeing Company, February.

U.S. Environmental Protection Agency (EPA), 2014a, U.S. EPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review: EPA 540-R-014-002, August.

EPA, 2014b, U.S. EPA National Functional Guidelines for Inorganic Superfund Data Review: EPA 540-R-013-001, August.

Memo

To:	John Long, Project Manager	Project:	0088880100.2017
From:	Crystal Thimsen	cc:	Project File
Tel:	(206) 342-1760		
Fax:	(206) 342-1761		
Date:	April 30, 2018		

Subject: Summary Data Quality Review
March 2018 Boeing Renton Groundwater Sampling
Building 4-78/79 SWMU/AOC Group
ARI Work Order Number: 18C0133

This memo presents the summary data quality review of 16 primary groundwater samples, one field duplicate groundwater sample, and one trip blank sample collected on March 6, 2018. The samples were submitted to Analytical Resources, Inc. (ARI), located in Tukwila, Washington, a laboratory accredited by the Washington State Department of Ecology (Ecology). The samples were analyzed for the following:

- Volatile organic compounds (VOCs) (limited suite: benzene, vinyl chloride, cis-1,2-dichloroethene, and trichloroethene) by U.S. Environmental Protection Agency (EPA) Method 8260C;
- Total petroleum hydrocarbons as gasoline (TPH-G) by Ecology Method NWTPH-Gx; and
- Total organic carbon (TOC) by Standard Method (SM) 5310B-2000.

The samples and the analyses conducted on the samples are listed below.

Sample ID	Laboratory Sample ID	Requested Analyses
RGWDUP2-180306	18C0133-01	all
RGW038S-180306	18C0133-02	all
RGW239I-180306	18C0133-03	all
RGW240D-180306	18C0133-04	all
RGW143S-180306	18C0133-05	all
RGW242I-180306	18C0133-06	VOCs and TPH-G
RGW241S-180306	18C0133-07	VOCs and TPH-G
RGW237S-180306	18C0133-08	all
RGW238I-180306	18C0133-09	all
RGW210S-180306	18C0133-10	all
RGW209S-180306	18C0133-11	all
RGW031S-180306	18C0133-12	all
RGW039S-180306	18C0133-13	all

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Sample ID	Laboratory Sample ID	Requested Analyses
RGW244S-180306	18C0133-14	all
RGW033S-180306	18C0133-15	all
RGW243I-180306	18C0133-16	all
RGW0345-180306	18C0133-17	all
Trip Blank	18C0133-18	VOCs and TPH-G

Data were reviewed in accordance with the appropriate method procedures and criteria documented in the Quality Assurance Project Plan (QAPP) (Amec Foster Wheeler, 2016). The control limits provided in the QAPP are advisory limits; therefore, the most current control limits provided by the laboratory were used to evaluate the quality control data. In cases where the laboratory did not track limits for an analyte, the limits in the QAPP were used.

Holding times, method/trip blanks, surrogate recoveries, laboratory control samples (LCS) and laboratory control sample duplicates (LCSD), matrix spike/matrix spike duplicates (MS/MSD), field duplicates, and reporting limits were reviewed where available to assess compliance with applicable methods. If qualification was required, data were qualified based on the definitions and use of qualifying flags outlined in EPA guidelines (EPA, 2014a and b).

ARI received the samples on March 7, 2018. The temperatures of the coolers were recorded upon receipt and were below the maximum acceptable temperature of 6 degrees Celsius (°C). ARI noted the following upon sample receipt:

- Small (> than 2 millimeters [mm]) and large (> 4 mm) air bubbles were noted in two of six vials submitted for sample RGW240D-180306, a small bubble was noted in one of six vials submitted for sample RGW210S-180306, and pea-sized bubbles (approximately 2 to 4 mm) and large bubbles were noted in six of eight vials submitted for the trip blank. The laboratory proceeded with analysis using unaffected vials if available or the least affected vials, and sample results are not qualified.

ORGANIC ANALYSES

Samples were analyzed for VOCs and TPH-G. Laboratory data were evaluated for the following parameters:

1. Preservation and Holding Times – Acceptable
2. Blanks – Acceptable
3. Surrogates – Acceptable except as noted:

   VOCs by EPA 8260C: The recoveries for one of three surrogates, 1,2-dichloroethane-d4, was 210 and 208 percent, respectively, for samples RGWDUP2-180306 and RGW031S-180306, above the control limits of 80 to 129 percent. The laboratory did not reanalyze the samples. The high surrogate recovery equates to a potential high bias in the sample; therefore, detected analytes are qualified as estimated and flagged with a “J” and non-detected analytes are not qualified.

4. LCS/LCSD – Acceptable
5. MS/MSD – Acceptable
6. Field Duplicates – Acceptable

   One field duplicate was submitted for each analysis during this sampling event, meeting the project frequency requirement of five percent, or one for every 20 samples. Primary and duplicate results are summarized in the table below. The relative percent differences (RPDs) for the field duplicate are within the project-specific control limit of 30 percent.

Sample ID/ Field Duplicate ID	Analyte	Primary Result (µg/L)	Duplicate Result (µg/L)	Primary/Duplicate Reporting Limit (µg/L)	RPD (%)
RGW031S-180306/ RGWDUP2-180306	benzene	60.3	58.3	0.03	3
	cis-1,2-dichloroethene	1.18	1.13	0.04	4
	TPH-G	3,450	3,490	100	1

Notes
µg/L = micrograms per liter
RPD= relative percent difference
TPH-G = total petroleum hydrocarbons as gasoline

7. Reporting Limits and Laboratory Flags – Acceptable except as noted:

   VOCs by EPA 8260C: The laboratory flagged the cis-1,2-dichloroethene results in samples RGWDUP2-180306 and RGW031S-180306 with an "M" to indicate an estimated value for the analyte was detected and confirmed by an analyst but with low spectral match parameters. The affected results are qualified as estimated and flagged with a "J."

INORGANIC ANALYSES

Samples were analyzed for TOC. Laboratory data were evaluated for the following parameters:

1. Preservation and Holding Times – Acceptable
2. Blanks – Acceptable
3. LCS – Acceptable
4. MS – Acceptable
5. Laboratory Duplicates – Acceptable
6. Field Duplicates – Acceptable

   One field duplicate was submitted for each analysis during this sampling event, meeting the project frequency requirement of five percent, or one for every 20 samples. Primary and duplicate results are summarized in the table below. The RPDs are acceptable.

Sample ID/ Field Duplicate ID	Analyte	Primary Result (µg/L)	Duplicate Result (µg/L)	Reporting Limit (µg/L)	RPD (%)
RGW031S-180306/ RGWDUP2-180306	TOC	14.90	15.50	0.50	4

Notes
µg/L = micrograms per liter
RPD= relative percent difference
TOC = total organic carbon

7. Reporting Limits and Laboratory Flags – Acceptable

OVERALL ASSESSMENT OF DATA

The table below summarizes the data assessment. The completeness of ARI work order number 18C0133 is 100 percent. Evaluation of the usefulness of these data is based on EPA guidance documents identified in the introduction to this report. Few problems were identified, and analytical performance was generally within specified limits. The data meet the project's data quality objectives.

Sample ID	Qualified Analyte	Qualified Result (µg/L)	Qualifier Reason
RGWDUP2-180306	cis-1,2-dichloroethene benzene	1.13 J 58.3 J	flagged "M" by lab/surrogate recovery surrogate recovery
RGW038S-180306	none		
RGW239I-180306	none		
RGW240D-180306	none		
RGW143S-180306	none		
RGW242I-180306	none		
RGW241S-180306	none		
RGW237S-180306	none		
RGW238I-180306	none		
RGW210S-180306	none		
RGW209S-180306	none		
RGW031S-180306	cis-1,2-dichloroethene benzene	1.18 J 60.3 J	flagged "M" by lab/surrogate recovery surrogate recovery
RGW039S-180306	none		
RGW244S-180306	none		
RGW033S-180306	none		
RGW243I-180306	none		
RGW0345-180306	none		
Trip Blank	none		

Abbreviations:
µg/L = micrograms per liter
J = the value is an estimate
M = the value is estimated but with low spectral match parameters

REFERENCES

Amec Foster Wheeler Environment & Infrastructure, Inc. (Amec Foster Wheeler), 2016, Quality Assurance Project Plan, Boeing Renton Facility, Renton, Washington: Prepared for the Boeing Company, February.

U.S. Environmental Protection Agency (EPA), 2014a, U.S. EPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review: EPA 540-R-014-002, August.

EPA, 2014b, U.S. EPA National Functional Guidelines for Inorganic Superfund Data Review: EPA 540-R-013-001, August.

Memo

To:	John Long, Project Manager	Project:	0088880100.2018
From:	Crystal Thimsen	cc:	Project File
Tel:	(206) 342-1760		
Fax:	(206) 342-1761		
Date:	April 3, 2018		

Subject: Summary Data Quality Review
March 2018 Boeing Renton Groundwater Sampling
AOC-001 and -002 and AOC-003
ARI Work Order Number: 18C0127

This memo presents the summary data quality review of 18 primary groundwater samples, one field duplicate, and one trip blank sample collected on March 7, 2018. The samples were submitted to Analytical Resources, Inc. (ARI), located in Tukwila, Washington, a laboratory accredited by the Washington State Department of Ecology.

The samples from AOC-001 and -002 were analyzed for the following:

- Volatile organic compounds (VOCs) (benzene only reported) by U.S. Environmental Protection Agency (EPA) Method 8260C;
- VOCs (Vinyl chloride, 1,1-dichloroethene, trichloroethene, and cis-1,2-dichloroethene) by EPA Method 8260C with selected ion monitoring (SIM);
- Total organic carbon (TOC) by Standard Method (SM) 5310C.

Samples from AOC-003 were analyzed for the following:

- VOCs (cis-1,2-dichloroethene, tetrachloroethene, trichloroethene, and vinyl chloride) by EPA Method 8260C SIM; and
- TOC by SM 5310C.

The samples and the analyses conducted on the samples are listed below.

Sample ID	Laboratory Sample ID	Requested Analyses
RGWDup3-180307	18C0127-01	all AOC-001 and -002 analyses
RGW214S-180307	18C01227-02	all AOC-001 and -002 analyses
RGW185S-180307	18C0127-03	all AOC-001 and -002 analyses
RGW213S-180307	18C0127-04	all AOC-001 and -002 analyses
RGW197S-180307	18C0127-05	all AOC-001 and -002 analyses
RGW050S-180307	18C0127-06	all AOC-001 and -002 analyses
RGW245S-180307	18C0127-07	all AOC-001 and -002 analyses
RGW195-180307	18C0127-08	all AOC-001 and -002 analyses
RGW194S-180307	18C0127-09	all AOC-001 and -002 analyses

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Sample ID	Laboratory Sample ID	Requested Analyses
RGW196D-180307	18C0127-10	all AOC-001 and -002 analyses
RGW246S-180307	18C0127-11	all AOC-001 and -002 analyses
RGW191D-180307	18C0127-12	all AOC-001 and -002 analyses
RGW190S-180307	18C0127-13	all AOC-001 and -002 analyses
RGW192S-180307	18C0127-14	all AOC-001 and -002 analyses
RGW193S-180307	18C0127-15	all AOC-001 and -002 analyses
RGW247S-180307	18C0127-16	all AOC-003 analyses
RGW248I-180307	18C0127-17	all AOC-003 analyses
RGW188S-180307	18C0127-18	all AOC-003 analyses
RGW249I-180307	18C0127-19	all AOC-003 analyses
Trip Blank	18C0127-20	VOCs

Data were reviewed in accordance with the appropriate method procedures and criteria documented in the Quality Assurance Project Plan (QAPP) (Amec Foster Wheeler, 2016). The control limits provided in the QAPP are advisory limits; therefore, the most current control limits provided by the laboratory were used to evaluate the quality control data. In cases where the laboratory did not track limits for an analyte, the limits in the QAPP were used.

Holding times, method/trip blanks, surrogate recoveries, laboratory control samples (LCS) and laboratory control sample duplicates (LCSD), matrix spike/matrix spike duplicates (MS/MSD), field duplicates, and reporting limits were reviewed where available to assess compliance with applicable methods. If qualification was required, data were qualified based on the definitions and use of qualifying flags outlined in the EPA guidance documents (EPA, 2014a and b).

ARI received the samples on March 8, 2018. The temperatures of the coolers were recorded upon receipt and were below the maximum acceptable temperature of 6 degrees Celsius (°C).

ORGANIC ANALYSES

Samples were analyzed for VOCs. Laboratory data were evaluated for the following parameters:

1. Preservation and Holding Times – Acceptable
2. Blanks – Acceptable
3. Surrogates – Acceptable
4. LCS/LCSD – Acceptable except as noted:

   The vinyl chloride recovery in the SIM LCSD analyzed on March 9, 2018 with batch BGC0272 was 124 percent, greater than the control limits of 76 to 120 percent. The associated LSC recovery was acceptable; therefore, sample results are not affected and are not qualified.

5. MS/MSD – Acceptable
6. Field Duplicates – Acceptable

   One field duplicate was submitted for each analysis during this sampling event, meeting the project frequency requirement of five percent, or one for every 20 samples. Primary and duplicate results are summarized in the table below. The project-specific control limit for field duplicate relative percent differences (RPDs) is 30 percent for concentrations greater than five times the reporting limit. The RPD is not calculated for results that are less than five times the reporting limit, as indicated on the table below by "NC." In these cases, the absolute value of the difference between the primary and duplicate result should not exceed the value of the reporting limit. The field duplicate RPDs were within the control limits.

Sample ID/ Field Duplicate ID	Analyte	Primary Result (µg/L)	Duplicate Result (µg/L)	Reporting Limit (µg/L)	RPD (%)
RGW185S-180307/ RGWDup3-180307	benzene	0.31	0.30	0.20	NC
	vinyl chloride	0.219	0.231	0.020	5
	cis-1,2-dichloroethene	0.234	0.236	0.020	1

Notes
µg/L = micrograms per liter
NC = not calculated
RPD= relative percent difference

7. Reporting Limits and Laboratory Flags – Acceptable except as noted:

   The laboratory flagged all of the detected vinyl chloride results with an "M" to indicate an estimated value for the analyte was detected and confirmed by an analyst but with low spectral match parameters. The affected results are qualified as estimated and flagged with a "J."

INORGANIC ANALYSES

Samples were analyzed for TOC. Laboratory data were evaluated for the following parameters:

1. Preservation and Holding Times – Acceptable
2. Blanks – Acceptable
3. LCS – Acceptable
4. MS – Acceptable
5. Laboratory Duplicates – Acceptable
6. Field Duplicates – Acceptable

   One field duplicate was submitted for TOC analysis during this sampling event, meeting the project frequency requirement of five percent, or one for every 20 samples. Primary and duplicate results are summarized in the table below. The project-specific control limit for field duplicate RPDs is 30 percent for concentrations greater than five times the reporting limit. The field duplicate RPD was within the control limits.

Sample ID/ Field Duplicate ID	Analyte	Primary Result (mg/L)	Duplicate Result (mg/L)	Reporting Limit (mg/L)	RPD (%)
RGW185S-180307/ RGWDup3-180307	TOC	13.39	13.15	0.50	2

Notes
mg/L = milligrams per liter
RPD= relative percent difference
TOC = total organic carbon

7. Reporting Limits and Laboratory Flags – Acceptable

OVERALL ASSESSMENT OF DATA

The table below summarizes the data assessment. The completeness of ARI work order number 18C0127 is 100 percent. The usefulness of these data was evaluated based on EPA guidance documents listed in the introduction to this report. Few problems were identified, and analytical performance was generally within specified limits.

Sample ID	Qualified Analyte	Qualified Result	Units	Qualifier Reason
RGWDup3-180307	vinyl chloride	231 J	ng/L	flagged “M” by laboratory
RGW214S-180307	none			
RGW185S-180307	vinyl chloride	219 J	ng/L	flagged “M” by laboratory
RGW213S-180307	vinyl chloride	214 J	ng/L	flagged “M” by laboratory
RGW197S-180307	vinyl chloride	287 J	ng/L	flagged “M” by laboratory
RGW050S-180307	vinyl chloride	71.9 J	ng/L	flagged “M” by laboratory
RGW245S-180307	none			
RGW195-180307	vinyl chloride	81.5 J	ng/L	flagged “M” by laboratory
RGW194S-180307	none			
RGW196D-180307	vinyl chloride	56.7 J	ng/L	flagged “M” by laboratory
RGW246S-180307	vinyl chloride	506 J	ng/L	flagged “M” by laboratory
RGW191D-180307	vinyl chloride	147 J	ng/L	flagged “M” by laboratory
RGW190S-180307	vinyl chloride	444 J	ng/L	flagged “M” by laboratory
RGW192S-180307	vinyl chloride	526 J	ng/L	flagged “M” by laboratory
RGW193S-180307	vinyl chloride	82.4 J	ng/L	flagged “M” by laboratory
RGW247S-180307	vinyl chloride	453 J	ng/L	flagged “M” by laboratory
RGW248I-180307	vinyl chloride	647 J	ng/L	flagged “M” by laboratory
RGW188S-180307	vinyl chloride	443 J	ng/L	flagged “M” by laboratory
RGW249I-180307	vinyl chloride	114 J	ng/L	flagged “M” by laboratory
Trip Blank	none			

Abbreviations:
J = the value is estimated
M = the value is estimated but with low spectral match parameters
ng/L = nanograms per liter

REFERENCES

Amec Foster Wheeler Environment & Infrastructure, Inc. (Amec Foster Wheeler), 2016, Quality Assurance Project Plan, Boeing Renton Facility, Renton, Washington: Prepared for the Boeing Company, February.

U.S. Environmental Protection Agency (EPA), 2014a, U.S. EPA National Functional Guidelines for Superfund Organic Methods Data Review: EPA 540-R-014-002, August.

EPA, 2014b, U.S. EPA National Functional Guidelines for Inorganic Superfund Data Review: EPA 540-R-013-001, August.

Memo

To:	John Long, Project Manager	Project:	0088880100.2018
From:	Crystal Thimsen	cc:	Project File
Tel:	(206) 342-1760		
Fax:	(206) 342-1761		
Date:	March 26, 2018		

Subject: Summary Data Quality Review
March 2018 Boeing Renton Groundwater Sampling
AOC-004
ARI Work Order Number: 18C0124

This memo presents the summary data quality review of two primary groundwater samples collected on March 6, 2018. The samples were submitted to Analytical Resources, Inc. (ARI), located in Tukwila, Washington, a laboratory accredited by the Washington State Department of Ecology. The samples were analyzed for total lead by U.S. Environmental Protection Agency (EPA) Method 6020A.

The samples and the analyses conducted on the samples are listed below.

Sample ID	Laboratory Sample ID	Requested Analyses
RGW174S-180306	18C0124-01	total lead
RGW250S-180306	18C0124-02	total lead

Data were reviewed in accordance with the appropriate method procedures and criteria documented in the Quality Assurance Project Plan (QAPP) (Amec Foster Wheeler, 2016). The control limits provided in the QAPP are advisory limits; therefore, the most current control limits provided by the laboratory were used to evaluate the quality control data. In cases where the laboratory did not track limits for an analyte, the limits in the QAPP were used.

Holding times, method/trip blanks, laboratory control samples (LCS) and laboratory control sample duplicates (LCSD), matrix spike/matrix spike duplicates (MS/MSD), field duplicates, and reporting limits were reviewed where available to assess compliance with applicable methods. If qualification was required, data were qualified based on the definitions and use of qualifying flags outlined in the EPA guidance documents (EPA, 2014).

ARI received the samples on March 7, 2018. The temperature of the cooler was recorded upon receipt and was below the maximum acceptable temperature of 6 degrees Celsius (°C).

INORGANIC ANALYSES

Samples were analyzed for total lead. Laboratory data were evaluated for the following parameters:

1. Preservation and Holding Times – Acceptable
2. Blanks – Acceptable

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3. LCS – Acceptable
4. MS/MSD – Acceptable

   Additional sample volume was not submitted for MS/MSD analyses with samples collected from this site. MS/MSD results were reported with samples not associated with project samples; therefore, sample results are evaluated based on LCS/LCSD results. Project-specific MS/MSD requirements were met with samples collected at other sites included in this sampling event. The laboratory reported MS/MSD results; but project samples are not evaluated using this data since the spiked sample was not a project sample

5. Field Duplicates – Acceptable

   Field duplicates were not collected at this site during this sampling event. The project frequency requirement of one field duplicate for every 20 samples was achieved with field duplicate samples collected at other sites included in this sampling event.

6. Reporting Limits and Laboratory Flags – Acceptable

OVERALL ASSESSMENT OF DATA

The table below summarizes the data assessment. The completeness of work order number 18C0124 is 100 percent. The usefulness of these data was evaluated based on EPA guidance documents listed in the introduction to this report. Few problems were identified, and analytical performance was generally within specified limits.

Sample ID	Qualified Analyte
RGW174S-180306	none
RGW250S-180306	none

REFERENCES

Amec Foster Wheeler Environment & Infrastructure, Inc. (Amec Foster Wheeler), 2016, Quality Assurance Project Plan, Boeing Renton Facility, Renton, Washington: Prepared for the Boeing Company, February.

U.S. Environmental Protection Agency (EPA), 2014, U.S. EPA National Functional Guidelines for Inorganic Superfund Data Review: EPA 540-R-013-001, August.

Memo

To:	John Long, Project Manager	Project:	0088880100.2018
From:	Crystal Thimsen	cc:	Project File
Tel:	(206) 342-1760		
Fax:	(206) 342-1761		
Date:	April 30, 2018		

Subject: **Summary Data Quality Review**
March 2018 Boeing Renton Groundwater Sampling
AOC-060
ARI Work Order Number: 18C0131

This memo presents the summary data quality review of nine primary groundwater samples, one field duplicate, and one trip blank sample collected on March 6, 2018. The samples were submitted to Analytical Resources, Inc. (ARI), located in Tukwila, Washington, a laboratory accredited by the Washington State Department of Ecology. The samples were selectively analyzed for the following:

- Volatile organic compounds (VOCs) (cis-1,2-dichloroethene, trichloroethene, and vinyl chloride) by U.S. Environmental Protection Agency (EPA) Method 8260C with selected ion monitoring (SIM); and
- Total organic carbon (TOC) by Standard Method (SM) 5310 - C2000.

The samples and the analyses conducted on the samples are listed below.

Sample ID	Laboratory Sample ID	Requested Analyses
RGWDup4-180306	18C0131-01	all
RGW014S-180306	18C0131-02	all
RGW147S-180306	18C0131-03	all
RGW012S-180306	18C0131-04	all
RGW254S-180306	18C0131-05	all
RGW149S-180306	18C0131-06	all
RGW150S-180306	18C0131-07	all
RGW252S-180306	18C0131-08	all
RGW253I-180306	18C0131-09	all
RGW009S-180306	18C0131-10	all
Trip Blank	18C0131-11	VOCs

Data were reviewed in accordance with the appropriate method procedures and criteria documented in the Quality Assurance Project Plan (QAPP) (Amec Foster Wheeler, 2016). The control limits provided in the QAPP are advisory limits; therefore, the most current control limits provided by the laboratory were used to evaluate the quality control data. In cases where the laboratory did not track limits for an analyte, the limits in the QAPP were used.

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Hold times, method/trip blanks, surrogate recoveries, laboratory control samples (LCS) and laboratory control sample duplicates (LCSD), matrix spike/matrix spike duplicates (MS/MSD), field duplicates, and reporting limits were reviewed where available to assess compliance with applicable methods. If qualification was required, data were qualified based on the definitions and use of qualifying flags outlined in EPA guidelines (EPA, 2014a and b).

Samples were received by ARI on March 8, 2018. The temperatures of the coolers were recorded upon receipt and were below the maximum acceptable temperature of 6° Celsius. The following was noted by the laboratory upon sample receipt:

- Though a trip blank was submitted with the samples, it was not included on the chain-of-custody. The laboratory logged the sample in for analysis of VOCs and proceeded with analysis.
- The laboratory noted two large bubbles (greater than 4 millimeters [mm]) and two pea-sized bubbles (between 2 and 4 mm) in two out of four vials submitted for sample RGW253S-180306. Large air bubbles were also noted in both vials submitted for the trip blank. The laboratory proceeded with analysis using unaffected vials if possible, and sample results are not qualified.

ORGANIC ANALYSES

Samples were analyzed for VOCs. Laboratory data were evaluated for the following parameters.

1. Preservation and Holding Times – Acceptable
2. Blanks – Acceptable
3. Surrogates – Acceptable
4. LCS/LCSD – Acceptable
5. MS/MSD – Acceptable
6. Field Duplicates – Acceptable
7. One field duplicate was submitted for each analysis during this sampling event, meeting the project frequency requirement of five percent, or one for every 20 samples. Primary and duplicate results are summarized in the table below. The project-specific control limit for field duplicate relative percent differences (RPDs) is 30 percent for concentrations greater than five times the reporting limit. The RPD is not calculated for results that are less than five times the reporting limit, as indicated on the table below by “NC.” In these cases, the absolute value of the difference between the primary and duplicate result should not exceed the value of the reporting limit. The field duplicate RPDs were within the control limits.

Sample ID/ Field Duplicate ID	Analyte	Primary Result (µg/L)	Duplicate Result (µg/L)	Reporting Limit (µg/L)	RPD (%)
RGW014S-180306/ RGWDup4-180306	cis-1,2-dichloroethene trichloroethene vinyl chloride	0.134 0.0347 0.266	0.139 0.0372 0.283	0.020 0.020 0.020	4 NC 6

Notes:
µg/L = micrograms per liter
NC = not calculated
RPD= relative percent difference

8. Reporting Limits and Laboratory Flags – Acceptable

   The laboratory flagged all of the detected vinyl chloride results with an "M" to indicate an estimated value for the analyte was detected and confirmed by an analyst but with low spectral match parameters. The affected results are qualified as estimated and flagged with a "J."

CONVENTIONAL ANALYSES

Samples were analyzed for TOC. Laboratory data were evaluated for the following parameters:

1. Preservation and Holding Times – Acceptable
2. Blanks – Acceptable
3. LCS – Acceptable
4. MS – Acceptable except as noted:
5. Laboratory Duplicates – Acceptable
6. Field Duplicates – Acceptable
7. One field duplicate was submitted for TOC analysis during this sampling event, meeting the project frequency requirement of five percent, or one for every 20 samples. Primary and duplicate results are summarized in the table below.

Sample ID/ Field Duplicate ID	Analyte	Primary Result (mg/L)	Duplicate Result (mg/L)	Reporting Limit (mg/L)	RPD (%)
RGW014S-180306/ RGWDup4-180306	TOC	3.18	3.15	0.50	1

Notes:
mg/L = milligrams per liter
RPD= relative percent difference
TOC = total organic carbon

8. Reporting Limits – Acceptable

OVERALL ASSESSMENT OF DATA

A summary of the data assessment is presented in the table below. The completeness of work order number 18C0131 is 100 percent. Evaluation of the usefulness of these data is based on the EPA guidance document listed in the introduction to this report. Few problems were identified, and analytical performance was generally within specified limits. The data meet the project's data quality objectives.

Sample ID	Qualified Analyte	Qualified Result	Units	Qualifier Reason
RGWDup4-180306	vinyl chloride	283 J	ng/L	flagged "M" by the laboratory
RGW014S-180306	vinyl chloride	266 J	ng/L	flagged "M" by the laboratory
RGW147S-180306	none			
RGW012S-180306	vinyl chloride	586 J	ng/L	flagged "M" by the laboratory
RGW254S-180306	vinyl chloride	30.3 J	ng/L	flagged "M" by the laboratory
RGW149S-180306	vinyl chloride	85.4 J	ng/L	flagged "M" by the laboratory
RGW150S-180306	vinyl chloride	59.6 J	ng/L	flagged "M" by the laboratory
RGW252S-180306	none			
RGW253I-180306	vinyl chloride	132 J	ng/L	flagged "M" by the laboratory
RGW009S-180306	vinyl chloride	241 J	ng/L	flagged "M" by the laboratory
Trip Blank	none			

Abbreviations:
J = the value is estimated
M = the value is estimated but with low spectral match parameters
ng/L = nanograms per liter

REFERENCES

Amec Foster Wheeler Environment & Infrastructure, Inc. (Amec Foster Wheeler), 2016, Quality Assurance Project Plan, Boeing Renton Facility, Renton, Washington: Prepared for the Boeing Company, February.

EPA, 2014a, U.S. EPA National Functional Guidelines for Superfund Organic Methods Data Review (SOM02.2): EPA 540-R-014-002, August 2014.

EPA, 2014b, U.S. EPA National Functional Guidelines for Inorganic Superfund Data Review (ISM02.2): EPA 540-R-013-001, August 2014.

Memo

To:	John Long, Project Manager	Project:	0088880100.2018
From:	Crystal Thimsen	cc:	Project File
Tel:	(206) 342-1760		
Fax:	(206) 342-1761		
Date:	May 2, 2018		

Subject: Summary Data Quality Review
March 2018 Boeing Renton Groundwater Sampling
AOC-090
ARI Work Order Number: 18C0108

This memo summarizes the data quality review of 11 primary groundwater samples, one duplicate sample, and one trip blank sample collected on March 5, 2018. The samples were submitted to Analytical Resources, Inc. (ARI), located in Tukwila, Washington, a laboratory accredited by the Washington State Department of Ecology (Ecology). The samples were selectively analyzed for the following:

- Volatile organic compounds (VOCs) (acetone, methylene chloride, trans-1,2-dichlorethene, cis-1,2-dichloroethene, chloroform, carbon tetrachloride, benzene, toluene, 1,1,2-trichloroethane) by U.S. Environmental Protection Agency (EPA) Method 8260C;
- VOCs (vinyl chloride, 1,1-dichloroethene, trichloroethene, tetrachloroethene, 1,1,2,2-tetrachloroethane) by EPA Method 8260C with selected ion monitoring (SIM);
- Total petroleum hydrocarbons in the gasoline range (TPH-G) by Ecology Method NWTPH-Gx;
- Total petroleum hydrocarbons in the diesel and motor oil ranges (TPH-D and TPH-O) by Ecology Method NWTPH-Dx (with silica gel cleanup); and
- Total organic carbon (TOC) by Standard Method (SM) 5310C.

The samples and the analyses conducted on the samples are listed below.

Sample ID	Laboratory Sample ID	Requested Analyses
RGWDup5-180305	18C0108-01	VOCs and TPH
RGW189S-180305	18C0108-02	all
RGW165I-180305	18C0108-03	VOCs and TPH
RGW163I-180305	18C0108-04	VOCs and TPH
RGW207S-180305	18C0108-05	VOCs and TPH
RGW176S-180305	18C0108-06	VOCs and TPH
RGW175I-180305	18C0108-07	VOCs and TPH
RGW179I-180305	18C0108-08	VOCs and TPH
RGW180S-180305	18C0108-09	VOCs and TPH
RGW208S-180305	18C0108-10	VOCs and TPH

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Sample ID	Laboratory Sample ID	Requested Analyses
RGW177I-180305	18C0108-11	VOCs and TPH
RGW178S-180305	18C0108-12	VOCs and TPH
Trip Blank	18C0108-13	VOCs and TPH-G

Data were reviewed in accordance with the appropriate method procedures and criteria documented in the Quality Assurance Project Plan Addendum (QAPP) (Amec Foster Wheeler, 2016). The control limits provided in the QAPP are advisory limits; therefore, the most current control limits provided by the laboratory were used to evaluate the quality control data. In cases where the laboratory did not track limits for an analyte, the limits in the QAPP were used.

Holding times, method/trip blanks, surrogate recoveries, laboratory control samples (LCS), laboratory duplicates (LCSD), matrix spike/matrix spike duplicates (MS/MSD), standard reference materials, field duplicates, and reporting limits were reviewed where available to assess compliance with applicable methods. If qualification was required, data were qualified based on the definitions and use of qualifying flags outlined in EPA guidelines (EPA, 2014a and b).

ARI received the samples on March 6, 2018. The temperatures of the coolers were recorded upon receipt and were less than the maximum acceptable temperature of 6 degrees Celsius (°C). Small air bubbles (approximately 2 millimeters [mm]) were observed in:

- One out of 21 vials submitted for sample RGW189S-180305,
- One out of seven vials submitted for sample RGW179I-180305,
- Two out of seven vials submitted for sample RGW180S-180305,
- One out of seven vials submitted for sample RGW177I-180305, and
- One out of seven vials submitted for sample RGW178S-180305.

Pea-sized air bubbles (between 2 and 4 mm) were observed in:

- One out of seven vials submitted for sample RGW165I-180305,
- Five out of seven vials submitted for sample RGW163I-180305,
- Five out of seven vials submitted for sample RGW176S-180305,
- One out of seven vials submitted for sample RGW179I-180305,
- Two out of seven vials submitted for sample RGW208S-180305,
- One out of seven vials submitted for sample RGW178S-180305, and
- One out of five vials submitted for the trip blank.

Large air bubbles (approximately 4 mm) were observed in:

- Three out of seven vials submitted for sample RGW165I-180305,
- One out of seven vials submitted for sample RGW163I-180305,

- Three out of seven vials submitted for sample RGW175I-180305,
- Two out of seven vials submitted for sample RGW179I-180305,
- Two out of seven vials submitted for sample RGW208S-180305,
- Four out of seven vials submitted for sample RGW177I-180305, and
- Two out of five vials submitted for the trip blank.

The laboratory proceeded with analysis using unaffected or the least affected vials, and sample results are not qualified.

ORGANIC ANALYSES

Samples were analyzed for VOCs and TPH. Laboratory data were evaluated for the following parameters:

1. Preservation and Holding Times – Acceptable
2. Blanks – Acceptable
3. Surrogates – Acceptable
4. LCS/LCSD – Acceptable
5. MS/MSD – Acceptable except as noted:

   VOCs by EPA 8260C: the recoveries for cis-1,2-dichloroethene and toluene in the MS performed with sample RGW189S-180305 were below the control limits. The associated MSD recoveries were acceptable; therefore, sample results were not affected. The recoveries for 1,1,2-trichloroethane in the MS/MSD performed with sample RGW189S-180305 were greater than the control limits. The high recovery equates to a potential high bias in the sample and 1,1,2-trichloroethane was not detected in sample RGW189S-180305. Therefore, sample results are not affected by the potential high bias and are not qualified.

6. Field Duplicates – Acceptable

   One field duplicate was submitted for each analysis during this sampling event, meeting the project frequency requirement of five percent, or one for every 20 samples. Primary and duplicate results are summarized in the table below. The project-specific control limit for field duplicate relative percent differences (RPDs) is 30 percent for concentrations greater than five times the reporting limit. The RPD is not calculated for results that are less than five times the reporting limit, as indicated on the table below by “NC.” In these cases, the absolute value of the difference between the primary and duplicate result should not exceed the value of the reporting limit. The field duplicate RPDs were within the control limits.

Sample ID/ Field Duplicate ID	Analyte	Primary Result (ng/L)	Duplicate Result (ng/L)	Reporting Limit (ng/L)	RPD (%)
RGW014S-180306/ RGWDup5-180305	vinyl chloride	20.0 U	21.2	20	NC

Notes:
µg/L = micrograms per liter
NC = not calculated
RPD= relative percent difference

7. Reporting Limits and Laboratory Flags – Acceptable

   The laboratory flagged all of the detected vinyl chloride results with an "M" to indicate an estimated value for the analyte was detected and confirmed by an analyst but with low spectral match parameters. The affected results are qualified as estimated and flagged with a "J."

CONVENTIONAL ANALYSES

Samples were analyzed for TOC. Laboratory data were evaluated for the following parameters:

1. Preservation and Holding Times – Acceptable
2. Blanks – Acceptable
3. LCS – Acceptable
4. MS – Acceptable except as noted:
5. Laboratory Duplicates – Acceptable
6. Field Duplicates

   A field duplicate was not collected for TOC analysis at this site during this sampling event. The project frequency requirement of one field duplicate for every 20 samples was achieved with field duplicate samples collected at other sites included in this sampling event

7. Reporting Limits – Acceptable

OVERALL ASSESSMENT OF DATA

The completeness of ARI work order number 18C0108 is 100 percent. Evaluation of the usefulness of these data was evaluated based on EPA guidance documents listed in the introduction to this report. Few problems were identified, and analytical performance was generally within specified limits. The data, as qualified, meet the project's data quality objectives.

A summary of the data quality review is presented in the table below.

Sample ID	Qualified Analyte	Qualified Result	Units	Qualifier Reason
RGWDup5-180305	vinyl chloride	21.2 J	ng/L	flagged “M” by the laboratory
RGW189S-180305	vinyl chloride	508 J	ng/L	flagged “M” by the laboratory
RGW165I-180305	none			
RGW163I-180305	none			
RGW207S-180305	vinyl chloride	30.0 J	ng/L	flagged “M” by the laboratory
RGW176S-180305	vinyl chloride	208 J	ng/L	flagged “M” by the laboratory
RGW175I-180305	none			
RGW179I-180305	vinyl chloride	33.2 J	ng/L	flagged “M” by the laboratory
RGW180S-180305	none			
RGW208S-180305	vinyl chloride	388 J	ng/L	flagged “M” by the laboratory
RGW177I-180305	vinyl chloride	45.4 J	ng/L	flagged “M” by the laboratory
RGW178S-180305	vinyl chloride	409 J	ng/L	flagged “M” by the laboratory
Trip Blank	none			

Abbreviations:
J = the value is estimated
M = the value is estimated but with low spectral match parameters
ng/L = nanograms per liter

REFERENCES

Amec Foster Wheeler Environment & Infrastructure, Inc. (Amec Foster Wheeler), 2016, Quality Assurance Project Plan, Boeing Renton Facility, Renton, Washington: Prepared for the Boeing Company, February.

U.S. Environmental Protection Agency (EPA), 2014a, U.S. EPA National Functional Guidelines for Superfund Organic Methods Data Review: EPA 540-R-014-002, August.

EPA, 2014b, U.S. EPA National Functional Guidelines for Inorganic Superfund Data Review: EPA 540-R-013-001, August.

Memo

To:	John Long, Project Manager	Project:	0088880100.2018
From:	Crystal Thimsen	cc:	Project File
Tel:	(206) 342-1760		
Fax:	(206) 342-1761		
Date:	March 26, 2018		

Subject: Summary Data Quality Review
March 2018 Boeing Renton Groundwater Sampling
Bldg. 4-70
ARI Work Order Number: 18C0130

This memo summarizes the data quality review of two primary groundwater samples and one trip blank sample collected on March 6, 2018. The samples were submitted to Analytical Resources, Inc. (ARI), located in Tukwila, Washington, a laboratory accredited by the Washington State Department of Ecology. The samples were selectively analyzed for Volatile organic compounds (VOCs) (vinyl chloride, cis-1,2-dichloroethene, and trichloroethene) by U.S. Environmental Protection Agency (EPA) Method 8260C.

Sample ID	Laboratory Sample ID	Requested Analyses
RGW260S-180306	18C0130-01	all
RGW259S-180306	18C0130-02	all
Trip Blank	18C0130-03	VOCs

Data were reviewed in accordance with the appropriate method procedures and criteria documented in the Quality Assurance Project Plan Addendum (QAPP) (Amec Foster Wheeler, 2016). The control limits provided in the QAPP are advisory limits; therefore, the most current control limits provided by the laboratory were used to evaluate the quality control data. In cases where the laboratory did not track limits for an analyte, the limits in the QAPP were used.

Holding times, method/trip blanks, surrogate recoveries, laboratory control samples (LCS), laboratory duplicates (LCSD), matrix spike/matrix spike duplicates (MS/MSD), standard reference materials, field duplicates, and reporting limits were reviewed where available to assess compliance with applicable methods. If qualification was required, data were qualified based on the definitions and use of qualifying flags outlined in EPA guidelines (EPA, 2014).

ARI received the samples on March 7, 2018. The temperature of the cooler was recorded upon receipt and was less than the maximum acceptable temperature of 6 degrees Celsius (°C).

ORGANIC ANALYSES

Samples were analyzed for VOCs. Laboratory data were evaluated for the following parameters:

1. Preservation and Holding Times – Acceptable
2. Blanks – Acceptable

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3. Surrogates – Acceptable
4. LCS – Acceptable
5. MS/MSD – Extra volume was not submitted with samples to perform MS/MSD analyses. MS/MSD analyses performed with project samples submitted separately met project frequency requirements.
6. Field Duplicates – Acceptable

   Field duplicates were not collected at this site during this sampling event. The project frequency requirement of one field duplicate for every 20 samples was achieved with field duplicate samples collected at other sites included in this sampling event.
7. Reporting Limits and Laboratory Flags – Acceptable

OVERALL ASSESSMENT OF DATA

The completeness of ARI work order number 18C0130 is 100 percent. Evaluation of the usefulness of these data is based on EPA guidance documents referenced in the introduction to this report. Few problems were identified, and analytical performance was generally within specified limits. The data, as qualified, meet the project's data quality objectives.

A summary of the data quality review is presented in the table below.

Sample ID	Qualified Result
RGW259S-170817	none
RGW260S-170817	none
Trip Blank	none

REFERENCES

Amec Foster Wheeler Environment & Infrastructure, Inc. (Amec Foster Wheeler), 2016, Quality Assurance Project Plan, Boeing Renton Facility, Renton, Washington: Prepared for the Boeing Company, February.

EPA, 2014, U.S. EPA National Functional Guidelines for Superfund Organic Methods Data Review (SOM02.2): EPA 540-R-014-002, August 2014.

APPENDIX D

SVE Report

APPENDIX D

Summary of Remedial Actions at the Boeing Renton Facility January - March 2018

Boeing Renton Site
Renton, Washington

Prepared for:
The Boeing Company
EHS Remediation

Prepared by:
CALIBRE Systems, Inc.
Project No. K0357000

May 15, 2018

Table of Contents

List of Tables

List of Figures

1.0 Introduction

CALIBRE Systems, Inc. (CALIBRE) prepared this Technical Memorandum (Tech Memo) for the Boeing Company to summarize remedial actions implemented at the Boeing Renton Facility in the first quarter of 2018 (between January 1 and March 31, 2018). The ongoing remedial actions include:

1. Operation of two soil vapor extraction (SVE) systems located at Solid Waste Management Unit (SWMU) and Area of Concern (AOC) locations designated as SWMU-172/174 and Building 4-78/4-79 SWMU/AOC Group,
2. Biological treatment to promote Enhanced Reductive Dechlorination (ERD) of volatile organic compounds (VOCs) in groundwater underway at several AOCs located throughout the Renton Facility, and;
3. Anaerobic biodegradation of benzene by nitrate/sulfate injections at the 4-78/79 Building.

CALIBRE completed the work described in this Tech Memo to support remedial activities described in the Engineering Design Report (EDR), (AMEC, 2014) as supplemented by a document describing an approach for *in situ* treatment for benzene in groundwater (CALIBRE 2017).

1.1 Facility Location and Background

The Boeing Renton Facility is used for assembly of 737 airplanes and is located at the southern end of Lake Washington in Renton, Washington. The location of the Renton Facility and the locations of SWMU-172/174 and Building 4-78/79 within the Facility are shown on Figure 1-1 (SWMU-172/174 and Building 4-78/79 are the locations where the two SVE system are operating). The locations of the other AOCs and SWMUs where groundwater treatment is ongoing are also included in Figure 1-1.

1.2 Objectives and Organization

The objective for this Tech Memo is to summarize work completed in accordance with the EDR in the first quarter of 2018. This includes rebound monitoring activities for the SVE systems located at Building 4-78/79 and SWMU-172/174, and a summary of the ongoing biological treatment of groundwater at the following areas:

SWMU-172/174
Building 4-78/4-79 SWMU/AOC Group (Building 4-78/79)
AOC-001/002
AOC-003
Lot 20/Former Building 10-71
AOC-060
AOC-090
Building 4-70, and
Apron A

This Tech Memo is organized as follows:

Section 1 – Introduction and Background
Section 2 – SVE System Operation and Monitoring
Section 3 – Groundwater Treatment
Section 4 – Conclusions and Recommendations
Section 5 – References
Attachment A – Field Data Sheets
Attachment B – Laboratory Report

2.0 SVE Systems Operation and Monitoring

SVE systems were installed in the Building 4-78/79 and SWMU-172/174 areas and began operation in April 2015. During the last quarter of 2017 photoionization detector (PID) monitoring results from both systems had shown VOC concentrations removed at asymptotically low levels. Given these data, a rebound test for both systems was started on December 15, 2017 and continued through the period covered in this report. The following sections summarize the rebound monitoring results for the SVE systems.

2.1 SVE Rebound Test Summary

This section presents a summary of the rebound test procedures and data collected for the SVE systems (applicable to both the Building 4-78/79 and SWMU-172/174 SVE systems). Each of the SVE systems were tested on December 8, 2017, at the end of the continuous operating period, and then shut down for a period of 35 days starting December 15, 2017. On January 19th 2018, (a 35-day rest period), the SVE systems were restarted and vapor concentrations were monitored at key points with a calibrated PID to determine if vapor concentrations had rebounded. Some level of rebounding was expected with the shutdown and restart of the SVE systems. The key operational question was whether sufficient vapor accumulated to make further mass recovery via SVE effective. After the 35-day rest period, the system was started and operated for approximately 10 minutes before collecting field measurements. Additional field measurements were collected after 30 minutes, 1 hour, and 3 hour operating periods. The same procedures were implemented following an 80-day rest period (45 days after the first 35-day period).

The vapor monitoring points tested at the Building 4-78/79 SVE area included SVE-1, SVE-3, SVE-5, SVE-6, SVE-8, SVE-10, SVE-12 and the system inlet (refer to Figure 2-1). The vapor monitoring points tested in the SWMU-172/174 SVE area included SVE-1, SVE-2, SVE-3 and the system inlet (refer to Figure 2-2).

As described in the rebound testing work plan (and noted above) most of the vapor measurements were made with a calibrated PID. Selected samples were also collected for laboratory TO-15 analysis for VOCs (gas chromatography mass spectrometry analysis), the laboratory data sheets are presented in Attachment B.

2.2 Building 4-78/4-79 SWMU/AOC Group SVE System

The Building 4-78/79 SVE system consists of 15 vapor extraction wells and a SVE equipment trailer as shown in Figure 2-1. The SVE system is equipped with two vapor-phase granular-activated carbon (GAC) vessels

each filled with 1,800 pounds of virgin carbon. The GAC vapor treatment system is configured to run in a lead-lag configuration with vapors from the outlet of the lead vessel passing through the lag vessel. The system also includes two smaller vessels each containing 200 pounds of zeolite impregnated with permanganate to remove and oxidize specific compounds, such as vinyl chloride, that are not efficiently adsorbed by GAC.

On December 8, 2017 the system was adjusted to allow air flow from all 15 wells of the SVE system. PID measurements were collected from six wells that have historically shown higher vapor concentrations (SVE-1, SVE-3, SVE-6, SVE-8, SVE-10, and SVE-12). Based on those PID measurements, three wells (SVE-1, SVE-6, and SVE-10; one from each of the SVE system manifolds) and the combined SVE system influent were selected for TO-15 analysis to provide operational baseline data for the rebound testing.

The 35-day and 80-day rebound testing were completed on January 19, 2018 and March 6, 2018, respectively, and included PID measurements with paired samples for TO-15 analysis from SVE-6, SVE-10 and the SVE system influent. Vent wells SVE-5 and SVE-12 were also monitored with a PID during the 80-day rebound testing. Vent well SVE-1 was not included in the 35-day and 80-day rebound monitoring because the baseline TO-15 results for this well (i.e., at the start of rebound testing) were non-detect for TCE and other chlorinated VOCs indicating future sample collection would not provide meaningful data for rebound interpretation of these analytes.

The CVOCs and other VOCs detected in the TO-15 samples collected during the SVE operations and rebound periods for the Building 4-78/79 area SVE system are shown in Table 2-1. The data collected at the system influent, SVE-6, and SVE-10 during the rebound period indicate some rebounding of TCE; the largest increase was observed at SVE-10 with baseline asymptote results at 180 parts per billion by volume (ppbv) and 80-day rebound results of 300 ppbv. Some rebounding was observed with non-chlorinated VOCs, specifically Freon 113 at SVE-6 and TPH-G at the system influent (both at the 60 minute mark of the 80-day sampling period).

Table 2-2 summarizes the rebound test data at the Building 4-78/79 area SVE system. The data presented for both the 35-day and 80-day rest period are sample results after running the system for a period of approximately 3 hours, with the exception of the system influent and SVE-6 samples that were collected 60 minutes after re-starting the system. As described in the rebound procedures above, measurements were taken during this brief operating period to determine if and how quickly the initial concentrations declined after restarting operations.

At the beginning of the rebound test in December 2017, concentrations at SVE-6 were down 98 percent from SVE startup levels as measured in April 2015 meeting the performance objectives set in the EDR. Concentrations remained at levels 97 percent below SVE startup levels at the 35-day timeframe and 96 percent at 80 days (see Table 2-2). Vent well SVE-10 showed similar results with rebound baseline concentrations down 95 percent from SVE startup levels, 90 percent at the 35-day timeframe, and 92

percent after the 80-day monitoring. In addition, wells SVE-5 and SVE-12 showed concentration reductions of 86 percent and 99 percent after the 80-day rebound period from SVE startup levels.

2.3 VOC Mass Removal Rates from the Building 4-78/4-79 SVE System

Peak influent concentrations for the Building 4-78/79 area SVE system were measured at 5,860 ppbv (PID uncorrected) and a mass removal rate of approximately 0.213 pounds per day (lbs/day) in August 2015 (approximately 4 months after SVE system startup). The asymptote condition at the end of SVE operation (in December 2017) for the Building 4-78/79 area SVE system indicated an influent concentration of approximately 521 ppbv (PID uncorrected) and a mass removal rate of approximately 0.017 lbs/day, approximately 8 percent of the peak mass removal (see Table 2-3).

The estimated daily mass removal rate for the Building 4-78/79 area SVE system is 0.020 lbs/day following the 35-day rebound period and 0.024 lbs/day following the 80-day rebound period, based on the observed detections at the end of the 3-hour operating window for the two rebound periods. These values represent approximately 9% and 11% of the peak mass removal rate, respectively (see Table 2-3). The influent vapor concentrations did not steadily decrease over the 3-hour operating window for the 35-day and 80-day rebound periods. Vapor concentrations increased or decreased and then increased during the rebound monitoring, indicating that this brief operating period was not long enough to determine when vapor levels will decline to the baseline asymptote (i.e., returning to asymptotic vapor levels at the end of SVE operation).

2.4 SWMU-172/174 SVE System

The SWMU-172/174 SVE system consists of three vapor extraction wells and a SVE equipment trailer as shown in Figure 2-2. The SVE system is equipped with two vapor-phase GAC vessels, each filled with 1,800 pounds of virgin carbon. The GAC vapor treatment system is configured to run in a lead-lag configuration with vapor from the outlet of the lead vessel passing through the lag vessel. The system also includes two smaller vessels each containing 200 pounds of zeolite impregnated with permanganate.

On December 8, 2017 well SVE-3 and the system influent were sampled for TO-15 analysis and paired PID measurements to provide baseline data for the planned rebound testing. The 35-day and 80-day rebound testing were completed on January 19, 2018 and March 6, 2018, respectively, and included PID measurements from the influent and SVE-3 and paired samples for TO-15 analysis from SVE-3. Vent wells SVE-1 and SVE-2 were also monitored with a PID during the 35-day and 80-day rebound testing.

The CVOCs and other VOCs detected in the TO-15 samples collected during the SVE operations and rebound periods for the SWMU-172/174 area SVE system are shown in Table 2-4. The data collected at SVE-3 during the rebound period show PCE as the primary VOC detected with an increase from the baseline asymptote of 170 ppbv to 410 ppbv (PCE) after the 80-day rebound rest period. Marginal increases were observed from other CVOCs.

Table 2-5 summarizes the rebound test data for the SWMU-172/174 area SVE system. The data presented for both the 35-day and 80-day rest period represent concentrations after running the system for a period of approximately 3 hours. As described in the rebound procedures above, measurements were taken during this brief operating period to determine if and how quickly the initial concentrations declined during operation.

At the beginning of the rebound test in December 2017, concentrations at SVE-3 were down 98 percent from SVE startup levels measured in April 2015. Concentrations remained at levels 96 percent below SVE startup levels at the 35-day timeframe and 94 percent at 80 days (see Table 2-5). PID monitoring results from vent wells SVE-1 and SVE-2 showed concentration reductions of 100 percent and 95 percent after the 80-day rebound period from SVE startup levels.

2.5 VOC Mass Removal Rates from the SWMU-172/174 SVE System

Table 2-6 presents a summary of the mass removal measurements from the startup of SVE operation along with the rebound monitoring period. The baseline condition (asymptote at the end of SVE operation) for the SWMU-172/174 area SVE system indicated an influent concentration of approximately 99 ppbv TCE (from TO-15 results) and a mass removal rate of approximately 0.005 lbs/day. The data presented for both the 35-day and 80-day rest period represent concentrations after running the system for a period of approximately 3 hours and the influent concentrations and corresponding mass removal rates increased for these two monitoring periods.

The influent vapor concentrations did not steadily decrease over the 3-hour operating window for the tests at the 35-day and 80-day rebound periods. Vapor concentrations initially decreased and then increased marginally during the 3-hour test period; total increases were 19 ppbv for 35-day and 35 ppbv for 80-day tests.

2.6 Data Evaluation

A key question identified in the rebound study approach is:

1. *Is the increased mass removal rate sustained for any significant time period after a rest/rebound period and is any increased mass removed sufficient to justify prolonged SVE system operation?*

Table 2-7 presents the raw PID field measurements (uncorrected for PCE or TCE) at the various wells sampled during the rebound period at both the Building 4-78/79 SVE system and the SWMU-172/174 SVE system. The trend for PID measurements at the Building 4-78/79 system influent show some variability during the 35-day and 80-day rebound testing with the final detections at the end of the 3-hour operating period showing an increase in concentrations. A similar trend in PID measurements was observed at the SWMU-172/174 SVE system influent with marginal increases in concentrations (<50 ppb). These data indicate that the mass removal rate was sustained during the 3-hour monitoring period but at levels significantly reduced from peak mass removal rates (see Tables 2-3 and 2-6). Therefore, it is recommended

both systems operate for a longer period in order to estimate the duration over which increased mass removal rates may be sustained (existing data indicate that it is longer than 3-hours).

The proposed approach to completing this task is a limited rebound test with parameters similar to those specified in the Engineering Design Report (EDR, AMEC 2014). The SVE system would be restarted and operated for approximately 30 days. PID monitoring would be performed during rebound operations at system restart, at 15 days, and after 30 days of continuous operation. Paired samples for TO-15 analysis would be collected at restart, 15 days and 30 days from the influent, SVE-1, SVE-6, and SVE-10 at the Building 4-78/79 system and the influent and SVE-3 at the SWMU-172/174 system. This should be a sufficient period of time to reach the baseline asymptote. If the trends in soil gas VOC concentrations measured during the additional 30-day operating period approach the baseline asymptotic slope then the systems will be shut down for soil confirmation sampling as discussed in the following section.

The second key question identified in the rebound study approach is:

2. *Are there data to indicate that continued SVE system operation is having a measurable improvement on the groundwater system, over and beyond what is being accomplished with the groundwater ERD system?*

Data collected during regular SVE operation indicate TCE at the 4-78/79 area and PCE at the 172/174 area are the primary compounds detected and recovered with the SVE systems. The rebound data from both SVE systems show very low remaining concentrations of these compounds in soil vapor. Concentrations of these two compounds in groundwater have declined with the ERD treatment; TCE (at the 4-78/79 area) and PCE (at the 172/174 area) concentrations have been significantly reduced or eliminated from virtually all wells at these two areas.

At the 4-78/79 area, four of the six source-area wells are non-detect for TCE with one well at 0.21 micrograms per liter (µg/L) TCE (GW034S) and the other at 1.26 µg/L TCE (GW244S). All seven of the conditional point of compliance wells are non-detect for TCE in March 2018. These groundwater monitoring data indicate that continued SVE system operation in the 4-78/4-79 area will not have a measurable impact on the groundwater remediation.

At the 172/174 area, the two source-area wells are both under 1.0 µg/L PCE and all conditional point of compliance wells are non-detect for PCE. These groundwater monitoring data indicate that continued SVE system operation in the 172/174 area will not have a measurable impact on the groundwater remediation.

These combined performance monitoring data from SVE operations (asymptotically low mass removal) and ERD treatment indicate that SVE operations have been effective for source removal and support the recommendations of ending SVE operations.

Some rebound of TPH-G was observed at the system influent of the 4-78/79 SVE system during the rebound rest period. Groundwater monitoring results from the 4-78/79 area show a TPH-G detection in source area well GW031S at 3,490 µg/L in March 2018, which is above the cleanup level of 800 µg/L. This well was historically used as an extraction well for a pump and treat system associated with an underground fuel storage tank. The water table at this well was lowered during the pump and treat operation, which may have created a smear zone that is now below the current water table. This zone is not treated by the SVE system because it is below the water table and continued operation of the SVE system with focused vapor removal in this area is will not have an impact on the TPH-G concentrations in groundwater.

2.7 Soil Confirmation Sampling

Upon completion of the additional 30-day operating period and verification that the 4-78/79 and SWMU-172/174 SVE systems return to the asymptotic conditions, soil confirmation sampling will be performed in accordance with the Compliance Monitoring Plan in the EDR.

For the Building 4-78/79 SVE system, the results for the confirmation samples will be used to assess attainment of the soil cleanup levels for volatile soil COCs, to include VOCs and total petroleum hydrocarbons in the gasoline range (TPH-G) (as specified in the EDR). A total of 12 soil compliance samples will be collected from the SVE target area at locations shown in the Compliance Monitoring Plan within the EDR. Samples will be collected using direct-push sampling methods from the vadose zone at depths of 1.0 and 3.0 feet from each sample location. The soil sampling locations may be adjusted in the field as necessary based on utility clearance.

For the SWMU-172/174 SVE system, the results for the confirmation samples will be used to assess attainment of the soil cleanup levels for multiple VOCs. In addition, samples will also be collected for the metals copper, thallium, and zinc (as specified in the EDR). A total of 6 soil compliance samples will be collected from the SVE target area at locations shown in the Compliance Monitoring Plan within the EDR. Samples will be collected using direct-push sampling methods from the vadose zone at depths of 2.0 and 8.5 feet from each sample location. The soil sampling locations may be adjusted in the field as necessary based on utility clearance.

3.0 Ongoing Groundwater Treatment

Groundwater treatment is being implemented at several AOCs/SWMUs at the Renton Facility. The remedy being implemented is enhanced reductive dechlorination (ERD) of chlorinated solvents in targeted areas. The ERD treatment involves substrate injection using sucrose as a carbon source to stimulate biological degradation of the chlorinated solvents between December 2014 and June 2016. In 2017, the total organic carbon (TOC) levels were dropping to near background concentrations, which prompted a substrate injection event in January 2018. Beginning in late 2017, anaerobic biodegradation of benzene using nitrate and sulfate injections was implemented for a small area at the 4-78/79 Building.

Site wide groundwater sampling was conducted as part of the quarterly monitoring program during this reporting period and the results are presented in the main text of the quarterly report to Ecology.

Four wells (B78-12, B78-14, B78-15, and B78-16) were injected in January 2018 with approximately 575 gallons of 7.2% substrate solution in each well, see Table 3-1. Since the last substrate injection in June 2016, most of the wells in the area have CVOC concentrations from below the method reporting limit up to 0.8 µg/L. The two exceptions are GW-033S, which showed total CVOC concentrations increase in November 2017. In March 2018, approximately 2 months after substrate injection, well GW-033S indicated a 97 % reduction with total CVOCs of 38.8 µg/L. The other exception is GW-244S which had total CVOCs at 17.2 µg/L in November 2017. In February 2018, about a month after the substrate injection, the total CVOCs decreased to 3.5 µg/L. Ongoing monitoring of the CVOCs at these two wells will be conducted to verify effective treatment.

3.1 4-78/79 Building Injection and Monitoring for Benzene

In September 2017 Boeing submitted a Tech Memo to Ecology that recommended adaptations and expansion of the bioremediation system to address a small area of the Building 4-78/79 plume that contains benzene (CALIBRE 2017). The biodegradation of benzene involves injecting nitrate and sulfate to act as electron acceptors while the benzene serves as the electron donor. Per the Tech Memo, following well installation, development and baseline groundwater sampling, CALIBRE completed the first round of nitrate/sulfate injections (see Table 3-2 for wells injected and total mass of substrate amendment per well and Figure 3-1 showing the location of the injection wells in this area). A nitrate and sulfate solution with a concentration of approximately 100 mg/L was injected in October 2017 and second round of injections with a concentration of approximately 200 mg/L was performed in January 2018. These injection concentrations for nitrate and sulfate were selected as comparatively low levels because the measured benzene levels are also very low.

Subsequent performance monitoring was conducted in November 2017 and February 2018 at this area to monitor trends of the benzene treatment. The samples were analyzed by Analytical Resources, Incorporated and the laboratory report is included in Attachment B.

Table 3-3 presents the results of the performance monitoring in February 2018 and these data show that the injected amendments were rapidly consumed; nitrate was non-detect and sulfate concentrations ranged from 1.22 mg/L to 21.1 mg/L. Table 3-4 presents benzene concentration trends in this area before and after the October 2017 and January 2018 nitrate/sulfate injection events. With only two injection events, no clear trends can be determined for benzene concentrations in these wells. Monitoring well GW-031S, which has historically fluctuated from 5 – 79 µg/L over the last two years was at 22 µg/L in February 2018 and 60 µg/L in March 2018. GW-244S has been on a decreasing trend from around 20 µg/L to 6.9 µg/L in March 2018. B78-11 is down from 28 µg/L in May 2017 to 15 µg/L in February 2018. These results coincide with the recent nitrate/sulfate injections and may be associated with increased biological activity. Ongoing monitoring and injections with higher concentrations of nitrate will help to develop more clear trends.

An injection was completed in April 2018 with nitrate and sulfate concentrations of 400 mg/L (four times the concentration used during the initial injection event) to provide additional reagents to the impacted area. The injection wells were B78-11, B78-13, B78-17, B78-18, B78-19, B78-20, and B78-21. Subsequent monitoring results will be included in the next quarterly report.

3.2 Recommendations for Groundwater Treatment Actions in Specific Areas

Table 3-5 presents a summary of groundwater monitoring results, by area, related to groundwater treatment/ERD implementation. Current recommendations are to amend selected wells at SWMU-172/174, 4-78/79 Building Area, AOC-001/002, AOC-60, and AOC-90 areas with sucrose substrate. Dissolved oxygen and ORP levels are low in these areas however each area showed TOC concentrations nearing background levels or VOC detections in recent sampling events. In addition, Boeing recently completed a 3rd round of nitrate/sulfate injections for the benzene plume near Building 4-78/79 in April 2018. Performance monitoring results for that area will be included in the next quarterly summary.

4.0 Conclusions and Recommendations

The SVE rebound monitoring data for the Building 4-78/79, after the 80-day monitoring, show concentrations with reductions ranging from 86 percent to 99 percent from initial startup concentrations (see Table 2-2). The SWMU-172/174 SVE systems shows similar reductions ranging from 94 percent to 100 percent (no response with a PID) after the 80-day monitoring. The influent concentrations for both systems showed the mass removal is reduced significantly from peak levels. The 4-78/79 SVE system did show some rebound of TPH-G during the 35-day and 80-day monitoring.

In order to estimate the duration for increased mass removal after a rebound rest period (i.e., 4 hours, 1 day, or 10 days etc.) it is recommended that both systems undergo an additional rebound monitoring period where measurements are collected (with PID and TO-15 samples) during continuous operation over the span of approximately 30 days. If the VOC concentrations are reduced to the asymptotic levels within this 30-day period then the systems will be shut down for soil confirmation sampling to assess attainment of the soil cleanup levels for soil COCs. After receiving the results from the soil confirmation sampling, Boeing will prepare a technical memorandum for submittal to Ecology documenting the results of soil sampling and attainment of the soil cleanup levels with a request for permanent shutdown and decommissioning of the SVE systems (pending results that meet the soil cleanup goal). If the soil sampling results do not meet the soils cleanup goals, then modified SVE operations would continue to further address selected/targeted areas.

Groundwater monitoring will continue according to the EDR, with supplemental VOC and TOC sampling at selected wells. Additional substrate injections are recommended for selected areas of the SWMU-172/174, Building 4-78/79, AOC-001/002, AOC-60, and AOC-90 sites for continued ERD treatment.

5.0 References

AMEC 2014. Draft Engineering Design Report Boeing Renton Cleanup Action Plan Implementation. Prepared by AMEC Environment & Infrastructure, Inc. for The Boeing Company. July 2014.

CALIBRE 2014. Operations and Maintenance Plan for the Renton Cleanup Action Soil Vapor Extraction Systems. Prepared by CALIBRE Systems, Inc. for The Boeing Company, EHS Remediation. July 2014.

CALIBRE 2017. Bioremediation of Benzene in Groundwater; Building 4-78/79 Area, Boeing Renton Facility Rev. 1. Prepared by CALIBRE Systems, Inc. for The Boeing Company, EHS Remediation. September 2017.

TABLES

Table 2-1 TO-15 Analytical Results - 4-78/79 SVE System

SVE System Inlet

Date	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	Vinyl Chloride	1,1,1-TCA	1,1-DCA	1,1-DCE	Acetone	Benzene	Freon 113	Hexane	Pentane	Toluene	TPHg	MEK	Carbon Disulfide	m,p-Xylene	o-Xylene	Ethyl Benzene	Chloroform	1,2,4-Trimethylbenzene	Total Chlorinated
4/17/2015[1]	2.9	280	5.2	ND	ND	8.0	ND	ND	ND	ND	98	ND	ND	1.2	ND	21	ND	ND	ND	ND	ND	ND	296
5/18/2015	11	800	27	ND	ND	21.0	ND	ND	ND	ND	120	ND	ND	ND	ND	61	ND	ND	ND	ND	ND	ND	859
10/13/2015	2.7	160	11	ND	ND	2.7	ND	ND	12	ND	48	9.4	ND	ND	1,400	ND	ND	ND	ND	ND	ND	ND	176
3/18/2016	ND	49	2.5	ND	ND	ND	ND	ND	19	ND	16	6.6	13	2.3	69	ND	ND	ND	ND	ND	ND	ND	52
6/30/2016	1.2	100	6.0	ND	2.3	2.2	ND	ND	32	ND	49	ND	ND	ND	ND	ND	7.2	ND	ND	ND	ND	ND	112
9/12/2016	1.6	110	20	ND	5.9	2.2	ND	ND	ND	ND	54	26	100	ND	600	ND	ND	ND	ND	ND	ND	ND	140
12/14/2016	ND	17	6.3	ND	2.4	ND	ND	ND	ND	ND	18	4.5	33	ND	ND	ND	ND	ND	ND	ND	ND	ND	25.7
4/5/2017	ND	43	3.0	ND	ND	1.7	ND	ND	ND	ND	11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	47.7
8/16/2017	1.3	91	8.0	ND	ND	3.1	ND	ND	ND	ND	6.4	ND	ND	7	ND	ND	ND	0.96	ND	ND	ND	ND	103
12/8/2017 - Rebound Start	**ND**	**42**	**2.5**	**ND**	**ND**	**1.3**	**ND**	**ND**	**ND**	**ND**	**1.7**	**1.7**	**5.2**	**1.9**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**45.8**
1/19/2018 - 35-Day 60 Minute Sample	**ND**	**68**	**2.6**	**ND**	**2.0**	**5.8**	**ND**	**ND**	**ND**	**ND**	**13**	**13**	**26**	**1.0**	**280**	**7.1**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**78.4**
3/6/2018 - 80-Day 60 Min Sample	**ND**	**67**	**3.2**	**ND**	**8.9**	**7.6**	**ND**	**ND**	**ND**	**ND**	**40**	**44**	**48**	**1.0**	**510**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**86.7**

SVE-01

Date	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	Vinyl Chloride	1,1,1-TCA	1,1-DCA	1,1-DCE	Acetone	Benzene	Freon 113	Hexane	Pentane	Toluene	TPHg	MEK	Carbon Disulfide	m,p-Xylene	o-Xylene	Ethyl Benzene	Chloroform	1,2,4-Trimethylbenzene	Total Chlorinated
10/13/2015	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	11	ND	ND	2,100	ND	ND	ND	ND	ND	ND	ND	ND
6/30/2016	ND	1.2	ND	ND	ND	ND	ND	ND	11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.2
9/12/2016	ND	ND	ND	ND	ND	ND	ND	ND	14	ND	ND	62	160	1.3	1,800	ND	ND	ND	ND	ND	ND	ND	ND
12/8/2017 - Rebound Start	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**11**	**27**	**2.0**	**250**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**

SVE-6

Date	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	Vinyl Chloride	1,1,1-TCA	1,1-DCA	1,1-DCE	Acetone	Benzene	Freon 113	Hexane	Pentane	Toluene	TPHg	MEK	Carbon Disulfide	m,p-Xylene	o-Xylene	Ethyl Benzene	Chloroform	1,2,4-Trimethylbenzene	Total Chlorinated
9/12/2016	ND	98	ND	ND	190	ND	ND	ND	ND	ND	6,900	55	360	ND	ND	ND	ND	ND	ND	ND	ND	ND	288
8/16/2017	16	100	4.5	ND	ND	5.4	1.5	ND	ND	ND	75	ND	ND	ND	440	ND	ND	ND	ND	ND	5.0	ND	127
12/8/2017 - Rebound Start	**5.4**	**37**	**ND**	**ND**	**ND**	**2.7**	**ND**	**ND**	**ND**	**ND**	**7.2**	**ND**	**ND**	**6.4**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**1.2**	**ND**	**45**
1/19/2018 - 35-Day 60 Minute Sample	**6.4**	**52**	**1.0**	**ND**	**ND**	**4.6**	**ND**	**ND**	**ND**	**ND**	**24**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**1.3**	**ND**	**64**
3/6/2018 - 80-Day 60 Min Sample	**9.8**	**67**	**ND**	**ND**	**ND**	**10**	**ND**	**ND**	**ND**	**ND**	**2,000**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**87**

Table 2-1 TO-15 Analytical Results - 4-78/79 SVE System

SVE-10

Date	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	Vinyl Chloride	1,1,1-TCA	1,1-DCA	1,1-DCE	Acetone	Benzene	Freon 113	Hexane	Pentane	Toluene	TPHg	MEK	Carbon Disulfide	m,p-Xylene	o-Xylene	Ethyl Benzene	Chloroform	1,2,4-Trimethylbenzene	Total Chlorinated
3/18/2016	ND	250	13	ND	ND	6.9	ND	ND	ND	ND	16	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	270
6/30/2016	1.5	250	17	ND	7.1	6.2	ND	ND	ND	ND	120	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	282
9/12/2016	2.6	320	97	2.1	18	7.9	2.3	1.6	ND	ND	130	ND	ND	2.9	ND	ND	ND	ND	ND	ND	ND	ND	452
12/16/2016	ND	91	95	1.4	28	3.3	1.6	1.4	ND	ND	95	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	222
4/5/2017	1.4	240	19	ND	ND	10	ND	ND	ND	ND	20	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	270
8/16/2017	2.6	300	42	ND	ND	14	1.4	ND	ND	ND	34	ND	ND	9.5	260	ND	ND	2.9	1.6	ND	ND	1.5	360
12/8/2017 - Rebound Start	**ND**	**180**	**11**	**ND**	**ND**	**6.3**	**ND**	**ND**	**ND**	**ND**	**8.9**	**ND**	**ND**	**1.2**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**197**
1/19/2018 - 35-Day 60 Minute Sample	**1.7**	**330**	**13**	**ND**	**ND**	**28**	**1.2**	**ND**	**ND**	**ND**	**39**	**ND**	**ND**	**1.4**	**ND**	**17**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**374**
1/19/2018 - 35-Day 180 Minute Sample	**1.8**	**350**	**15**	**ND**	**ND**	**24**	**1.3**	**ND**	**ND**	**ND**	**31**	**ND**	**ND**	**ND**	**ND**	**37**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**392**
3/6/2018 - 80-Day 60 Min Sample	**1.7**	**330**	**12**	**ND**	**ND**	**41**	**1.7**	**ND**	**ND**	**ND**	**59**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**386**
3/6/2018 - 80-Day 180 Min Sample	**1.6**	**300**	**12**	**ND**	**ND**	**32**	**ND**	**ND**	**ND**	**ND**	**41**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**346**

Notes:
(1) The TO-15 sample results from this day were considered anomalously low based on multiple PID measurements at the time and subsequent TO-15 samples from system operation
All results are in parts per billion by volume (ppbv).
ND = non-detect
DCA = Dichloroethane
DCE = Dichloroethene
MEK = methyl ethyl ketone or 2-butanone
PCE = Tetrachloroethene
TCA = Trichloroethane
TCE = Trichloroethene
Total Chlorinated = the sum of PCE, TCE, cis-1,2-DCE, trans-1,2-DCE, 1,1,1-TCA, 1,1-DCA, and 1,1-DCE.

Table 2-2 Rebound Data - TCE - 4-78/79 SVE System

	Concentration at initial startup of SVE Operation (ppbv)[2]	Concentration at Rebound Start (ppbv)	Concentration at 35-Day (ppbv)[3]	Concentration at 80-Day (ppbv)[3]	% Reduction from baseline at start of rebound test	Remaining % Reduction after 35-Day rebound test	Remaining % Reduction after 80-Day rebound test
SVE-1	0	ND[1]	-	-	-	-	-
SVE-5	5,508	-	-	754	-	-	86%
SVE-6	1,805	37[1]	52[1]	67[1]	98%	97%	96%
SVE-10	3,536	180[1]	350[1]	300[1]	95%	90%	92%
SVE-12	15,822	1,421	-	198	91%	-	99%
System Inlet[4]	800[1]	42[1]	68[1]	67[1]	95%	92%	92%

[1]Values listed are from TO-15 analytical data for TCE.

[2]Listed values are corrected field measurements taken at time of system startup.

[3] Values listed are final rebound runtime measurements (~3 hr run time where applicable).

[4] Initial SVE system inlet data based on data from 5/8/2015

Unless otherwise noted data points are corrected PID measurements, 0.54 for TCE.

Table 2-3 Mass Removal Data - 4-78/79 SVE System

Building 4-78/79 Influent	Date	PID Reading (ppbv)	Corrected Value (TCE) (ppbv)[1]	System Flow (cfm)	Mass removal (lbs/day)	Percent of Peak Removal
Peak Mass Removal	8/17/2015	5,320	2,873	150	0.213	
Rebound Start	12/8/2017	521	281	119	0.017	8%
35-Day	1/19/2018	632	341	119	0.020	9%
80-Day	3/6/2018	768	414	119	0.024	11%

[1] Corrected PID measurements, 0.54 for TCE.

[2]Values listed are final rebound runtime measurements (~3 hr run time where applicable).

Table 2-4 TO-15 Analytical Results - SWMU-172/174 SVE System

SVE System Inlet

Date	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	Vinyl Chloride	1,1,1-TCA	1,1-DCA	Acetone	Toluene	m,p-Xylene	Chloroform	o-Xylene	Pentane	Hexane	Total Chlorinated
4/17/2015	1500	130	120	ND	ND	13	ND	ND	ND	ND	ND	ND	ND	ND	1,763
10/13/2015	400	31	13	ND	ND	3.3	ND	ND	ND	ND	ND	ND	ND	ND	447
3/8/2016	82	5.4	3.1	ND	ND	ND	ND	ND	1.1	2.2	ND	ND	ND	ND	91
6/30/2016	230	18	10	ND	ND	1.8	ND	11	ND	ND	2.4	ND	ND	ND	260
9/12/2016	230	16	8.3	ND	ND	1.9	ND	ND	ND	ND	1.2	ND	ND	ND	256
12/14/2016	100	6.2	3.8	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	110
5/30/2017 - 30 min	520	220	17	ND	ND	13	2.7	ND	ND	ND	ND	ND	ND	ND	773
5/30/2017 - 100 min	530	200	17	ND	ND	14	ND	ND	ND	ND	ND	ND	ND	ND	761
5/30/2017 - 225 min	510	130	16	ND	ND	12	ND	ND	ND	ND	ND	ND	ND	ND	668
8/16/2017	180	16	7.8	ND	ND	1.7	ND	ND	ND	ND	ND	ND	ND	ND	206
12/8/2017 - Rebound Start	**99**	**7.6**	**3.4**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**110**

SVE-3

Date	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	Vinyl Chloride	1,1,1-TCA	1,1-DCA	Acetone	Toluene	m,p-Xylene	Chloroform	o-Xylene	Pentane	Hexane	Total Chlorinated
5/30/2017 - 30 min	540	51	18	ND	ND	14	2.6	ND	2.2	ND	ND	ND	ND	ND	626
5/30/2017 - 100 min	200	16	6.5	ND	ND	5.5	ND	ND	ND	ND	ND	ND	ND	ND	228
8/16/2017	350	30	15	ND	ND	3.5	ND	ND	ND	ND	1.3	ND	ND	ND	399
12/8/2017 - Rebound Start	**170**	**13**	**5.8**	**ND**	**ND**	**1.7**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**191**
1/19/2018 - 35-Day 60 Minute Sample	**310**	**30**	**13**	**ND**	**ND**	**6.9**	**1.3**	**ND**	**ND**	**ND**	**1.1**	**ND**	**ND**	**ND**	**361**
1/19/2018 - 35-Day 180 Minute Sample	**310**	**28**	**12**	**ND**	**ND**	**7.9**	**1.1**	**ND**	**ND**	**ND**	**1.1**	**ND**	**ND**	**ND**	**359**
3/6/2018 - 80-Day 60 Min Sample	**440**	**41**	**15**	**ND**	**ND**	**14**	**2.2**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**512**
3/6/2018 - 80-Day 180 Min Sample	**410**	**33**	**13**	**ND**	**ND**	**13**	**1.6**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**471**

Notes:

All results are in parts per billion by volume (ppbv).

ND = non-detect

DCE = Dichloroethene

PCE = tetrachloroethene

TCE = trichloroethene

Total Chlorinated = the sum of PCE, TCE, cis-1,2-DCE, trans-1,2-DCE, 1,1,1-TCA, and 1,1-DCA.

Table 2-5 Rebound Data - PCE - SWMU-172/174 SVE System

	Concentration at initial startup of SVE Operation (ppbv)[2]	Concentration at Rebound Start (ppbv)	Concentration at 35-Day (ppbv)[3]	Concentration at 80-Day (ppbv)[3]	% Reduction from baseline at start of rebound test	Remaining % Reduction after 35-Day rebound test	Remaining % Reduction after 80-Day rebound test
SVE-1	4,858	-	-	0	-	-	100%
SVE-2	390	-	-	20	-	-	95%
SVE-3	7,353	170[1]	310[1]	410[1]	98%	96%	94%
System Inlet	1,500 [1]	99[1]	408	304	93%	73%	80%

[1]Values listed are from TO-15 analytical data for PCE.

[2]Listed values are corrected field measurements taken at time of system startup.

[3] Values listed are final rebound runtime measurements (~3 hr run time where applicable).

Unless otherwise noted data points are corrected PID measurements, 0.57 for PCE.

Table 2-6 Mass Removal Data - SWMU-172/174 SVE System

SWMU-172/174 Influent	Date	PID Reading (ppbv)	Corrected Value (PCE) (ppbv)[1]	System Flow (cfm)	Mass removal (lbs/day)	Percent of Peak Removal
Peak Mass Removal	4/17/2015	NA	1,500	73	0.068	
Rebound Start [3]	12/8/2017	NA	99	86	0.005	8%
35-Day [2,4]	1/19/2018	716 [5]	408	105	0.027	39%
80-Day [2,4]	3/6/2018	533 [5]	304	105	0.020	29%

[1] Corrected PID measurements, 0.57 for PCE, or as TO-15 lab results if adjacent column is NA

[2] Values listed are final rebound runtime measurements (~3 hr run time where applicable).

[3] System changes included a new blower before this test with an increased flow rate so direct comparison of mass removal needs to consider increased flow rate

[4] Process changes included replacement of a plugged air filter with an increased flow rate so direct comparison of mass removal needs to consider increased flow rate

[5] The PID response on these days/measurements is suspect and appears to be biased high

Table 2-7 Rebound Study PID Field Measurements (Uncorrected Data)

4-78/79 SVE	Sample Event	Date	Sample Time	PID Reading 1 (ppb)	PID Reading 2 (ppb)	Average PID (ppb)	TO-15 Results (TCE ppbv)
SVE-1	Initial Shutdown	12/8/2017	10:12	533	473	503	ND
SVE-3	Initial Shutdown	12/8/2017	10:27	0	0	0	
SVE-5	80 Day Rest Period	3/6/2018	10:07	2,467	2,712	2,590	
		3/6/2018	10:27	1,912	1,999	1,956	
		3/6/2018	10:57	1,831	1,814	1,823	
		3/6/2018	12:57	1,348	1,445	1,397	
SVE-6	Initial Shutdown	12/8/2017	10:40	310	462	386	37
	35 Day Rest Period	1/19/2018	9:10	250	237	244	
		1/19/2018	9:35	308	411	360	
		1/19/2018	11:10	414	354	384	52
		1/19/2018	13:35	603	524	564	
	80 Day Rest Period	3/6/2018	10:15	1,631	1,696	1,664	
		3/6/2018	10:35	1,843	1,414	1,629	
		3/6/2018	11:05	1,201	1,370	1,286	67
		3/6/2018	13:05	1,176	1,112	1,144	
SVE-8	Initial Shutdown	12/8/2017	10:46	0	0	0	
SVE-10	Initial Shutdown	12/8/2017	10:52	2,624	2,831	2,728	180
	35 Day Rest Period	1/19/2018	9:20	955	996	976	
		1/19/2018	10:20	894	913	904	
		1/19/2018	11:15	1,062	1,037	1,050	330
		1/19/2018	13:40	1,399	1,348	1,374	350
	80 Day Rest Period	3/6/2018	10:20	551	633	592	
		3/6/2018	10:40	621	629	625	
		3/6/2018	11:10	555	566	561	330
		3/6/2018	13:10	622	509	566	300
SVE-12	Initial Shutdown	12/8/2017	10:58	2,589	2,673	2,631	
	80 Day Rest Period	3/6/2018	10:25	331	391	361	
		3/6/2018	10:45	435	333	384	
		3/6/2018	11:15	400	359	380	
		3/6/2018	13:15	323	410	367	
VPC Inlet	Initial Shutdown	12/8/2017	10:00	513	528	521	42
	35 Day Rest Period	1/19/2018	9:00	343	332	338	
		1/19/2018	9:30	348	367	358	
		1/19/2018	11:05	490	501	496	68
		1/19/2018	13:30	643	621	632	
	80 Day Rest Period	3/6/2018	10:02	603	624	614	
		3/6/2018	10:22	400	496	448	
		3/6/2018	10:52	534	666	600	67
		3/6/2018	12:52	823	712	768	
VPC Outlet	Initial Shutdown	12/8/2017	11:02	19	0	10	

5-09 SVE	Sample Event	Date	Sample Time	PID Reading 1 (ppb)	PID Reading 2 (ppb)	Average PID (ppb)	TO-15 Results (PCE ppbv)
SVE-1	35 Day Rest Period	1/19/2018	12:30	147	138	143	
	80 Day Rest Period	3/6/2018	8:30	45	53	49	
		3/6/2018	8:50	131	96	114	
		3/6/2018	9:30	97	60	79	
		3/6/2018	11:30	0	0	0	
SVE-2	35 Day Rest Period	1/19/2018	12:25	134	108	121	
		1/19/2018	12:50	208	199	204	
	80 Day Rest Period	3/6/2018	8:24	102	74	88	
		3/6/2018	8:44	90	86	88	
		3/6/2018	9:24	90	129	110	
		3/6/2018	11:24	52	17	35	
SVE-3	Initial Shutdown	12/8/2017	9:28	1,873	2,173	2,023	170
	35 Day Rest Period	1/19/2018	12:05	1,212	1,222	1,217	
		1/19/2018	12:45	1,036	1,053	1,045	
		1/19/2018	13:10	1,091	1,142	1,117	310
		1/19/2018	15:10	1,297	1,224	1,261	310
	80 Day Rest Period	3/6/2018	8:18	1,156	1,264	1,210	
		3/6/2018	8:38	1,093	1,142	1,118	
		3/6/2018	9:18	1,002	1,011	1,007	440
		3/6/2018	11:18	830	836	833	410
VPC Inlet	Initial Shutdown	12/8/2017	9:20	1,196	1,220	1,208	99
	35 Day Rest Period	1/19/2018	12:00	644	750	697	
		1/19/2018	12:30	614	539	577	
		1/19/2018	13:00	604	624	614	
		1/19/2018	15:00	707	724	716	
	80 Day Rest Period	3/6/2018	8:15	536	460	498	
		3/6/2018	8:35	657	622	640	
		3/6/2018	9:15	548	491	520	
		3/6/2018	11:15	509	557	533	
VPC Out	Initial Shutdown	12/8/2017	9:36	0	0	0	

PID measurements presented are raw data and do not include a correction factor of 0.54 for TCE or 0.57 for PCE

Table 3-1 Sucrose Substrate Injections - January 2018

Well ID	Gallons Injected	Brix	lbs Sugar
B78-12	565	7.2	338
B78-14	578	7.2	345
B78-15	589	7.2	352
B78-16	571	7.2	341
subtotal	2,303		1,376

Notes:
Each well received 125 gallons chase water following substrate injections.

°Bx (degrees Brix) is a measure of the sugar content in an aqueous solution. One degree Brix is 1 gram of sucrose in 100 grams of solution and represents the strength of the solution as percentage by mass.

Table 3-2 - Injection Event Volumes - Benzene Treatment Area

October 2017 Injection Summary

Well	Volume Total (gal)	NaNO3 (lbs)	MgSO4 (lbs)	DAP (lbs)	Concentration NO3 Injected (mg/L)
B78-11	543	0.60	0.52	1.52	97
B78-13	536	0.74	0.52	1.52	121
B78-17	528	0.73	0.52	1.52	121
B78-18	488	0.73	0.52	1.52	131
B78-19	539	0.73	0.52	1.52	119
B78-20	544	0.74	0.52	1.52	119
B78-21	545	0.74	0.52	1.52	119

January 2018 Injection Summary

Well	Volume Total (gal)	NaNO3 (lbs)	MgSO4 (lbs)	DAP (lbs)	Concentration NO3 Injected (mg/L)
B78-11	439	1.14	1.04	3.02	228
B78-13	450	1.14	1.04	3.02	222
B78-17	450	1.14	1.04	3.02	222
B78-18	450	1.14	1.04	3.02	222
B78-19	450	1.14	1.04	3.02	222
B78-20	450	1.14	1.04	3.02	222
B78-21	450	1.14	1.04	3.02	222

Table 3-3 - Baseline and Performance Monitoring Groundwater Data; Benzene Treatment Area

Sample ID	Date	Sample Depth (ft bgs)	TCE (ug/L)		cis-1,2-DCE (ug/L)		VC (ug/L)		Benzene (ug/L)		Nitrate (mg-N/L)		Nitrite (mg-N/L)		Sulfate (mg/L)		Duplicate Well ID
B78-11-8-113017	11/30/2017	8	0.42		0.98		1.11		9.66		<0.100	U	<0.100	U	1.94		
B78-11-021418	2/14/2018	8	1.16		0.84		1.09		14.8		<0.100	U	<0.100	U	9.22	D	
B78-13-15-112917	11/29/2017	15	0.24		1.29		2.02		9.92		0.135		<0.100	U	0.652		
B78-13-021418	2/14/2018	15	<0.2	U	1.78		8.49		4.11		<0.100	U	<0.100	U	1.31		
B78-17-9-100617	10/6/2017	9	<0.2	U	0.17	J	0.33		4.84		-		-		-		
B78-17-15-112917	11/29/2017	15	1.25		0.81		1.31		6.52		<0.100	U	<0.100	U	17.1	D	
B78-17-021418	2/14/2018	15	2.57		1.78		1.47		4.61		<0.100	U	<0.100	U	7.35	D	
B78-18-8-100617	10/6/2017	8	<0.2	U	0.07	J	0.29		0.72		-		-		-		
B78-18-15-112917	11/29/2017	15	<0.2	U	<0.2	U	0.35	M	3.10		<0.100	U	<0.100	U	0.343		
DUP-01-112917	11/29/2017	15	<0.2	U	<0.2	U	0.36		2.96		<0.100	U	<0.100	U	1.68		B78-18-15
B78-18-021418	2/14/2018	15	<0.2	U	<0.2	U	0.24		1.28		<0.100	U	<0.100	U	1.47		
B78-19-9-100617	10/6/2017	9	<0.2	U	0.06	J	0.22		0.69		-		-		-		
B78-19-15-112917	11/29/2017	15	<0.2	U	<0.2	U	0.27	M	0.36		<0.100	U	<0.100	U	0.255		
B78-19-021418	2/14/2018	15	<0.2	U	<0.2	U	0.21		0.23		<0.100	U	<0.100	U	1.22		
B78-20-8-100617	10/6/2017	8	<0.2	U	<0.2	U	0.14	J	8.81		-		-		-		
B78-20-15-113017	11/30/2017	15	0.41		<0.2	U	<0.2	U	25.9		2.93	D	<0.100	U	53.9	D	
B78-20-021418	2/14/2018	15	0.25		0.49	M	<0.2	U	40.0		<0.100	U	<0.100	U	21.1	D	
B78-21-8-100617	10/6/2017	8	<0.2	U	0.13	J	0.21		1.42		-		-		-		
Dup01-100617	10/6/2017	8	<0.2	U	0.15	J	0.20	J	2.01		-		-		-		B78-21-8
B78-21-15-112917	11/29/2017	15	<0.2	U	0.31	M	0.26		2.27		0.101		<0.100	U	4.43	D	
B78-21-021418	2/14/2018	15	<0.2	U	0.24		0.30		0.86		<0.100	U	<0.100	U	1.60		
GW-244S-13-112917	11/29/2017	13	3.48		8.06		5.68		7.97		<0.100	U	<0.100	U	0.753		
GW-244S-021418	2/14/2018	13	1.01		1.25		1.22		5.34		<0.100	U	<0.100	U	1.25		
GW-244S	3/6/2018	13	1.26		2		1.56		6.86		-		-		-		
GW-031S-23-113017	11/30/2017	23	<0.2	U	<0.2	U	<0.2	U	17.6		<0.100	U	<0.100	U	2.54	D	
GW-031S-021418	2/14/2018	23	<0.2	U	0.45	M	0.49		21.9		<0.100	U	<0.100	U	3.67	D	
DUP-01-021418	2/14/2018	23	<0.2	U	0.46		0.42		21.4		-		-		-		GW-031S
GW-031S	3/6/2018	23	<0.2	U	1.18		<0.2	U	60.3		-		-		-		

Table 3-4 - Recent Groundwater Benzene Trends in 4-78/79 Building Wells

	Benzene (µg/L)	Benzene (µg/L)	Benzene (µg/L)
Sampling date	GW031S	GS244S	B78-11
2/3/2016	7.7	19	56
5/11/2016	23	19	NS
8/26/2016	7	21	NS
11/9/2016	79	22	NS
3/3/2017	75	13	NS
5/11/2017	29	11	28
8/16/2017	5.0	9.8	NS
Start of Nitrate/Sulfate Injection - October 2017			
11/13-11/14/2017	60	7.3	NS
11/29-11/30/2017	18	7.9	9.7
2nd Round of Nitrate/Sulfate Injection - January 2018			
2/14/2018	22	5.3	15
3/6/2018	60	6.9	NS

NS = Not Sampled

Table 3-5 Groundwater Monitoring Results Summary and Recommended ERD Treatment

GW Treatment Area	Source and downgradient	CPOC wells	Treatment IWs	ERD Treatment
SWMU-172/174	All detections are less than 1.5 ug/L.	All detections are less than 0.40 ug/L.	North and South IWS showed total CVOCs range from 0.03 ug/L to 6.90 ug/L. TOC near background.	**Substrate injection in all IWs B172-1 through B172-14.**
Building 4-78/4-79 SWMU/AOC Group	Most source area MWs are ND or less than 1.0 ug/L. One central well shows significant decrease in total CVOCs from 1,430 ug/L in Nov 2017 to 39 ug/L in March 2018, after substrate injections in January 2018. Benzene remains in selected wells/area (<10 typically). GW-031S was at 60 ug/L in March 2018; Nitrate/sulfate injected in April 2018.	Five of seven CPOC wells are ND for CVOCs. The two wells with detections of CVOCs are less than 0.25 ug/L.	*Prior data, 4 of 5 wells with low detections where sum of CVOCs are less than 3 ug/L. One central well shows total CVOCs at 2,440 ug/L. TOC near background.*	**Substrate injection in selected IWs/areas around GW-033S.**
AOC-001/002	MW near source at 0.8 ug/L; downgradient all detections are less than 1.5 ug/L.	All detections are less than 0.50 ug/L.	Detections at or below 0.30 ug/L.	**Inject infiltration galleries at source (IPRA and IPRB).**
AOC-003	All detections are less than 0.50 ug/L.	Detections at or below 0.65 ug/L.	*Prior data, in May 2017 one of four IWs sampled – VC detection less than 0.30 ug/L*	**No action**
Lot 20 / former 10-71	*Prior data, all MWs are ND.*	-	-	**No action**
AOC-60	Detections less than 3 ug/L.	*Prior data, all detections less than 0.30 ug/L*	-	**Inject MWs GW-012S and GW-147S**
AOC – 90	MW near source at 3.0 ug/L CVOCs; downgradient wells less than 0.50 ug/L.	All detections are less than 0.60 ug/L.	-	**Inject GW-189S**
Apron A	*Prior data, two wells sampled, one is ND and the other with VC at 0.97 ug/L.*	-	-	**No action**
Building 4-70	-	CVOCs at 0.75 ug/L and 0.26 ug/L.	-	**No action**

FIGURES

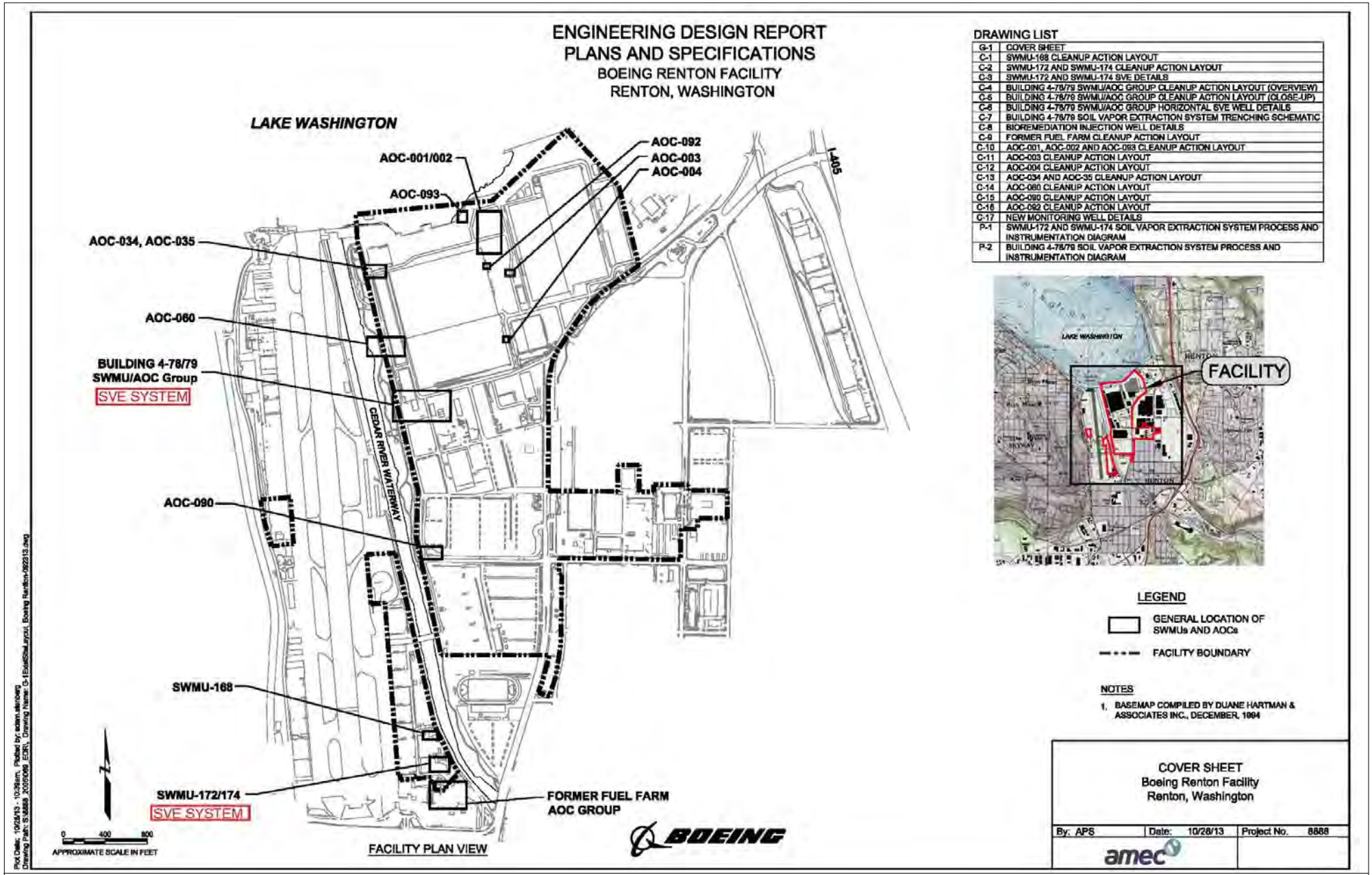

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Figure 1-1 Site Location/ AOC Outlines

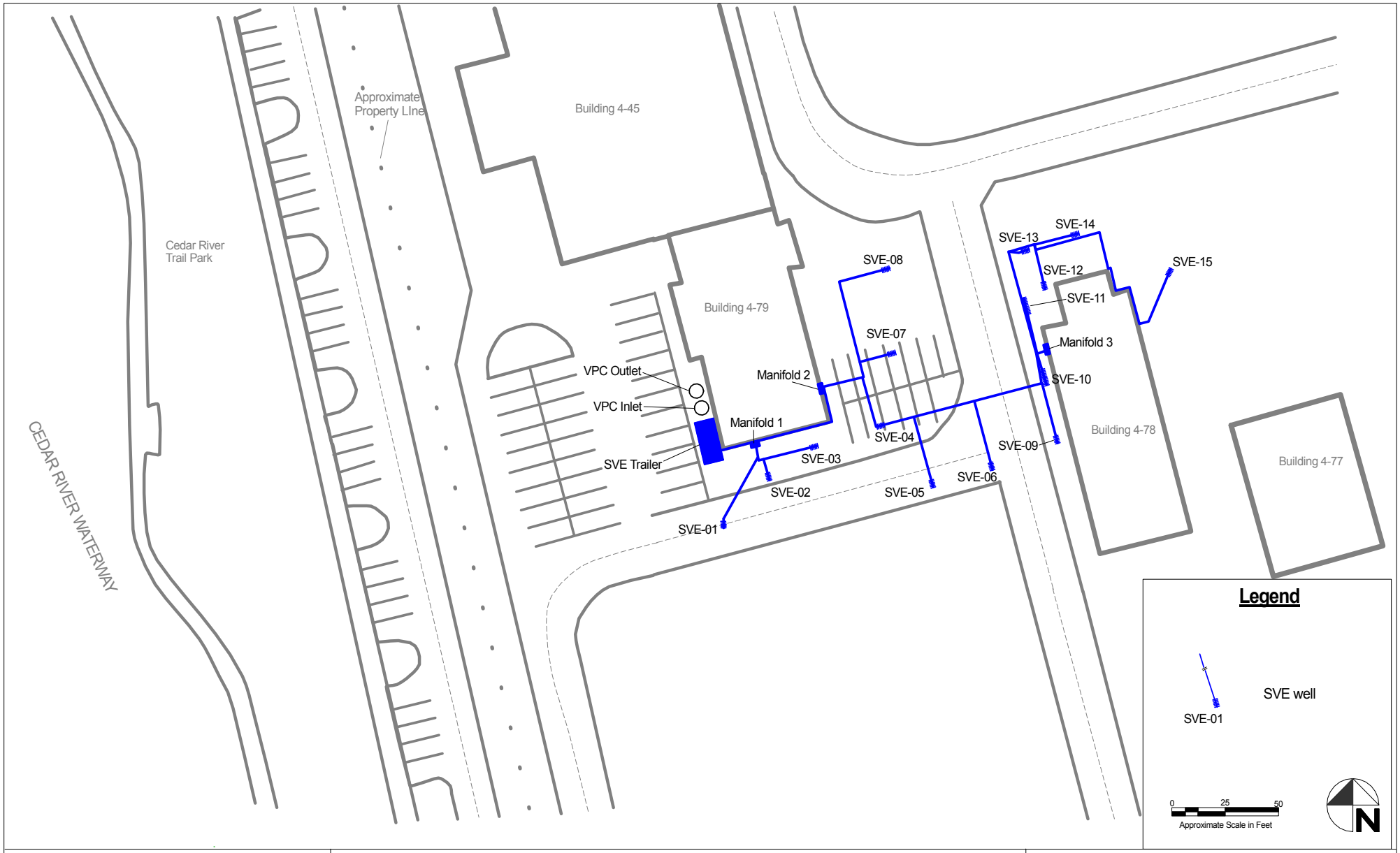

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Figure 2-1 Building 4-78/79

SVE System Layout

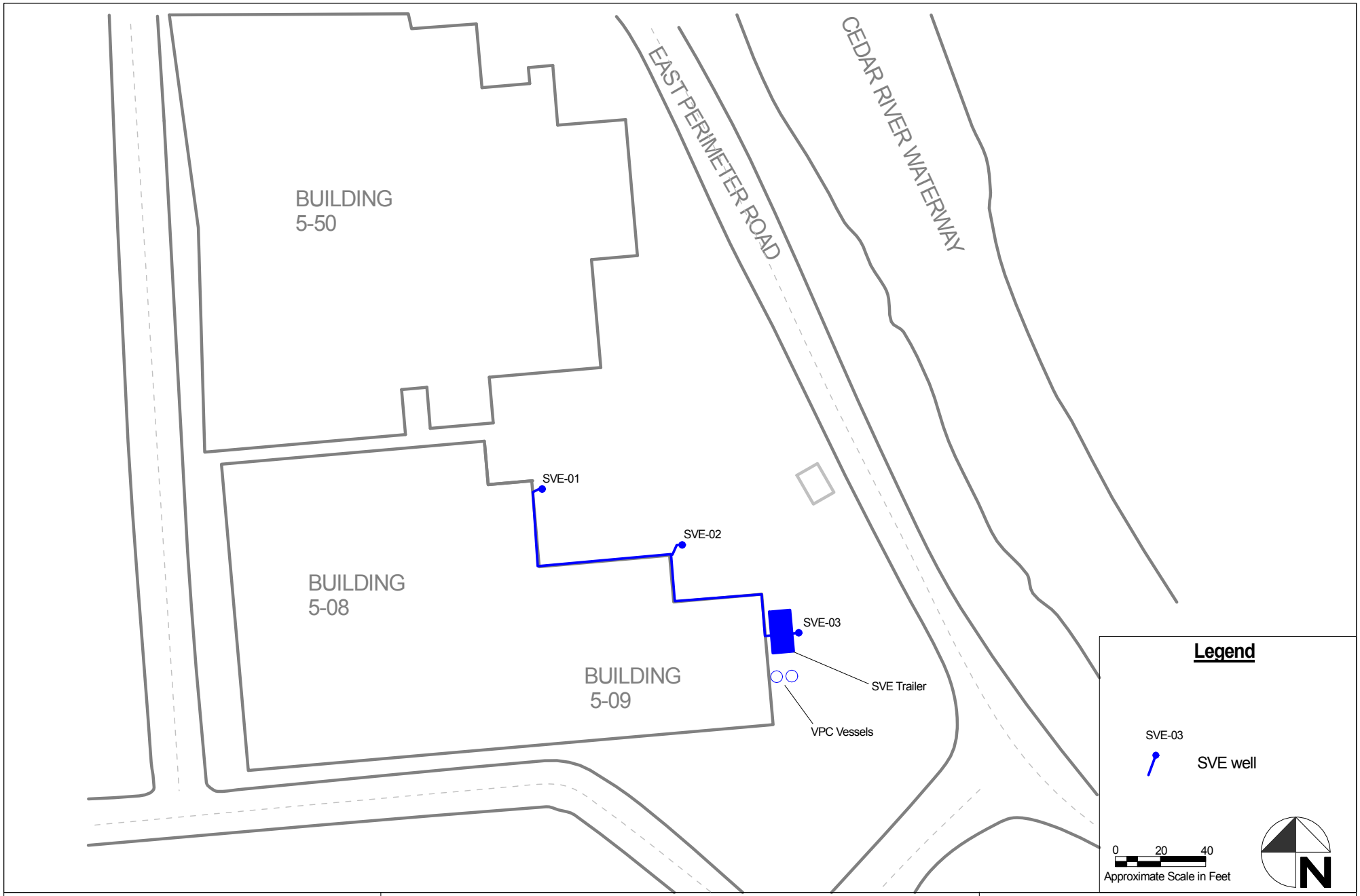

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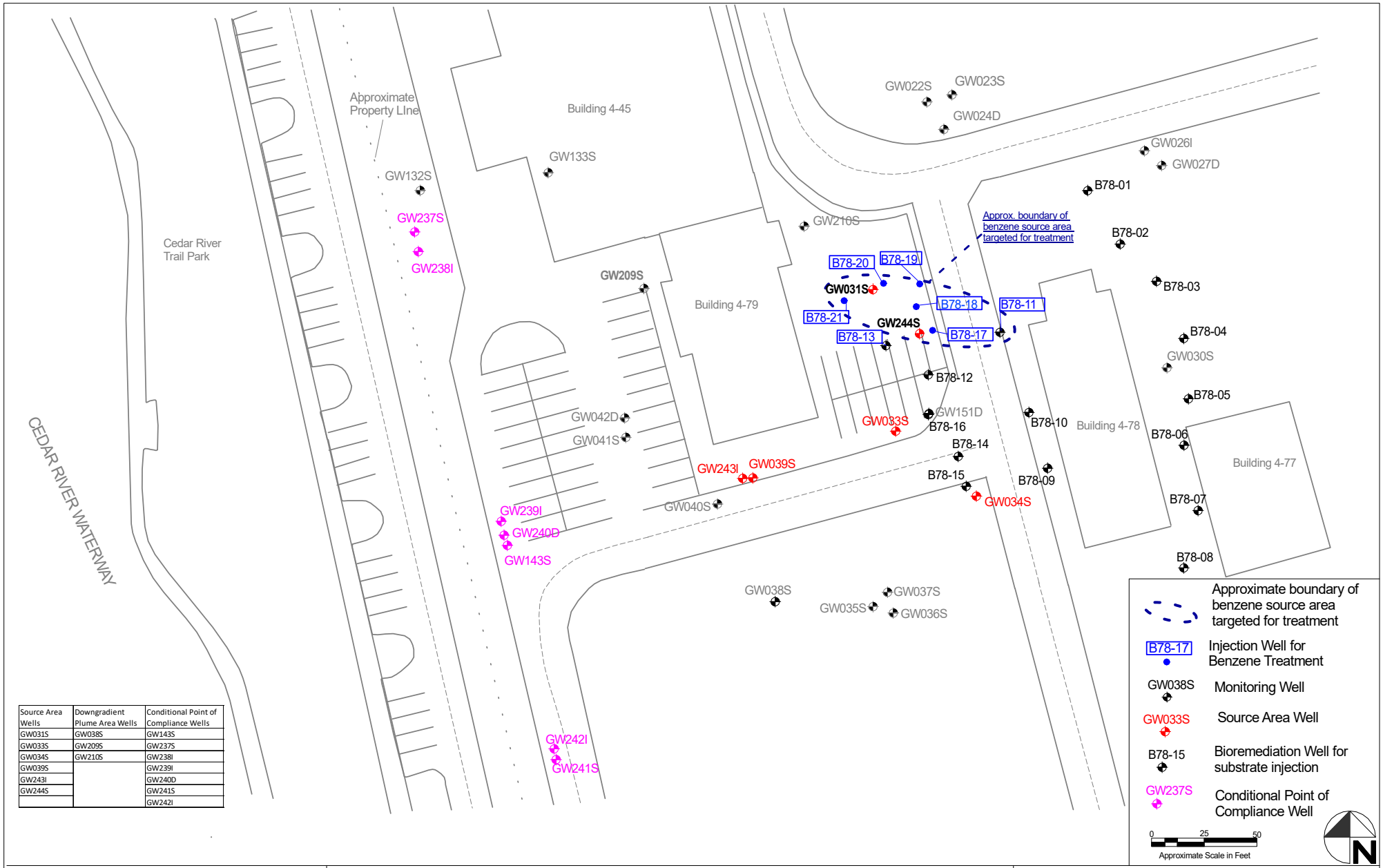
Figure 2-2 SWMU-172/174 Area
SVE System Layout



Source Area Wells	Downgradient Plume Area Wells	Conditional Point of Compliance Wells
GW031S	GW038S	GW143S
GW033S	GW209S	GW237S
GW034S	GW210S	GW238I
GW039S		GW239I
GW243I		GW240D
GW244S		GW241S
		GW242I

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Groundwater Treatment of Benzene in 4-78/79 Source Area

Figure 3-1 Building 4-78/79 Area Nitrate/Sulfate Injection Wells

Attachment A: Field Log Forms

Renton Cleanup Action SVE System – 4-78/79
Field Operations Log Form

Inspection Date: 1/19/18 Date of last inspection: 12/15/17

Periodic systems check:

1) Check flowrate, vacuum, pressure, moisture separator, water storage drums

2) Check each SVE well, VPC inlet, and VPC outlet with PID.

Operational Parameters - Monitoring interval is variable.

Inspection Time: 0830 Motor Hours: 3201.2

Blower	Current Value (Starting)	4 HR
Vacuum gauge	36 "H2O	36 "H2O
Pressure gauge	22 "H2O	30 "H2O
System flow rate	119 scfm @ 68°F	119 scfm
Blower Temperature	68°F	114°F
Temp.at lag VPC discharge	59.0°F	

Other Notes

System start @ 0830
Will monitor Influent, SVE-6 & 10 @ 10 min, 30 min, 60 min & 180 min
TO-15 @ 60 min from SVE-In, 6, 10
@ 240 min from SVE-10

@ 20 min mark encountered strong Paint odors in area. stopped monitoring until odors were gone.

Other notes: check oil level, drive belts, TEFC motor fan, any unusual noise/vibration

PID Model: PPB RAE 3000 Details: 1PPb / 10.02 ppb

Calibration time/ date: 1/19/18 PID check after monitoring:

Sampling Point	Time	PID Reading (1)	PID Reading (2)	Vacuum	Flow Rate (gauge)	Differential Pressure	Flow Rate Calculated[1]	Well Off
SVE-01								
SVE-02								
SVE-03								
SVE-04								
SVE-05								
SVE-06	0910	250 ppb	237 ppb					
SVE-07								
SVE-08								
SVE-09								
SVE-10	0920	955 ppb	996 ppb					
SVE-11								
SVE-12								
SVE-13								
SVE-14								
SVE-15								
Other:_____								

Sampling Point	Time	PID Reading (1)	PID Reading (2)	Vacuum	Flow Rate (gauge)	Differential Pressure	Flow Rate Calculated[1]	Well Off
VPC Inlet	0900	343 ppb	287 ppb / 332 ppb					
VPC Midpoint								
VPC Outlet								

1. Flow rate calculated from the equation $Flow\ Rate\ (cfm) = 12.24 \times \sqrt{differential\ pressure}$.

Questions? Call Justin Neste @ (360) 981-5606

At the Completion of a monitoring event scan monitoring forms and e-mail to Justin Neste @ Justin.Neste@calibresys.com

Signature: Justin Neste (Printed Name) _____ (Signature) 1/19/18 (Date)

	SVE-IN	SOE-6	SOE-10
10 min	0900 343/287/332	0910 250/237	0920 955/996
30 min	0930 348/367	0935-1025 308/411	1020 894/913
60 min	1105 Sample TO-15 490/501	TO-15 414/354	TO-15 1,062/1,037
~~240 min 180 min~~	643/621	603/524	1,399/1,348 - TO-15 Sample

Renton Cleanup Action SVE System – 4-78/79
Field Operations Log Form

Inspection Date: 3/6/18 Date of last inspection: 1/19/18

Periodic systems check:

1) Check flowrate, vacuum, pressure, moisture separator, water storage drums

2) Check each SVE well, VPC inlet, and VPC outlet with PID.

Operational Parameters - Monitoring interval is variable.

Inspection Time: 0940	Motor Hours: 3206.3

Blower	Current Value
Vacuum gauge	36 "H2O
Pressure gauge	20 "H2O
System flow rate	112 SCFM
Blower Temperature	66°F
Temp.at lag VPC discharge	

Other Notes

on site for 60 Day Rebound monitoring
10, 30, 60, 180 min Readings on next page
TO-15 @60min - SVE-In, 6, 10
180 min - SVE-10

Other notes: check oil level, drive belts, TEFC motor fan, any unusual noise/vibration

PID Model: PPB RAE 3000

Details: 0 PPB / 10.00 PPM

Calibration time/ date: 0800 3/6/18

PID check after monitoring:

Sampling Point	Time	PID Reading (1)	PID Reading (2)	Vacuum	Flow Rate (gauge)	Differential Pressure	Flow Rate Calculated[1]	Well Off
SVE-01								
SVE-02								
SVE-03								
SVE-04								
SVE-05	1007	2,467	2,712					
SVE-06	1015	1,651	1,696					
SVE-07								
SVE-08								
SVE-09								
SVE-10	1020	551	633					
SVE-11	1025	331	391					
SVE-12								
SVE-13								
SVE-14								
SVE-15								
Other:_____								

Sampling Point	Time	PID Reading (1)	PID Reading (2)	Vacuum	Flow Rate (gauge)	Differential Pressure	Flow Rate Calculated[1]	Well Off
VPC Inlet	1002	603 PPb	624 PPb					
VPC Midpoint	6959	60 PPb	83 ppb					
VPC Outlet	0955	13 PPb	19 ppb					

1. Flow rate calculated from the equation $Flow\ Rate\ (cfm) = 12.24 \times \sqrt{differential\ pressure}$.

Questions? Call Justin Neste @ (360) 981-5606

At the Completion of a monitoring event scan monitoring forms and e-mail to Justin Neste @ Justin.Neste@calibresys.com

Signature Justin Neste (Printed Name) _____ (Signature) 3/6/18 (Date)

	Out	Mid	In	~~SVE-01~~	SVE-05	SVE-10	SVE-12	SVE-06
10 min	13/19	60/83	603/624		2467/2712	551/633	331/391	1631/1696
30 min	19/11	207/228	400/496		1912/1999	621/629	435/333	1843/1414
60 min	8/0	421/422	534/666		1831/1814	555/566	400/359	1207/1370
180 min	146/132	269/11	823/712		1,348/1445	622/509	323/410	1176/1112

Swap

Renton Cleanup Action SVE System – SWMU 172/174
Field Operations Log Form

Inspection Date: 1/19/18 Date of last inspection: 12/15/17

Periodic systems check:
1) Check flowrate, vacuum, pressure, moisture separator, water storage drums
2) Check each SVE well, VPC inlet, and VPC outlet with PID.

Operational Parameters - Monitoring interval is variable.

Inspection Time: 1145 Motor Hours: 3050.4

Blower	Current Value	
Vacuum gauge	30" H_2O	32" H_2O
Pressure gauge	36" H_2O	34" H_2O
System flow rate	105 SCFM	105 SCFM
Blower Temperature	66°F	95°F
Temp.at lag VPC discharge		

Other Notes

Replaced Air Filter on system – Stoddard F8-108.
On site for 30 day Rebound Testing
System started at 1150.
10, 30, 60, 180 min sampling pattern.
collect Summa @ 60 & 180 min from SVE-3
Vacuum gauge from Eurofins check @ 20" H_2O @ SVE-6 @ Initial Readings. Stopped using after first. took 45 seconds
Grab samples w/ summa cans.

Other notes: check oil level, drive belts, TEFC motor fan, any unusual noise/vibration

PID Model: PPB RAE 3000 Details: 1 PPb / 10.02 ppm

Calibration time/ date: 1/19/18 ~0830 PID check after monitoring:

Sampling Point	Time	PID Reading (1)	PID Reading (2)	Vacuum	Flow Rate (gauge)	Differential Pressure	Flow Rate Calculated[1]
SVE-01	1230	147 ppb	138 PPb				
SVE-02	1225	134 ppb	108 ppb				
SVE-03	1205	1,212 ppb	1,222 ppb				
VPC Inlet	1200	644 ppb	750 ppb				
VPC Midpoint							
VPC Outlet							
Other vapor point _____							

1. Flow rate calculated from the equation $Flow\ Rate\ (cfm) = 12.24 \times \sqrt{differential\ pressure}$.

Questions? Call Justin Neste @ (360) 981-5606
At the Completion of a monitoring event scan monitoring forms and email to Justin Neste: Justin.Neste@calibresys.com

Justin Neste — Printed Name
Signature — Signature
1/19/18 — Date

	SVE-1	SVE-2	SVE-3	SVE-IN
10 min	147/138	134/108	1,212/1,222	644/750
30 min		208/199	1,036/1,053	614/539
60 min			1,091/1,142	604/624
180 min			1,297/1,224	707/724

Renton Cleanup Action SVE System – SWMU 172/174
Field Operations Log Form

Inspection Date: 3/6/18 Date of last inspection: 1/19/18

Periodic systems check:

1) Check flowrate, vacuum, pressure, moisture separator, water storage drums

2) Check each SVE well, VPC inlet, and VPC outlet with PID.

Operational Parameters - Monitoring interval is variable.

Inspection Time: 0800 Motor Hours: 3053.5

Blower	Current Value	Other Notes
Vacuum gauge	25"H20 / 35"H20 @4Hrs.	60 Day Rebound Monitoring. Readings below.
Pressure gauge	25"H20	TO-15 @ 100 min & 180 min from SVE-3
System flow rate	1055 CFM	
Blower Temperature	63°F	
Temp.at lag VPC discharge		

Other notes: check oil level, drive belts, TEFC motor fan, any unusual noise/vibration

PID Model: PPB RAE 3000 Details: 0 ppb / 10.00 ppm

Calibration time/ date: 0800 3/6/18 PID check after monitoring:

Sampling Point	Time (Initial Readings)	PID Reading (1)	PID Reading (2)	Vacuum	Flow Rate (gauge)	Differential Pressure	Flow Rate Calculated[1]
SVE-01	0830	45 ppb	53 ppb				
SVE-02	824	102 PPb	74 ppb				
SVE-03	0818	1,156 ppb	1,264				
VPC Inlet	0815	536 ppb	460 ppb				
VPC Midpoint	0813	24 ppb	21 ppb				
VPC Outlet	0810	16 ppb	28 ppb				
Other vapor point _____							

1. Flow rate calculated from the equation $Flow\ Rate\ (cfm) = 12.24 \times \sqrt{differential\ pressure}$.

Questions? Call Justin Neste @ (360) 981-5606

At the Completion of a monitoring event scan monitoring forms and email to Justin Neste: Justin.Neste@calibresys.com

Signature Justin Neste (Printed Name) (Signature) 3/6/18 (Date)

	SVE-1	SVE-2	SVE-3	SVE In	SVE Mid	SVE-4
10 min	45 / 53 ppb	102 / 74 ppb	1,156 / 1,264 ppb	536 / 460 ppb	24 / 21 ppb	16 / 28 ppb
30 min	131 / 96 ppb	90 / 86 PPb	1,093 / 1,142 ppb	657 / 622	33 / 31 ppb	35 / 32 ppb
60 min	97 / 60 ppb	90 / 129 Ppb	1,002 / 1,011 ppb	548 / 491 PPb	55 / 58 ppb	30 / 36 ppb
180 min	0 / 0 ppb	52 / 17 ppb	930 / 836	509 / 557	51 / 36	61 / 31

Attachment B: Laboratory Data Package

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2/5/2018

Mr. Justin Neste
CALIBRE, Environmental Technology Solutions
20926 Pugh Rd NE

Poulsbo WA 98370

Project Name: Renton
Project #:
Workorder #: 1801340

Dear Mr. Justin Neste

The following report includes the data for the above referenced project for sample(s) received on 1/23/2018 at Air Toxics Ltd.

The data and associated QC analyzed by TO-15 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Eurofins Air Toxics Inc. for your air analysis needs. Eurofins Air Toxics Inc. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Kelly Buettner at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Kelly Buettner

Project Manager

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WORK ORDER #: 1801340

Work Order Summary

CLIENT:	Mr. Justin Neste CALIBRE, Environmental Technology Solutions 20926 Pugh Rd NE Poulsbo, WA 98370	**BILL TO:**	Accounts Payable Eurofins Lancaster Laboratories Environmental, LLC 2425 New Holland Pike Lancaster, PA 17605-2425
PHONE:	360-981-5606	**P.O. #**	Renton
FAX:		**PROJECT #**	Renton
DATE RECEIVED:	01/23/2018	**CONTACT:**	Kelly Buettner
DATE COMPLETED:	02/05/2018		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	4-78-SVE-IN-60-011918	TO-15	1.2 psi	15.3 psi
02A	4-78-SVE-6-60-011918	TO-15	0.2 "Hg	14.9 psi
03A	4-78-SVE-10-60-011918	TO-15	0.6 "Hg	15.1 psi
04A	5-09-SVE-3-60-011918	TO-15	0.2 psi	15.3 psi
05A	4-78-SVE-10-240-011918	TO-15	1.0 "Hg	15 psi
06A	5-09-SVE-3-180-011908	TO-15	0.4 psi	15 psi
07A	Lab Blank	TO-15	NA	NA
08A	CCV	TO-15	NA	NA
09A	LCS	TO-15	NA	NA
09AA	LCSD	TO-15	NA	NA

CERTIFIED BY: Heidi Hayes DATE: 02/05/18

Technical Director

Certification numbers: AZ Licensure AZ0775, NJ NELAP - CA016, NY NELAP - 11291,
TX NELAP - T104704434-16-11, UT NELAP CA0093332016-7, VA NELAP - 8113, WA NELAP - C935
Name of Accreditation Body: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
Accreditation number: CA300005, Effective date: 10/18/2016, Expiration date: 10/17/2017.
Eurofins Air Toxics Inc.. certifies that the test results contained in this report meet all requirements of the NELAC standards

LABORATORY NARRATIVE
EPA Method TO-15
CALIBRE, Environmental Technology Solutions
Workorder# 1801340

Six 1 Liter Summa Canister samples were received on January 23, 2018. The laboratory performed analysis via EPA Method TO-15 using GC/MS in the full scan mode.

This workorder was independently validated prior to submittal using 'USEPA National Functional Guidelines' as generally applied to the analysis of volatile organic compounds in air. A rules-based, logic driven, independent validation engine was employed to assess completeness, evaluate pass/fail of relevant project quality control requirements and verification of all quantified amounts.

Receiving Notes

The Chain of Custody (COC) information for sample 5-09-SVE-3-180-011908 did not match the entry on the sample tag with regard to sample identification. The information on the COC was used to process and report the sample.

Analytical Notes

The reported CCV for each daily batch may be derived from more than one analytical file due to the client's request for non-standard compounds. Non-standard compounds may have different acceptance criteria than the standard TO-14A/TO-15 compound list as per contract or verbal agreement.

A single point calibration for TPH referenced to Gasoline was performed for each daily analytical batch. Recovery is reported as 100% in the associated results for each CCV.

Definition of Data Qualifying Flags

Ten qualifiers may have been used on the data analysis sheets and indicates as follows:

B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).

J - Estimated value.

E - Exceeds instrument calibration range.

S - Saturated peak.

Q - Exceeds quality control limits.

U - Compound analyzed for but not detected above the reporting limit, LOD, or MDL value. See data page for project specific U-flag definition.

UJ- Non-detected compound associated with low bias in the CCV

N - The identification is based on presumptive evidence.

M - Reported value may be biased due to apparent matrix interferences.

CN - See Case Narrative.

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified

b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue

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Summary of Detected Compounds
EPA METHOD TO-15 GC/MS FULL SCAN

Client Sample ID: 4-78-SVE-IN-60-011918

Lab ID#: 1801340-01A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.94	2.0	2.4	5.0
Freon 113	0.94	13	7.2	100
Hexane	0.94	13	3.3	46
2-Butanone (Methyl Ethyl Ketone)	3.8	7.1	11	21
cis-1,2-Dichloroethene	0.94	2.6	3.7	10
1,1,1-Trichloroethane	0.94	5.8	5.2	32
Trichloroethene	0.94	68	5.1	370
Toluene	0.94	1.0	3.6	3.8
TPH ref. to Gasoline (MW=100)	94	280	390	1100
Pentane	3.8	26	11	78

Client Sample ID: 4-78-SVE-6-60-011918

Lab ID#: 1801340-02A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 113	1.0	24	7.8	180
cis-1,2-Dichloroethene	1.0	1.0	4.0	4.1
Chloroform	1.0	1.3	5.0	6.3
1,1,1-Trichloroethane	1.0	4.6	5.5	25
Trichloroethene	1.0	52	5.4	280
Tetrachloroethene	1.0	6.4	6.9	43

Client Sample ID: 4-78-SVE-10-60-011918

Lab ID#: 1801340-03A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 113	1.0	39	7.9	300
1,1-Dichloroethane	1.0	1.2	4.2	4.9
2-Butanone (Methyl Ethyl Ketone)	4.1	17	12	49
cis-1,2-Dichloroethene	1.0	13	4.1	53
1,1,1-Trichloroethane	1.0	28	5.6	150
Trichloroethene	1.0	330	5.6	1800
Toluene	1.0	1.4	3.9	5.4

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Summary of Detected Compounds
EPA METHOD TO-15 GC/MS FULL SCAN

Client Sample ID: 4-78-SVE-10-60-011918

Lab ID#: 1801340-03A

Tetrachloroethene	1.0	1.7	7.0	12

Client Sample ID: 5-09-SVE-3-60-011918

Lab ID#: 1801340-04A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethane	1.0	1.3	4.1	5.3
cis-1,2-Dichloroethene	1.0	13	4.0	52
Chloroform	1.0	1.1	4.9	5.4
1,1,1-Trichloroethane	1.0	6.9	5.5	38
Trichloroethene	1.0	30	5.4	160
Tetrachloroethene	1.0	310	6.8	2100

Client Sample ID: 4-78-SVE-10-240-011918

Lab ID#: 1801340-05A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 113	1.0	31	8.0	240
1,1-Dichloroethane	1.0	1.3	4.2	5.3
2-Butanone (Methyl Ethyl Ketone)	4.2	37	12	110
cis-1,2-Dichloroethene	1.0	15	4.1	61
1,1,1-Trichloroethane	1.0	24	5.7	130
Trichloroethene	1.0	350	5.6	1900
Tetrachloroethene	1.0	1.8	7.1	12

Client Sample ID: 5-09-SVE-3-180-011908

Lab ID#: 1801340-06A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethane	0.98	1.1	4.0	4.5
cis-1,2-Dichloroethene	0.98	12	3.9	46
Chloroform	0.98	1.1	4.8	5.2
1,1,1-Trichloroethane	0.98	7.9	5.4	43
Trichloroethene	0.98	28	5.3	150

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Summary of Detected Compounds
EPA METHOD TO-15 GC/MS FULL SCAN

Client Sample ID: 5-09-SVE-3-180-011908

Lab ID#: 1801340-06A

Tetrachloroethene	0.98	310	6.7	2100

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Client Sample ID: 4-78-SVE-IN-60-011918

Lab ID#: 1801340-01A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17013010**	**Date of Collection:**	**1/19/18 10:28:00 AM**
Dil. Factor:	**1.89**	**Date of Analysis:**	**1/30/18 04:16 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Chloromethane	9.4	Not Detected	20	Not Detected
Vinyl Chloride	0.94	2.0	2.4	5.0
Freon 113	0.94	13	7.2	100
1,1-Dichloroethene	0.94	Not Detected	3.7	Not Detected
Acetone	9.4	Not Detected	22	Not Detected
Carbon Disulfide	3.8	Not Detected	12	Not Detected
Methylene Chloride	9.4	Not Detected	33	Not Detected
trans-1,2-Dichloroethene	0.94	Not Detected	3.7	Not Detected
Hexane	0.94	13	3.3	46
1,1-Dichloroethane	0.94	Not Detected	3.8	Not Detected
2-Butanone (Methyl Ethyl Ketone)	3.8	7.1	11	21
cis-1,2-Dichloroethene	0.94	2.6	3.7	10
Chloroform	0.94	Not Detected	4.6	Not Detected
1,1,1-Trichloroethane	0.94	5.8	5.2	32
Benzene	0.94	Not Detected	3.0	Not Detected
Trichloroethene	0.94	68	5.1	370
Toluene	0.94	1.0	3.6	3.8
1,1,2-Trichloroethane	0.94	Not Detected	5.2	Not Detected
Tetrachloroethene	0.94	Not Detected	6.4	Not Detected
Chlorobenzene	0.94	Not Detected	4.4	Not Detected
Ethyl Benzene	0.94	Not Detected	4.1	Not Detected
m,p-Xylene	0.94	Not Detected	4.1	Not Detected
o-Xylene	0.94	Not Detected	4.1	Not Detected
Styrene	0.94	Not Detected	4.0	Not Detected
Cumene	0.94	Not Detected	4.6	Not Detected
Propylbenzene	0.94	Not Detected	4.6	Not Detected
1,3,5-Trimethylbenzene	0.94	Not Detected	4.6	Not Detected
1,2,4-Trimethylbenzene	0.94	Not Detected	4.6	Not Detected
TPH ref. to Gasoline (MW=100)	94	280	390	1100
Acetonitrile	9.4	Not Detected	16	Not Detected
Vinyl Acetate	3.8	Not Detected	13	Not Detected
Octane	3.8	Not Detected	18	Not Detected
Pentane	3.8	26	11	78
Butylbenzene	3.8	Not Detected	21	Not Detected
Decane	3.8	Not Detected	22	Not Detected
Dodecane	9.4	Not Detected	66	Not Detected
sec-Butylbenzene	3.8	Not Detected	21	Not Detected
p-Cymene	3.8	Not Detected	21	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits

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Client Sample ID: 4-78-SVE-IN-60-011918

Lab ID#: 1801340-01A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17013010**	**Date of Collection:**	**1/19/18 10:28:00 AM**
Dil. Factor:	**1.89**	**Date of Analysis:**	**1/30/18 04:16 PM**

Surrogates	%Recovery	Method Limits
Toluene-d8	101	70-130
1,2-Dichloroethane-d4	98	70-130
4-Bromofluorobenzene	98	70-130

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Client Sample ID: 4-78-SVE-6-60-011918

Lab ID#: 1801340-02A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17013011**	**Date of Collection:**	**1/19/18 11:15:00 AM**
Dil. Factor:	**2.03**	**Date of Analysis:**	**1/30/18 04:44 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Chloromethane	10	Not Detected	21	Not Detected
Vinyl Chloride	1.0	Not Detected	2.6	Not Detected
Freon 113	1.0	24	7.8	180
1,1-Dichloroethene	1.0	Not Detected	4.0	Not Detected
Acetone	10	Not Detected	24	Not Detected
Carbon Disulfide	4.1	Not Detected	13	Not Detected
Methylene Chloride	10	Not Detected	35	Not Detected
trans-1,2-Dichloroethene	1.0	Not Detected	4.0	Not Detected
Hexane	1.0	Not Detected	3.6	Not Detected
1,1-Dichloroethane	1.0	Not Detected	4.1	Not Detected
2-Butanone (Methyl Ethyl Ketone)	4.1	Not Detected	12	Not Detected
cis-1,2-Dichloroethene	1.0	1.0	4.0	4.1
Chloroform	1.0	1.3	5.0	6.3
1,1,1-Trichloroethane	1.0	4.6	5.5	25
Benzene	1.0	Not Detected	3.2	Not Detected
Trichloroethene	1.0	52	5.4	280
Toluene	1.0	Not Detected	3.8	Not Detected
1,1,2-Trichloroethane	1.0	Not Detected	5.5	Not Detected
Tetrachloroethene	1.0	6.4	6.9	43
Chlorobenzene	1.0	Not Detected	4.7	Not Detected
Ethyl Benzene	1.0	Not Detected	4.4	Not Detected
m,p-Xylene	1.0	Not Detected	4.4	Not Detected
o-Xylene	1.0	Not Detected	4.4	Not Detected
Styrene	1.0	Not Detected	4.3	Not Detected
Cumene	1.0	Not Detected	5.0	Not Detected
Propylbenzene	1.0	Not Detected	5.0	Not Detected
1,3,5-Trimethylbenzene	1.0	Not Detected	5.0	Not Detected
1,2,4-Trimethylbenzene	1.0	Not Detected	5.0	Not Detected
TPH ref. to Gasoline (MW=100)	100	Not Detected	420	Not Detected
Acetonitrile	10	Not Detected	17	Not Detected
Vinyl Acetate	4.1	Not Detected	14	Not Detected
Octane	4.1	Not Detected	19	Not Detected
Pentane	4.1	Not Detected	12	Not Detected
Butylbenzene	4.1	Not Detected	22	Not Detected
Decane	4.1	Not Detected	24	Not Detected
Dodecane	10	Not Detected	71	Not Detected
sec-Butylbenzene	4.1	Not Detected	22	Not Detected
p-Cymene	4.1	Not Detected	22	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits

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Client Sample ID: 4-78-SVE-6-60-011918

Lab ID#: 1801340-02A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17013011**	**Date of Collection:**	**1/19/18 11:15:00 AM**
Dil. Factor:	**2.03**	**Date of Analysis:**	**1/30/18 04:44 PM**

Surrogates	%Recovery	Method Limits
Toluene-d8	103	70-130
1,2-Dichloroethane-d4	99	70-130
4-Bromofluorobenzene	98	70-130

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Client Sample ID: 4-78-SVE-10-60-011918

Lab ID#: 1801340-03A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17013012**	**Date of Collection:**	**1/19/18 11:20:00 AM**
Dil. Factor:	**2.07**	**Date of Analysis:**	**1/30/18 05:13 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Chloromethane	10	Not Detected	21	Not Detected
Vinyl Chloride	1.0	Not Detected	2.6	Not Detected
Freon 113	1.0	39	7.9	300
1,1-Dichloroethene	1.0	Not Detected	4.1	Not Detected
Acetone	10	Not Detected	24	Not Detected
Carbon Disulfide	4.1	Not Detected	13	Not Detected
Methylene Chloride	10	Not Detected	36	Not Detected
trans-1,2-Dichloroethene	1.0	Not Detected	4.1	Not Detected
Hexane	1.0	Not Detected	3.6	Not Detected
1,1-Dichloroethane	1.0	1.2	4.2	4.9
2-Butanone (Methyl Ethyl Ketone)	4.1	17	12	49
cis-1,2-Dichloroethene	1.0	13	4.1	53
Chloroform	1.0	Not Detected	5.0	Not Detected
1,1,1-Trichloroethane	1.0	28	5.6	150
Benzene	1.0	Not Detected	3.3	Not Detected
Trichloroethene	1.0	330	5.6	1800
Toluene	1.0	1.4	3.9	5.4
1,1,2-Trichloroethane	1.0	Not Detected	5.6	Not Detected
Tetrachloroethene	1.0	1.7	7.0	12
Chlorobenzene	1.0	Not Detected	4.8	Not Detected
Ethyl Benzene	1.0	Not Detected	4.5	Not Detected
m,p-Xylene	1.0	Not Detected	4.5	Not Detected
o-Xylene	1.0	Not Detected	4.5	Not Detected
Styrene	1.0	Not Detected	4.4	Not Detected
Cumene	1.0	Not Detected	5.1	Not Detected
Propylbenzene	1.0	Not Detected	5.1	Not Detected
1,3,5-Trimethylbenzene	1.0	Not Detected	5.1	Not Detected
1,2,4-Trimethylbenzene	1.0	Not Detected	5.1	Not Detected
TPH ref. to Gasoline (MW=100)	100	Not Detected	420	Not Detected
Acetonitrile	10	Not Detected	17	Not Detected
Vinyl Acetate	4.1	Not Detected	14	Not Detected
Octane	4.1	Not Detected	19	Not Detected
Pentane	4.1	Not Detected	12	Not Detected
Butylbenzene	4.1	Not Detected	23	Not Detected
Decane	4.1	Not Detected	24	Not Detected
Dodecane	10	Not Detected	72	Not Detected
sec-Butylbenzene	4.1	Not Detected	23	Not Detected
p-Cymene	4.1	Not Detected	23	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits

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Client Sample ID: 4-78-SVE-10-60-011918

Lab ID#: 1801340-03A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17013012**	**Date of Collection: 1/19/18 11:20:00 AM**	
Dil. Factor:	**2.07**	**Date of Analysis: 1/30/18 05:13 PM**	

Surrogates	%Recovery	Method Limits
Toluene-d8	105	70-130
1,2-Dichloroethane-d4	98	70-130
4-Bromofluorobenzene	98	70-130

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Client Sample ID: 5-09-SVE-3-60-011918

Lab ID#: 1801340-04A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17013013**	**Date of Collection:**	**1/19/18 1:15:00 PM**
Dil. Factor:	**2.01**	**Date of Analysis:**	**1/30/18 05:41 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Chloromethane	10	Not Detected	21	Not Detected
Vinyl Chloride	1.0	Not Detected	2.6	Not Detected
Freon 113	1.0	Not Detected	7.7	Not Detected
1,1-Dichloroethene	1.0	Not Detected	4.0	Not Detected
Acetone	10	Not Detected	24	Not Detected
Carbon Disulfide	4.0	Not Detected	12	Not Detected
Methylene Chloride	10	Not Detected	35	Not Detected
trans-1,2-Dichloroethene	1.0	Not Detected	4.0	Not Detected
Hexane	1.0	Not Detected	3.5	Not Detected
1,1-Dichloroethane	1.0	1.3	4.1	5.3
2-Butanone (Methyl Ethyl Ketone)	4.0	Not Detected	12	Not Detected
cis-1,2-Dichloroethene	1.0	13	4.0	52
Chloroform	1.0	1.1	4.9	5.4
1,1,1-Trichloroethane	1.0	6.9	5.5	38
Benzene	1.0	Not Detected	3.2	Not Detected
Trichloroethene	1.0	30	5.4	160
Toluene	1.0	Not Detected	3.8	Not Detected
1,1,2-Trichloroethane	1.0	Not Detected	5.5	Not Detected
Tetrachloroethene	1.0	310	6.8	2100
Chlorobenzene	1.0	Not Detected	4.6	Not Detected
Ethyl Benzene	1.0	Not Detected	4.4	Not Detected
m,p-Xylene	1.0	Not Detected	4.4	Not Detected
o-Xylene	1.0	Not Detected	4.4	Not Detected
Styrene	1.0	Not Detected	4.3	Not Detected
Cumene	1.0	Not Detected	4.9	Not Detected
Propylbenzene	1.0	Not Detected	4.9	Not Detected
1,3,5-Trimethylbenzene	1.0	Not Detected	4.9	Not Detected
1,2,4-Trimethylbenzene	1.0	Not Detected	4.9	Not Detected
TPH ref. to Gasoline (MW=100)	100	Not Detected	410	Not Detected
Acetonitrile	10	Not Detected	17	Not Detected
Vinyl Acetate	4.0	Not Detected	14	Not Detected
Octane	4.0	Not Detected	19	Not Detected
Pentane	4.0	Not Detected	12	Not Detected
Butylbenzene	4.0	Not Detected	22	Not Detected
Decane	4.0	Not Detected	23	Not Detected
Dodecane	10	Not Detected	70	Not Detected
sec-Butylbenzene	4.0	Not Detected	22	Not Detected
p-Cymene	4.0	Not Detected	22	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits

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Client Sample ID: 5-09-SVE-3-60-011918

Lab ID#: 1801340-04A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17013013**	**Date of Collection:**	**1/19/18 1:15:00 PM**
Dil. Factor:	**2.01**	**Date of Analysis:**	**1/30/18 05:41 PM**

Surrogates	%Recovery	Method Limits
Toluene-d8	101	70-130
1,2-Dichloroethane-d4	98	70-130
4-Bromofluorobenzene	98	70-130

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Client Sample ID: 4-78-SVE-10-240-011918

Lab ID#: 1801340-05A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17013014**	**Date of Collection: 1/19/18 1:50:00 PM**	
Dil. Factor:	**2.09**	**Date of Analysis: 1/30/18 06:10 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Chloromethane	10	Not Detected	22	Not Detected
Vinyl Chloride	1.0	Not Detected	2.7	Not Detected
Freon 113	1.0	31	8.0	240
1,1-Dichloroethene	1.0	Not Detected	4.1	Not Detected
Acetone	10	Not Detected	25	Not Detected
Carbon Disulfide	4.2	Not Detected	13	Not Detected
Methylene Chloride	10	Not Detected	36	Not Detected
trans-1,2-Dichloroethene	1.0	Not Detected	4.1	Not Detected
Hexane	1.0	Not Detected	3.7	Not Detected
1,1-Dichloroethane	1.0	1.3	4.2	5.3
2-Butanone (Methyl Ethyl Ketone)	4.2	37	12	110
cis-1,2-Dichloroethene	1.0	15	4.1	61
Chloroform	1.0	Not Detected	5.1	Not Detected
1,1,1-Trichloroethane	1.0	24	5.7	130
Benzene	1.0	Not Detected	3.3	Not Detected
Trichloroethene	1.0	350	5.6	1900
Toluene	1.0	Not Detected	3.9	Not Detected
1,1,2-Trichloroethane	1.0	Not Detected	5.7	Not Detected
Tetrachloroethene	1.0	1.8	7.1	12
Chlorobenzene	1.0	Not Detected	4.8	Not Detected
Ethyl Benzene	1.0	Not Detected	4.5	Not Detected
m,p-Xylene	1.0	Not Detected	4.5	Not Detected
o-Xylene	1.0	Not Detected	4.5	Not Detected
Styrene	1.0	Not Detected	4.4	Not Detected
Cumene	1.0	Not Detected	5.1	Not Detected
Propylbenzene	1.0	Not Detected	5.1	Not Detected
1,3,5-Trimethylbenzene	1.0	Not Detected	5.1	Not Detected
1,2,4-Trimethylbenzene	1.0	Not Detected	5.1	Not Detected
TPH ref. to Gasoline (MW=100)	100	Not Detected	430	Not Detected
Acetonitrile	10	Not Detected	18	Not Detected
Vinyl Acetate	4.2	Not Detected	15	Not Detected
Octane	4.2	Not Detected	20	Not Detected
Pentane	4.2	Not Detected	12	Not Detected
Butylbenzene	4.2	Not Detected	23	Not Detected
Decane	4.2	Not Detected	24	Not Detected
Dodecane	10	Not Detected	73	Not Detected
sec-Butylbenzene	4.2	Not Detected	23	Not Detected
p-Cymene	4.2	Not Detected	23	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits

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Client Sample ID: 4-78-SVE-10-240-011918

Lab ID#: 1801340-05A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17013014**	**Date of Collection:**	**1/19/18 1:50:00 PM**
Dil. Factor:	**2.09**	**Date of Analysis:**	**1/30/18 06:10 PM**

Surrogates	%Recovery	Method Limits
Toluene-d8	103	70-130
1,2-Dichloroethane-d4	98	70-130
4-Bromofluorobenzene	97	70-130

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Client Sample ID: 5-09-SVE-3-180-011908

Lab ID#: 1801340-06A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17013015**	**Date of Collection: 1/19/18 2:50:00 PM**	
Dil. Factor:	**1.97**	**Date of Analysis: 1/30/18 06:38 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Chloromethane	9.8	Not Detected	20	Not Detected
Vinyl Chloride	0.98	Not Detected	2.5	Not Detected
Freon 113	0.98	Not Detected	7.5	Not Detected
1,1-Dichloroethene	0.98	Not Detected	3.9	Not Detected
Acetone	9.8	Not Detected	23	Not Detected
Carbon Disulfide	3.9	Not Detected	12	Not Detected
Methylene Chloride	9.8	Not Detected	34	Not Detected
trans-1,2-Dichloroethene	0.98	Not Detected	3.9	Not Detected
Hexane	0.98	Not Detected	3.5	Not Detected
1,1-Dichloroethane	0.98	1.1	4.0	4.5
2-Butanone (Methyl Ethyl Ketone)	3.9	Not Detected	12	Not Detected
cis-1,2-Dichloroethene	0.98	12	3.9	46
Chloroform	0.98	1.1	4.8	5.2
1,1,1-Trichloroethane	0.98	7.9	5.4	43
Benzene	0.98	Not Detected	3.1	Not Detected
Trichloroethene	0.98	28	5.3	150
Toluene	0.98	Not Detected	3.7	Not Detected
1,1,2-Trichloroethane	0.98	Not Detected	5.4	Not Detected
Tetrachloroethene	0.98	310	6.7	2100
Chlorobenzene	0.98	Not Detected	4.5	Not Detected
Ethyl Benzene	0.98	Not Detected	4.3	Not Detected
m,p-Xylene	0.98	Not Detected	4.3	Not Detected
o-Xylene	0.98	Not Detected	4.3	Not Detected
Styrene	0.98	Not Detected	4.2	Not Detected
Cumene	0.98	Not Detected	4.8	Not Detected
Propylbenzene	0.98	Not Detected	4.8	Not Detected
1,3,5-Trimethylbenzene	0.98	Not Detected	4.8	Not Detected
1,2,4-Trimethylbenzene	0.98	Not Detected	4.8	Not Detected
TPH ref. to Gasoline (MW=100)	98	Not Detected	400	Not Detected
Acetonitrile	9.8	Not Detected	16	Not Detected
Vinyl Acetate	3.9	Not Detected	14	Not Detected
Octane	3.9	Not Detected	18	Not Detected
Pentane	3.9	Not Detected	12	Not Detected
Butylbenzene	3.9	Not Detected	22	Not Detected
Decane	3.9	Not Detected	23	Not Detected
Dodecane	9.8	Not Detected	69	Not Detected
sec-Butylbenzene	3.9	Not Detected	22	Not Detected
p-Cymene	3.9	Not Detected	22	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits

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Client Sample ID: 5-09-SVE-3-180-011908

Lab ID#: 1801340-06A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17013015**	**Date of Collection: 1/19/18 2:50:00 PM**	
Dil. Factor:	**1.97**	**Date of Analysis: 1/30/18 06:38 PM**	

Surrogates	%Recovery	Method Limits
Toluene-d8	103	70-130
1,2-Dichloroethane-d4	98	70-130
4-Bromofluorobenzene	98	70-130

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Client Sample ID: Lab Blank

Lab ID#: 1801340-07A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17013009c**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 1/30/18 01:58 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Chloromethane	5.0	Not Detected	10	Not Detected
Vinyl Chloride	0.50	Not Detected	1.3	Not Detected
Freon 113	0.50	Not Detected	3.8	Not Detected
1,1-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Acetone	5.0	Not Detected	12	Not Detected
Carbon Disulfide	2.0	Not Detected	6.2	Not Detected
Methylene Chloride	5.0	Not Detected	17	Not Detected
trans-1,2-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Hexane	0.50	Not Detected	1.8	Not Detected
1,1-Dichloroethane	0.50	Not Detected	2.0	Not Detected
2-Butanone (Methyl Ethyl Ketone)	2.0	Not Detected	5.9	Not Detected
cis-1,2-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Chloroform	0.50	Not Detected	2.4	Not Detected
1,1,1-Trichloroethane	0.50	Not Detected	2.7	Not Detected
Benzene	0.50	Not Detected	1.6	Not Detected
Trichloroethene	0.50	Not Detected	2.7	Not Detected
Toluene	0.50	Not Detected	1.9	Not Detected
1,1,2-Trichloroethane	0.50	Not Detected	2.7	Not Detected
Tetrachloroethene	0.50	Not Detected	3.4	Not Detected
Chlorobenzene	0.50	Not Detected	2.3	Not Detected
Ethyl Benzene	0.50	Not Detected	2.2	Not Detected
m,p-Xylene	0.50	Not Detected	2.2	Not Detected
o-Xylene	0.50	Not Detected	2.2	Not Detected
Styrene	0.50	Not Detected	2.1	Not Detected
Cumene	0.50	Not Detected	2.4	Not Detected
Propylbenzene	0.50	Not Detected	2.4	Not Detected
1,3,5-Trimethylbenzene	0.50	Not Detected	2.4	Not Detected
1,2,4-Trimethylbenzene	0.50	Not Detected	2.4	Not Detected
TPH ref. to Gasoline (MW=100)	50	Not Detected	200	Not Detected
Acetonitrile	5.0	Not Detected	8.4	Not Detected
Vinyl Acetate	2.0	Not Detected	7.0	Not Detected
Octane	2.0	Not Detected	9.3	Not Detected
Pentane	2.0	Not Detected	5.9	Not Detected
Butylbenzene	2.0	Not Detected	11	Not Detected
Decane	2.0	Not Detected	12	Not Detected
Dodecane	5.0	Not Detected	35	Not Detected
sec-Butylbenzene	2.0	Not Detected	11	Not Detected
p-Cymene	2.0	Not Detected	11	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits

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Client Sample ID: Lab Blank

Lab ID#: 1801340-07A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17013009c**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 1/30/18 01:58 PM**	

Surrogates	%Recovery	Method Limits
Toluene-d8	101	70-130
1,2-Dichloroethane-d4	97	70-130
4-Bromofluorobenzene	96	70-130

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Client Sample ID: CCV

Lab ID#: 1801340-08A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17013002**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 1/30/18 09:07 AM**	

Compound	%Recovery
Chloromethane	100
Vinyl Chloride	97
Freon 113	90
1,1-Dichloroethene	96
Acetone	94
Carbon Disulfide	93
Methylene Chloride	94
trans-1,2-Dichloroethene	97
Hexane	105
1,1-Dichloroethane	98
2-Butanone (Methyl Ethyl Ketone)	100
cis-1,2-Dichloroethene	99
Chloroform	98
1,1,1-Trichloroethane	95
Benzene	103
Trichloroethene	103
Toluene	106
1,1,2-Trichloroethane	98
Tetrachloroethene	98
Chlorobenzene	101
Ethyl Benzene	106
m,p-Xylene	112
o-Xylene	110
Styrene	114
Cumene	111
Propylbenzene	108
1,3,5-Trimethylbenzene	110
1,2,4-Trimethylbenzene	114
TPH ref. to Gasoline (MW=100)	100
Acetonitrile	94
Vinyl Acetate	99
Octane	119
Pentane	118
Butylbenzene	98
Decane	117
Dodecane	90
sec-Butylbenzene	89
p-Cymene	99

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits

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Client Sample ID: CCV

Lab ID#: 1801340-08A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17013002**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 1/30/18 09:07 AM**	

Surrogates	%Recovery	Method Limits
Toluene-d8	105	70-130
1,2-Dichloroethane-d4	102	70-130
4-Bromofluorobenzene	105	70-130

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Client Sample ID: LCS

Lab ID#: 1801340-09A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17013003**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 1/30/18 09:36 AM**	

Compound	%Recovery	Method Limits
Chloromethane	95	70-130
Vinyl Chloride	96	70-130
Freon 113	87	70-130
1,1-Dichloroethene	95	70-130
Acetone	94	70-130
Carbon Disulfide	80	70-130
Methylene Chloride	92	70-130
trans-1,2-Dichloroethene	82	70-130
Hexane	104	70-130
1,1-Dichloroethane	97	70-130
2-Butanone (Methyl Ethyl Ketone)	94	70-130
cis-1,2-Dichloroethene	107	70-130
Chloroform	96	70-130
1,1,1-Trichloroethane	91	70-130
Benzene	104	70-130
Trichloroethene	104	70-130
Toluene	103	70-130
1,1,2-Trichloroethane	90	70-130
Tetrachloroethene	92	70-130
Chlorobenzene	92	70-130
Ethyl Benzene	97	70-130
m,p-Xylene	100	70-130
o-Xylene	101	70-130
Styrene	102	70-130
Cumene	101	70-130
Propylbenzene	98	70-130
1,3,5-Trimethylbenzene	103	70-130
1,2,4-Trimethylbenzene	100	70-130
TPH ref. to Gasoline (MW=100)	Not Spiked	
Acetonitrile	Not Spiked	
Vinyl Acetate	95	60-140
Octane	Not Spiked	
Pentane	Not Spiked	
Butylbenzene	Not Spiked	
Decane	Not Spiked	
Dodecane	Not Spiked	
sec-Butylbenzene	Not Spiked	
p-Cymene	Not Spiked	

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits

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Client Sample ID: LCS

Lab ID#: 1801340-09A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17013003**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 1/30/18 09:36 AM**	

Surrogates	%Recovery	Method Limits
Toluene-d8	106	70-130
1,2-Dichloroethane-d4	99	70-130
4-Bromofluorobenzene	102	70-130

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Client Sample ID: LCSD

Lab ID#: 1801340-09AA

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17013004**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 1/30/18 10:04 AM**	

Compound	%Recovery	Method Limits
Chloromethane	97	70-130
Vinyl Chloride	99	70-130
Freon 113	87	70-130
1,1-Dichloroethene	94	70-130
Acetone	94	70-130
Carbon Disulfide	81	70-130
Methylene Chloride	92	70-130
trans-1,2-Dichloroethene	83	70-130
Hexane	103	70-130
1,1-Dichloroethane	98	70-130
2-Butanone (Methyl Ethyl Ketone)	94	70-130
cis-1,2-Dichloroethene	109	70-130
Chloroform	97	70-130
1,1,1-Trichloroethane	92	70-130
Benzene	103	70-130
Trichloroethene	104	70-130
Toluene	103	70-130
1,1,2-Trichloroethane	93	70-130
Tetrachloroethene	95	70-130
Chlorobenzene	96	70-130
Ethyl Benzene	100	70-130
m,p-Xylene	103	70-130
o-Xylene	104	70-130
Styrene	104	70-130
Cumene	102	70-130
Propylbenzene	100	70-130
1,3,5-Trimethylbenzene	104	70-130
1,2,4-Trimethylbenzene	102	70-130
TPH ref. to Gasoline (MW=100)	Not Spiked	
Acetonitrile	Not Spiked	
Vinyl Acetate	96	60-140
Octane	Not Spiked	
Pentane	Not Spiked	
Butylbenzene	Not Spiked	
Decane	Not Spiked	
Dodecane	Not Spiked	
sec-Butylbenzene	Not Spiked	
p-Cymene	Not Spiked	

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits

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Client Sample ID: LCSD

Lab ID#: 1801340-09AA

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17013004**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 1/30/18 10:04 AM**	

Surrogates	%Recovery	Method Limits
Toluene-d8	106	70-130
1,2-Dichloroethane-d4	100	70-130
4-Bromofluorobenzene	104	70-130

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3/21/2018
Mr. Justin Neste
CALIBRE, Environmental Technology Solutions
20926 Pugh Rd NE

Poulsbo WA 98370

Project Name: Renton
Project #:
Workorder #: 1803144

Dear Mr. Justin Neste

The following report includes the data for the above referenced project for sample(s) received on 3/8/2018 at Air Toxics Ltd.

The data and associated QC analyzed by TO-15 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Eurofins Air Toxics Inc. for your air analysis needs. Eurofins Air Toxics Inc. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Kelly Buettner at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Kelly Buettner

Project Manager

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WORK ORDER #: 1803144

Work Order Summary

CLIENT:	Mr. Justin Neste CALIBRE, Environmental Technology Solutions 20926 Pugh Rd NE Poulsbo, WA 98370	**BILL TO:**	Accounts Payable Eurofins Lancaster Laboratories Environmental, LLC 2425 New Holland Pike Lancaster, PA 17605-2425
PHONE:	360-981-5606	**P.O. #**	Renton - Boeing
FAX:		**PROJECT #**	Renton
DATE RECEIVED:	03/08/2018	**CONTACT:**	Kelly Buettner
DATE COMPLETED:	03/21/2018		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	5-09-SVE-3-60-030618	TO-15	1 "Hg	15 psi
02A	4-78-SVE-IN-60-030618	TO-15	1.8 psi	15.1 psi
03A	4-78-SVE-6-60-030618	TO-15	0.2 psi	15.2 psi
04A	4-78-SVE-10-60-030618	TO-15	0.3 psi	15.2 psi
05A	5-09-SVE-3-180-030618	TO-15	0.3 psi	15.6 psi
06A	4-78-SVE-10-180-030618	TO-15	6.9 "Hg	15.2 psi
07A	Lab Blank	TO-15	NA	NA
08A	CCV	TO-15	NA	NA
09A	LCS	TO-15	NA	NA
09AA	LCSD	TO-15	NA	NA

CERTIFIED BY: Heidi Hayes DATE: 03/21/18

Technical Director

Certification numbers: AZ Licensure AZ0775, NJ NELAP - CA016, NY NELAP - 11291, TX NELAP - T104704434-16-11, UT NELAP CA0093332016-7, VA NELAP - 8113, WA NELAP - C935
Name of Accreditation Body: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
Accreditation number: CA300005, Effective date: 10/18/2016, Expiration date: 10/17/2017.
Eurofins Air Toxics Inc.. certifies that the test results contained in this report meet all requirements of the NELAC standards

LABORATORY NARRATIVE
EPA Method TO-15
CALIBRE, Environmental Technology Solutions
Workorder# 1803144

Six 1 Liter Summa Canister samples were received on March 08, 2018. The laboratory performed analysis via EPA Method TO-15 using GC/MS in the full scan mode.

This workorder was independently validated prior to submittal using 'USEPA National Functional Guidelines' as generally applied to the analysis of volatile organic compounds in air. A rules-based, logic driven, independent validation engine was employed to assess completeness, evaluate pass/fail of relevant project quality control requirements and verification of all quantified amounts.

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

The reported CCV for each daily batch may be derived from more than one analytical file due to the client's request for non-standard compounds.

Non-standard compounds may have different acceptance criteria than the standard TO-14A/TO-15 compound list as per contract or verbal agreement.

A single point calibration for TPH referenced to Gasoline was performed for each daily analytical batch. Recovery is reported as 100% in the associated results for each CCV.

Dilution was performed on samples 5-09-SVE-3-60-030618, 4-78-SVE-6-60-030618 and 5-09-SVE-3-180-030618 due to the presence of high level target species.

Definition of Data Qualifying Flags

Ten qualifiers may have been used on the data analysis sheets and indicates as follows:

B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).
J - Estimated value.
E - Exceeds instrument calibration range.
S - Saturated peak.
Q - Exceeds quality control limits.
U - Compound analyzed for but not detected above the reporting limit, LOD, or MDL value. See data page for project specific U-flag definition.
UJ- Non-detected compound associated with low bias in the CCV
N - The identification is based on presumptive evidence.
M - Reported value may be biased due to apparent matrix interferences.
CN - See Case Narrative.

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified
b-File was quantified by a second column and detector
r1-File was requantified for the purpose of reissue

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Summary of Detected Compounds
EPA METHOD TO-15 GC/MS FULL SCAN

Client Sample ID: 5-09-SVE-3-60-030618

Lab ID#: 1803144-01A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethane	1.4	2.2	5.6	9.0
cis-1,2-Dichloroethene	1.4	15	5.5	61
1,1,1-Trichloroethane	1.4	14	7.6	76
Trichloroethene	1.4	41	7.5	220
Tetrachloroethene	1.4	440	9.5	3000

Client Sample ID: 4-78-SVE-IN-60-030618

Lab ID#: 1803144-02A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.90	8.9	2.3	23
Freon 113	0.90	40	6.9	300
Hexane	0.90	44	3.2	150
cis-1,2-Dichloroethene	0.90	3.2	3.6	13
1,1,1-Trichloroethane	0.90	7.6	4.9	42
Trichloroethene	0.90	67	4.9	360
Toluene	0.90	1.0	3.4	3.8
TPH ref. to Gasoline (MW=100)	90	510	370	2100
Pentane	3.6	48	11	140

Client Sample ID: 4-78-SVE-6-60-030618

Lab ID#: 1803144-03A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 113	8.0	2000	61	16000
1,1,1-Trichloroethane	8.0	10	44	56
Trichloroethene	8.0	67	43	360
Tetrachloroethene	8.0	9.8	54	66

Client Sample ID: 4-78-SVE-10-60-030618

Lab ID#: 1803144-04A

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Summary of Detected Compounds
EPA METHOD TO-15 GC/MS FULL SCAN

Client Sample ID: 4-78-SVE-10-60-030618

Lab ID#: 1803144-04A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 113	1.0	59	7.6	450
1,1-Dichloroethane	1.0	1.7	4.0	6.8
cis-1,2-Dichloroethene	1.0	12	3.9	47
1,1,1-Trichloroethane	1.0	41	5.4	220
Trichloroethene	1.0	330	5.3	1800
Tetrachloroethene	1.0	1.7	6.7	12

Client Sample ID: 5-09-SVE-3-180-030618

Lab ID#: 1803144-05A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Dichloroethane	1.3	1.6	5.4	6.4
cis-1,2-Dichloroethene	1.3	13	5.3	52
1,1,1-Trichloroethane	1.3	13	7.3	69
Trichloroethene	1.3	33	7.2	180
Tetrachloroethene	1.3	410	9.1	2800

Client Sample ID: 4-78-SVE-10-180-030618

Lab ID#: 1803144-06A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 113	1.3	41	10	320
cis-1,2-Dichloroethene	1.3	12	5.2	50
1,1,1-Trichloroethane	1.3	32	7.2	180
Trichloroethene	1.3	300	7.1	1600
Tetrachloroethene	1.3	1.6	9.0	11

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Client Sample ID: 5-09-SVE-3-60-030618

Lab ID#: 1803144-01A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3031924**	**Date of Collection:**	**3/6/18 9:15:00 AM**
Dil. Factor:	**2.79**	**Date of Analysis:**	**3/20/18 01:56 AM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Chloromethane	14	Not Detected	29	Not Detected
Vinyl Chloride	1.4	Not Detected	3.6	Not Detected
Freon 113	1.4	Not Detected	11	Not Detected
1,1-Dichloroethene	1.4	Not Detected	5.5	Not Detected
Acetone	14	Not Detected	33	Not Detected
Carbon Disulfide	5.6	Not Detected	17	Not Detected
Methylene Chloride	14	Not Detected	48	Not Detected
trans-1,2-Dichloroethene	1.4	Not Detected	5.5	Not Detected
Hexane	1.4	Not Detected	4.9	Not Detected
1,1-Dichloroethane	1.4	2.2	5.6	9.0
2-Butanone (Methyl Ethyl Ketone)	5.6	Not Detected	16	Not Detected
cis-1,2-Dichloroethene	1.4	15	5.5	61
Chloroform	1.4	Not Detected	6.8	Not Detected
1,1,1-Trichloroethane	1.4	14	7.6	76
Benzene	1.4	Not Detected	4.4	Not Detected
Trichloroethene	1.4	41	7.5	220
Toluene	1.4	Not Detected	5.2	Not Detected
1,1,2-Trichloroethane	1.4	Not Detected	7.6	Not Detected
Tetrachloroethene	1.4	440	9.5	3000
Chlorobenzene	1.4	Not Detected	6.4	Not Detected
Ethyl Benzene	1.4	Not Detected	6.0	Not Detected
m,p-Xylene	1.4	Not Detected	6.0	Not Detected
o-Xylene	1.4	Not Detected	6.0	Not Detected
Styrene	1.4	Not Detected	5.9	Not Detected
Cumene	1.4	Not Detected	6.8	Not Detected
Propylbenzene	1.4	Not Detected	6.8	Not Detected
1,3,5-Trimethylbenzene	1.4	Not Detected	6.8	Not Detected
1,2,4-Trimethylbenzene	1.4	Not Detected	6.8	Not Detected
TPH ref. to Gasoline (MW=100)	140	Not Detected	570	Not Detected
Acetonitrile	14	Not Detected	23	Not Detected
Vinyl Acetate	5.6	Not Detected	20	Not Detected
Octane	5.6	Not Detected	26	Not Detected
Pentane	5.6	Not Detected	16	Not Detected
Butylbenzene	5.6	Not Detected	31	Not Detected
Decane	5.6	Not Detected	32	Not Detected
Dodecane	14	Not Detected	97	Not Detected
sec-Butylbenzene	5.6	Not Detected	31	Not Detected
p-Cymene	5.6	Not Detected	31	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits

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Client Sample ID: 5-09-SVE-3-60-030618

Lab ID#: 1803144-01A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3031924**	**Date of Collection:**	**3/6/18 9:15:00 AM**
Dil. Factor:	**2.79**	**Date of Analysis:**	**3/20/18 01:56 AM**

Surrogates	%Recovery	Method Limits
Toluene-d8	102	70-130
1,2-Dichloroethane-d4	110	70-130
4-Bromofluorobenzene	98	70-130

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Client Sample ID: 4-78-SVE-IN-60-030618

Lab ID#: 1803144-02A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3031920**	**Date of Collection:**	**3/6/18 11:20:00 AM**
Dil. Factor:	**1.81**	**Date of Analysis:**	**3/20/18 12:13 AM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Chloromethane	9.0	Not Detected	19	Not Detected
Vinyl Chloride	0.90	8.9	2.3	23
Freon 113	0.90	40	6.9	300
1,1-Dichloroethene	0.90	Not Detected	3.6	Not Detected
Acetone	9.0	Not Detected	21	Not Detected
Carbon Disulfide	3.6	Not Detected	11	Not Detected
Methylene Chloride	9.0	Not Detected	31	Not Detected
trans-1,2-Dichloroethene	0.90	Not Detected	3.6	Not Detected
Hexane	0.90	44	3.2	150
1,1-Dichloroethane	0.90	Not Detected	3.7	Not Detected
2-Butanone (Methyl Ethyl Ketone)	3.6	Not Detected	11	Not Detected
cis-1,2-Dichloroethene	0.90	3.2	3.6	13
Chloroform	0.90	Not Detected	4.4	Not Detected
1,1,1-Trichloroethane	0.90	7.6	4.9	42
Benzene	0.90	Not Detected	2.9	Not Detected
Trichloroethene	0.90	67	4.9	360
Toluene	0.90	1.0	3.4	3.8
1,1,2-Trichloroethane	0.90	Not Detected	4.9	Not Detected
Tetrachloroethene	0.90	Not Detected	6.1	Not Detected
Chlorobenzene	0.90	Not Detected	4.2	Not Detected
Ethyl Benzene	0.90	Not Detected	3.9	Not Detected
m,p-Xylene	0.90	Not Detected	3.9	Not Detected
o-Xylene	0.90	Not Detected	3.9	Not Detected
Styrene	0.90	Not Detected	3.8	Not Detected
Cumene	0.90	Not Detected	4.4	Not Detected
Propylbenzene	0.90	Not Detected	4.4	Not Detected
1,3,5-Trimethylbenzene	0.90	Not Detected	4.4	Not Detected
1,2,4-Trimethylbenzene	0.90	Not Detected	4.4	Not Detected
TPH ref. to Gasoline (MW=100)	90	510	370	2100
Acetonitrile	9.0	Not Detected	15	Not Detected
Vinyl Acetate	3.6	Not Detected	13	Not Detected
Octane	3.6	Not Detected	17	Not Detected
Pentane	3.6	48	11	140
Butylbenzene	3.6	Not Detected	20	Not Detected
Decane	3.6	Not Detected	21	Not Detected
Dodecane	9.0	Not Detected	63	Not Detected
sec-Butylbenzene	3.6	Not Detected	20	Not Detected
p-Cymene	3.6	Not Detected	20	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits

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Client Sample ID: 4-78-SVE-IN-60-030618

Lab ID#: 1803144-02A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3031920**	**Date of Collection:**	**3/6/18 11:20:00 AM**
Dil. Factor:	**1.81**	**Date of Analysis:**	**3/20/18 12:13 AM**

Surrogates	%Recovery	Method Limits
Toluene-d8	99	70-130
1,2-Dichloroethane-d4	109	70-130
4-Bromofluorobenzene	100	70-130

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Client Sample ID: 4-78-SVE-6-60-030618

Lab ID#: 1803144-03A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3031926**	**Date of Collection:**	**3/6/18 11:35:00 AM**
Dil. Factor:	**16.0**	**Date of Analysis:**	**3/20/18 07:10 AM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Chloromethane	80	Not Detected	160	Not Detected
Vinyl Chloride	8.0	Not Detected	20	Not Detected
Freon 113	8.0	2000	61	16000
1,1-Dichloroethene	8.0	Not Detected	32	Not Detected
Acetone	80	Not Detected	190	Not Detected
Carbon Disulfide	32	Not Detected	100	Not Detected
Methylene Chloride	80	Not Detected	280	Not Detected
trans-1,2-Dichloroethene	8.0	Not Detected	32	Not Detected
Hexane	8.0	Not Detected	28	Not Detected
1,1-Dichloroethane	8.0	Not Detected	32	Not Detected
2-Butanone (Methyl Ethyl Ketone)	32	Not Detected	94	Not Detected
cis-1,2-Dichloroethene	8.0	Not Detected	32	Not Detected
Chloroform	8.0	Not Detected	39	Not Detected
1,1,1-Trichloroethane	8.0	10	44	56
Benzene	8.0	Not Detected	26	Not Detected
Trichloroethene	8.0	67	43	360
Toluene	8.0	Not Detected	30	Not Detected
1,1,2-Trichloroethane	8.0	Not Detected	44	Not Detected
Tetrachloroethene	8.0	9.8	54	66
Chlorobenzene	8.0	Not Detected	37	Not Detected
Ethyl Benzene	8.0	Not Detected	35	Not Detected
m,p-Xylene	8.0	Not Detected	35	Not Detected
o-Xylene	8.0	Not Detected	35	Not Detected
Styrene	8.0	Not Detected	34	Not Detected
Cumene	8.0	Not Detected	39	Not Detected
Propylbenzene	8.0	Not Detected	39	Not Detected
1,3,5-Trimethylbenzene	8.0	Not Detected	39	Not Detected
1,2,4-Trimethylbenzene	8.0	Not Detected	39	Not Detected
TPH ref. to Gasoline (MW=100)	800	Not Detected	3300	Not Detected
Acetonitrile	80	Not Detected	130	Not Detected
Vinyl Acetate	32	Not Detected	110	Not Detected
Octane	32	Not Detected	150	Not Detected
Pentane	32	Not Detected	94	Not Detected
Butylbenzene	32	Not Detected	180	Not Detected
Decane	32	Not Detected	190	Not Detected
Dodecane	80	Not Detected	560	Not Detected
sec-Butylbenzene	32	Not Detected	180	Not Detected
p-Cymene	32	Not Detected	180	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits

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Client Sample ID: 4-78-SVE-6-60-030618

Lab ID#: 1803144-03A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3031926**	**Date of Collection:**	**3/6/18 11:35:00 AM**
Dil. Factor:	**16.0**	**Date of Analysis:**	**3/20/18 07:10 AM**

Surrogates	%Recovery	Method Limits
Toluene-d8	98	70-130
1,2-Dichloroethane-d4	105	70-130
4-Bromofluorobenzene	100	70-130

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Client Sample ID: 4-78-SVE-10-60-030618

Lab ID#: 1803144-04A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3031921**	**Date of Collection:**	**3/6/18 11:40:00 AM**
Dil. Factor:	**1.99**	**Date of Analysis:**	**3/20/18 12:39 AM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Chloromethane	10	Not Detected	20	Not Detected
Vinyl Chloride	1.0	Not Detected	2.5	Not Detected
Freon 113	1.0	59	7.6	450
1,1-Dichloroethene	1.0	Not Detected	3.9	Not Detected
Acetone	10	Not Detected	24	Not Detected
Carbon Disulfide	4.0	Not Detected	12	Not Detected
Methylene Chloride	10	Not Detected	34	Not Detected
trans-1,2-Dichloroethene	1.0	Not Detected	3.9	Not Detected
Hexane	1.0	Not Detected	3.5	Not Detected
1,1-Dichloroethane	1.0	1.7	4.0	6.8
2-Butanone (Methyl Ethyl Ketone)	4.0	Not Detected	12	Not Detected
cis-1,2-Dichloroethene	1.0	12	3.9	47
Chloroform	1.0	Not Detected	4.8	Not Detected
1,1,1-Trichloroethane	1.0	41	5.4	220
Benzene	1.0	Not Detected	3.2	Not Detected
Trichloroethene	1.0	330	5.3	1800
Toluene	1.0	Not Detected	3.7	Not Detected
1,1,2-Trichloroethane	1.0	Not Detected	5.4	Not Detected
Tetrachloroethene	1.0	1.7	6.7	12
Chlorobenzene	1.0	Not Detected	4.6	Not Detected
Ethyl Benzene	1.0	Not Detected	4.3	Not Detected
m,p-Xylene	1.0	Not Detected	4.3	Not Detected
o-Xylene	1.0	Not Detected	4.3	Not Detected
Styrene	1.0	Not Detected	4.2	Not Detected
Cumene	1.0	Not Detected	4.9	Not Detected
Propylbenzene	1.0	Not Detected	4.9	Not Detected
1,3,5-Trimethylbenzene	1.0	Not Detected	4.9	Not Detected
1,2,4-Trimethylbenzene	1.0	Not Detected	4.9	Not Detected
TPH ref. to Gasoline (MW=100)	100	Not Detected	410	Not Detected
Acetonitrile	10	Not Detected	17	Not Detected
Vinyl Acetate	4.0	Not Detected	14	Not Detected
Octane	4.0	Not Detected	18	Not Detected
Pentane	4.0	Not Detected	12	Not Detected
Butylbenzene	4.0	Not Detected	22	Not Detected
Decane	4.0	Not Detected	23	Not Detected
Dodecane	10	Not Detected	69	Not Detected
sec-Butylbenzene	4.0	Not Detected	22	Not Detected
p-Cymene	4.0	Not Detected	22	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits

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Client Sample ID: 4-78-SVE-10-60-030618

Lab ID#: 1803144-04A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3031921**	**Date of Collection:**	**3/6/18 11:40:00 AM**
Dil. Factor:	**1.99**	**Date of Analysis:**	**3/20/18 12:39 AM**

Surrogates	%Recovery	Method Limits
Toluene-d8	97	70-130
1,2-Dichloroethane-d4	116	70-130
4-Bromofluorobenzene	102	70-130

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Client Sample ID: 5-09-SVE-3-180-030618

Lab ID#: 1803144-05A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3031923**	**Date of Collection:**	**3/6/18 12:35:00 PM**
Dil. Factor:	**2.69**	**Date of Analysis:**	**3/20/18 01:30 AM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Chloromethane	13	Not Detected	28	Not Detected
Vinyl Chloride	1.3	Not Detected	3.4	Not Detected
Freon 113	1.3	Not Detected	10	Not Detected
1,1-Dichloroethene	1.3	Not Detected	5.3	Not Detected
Acetone	13	Not Detected	32	Not Detected
Carbon Disulfide	5.4	Not Detected	17	Not Detected
Methylene Chloride	13	Not Detected	47	Not Detected
trans-1,2-Dichloroethene	1.3	Not Detected	5.3	Not Detected
Hexane	1.3	Not Detected	4.7	Not Detected
1,1-Dichloroethane	1.3	1.6	5.4	6.4
2-Butanone (Methyl Ethyl Ketone)	5.4	Not Detected	16	Not Detected
cis-1,2-Dichloroethene	1.3	13	5.3	52
Chloroform	1.3	Not Detected	6.6	Not Detected
1,1,1-Trichloroethane	1.3	13	7.3	69
Benzene	1.3	Not Detected	4.3	Not Detected
Trichloroethene	1.3	33	7.2	180
Toluene	1.3	Not Detected	5.1	Not Detected
1,1,2-Trichloroethane	1.3	Not Detected	7.3	Not Detected
Tetrachloroethene	1.3	410	9.1	2800
Chlorobenzene	1.3	Not Detected	6.2	Not Detected
Ethyl Benzene	1.3	Not Detected	5.8	Not Detected
m,p-Xylene	1.3	Not Detected	5.8	Not Detected
o-Xylene	1.3	Not Detected	5.8	Not Detected
Styrene	1.3	Not Detected	5.7	Not Detected
Cumene	1.3	Not Detected	6.6	Not Detected
Propylbenzene	1.3	Not Detected	6.6	Not Detected
1,3,5-Trimethylbenzene	1.3	Not Detected	6.6	Not Detected
1,2,4-Trimethylbenzene	1.3	Not Detected	6.6	Not Detected
TPH ref. to Gasoline (MW=100)	130	Not Detected	550	Not Detected
Acetonitrile	13	Not Detected	22	Not Detected
Vinyl Acetate	5.4	Not Detected	19	Not Detected
Octane	5.4	Not Detected	25	Not Detected
Pentane	5.4	Not Detected	16	Not Detected
Butylbenzene	5.4	Not Detected	30	Not Detected
Decane	5.4	Not Detected	31	Not Detected
Dodecane	13	Not Detected	94	Not Detected
sec-Butylbenzene	5.4	Not Detected	30	Not Detected
p-Cymene	5.4	Not Detected	30	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits

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Client Sample ID: 5-09-SVE-3-180-030618

Lab ID#: 1803144-05A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3031923**	**Date of Collection:**	**3/6/18 12:35:00 PM**
Dil. Factor:	**2.69**	**Date of Analysis:**	**3/20/18 01:30 AM**

Surrogates	%Recovery	Method Limits
Toluene-d8	100	70-130
1,2-Dichloroethane-d4	111	70-130
4-Bromofluorobenzene	101	70-130

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Client Sample ID: 4-78-SVE-10-180-030618

Lab ID#: 1803144-06A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3031922**	**Date of Collection:**	**3/6/18 1:50:00 PM**
Dil. Factor:	**2.64**	**Date of Analysis:**	**3/20/18 01:05 AM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Chloromethane	13	Not Detected	27	Not Detected
Vinyl Chloride	1.3	Not Detected	3.4	Not Detected
Freon 113	1.3	41	10	320
1,1-Dichloroethene	1.3	Not Detected	5.2	Not Detected
Acetone	13	Not Detected	31	Not Detected
Carbon Disulfide	5.3	Not Detected	16	Not Detected
Methylene Chloride	13	Not Detected	46	Not Detected
trans-1,2-Dichloroethene	1.3	Not Detected	5.2	Not Detected
Hexane	1.3	Not Detected	4.6	Not Detected
1,1-Dichloroethane	1.3	Not Detected	5.3	Not Detected
2-Butanone (Methyl Ethyl Ketone)	5.3	Not Detected	16	Not Detected
cis-1,2-Dichloroethene	1.3	12	5.2	50
Chloroform	1.3	Not Detected	6.4	Not Detected
1,1,1-Trichloroethane	1.3	32	7.2	180
Benzene	1.3	Not Detected	4.2	Not Detected
Trichloroethene	1.3	300	7.1	1600
Toluene	1.3	Not Detected	5.0	Not Detected
1,1,2-Trichloroethane	1.3	Not Detected	7.2	Not Detected
Tetrachloroethene	1.3	1.6	9.0	11
Chlorobenzene	1.3	Not Detected	6.1	Not Detected
Ethyl Benzene	1.3	Not Detected	5.7	Not Detected
m,p-Xylene	1.3	Not Detected	5.7	Not Detected
o-Xylene	1.3	Not Detected	5.7	Not Detected
Styrene	1.3	Not Detected	5.6	Not Detected
Cumene	1.3	Not Detected	6.5	Not Detected
Propylbenzene	1.3	Not Detected	6.5	Not Detected
1,3,5-Trimethylbenzene	1.3	Not Detected	6.5	Not Detected
1,2,4-Trimethylbenzene	1.3	Not Detected	6.5	Not Detected
TPH ref. to Gasoline (MW=100)	130	Not Detected	540	Not Detected
Acetonitrile	13	Not Detected	22	Not Detected
Vinyl Acetate	5.3	Not Detected	18	Not Detected
Octane	5.3	Not Detected	25	Not Detected
Pentane	5.3	Not Detected	16	Not Detected
Butylbenzene	5.3	Not Detected	29	Not Detected
Decane	5.3	Not Detected	31	Not Detected
Dodecane	13	Not Detected	92	Not Detected
sec-Butylbenzene	5.3	Not Detected	29	Not Detected
p-Cymene	5.3	Not Detected	29	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits

eurofins | Air Toxics

Client Sample ID: 4-78-SVE-10-180-030618

Lab ID#: 1803144-06A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3031922**	**Date of Collection:**	**3/6/18 1:50:00 PM**
Dil. Factor:	**2.64**	**Date of Analysis:**	**3/20/18 01:05 AM**

Surrogates	%Recovery	Method Limits
Toluene-d8	100	70-130
1,2-Dichloroethane-d4	108	70-130
4-Bromofluorobenzene	103	70-130

eurofins | Air Toxics

Client Sample ID: Lab Blank

Lab ID#: 1803144-07A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3031919**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 3/19/18 11:46 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Chloromethane	5.0	Not Detected	10	Not Detected
Vinyl Chloride	0.50	Not Detected	1.3	Not Detected
Freon 113	0.50	Not Detected	3.8	Not Detected
1,1-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Acetone	5.0	Not Detected	12	Not Detected
Carbon Disulfide	2.0	Not Detected	6.2	Not Detected
Methylene Chloride	5.0	Not Detected	17	Not Detected
trans-1,2-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Hexane	0.50	Not Detected	1.8	Not Detected
1,1-Dichloroethane	0.50	Not Detected	2.0	Not Detected
2-Butanone (Methyl Ethyl Ketone)	2.0	Not Detected	5.9	Not Detected
cis-1,2-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Chloroform	0.50	Not Detected	2.4	Not Detected
1,1,1-Trichloroethane	0.50	Not Detected	2.7	Not Detected
Benzene	0.50	Not Detected	1.6	Not Detected
Trichloroethene	0.50	Not Detected	2.7	Not Detected
Toluene	0.50	Not Detected	1.9	Not Detected
1,1,2-Trichloroethane	0.50	Not Detected	2.7	Not Detected
Tetrachloroethene	0.50	Not Detected	3.4	Not Detected
Chlorobenzene	0.50	Not Detected	2.3	Not Detected
Ethyl Benzene	0.50	Not Detected	2.2	Not Detected
m,p-Xylene	0.50	Not Detected	2.2	Not Detected
o-Xylene	0.50	Not Detected	2.2	Not Detected
Styrene	0.50	Not Detected	2.1	Not Detected
Cumene	0.50	Not Detected	2.4	Not Detected
Propylbenzene	0.50	Not Detected	2.4	Not Detected
1,3,5-Trimethylbenzene	0.50	Not Detected	2.4	Not Detected
1,2,4-Trimethylbenzene	0.50	Not Detected	2.4	Not Detected
TPH ref. to Gasoline (MW=100)	50	Not Detected	200	Not Detected
Acetonitrile	5.0	Not Detected	8.4	Not Detected
Vinyl Acetate	2.0	Not Detected	7.0	Not Detected
Octane	2.0	Not Detected	9.3	Not Detected
Pentane	2.0	Not Detected	5.9	Not Detected
Butylbenzene	2.0	Not Detected	11	Not Detected
Decane	2.0	Not Detected	12	Not Detected
Dodecane	5.0	Not Detected	35	Not Detected
sec-Butylbenzene	2.0	Not Detected	11	Not Detected
p-Cymene	2.0	Not Detected	11	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits

eurofins | Air Toxics

Client Sample ID: Lab Blank

Lab ID#: 1803144-07A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3031919**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 3/19/18 11:46 PM**	

Surrogates	%Recovery	Method Limits
Toluene-d8	101	70-130
1,2-Dichloroethane-d4	110	70-130
4-Bromofluorobenzene	101	70-130

eurofins | Air Toxics

Client Sample ID: CCV

Lab ID#: 1803144-08A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3031902**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 3/19/18 11:15 AM**

Compound	%Recovery
Chloromethane	102
Vinyl Chloride	98
Freon 113	98
1,1-Dichloroethene	104
Acetone	95
Carbon Disulfide	87
Methylene Chloride	98
trans-1,2-Dichloroethene	100
Hexane	100
1,1-Dichloroethane	100
2-Butanone (Methyl Ethyl Ketone)	100
cis-1,2-Dichloroethene	97
Chloroform	104
1,1,1-Trichloroethane	107
Benzene	100
Trichloroethene	102
Toluene	100
1,1,2-Trichloroethane	97
Tetrachloroethene	103
Chlorobenzene	100
Ethyl Benzene	101
m,p-Xylene	101
o-Xylene	102
Styrene	107
Cumene	106
Propylbenzene	103
1,3,5-Trimethylbenzene	105
1,2,4-Trimethylbenzene	107
TPH ref. to Gasoline (MW=100)	100
Acetonitrile	94
Vinyl Acetate	104
Octane	105
Pentane	96
Butylbenzene	103
Decane	107
Dodecane	107
sec-Butylbenzene	104
p-Cymene	108

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits

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Client Sample ID: CCV

Lab ID#: 1803144-08A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3031902**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 3/19/18 11:15 AM**	

Surrogates	%Recovery	Method Limits
Toluene-d8	103	70-130
1,2-Dichloroethane-d4	109	70-130
4-Bromofluorobenzene	103	70-130

eurofins | Air Toxics

Client Sample ID: LCS

Lab ID#: 1803144-09A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3031903**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 3/19/18 11:39 AM**	

Compound	%Recovery	Method Limits
Chloromethane	103	70-130
Vinyl Chloride	100	70-130
Freon 113	96	70-130
1,1-Dichloroethene	102	70-130
Acetone	100	70-130
Carbon Disulfide	89	70-130
Methylene Chloride	98	70-130
trans-1,2-Dichloroethene	110	70-130
Hexane	102	70-130
1,1-Dichloroethane	100	70-130
2-Butanone (Methyl Ethyl Ketone)	103	70-130
cis-1,2-Dichloroethene	92	70-130
Chloroform	104	70-130
1,1,1-Trichloroethane	108	70-130
Benzene	99	70-130
Trichloroethene	102	70-130
Toluene	98	70-130
1,1,2-Trichloroethane	99	70-130
Tetrachloroethene	101	70-130
Chlorobenzene	99	70-130
Ethyl Benzene	98	70-130
m,p-Xylene	101	70-130
o-Xylene	102	70-130
Styrene	106	70-130
Cumene	104	70-130
Propylbenzene	103	70-130
1,3,5-Trimethylbenzene	104	70-130
1,2,4-Trimethylbenzene	106	70-130
TPH ref. to Gasoline (MW=100)	Not Spiked	
Acetonitrile	Not Spiked	
Vinyl Acetate	101	70-130
Octane	Not Spiked	
Pentane	Not Spiked	
Butylbenzene	Not Spiked	
Decane	Not Spiked	
Dodecane	Not Spiked	
sec-Butylbenzene	Not Spiked	
p-Cymene	Not Spiked	

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits

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Client Sample ID: LCS

Lab ID#: 1803144-09A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3031903**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 3/19/18 11:39 AM**	

Surrogates	%Recovery	Method Limits
Toluene-d8	100	70-130
1,2-Dichloroethane-d4	106	70-130
4-Bromofluorobenzene	102	70-130

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Client Sample ID: LCSD

Lab ID#: 1803144-09AA

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3031904**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 3/19/18 12:04 PM**	

Compound	%Recovery	Method Limits
Chloromethane	102	70-130
Vinyl Chloride	101	70-130
Freon 113	97	70-130
1,1-Dichloroethene	102	70-130
Acetone	100	70-130
Carbon Disulfide	88	70-130
Methylene Chloride	100	70-130
trans-1,2-Dichloroethene	109	70-130
Hexane	103	70-130
1,1-Dichloroethane	101	70-130
2-Butanone (Methyl Ethyl Ketone)	99	70-130
cis-1,2-Dichloroethene	91	70-130
Chloroform	104	70-130
1,1,1-Trichloroethane	106	70-130
Benzene	98	70-130
Trichloroethene	101	70-130
Toluene	97	70-130
1,1,2-Trichloroethane	98	70-130
Tetrachloroethene	100	70-130
Chlorobenzene	99	70-130
Ethyl Benzene	99	70-130
m,p-Xylene	100	70-130
o-Xylene	103	70-130
Styrene	107	70-130
Cumene	104	70-130
Propylbenzene	103	70-130
1,3,5-Trimethylbenzene	103	70-130
1,2,4-Trimethylbenzene	107	70-130
TPH ref. to Gasoline (MW=100)	Not Spiked	
Acetonitrile	Not Spiked	
Vinyl Acetate	102	70-130
Octane	Not Spiked	
Pentane	Not Spiked	
Butylbenzene	Not Spiked	
Decane	Not Spiked	
Dodecane	Not Spiked	
sec-Butylbenzene	Not Spiked	
p-Cymene	Not Spiked	

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits

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Client Sample ID: LCSD

Lab ID#: 1803144-09AA

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3031904**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 3/19/18 12:04 PM**	

Surrogates	%Recovery	Method Limits
Toluene-d8	99	70-130
1,2-Dichloroethane-d4	106	70-130
4-Bromofluorobenzene	102	70-130

Analytical Resources, Incorporated
Analytical Chemists and Consultants

01 March 2018

Carl Bach
The Boeing Company
P.O. Box 3707 MC 9U4-26
Seattle, WA 98124

RE: Boeing Renton Regional GW Building 4-78/79

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)	Associated SDG ID(s)
18B0200	N/A

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclose Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the requirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, Inc.

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

ACCREDITED IN ACCORDANCE WITH nelac
Cert# 100006

PJLA Testing
Accreditation # 66169

4611 S. 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6202

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: 18B0200	Turn-around Requested: Standard	Page: 1 of 2	
ARI Client Company: Boeing	Phone: (206) 898-0438	Date: 2/14/18	Ice Present?
Client Contact: CARL BACH		No. of Coolers:	Cooler Temps:
Client Project Name: Renton 4-79			
Client Project #:	Samplers: R Lassen JNestl		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)
www.arilabs.com

Sample ID	Date	Time	Matrix	No. Containers	VOCs	Nitrate	Nitrite	Sulfate					Notes/Comments
													VOCs = TCE, cis 1,2 DCE, VC, & Benzene
GW-244S-021418	2/14/18	1052	H_2O	4	x	x	x	x					13'
B78-17-021418	2/14/18	1137	H_2O	4	x	x	x	x					15'
B78-18-021418	2/14/18	1222	H_2O	4	x	x	x	x					15'
B78-19-021418	2/14/18	1335	H_2O	4	x	x	x	x					15'
B78-20-021418	2/14/18	1407	H_2O	4	x	x	x	x					15'
GW-031S-021418	2/14/18	1447	H_2O	4	x	x	x	x					23'
B78-21-021418	2/14/18	1523	H_2O	4	x	x	x	x					15'
B78-13-021418	2/14/18	1558	H_2O	4	x	x	x	x					15'
B78-11-021418	2/14/18	1640	H_2O	4	x	x	x	x					8'
Dup 01-021418	2/14/18	0800	H_2O	3	x								

Comments/Special Instructions	Relinquished by:	Received by:	Relinquished by:	Received by:
CC Tom McKeon Justin Nestl	(Signature)	(Signature)	(Signature)	(Signature)
	Printed Name: Justin Nestl	Printed Name: Stephanie Fishel	Printed Name:	Printed Name:
	Company: CALIBRE	Company: ARI	Company:	Company:
	Date & Time: 2/14/18 1730	Date & Time: 2/14/18 1730	Date & Time:	Date & Time:

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: 18B0200	Turn-around Requested: Standard	Page: 2 of 2	
ARI Client Company: Boring	Phone: (206) 898-0438	Date: 2/14/18	Ice Present?
Client Contact: Carl Isach		No. of Coolers:	Cooler Temps:
Client Project Name: Renton			
Client Project #:	Samplers: JN RL		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)
www.arilabs.com

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: VOCs								Notes/Comments
Trip Blank	2/14/18				x								

Comments/Special Instructions	Relinquished by: (Signature)	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
	Printed Name: Justin Neste	Printed Name: Stephanie Fisher	Printed Name:	Printed Name:
	Company: CALIBRE	Company: ARI	Company:	Company:
	Date & Time: 2/14/18 1730	Date & Time: 2/14/18 1730	Date & Time:	Date & Time:

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

The Boeing Company	Project: Boeing Renton Regional GW Building 4-78/79	
P.O. Box 3707 MC 9U4-26	Project Number: Boeing Renton Regional GW Building 4-78/79	**Reported:**
Seattle WA, 98124	Project Manager: Carl Bach	01-Mar-2018 14:09

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
GW-244S-021418	18B0200-01	Water	14-Feb-2018 10:52	14-Feb-2018 17:30
B78-17-021418	18B0200-02	Water	14-Feb-2018 11:37	14-Feb-2018 17:30
B78-18-021418	18B0200-03	Water	14-Feb-2018 12:22	14-Feb-2018 17:30
B78-19-021418	18B0200-04	Water	14-Feb-2018 13:35	14-Feb-2018 17:30
B78-20-021418	18B0200-05	Water	14-Feb-2018 14:07	14-Feb-2018 17:30
GW-031S-021418	18B0200-06	Water	14-Feb-2018 14:47	14-Feb-2018 17:30
B78-21-021418	18B0200-07	Water	14-Feb-2018 15:23	14-Feb-2018 17:30
B78-13-021418	18B0200-08	Water	14-Feb-2018 15:58	14-Feb-2018 17:30
B78-11-021418	18B0200-09	Water	14-Feb-2018 16:40	14-Feb-2018 17:30
DUP01-021418	18B0200-10	Water	14-Feb-2018 08:00	14-Feb-2018 17:30
Trip Blank	18B0200-11	Water	14-Feb-2018 10:52	14-Feb-2018 17:30

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The Boeing Company	Project: Boeing Renton Regional GW Building 4-78/79	
P.O. Box 3707 MC 9U4-26	Project Number: Boeing Renton Regional GW Building 4-78/79	**Reported:**
Seattle WA, 98124	Project Manager: Carl Bach	01-Mar-2018 14:09

Case Narrative

Volatiles - EPA Method SW8260C

The sample(s) were run within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits with the exception of surrogates flagged on the associated forms. Sample Dup01-021418 had an out of control surrogate and the sample was re-analyzed with the same matrix effects. Both sets of data have been reported.

The method blank(s) were clean at the reporting limits.

The LCS/LCSD percent recoveries and RPD were within control limits.

Wet Chemistry

The sample(s) were prepared and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The method blank(s) were clean at the reporting limits.

The LCS percent recoveries were within control limits.

The matrix spike and RPD for sulfate is outside of the control limits.

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WORK ORDER

18B0200

Client: The Boeing Company
Project: Boeing Renton Regional GW Building 4-78/79
Project Manager: Kelly Bottem
Project Number: Boeing Renton Regional GW Building 4-78/79

Report To:
The Boeing Company
Jennifer Parsons
PO Box 3703 MS 2R-96
Seattle, WA 98124
Phone: -
Fax: -

Invoice To:
The Boeing Company
Jennifer Parsons
PO Box 3703 MS 2R-96
Seattle, WA 98124
Phone :-
Fax: -

Date Due: 01-Mar-2018 18:00 (10 day TAT)

Received By: Stephanie Fishel
Date Received: 14-Feb-2018 17:30

Logged In By: Jacob Walter
Date Logged In: 15-Feb-2018 07:59

Samples Received at: **5.3°C**

Intact, properly signed and dated custody seals attached to outside of cooler(s)	No	Custody papers included with the cooler	Yes
Custody papers properly filled out (in, signed, analyses requested, etc)	Yes	Was a temperature blank included in the cooler	No
Was sufficient ice used (if appropriate)	Yes	All bottles sealed in individual plastic bags	No
All bottles arrived in good condition (unbroken)	Yes	All bottle labels complete and legible	Yes
Number of containers listed on COC match number received	Yes	Bottle labels and tags agree with COC	Yes
Correct bottles used for the requested analyses	Yes	All VOC vials free of air bubbles	Yes
Analyses/bottles require preservation (attach preservation sheet excluding VOC)	No	Sufficient amount of sample sent in each bottle	Yes
Sample split at ARI	No		

Analysis	Due	TAT	Expires	Comments

WORK ORDER

18B0200

Client: The Boeing Company | **Project Manager:** Kelly Bottem

Project: Boeing Renton Regional GW Building 4-78/79 | **Project Number:** Boeing Renton Regional GW Building 4-78/79

Analysis	Due	TAT	Expires	Comments
18B0200-01 GW-244S-021418 [Water] Sampled 14-Feb-2018 10:52 (GMT-08:00) Pacific Time (US & Canada)				
A = VOA Vial, Clear, 40 mL, HCL	*B = VOA Vial, Clear, 40 mL, HCL*	*C = VOA Vial, Clear, 40 mL, HCL*	*D = Small OJ, 500 mL*	
Nitrate-N, IC, EPA 300.0	01-Mar-2018 15:00	10	16-Feb-2018 10:52	
Nitrite-N, IC, EPA 300.0	01-Mar-2018 15:00	10	16-Feb-2018 10:52	
Sulfate, IC, EPA 300.0	01-Mar-2018 15:00	10	14-Mar-2018 10:52	
8260C VOA	01-Mar-2018 15:00	10	28-Feb-2018 10:52	
18B0200-02 B78-17-021418 [Water] Sampled 14-Feb-2018 11:37 (GMT-08:00) Pacific Time (US & Canada)				
A = VOA Vial, Clear, 40 mL, HCL	*B = VOA Vial, Clear, 40 mL, HCL*	*C = VOA Vial, Clear, 40 mL, HCL*	*D = Small OJ, 500 mL*	
8260C VOA	01-Mar-2018 15:00	10	28-Feb-2018 11:37	
Nitrate-N, IC, EPA 300.0	01-Mar-2018 15:00	10	16-Feb-2018 11:37	
Nitrite-N, IC, EPA 300.0	01-Mar-2018 15:00	10	16-Feb-2018 11:37	
Sulfate, IC, EPA 300.0	01-Mar-2018 15:00	10	14-Mar-2018 11:37	
18B0200-03 B78-18-021418 [Water] Sampled 14-Feb-2018 12:22 (GMT-08:00) Pacific Time (US & Canada)				
A = VOA Vial, Clear, 40 mL, HCL	*B = VOA Vial, Clear, 40 mL, HCL*	*C = VOA Vial, Clear, 40 mL, HCL*	*D = Small OJ, 500 mL*	
8260C VOA	01-Mar-2018 15:00	10	28-Feb-2018 12:22	
Sulfate, IC, EPA 300.0	01-Mar-2018 15:00	10	14-Mar-2018 12:22	
Nitrate-N, IC, EPA 300.0	01-Mar-2018 15:00	10	16-Feb-2018 12:22	
Nitrite-N, IC, EPA 300.0	01-Mar-2018 15:00	10	16-Feb-2018 12:22	
18B0200-04 B78-19-021418 [Water] Sampled 14-Feb-2018 13:35 (GMT-08:00) Pacific Time (US & Canada)				
A = VOA Vial, Clear, 40 mL, HCL	*B = VOA Vial, Clear, 40 mL, HCL*	*C = VOA Vial, Clear, 40 mL, HCL*	*D = Small OJ, 500 mL*	
8260C VOA	01-Mar-2018 15:00	10	28-Feb-2018 13:35	
Nitrate-N, IC, EPA 300.0	01-Mar-2018 15:00	10	16-Feb-2018 13:35	
Nitrite-N, IC, EPA 300.0	01-Mar-2018 15:00	10	16-Feb-2018 13:35	
Sulfate, IC, EPA 300.0	01-Mar-2018 15:00	10	14-Mar-2018 13:35	
18B0200-05 B78-20-021418 [Water] Sampled 14-Feb-2018 14:07 (GMT-08:00) Pacific Time (US & Canada)				
A = VOA Vial, Clear, 40 mL, HCL	*B = VOA Vial, Clear, 40 mL, HCL*	*C = VOA Vial, Clear, 40 mL, HCL*	*D = Small OJ, 500 mL*	
Nitrate-N, IC, EPA 300.0	01-Mar-2018 15:00	10	16-Feb-2018 14:07	
Nitrite-N, IC, EPA 300.0	01-Mar-2018 15:00	10	16-Feb-2018 14:07	
Sulfate, IC, EPA 300.0	01-Mar-2018 15:00	10	14-Mar-2018 14:07	
8260C VOA	01-Mar-2018 15:00	10	28-Feb-2018 14:07	

WORK ORDER

18B0200

Client: The Boeing Company **Project Manager:** Kelly Bottem

Project: Boeing Renton Regional GW Building 4-78/79 **Project Number:** Boeing Renton Regional GW Building 4-78/79

Analysis	Due	TAT	Expires	Comments
18B0200-06 GW-031S-021418 [Water] Sampled 14-Feb-2018 14:47 (GMT-08:00) Pacific Time (US & Canada)				
A = VOA Vial, Clear, 40 mL, HCL	*B = VOA Vial, Clear, 40 mL, HCL*	*C = VOA Vial, Clear, 40 mL, HCL*	*D = Small OJ, 500 mL*	
8260C VOA	01-Mar-2018 15:00	10	28-Feb-2018 14:47	
Nitrate-N, IC, EPA 300.0	01-Mar-2018 15:00	10	16-Feb-2018 14:47	
Nitrite-N, IC, EPA 300.0	01-Mar-2018 15:00	10	16-Feb-2018 14:47	
Sulfate, IC, EPA 300.0	01-Mar-2018 15:00	10	14-Mar-2018 14:47	
18B0200-07 B78-21-021418 [Water] Sampled 14-Feb-2018 15:23 (GMT-08:00) Pacific Time (US & Canada)				
A = VOA Vial, Clear, 40 mL, HCL	*B = VOA Vial, Clear, 40 mL, HCL*	*C = VOA Vial, Clear, 40 mL, HCL*	*D = Small OJ, 500 mL*	
Sulfate, IC, EPA 300.0	01-Mar-2018 15:00	10	14-Mar-2018 15:23	
8260C VOA	01-Mar-2018 15:00	10	28-Feb-2018 15:23	
Nitrate-N, IC, EPA 300.0	01-Mar-2018 15:00	10	16-Feb-2018 15:23	
Nitrite-N, IC, EPA 300.0	01-Mar-2018 15:00	10	16-Feb-2018 15:23	
18B0200-08 B78-13-021418 [Water] Sampled 14-Feb-2018 15:58 (GMT-08:00) Pacific Time (US & Canada)				
A = VOA Vial, Clear, 40 mL, HCL	*B = VOA Vial, Clear, 40 mL, HCL*	*C = VOA Vial, Clear, 40 mL, HCL*	*D = Small OJ, 500 mL*	
Sulfate, IC, EPA 300.0	01-Mar-2018 15:00	10	14-Mar-2018 15:58	
Nitrite-N, IC, EPA 300.0	01-Mar-2018 15:00	10	16-Feb-2018 15:58	
8260C VOA	01-Mar-2018 15:00	10	28-Feb-2018 15:58	
Nitrate-N, IC, EPA 300.0	01-Mar-2018 15:00	10	16-Feb-2018 15:58	
18B0200-09 B78-11-021418 [Water] Sampled 14-Feb-2018 16:40 (GMT-08:00) Pacific Time (US & Canada)				
A = VOA Vial, Clear, 40 mL, HCL	*B = VOA Vial, Clear, 40 mL, HCL*	*C = VOA Vial, Clear, 40 mL, HCL*	*D = Small OJ, 500 mL*	
8260C VOA	01-Mar-2018 15:00	10	28-Feb-2018 16:40	
Nitrate-N, IC, EPA 300.0	01-Mar-2018 15:00	10	16-Feb-2018 16:40	
Nitrite-N, IC, EPA 300.0	01-Mar-2018 15:00	10	16-Feb-2018 16:40	
Sulfate, IC, EPA 300.0	01-Mar-2018 15:00	10	14-Mar-2018 16:40	
18B0200-10 DUP01-021418 [Water] Sampled 14-Feb-2018 08:00 (GMT-08:00) Pacific Time (US & Canada)				
A = VOA Vial, Clear, 40 mL, HCL	*B = VOA Vial, Clear, 40 mL, HCL*	*C = VOA Vial, Clear, 40 mL, HCL*		
8260C VOA	01-Mar-2018 15:00	10	28-Feb-2018 08:00	
18B0200-11 Trip Blank [Water] Sampled 14-Feb-2018 10:52 (GMT-08:00) Pacific Time (US & Canada)				
A = VOA Vial, Clear, 40 mL, HCL				
8260C VOA	01-Mar-2018 15:00	10	28-Feb-2018 10:52	

Reviewed By

Date

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Boeing Project Name: Renton 4-79

COC No(s): _____ (NA) Delivered by: Fed-Ex UPS Courier Hand Delivered Other:_____

Assigned ARI Job No: 18B0200 Tracking No: _____ (NA)

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler?	YES	(NO)
Were custody papers included with the cooler?	(YES)	NO
Were custody papers properly filled out (ink, signed, etc.)	(YES)	NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry) 5.3 ___ ___ ___ ___ ___

Time: _____

If cooler temperature is out of compliance fill out form 00070F Temp Gun ID#: D00256S

Cooler Accepted by: SEF Date: 2/14/18 Time: 1730

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler?		YES	(NO)
What kind of packing material was used? …	Bubble Wrap Wet Ice Gel Packs Baggies Foam Block Paper Other:_____		
Was sufficient ice used (if appropriate)?	NA	(YES)	NO
Were all bottles sealed in individual plastic bags?		YES	(NO)
Did all bottles arrive in good condition (unbroken)?		(YES)	NO
Were all bottle labels complete and legible?		(YES)	NO
Did the number of containers listed on COC match with the number of containers received?		(YES)	NO
Did all bottle labels and tags agree with custody papers?		(YES)	NO
Were all bottles used correct for the requested analyses?		(YES)	NO
Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)...	(NA)	YES	NO
Were all VOC vials free of air bubbles?	NA	(YES)	NO
Was sufficient amount of sample sent in each bottle?		(YES)	NO
Date VOC Trip Blank was made at ARI	NA	02/14/18	

Was Sample Split by ARI : (NA) YES Date/Time:_____ Equipment:_____ Split by:_____

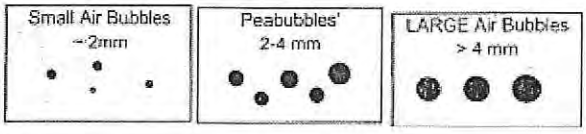
Samples Logged by: JBW Date: 02/15/18 Time: 0758

*** Notify Project Manager of discrepancies or concerns ***

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

By: Date:



Small → "sm" (< 2 mm)
Peabubbles → "pb" (2 to < 4 mm)
Large → "lg" (4 to < 6 mm)
Headspace → "hs" (> 6 mm)

The Boeing Company	Project: Boeing Renton Regional GW Building 4-78/79	
P.O. Box 3707 MC 9U4-26	Project Number: Boeing Renton Regional GW Building 4-78/79	**Reported:**
Seattle WA, 98124	Project Manager: Carl Bach	01-Mar-2018 14:09

GW-244S-021418

18B0200-01 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 02/14/2018 10:52

Instrument: NT2 — Analyzed: 16-Feb-2018 18:29

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)
Preparation Batch: BGB0416 — Sample Size: 10 mL
Prepared: 16-Feb-2018 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.20	**1.22**	ug/L	
cis-1,2-Dichloroethene	156-59-2	1	0.20	**1.25**	ug/L	
Benzene	71-43-2	1	0.20	**5.34**	ug/L	
Trichloroethene	79-01-6	1	0.20	**1.01**	ug/L	
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*100*	*%*	
Surrogate: Toluene-d8			*80-120 %*	*94.3*	*%*	
Surrogate: 4-Bromofluorobenzene			*80-120 %*	*101*	*%*	
Surrogate: 1,2-Dichlorobenzene-d4			*80-120 %*	*102*	*%*	

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The Boeing Company	Project: Boeing Renton Regional GW Building 4-78/79	
P.O. Box 3707 MC 9U4-26	Project Number: Boeing Renton Regional GW Building 4-78/79	**Reported:**
Seattle WA, 98124	Project Manager: Carl Bach	01-Mar-2018 14:09

GW-244S-021418

18B0200-01 (Water)

Wet Chemistry

Method: EPA 300.0 — Sampled: 02/14/2018 10:52

Instrument: DX500 — Analyzed: 15-Feb-2018 12:57

Sample Preparation: Preparation Method: No Prep Wet Chem
Preparation Batch: BGB0367 — Sample Size: 5 mL
Prepared: 15-Feb-2018 — Final Volume: 5 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Nitrate-N	14797-55-8	1	0.100	ND	mg-N/L	U

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Nitrite-N	14797-65-0	1	0.100	ND	mg-N/L	U

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Sulfate	14808-79-8	1	0.100	**1.25**	mg/L	

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The Boeing Company	Project: Boeing Renton Regional GW Building 4-78/79	
P.O. Box 3707 MC 9U4-26	Project Number: Boeing Renton Regional GW Building 4-78/79	**Reported:**
Seattle WA, 98124	Project Manager: Carl Bach	01-Mar-2018 14:09

B78-17-021418

18B0200-02 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 02/14/2018 11:37

Instrument: NT2 — Analyzed: 16-Feb-2018 18:49

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)
Preparation Batch: BGB0416 — Sample Size: 10 mL
Prepared: 16-Feb-2018 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.20	**1.47**	ug/L	
cis-1,2-Dichloroethene	156-59-2	1	0.20	**1.78**	ug/L	
Benzene	71-43-2	1	0.20	**4.61**	ug/L	
Trichloroethene	79-01-6	1	0.20	**2.57**	ug/L	
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*101*	*%*	
Surrogate: Toluene-d8			*80-120 %*	*94.9*	*%*	
Surrogate: 4-Bromofluorobenzene			*80-120 %*	*96.5*	*%*	
Surrogate: 1,2-Dichlorobenzene-d4			*80-120 %*	*104*	*%*	

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The Boeing Company	Project: Boeing Renton Regional GW Building 4-78/79	
P.O. Box 3707 MC 9U4-26	Project Number: Boeing Renton Regional GW Building 4-78/79	**Reported:**
Seattle WA, 98124	Project Manager: Carl Bach	01-Mar-2018 14:09

B78-17-021418

18B0200-02 (Water)

Wet Chemistry

Method: EPA 300.0 — Sampled: 02/14/2018 11:37

Instrument: DX500 — Analyzed: 15-Feb-2018 13:47

Sample Preparation: Preparation Method: No Prep Wet Chem
Preparation Batch: BGB0367 — Sample Size: 5 mL
Prepared: 15-Feb-2018 — Final Volume: 5 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Nitrate-N	14797-55-8	1	0.100	ND	mg-N/L	U

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Nitrite-N	14797-65-0	1	0.100	ND	mg-N/L	U

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The Boeing Company	Project: Boeing Renton Regional GW Building 4-78/79	
P.O. Box 3707 MC 9U4-26	Project Number: Boeing Renton Regional GW Building 4-78/79	**Reported:**
Seattle WA, 98124	Project Manager: Carl Bach	01-Mar-2018 14:09

B78-17-021418

18B0200-02RE1 (Water)

Wet Chemistry

Method: EPA 300.0 — Sampled: 02/14/2018 11:37

Instrument: DX500 — Analyzed: 23-Feb-2018 22:15

Sample Preparation: Preparation Method: No Prep Wet Chem
Preparation Batch: BGB0367 — Sample Size: 5 mL
Prepared: 15-Feb-2018 — Final Volume: 5 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Sulfate	14808-79-8	5	0.500	**7.35**	mg/L	D

The Boeing Company	Project: Boeing Renton Regional GW Building 4-78/79	
P.O. Box 3707 MC 9U4-26	Project Number: Boeing Renton Regional GW Building 4-78/79	**Reported:**
Seattle WA, 98124	Project Manager: Carl Bach	01-Mar-2018 14:09

B78-18-021418

18B0200-03 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 02/14/2018 12:22

Instrument: NT2 — Analyzed: 16-Feb-2018 19:10

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)
Preparation Batch: BGB0416 — Sample Size: 10 mL
Prepared: 16-Feb-2018 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.20	**0.24**	ug/L	
cis-1,2-Dichloroethene	156-59-2	1	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.20	**1.28**	ug/L	
Trichloroethene	79-01-6	1	0.20	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*101*	*%*	
Surrogate: Toluene-d8			*80-120 %*	*97.0*	*%*	
Surrogate: 4-Bromofluorobenzene			*80-120 %*	*104*	*%*	
Surrogate: 1,2-Dichlorobenzene-d4			*80-120 %*	*102*	*%*	

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The Boeing Company	Project: Boeing Renton Regional GW Building 4-78/79	
P.O. Box 3707 MC 9U4-26	Project Number: Boeing Renton Regional GW Building 4-78/79	**Reported:**
Seattle WA, 98124	Project Manager: Carl Bach	01-Mar-2018 14:09

B78-18-021418

18B0200-03 (Water)

Wet Chemistry

Method: EPA 300.0 — Sampled: 02/14/2018 12:22

Instrument: DX500 — Analyzed: 15-Feb-2018 14:04

Sample Preparation: Preparation Method: No Prep Wet Chem
Preparation Batch: BGB0367 — Sample Size: 5 mL
Prepared: 15-Feb-2018 — Final Volume: 5 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Nitrate-N	14797-55-8	1	0.100	ND	mg-N/L	U

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Nitrite-N	14797-65-0	1	0.100	ND	mg-N/L	U

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Sulfate	14808-79-8	1	0.100	**1.47**	mg/L	

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The Boeing Company	Project: Boeing Renton Regional GW Building 4-78/79	
P.O. Box 3707 MC 9U4-26	Project Number: Boeing Renton Regional GW Building 4-78/79	**Reported:**
Seattle WA, 98124	Project Manager: Carl Bach	01-Mar-2018 14:09

B78-19-021418

18B0200-04 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 02/14/2018 13:35

Instrument: NT2 — Analyzed: 16-Feb-2018 19:30

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)
Preparation Batch: BGB0416 — Sample Size: 10 mL
Prepared: 16-Feb-2018 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.20	**0.21**	ug/L	
cis-1,2-Dichloroethene	156-59-2	1	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.20	**0.23**	ug/L	
Trichloroethene	79-01-6	1	0.20	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*106*	*%*	
Surrogate: Toluene-d8			*80-120 %*	*96.7*	*%*	
Surrogate: 4-Bromofluorobenzene			*80-120 %*	*100*	*%*	
Surrogate: 1,2-Dichlorobenzene-d4			*80-120 %*	*106*	*%*	

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The Boeing Company	Project: Boeing Renton Regional GW Building 4-78/79	
P.O. Box 3707 MC 9U4-26	Project Number: Boeing Renton Regional GW Building 4-78/79	**Reported:**
Seattle WA, 98124	Project Manager: Carl Bach	01-Mar-2018 14:09

B78-19-021418

18B0200-04 (Water)

Wet Chemistry

Method: EPA 300.0 — Sampled: 02/14/2018 13:35

Instrument: DX500 — Analyzed: 15-Feb-2018 14:54

Sample Preparation: Preparation Method: No Prep Wet Chem
Preparation Batch: BGB0367 — Sample Size: 5 mL
Prepared: 15-Feb-2018 — Final Volume: 5 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Nitrate-N	14797-55-8	1	0.100	ND	mg-N/L	U

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Nitrite-N	14797-65-0	1	0.100	ND	mg-N/L	U

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Sulfate	14808-79-8	1	0.100	**1.22**	mg/L	

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The Boeing Company	Project: Boeing Renton Regional GW Building 4-78/79	
P.O. Box 3707 MC 9U4-26	Project Number: Boeing Renton Regional GW Building 4-78/79	**Reported:**
Seattle WA, 98124	Project Manager: Carl Bach	01-Mar-2018 14:09

B78-20-021418

18B0200-05 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 02/14/2018 14:07

Instrument: NT2 — Analyzed: 16-Feb-2018 19:50

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)
Preparation Batch: BGB0416 — Sample Size: 10 mL
Prepared: 16-Feb-2018 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.20	**0.49**	ug/L	M
Benzene	71-43-2	1	0.20	**40.0**	ug/L	
Trichloroethene	79-01-6	1	0.20	**0.25**	ug/L	
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*123*	*%*	
Surrogate: Toluene-d8			*80-120 %*	*102*	*%*	
Surrogate: 4-Bromofluorobenzene			*80-120 %*	*107*	*%*	
Surrogate: 1,2-Dichlorobenzene-d4			*80-120 %*	*101*	*%*	

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The Boeing Company	Project: Boeing Renton Regional GW Building 4-78/79	
P.O. Box 3707 MC 9U4-26	Project Number: Boeing Renton Regional GW Building 4-78/79	**Reported:**
Seattle WA, 98124	Project Manager: Carl Bach	01-Mar-2018 14:09

B78-20-021418

18B0200-05 (Water)

Wet Chemistry

Method: EPA 300.0 — Sampled: 02/14/2018 14:07

Instrument: DX500 — Analyzed: 15-Feb-2018 15:11

Sample Preparation: Preparation Method: No Prep Wet Chem
Preparation Batch: BGB0367 — Sample Size: 5 mL
Prepared: 15-Feb-2018 — Final Volume: 5 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Nitrate-N	14797-55-8	1	0.100	ND	mg-N/L	U

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Nitrite-N	14797-65-0	1	0.100	ND	mg-N/L	U

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The Boeing Company	Project: Boeing Renton Regional GW Building 4-78/79	
P.O. Box 3707 MC 9U4-26	Project Number: Boeing Renton Regional GW Building 4-78/79	**Reported:**
Seattle WA, 98124	Project Manager: Carl Bach	01-Mar-2018 14:09

B78-20-021418

18B0200-05RE1 (Water)

Wet Chemistry

Method: EPA 300.0 — Sampled: 02/14/2018 14:07

Instrument: DX500 — Analyzed: 16-Feb-2018 12:30

Sample Preparation: Preparation Method: No Prep Wet Chem
Preparation Batch: BGB0367 — Sample Size: 5 mL
Prepared: 15-Feb-2018 — Final Volume: 5 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Sulfate	14808-79-8	20	2.00	**21.1**	mg/L	D

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The Boeing Company	Project: Boeing Renton Regional GW Building 4-78/79	
P.O. Box 3707 MC 9U4-26	Project Number: Boeing Renton Regional GW Building 4-78/79	**Reported:**
Seattle WA, 98124	Project Manager: Carl Bach	01-Mar-2018 14:09

GW-031S-021418

18B0200-06 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 02/14/2018 14:47

Instrument: NT2 — Analyzed: 16-Feb-2018 20:11

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)
Preparation Batch: BGB0416 — Sample Size: 10 mL
Prepared: 16-Feb-2018 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.20	**0.49**	ug/L	
cis-1,2-Dichloroethene	156-59-2	1	0.20	**0.45**	ug/L	M
Benzene	71-43-2	1	0.20	**21.9**	ug/L	
Trichloroethene	79-01-6	1	0.20	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*120*	*%*	
Surrogate: Toluene-d8			*80-120 %*	*99.9*	*%*	
Surrogate: 4-Bromofluorobenzene			*80-120 %*	*103*	*%*	
Surrogate: 1,2-Dichlorobenzene-d4			*80-120 %*	*99.0*	*%*	

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The Boeing Company	Project: Boeing Renton Regional GW Building 4-78/79	
P.O. Box 3707 MC 9U4-26	Project Number: Boeing Renton Regional GW Building 4-78/79	**Reported:**
Seattle WA, 98124	Project Manager: Carl Bach	01-Mar-2018 14:09

GW-031S-021418

18B0200-06 (Water)

Wet Chemistry

Method: EPA 300.0 — Sampled: 02/14/2018 14:47

Instrument: DX500 — Analyzed: 15-Feb-2018 15:28

Sample Preparation: Preparation Method: No Prep Wet Chem
Preparation Batch: BGB0367 — Sample Size: 5 mL
Prepared: 15-Feb-2018 — Final Volume: 5 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Nitrate-N	14797-55-8	1	0.100	ND	mg-N/L	U

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Nitrite-N	14797-65-0	1	0.100	ND	mg-N/L	U

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The Boeing Company	Project: Boeing Renton Regional GW Building 4-78/79	
P.O. Box 3707 MC 9U4-26	Project Number: Boeing Renton Regional GW Building 4-78/79	**Reported:**
Seattle WA, 98124	Project Manager: Carl Bach	01-Mar-2018 14:09

GW-031S-021418

18B0200-06RE1 (Water)

Wet Chemistry

Method: EPA 300.0 — Sampled: 02/14/2018 14:47

Instrument: DX500 — Analyzed: 16-Feb-2018 12:47

Sample Preparation: Preparation Method: No Prep Wet Chem
Preparation Batch: BGB0367 — Sample Size: 5 mL
Prepared: 15-Feb-2018 — Final Volume: 5 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Sulfate	14808-79-8	2	0.200	**3.67**	mg/L	D

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The Boeing Company	Project: Boeing Renton Regional GW Building 4-78/79	
P.O. Box 3707 MC 9U4-26	Project Number: Boeing Renton Regional GW Building 4-78/79	**Reported:**
Seattle WA, 98124	Project Manager: Carl Bach	01-Mar-2018 14:09

B78-21-021418

18B0200-07 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 02/14/2018 15:23

Instrument: NT2 — Analyzed: 17-Feb-2018 12:09

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)
Preparation Batch: BGB0443 — Sample Size: 10 mL
Prepared: 17-Feb-2018 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.20	**0.30**	ug/L	
cis-1,2-Dichloroethene	156-59-2	1	0.20	**0.24**	ug/L	
Benzene	71-43-2	1	0.20	**0.86**	ug/L	
Trichloroethene	79-01-6	1	0.20	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*103*	*%*	
Surrogate: Toluene-d8			*80-120 %*	*95.1*	*%*	
Surrogate: 4-Bromofluorobenzene			*80-120 %*	*103*	*%*	
Surrogate: 1,2-Dichlorobenzene-d4			*80-120 %*	*105*	*%*	

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The Boeing Company	Project: Boeing Renton Regional GW Building 4-78/79	
P.O. Box 3707 MC 9U4-26	Project Number: Boeing Renton Regional GW Building 4-78/79	**Reported:**
Seattle WA, 98124	Project Manager: Carl Bach	01-Mar-2018 14:09

B78-21-021418

18B0200-07 (Water)

Wet Chemistry

Method: EPA 300.0 — Sampled: 02/14/2018 15:23

Instrument: DX500 — Analyzed: 15-Feb-2018 15:45

Sample Preparation: Preparation Method: No Prep Wet Chem
Preparation Batch: BGB0367 — Sample Size: 5 mL
Prepared: 15-Feb-2018 — Final Volume: 5 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Nitrate-N	14797-55-8	1	0.100	ND	mg-N/L	U

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Nitrite-N	14797-65-0	1	0.100	ND	mg-N/L	U

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Sulfate	14808-79-8	1	0.100	**1.60**	mg/L	

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The Boeing Company	Project: Boeing Renton Regional GW Building 4-78/79	
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Seattle WA, 98124	Project Manager: Carl Bach	01-Mar-2018 14:09

B78-13-021418

18B0200-08 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 02/14/2018 15:58

Instrument: NT2 — Analyzed: 17-Feb-2018 12:29

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)
Preparation Batch: BGB0443 — Sample Size: 10 mL
Prepared: 17-Feb-2018 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.20	**8.49**	ug/L	
cis-1,2-Dichloroethene	156-59-2	1	0.20	**1.78**	ug/L	
Benzene	71-43-2	1	0.20	**4.11**	ug/L	
Trichloroethene	79-01-6	1	0.20	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*103*	*%*	
Surrogate: Toluene-d8			*80-120 %*	*96.7*	*%*	
Surrogate: 4-Bromofluorobenzene			*80-120 %*	*103*	*%*	
Surrogate: 1,2-Dichlorobenzene-d4			*80-120 %*	*98.3*	*%*	

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The Boeing Company	Project: Boeing Renton Regional GW Building 4-78/79	
P.O. Box 3707 MC 9U4-26	Project Number: Boeing Renton Regional GW Building 4-78/79	**Reported:**
Seattle WA, 98124	Project Manager: Carl Bach	01-Mar-2018 14:09

B78-13-021418

18B0200-08 (Water)

Wet Chemistry

Method: EPA 300.0 — Sampled: 02/14/2018 15:58

Instrument: DX500 — Analyzed: 15-Feb-2018 16:01

Sample Preparation: Preparation Method: No Prep Wet Chem
Preparation Batch: BGB0367 — Sample Size: 5 mL
Prepared: 15-Feb-2018 — Final Volume: 5 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Nitrate-N	14797-55-8	1	0.100	ND	mg-N/L	U

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Nitrite-N	14797-65-0	1	0.100	ND	mg-N/L	U

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Sulfate	14808-79-8	1	0.100	**1.31**	mg/L	

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P.O. Box 3707 MC 9U4-26	Project Number: Boeing Renton Regional GW Building 4-78/79	**Reported:**
Seattle WA, 98124	Project Manager: Carl Bach	01-Mar-2018 14:09

B78-11-021418

18B0200-09 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 02/14/2018 16:40

Instrument: NT2 — Analyzed: 17-Feb-2018 12:50

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)
Preparation Batch: BGB0443 — Sample Size: 10 mL
Prepared: 17-Feb-2018 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.20	**1.09**	ug/L	
cis-1,2-Dichloroethene	156-59-2	1	0.20	**0.84**	ug/L	
Benzene	71-43-2	1	0.20	**14.8**	ug/L	
Trichloroethene	79-01-6	1	0.20	**1.16**	ug/L	
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*100*	*%*	
Surrogate: Toluene-d8			*80-120 %*	*94.1*	*%*	
Surrogate: 4-Bromofluorobenzene			*80-120 %*	*94.7*	*%*	
Surrogate: 1,2-Dichlorobenzene-d4			*80-120 %*	*100*	*%*	

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Seattle WA, 98124	Project Manager: Carl Bach	01-Mar-2018 14:09

B78-11-021418

18B0200-09 (Water)

Wet Chemistry

Method: EPA 300.0 — Sampled: 02/14/2018 16:40

Instrument: DX500 — Analyzed: 15-Feb-2018 16:18

Sample Preparation: Preparation Method: No Prep Wet Chem
Preparation Batch: BGB0367 — Sample Size: 5 mL
Prepared: 15-Feb-2018 — Final Volume: 5 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Nitrate-N	14797-55-8	1	0.100	ND	mg-N/L	U

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Nitrite-N	14797-65-0	1	0.100	ND	mg-N/L	U

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Seattle WA, 98124	Project Manager: Carl Bach	01-Mar-2018 14:09

B78-11-021418

18B0200-09RE1 (Water)

Wet Chemistry

Method: EPA 300.0 — Sampled: 02/14/2018 16:40

Instrument: DX500 — Analyzed: 16-Feb-2018 13:03

Sample Preparation: Preparation Method: No Prep Wet Chem
Preparation Batch: BGB0367 — Sample Size: 5 mL
Prepared: 15-Feb-2018 — Final Volume: 5 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Sulfate	14808-79-8	5	0.500	**9.22**	mg/L	D

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The Boeing Company	Project: Boeing Renton Regional GW Building 4-78/79	
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Seattle WA, 98124	Project Manager: Carl Bach	01-Mar-2018 14:09

DUP01-021418

18B0200-10 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 02/14/2018 08:00

Instrument: NT2 — Analyzed: 17-Feb-2018 13:10

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)
Preparation Batch: BGB0443 — Sample Size: 10 mL
Prepared: 17-Feb-2018 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.20	**0.42**	ug/L	
cis-1,2-Dichloroethene	156-59-2	1	0.20	**0.46**	ug/L	
Benzene	71-43-2	1	0.20	**21.4**	ug/L	
Trichloroethene	79-01-6	1	0.20	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*131*	*%*	*
Surrogate: Toluene-d8			*80-120 %*	*104*	*%*	
Surrogate: 4-Bromofluorobenzene			*80-120 %*	*108*	*%*	
Surrogate: 1,2-Dichlorobenzene-d4			*80-120 %*	*98.3*	*%*	

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Seattle WA, 98124	Project Manager: Carl Bach	01-Mar-2018 14:09

DUP01-021418

18B0200-10RE1 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 02/14/2018 08:00

Instrument: NT3 — Analyzed: 20-Feb-2018 18:22

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)
Preparation Batch: BGB0487 — Sample Size: 10 mL
Prepared: 20-Feb-2018 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.20	**0.63**	ug/L	
cis-1,2-Dichloroethene	156-59-2	1	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.20	**22.8**	ug/L	
Trichloroethene	79-01-6	1	0.20	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*136*	*%*	*
Surrogate: Toluene-d8			*80-120 %*	*103*	*%*	
Surrogate: 4-Bromofluorobenzene			*80-120 %*	*98.5*	*%*	
Surrogate: 1,2-Dichlorobenzene-d4			*80-120 %*	*207*	*%*	*

The Boeing Company	Project: Boeing Renton Regional GW Building 4-78/79	
P.O. Box 3707 MC 9U4-26	Project Number: Boeing Renton Regional GW Building 4-78/79	**Reported:**
Seattle WA, 98124	Project Manager: Carl Bach	01-Mar-2018 14:09

Trip Blank

18B0200-11 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 02/14/2018 10:52

Instrument: NT2 — Analyzed: 17-Feb-2018 11:07

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)
Preparation Batch: BGB0443 — Sample Size: 10 mL
Prepared: 17-Feb-2018 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.20	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*106*	*%*	
Surrogate: Toluene-d8			*80-120 %*	*94.9*	*%*	
Surrogate: 4-Bromofluorobenzene			*80-120 %*	*99.6*	*%*	
Surrogate: 1,2-Dichlorobenzene-d4			*80-120 %*	*105*	*%*	

The Boeing Company	Project: Boeing Renton Regional GW Building 4-78/79	
P.O. Box 3707 MC 9U4-26	Project Number: Boeing Renton Regional GW Building 4-78/79	**Reported:**
Seattle WA, 98124	Project Manager: Carl Bach	01-Mar-2018 14:09

Volatile Organic Compounds - Quality Control

Batch BGB0416 - EPA 5030 (Purge and Trap)

Instrument: NT2 Analyst: PKC

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BGB0416-BLK1)				Prepared: 16-Feb-2018 Analyzed: 16-Feb-2018 12:12						
Vinyl Chloride	ND	0.20	ug/L							U
cis-1,2-Dichloroethene	ND	0.20	ug/L							U
Benzene	ND	0.20	ug/L							U
Trichloroethene	ND	0.20	ug/L							U
Surrogate: 1,2-Dichloroethane-d4	5.09		ug/L	*5.00*		*102*	*81-118*			
Surrogate: Toluene-d8	4.89		ug/L	*5.00*		*97.8*	*89-112*			
Surrogate: 4-Bromofluorobenzene	4.82		ug/L	*5.00*		*96.4*	*85-114*			
Surrogate: 1,2-Dichlorobenzene-d4	5.01		ug/L	*5.00*		*100*	*80-120*			
LCS (BGB0416-BS1)				Prepared: 16-Feb-2018 Analyzed: 16-Feb-2018 10:06						
Vinyl Chloride	8.51	0.20	ug/L	10.0		85.1	66-133			
cis-1,2-Dichloroethene	9.13	0.20	ug/L	10.0		91.3	80-121			
Benzene	9.50	0.20	ug/L	10.0		95.0	80-120			
Trichloroethene	9.88	0.20	ug/L	10.0		98.8	80-120			
Surrogate: 1,2-Dichloroethane-d4	4.70		ug/L	*5.00*		*94.1*	*81-118*			
Surrogate: Toluene-d8	4.95		ug/L	*5.00*		*99.0*	*89-112*			
Surrogate: 4-Bromofluorobenzene	5.42		ug/L	*5.00*		*108*	*85-114*			
Surrogate: 1,2-Dichlorobenzene-d4	5.05		ug/L	*5.00*		*101*	*80-120*			
LCS Dup (BGB0416-BSD1)				Prepared: 16-Feb-2018 Analyzed: 16-Feb-2018 10:27						
Vinyl Chloride	8.40	0.20	ug/L	10.0		84.0	66-133	1.31	20	
cis-1,2-Dichloroethene	9.19	0.20	ug/L	10.0		91.9	80-121	0.72	20	
Benzene	9.53	0.20	ug/L	10.0		95.3	80-120	0.29	20	
Trichloroethene	9.92	0.20	ug/L	10.0		99.2	80-120	0.39	20	
Surrogate: 1,2-Dichloroethane-d4	4.72		ug/L	*5.00*		*94.4*	*81-118*			
Surrogate: Toluene-d8	4.96		ug/L	*5.00*		*99.1*	*89-112*			
Surrogate: 4-Bromofluorobenzene	5.32		ug/L	*5.00*		*106*	*85-114*			
Surrogate: 1,2-Dichlorobenzene-d4	5.04		ug/L	*5.00*		*101*	*80-120*			

The Boeing Company	Project: Boeing Renton Regional GW Building 4-78/79	
P.O. Box 3707 MC 9U4-26	Project Number: Boeing Renton Regional GW Building 4-78/79	**Reported:**
Seattle WA, 98124	Project Manager: Carl Bach	01-Mar-2018 14:09

Volatile Organic Compounds - Quality Control

Batch BGB0443 - EPA 5030 (Purge and Trap)

Instrument: NT2 Analyst: PKC

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BGB0443-BLK1)				Prepared: 17-Feb-2018 Analyzed: 17-Feb-2018 10:47						
Vinyl Chloride	ND	0.20	ug/L							U
cis-1,2-Dichloroethene	ND	0.20	ug/L							U
Benzene	ND	0.20	ug/L							U
Trichloroethene	ND	0.20	ug/L							U
Surrogate: 1,2-Dichloroethane-d4	5.30		ug/L	*5.00*		*106*	*80-129*			
Surrogate: Toluene-d8	4.77		ug/L	*5.00*		*95.4*	*80-120*			
Surrogate: 4-Bromofluorobenzene	4.85		ug/L	*5.00*		*97.0*	*80-120*			
Surrogate: 1,2-Dichlorobenzene-d4	5.09		ug/L	*5.00*		*102*	*80-120*			
LCS (BGB0443-BS1)				Prepared: 17-Feb-2018 Analyzed: 17-Feb-2018 09:02						
Vinyl Chloride	8.41	0.20	ug/L	10.0		84.1	66-133			
cis-1,2-Dichloroethene	9.40	0.20	ug/L	10.0		94.0	80-121			
Benzene	9.81	0.20	ug/L	10.0		98.1	80-120			
Trichloroethene	10.1	0.20	ug/L	10.0		101	80-120			
Surrogate: 1,2-Dichloroethane-d4	4.20		ug/L	*5.00*		*84.0*	*80-129*			
Surrogate: Toluene-d8	4.80		ug/L	*5.00*		*96.1*	*80-120*			
Surrogate: 4-Bromofluorobenzene	5.26		ug/L	*5.00*		*105*	*80-120*			
Surrogate: 1,2-Dichlorobenzene-d4	4.97		ug/L	*5.00*		*99.3*	*80-120*			
LCS Dup (BGB0443-BSD1)				Prepared: 17-Feb-2018 Analyzed: 17-Feb-2018 09:23						
Vinyl Chloride	8.27	0.20	ug/L	10.0		82.7	66-133	1.66	30	
cis-1,2-Dichloroethene	9.36	0.20	ug/L	10.0		93.6	80-121	0.47	30	
Benzene	9.80	0.20	ug/L	10.0		98.0	80-120	0.09	30	
Trichloroethene	10.1	0.20	ug/L	10.0		101	80-120	0.64	30	
Surrogate: 1,2-Dichloroethane-d4	4.62		ug/L	*5.00*		*92.4*	*80-129*			
Surrogate: Toluene-d8	4.82		ug/L	*5.00*		*96.4*	*80-120*			
Surrogate: 4-Bromofluorobenzene	5.26		ug/L	*5.00*		*105*	*80-120*			
Surrogate: 1,2-Dichlorobenzene-d4	4.94		ug/L	*5.00*		*98.8*	*80-120*			

The Boeing Company	Project: Boeing Renton Regional GW Building 4-78/79	
P.O. Box 3707 MC 9U4-26	Project Number: Boeing Renton Regional GW Building 4-78/79	**Reported:**
Seattle WA, 98124	Project Manager: Carl Bach	01-Mar-2018 14:09

Volatile Organic Compounds - Quality Control

Batch BGB0487 - EPA 5030 (Purge and Trap)

Instrument: NT3 Analyst: PKC

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BGB0487-BLK1)				Prepared: 20-Feb-2018 Analyzed: 20-Feb-2018 11:27						
Vinyl Chloride	ND	0.20	ug/L							U
cis-1,2-Dichloroethene	ND	0.20	ug/L							U
Benzene	ND	0.20	ug/L							U
Trichloroethene	ND	0.20	ug/L							U
Surrogate: 1,2-Dichloroethane-d4	4.85		ug/L	*5.00*		*97.1*	*80-129*			
Surrogate: Toluene-d8	5.02		ug/L	*5.00*		*100*	*80-120*			
Surrogate: 4-Bromofluorobenzene	4.78		ug/L	*5.00*		*95.6*	*80-120*			
Surrogate: 1,2-Dichlorobenzene-d4	4.79		ug/L	*5.00*		*95.8*	*80-120*			
LCS (BGB0487-BS1)				Prepared: 20-Feb-2018 Analyzed: 20-Feb-2018 09:20						
Vinyl Chloride	10.1	0.20	ug/L	10.0		101	66-133			
cis-1,2-Dichloroethene	9.72	0.20	ug/L	10.0		97.2	80-121			
Benzene	10.7	0.20	ug/L	10.0		107	80-120			
Trichloroethene	10.4	0.20	ug/L	10.0		104	80-120			
Surrogate: 1,2-Dichloroethane-d4	4.88		ug/L	*5.00*		*97.7*	*80-129*			
Surrogate: Toluene-d8	5.24		ug/L	*5.00*		*105*	*80-120*			
Surrogate: 4-Bromofluorobenzene	5.12		ug/L	*5.00*		*102*	*80-120*			
Surrogate: 1,2-Dichlorobenzene-d4	4.76		ug/L	*5.00*		*95.2*	*80-120*			
LCS Dup (BGB0487-BSD1)				Prepared: 20-Feb-2018 Analyzed: 20-Feb-2018 09:45						
Vinyl Chloride	9.75	0.20	ug/L	10.0		97.5	66-133	3.25	30	
cis-1,2-Dichloroethene	9.09	0.20	ug/L	10.0		90.9	80-121	6.72	30	
Benzene	10.4	0.20	ug/L	10.0		104	80-120	2.89	30	
Trichloroethene	10.2	0.20	ug/L	10.0		102	80-120	2.20	30	
Surrogate: 1,2-Dichloroethane-d4	4.65		ug/L	*5.00*		*93.0*	*80-129*			
Surrogate: Toluene-d8	5.21		ug/L	*5.00*		*104*	*80-120*			
Surrogate: 4-Bromofluorobenzene	5.12		ug/L	*5.00*		*102*	*80-120*			
Surrogate: 1,2-Dichlorobenzene-d4	4.73		ug/L	*5.00*		*94.6*	*80-120*			

The Boeing Company	Project: Boeing Renton Regional GW Building 4-78/79	
P.O. Box 3707 MC 9U4-26	Project Number: Boeing Renton Regional GW Building 4-78/79	**Reported:**
Seattle WA, 98124	Project Manager: Carl Bach	01-Mar-2018 14:09

Wet Chemistry - Quality Control

Batch BGB0367 - No Prep Wet Chem

Instrument: DX500 Analyst: KK

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BGB0367-BLK1)				Prepared: 15-Feb-2018 Analyzed: 15-Feb-2018 12:23						
Nitrate-N	ND	0.100	mg-N/L							U
Nitrite-N	ND	0.100	mg-N/L							U
Sulfate	ND	0.100	mg/L							U
LCS (BGB0367-BS1)				Prepared: 15-Feb-2018 Analyzed: 15-Feb-2018 12:40						
Nitrate-N	1.52	0.100	mg-N/L	1.50		101	90-110			
Nitrite-N	1.48	0.100	mg-N/L	1.50		98.8	90-110			
Sulfate	1.58	0.100	mg/L	1.50		105	90-110			
Duplicate (BGB0367-DUP1)		**Source: 18B0200-01**		Prepared: 15-Feb-2018 Analyzed: 15-Feb-2018 13:13						
Nitrate-N	ND	0.100	mg-N/L		ND					U
Nitrite-N	ND	0.100	mg-N/L		ND					U
Sulfate	0.108	0.100	mg/L		1.25			168.00	20	*
Matrix Spike (BGB0367-MS1)		**Source: 18B0200-01**		Prepared: 15-Feb-2018 Analyzed: 15-Feb-2018 13:30						
Nitrate-N	2.21	0.100	mg-N/L	2.00	ND	111	75-125			
Nitrite-N	2.11	0.100	mg-N/L	2.00	ND	105	75-125			
Sulfate	2.20	0.100	mg/L	2.00	1.25	47.6	75-125			*

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

The Boeing Company	Project: Boeing Renton Regional GW Building 4-78/79	
P.O. Box 3707 MC 9U4-26	Project Number: Boeing Renton Regional GW Building 4-78/79	**Reported:**
Seattle WA, 98124	Project Manager: Carl Bach	01-Mar-2018 14:09

Certified Analyses included in this Report

Analyte	Certifications
EPA 300.0 in Water	
Nitrate-N	DoD-ELAP,WADOE,WA-DW,NELAP
Nitrite-N	DoD-ELAP,WADOE,WA-DW,NELAP
Sulfate	DoD-ELAP,WADOE,WA-DW,NELAP
EPA 8260C in Water	
Chloromethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Vinyl Chloride	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Bromomethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Chloroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Trichlorofluoromethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Acrolein	DoD-ELAP,NELAP,CALAP,WADOE
1,1,2-Trichloro-1,2,2-Trifluoroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Acetone	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,1-Dichloroethene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Bromoethane	DoD-ELAP,NELAP,CALAP,WADOE
Iodomethane	DoD-ELAP,NELAP,CALAP,WADOE
Methylene Chloride	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Acrylonitrile	DoD-ELAP,NELAP,CALAP,WADOE
Carbon Disulfide	DoD-ELAP,NELAP,CALAP,WADOE
trans-1,2-Dichloroethene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Vinyl Acetate	DoD-ELAP,NELAP,CALAP,WADOE
1,1-Dichloroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
2-Butanone	DoD-ELAP,NELAP,CALAP,WADOE
2,2-Dichloropropane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
cis-1,2-Dichloroethene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Chloroform	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Bromochloromethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,1,1-Trichloroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,1-Dichloropropene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Carbon tetrachloride	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,2-Dichloroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Benzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Trichloroethene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,2-Dichloropropane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Bromodichloromethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Dibromomethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE

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The Boeing Company	Project: Boeing Renton Regional GW Building 4-78/79	
P.O. Box 3707 MC 9U4-26	Project Number: Boeing Renton Regional GW Building 4-78/79	**Reported:**
Seattle WA, 98124	Project Manager: Carl Bach	01-Mar-2018 14:09

2-Chloroethyl vinyl ether	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
4-Methyl-2-Pentanone	DoD-ELAP,NELAP,CALAP,WADOE
cis-1,3-Dichloropropene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Toluene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
trans-1,3-Dichloropropene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
2-Hexanone	DoD-ELAP,NELAP,CALAP,WADOE
1,1,2-Trichloroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,3-Dichloropropane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Tetrachloroethene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Dibromochloromethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,2-Dibromoethane	DoD-ELAP,NELAP,CALAP,WADOE
Chlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Ethylbenzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,1,1,2-Tetrachloroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
m,p-Xylene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
o-Xylene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Styrene	DoD-ELAP,NELAP,CALAP,WADOE
Bromoform	DoD-ELAP,NELAP,CALAP,WADOE
1,1,2,2-Tetrachloroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,2,3-Trichloropropane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
trans-1,4-Dichloro 2-Butene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
n-Propylbenzene	DoD-ELAP,NELAP,CALAP,WADOE
Bromobenzene	DoD-ELAP,NELAP,CALAP,WADOE
Isopropyl Benzene	DoD-ELAP,NELAP,CALAP,WADOE
2-Chlorotoluene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
4-Chlorotoluene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
t-Butylbenzene	DoD-ELAP,NELAP,CALAP,WADOE
1,3,5-Trimethylbenzene	DoD-ELAP,NELAP,CALAP,WADOE
1,2,4-Trimethylbenzene	DoD-ELAP,NELAP,CALAP,WADOE
s-Butylbenzene	DoD-ELAP,NELAP,CALAP,WADOE
4-Isopropyl Toluene	DoD-ELAP,NELAP,CALAP,WADOE
1,3-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,4-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
n-Butylbenzene	DoD-ELAP,NELAP,CALAP,WADOE
1,2-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,2-Dibromo-3-chloropropane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,2,4-Trichlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Hexachloro-1,3-Butadiene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Naphthalene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,2,3-Trichlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE

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P.O. Box 3707 MC 9U4-26	Project Number: Boeing Renton Regional GW Building 4-78/79	**Reported:**
Seattle WA, 98124	Project Manager: Carl Bach	01-Mar-2018 14:09

Dichlorodifluoromethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Methyl tert-butyl Ether	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
n-Hexane	WADOE
2-Pentanone	WADOE

Code	Description	Number	Expires
ADEC	Alaska Dept of Environmental Conservation	UST-033	05/11/2018
CALAP	California Department of Public Health CAELAP	2748	06/30/2018
DoD-ELAP	DoD-Environmental Laboratory Accreditation Program	66169	02/07/2019
NELAP	ORELAP - Oregon Laboratory Accreditation Program	WA100006	05/11/2018
WADOE	WA Dept of Ecology	C558	06/30/2018
WA-DW	Ecology - Drinking Water	C558	06/30/2018

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Notes and Definitions

Y1	Raised reporting limit due to interference
U	This analyte is not detected above the applicable reporting or detection limit.
M	Estimated value for a GC/MS analyte detected and confirmed by an analyst but with low spectral match parameters.
E	The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL)
D	The reported value is from a dilution
*	Flagged value is not within established control limits.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
[2C]	Indicates this result was quantified on the second column on a dual column analysis.