BOEING RENTON FACILITY
QUARTERLY REPORTS
RCRA CORRECTIVE ACTION PROGRAM, 2017

Volume I

amec foster wheeler

BOEING RENTON FACILITY
Quarterly Report
RCRA Corrective Action Program
Fourth Quarter 2017
Renton, Washington

February 15, 2018
Project No. 0088880100.2018

This report was prepared by the staff of Amec Foster Wheeler Environment & Infrastructure, Inc., under the supervision of the Hydrogeologist whose seal and signature appear hereon.

The findings, recommendations, specifications, or professional opinions are presented within the limits described by the client, in accordance with generally accepted professional engineering and geologic practice. No warranty is expressed or implied.

State of Washington
Hydrogeologist
1354
Licensed Geologist
John Douglas Long

John Long 2/15/18

John Long, L.G., L.Hg.
Licensed Geologist/Hydrogeologist #1354
Expiration Date: May 23, 2018

QUARTERLY REPORT
RCRA CORRECTIVE ACTION PROGRAM
FOURTH QUARTER 2017

Boeing Renton Facility

Renton, Washington

Prepared for:

The Boeing Company
Seattle, Washington

Prepared by:

Amec Foster Wheeler
Environment & Infrastructure, Inc.
600 University Street, Suite 600
Seattle, Washington 98101
(206) 342-1760

February 2018

Project No. 0088880100.2018

TABLE OF CONTENTS

TABLE OF CONTENTS
(Continued)

TABLE OF CONTENTS
(Continued)

TABLES

TABLE OF CONTENTS
(Continued)

FIGURES

TABLE OF CONTENTS
(Continued)

APPENDICES

QUARTERLY REPORT
RCRA CORRECTIVE ACTION PROGRAM
FOURTH QUARTER 2017

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 fourth quarter 2017. 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 Second 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 fourth quarter of 2017, the period from October through December 2017.

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 Fourth Quarter 2017

The following work was completed during the fourth quarter of 2017, the period from October through December 2017:

- The SVE systems for the Building 4-78/79 area and for SWMU-172/174 continued operation until December 15, 2017, when both systems were shut down.
- Groundwater monitoring for the fourth quarter of 2017 was completed during November 2017.
- On behalf of Boeing, Amec Foster Wheeler submitted the Third Quarter 2017 Report to Ecology on November 15, 2017.
- On behalf of Boeing, Amec Foster Wheeler submitted the Second Addendum to the Compliance Monitoring Plan on December 8, 2017.
- Five injection wells (B78-17, B78-18, B78-19, B78-20, and B78-21) were installed on October 5, 2017 at the Building 4-78/79 SWMU/AOC Group. After development and baseline sampling, an initial round of nitrate/sulfate injections was completed in these wells, as well as in B78-11 and B78-13, on October 11, 2017. All work was performed in accordance with the Tech Memo submitted to Ecology in September 2017, except that the nitrate/sulfate injections were conducted in injection wells B78-11 and B78-13 since they were in the immediate treatment area.
- On behalf of Boeing, Amec Foster Wheeler submitted the Apron R Well Abandonment and Replacement Memo describing the impact to monitoring wells during Apron R construction on December 21, 1017.

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 first quarter of 2018:

- Reporting will be completed in accordance with the Order, CAP, EDR, and any changes approved by Ecology.
- Groundwater sampling and analysis for the first quarter of 2018 will be completed.
- SVE rebound vapor sampling will continue at SWMU-172/174 and the Building 4-78/79 Area as described in Section 3.2 of Appendix D of the Third Quarter Monitoring Report (Amec Foster Wheeler, 2017b).
- Substrate injections are planned for January 2018 for the Building 4-78/79 Area as described in Section 3.0 or Appendix D.
- CALIBRE will conduct additional investigations at the Building 4-78/79 Area to address the benzene concentrations observed in groundwater in accordance with their work plan proposal submitted on January 12, 2018.

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 Second 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.

3.0 CORRECTIVE ACTION ACTIVITIES COMPLETED DURING QUARTER

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

3.1 SWMU-168

SWMU-168 is monitored semiannually during the first and third quarters; therefore, no monitoring was conducted for this area during the fourth quarter of 2017.

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 bioremediation, SVE, and MA. Figure 1 shows the layout of the groundwater monitoring wells and the 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 fourth quarter.

3.2.1.2 Soil Vapor Extraction and Bioremediation Operations

The SVE system at SWMU-172 and SWMU-174 operated normally during the fourth quarter, until December 15, 2017, when it was shut down. Details for system operations 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 fourth quarter.

3.2.3 Water Levels

Groundwater elevations for the SWMU-172 and SWMU-174 area measured during the fourth quarter 2017 are summarized in Table 1 and shown on Figure 1. The contoured data for November 2017 show that groundwater generally flows 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 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 2; results for the SWMU-172 and SWMU-174 area COCs are presented in Table 3.

3.2.4.1 Monitored Attenuation/Geochemical Indicators

The geochemical indicator results are presented in Table 2. TOC concentrations ranged from 1.03 milligrams per liter (mg/L) to 11.3 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. The oxidation reduction potential (ORP) and dissolved oxygen (DO) results indicate reducing conditions were present.

3.2.4.2 COC Results for Source and Downgradient Plume Areas

Table 3 lists fourth quarter 2017 analytical results for the SWMU-172 and SWMU-174 COCs. Figures 2 and 3 show 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, and in downgradient plume area wells GW172S and GW173S. 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 3, *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 2, 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 PCE in groundwater collected from source area well GW152S, which increased during the fourth quarter. As shown in Figure 3, COC concentrations increased in the groundwater sample collected from downgradient plume area well GW172S during the third quarter, but overall, COC concentrations have decreased over time. Decreasing COC concentrations are also observed in groundwater from GW173S.

Arsenic was detected above the CUL in all source area and downgradient plume area wells. As shown in Figure 4, the arsenic concentrations in the groundwater from both source area and downgradient wells decreased during the fourth quarter sampling event. Copper was detected at concentration above the CUL in the groundwater from downgradient wells GW173S and GW226S, and lead was detected above the CUL in the groundwater from source area well GW152S and in downgradient plume area wells GW172S and GW173S. The observed variations for metals concentrations are influenced by the naturally occurring reducing conditions and potentially by the conditions created to support reductive dechlorination of the chlorinated solvents. Additional evaluations of metals will be performed 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. Additionally, as site COCs are dropped it may be appropriate to re-evaluate CULs based on the total risk which could result in an arsenic CUL adjustment.

3.2.4.3 COC Results for Conditional Point of Compliance Area

Results from the CPOC area wells are presented in Table 3 and trend charts for cis-1,2-DCE, TCE, and VC for all CPOC area wells are presented in Figure 5. As shown in Table 3, *cis*-1,2-DCE was detected at concentrations above the CUL, ranging from 0.0352 to 0.519 micrograms per liter (µg/L,) in the groundwater collected from all CPOC area wells; TCE was detected above the CUL in the groundwater from monitoring well 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 shown in Figure 5. As shown on Figure 5, concentrations of cis-1,2-DCE have exceeded the CUL in the CPOC wells since compliance monitoring began, but are generally stable, except for the slight increase in concentration observed in the groundwater from GW232S. TCE and PCE concentrations exceed the CUL in the groundwater from CPOC wells GW235I and GW232S, respectively, and generally appear to be stable.

Arsenic was detected above the CUL in the groundwater from CPOC area wells GW232S, GW234S, and GW236S. Copper was detected above the CUL in the groundwater from monitoring well GW234S. Lead was detected above the CUL in the groundwater from monitoring wells GW234S and GW236S (Table 3). Figure 6 shows arsenic, copper, and lead trends since the beginning of compliance monitoring in groundwater from CPOC wells. As shown in Figure 6, 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 fourth quarter of 2017. The cleanup remedy for this SMWU/AOC group is bioremediation, SVE, MNA, and MA. Figure 7 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

Five injection wells were installed on October 5, 2017 (B78-17, B78-18, B78-19, B78-20, and B78-21). All work was performed in accordance with the Tech Memo submitted to Ecology in September 2017.

3.3.1.2 Soil Vapor Extraction and Bioremediation Operations

The SVE system at the Building 4-78/79 SWMU/AOC Group was in normal operation during the fourth quarter until December 15, 2017, when it was shut down. Details for system operations 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 fourth quarter.

3.3.3 Water Levels

Table 4 presents the groundwater elevations measured during the fourth quarter 2017 groundwater monitoring event at the Building 4-78/79 SWMU/AOC group. As shown in Figure 7, the observed direction of groundwater flow from the source area during November 2017 is generally to the west, with a hydraulic gradient of 0.001.

3.3.4 Groundwater Monitoring Results

Results for primary geochemical indicators are presented in Table 5; results for the COCs for Building 4-78/79 SWMU/AOC Group are presented in Table 6. 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 5. 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 above 6.0 standard units during the fourth quarter monitoring period. Results for the other primary geochemical indicators were fairly consistent throughout this area. TOC concentrations in source area wells ranged from 4.03 to 16.2, indicating that additional substrates injections would be beneficial for continued enhanced bioremediation.

3.3.4.2 COC Results for Source and Downgradient Plume Areas

Table 6 lists fourth quarter 2017 analytical results for the Building 4-78/79 SWMU/AOC Group COCs. The CULs established in the CAP are also presented on Table 6. Figures 8 and 9 are trend charts showing historical trends for COCs for four 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 6, 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 wells GW034S and 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 3,040 µg/L (the field duplicate concentration was 2,940 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 8.45 µg/L in the groundwater collected from downgradient plume area well GW210S and VC was detected in the groundwater collected from downgradient plume area wells GW038S and GW209S at concentrations of 0.25 µg/L and 0.26 µg/L, respectively. Benzene has been sporadically detected in the groundwater samples from GW210S and the concentration observed during the fourth 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 8 shows trends for selected COCs for source area wells GW031S and GW033S and Figure 9 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 concentrations of TCE and benzene in the groundwater collected from source area well GW033S are generally consistent with historical results, the concentrations of *cis*-1,2-DCE and VC have continued the increasing trend first observed in the first quarter 2017 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 9) 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 9 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 benzene and VC for GW209S decreased in 2015 and have remained low through the fourth quarter 2017 monitoring event, with VC detected at a concentration equal to the reporting limit and all other COCs below reporting limits.

3.3.4.3 COC Results for Conditional Point of Compliance Area

Groundwater monitoring results from the fourth quarter for the CPOC area are summarized in Table 6. Trends for CPOC wells GW143S, GW237S and GW240D are shown in Figures 10 through 12. Benzene was detected above the CUL in GW237S at a concentration of 2.88 µg/L in the groundwater sample from CPOC well GW237S; all other benzene results for the CPOC area were below detection. As shown in Figure 11, benzene has been sporadically detected in the groundwater from CPOC well GW237S and has not been detected in the groundwater samples from any other CPOC wells at concentrations above the CUL. The only other COCs detected in the groundwater samples from the CPOC area during the fourth quarter was TPH-G at a concentration of 1,780 µg/L in the groundwater sample from CPOC well GW237S and *cis*-1,2-DCE at 0.23 µg/L in well GW143S. As shown in Figure 12, 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 Former Fuel Farm AOC group is monitored semiannually in May and November. The fourth quarter 2017 monitoring event is the sixth monitoring event since the start of compliance monitoring. The final remedy for the Former Fuel Farm is MNA.

3.4.1 Cleanup Action Activities

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

3.4.2 Compliance Monitoring Plan Deviations

No deviations from the compliance monitoring plan occurred for this area during the fourth quarter.

3.4.3 Water Levels

Groundwater elevations for the Former Fuel Farm AOC Group measured during the fourth quarter 2017 are summarized in Table 7 and shown on Figure 13. Groundwater elevation contours are not shown on Figure 13 due to anomalous measurements.

3.4.4 Groundwater Monitoring Results

Results for primary geochemical indicators are presented in Table 8; results for COCs for the Former Fuel Farm AOC Group are presented in Table 9. Groundwater in this area is monitored following the schedule presented in Tables A-1 and A-2 in Appendix A.

3.4.4.1 Monitored Natural Attenuation Indicators

The geochemical indicator results are presented in Table 8. Results in Table 8 indicate that geochemical conditions are generally consistent throughout the Former Fuel Farm AOC Group. The pH in CPOC area wells GW212S and GW224S was below 6.0 standard units; low pH may interfere with biological degradation of site COCs. The other geochemical indicators indicate that conditions are generally conducive to natural attenuation of the COCs for the Former Fuel Farm AOC Group.

3.4.4.2 COC Results for Source Area

Table 9 lists fourth quarter 2017 analytical results for the Former Fuel Farm AOC Group COCs. The CULs established in the CAP are also presented on Table 9. As shown in Table 9, TPH in the diesel and Jet A ranges was not detected above the reporting limit in the groundwater from source area well GW255S.

3.4.4.3 COC Results for Conditional Point of Compliance Area

CPOC area monitoring results are presented in Table 9. Figure 14 shows trend data for CPOC area wells GW211S, GW221S, and GW224S. Table 9 shows that COC concentrations were below their respective CULs for all CPOC area wells except GW211S, GW221S, and GW224S. Diesel range organics exceeded the CUL in the groundwater collected from all three wells and Jet A range petroleum hydrocarbons exceeded the CUL in the groundwater from CPOC wells GW221S and GW224S. Figure 14 shows that the fourth quarter results for these wells are consistent with the historical monitoring results since late 2013, except for the concentrations in the groundwater from CPOC well GW221S.

3.5 AOC-001 AND AOC-002

This section describes corrective action activities conducted at these AOCs during the fourth quarter of 2017. 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 15 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 installation/construction activities were conducted for this cleanup action area during the fourth quarter.

3.5.2 Compliance Monitoring Plan Deviations

No deviations from the compliance monitoring plan occurred for this area during the fourth quarter.

3.5.3 Water Levels

Table 10 presents the groundwater elevations measured during the fourth quarter 2017 monitoring event at AOC-001 and AOC-002. Figure 15 shows the groundwater elevations from this event. Groundwater flow directions cannot be determined from the available groundwater elevation data.

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

Source area and downgradient wells are monitored semiannually in March and August; therefore, no monitoring for source area or downgradient plume wells was conducted in the fourth quarter.

3.5.4.3 COC Results for Conditional Point of Compliance Area

As shown in Table 12, 1,1-dichloroethene, benzene, 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 and VC were 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 0.0352 µg/L to 0.510 µg/L, all greater than the CUL of 0.02 µg/L. VC was detected above the CUL of 0.05 µg/L at concentrations ranging from 0.0582 to 0.461 µg/L.

As shown in Figure 16, 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 16 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 16.

3.6 AOC-003

This section describes corrective action activities conducted at AOC-003 for the fourth quarter of 2017. The cleanup remedy for this AOC is bioremediation and MA. Figure 17 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 fourth quarter.

3.6.2 Compliance Monitoring Plan Deviations

No deviations from the compliance monitoring plan occurred for this area during the fourth quarter.

3.6.3 Water Levels

Table 13 presents the groundwater elevations measured during the fourth quarter 2017 monitoring event at AOC-003 and AOC-092. Figure 17 shows the groundwater elevations from this event. Groundwater flow directions cannot be determined from the available groundwater elevation data.

3.6.4 Groundwater Monitoring Results

Groundwater at AOC-003 is monitored following the schedule presented in Tables A-1 and A-2 in Appendix A. Results for 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 Source and Downgradient Plume Areas

Source area and downgradient wells are monitored semiannually in March and August; therefore, no monitoring for source area or downgradient plume wells was conducted in the fourth quarter.

3.6.4.3 COC Results for 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 CPOC wells GW247S and GW248I, at concentrations of 0.489 and 0.671 µg/L, respectively.

3.7 AOC-004

AOC-004 is monitored semiannually during the first and third quarters; therefore, no monitoring was conducted for this area during the fourth quarter of 2017.

3.8 AOC-034 AND AOC-035

This section describes corrective action activities conducted at AOC-034 and AOC-035 during the fourth quarter of 2017. The cleanup remedy for these AOCs is MNA. Figure 18 shows the locations of the groundwater monitoring wells at AOC-034 and AOC-035, as well as the groundwater elevations measured during this sampling event.

3.8.1 Cleanup Action Activities

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

3.8.2 Compliance Monitoring Plan Deviations

No deviations from the compliance monitoring plan occurred for this area during the fourth quarter.

3.8.3 Water Levels

Table 16 presents the groundwater elevations measured during the fourth quarter 2017 monitoring event at AOC-034 and AOC-035. Figure 18 shows the groundwater elevation contours based on the groundwater elevations. Based on these contours, groundwater in the vicinity of AOC-034 and

AOC-035 flows to the west-northwest, toward the Cedar River Waterway/Lake Washington, with a horizontal hydraulic gradient of approximately 0.0005.

3.8.4 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 geochemical indicators are presented in Table 17; results for COCs are presented in Table 18.

3.8.4.1 Monitored Natural Attenuation/Geochemical Indicators

The geochemical indicator results are presented in Table 17. In general, the results indicate uniform conditions are present across this corrective action area and that conditions are conducive to natural attenuation of chlorinated VOCs, as indicated by the pH, ORP, and DO measurements.

3.8.4.2 COC Results for Source and Downgradient Plume Areas

Table 18 presents the fourth quarter 2017 analytical results for the AOC-034 and AOC-035 groundwater COCs. Trend charts have not been developed for this area, because the COCs are not commonly detected in the AOC-034 and AOC-035 groundwater monitoring wells. As shown in Table 18, neither *cis*-1,2-DCE nor VC were detected in the groundwater collected from source area well GW217S or cross-gradient plume area well GW216S.

3.8.4.3 COC Results for Conditional Point of Compliance Area

Table 18 shows that COC concentrations in groundwater samples from the CPOC area wells were below reporting limits and CULs for the fourth quarter of 2017. This is the sixth consecutive semiannual monitoring event with COC concentrations below CULs in the CPOC area well samples.

3.9 AOC-060

AOC-060 is monitored semiannually during the first and third quarters; therefore, no monitoring was conducted for this area during the fourth quarter of 2017.

3.10 AOC-090

AOC-090 is monitored semiannually during the first and third quarters; therefore, no monitoring was conducted for this area during the fourth quarter of 2017.

3.11 BUILDING 4-70 AREA

The Building 4-70 Area is monitored semiannually during the first and third quarters; therefore, no monitoring was conducted for this area during the fourth quarter of 2017.

3.12 LOT 20/FORMER BUILDING 10-71 PARCEL

This section describes corrective action activities conducted for this area during the fourth quarter 2017. Figure 19 shows the locations of the groundwater monitoring wells and the bioremediation injection system at the Lot 20/Former Building 10-71 Parcel, as well as the groundwater elevations measured during the fourth quarter. The Lot 20/Former Building 10-71 Parcel was not included in the EDR, but was later added to the Compliance Monitoring Plan (Amec Foster Wheeler, 2016a) and has been regularly monitored in conjunction with the Facility corrective action areas. The cleanup remedy for the Lot 20/Former Building 10-71 Parcel is bioremediation and MA. This area is monitored semiannually in the second and fourth quarters, in accordance with Table A-1 in Appendix A.

3.12.1 Cleanup Action Activities

No construction or operations work was conducted for the Lot 20/Former Building 10-71 Parcel during the fourth quarter.

3.12.2 Water Levels

The groundwater elevations measured during the fourth quarter at the Lot 20/Former Building 10-71 Parcel are presented in Table 19 and on Figure 19. Groundwater contours are not shown on Figure 19 because the three monitoring wells measured are arranged nearly in a straight line and do not provide enough water level data to prepare contours. Based on the fourth quarter water level measurements, the apparent groundwater flow appears to be generally to the northwest.

3.12.3 Groundwater Monitoring Results

Results for primary geochemical indicators for groundwater from the Lot 20/Former Building 10-71 Parcel monitoring wells are presented in Table 20; results for COCs for the Lot 20/Former Building 10-71 Parcel monitoring wells are presented in Table 21. Groundwater in this area is monitored following the schedule presented in Tables A-1 in Appendix A.

3.12.3.1 Monitored Attenuation/Geochemical Indicators

The geochemical indicator results are presented in Table 20. The pH in groundwater from the Lot 20/Former Building 10-71 Parcel monitoring wells was near neutral and the remaining parameters appear uniform in the groundwater samples collected from these monitoring wells.

3.12.3.2 COC Results

Fourth quarter analytical results for the Lot 20/Former Building 10-71 Parcel COCs are presented in Table 21. The concentrations of all of the COCs—*cis*-1,2-DCE, toluene, TCE, and VC—in the groundwater samples collected from Lot 20/Former Building 10-71 Parcel monitoring wells were below detection.

3.13 APRON A AREA

This section describes corrective action activities conducted at the Apron A area during the fourth quarter 2017. The cleanup remedy proposed for the Apron A area is bioremediation and MA. Figure 20 shows the locations of the groundwater monitoring wells in the Apron A area.

3.13.1 Cleanup Action Activities

No construction or operations work was conducted in the Apron A area during the fourth quarter.

3.13.2 Water Levels

The depth to groundwater measured during the fourth quarter at Apron A are presented in Table 22 and on Figure 20. Groundwater elevations are not available because the top of casing elevations were never surveyed.

3.13.3 Groundwater Monitoring Results

Results for primary geochemical indicators for groundwater from groundwater monitoring wells GW262S and GW264S are presented in Table 23; results for COCs from these wells are presented in Table 24. Groundwater in this area is monitored following the schedule presented in Tables A-1 and A-2 in Appendix A.

3.13.3.1 Monitored Attenuation/Geochemical Indicators

Geochemical parameters are presented in Table 23. TOC concentrations in the monitoring wells were slightly elevated during the fourth quarter 2017 monitoring event. The other primary geochemical indicators show that reducing conditions were present and that conditions were conducive to biological degradation of the chlorinated VOCs.

3.13.3.2 COC Results

Table 24 lists fourth quarter analytical results for the Apron A COCs: *cis*-1,2-DCE and VC. *Cis*-1,2-DCE was not detected in the groundwater samples collected from either GW262S or GW264S. VC was detected in the groundwater samples collected from monitoring well GW264S at a concentration of 0.97 µg/L. The reporting limits reported for monitoring well GW262S were elevated. The laboratory stated that a dilution was performed due to sample foaming.

4.0 REFERENCES

AMEC Environment & Infrastructure, Inc. (AMEC), 2012, Draft Cleanup Action Plan, Boeing Renton Facility, Renton, Washington: Prepared for The Boeing Company, September.

AMEC, 2014, Draft Engineering Design Report, Boeing Renton Cleanup Plan Implementation, Boeing Renton Facility, Renton, Washington: Prepared for The Boeing Company, July.

Amec Foster Wheeler Environment & Infrastructure, Inc. (Amec Foster Wheeler), 2016a, Compliance Monitoring Plan, Boeing Renton Facility, Renton, Washington: Prepared for The Boeing Company, February.

Amec Foster Wheeler, 2016b, Apron A Investigation Results, Renton Municipal Airport – Boeing Apron A Renton, Washington, June.

Amec Foster Wheeler, 2016c, Quality Assurance Project Plan, Boeing Renton Facility, Renton, Washington: Prepared for The Boeing Company, February.

Amec Foster Wheeler, 2017a, Quarterly Monitoring Report, RCRA Corrective Action Program, Third Quarter 2017, Boeing Renton Facility, Renton Washington: Prepared for the Boeing Company, November.

Amec Foster Wheeler, 2017b, Second Addendum to the Compliance Monitoring Plan, Boeing Renton Facility, Renton Washington: Prepared for the Boeing Company, December.

TABLES

TABLE 1

SWMU-172 and SWMU-174 GROUP GROUNDWATER ELEVATION DATA
NOVEMBER 13, 2017

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]
GW081S	5 to 20[3]	25.91	8.71	17.20
GW152S	5 to 20[3]	26.98	9.07	17.91
GW153S	5 to 20[3]	27.47	9.55	17.92
GW172S	8 to 18[3]	26.44	9.70	16.74
GW173S	8 to 18[3]	26.51	9.73	16.78
GW226S	5 to 20[3]	26.86	8.90	17.96
GW232S	4 to 14	24.45	7.90	16.55
GW233I	15 to 25	24.35	7.49	16.86
GW234S	3 to 13	24.95	8.16	16.79
GW235I	15 to 25	24.90	7.70	17.20
GW236S	5 to 15	24.36	7.30	17.06

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

Abbreviations
bgs = below ground surface
TOC = top of casing

TABLE 2

SWMU-172 AND SWMU-174 GROUP CONCENTRATIONS OF PRIMARY GEOCHEMICAL INDICATORS[1, 2]
NOVEMBER 13, 2017
Boeing Renton Facility
Renton, Washington

	Well ID[3]											
	Source Area			Downgradient Plume Area				CPOC Area				
	GW152S	GW152S (field dup.)	GW153S	GW081S	GW172S	GW173S	GW226S	GW232S	GW233I	GW234S	GW235I	GW236S
Specific Conductivity (µS/cm)	78	78	120	180	199	377	183	520	195	109	140	309
Dissolved Oxygen (mg/L)	0.71	0.71	1.81	1.21	2.43	0.71	2.51	6.84	0.48	4.90	1.09	4.83
Oxidation/Reduction Potential (mV)	54.8	54.8	21.8	-5.10	-29.6	-18.7	-12.9	-92.2	-7.80	44.2	13.4	-37.8
pH (standard units)	6.17	6.17	6.34	6.41	6.50	6.48	6.46	6.26	6.92	6.39	6.66	6.51
Temperature (degrees C)	12.90	12.90	12.20	14.00	12.20	12.70	13.70	12.40	14.10	12.70	12.30	9.90
Total Organic Carbon (mg/L)	2.84	2.60	2.38	4.67	3.26	8.42	7.62	11.3	4.56	3.63	1.03	1.76

Notes
1. Primary geochemical indicators are measured in the field, with the exception of total organic carbon, which is measured in the laboratory.
2. Data qualifiers are as follows:
   U = The analyte was not detected at the reporting limit indicated.
3. 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 3

SWMU-172 AND SWMU-174 GROUP CONCENTRATIONS OF CONSTITUENTS OF CONCERN[1, 2]
NOVEMBER 13, 2017
Boeing Renton Facility
Renton, Washington

	Cleanup Level[4]	Well ID[3]											
		Source Area			Downgradient Plume Area				CPOC Area				
		GW152S	GW152S (field dup.)	GW153S	GW081S	GW172S	GW173S	GW226S	GW232S	GW233I	GW234S	GW235I	GW236S
Volatile Organic Compounds (µg/L)													
cis-1,2-Dichloroethene	0.03	**0.203**	**0.188**	0.025	**0.0360**	**0.130**	0.027	0.020 U	**0.519**	**0.0765**	**0.0352**	**0.167**	**0.0468**
Tetrachloroethene	0.02	**0.529**	**0.589**	**0.830**	0.020 U	**0.0349**	**0.0355**	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Trichloroethene	0.02	**0.146**	**0.149**	**0.127**	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	**0.0352**	0.020 U
Vinyl Chloride	0.11	0.0449 J	0.0409 J	0.020 U	0.020 U	**0.286 J**	0.0705 J	0.0483	**0.621**	0.020 U	0.020 U	0.020 U	0.020 U
Metals (µg/L)													
Arsenic	1.0	**1.56**	**1.69**	**2.08**	**1.94**	**6.71**	**9.85**	**4.73**	**7.43**	0.329	**1.43**	0.228	**2.78**
Copper	3.5	2.95	3.14	2.70	0.900	1.89	**4.53**	**5.24**	1.23	0.500 U	**3.53**	0.736	3.36
Lead	1.0	**1.54**	**1.79**	0.338	0.105	**1.58**	**1.99**	0.933	0.232	0.100 U	**1.94**	0.217	**7.38**

Notes
1. Data qualifiers are as follows:
   U = The analyte was not detected at the reporting limit indicated.
   J = The value is an estimate.
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
NA = not analyzed

TABLE 4

BUILDING 4-78/79 SWMU/AOC GROUP
GROUNDWATER ELEVATION DATA
NOVEMBER 13 AND 14, 2017

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	5.23	14.26
GW034S	5 to 25	19.65	5.30	14.35
GW038S	5 to 25	19.68	5.40	14.28
GW039S	3.5 to 13.5	19.30	5.14	14.16
GW143S	10 to 15	19.81	5.62	14.19
GW209S	3.5 to 13.3	19.37	5.15	14.22
GW210S	3.5 to 13.3	19.19	4.54	14.65
GW237S	5 to 15	18.85	4.70	14.15
GW238I	5 to 20	18.94	4.77	14.17
GW239I	15 to 20	19.69	5.51	14.18
GW240D	22 to 27	19.81	5.04	14.77
GW241S	4 to 14	20.28	6.05	14.23
GW242I	15 to 20	20.44	6.15	14.29
GW243I	5 to 20	19.49	5.21	14.28
GW244S	5 to 15	19.53	5.22	14.31

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

Abbreviations
bgs = below ground surface
TOC = top of casing

TABLE 5

BUILDING 4-78/79 SWMU/AOC GROUP CONCENTRATIONS OF PRIMARY GEOCHEMICAL INDICATORS[1]
NOVEMBER 13 AND 14, 2017
Boeing Renton Facility
Renton, Washington

	Well ID[2]									
	Source Area							Downgradient Plume Area		
	GW031S	GW031S (field dup.)	GW033S	GW034S	GW039S	GW243I	GW244S	GW038S	GW209S	GW210S
Specific Conductivity (µS/cm)	259	259	277	397	87	323	492	257	378	254
Dissolved Oxygen (mg/L)	4.29	4.29	0.80	0.45	1.63	0.2	0.40	2.77	4.38	1.14
Oxidation/Reduction Potential (mV)	-17.0	-17	-10.5	-10.1	54.7	-16.4	25.7	-82.5	88.0	254
pH (standard units)	6.17	6.17	6.42	6.60	6.32	6.35	6.17	6.49	6.40	6.60
Temperature (degrees C)	14.20	14.2	15.50	14.53	16.50	15.10	13.59	16.30	14.40	12.80
Total Organic Carbon (mg/L)	14.4	14.8	16.2	8.74	4.03	9.69	14.4	8.71	11.5	10.1

	Well ID[2]						
	CPOC Area						
	GW143S	GW237S	GW238I	GW239I	GW240D	GW241S	GW242I
Specific Conductivity (µS/cm)	290	237	381	269	324	297	262
Dissolved Oxygen (mg/L)	0.31	1.90	4.24	0.43	0.73	3.90	4.56
Oxidation/Reduction Potential (mV)	-31.7	-2.80	-94.5	-21.4	-24.2	-51.0	-35.0
pH (standard units)	6.57	6.51	6.44	6.49	6.48	6.32	6.31
Temperature (degrees C)	15.50	14.40	13.50	13.70	12.20	13.10	12.30
Total Organic Carbon (mg/L)	8.14	6.75	9.70	10.0	9.96	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; 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
NA = not analyzed

TABLE 6

BUILDING 4-78/79 SWMU/AOC GROUP
CONCENTRATIONS OF CONSTITUENTS OF CONCERN[1, 2]
NOVEMBER 13 AND 14, 2017
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	**59.9 J**	**59.2 J**	**5.76**	0.20 U	0.20 U	**1.61**	**7.28**
cis-1,2-Dichloroethene	0.70	0.47 J	0.38 J	**754**	0.23	0.20 U	0.20 U	**2.46**
Trichloroethene	0.23	0.20 U	0.20 U	**0.28**	0.20 U	0.20 U	0.20 U	**0.73**
Vinyl Chloride	0.20	0.20 J	0.20 U	**676**	0.20 U	0.20 U	**0.53**	0.20 U
Total Petroleum Hydrocarbons (µg/L)								
NWTPH-Gx (C7-C12)	800	**3,040**	**2,940**	282	100 U	100 U	151	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	**8.45**
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	**0.25**	**0.26**	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	**2.88**	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
cis-1,2-Dichloroethene	0.70	0.23	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	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Total Petroleum Hydrocarbons (µg/L)								
NWTPH-Gx (C7-C12)	800	100 U	**1,780**	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 = The value is an estimate.
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
NA = not analyzed
NWTPH-Gx = total petroleum hydrocarbons as gasoline

TABLE 7

FORMER FUEL FARM GROUNDWATER ELEVATION DATA
NOVEMBER 14, 2017

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]
GW183S	5.5 to 15	26.58	8.70	17.88
GW184S	5.6 to 15	27.14	9.28	17.86
GW211S	4.8 to 14.7	27.77	9.91	17.86
GW212S	4.9 to 14.8	28.06	10.19	17.87
GW221S	5 to 15	27.93	9.95	17.98
GW224S	5 to 15	27.98	10.50	17.48
GW225I	5 to 15	27.07	9.11	17.96
GW255S	6 to 16	27.49	9.95	17.54
GW256S	7 to 16	27.22	8.82	18.40
GW257S	8 to 16	27.87	9.35	18.52
GW258S	9 to 16	25.51	7.73	17.78

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 8

FORMER FUEL FARM CONCENTRATIONS OF PRIMARY GEOCHEMICAL INDICATORS[1]
NOVEMBER 14, 2017

Boeing Renton Facility
Renton, Washington

	Well ID[2]										
	Source Area	CPOC Area									
	GW255S	GW183S	GW184S	GW211S	GW212S	GW221S	GW224S	GW225I	GW256S	GW257S	GW258S
Specific Conductivity (µS/cm)	157	145	163	274	281	216	328	127	147	145	263
Dissolved Oxygen (mg/L)	3.95	1.10	1.14	0.36	0.34	3.57	0.88	3.24	4.01	4.14	0.45
Oxidation/Reduction Potential (mV)	41.5	60.3	56.3	52.4	132.7	12.7	146.3	66.2	40.1	94.4	32.3
pH (standard units)	6.07	6.43	6.64	6.24	5.25	6.18	4.52	6.44	6.17	6.41	6.44
Temperature (degrees C)	11.90	12.10	13.90	13.39	10.47	12.40	10.55	9.30	11.90	12.20	13.00

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
field dup. = field duplicate
mg/L = milligrams per liter
mV = millivolts

TABLE 9

FORMER FUEL FARM CONCENTRATIONS OF CONSTITUENTS OF CONCERN [1, 2]
NOVEMBER 14, 2017
Boeing Renton Facility
Renton, Washington

		Well ID[3]											
		Source Area	CPOC Area										
	Cleanup Level[4]	GW255S	GW183S	GW184S	GW211S	GW212S	GW221S	GW224S	GW224S (field dup.)	GW225I	GW256S	GW257S	GW258S
Total Petroleum Hydrocarbons (mg/L)													
DRO (C12-C24)	0.5	0.100 U	0.100 U	0.100 U	**0.903**	0.100 U	**3.63**	**1.84**	**1.72**	0.100 U	0.100 U	0.100 U	0.100 U
Jet A	0.5	0.100 U	0.100 U	0.100 U	0.245	0.100 U	**2.12**	**1.97**	**1.72**	0.100 U	0.100 U	0.100 U	0.100 U

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; I = intermediate well.
4. Cleanup levels obtained from Table 2 of the Cleanup Action Plan.

Abbreviations
CPOC = conditional point of compliance
DRO = diesel range organics
field dup. = field duplicate
mg/L = milligrams per liter

TABLE 10

AOC-001 AND AOC-002 GROUNDWATER ELEVATION DATA
NOVEMBER 14, 2017

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	2.30	13.97
GW190S	3.0 to 13.0	17.30	NM	NM
GW191D	26.5 to 36.0	17.53	NM	NM
GW192S	5.0 to 9.5	17.54	NM	NM
GW193S	3.0 to 12.8	18.67	NM	NM
GW194S	7.3 to 12.0	16.79	3.85	12.94
GW195S	7.3 to 12.0	16.34	2.56	13.78
GW196D	26.8 to 36.8	16.46	2.55	13.91
GW197S	7.8 to 12.5	16.52	2.23	14.29
GW245S	3.0 to 13.0	16.08	2.40	13.68

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

Abbreviations
bgs = below ground surface
NM = not measured
TOC = top of casing

TABLE 11

AOC-001 and -002 CONCENTRATIONS OF PRIMARY GEOCHEMICAL INDICATORS[1]
NOVEMBER 14, 2017

Boeing Renton Facility
Renton, Washington

	CPOC Area						
	GW185S	**GW194S**	**GW194S (field dup.)**	**GW195S**	**GW196D[4]**	**GW197S**	**GW245S[5]**
Specific Conductivity (µS/cm)	659	602	602	641	366	956	229
Dissolved Oxygen (mg/L)	0.17	6.16	6.16	0.10	3.96	0.12	1.79
Oxidation/Reduction Potential (mV)	-46.7	-66.0	-66	-42.0	-60.0	-94.4	-61.0
pH (standard units)	6.64	6.19	6.19	6.55	6.39	7.17	6.79
Temperature (degrees C)	16.10	15.60	15.60	15.40	13.90	15.70	13.50
Total Organic Carbon (mg/L)	13.4	14.7	14.6	18.2	8.94	15.5	4.98

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. GW191D is installed in a cluster with GW192S, and is screened below a silt layer at 26.5 to 36 feet in depth.
4. GW196D is installed in a cluster with GW195S, and is screened below a silt layer at 26.8 to 36.8 feet in depth.
5. GW245S is both the source area and CPOC well for AOC-093.

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

TABLE 12

AOC-001 AND AOC-002 CONCENTRATIONS OF CONSTITUENTS OF CONCERN[1, 2]
NOVEMBER 14, 2017
Boeing Renton Facility
Renton, Washington

	Cleanup Level[4]	CPOC Area[3]						
		GW185S	**GW194S**	**GW194S (field dup.)**	**GW195S**	**GW196D[5]**	**GW197S**	**GW245S**
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
Benzene	0.8	0.41	0.20 U	0.20 U	0.20 U	0.20 U	0.28	0.20 U
cis -1,2-Dichloroethene	0.02	**0.510**	0.020 U	0.020 U	**0.0722**	**0.0352**	**0.107**	0.020 U
Trichloroethene	0.02	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	**0.461 J**	0.020 U	0.020 U	**0.137 J**	**0.0582 J**	**0.0843 J**	0.0210

Notes
1. Data qualifiers are as follows:
   U = The analyte was not detected at the reporting limit indicated.
   J = The value is an estimate.
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. GW196D is installed in a cluster with GW195S, and 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

TABLE 13

AOC-003 GROUNDWATER ELEVATION DATA
NOVEMBER 14, 2017

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	NM	NM
GW247S	4 to 14	18.91	3.90	15.01
GW248I	10 to 20	18.78	3.68	15.10
GW249S	4 to 14	18.85	NM	NM

Notes
1. S = shallow well; I = intermediate well.
2. Elevations in feet relative to National Geodetic Vertical Datum of 1929.
3. Depth to water measurement not collected at GW188S during the second quarter 2017.

Abbreviations
bgs = below ground surface
NM = not measured
TOC = top of casing

TABLE 14

AOC-003 CONCENTRATIONS
OF PRIMARY GEOCHEMICAL INDICATORS [1]
NOVEMBER 14, 2017

Boeing Renton Facility
Renton, Washington

	Well ID[2]			
	Source Area	Downgradient Plume Area	CPOC Area	
	GW249S	GW188S	GW247S	GW248I
Specific Conductivity (µS/cm)	NS	NS	383	408
Dissolved Oxygen (mg/L)	NS	NS	4.14	1.06
Oxidation/Reduction Potential (mV)	NS	NS	-54.0	4.1
pH (standard units)	NS	NS	6.48	6.41
Temperature (degrees C)	NS	NS	12.50	11.90
Total Organic Carbon (mg/L)	NS	NS	10.7	11.4

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
NS = not sampled

TABLE 15

AOC-003 CONCENTRATIONS OF CONSTITUENTS OF CONCERN[1, 2]
NOVEMBER 14, 2017
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	NS	NS	0.145	0.020 U
Tetrachloroethene	0.02	NS	NS	0.020 U	0.020 U
Trichloroethene	0.16	NS	NS	0.0402	0.020 U
Vinyl Chloride	0.24	NS	NS	**0.489 J**	**0.671 J**

Notes
1. Data qualifiers are as follows:
   U = The analyte was not detected at the reporting limit indicated.
   J = The value is an estimate.
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
NS = not sampled

TABLE 16

AOC-034 AND AOC-035 GROUNDWATER ELEVATION DATA
NOVEMBER 14, 2017

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]
GW001S	2 to 12	18.28	4.36	13.92
GW004S	2 to 12	16.66	2.86	13.80
GW005S[3]	2 to 12	18.20	NM	NM
GW216S	4.4 to 14.2	18.90	4.47	14.43
GW217S	3.5 to 13.4	19.20	4.80	14.40
GW218S	3.6 to 13.5	18.01	3.66	14.35
GW251S	4 to 14	17.98	3.55	14.43

Notes
1. S = shallow well
2. Elevations in feet relative to National Geodetic Vertical Datum of 1929.
3. Access to this well was blocked due to construction.

Abbreviations
bgs = below ground surface
NM = not measured
TOC = top of casing

TABLE 17

AOC-034 AND AOC-035 CONCENTRATIONS OF PRIMARY GEOCHEMICAL INDICATORS [1]

NOVEMBER 14, 2017

Boeing Renton Facility
Renton, Washington

	Well ID[2]			
	Source Area	Downgradient Plume Area	CPOC Area	
	GW217S	GW216S	GW218S	GW251S
Specific Conductivity (µS/cm)	110	238	142	113
Dissolved Oxygen (mg/L)	0.26	0.38	0.34	4.48
Oxidation/Reduction Potential (mV)	-7.9	-8.3	54.2	-3.0
pH (standard units)	6.48	6.85	6.76	7.02
Temperature (degrees C)	16.20	14.10	14.28	11.40

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-034 AND AOC-035
CONCENTRATIONS OF CONSTITUENTS OF CONCERN[1]
NOVEMBER 14, 2017

Boeing Renton Facility
Renton, Washington

	Cleanup Level[3]	Well ID[2]			
		Source Area	Cross-Gradient Plume Area	CPOC Area	
		GW217S	GW216S	GW218S	GW251S
Volatile Organic Compounds (µg/L)					
cis -1,2-Dichloroethene	0.65	0.2 U	0.2 U	0.2 U	0.2 U
Vinyl Chloride	0.29	0.2 U	0.2 U	0.2 U	0.2 U

Notes
1. Data qualifiers are as follows:
   U = The analyte was not detected at the reporting limit indicated.
2. S = shallow well
3. Cleanup levels obtained from Table 2 of the Cleanup Action Plan.

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

TABLE 19

LOT 20/FORMER BUILDING 10-71 PARCEL
GROUNDWATER ELEVATION DATA
NOVEMBER 14, 2017

Boeing Renton Facility
Renton, Washington

Well ID	Screen Interval Depth (feet bgs)	TOC Elevation (feet) [1]	Depth to Groundwater (feet below TOC)	Groundwater Elevation (feet) [1]
10-71-MW-1	7 to 17	30.07	8.33	21.74
10-71-MW-2	7 to 17	29.88	8.60	21.28
10-71-MW-3	5 to 15	29.13	NM	NM
10-71-MW-4	6 to 16	28.97	8.42	20.55

Notes
1. Elevations in feet relative to National Geodetic Vertical Datum of 1929.

Abbreviations
bgs = below ground surface
NM = not measured
TOC = top of casing

TABLE 20

LOT 20/FORMER BUILDING 10-71 PARCEL
PRIMARY GEOCHEMICAL INDICATORS[1]
NOVEMBER 14, 2017

Boeing Renton Facility
Renton, Washington

	Well ID		
	10-71-MW1	**10-71-MW2**	**10-71-MW4**
Specific Conductivity (µS/cm)	223	232	331
Dissolved Oxygen (mg/L)	0.25	0.18	0.33
Oxidation/Reduction Potential (mV)	72.9	61.8	57.6
pH (standard units)	6.12	6.18	6.21
Temperature (degrees C)	13.81	15.49	14.41

Notes
1. Primary geochemical indicators are measured in the field.

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

TABLE 21

LOT 20/FORMER BUILDING 10-71 PARCEL
CONCENTRATIONS OF CONSTITUENTS OF CONCERN [1, 2]
NOVEMBER 14, 2017

Boeing Renton Facility
Renton, Washington

	Well ID		
	10-71-MW1	**10-71-MW2**	**10-71-MW4**
Volatile Organic Compounds (µg/L)			
cis- 1,2-Dichloroethene	0.20 U	0.20 U	0.20 U
Toluene	0.20 U	0.20 U	0.20 U
Trichloroethene	0.20 U	0.20 U	0.20 U
Vinyl Chloride	0.20 U	0.20 U	0.20 U

Notes
1. Data qualifiers are as follows:
   U = The analyte was not detected at the reporting limit indicated.
2. No cleanup standards have been established for the Building 10-71 Parcel.

Abbreviations
µg/L = micrograms per liter

TABLE 22

APRON A GROUNDWATER ELEVATION DATA
NOVEMBER 14, 2017
Boeing Renton Facility
Renton, Washington

Well ID	Screen Interval Depth (feet bgs)	TOC Elevation (feet)[1]	Depth to Groundwater (feet below TOC)	Groundwater Elevation (feet)[1]
GW262S	8 to 18	NA	4.93	NA
GW263S	8 to 18	NA	5.37	NA
GW264S	8 to 18	NA	5.79	NA

Notes
1. Elevations in feet relative to National Geodetic Vertical Datum of 1929.

Abbreviations
bgs = below ground surface
NA = not available
TOC = top of casing

TABLE 23

APRON A CONCENTRATIONS OF PRIMARY GEOCHEMICAL INDICATORS[1] NOVEMBER 14, 2017

Boeing Renton Facility
Renton, Washington

	Well ID[2]	
	GW262S	GW264S
Specific Conductivity (µS/cm)	552	849
Dissolved Oxygen (mg/L)	0.36	0.21
Oxidation/Reduction Potential (mV)	78.2	56.3
pH (standard units)	6.26	6.19
Temperature (degrees C)	16.01	17.35
Total Organic Carbon (mg/L)	38.6	37.3

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
degrees C = degrees Celsius
mg/L = milligrams per liter
mV = millivolts

TABLE 24

APRON A CONCENTRATIONS OF CONSTITUENTS OF CONCERN[1] NOVEMBER 14, 2017

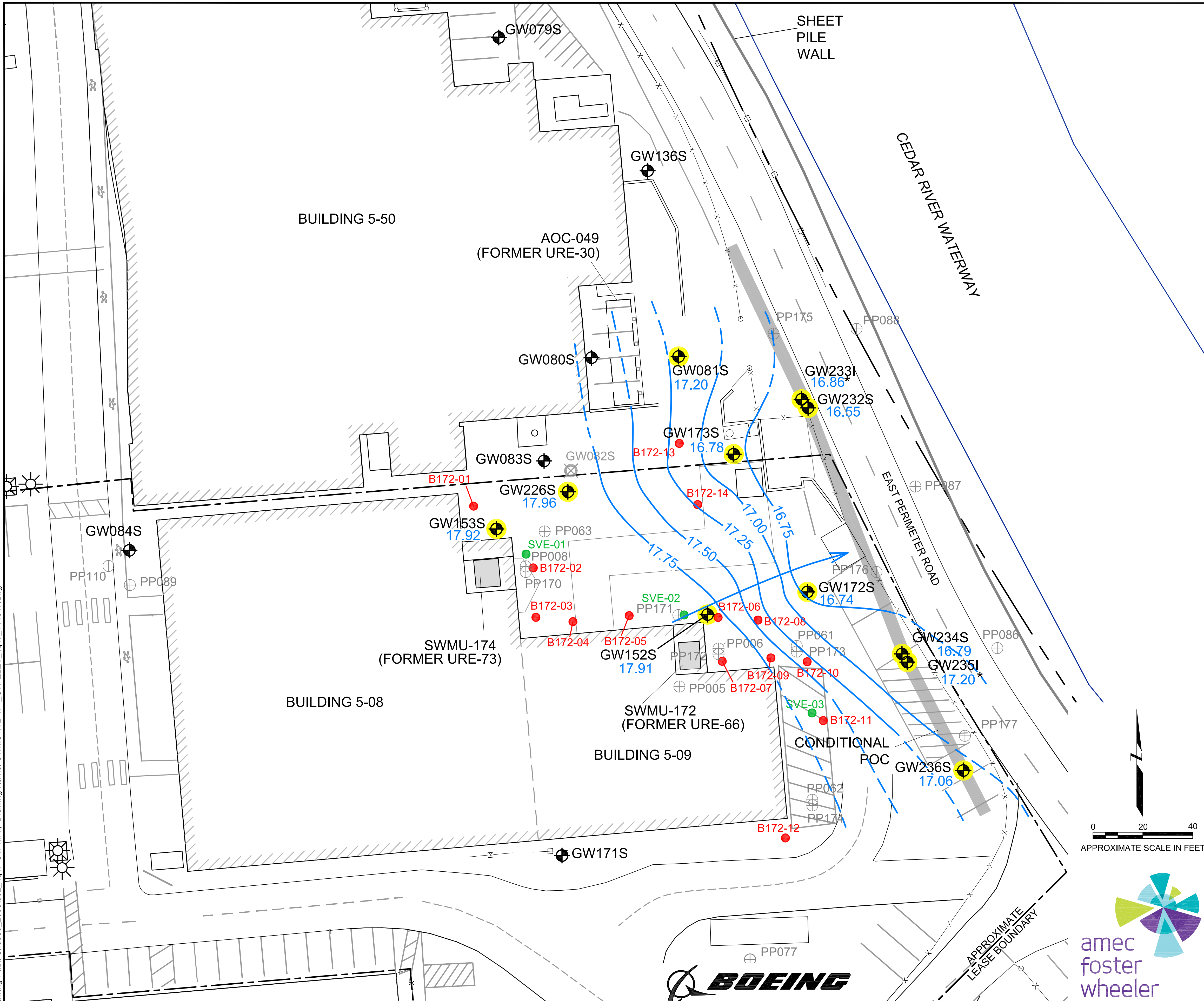
Boeing Renton Facility
Renton, Washington

	Well ID[2]	
	GW262S	GW264S
Volatile Organic Compounds (µg/L)		
cis- 1,2-Dichloroethene	1.00 U	0.20 U
Vinyl Chloride	1.00 U	0.97

Notes
1. Data qualifiers are as follows:
   U = The analyte was not detected at the reporting limit indicated.
2. S = shallow well.

Abbreviations
µg/L = micrograms per liter

FIGURES



NOTES

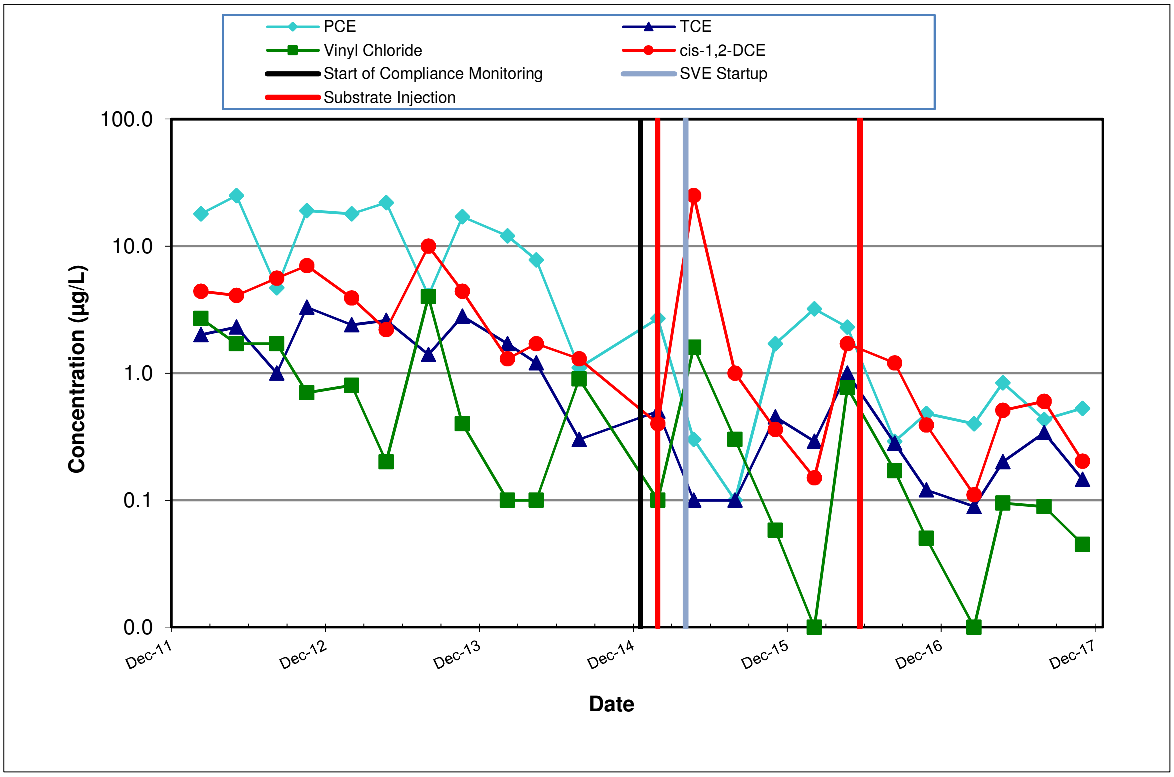
1. HORIZONTAL DATUM:
   WASHINGTON STATE COORDINATE SYSTEM NORTH ZONE NAD83 (91)
   VERTICAL DATUM: NATIONAL GEODETIC VERTICAL DATUM (NGVD1929)
2. BASEMAP COMPILED BY DUANE HARTMAN & ASSOCIATES, INC., DECEMBER 1994.
3. 'S' DESIGNATION INDICATES WELL SCREENED LESS THAN 20 FEET IN DEPTH.
   'I' DESIGNATION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

amec foster wheeler

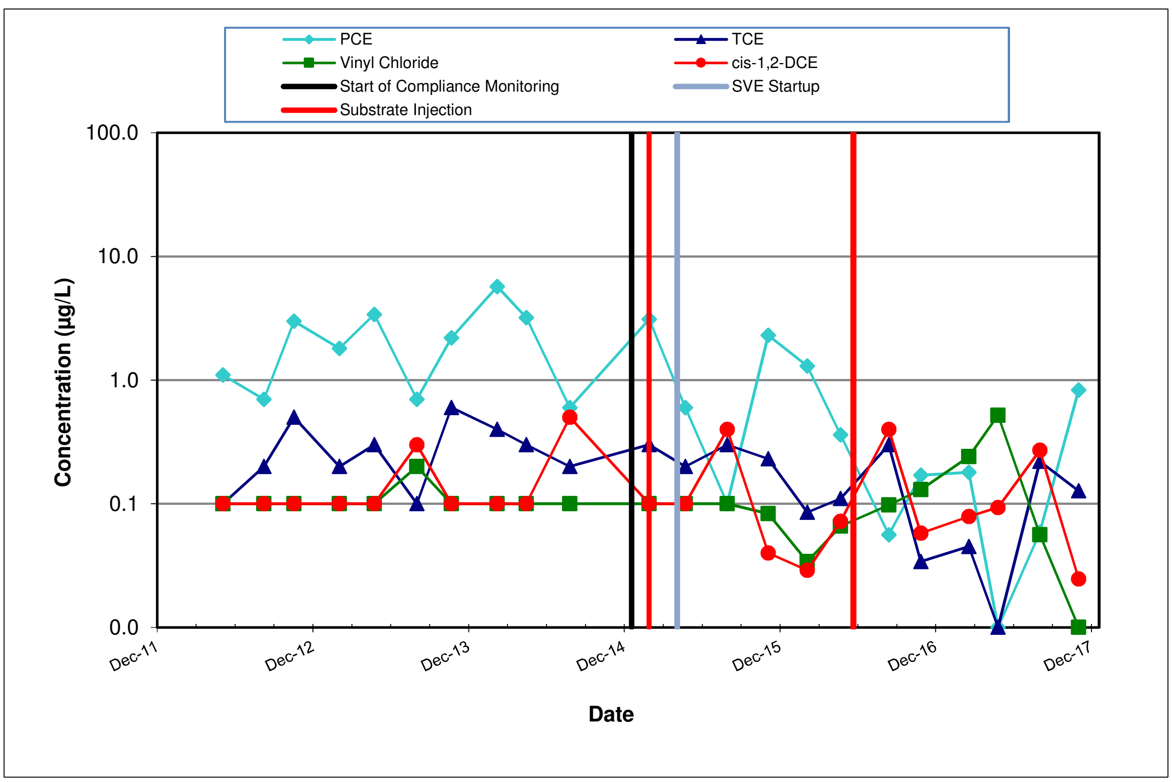
SWMU-172 AND SWMU-174
MONITORING WELL LOCATIONS
AND GROUNDWATER ELEVATIONS
NOVEMBER 13, 2017
Boeing Renton Facility
Renton, Washington

By: APS	Date: 01/30/18	Project No. 8888
Amec Foster Wheeler Environment & Infrastructure, Inc.		Figure 1

Plot Date: 01/30/18 - 3:25pm, Plotted by: adam.stenberg
Drawing Path: S:\8888_2006\092_4q17-GW-MR\, Drawing Name: SWMU-172-174_GW-ELEV_4q17_111317.dwg



SOURCE AREA WELL GW152S

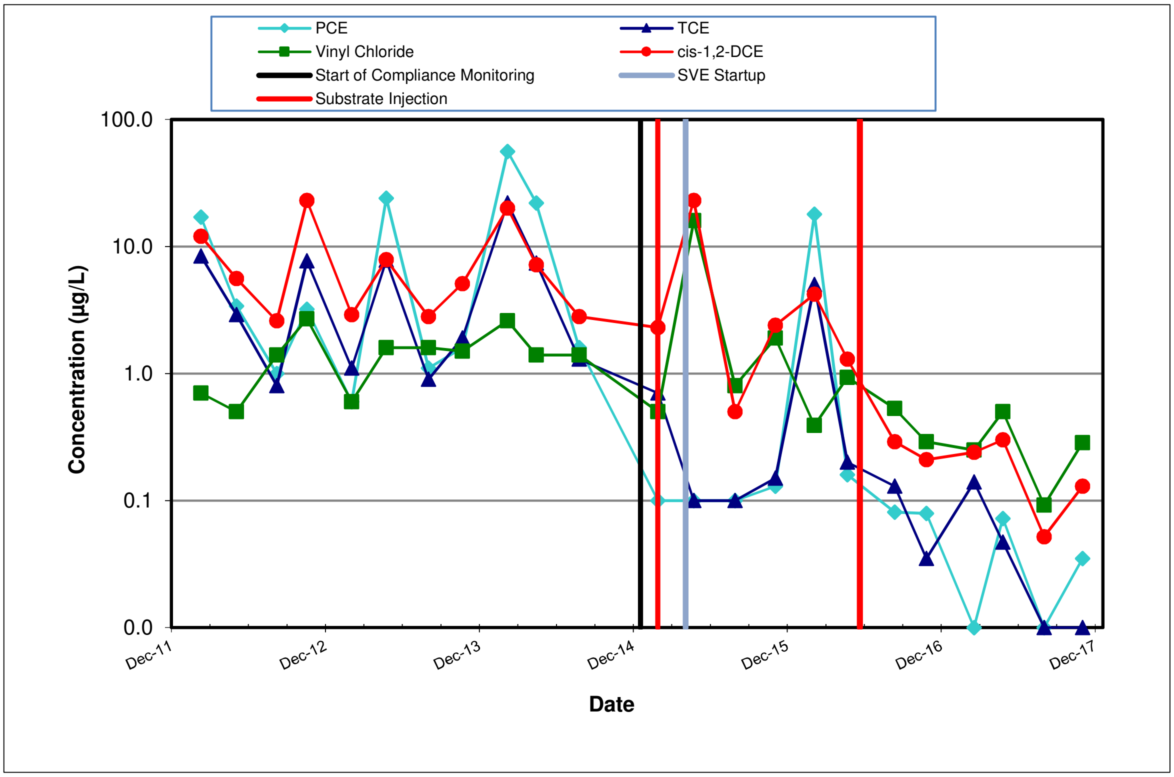


Note: non-detected values shown at one-half the reporting limit

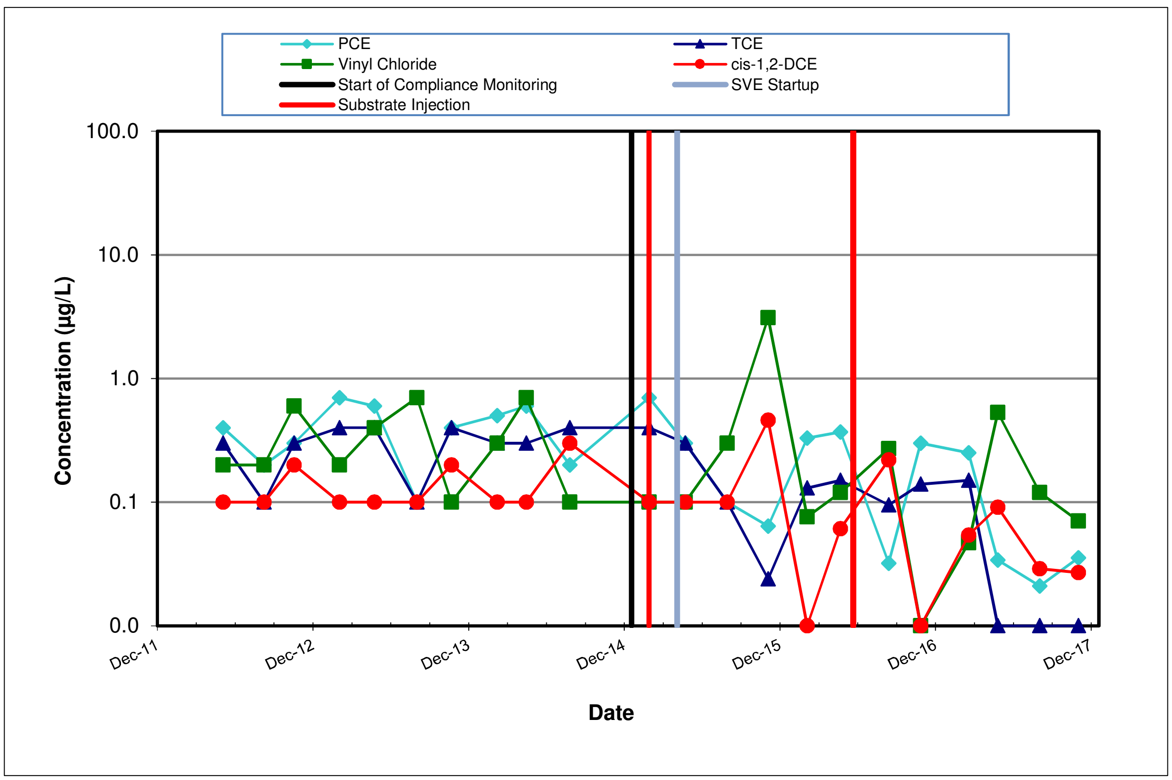
SOURCE AREA WELL GW153S

amec foster wheeler	SWMU-172 AND SWMU-174 TREND PLOTS FOR SOURCE AREA WELLS GW152S AND GW153S Boeing Renton Facility Renton, Washington	Project No. 8888 Figure 2

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

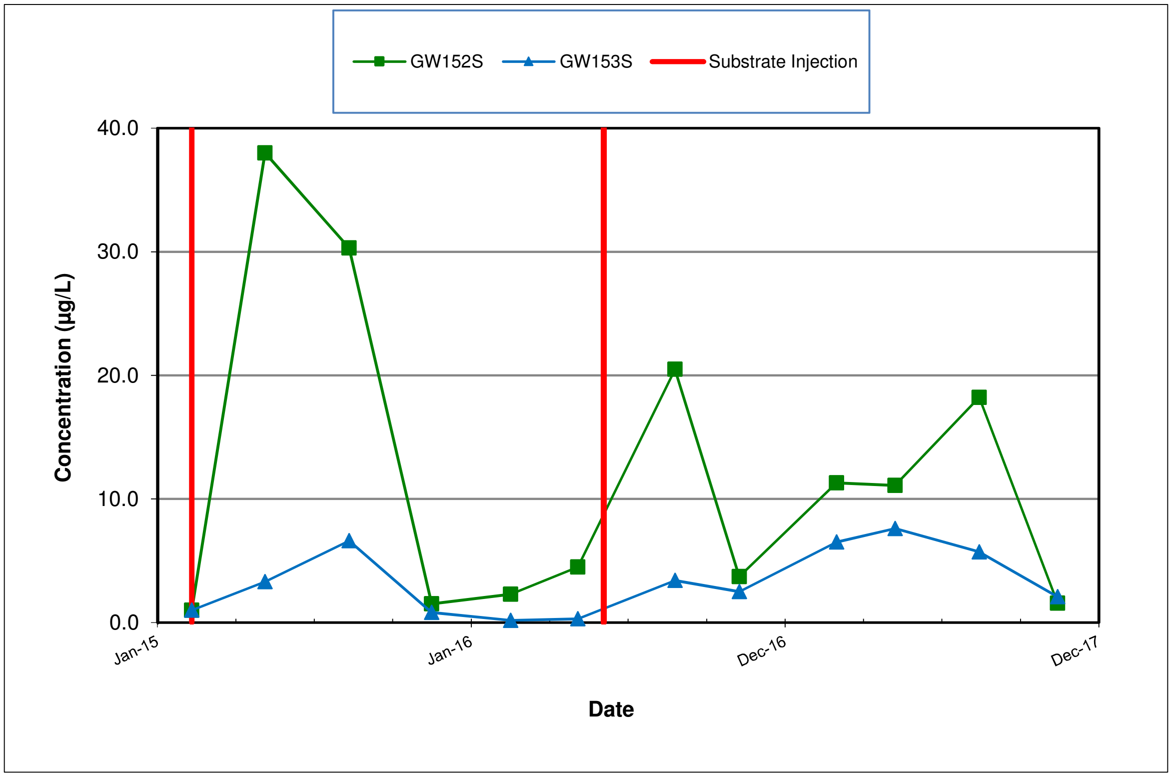


Note: non-detected values shown at one-half the reporting limit

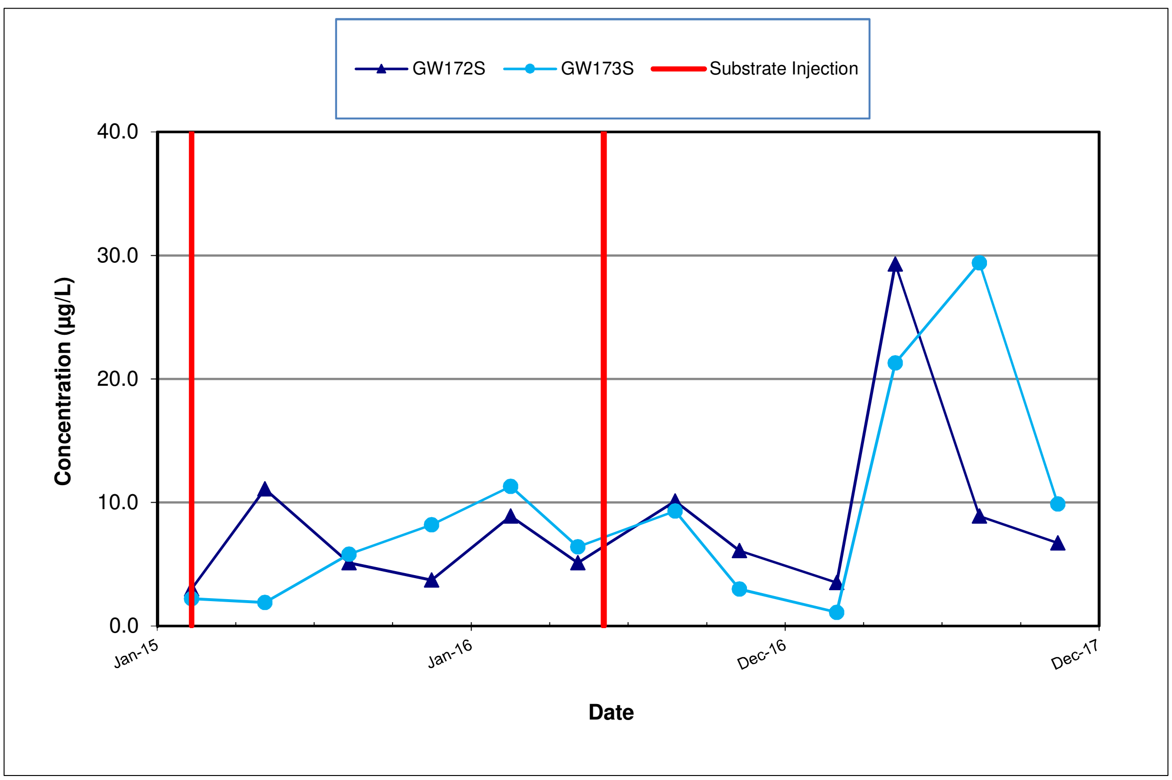
DOWNGRADIENT PLUME AREA WELL GW173S

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

amec foster wheeler	SWMU-172 AND SWMU-174 TREND PLOTS FOR DOWNGRADIENT PLUME AREA WELLS GW172S AND GW173S Boeing Renton Facility Renton, Washington	Project No. 8888 Figure 3



TOTAL ARSENIC IN SOURCE AREA WELLS

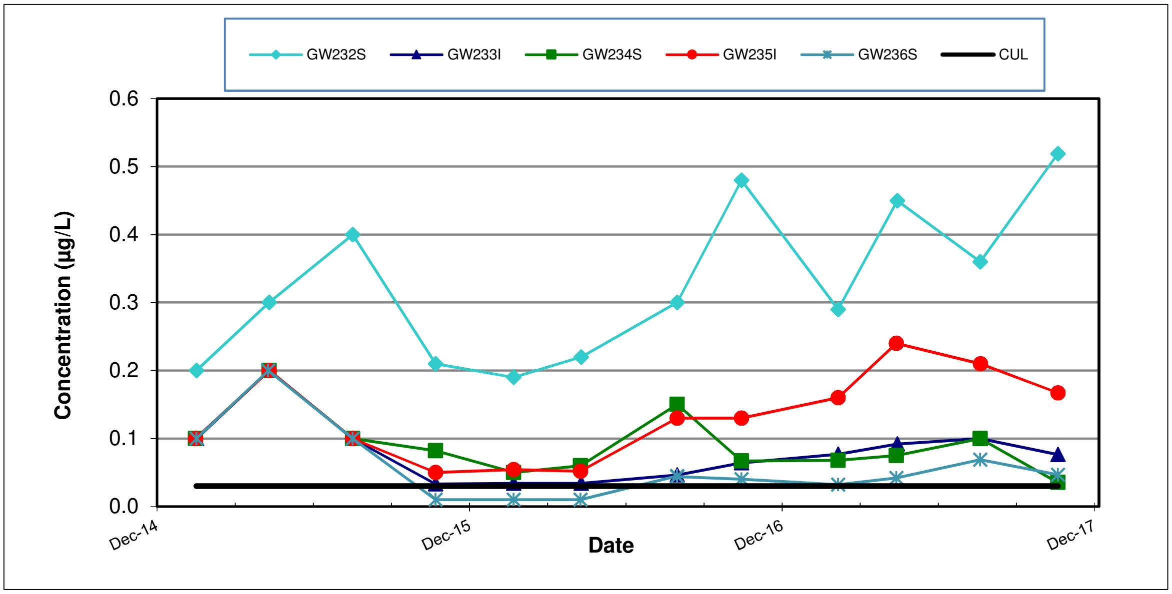


TOTAL ARSENIC IN DOWNGRADIENT PLUME AREA WELLS

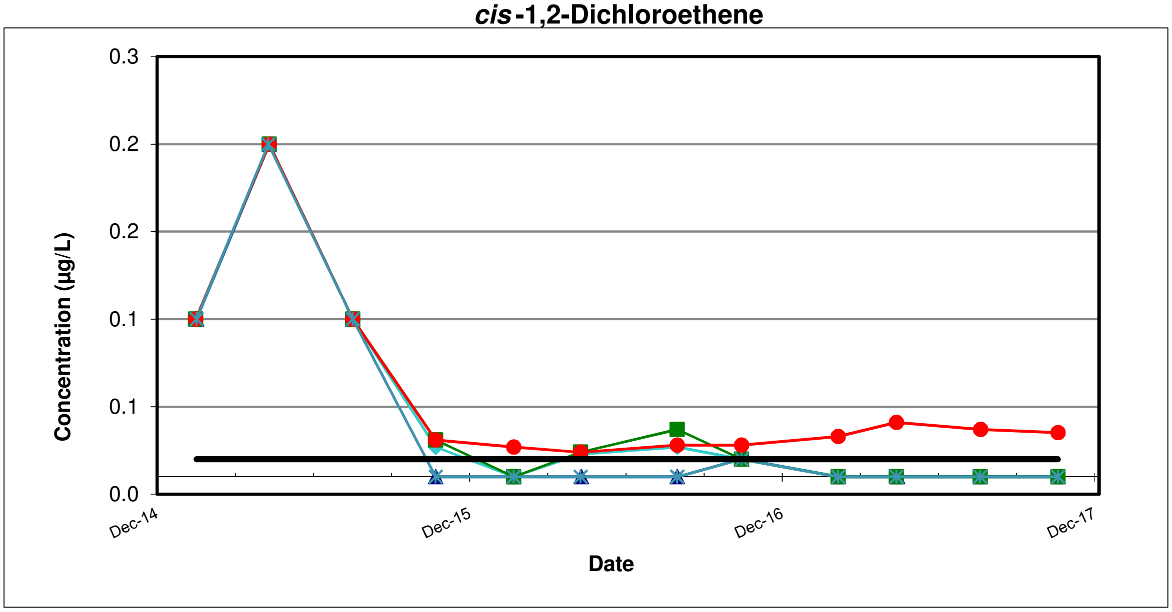
Note: non-detected values shown at one-half the reporting limit

amec foster wheeler	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 4

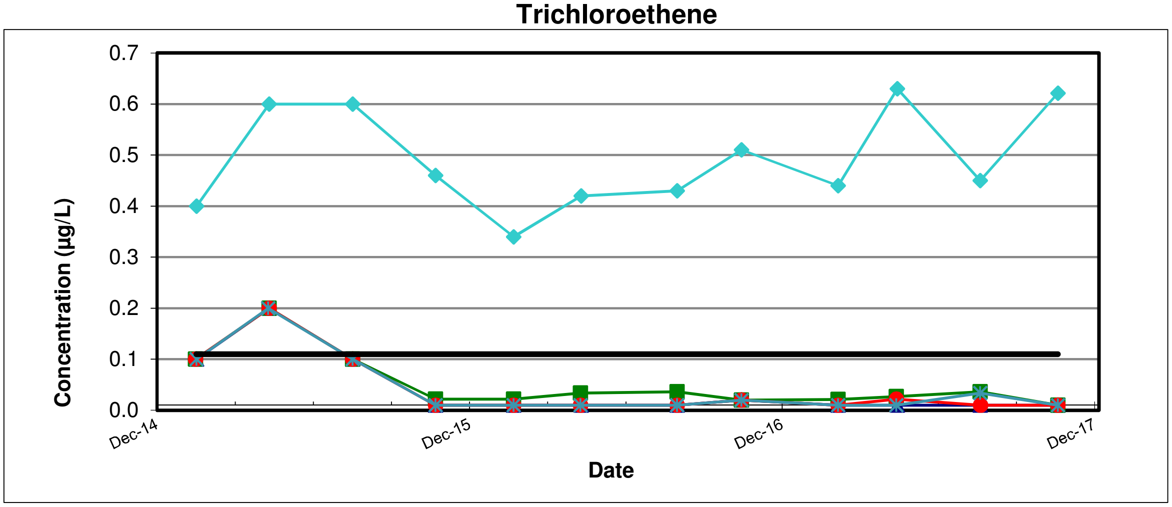
P:\8888 - Boeing Renton\02 Data Management\Grapher and Excel Figure Files\excel\Figures 3 & 4_ SWMU_172-174 Trend Plots.xls



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



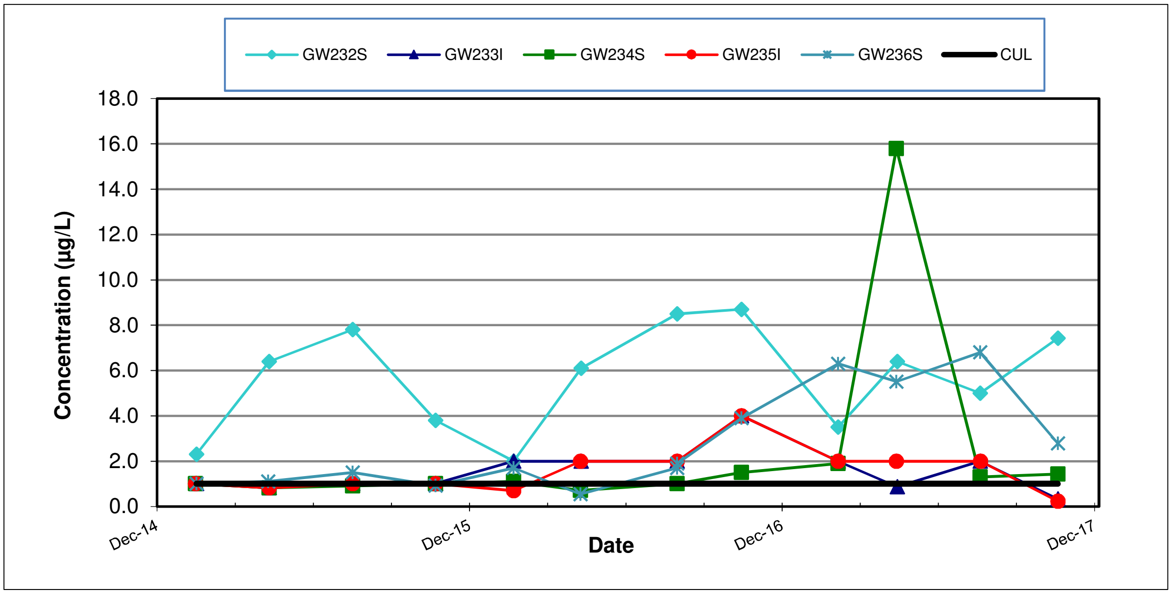
Trichloroethene



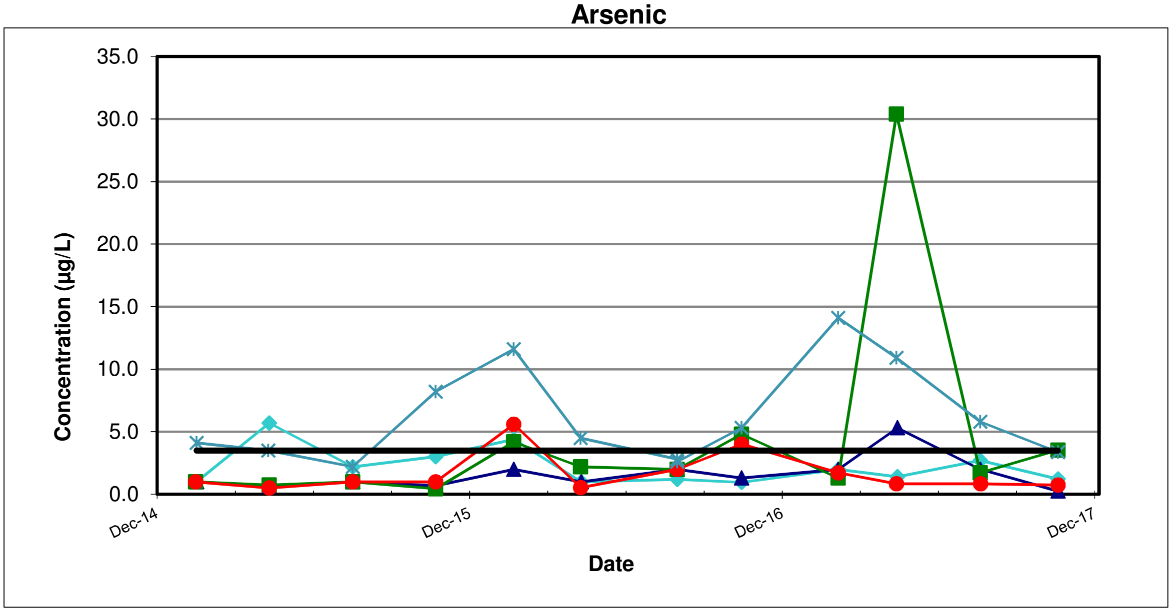
Vinyl Chloride

amec foster wheeler	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 5

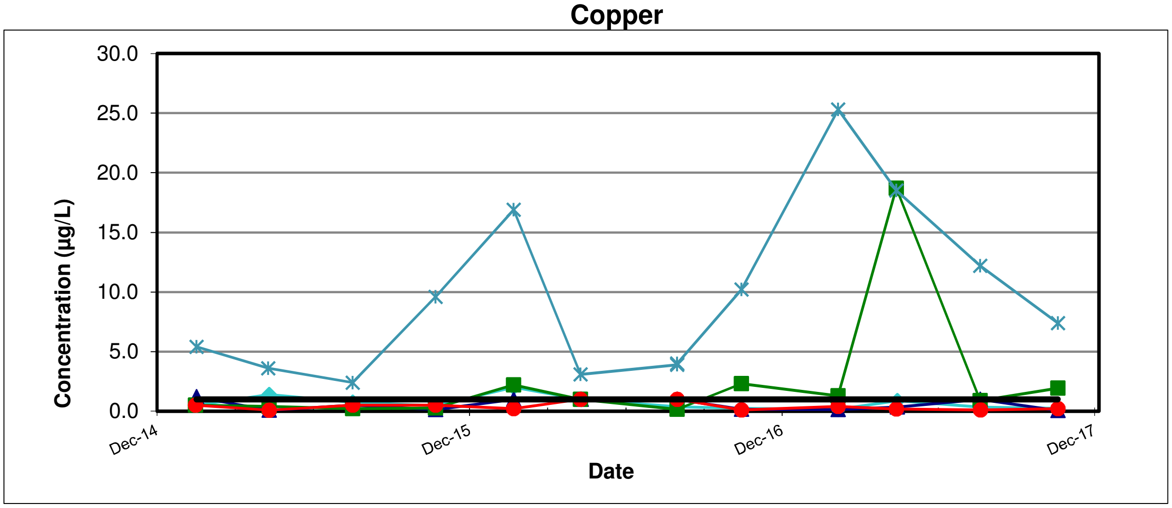
P:\8888 - Boeing Renton\02 Data Management\Grapher and Excel Figure Files\excel\Figures 3 & 4_ SWMU_172-174 Trend Plots.xls



Arsenic



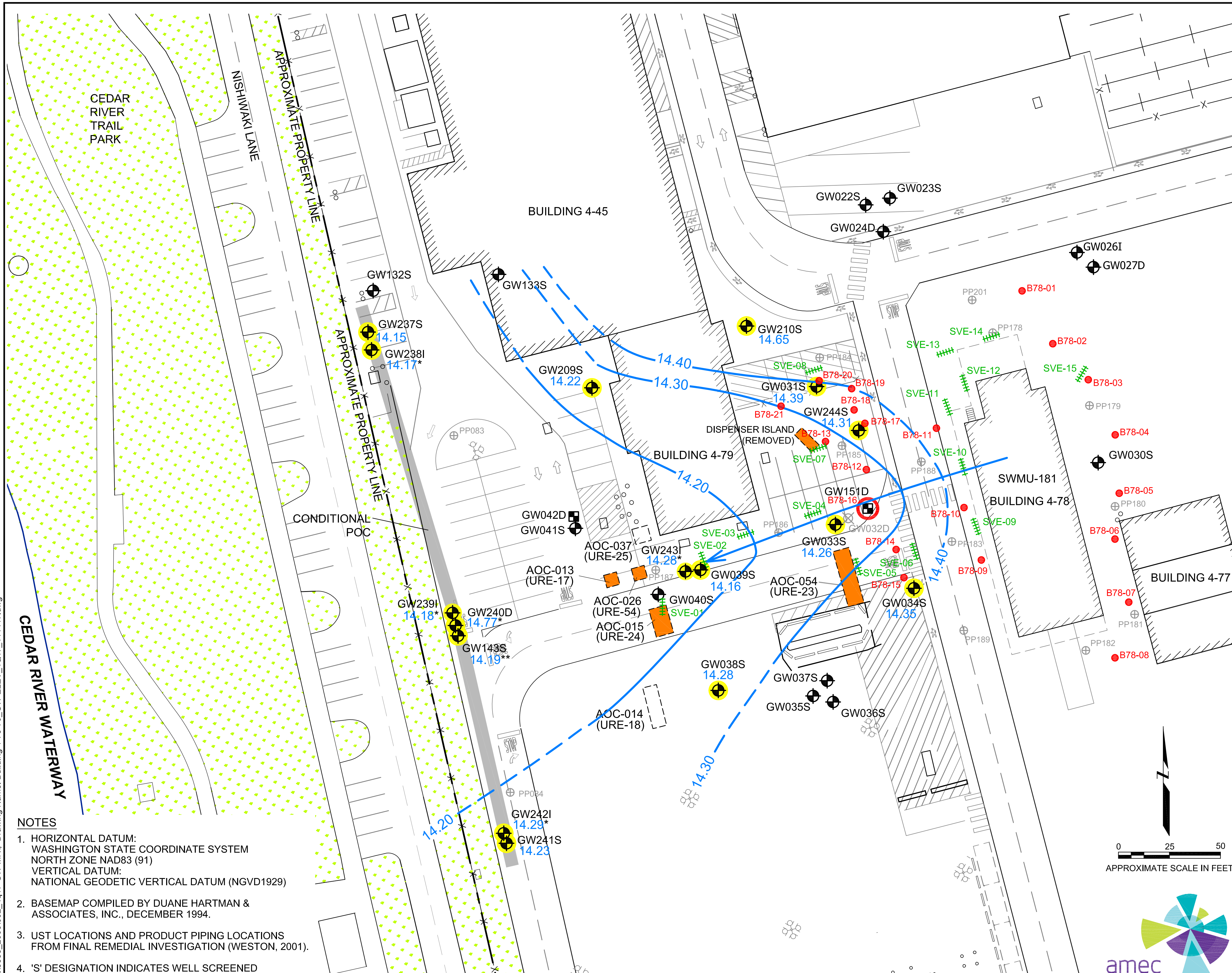
Copper



Lead

amec foster wheeler	SWMU-172 AND SWMU-174 TREND PLOTS FOR ARSENIC, COPPER AND LEAD IN CPOC WELLS Boeing Renton Facility Renton, Washington	Project No. 8888 Figure 6

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



LEGEND

GW031S 14.39	MONITORING WELL LOCATION WITH GROUNDWATER ELEVATION (NGVD-FEET)
*	WELL SCREENED IN LOWER PORTION OF AQUIFER, SO WATER LEVEL IS NOT USED FOR CONTOURING.
**	WATER LEVEL IS ANOMALOUS, NOT USED FOR CONTOURING.
14.30	GROUNWATER ELEVATION CONTOUR (IN FEET) (DASHED WHERE INFERRED)
	GENERAL DIRECTION OF GROUNDWATER FLOW
GW042D	EXTRACTION WELL
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
x	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. 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. UST LOCATIONS AND PRODUCT PIPING LOCATIONS FROM FINAL REMEDIAL INVESTIGATION (WESTON, 2001).
4. '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.

Plot Date: 02/14/18 - 9:09am, Plotted by: adam.stenberg
Drawing Path: S:\8888_2006\092_4q17-GW-MR\, Drawing Name: Building 4-78-79_GW-ELEV_4Q17_111417.dwg

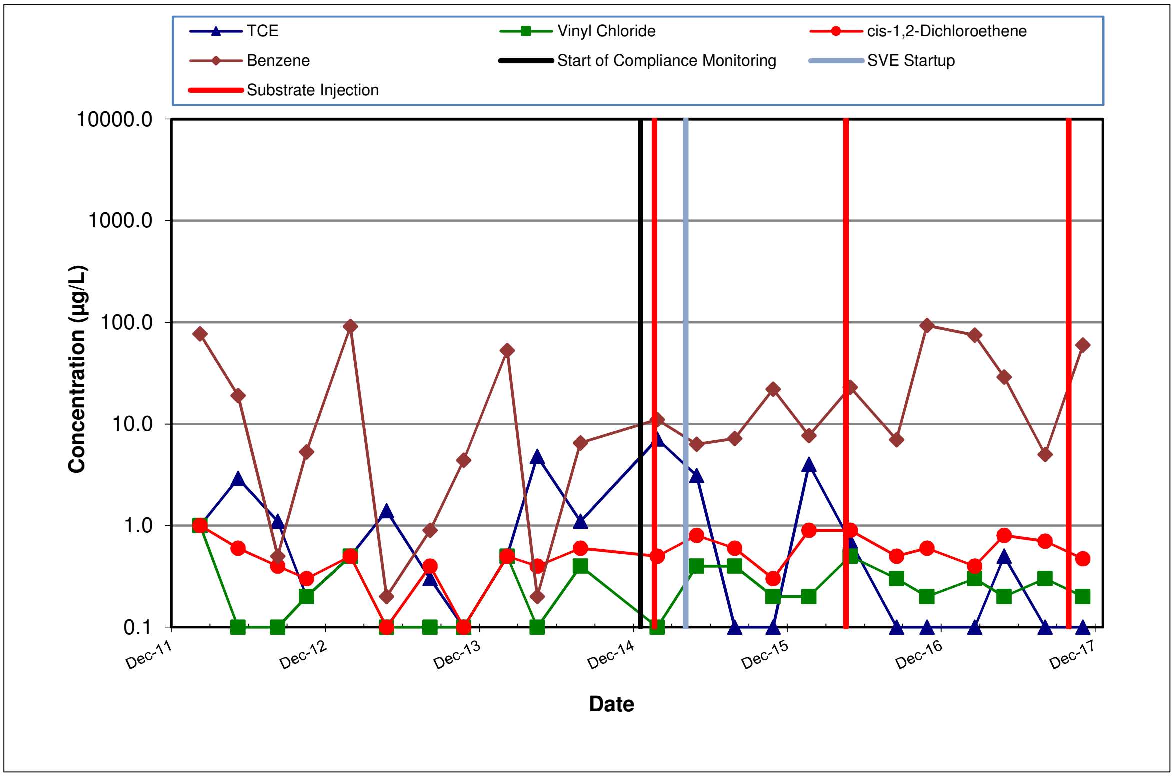
BOEING

amec foster wheeler

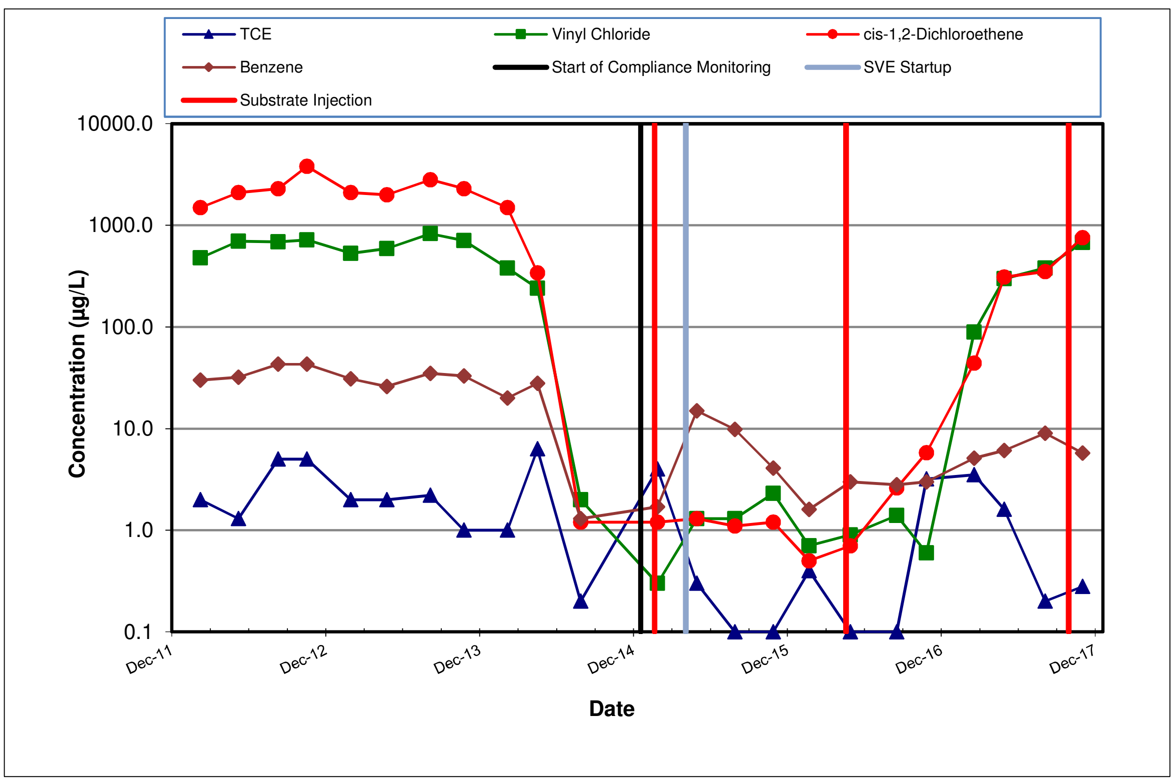
BUILDING 4-78/79 SWMU/AOC GROUP MONITORING WELL LOCATIONS AND GROUNDWATER ELEVATIONS NOVEMBER 13 AND 14, 2017

Boeing Renton Facility
Renton, Washington

By: APS	Date: 02/14/18	Project No. 8888
Amec Foster Wheeler Environment & Infrastructure, Inc.		Figure 7



SOURCE AREA WELL GW031S

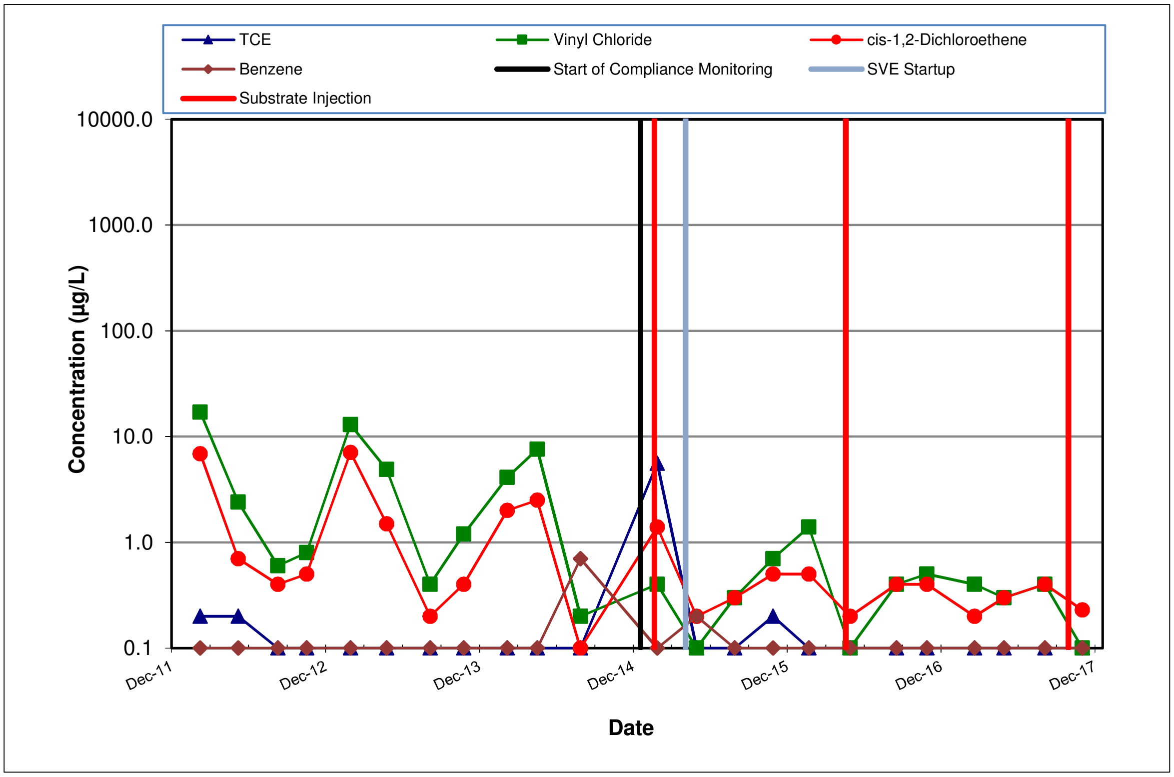


Note: non-detected values shown at one-half the reporting limit

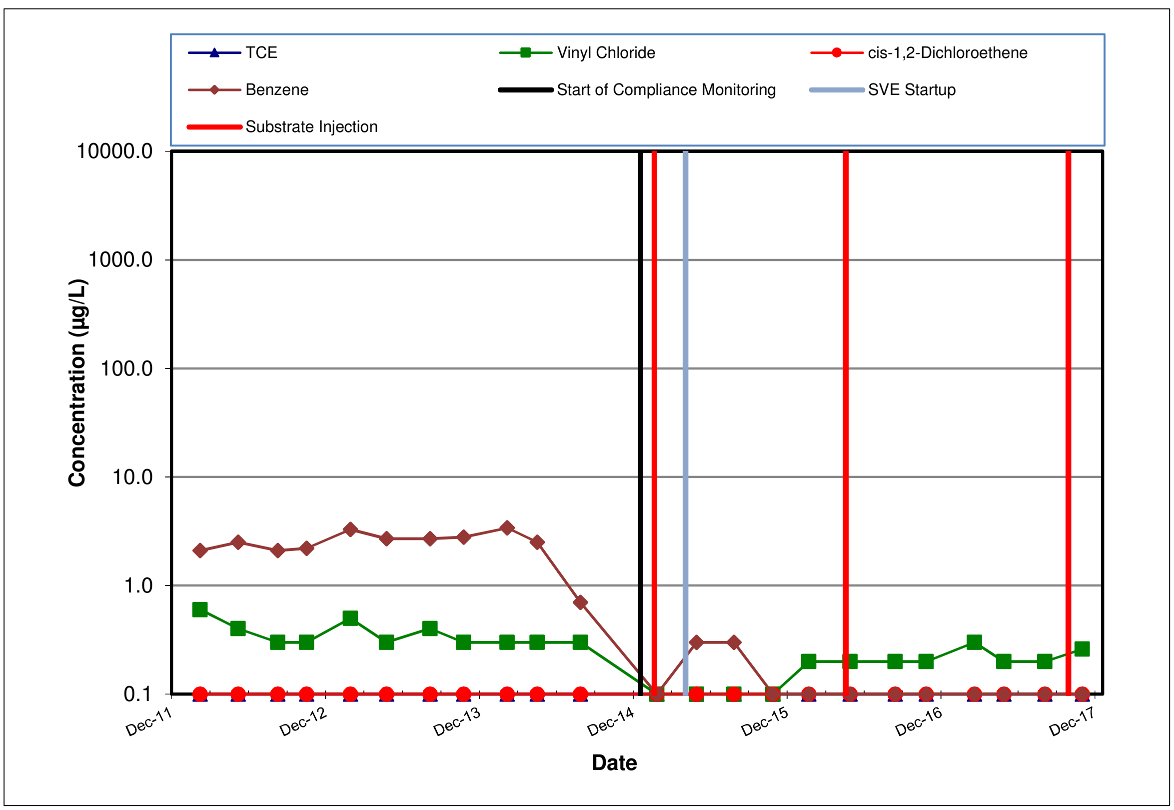
SOURCE AREA WELL GW033S

amec foster wheeler	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 8

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

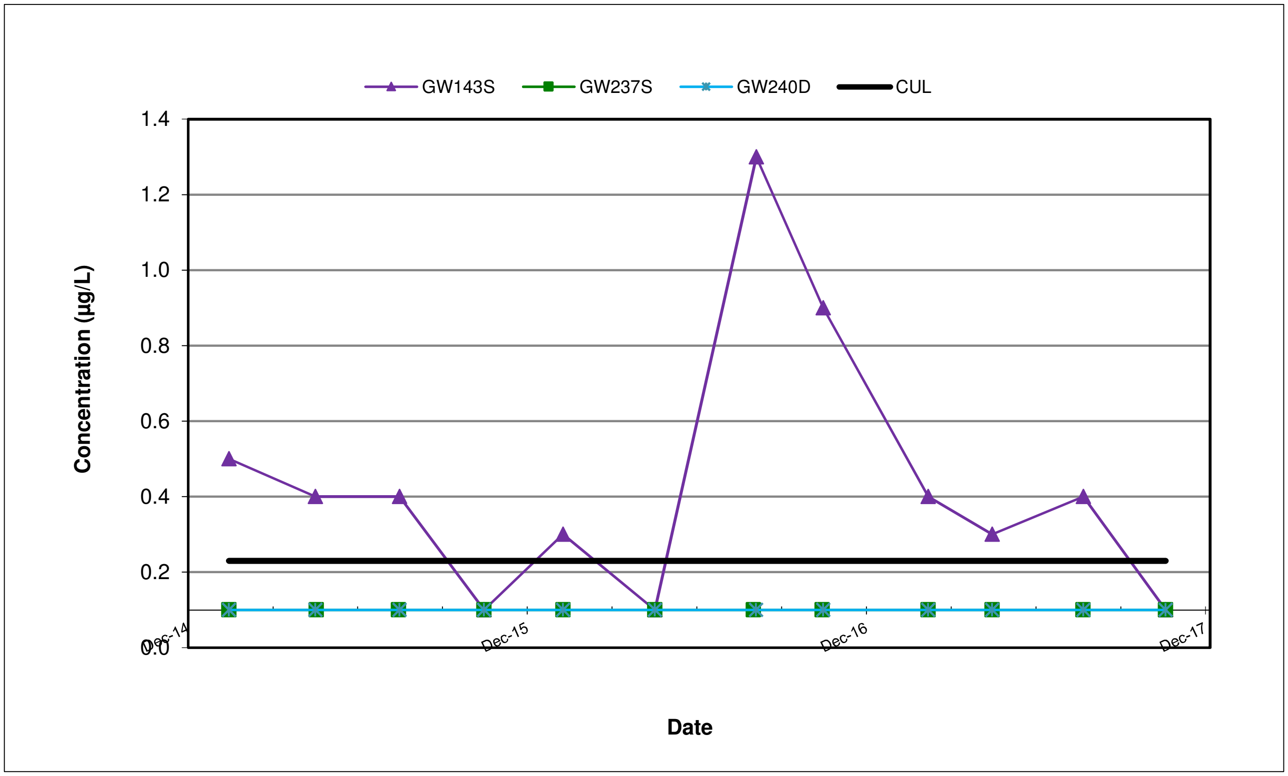


Note: non-detected values shown at one-half the reporting limit

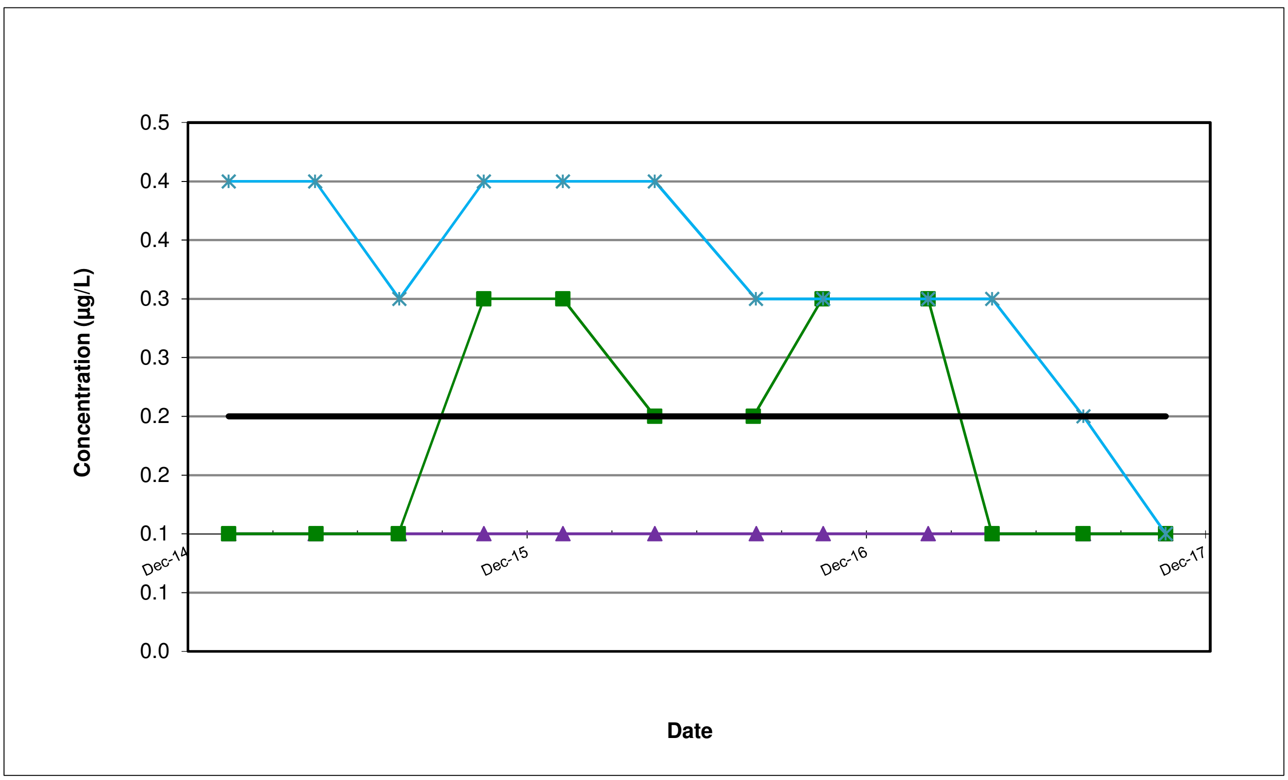
DOWNGRADIENT PLUME AREA WELL GW209S

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

amec foster wheeler	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 9



Trichloroethene

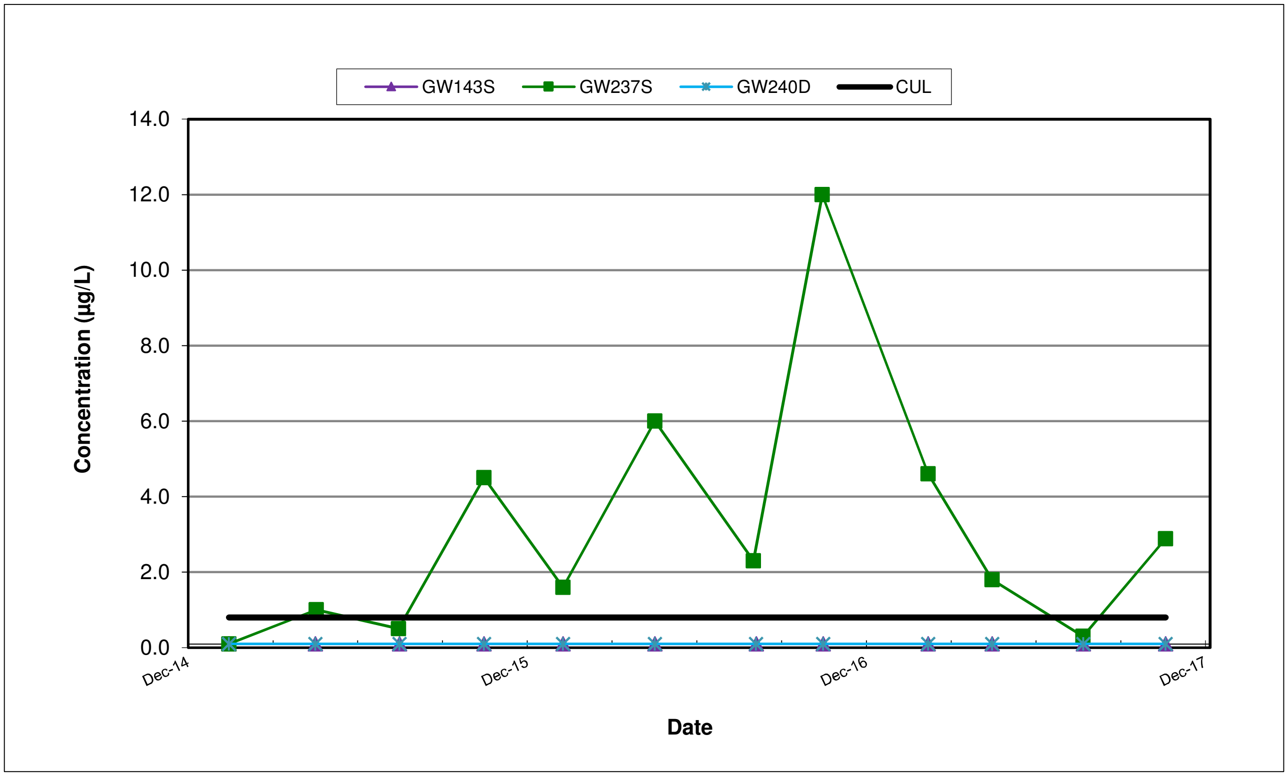


non-detected values shown at one-half the reporting limit

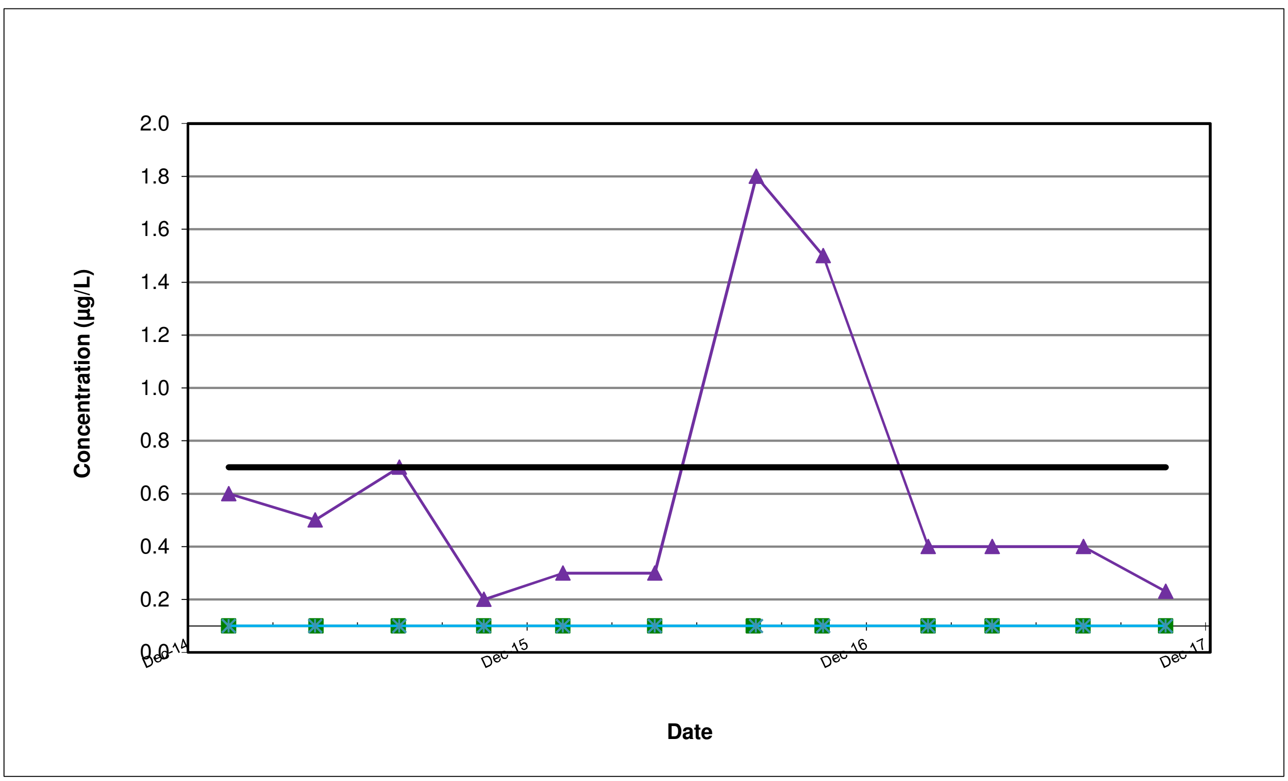
Vinyl Chloride

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

amec foster wheeler	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 10



Benzene

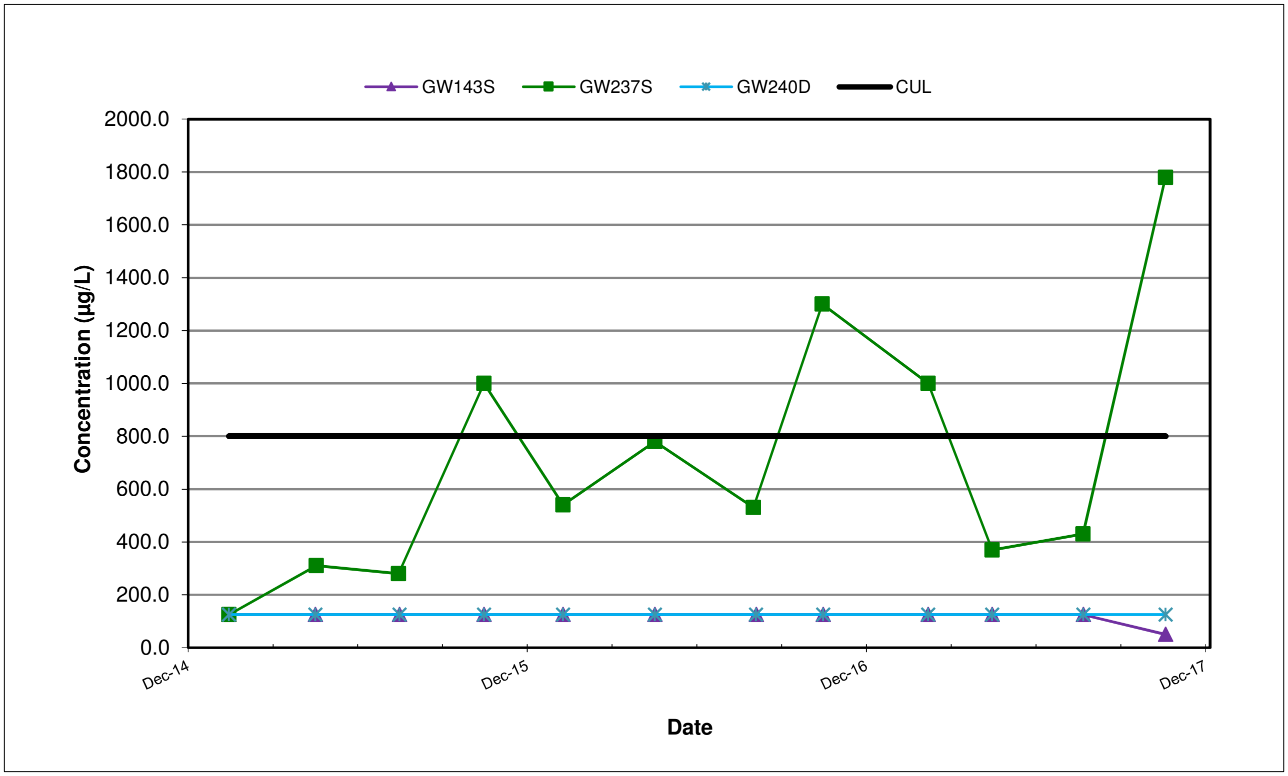


non-detected values shown at one-half the reporting limit

cis-1,2-Dichloroethene

amec foster wheeler	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

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



TPH as Gasoline

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

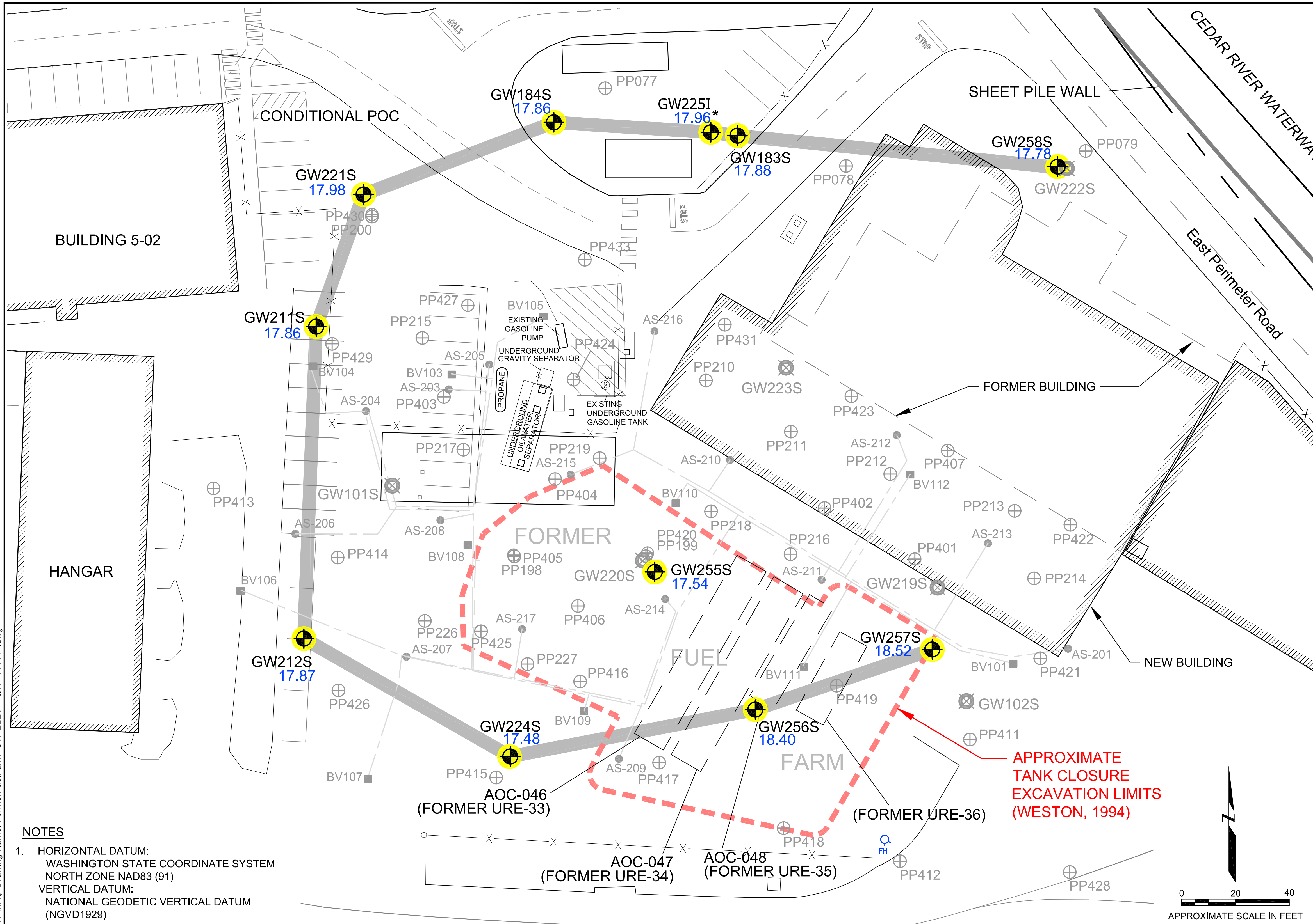
amec foster wheeler

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
12

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



LEGEND

- GW184S 17.86 — MONITORING WELL LOCATION WITH GROUNDWATER ELEVATION (NGVD-FEET)
- * WELL SCREENED IN LOWER PORTION OF AQUIFER, SO WATER LEVEL IS NOT USED FOR CONTOURING.
- PP042 — PUSH PROBE LOCATION
- GW222S — ABANDONED GROUNDWATER MONITORING WELL
- AS-204 — FORMER UNDERGROUND AIR SPARGING WELL
- BV112 — FORMER UNDERGROUND BIOVENTING WELL
- FORMER UNDERGROUND BIOVENTING LINE
- FORMER UNDERGROUND AIR SPARGING 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. PUSH-PROBE LOCATIONS FROM FINAL REMEDIAL INVESTIGATION REPORT (WESTON, 2001).
4. PIPING LOCATIONS APPROXIMATE.
5. 'S' DESIGNATION INDICATES WELL SCREENED LESS THAN 20 FEET IN DEPTH.
   'I' DESIGNATION INDICATES WELL SCREENED GREATER THAN 20 FEET IN DEPTH.

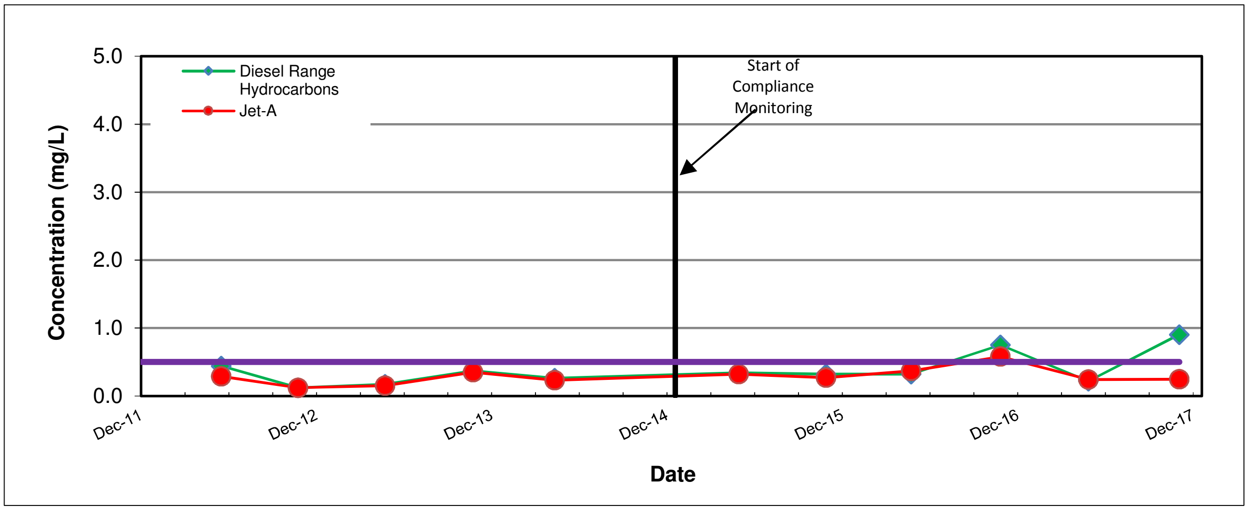
Plot Date: 01/30/18 - 3:32pm, Plotted by: adam.stenberg
Drawing Path: S:\8888_2006\092_4q17-GW-MR\, Drawing Name: FormerFuelFarm_GW-ELEV_4Q17_111417.dwg

BOEING

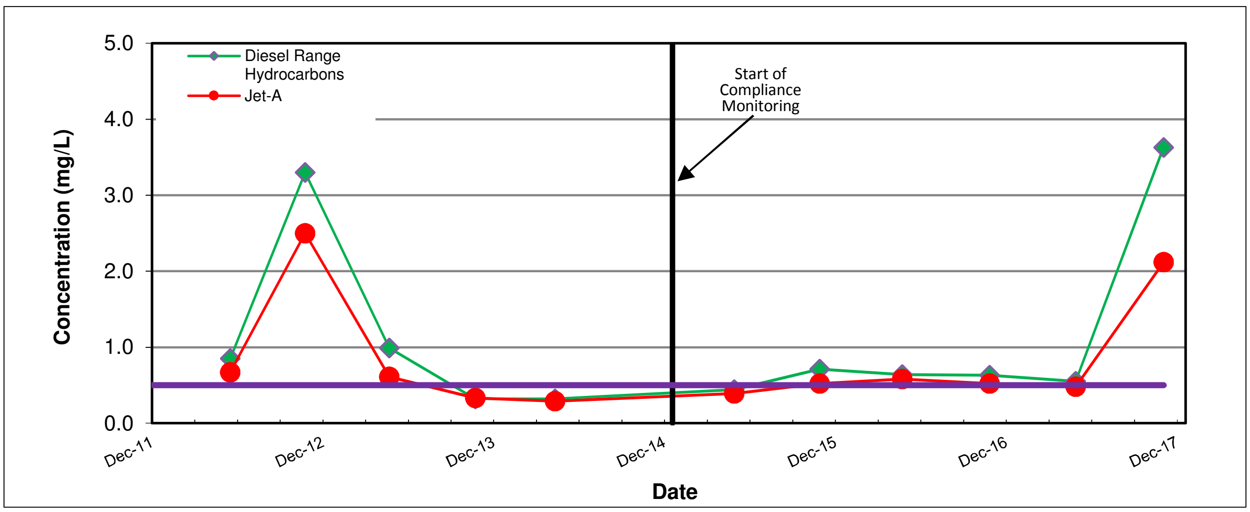
amec foster wheeler

FORMER FUEL FARM AOC GROUP
MONITORING WELL LOCATIONS
AND GROUNDWATER ELEVATIONS
NOVEMBER 14, 2017
Boeing Renton Facility
Renton, Washington

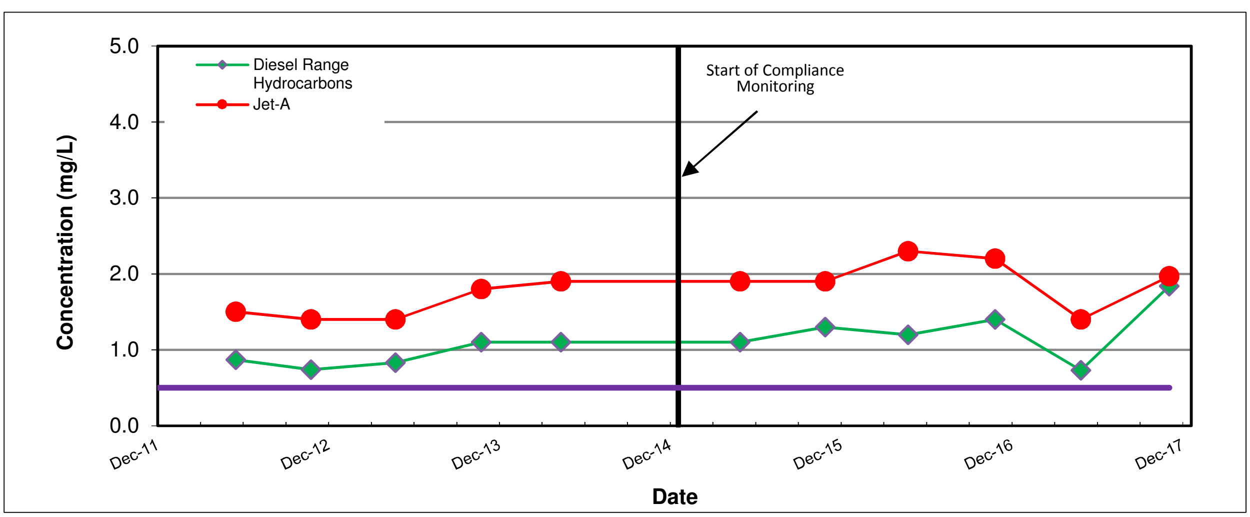
By: APS	Date: 01/30/18	Project No. 8888
Amec Foster Wheeler Environment & Infrastructure, Inc.		Figure 13



CPOC WELL GW211S



CPOC WELL GW221S



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

CPOC WELL GW224S

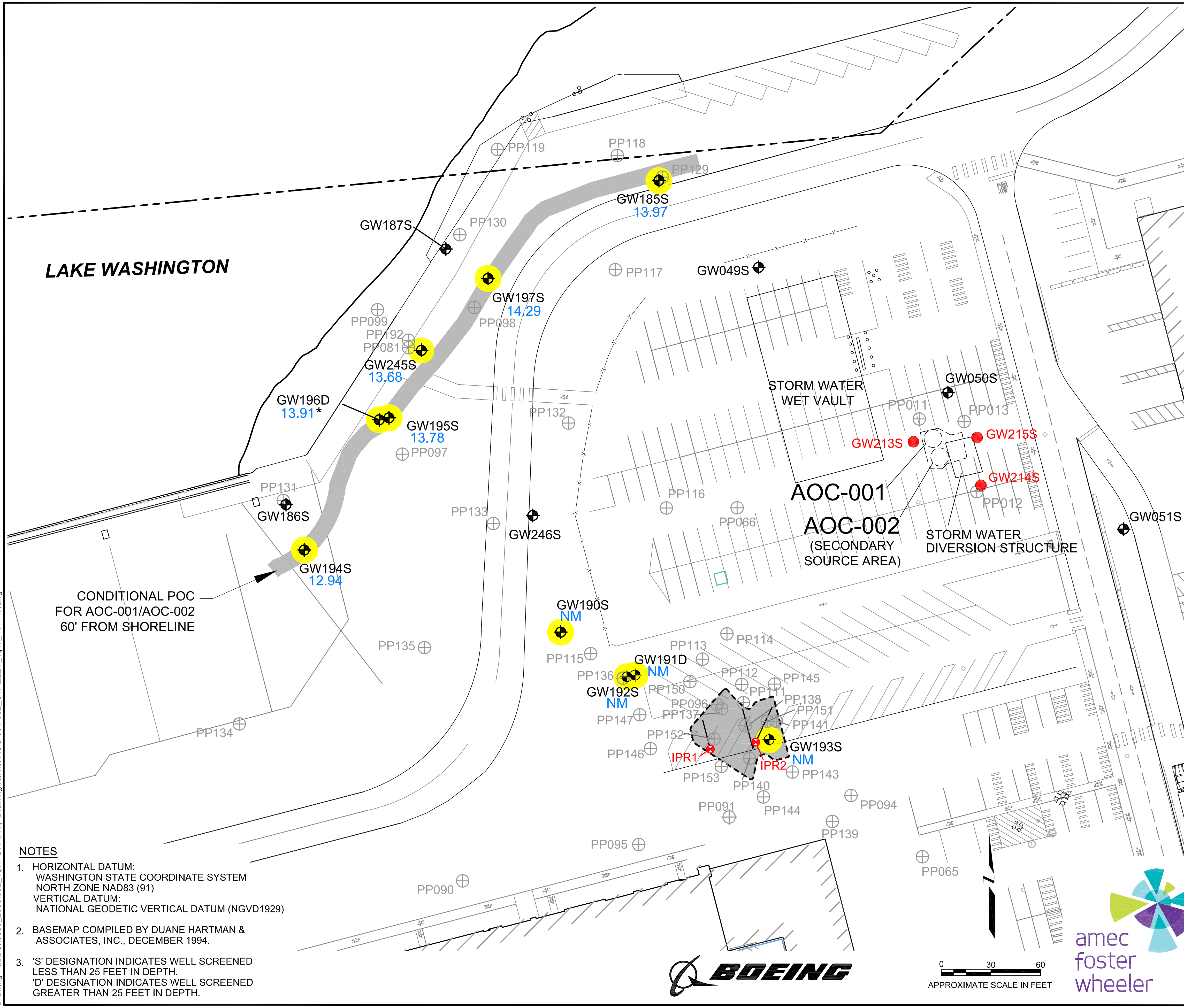
amec foster wheeler

FORMER FUEL FARM AOC GROUP TREND PLOTS
FOR CPOC WELLS GW211S, GW221S, AND GW224S
Boeing Renton Facility
Renton, Washington

Project No.
8888

Figure
14

P:\8888 - Boeing Renton\02 Data Management\Grapher and Excel Figure Files\excel\Fig 10 FFF CPOC trends.xls



LEGEND

GW195S 13.78	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.
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.

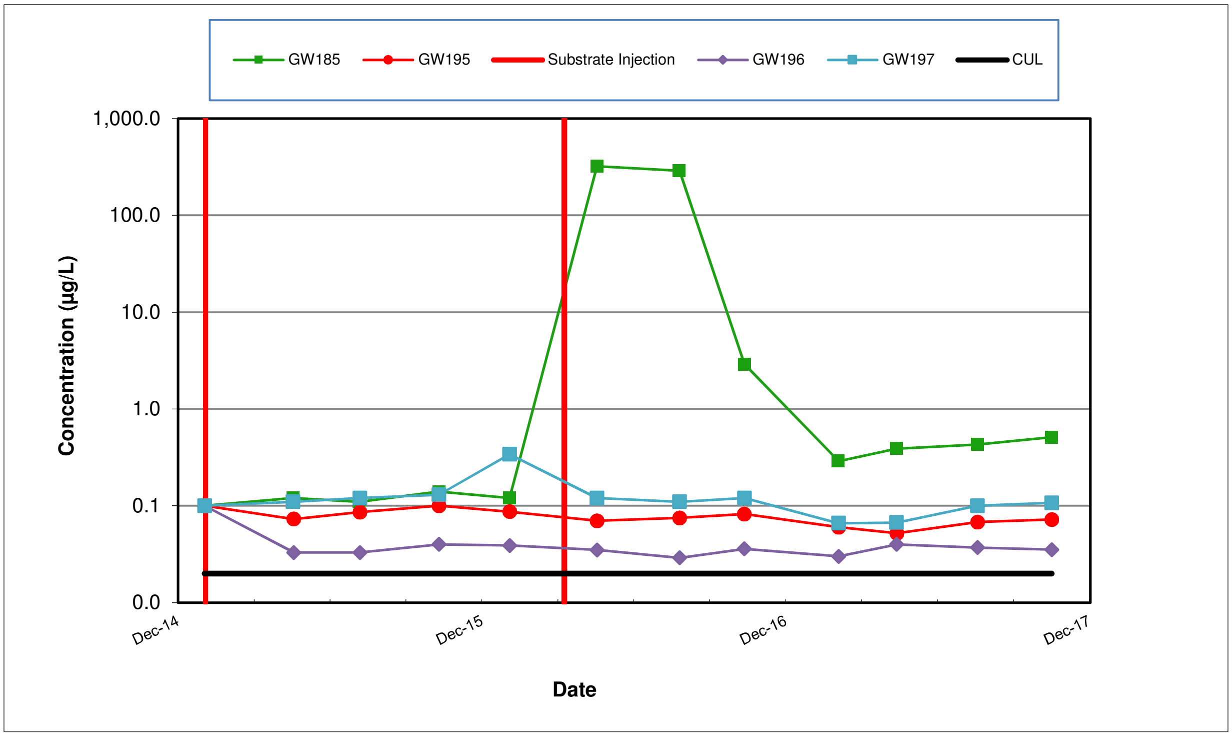
Plot Date: 02/14/18 - 9:30am, Plotted by: adam.stenberg
Drawing Path: S:\8888_2006\092_4q17-GW-MR\, Drawing Name: AOC-001-002_GW-ELEV_4q17_111417.dwg

BOEING

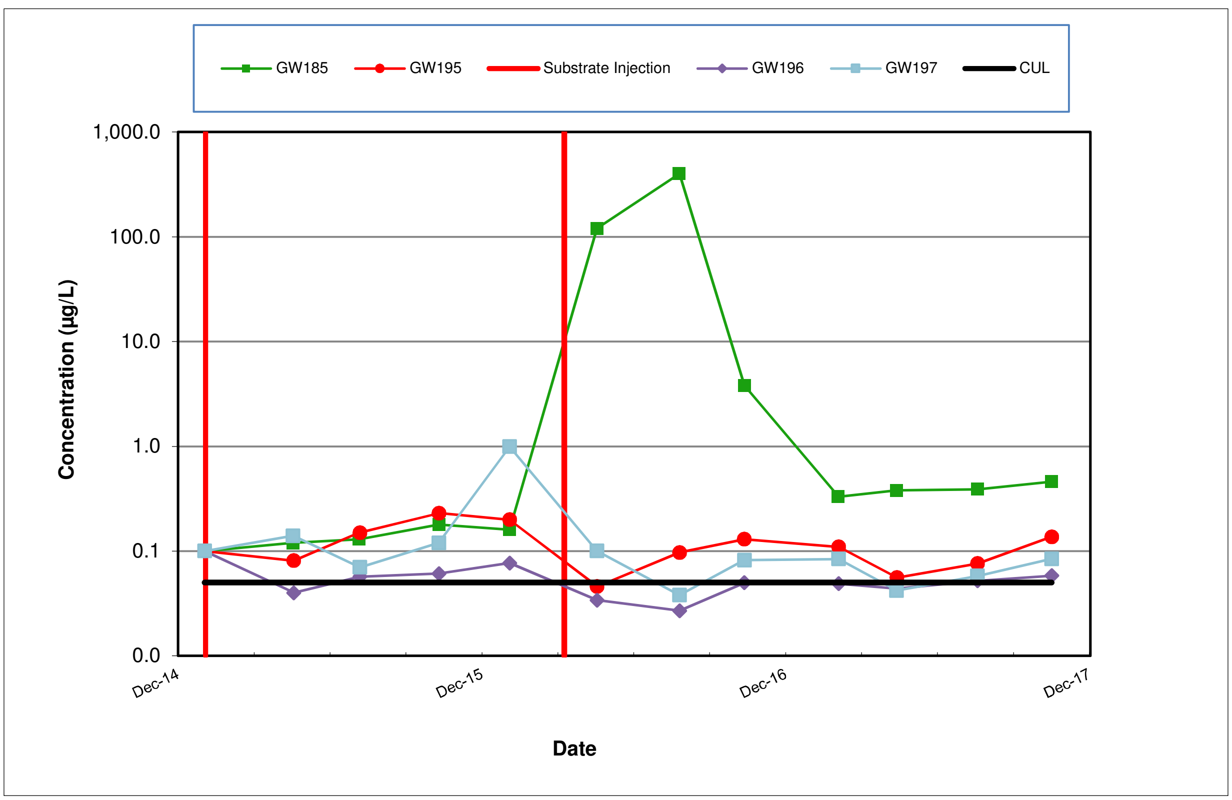
amec foster wheeler

AOC-001 AND AOC-002
MONITORING WELL LOCATIONS
AND GROUNDWATER ELEVATIONS
NOVEMBER 14, 2017
Boeing Renton Facility
Renton, Washington

By: APS	Date: 02/14/18	Project No. 8888
Amec Foster Wheeler Environment & Infrastructure, Inc.		Figure 15



cis-1,2-Dichloroethene

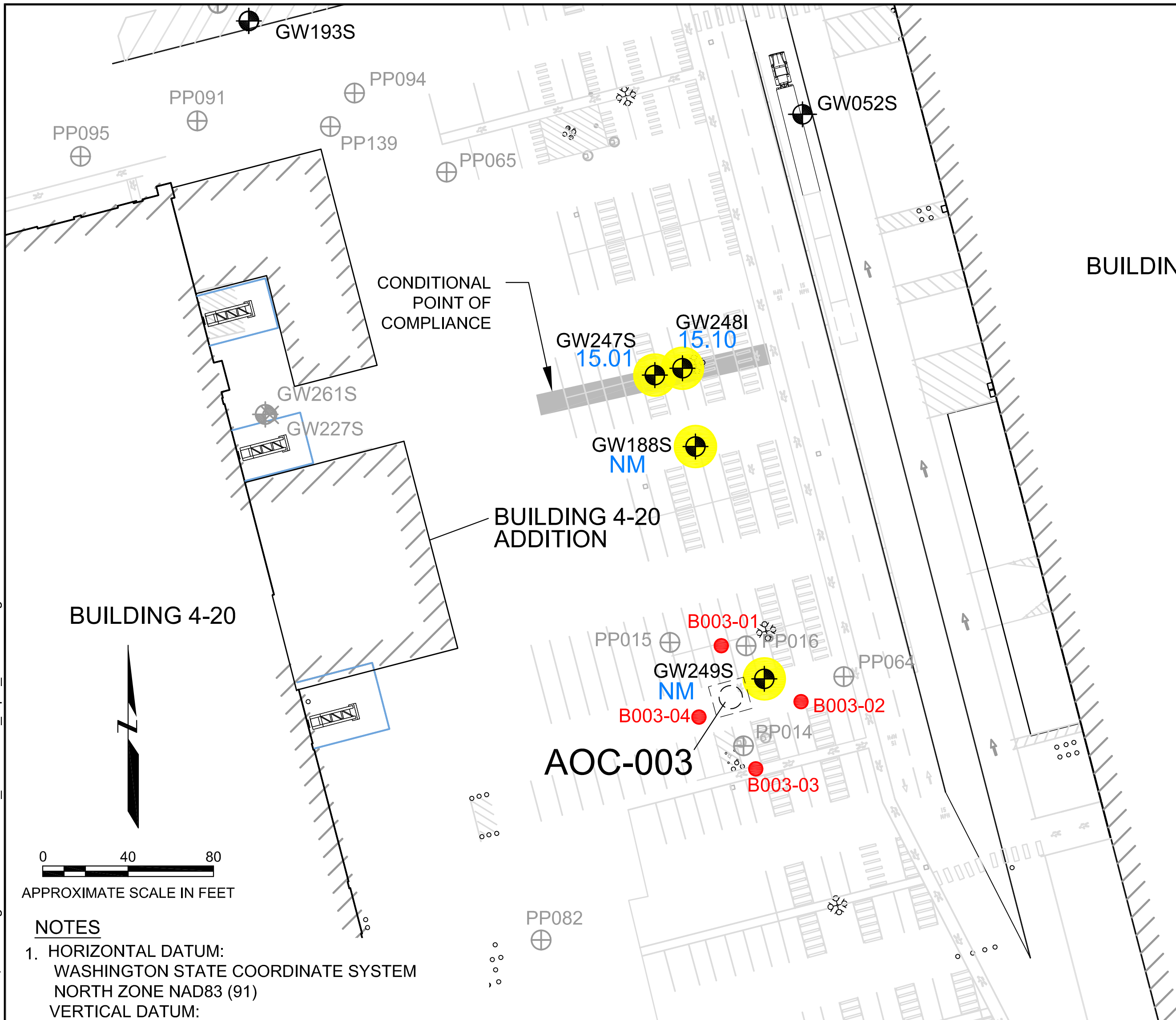


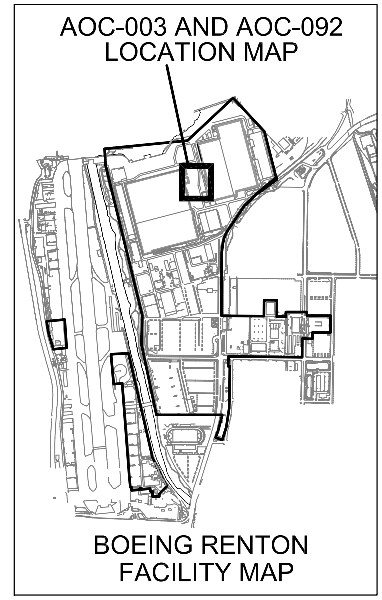
Vinyl Chloride

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

amec foster wheeler	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 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





LEGEND

GW247S 15.01	AOC-003 MONITORING WELL LOCATION WITH GROUNDWATER ELEVATION (NGVD-FEET)
NM	NOT MEASURED
GW261S	FORMER 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.

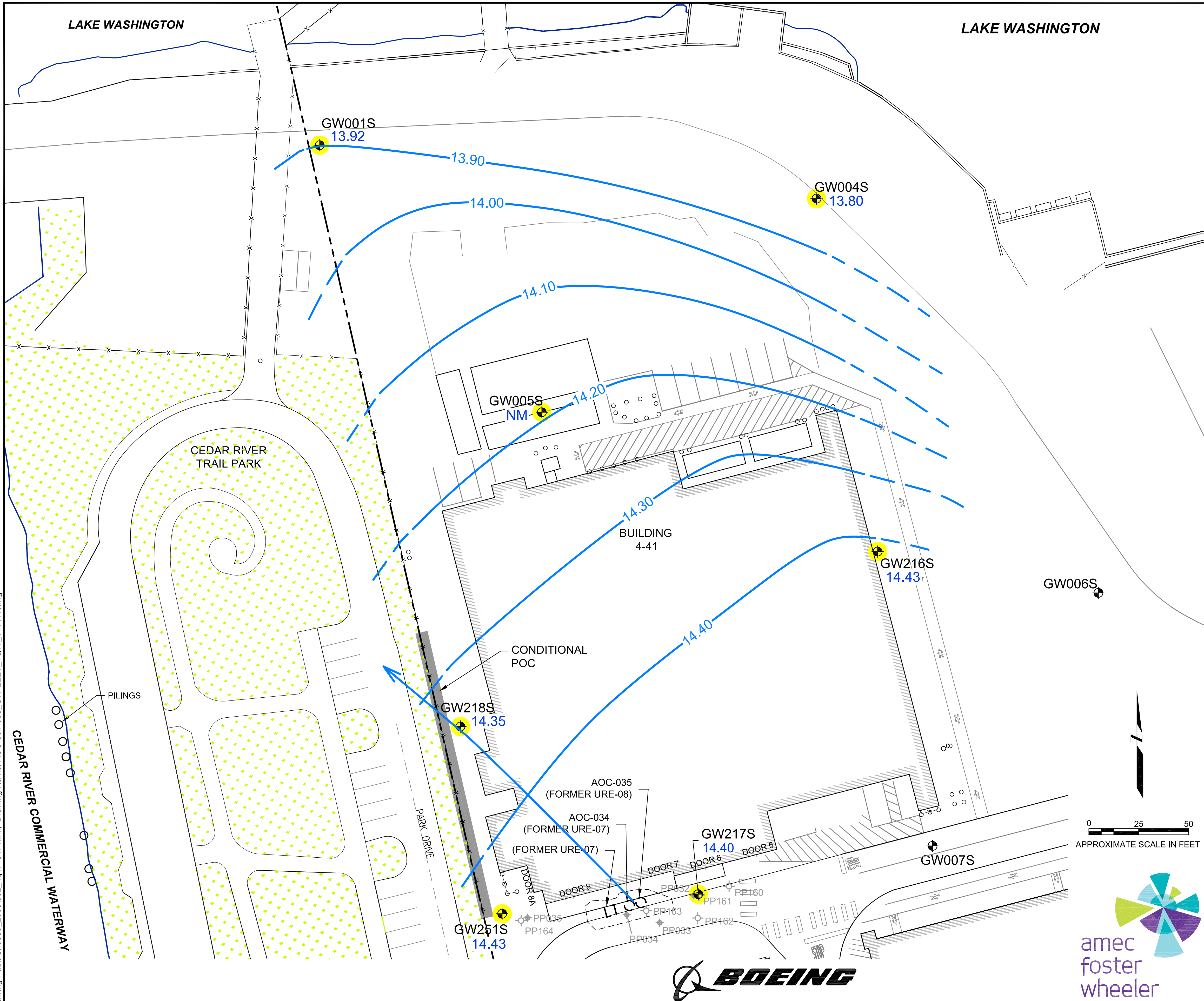
BOEING

amec foster wheeler

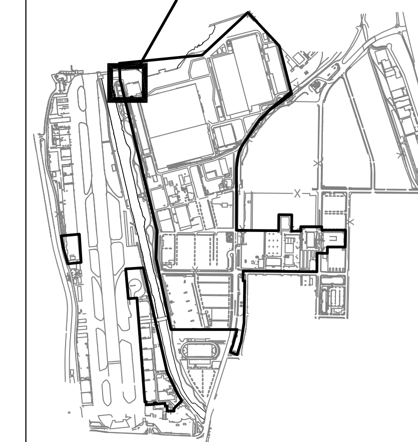
AOC-003
MONITORING WELL LOCATIONS AND GROUNDWATER ELEVATIONS
NOVEMBER 14, 2017
Boeing Renton Facility
Renton, Washington

By: APS	Date: 01/30/18	Project No. 8888
Amec Foster Wheeler Environment & Infrastructure, Inc.		Figure 17

Plot Date: 01/30/18 - 3:36pm, Plotted by: adam.stenberg
Drawing Path: S:\8888_2006\092_4q17-GW-MRI, Drawing Name: AOC-003_GW-ELEV_4q17_111417.dwg



AOC-034 and AOC-035
LOCATION MAP



BOEING RENTON
FACILITY MAP

LEGEND

GW218S 14.35	MONITORING WELL LOCATION WITH GROUNDWATER ELEVATION (NGVD-FEET)
NM	NOT MEASURED
14.30	GROUNDWATER ELEVATION CONTOUR (CONTOUR INTERVAL: 0.10 FOOT) (DASHED WHERE INFERRED)
	GENERAL DIRECTION OF GROUNDWATER FLOW
	LIMITS OF PREVIOUS EXCAVATION
	FORMER UST LOCATION
	APPROXIMATE PROPERTY LINE
	FENCE
	CONDITIONAL POINT OF COMPLIANCE
HIGHLIGHTED	WELLS INCLUDED IN MONITORING NETWORK
PP162	12/14/2006 PUSH-PROBE SOIL AND GROUNDWATER SAMPLE LOCATION
PP032	HISTORICAL PUSH-PROBE SAMPLE LOCATION

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 24 FEET IN DEPTH.

BOEING

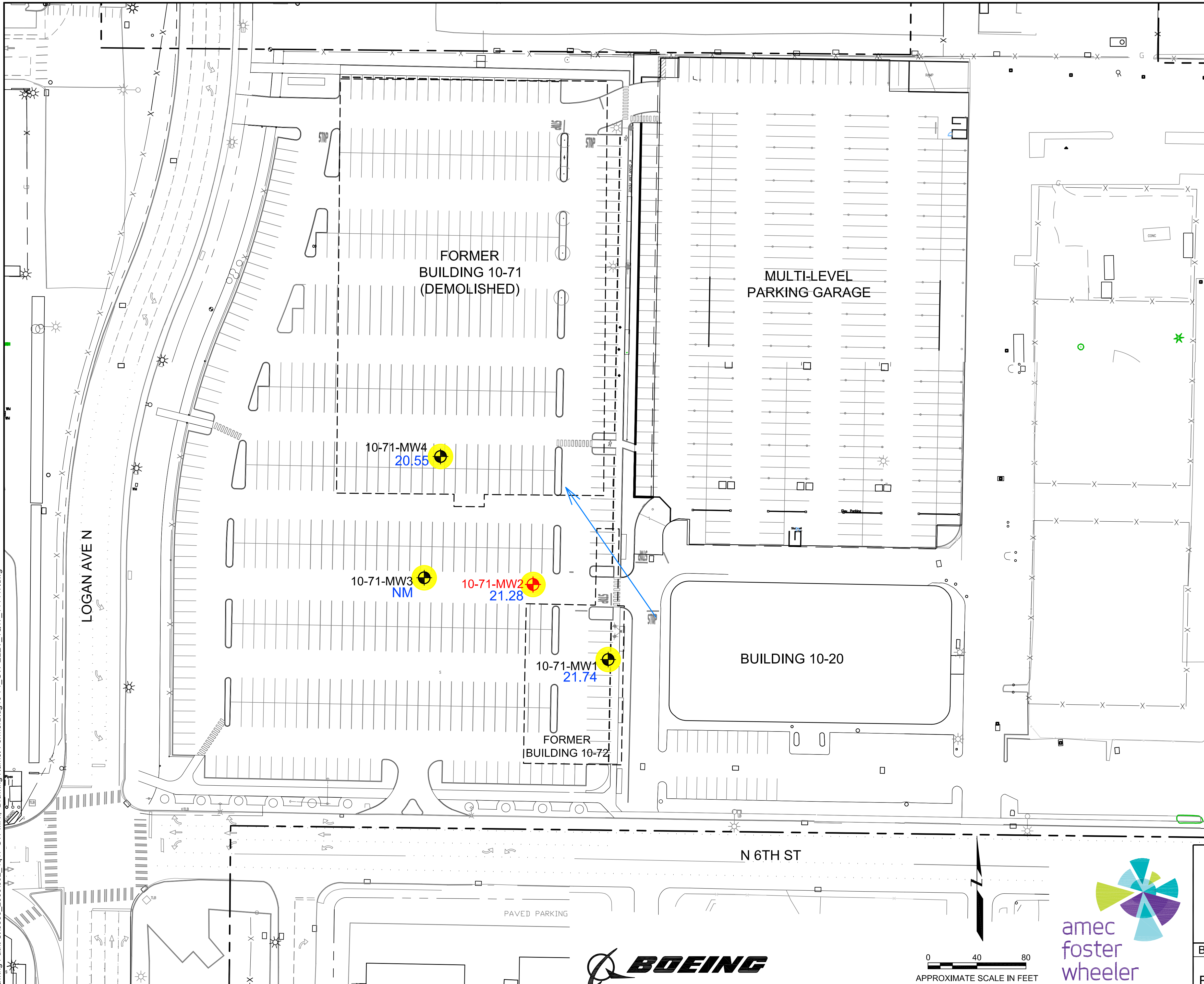
amec foster wheeler

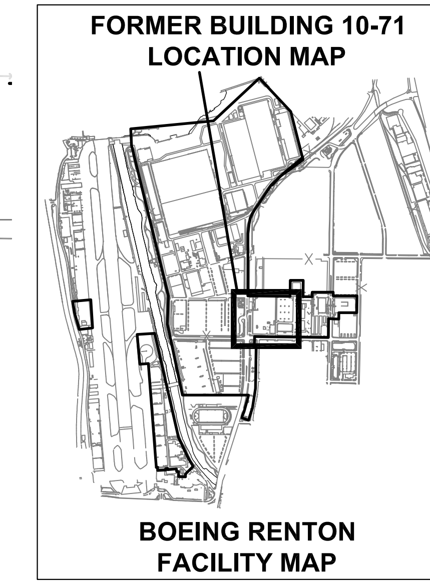
AOC-034 AND AOC-035 MONITORING WELL LOCATIONS AND GROUNDWATER ELEVATIONS NOVEMBER 14, 2017

Boeing Renton Facility
Renton, Washington

By: APS	Date: 01/30/18	Project No. 8888
Amec Foster Wheeler Environment & Infrastructure, Inc.		Figure 18

Plot Date: 01/30/18 - 3:40pm, Plotted by: adam.stenberg
Drawing Path: S:\8888_2006\092_4q17-GW-MR\, Drawing Name: AOC-034-035_GW-ELEV_4Q17_111417.dwg





LEGEND

10-71-MW4 20.55	MONITORING WELL LOCATION GROUNDWATER ELEVATION (NGVD-FT)
NM	NOT MEASURED
	GENERAL DIRECTION OF GROUNDWATER FLOW
10-71-MW2	ELECTRON DONOR INJECTION WELL AND MONITORING WELL LOCATION
	APPROXIMATE PROPERTY LINE
X	FENCE
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.

LOT 20 / FORMER BUILDING 10-71 PARCEL
MONITORING WELL LOCATIONS AND
GROUNDWATER ELEVATIONS
NOVEMBER 14, 2017
Boeing Renton Facility
Renton, Washington

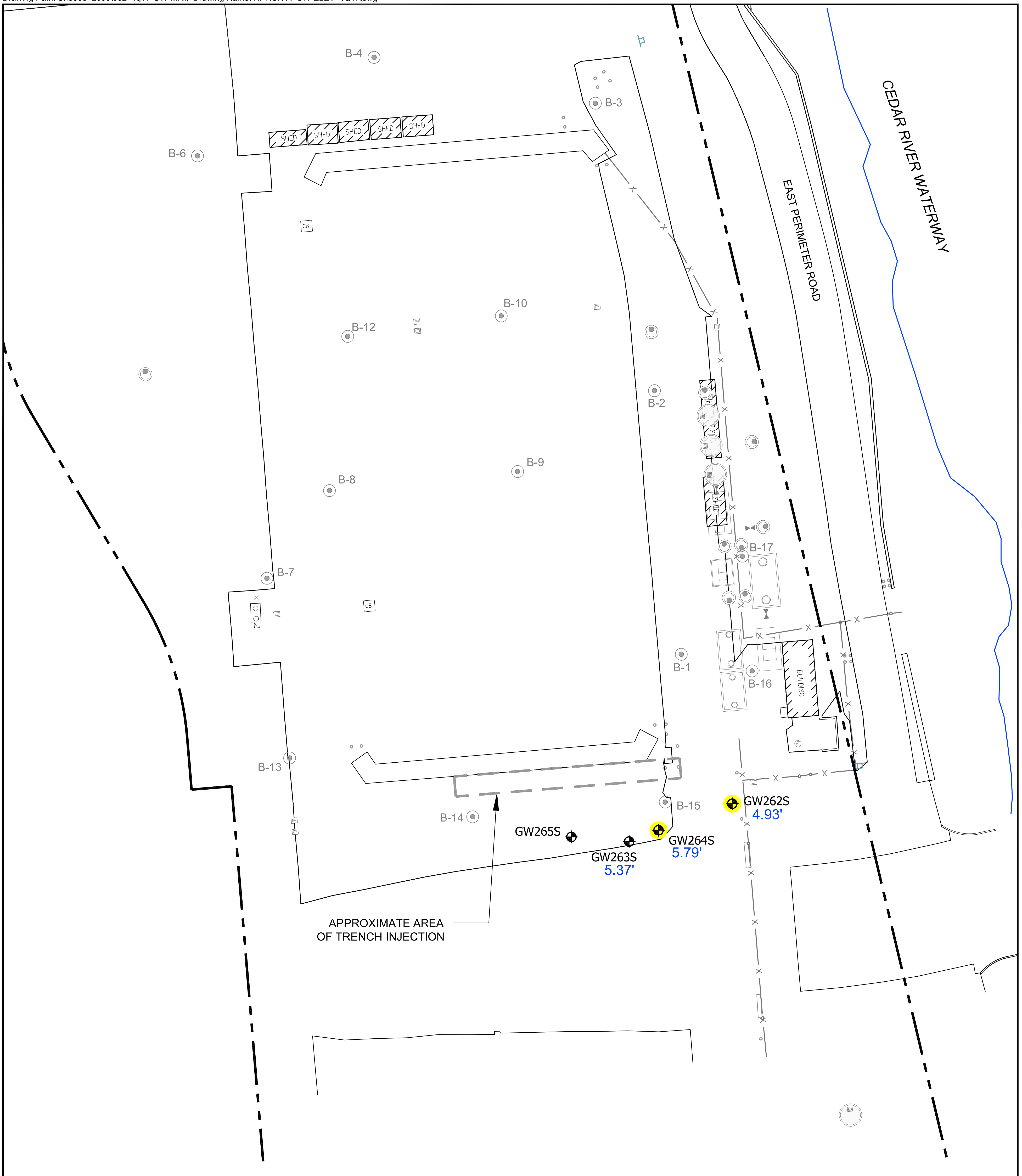
By: APS	Date: 01/30/18	Project No. 8888
Amec Foster Wheeler Environment & Infrastructure, Inc.		Figure 19

BOEING

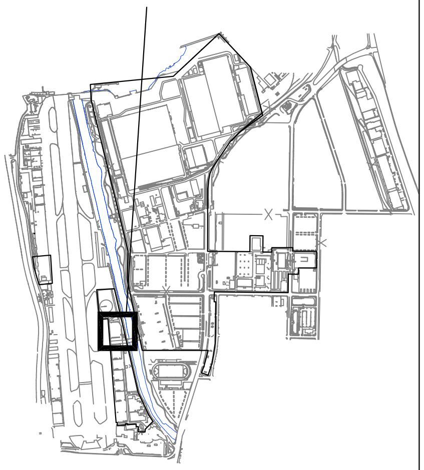
amec foster wheeler

Plot Date: 01/30/18 - 2:56pm, Plotted by: adam.stenberg
Drawing Path: S:\8888_2006\092_4q17-GW-MR\, Drawing Name: FormerBldg10-71_GW-ELEV_4Q17_111417.dwg

Plot Date: 02/14/18 - 9:25am, Plotted by: adam.stenberg
Drawing Path: S:\8888_2006\092_4q17-GW-MR\, Drawing Name: APRON A_GW-ELEV_4Q17.dwg



APRON A
LOCATION MAP



BOEING RENTON
FACILITY MAP

N

0 20 40
APPROXIMATE SCALE IN FEET

LEGEND

GW264S 5.79'	MONITORING WELL LOCATION WITH DEPTH TO GROUNDWATER (BGS IN FEET)
B-1	SOIL SAMPLE LOCATION
— — —	APPROXIMATE PROPERTY LINE
—— x ——	FENCE
HIGHLIGHTED	WELLS INCLUDED IN MONITORING NETWORK

BOEING

amec foster wheeler

APRON A
MONITORING WELL LOCATIONS AND
DEPTH TO GROUNDWATER
NOVEMBER 14, 2017
Boeing Renton Facility
Renton, Washington

By: APS	Date: 02/14/18	Project No. 16096
Amec Foster Wheeler Environment & Infrastructure, Inc.		Figure 20

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] Quarterly	Monitoring Frequency[1] Semiannual	Groundwater Monitoring Wells[2] Cross-Gradient Wells	Groundwater Monitoring Wells[2] Source Area Wells	Groundwater Monitoring Wells[2] Downgradient Plume Wells	Groundwater Monitoring Wells[2] CPOC Wells	Additional Water Level Monitoring Wells[3]	Constituents of Concern[4]	Analyses[5]
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 Arsenic, copper, and lead	SW8260C SIM[6] 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 TPH-gasoline	SW8260C[6] 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 TCE, *cis*-1,2-DCE, 1,1-dichloroethene, VC	SW8260C[6] SW8260C SIM[6]
AOC-003	X (CPOC wells)	X (1,3) (all other wells)	NA	GW249S	GW188S	GW247S and GW248I		PCE, TCE *cis*-1,2-DCE, VC	SW8260C SIM[6]
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 TCE, *cis*-1,2-DCE	SW8260C SIM[6]
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 1,1-Dichloroethene, 1,1,2,2-tetrachloroethane, VC, PCE, TCE TPH-gasoline TPH-diesel, TPH-motor oil	SW8260C[6] SW8260C SIM[6] NWPTH-Gx 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]		
						Monitoring Frequency[3]	
	Cross-Gradient Wells	Source Area Wells	Downgradient Plume Wells	CPOC Wells	Indicators	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

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton
Project Number: 0025217.099.099
Event: Quarterly August 2017
Date/Time: 11/ 14 /2017 @ 1221
Sample Number: RGW185S 171114
Weather: 40'S, CLOUDY
Landau Representative: JHA

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 2.3 Time: 1151 Flow through cell vol. GW Meter No.(s HERON 3

Begin Purge: Date/Time: 11/ 14 /2017 @ 1155 End Purge: Date/Time: 11/ 14 /2017 @ 1208 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	
1158	15.9	656	0.25	6.60	-32.1	LOW		<0.25	
1201	16.0	658	0.18	6.64	-42.5				
1204	16.1	659	0.18	6.65	-45.3		2.3	<0.25	
1207	16.1	659	0.17	6.64	-46.7				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ☒ Pump/Pump Type DED Geotech bladder pump

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	16.1	659	0.17	6.65	-47.1				
2	16.1	659	0.17	6.65	-47.1				
3	16.1	659	0.17	6.65	-47.3				
4	16.1	659	0.17	6.65	-47.3				
Average:	16.1	659	0.17	6.65	-47.2	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
5	(8260C & 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) (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: 11/14/2017

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly August 2017 | Date/Time: 11/14 /2017 @ 1215
Sample Number: RGW194S 171114 | Weather: 40s/50s PC
Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 3.85 Time: 1149 Flow through cell vol. GW Meter No.(s HERON 3

Begin Purge: Date/Time: 11/14 /2017 1150 End Purge: Date/Time: 11/ 14 /2017 @ 1213 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	15.8	647	0.80	6.18	-38.0		2.8		
1156	15.7	605	5.71	6.19	-64.0		2.8		
1159	15.6	603	6.08	6.19	-65.0		2.8		
1202	15.6	602	6.16	6.19	-66.0				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED Geotech bladder pump

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	15.6	599	6.30	6.20	-66.0				
2	15.6	598	6.47	6.19	-66.6				
3	15.5	595	6.66	6.20	-67.1				
4	15.5	593	6.79	6.20	-68.0				
Average:	15.6	596	6.56	6.20	-66.9	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
5	(8260C & 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) (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 (RGWDUP4)

Comments:

Signature: SRB Date: 11/14/2017

Groundwater Low-Flow Sample Collection Form

Project Name:	Boeing Renton	Project Number:	0025217.099.099
Event:	Quarterly August 2017	Date/Time:	11/ 14 /2017 @ 1306
Sample Number:	RGW195S 171114	Weather:	40'S, CLOUDY
Landau Representative:	JHA		

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 2.56 Time: 1242 Flow through cell vol. GW Meter No.(s HERON 3

Begin Purge: Date/Time: 11/ 14 /2017 @ 1245 End Purge: Date/Time: 11/ 14 /2017 @ 1304 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**		
1248	15.3	687	0.12	6.74	-46.7	LOW		<0.25	
1251	15.4	671	0.11	6.67	-44.7		2.56	<0.25	
1254	15.4	657	0.11	6.61	-43.2			0.25	
1257	15.4	649	0.11	6.59	-42.7		2.56		
1300	15.3	642	0.11	6.55	-42.2				
1303	15.4	641	0.10	6.55	-42.0				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED Geotech bladder pump

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	15.4	641	0.11	6.55	-42.0				
2	15.4	641	0.11	6.55	-42.0				
3	15.4	640	0.11	6.55	-42.0				
4	15.4	640	0.10	6.55	-41.9				
Average:	15.4	641	0.11	6.55	-42.0	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
5	(8260C & 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) (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: 11/14/2017

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton
Project Number: 0025217.099.099
Event: Quarterly August 2017
Date/Time: 11/14 /2017 @ 1325
Sample Number: RGW196D 171114
Weather: 40s/50s PC
Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 2.55 Time: 1243 Flow through cell vol. GW Meter No.(s HERON 3

Begin Purge: Date/Time: 11/14 /2017 1301 End Purge: Date/Time: 11/ 14 /2017 @ 1323 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		
1304	14.3	367	1.22	6.38	-41.0		2.55		
1307	14.0	366	3.62	6.38	-53.0		2.55		
1310	14.0	366	3.70	6.38	-55.0		2.55		
1313	13.9	366	3.96	6.39	-60.0				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED Geotech bladder pump

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	13.9	365	3.99	6.39	-61.0				
2	13.9	365	4.01	6.40	-62.4				
3	13.9	365	4.04	6.40	-63.0				
4	13.8	365	4.06	6.40	-64.0				
Average:	13.9	365	4.03	6.40	-62.6	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
5	(8260C & 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) (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: 11/14/2017

Groundwater Low-Flow Sample Collection Form

Project Name:	Boeing Renton	Project Number:	0025217.099.099
Event:	Quarterly August 2017	Date/Time:	11/ 14 /2017 @ 1241
Sample Number:	RGW197S 171114	Weather:	40'S, CLOUDY
Landau Representative:	JHA		

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 2.23 Time: 1213 Flow through cell vol. GW Meter No.(s HERON 3

Begin Purge: Date/Time: 11/ 14 /2017 @ 1215 End Purge: Date/Time: 11/ 14 /2017 @ 1228 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	
1218	15.6	962	0.12	7.03	-76.8	LOW		<0.25	
1221	15.7	962	0.13	7.14	-91.3				
1224	15.7	958	0.11	7.16	-93.3		2.23	0.25	
1227	15.7	956	0.12	7.17	-94.4			<0.50	

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED Geotech bladder pump

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	15.7	954	0.11	7.18	-95.1				
2	15.7	952	0.11	7.18	-95.3				
3	15.7	950	0.11	7.19	-97.6				
4	15.7	949	0.12	7.19	-98.0				
Average:	15.7	951	0.11	7.19	-96.5	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
5	(8260C & 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) (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: 11/14/2017

Groundwater Low-Flow Sample Collection Form

Project Name:	Boeing Renton	Project Number:	0025217.099.099
Event:	Quarterly August 2017	Date/Time:	11/14 /2017 @ 1300
Sample Number:	RGW245S 171114	Weather:	40s/50s PC
Landau Representative:	SRB		

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 2.4 Time: 1233 Flow through cell vol. GW Meter No.(s HERON 3

Begin Purge: Date/Time: 11/14 /2017 1235 End Purge: Date/Time: 11/ 14 /2017 @ 1257 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	
1238	15.4	207.0	0.29	6.88	-48.0		2.4		
1241	14.8	208.0	0.61	6.85	-52.0		2.4		
1244	14.1	211.0	1.23	6.82	-55.0		2.4		
1247	13.9	213.0	1.39	6.81	-56.0				
1250	13.8	220.0	1.56	6.81	-58.0				
1253	13.6	223.6	1.68	6.79	-59.0				
1256	13.5	228.6	1.79	6.79	-61.0				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED Geotech bladder pump

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	13.5	229.5	1.83	6.79	-61.4				
2	13.5	230.0	1.85	6.79	-61.8				
3	13.5	230.7	1.87	6.79	-62.2				
4	13.5	230.8	1.89	6.79	-62.4				
Average:	13.5	230.3	1.86	6.79	-62.0	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
5	(8260C & 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) (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: 11/14/2017

Groundwater Low-Flow Sample Collection Form

Project Name:	Boeing Renton	Project Number:	0025217.099.099
Event:	Quarterly August 2017	Date/Time:	11/14 /2017 @ 1110
Sample Number:	RGW247S 171114	Weather:	40s/50s PC
Landau Representative:	SRB		

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 3.9 Time: 1044 Flow through cell vol. GW Meter No.(s HERON 3

Begin Purge: Date/Time: 11/14 /2017 1045 End Purge: Date/Time: 11/ 14 /2017 @ 1107 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	
1048	14.5	435.0	0.17	6.42	-20.5		4		
1051	13.3	411.4	0.34	6.45	-41.8		4		
1054	12.8	393.0	3.14	6.46	-48.0		4		
1057	12.8	392.0	3.50	6.47	-49.0				
1100	12.6	387.0	3.92	6.48	-52.2				
1103	12.5	386.0	4.02	6.48	-53.0				
1106	12.5	383.0	4.14	6.48	-54.0				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ☑ Pump/Pump Type DED Geotech bladder pump

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	12.5	382.4	4.19	6.48	-54.0				
2	12.5	382.2	4.22	6.48	-54.7				
3	12.5	382.1	4.27	6.48	-55.4				
4	12.6	382.0	4.32	6.48	-55.7				
Average:	12.5	382.2	4.25	6.48	-55.0	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
3	(8260C SIM) (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: 11/14/2017

Groundwater Low-Flow Sample Collection Form

Project Name:	Boeing Renton	Project Number:	0025217.099.099
Event:	Quarterly August 2017	Date/Time:	11/ 14 /2017 @ 1116
Sample Number:	RGW248I 171114	Weather:	40'S, CLOUDY
Landau Representative:	JHA		

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 3.68 Time: 1046 Flow through cell vol. GW Meter No.(s HERON 3

Begin Purge: Date/Time: 11/ 14 /2017 @ 1050 End Purge: Date/Time: 11/ 14 /2017 @ 1103 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	
1053	12.3	408.6	0.90	6.42	11.9	low	3.68		
1056	12.3	408.0	1.02	6.41	8.3				
1059	12.0	407.8	1.05	6.41	5.2				
1102	11.9	407.5	1.06	6.41	4.1				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED Geotech bladder pump

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	11.9	407.3	1.06	6.41	3.8				
2	11.9	407.3	1.05	6.41	3.8				
3	11.9	407.1	1.04	6.41	3.8				
4	11.9	407.2	1.05	6.41	3.8				
Average:	11.9	407.2	1.05	6.41	3.8	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
3	(8260C SIM) (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: 11/14/2017

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton
Project Number: 0025217.099.099
Event: Quarterly August 2017
Date/Time: 11/ 14 /2017 @
Sample Number: RGW001S 171114
Weather: 40'S, CLOUDY
Landau Representative: JHA

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 4.36 Time: 1340 Flow through cell vol. GW Meter No.(s HERON 3

Begin Purge: Date/Time: N/A End Purge: Date/Time: N/A Gallons Purged:

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

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	

WATER LEVEL ONLY

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ☐ Pump/Pump Type DED Geotech bladder pump

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 ☐
	(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: 11/14/2017

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton
Project Number: 0025217.099.099
Event: Quarterly August 2017
Date/Time: 11/ 14 /2017 @
Sample Number: RGW004S 171114
Weather: 40'S, CLOUDY
Landau Representative: JHA

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 2.86 Time: 1342 Flow through cell vol. GW Meter No.(s HERON 3

Begin Purge: Date/Time: N/A End Purge: Date/Time: N/A Gallons Purged:

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

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	

WATER LEVEL ONLY

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ☐ Pump/Pump Type DED Geotech bladder pump

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 ☐
	(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: 11/14/2017

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton
Project Number: 0025217.099.099
Event: Quarterly August 2017
Date/Time: 11/ /2017 @
Sample Number: RGW005S 1711
Weather:
Landau Representative: JHA/DSB/SRB

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) N/A Time: Flow through cell vol. GW Meter No.(s)

Begin Purge: Date/Time: 11/ /2017 @ End Purge: Date/Time: 11/ /2017 @ Gallons Purged:

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

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	

WATER LEVEL ONLY

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ☐ Pump/Pump Type DED Geotech bladder pump

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 ☐
	(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: CONSTRUCTION TRAILER OVER WELL.

Signature: JHA Date: 11/14/2017

Groundwater Low-Flow Sample Collection Form

Project Name:	Boeing Renton	Project Number:	0025217.099.099
Event:	Quarterly August 2017	Date/Time:	11/ 14 /2017 @ 1411
Sample Number:	RGW216S 171114	Weather:	40'S, CLOUDY
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: 1345 Flow through cell vol. GW Meter No.(s HERON 3

Begin Purge: Date/Time: 11/ 14 /2017 @ 1350 End Purge: Date/Time: 11/ 14 /2017 @ 1410 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	
1353	14.3	329.9	1.45	6.90	-3.3	LOW			
1356	14.3	289.2	0.69	6.95	-10.8		4.53	<0.25	
1359	14.1	275.6	0.62	6.94	-11.8		4.53		
1402	14.1	264.1	0.54	6.91	-11.0			0.25	
1405	14.1	251.8	0.45	6.89	-9.9				
1408	14.1	245.9	0.41	6.87	-8.8				
1410	14.1	237.8	0.38	6.85	-8.3				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED GEOTECH 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	14.0	237.5	0.36	6.85	-8.2				
2	14.0	237.3	0.36	6.85	-8.0				
3	14.0	237.0	0.34	6.85	-7.9				
4	14.0	236.8	0.34	6.85	-7.9				
Average:	14.0	237.2	0.35	6.85	-8.0	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
3	(8260C) (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: 11/14/2017

Groundwater Low-Flow Sample Collection Form

Project Name:	Boeing Renton	Project Number:	0025217.099.099
Event:	Quarterly August 2017	Date/Time:	11/14 /2017 @ 1400
Sample Number:	RGW217S 171114	Weather:	40s/50s PC
Landau Representative:	SRB		

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 4.8 Time: 1330 Flow through cell vol. GW Meter No.(s HERON 3

Begin Purge: Date/Time: 11/14 /2017 1335 End Purge: Date/Time: 11/ 14 /2017 @ 1358 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	
1338	15.9	150.0	1.25	6.50	8.0		4.8		
1341	16.1	117.0	0.49	6.49	2.3		4.8		
1344	16.2	109.8	0.26	6.47	-4.3		4.8		
1347	16.3	110.0	0.26	6.48	-6.6				
1350	16.2	110.0	0.26	6.48	-7.9				

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	16.2	110.0	0.27	6.49	-8.8				
2	16.2	110.0	0.28	6.47	-8.3				
3	16.2	110.0	0.26	6.48	-9.3				
4	16.2	110.0	0.26	6.49	-10.2				
Average:	16.2	110.0	0.27	6.48	-9.2	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
3	(8260C) (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: SRB Date: 11/14/2017

Groundwater Low-Flow Sample Collection Form

Project Name:	Boeing Renton	Project Number:	0025217.099.099
Event:	Quarterly August 2017	Date/Time:	11/ 14 /2017 @ 1417
Sample Number:	RGW218S 171114	Weather:	OC
Landau Representative:	DSB		

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 3.66 Time: 1351 Flow through cell vol. GW Meter No.(s 2

Begin Purge: Date/Time: 11/ 14 /2017 1352 End Purge: Date/Time: 11/ 14 /2017 @ 1412 Gallons Purged: 0.25

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

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	14.67	143	0.83	6.75	76.5		3.66		
1358	14.65	142	0.65	6.78	68.5		3.66		
1401	14.48	142	0.43	6.77	59.6		3.66		
1404	14.41	142	0.40	6.76	57.9				
1407	14.34	142	0.38	6.76	55.8				
1410	14.28	142	0.34	6.76	54.2				

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.): ORANGE MODERATE TRUBIDITY 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	14.27	142	0.34	6.76	53.9				
2	14.26	142	0.33	6.76	53.6				
3	14.25	142	0.33	6.76	53.3				
4	14.24	141	0.33	6.76	53.1				
Average:	14.26	142	0.33	6.76	53.5	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
3	(8260C) (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: DSB Date: 11/14/2017

Groundwater Low-Flow Sample Collection Form

Project Name:	Boeing Renton	Project Number:	0025217.099.099
Event:	Quarterly August 2017	Date/Time:	11/14 /2017 @ 1425
Sample Number:	RGW251S 171114	Weather:	40s/50s PC
Landau Representative:	SRB		

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 3.55 Time: 1355 Flow through cell vol. GW Meter No.(s HERON 3

Begin Purge: Date/Time: 11/14 /2017 1401 End Purge: Date/Time: 11/ 14 /2017 @ 1423 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	
1404	11.2	120.8	4.65	6.72	4.2		3.55		
1407	11.4	115.0	4.54	6.71	5.3		3.55		
1410	11.4	115.0	4.77	6.85	0.1		3.55		
1413	11.3	113.0	4.53	6.93	-2.0				
1416	11.4	113.0	4.62	6.99	-2.8				
1419	11.4	113.0	4.48	7.02	-3.0				

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.): SLIGHTLY YELLOW 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	11.5	111.0	4.60	7.03	-3.1				
2	11.5	111.7	4.42	7.04	-3.1				
3	11.5	111.6	4.31	7.05	-3.1				
4	11.5	111.5	4.64	7.06	-3.1				
Average:	11.5	111.5	4.49	7.05	-3.1	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
3	(8260C) (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: SRB Date: 11/14/2017

Groundwater Low-Flow Sample Collection Form

Project Name:	Boeing Renton	Project Number:	0025217.099.099
Event:	Quarterly August 2017	Date/Time:	11/14 /2017 @ 1007
Sample Number:	RGW262S 171114	Weather:	OC
Landau Representative:	DSB		

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 4.93 Time: 942 Flow through cell vol. GW Meter No.(s 2

Begin Purge: Date/Time: 11/ 14 /2017 943 End Purge: Date/Time: 11/ 14 /2017 @ 1002 Gallons Purged: 0.75

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

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		
946	14.99	537	1.39	6.10	123.5		6.50		PUMP ON LOWES
949	15.78	544	0.84	6.17	107.0		7.09		
952	15.91	547	0.64	6.21	97.9		7.50		
955	15.96	549	0.49	6.24	88.9		8.03		
958	15.98	550	0.44	6.25	84.2		8.29		
1001	16.01	552	0.36	6.26	78.2				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type Peristaltic

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	16.01	552	0.35	6.26	77.5				
2	16.09	552	0.35	6.26	76.7				
3	16.12	553	0.34	6.26	76.1				
4	16.13	553	0.33	6.26	75.4				
Average:	16.09	553	0.34	6.26	76.4	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
3	(8260C) (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: 11/14/2017

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton
Project Number: 0025217.099.099
Event: Quarterly August 2017
Date/Time: 11/ /2017 @
Sample Number: RGW263S 1711
Weather:
Landau Representative: DSB

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 5.37 Time: 1039 Flow through cell vol. GW Meter No.(s)

Begin Purge: Date/Time: 11/ /2017 @ End Purge: Date/Time: 11/ /2017 @ Gallons Purged:

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

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 DED Geotech bladder pump

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 ☐
	(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: DSB Date: 11/14/2017

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton — Project Number: 0025217.099.099
Event: Quarterly August 2017 — Date/Time: 11/14 /2017 @ 1037
Sample Number: RGW264S 171114 — Weather: OC
Landau Representative: DSB

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 5.79 Time: 1010 Flow through cell vol. GW Meter No.(s 2

Begin Purge: 11/ 14 /2017 1014 End Purge: Date/Time: 11/ 14 /2017 @ 1030 Gallons Purged: 0.75

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ☒ Other TREATMENT CENTER

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	
1017	17.27	701	0.66	6.37	84.7		6.88		
1020	17.22	759	0.28	6.28	75.4		7.15		
1023	17.45	825	0.22	6.21	67.4		7.43		
1026	17.42	834	0.21	6.20	61.7		7.57		
1029	17.35	849	0.21	6.19	56.3		7.66		

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ☒ Pump/Pump Type Peristaltic

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 SLIGHT YELOW 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	17.29	851	0.20	6.19	55.2				
2	17.28	854	0.20	6.19	54.7				
3	17.30	851	0.20	6.19	54.3				
4	17.34	846	0.20	6.19	53.7				
Average:	17.30	851	0.20	6.19	54.5	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
3	(8260C) (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: 11/14/2017

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton
Project Number: 0025217.099.099
Event: Quarterly August 2017
Date/Time: 11/14 /2017 @ 1020
Sample Number: RGW031S 171114
Weather: 40s/50s PC
Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 5.05 Time: 950 Flow through cell vol. GW Meter No.(s HERON 3

Begin Purge: Date/Time: 11/14 /2017 955 End Purge: Date/Time: 11/ 14 /2017 @ 1017 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	
958	14.4	254.0	1.49	6.16	-2.3		5.05		
1001	14.5	255.0	1.99	6.17	-4.6		5.05		
1004	14.4	257.3	3.21	6.17	-8.8		5.05		
1007	14.3	258.0	3.89	6.17	-12.2				
1010	14.2	258.0	4.15	6.17	-14.5				
1013	14.2	259.0	4.29	6.17	-17.0				
1016									

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED Qed 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	14.2	259.0	4.34	6.17	-17.8				
2	14.2	259.0	4.40	6.17	-19.0				
3	14.2	259.3	4.46	6.17	-20.1				
4	14.2	259.5	4.53	6.17	-21.3				
Average:	14.2	259.2	4.43	6.17	-19.6	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
6	(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 (RGWDUP2)

Comments:

Signature: SRB Date: 11/14/2017

Groundwater Low-Flow Sample Collection Form

Project Name:	Boeing Renton	Project Number:	0025217.099.099
Event:	Quarterly August 2017	Date/Time:	11/ 13 /2017 @ 1326
Sample Number:	RGW033S 171113	Weather:	50'S, CLOUDY
Landau Representative:	JHA		

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 5.23 Time: 1257 Flow through cell vol. GW Meter No.(s HERON 1

Begin Purge: Date/Time: 11/ 13 /2017 @ 1300 End Purge: Date/Time: 11/ 13 /2017 @ 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	
1303	15.5	265.6	1.56	6.49	-7.4	LOW			
1309	15.3	273.2	1.33	6.48	-8.9		5.23		
1309	15.3	275.2	1.20	6.48	-12.1			0.25	
1312	15.4	275.0	1.11	6.46	-10.9				
1315	15.4	276.8	0.93	6.44	-10.8				
1318	15.4	276.9	0.87	6.44	-10.5				
1320	15.5	277.0	0.80	6.42	-10.5				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED Qed 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	15.6	277.3	0.85	6.39	-10.3				
2	15.6	277.3	0.81	6.41	-10.3				
3	15.6	277.3	0.81	6.41	-10.3				
4	15.6	277.3	0.78	6.42	-10.3				
Average:	15.6	277.3	0.81	6.41	-10.3	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
6	(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: PUMP REPAIRED AFTER AUGUST EVENT AND INSTALLED TODAY.

Signature: JHA Date: 11/13/2017

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton
Project Number: 0025217.099.099
Event: Quarterly August 2017
Date/Time: 11/13 /2017 @ 1417
Sample Number: RGW034S 171113
Weather: wind
Landau Representative: DSB

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 5.3 Time: 1345 Flow through cell vol. GW Meter No.(s 2

Begin Purge: Date/Time: 11/13 /2017 1349 End Purge: Date/Time: 11/ 13 /2017 @ 1409 Gallons Purged: 0.25

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ☒ Other site treatment

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	16.78	400	0.67	8.05	-30.9		5.35		
1355	16.21	405	1.24	7.45	-30.1		5.35		
1358	15.83	405	0.70	7.17	-23.7		5.35		
1401	15.44	406	0.70	6.98	-20.7				
1404	14.66	406	0.57	6.77	-16.8				
1407	14.53	397	0.45	6.60	-10.1				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ☒ Pump/Pump Type DED Qed 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	14.66	396	0.44	6.60	-9.9				
2	14.78	395	0.43	6.60	-11.6				
3	14.83	397	0.43	6.60	-13.0				
4	14.86	398	0.43	6.60	-14.0				
Average:	14.78	397	0.43	6.60	-12.1	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
6	(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: 11/13/2017

Groundwater Low-Flow Sample Collection Form

Project Name:	Boeing Renton	Project Number:	0025217.099.099
Event:	Quarterly August 2017	Date/Time:	11/ 13 /2017 @ 1440
Sample Number:	RGW038S 171113	Weather:	50S RAINY
Landau Representative:	SRB		

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 5.4 Time: 1410 Flow through cell vol. GW Meter No.(s HERON 3

Begin Purge: Date/Time: 11/ 13 /2017 1412 End Purge: Date/Time: 11/13 /2017 @ 1434 Gallons Purged: 0.5

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other te 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	
1415	16.9	299.0	0.16	6.48	-66.0		5.4		
1418	16.3	270.0	0.17	6.49	-78.0		5.4		
1421	16.4	269.0	0.25	6.49	-79.0		5.4		
1424	16.3	260.0	1.76	6.49	-81.0				
1427	16.3	258.0	2.10	6.49	-82.0				
1430	16.3	258.0	2.42	6.49	-82.0				
1433	16.3	257.0	2.77	6.49	-82.5				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED Qed 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	16.3	257.2	2.89	6.49	-82.9				
2	16.4	257.0	2.98	6.48	-83.0				
3	16.4	256.4	3.09	6.48	-83.0				
4	16.3	256.1	3.19	6.49	-83.4				
Average:	16.4	256.7	3.04	6.49	-83.1	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
6	(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: 11/13/2017

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton
Project Number: 0025217.099.099
Event: Quarterly August 2017
Date/Time: 11/ 13 /2017 @ 1406
Sample Number: RGW039S 171113
Weather: 50'S, WINDY
Landau Representative: JHA

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 5.14 Time: 1340 Flow through cell vol. GW Meter No.(s HERON 1

Begin Purge: Date/Time: 11/ 13 /2017 @ 1345 End Purge: Date/Time: 11/ 13 /2017 @ 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	
1348	16.5	116.7	1.64	6.49	39.7	LOW	5.14	<0.25	
1351	16.5	99.9	1.59	6.45	44.8				
1354	16.7	94.8	1.54	6.41	48.3		5.14	0.25	
1357	16.6	90.6	1.58	6.38	50.0				
1400	16.7	88.9	1.60	6.36	51.9				
1403	16.5	87.0	1.63	6.32	54.7			0.5	

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED Qed 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	16.6	87.0	1.61	6.31	54.9				
2	16.7	87.1	1.60	6.31	55.1				
3	16.7	87.0	1.65	6.31	55.3				
4	16.7	86.9	1.61	6.31	55.7				
Average:	16.7	87.0	1.62	6.31	55.3	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
6	(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: 11/13/2017

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton
Project Number: 0025217.099.099
Event: Quarterly August 2017
Date/Time: 11/ 13 /2017 @ 1236
Sample Number: RGW143S 171113
Weather: 50'S, CLOUDY AND WINDY
Landau Representative: JHA

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 5.62 Time: 1209 Flow through cell vol. GW Meter No.(s HERON 1

Begin Purge: Date/Time: 11/ 13 /2017 @ 1212 End Purge: Date/Time: 11/ 13 /2017 @ 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	15.3	277.8	0.83	6.61	-17.9	LOW	5.65	<0.25	
1218	15.3	281.0	0.96	6.60	-21.2				
1221	15.4	284.1	0.76	6.59	-24.6		5.65		
1224	15.4	287.3	0.39	6.58	-28.2				
1227	15.5	288.7	0.32	6.57	-29.8				
1230	15.5	289.6	0.33	6.57	-30.9		5.65		
1232	15.5	290.0	0.31	6.57	-31.7				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED Qed 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	15.5	290.3	0.31	6.57	-31.9				
2	15.5	290.2	0.32	6.57	-32.0				
3	15.5	290.2	0.32	6.57	-32.3				
4	15.5	290.3	0.32	6.57	-32.4				
Average:	15.5	290.3	0.32	6.57	-32.2	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
6	(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: 11/13/2017

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton
Project Number: 0025217.099.099
Event: Quarterly August 2017
Date/Time: 11/ 13 /2017 @ 1400
Sample Number: RGW209S 171113
Weather: 50S RAINY
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: 1334 Flow through cell vol. GW Meter No.(s HERON 3

Begin Purge: Date/Time: 11/ 13 /2017 1336 End Purge: Date/Time: 11/13 /2017 @ 1358 Gallons Purged: 0.5

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other te 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	
1339	15.1	380.0	0.18	6.40	-68.0		5.15		
1342	14.8	380.0	0.51	6.40	-83.0		5.15		
1345	14.7	380.0	2.94	6.40	-87.0		5.15		
1348	14.5	379.0	4.15	6.40	-88.0				
1351	14.5	378.0	4.32	6.40	-88.0				
1354	14.4	378.0	4.38	6.40	88.0				
1357									

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED Geotech bladder pump

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	377.0	4.40	6.40	-88.0				
2	14.4	377.0	4.42	6.40	-87.7				
3	14.3	376.6	4.45	6.40	-87.6				
4	14.3	376.0	4.73	6.40	-87.0				
Average:	14.4	376.7	4.50	6.40	-87.6	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
6	(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: 11/13/2017

Groundwater Low-Flow Sample Collection Form

Project Name:	Boeing Renton	Project Number:	0025217.099.099
Event:	Quarterly August 2017	Date/Time:	11/ 14 /2017 @ 1021
Sample Number:	RGW210S 171114	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) 4.54 Time: 956 Flow through cell vol. GW Meter No.(s HERON 3

Begin Purge: Date/Time: 11/ 14 /2017 @ 957 End Purge: Date/Time: 11/ /2017 @ 1018 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	
1000	13.7	311.9	3.12	6.47	29.0	LOW			
1003	13.6	274.3	2.27	6.60	21.6				
1006	13.6	251.5	1.84	6.64	21.6		4.67		LOWER CPM
1009	13.6	246.8	1.68	6.65	22.8				
1012	13.1	249.3	1.05	6.62	25.0		4.64	0.25	
1015	13.0	252.4	1.08	6.62	235.9				
1017	12.8	253.8	1.14	6.60	253.6				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED Geotech bladder pump

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.): CLODUY, LIGHT BROWN, 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	12.8	253.6	1.15	6.60	26.1				
2	12.8	253.6	1.17	6.60	26.1				
3	12.8	253.6	1.18	6.60	26.0				
4	12.8	253.6	1.19	6.60	25.9				
Average:	12.8	253.6	1.17	6.60	26.0	#DIV/0!	5.78		

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
6	(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: 11/14/2017

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton
Project Number: 0025217.099.099
Event: Quarterly August 2017
Date/Time: 11/ 13 /2017 @ 1330
Sample Number: RGW237S 171113
Weather: 50S RAINY
Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 4.7 Time: 1303 Flow through cell vol. GW Meter No.(s HERON 3

Begin Purge: Date/Time: 11/ 13 /2017 1304 End Purge: Date/Time: 11/13 /2017 @ 1326 Gallons Purged: 0.5

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other te 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	
1307	14.8	238.0	1.98	6.59	6.2		4.7		
1310	14.5	237.0	1.89	6.51	-1.5		4.7		
1313	14.4	237.0	1.90	6.51	-2.8		4.7		

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED Geotech bladder pump

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	237.0	1.90	6.50	-3.2				
2	14.4	236.7	1.90	6.50	-3.4				
3	14.4	236.7	1.92	6.50	-3.6				
4	14.3	236.6	1.92	6.50	-3.7				
Average:	14.4	236.8	1.91	6.50	-3.5	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
6	(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: 11/13/2017

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton
Project Number: 0025217.099.099
Event: Quarterly August 2017
Date/Time: 11/ 13 /2017 @ 1250
Sample Number: RGW238I 171113
Weather: 50S RAINY
Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 4.77 Time: 1220 Flow through cell vol. GW Meter No.(s HERON 3

Begin Purge: Date/Time: 11/ 13 /2017 1221 End Purge: Date/Time: 11/13 /2017 @ 1245 Gallons Purged: 0.5

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ☒ Other te 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	
1224	14.7	379.0	0.41	6.43	-88.0		4.8		
1227	13.6	383.2	4.15	6.44	-95.0		4.8		
1230	13.6	382.2	4.21	6.44	-94.7		4.8		
1233	13.5	381.0	4.24	6.44	-94.5				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ☒ Pump/Pump Type DED Geotech bladder pump

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	13.4	381.0	4.28	6.44	-94.0				
2	13.4	381.0	4.29	6.44	-94.3				
3	13.4	380.4	4.28	6.44	-94.3				
4	13.3	380.0	4.34	6.44	-94.0				
Average:	13.4	380.6	4.30	6.44	-94.2	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
6	(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: SRB Date: 11/13/2017

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly August 2017 | Date/Time: 11/ 13 /2017 @ 1146
Sample Number: RGW239I 171113 | Weather: 50'S, CLOUDY
Landau Representative: JHA

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 5.51 Time: 1120 Flow through cell vol. GW Meter No.(s HERON 1

Begin Purge: Date/Time: 11/ 13 /2017 @ 1121 End Purge: Date/Time: 11/ 13 /2017 @ 1140 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	
1124	13.4	251.5	0.78	6.38	27.5	LOW		<0.25	
1127	13.6	259.6	0.79	6.41	8.1		5.53	<0.25	
1130	13.6	263.1	0.52	6.45	-4.2				
1133	13.6	267.5	0.44	6.48	-15.8				
1136	13.7	268.1	0.41	6.49	-18.6		5.53		
1139	13.7	269.3	0.43	6.49	-21.4				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ☒ Pump/Pump Type DED Geotech bladder pump

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	13.6	269.4	0.43	6.49	-21.7				
2	13.6	269.4	0.43	6.49	-22.0				
3	13.6	269.5	0.41	6.49	-22.1				
4	13.6	269.7	0.40	6.49	-22.4				
Average:	13.6	269.5	0.42	6.49	-22.1	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
6	(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: 11/13/2017

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton
Project Number: 0025217.099.099
Event: Quarterly August 2017
Date/Time: 11/ 13 /2017 @ 1211
Sample Number: RGW240D 171113
Weather: 50'S, CLOUDY AND WINDY
Landau Representative: JHA

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 5.04 Time: 1133 Flow through cell vol. GW Meter No.(s HERON 1

Begin Purge: Date/Time: 11/ 13 /2017 @ 1146 End Purge: Date/Time: 11/ 13 /2017 @ 1159 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	
1149	12.8	320.8	0.83	6.47	-19.9	LOW		<0.25	
1152	12.6	324.3	0.77	6.48	-21.4			<0.25	
1155	12.3	323.7	0.71	6.48	-23.2		5.21	<0.25	TURNED PUMP OFF
1158	12.2	324.1	0.73	6.48	-24.2		5.21		PUMP ON

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ☒ Pump/Pump Type DED Geotech bladder pump

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, CLIGHT GRAY, 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	323.9	0.76	6.48	-24.5				
2	12.2	323.9	0.77	6.48	-24.5				
3	12.2	324.1	0.75	6.48	-24.6				
4	12.2	324.1	0.74	6.48	-24.6				
Average:	12.2	324.0	0.76	6.48	-24.6	#DIV/0!	5.31		

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
6	(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): LET RECHARGE A FEW MINUTES BEFORE SAMPLING.

Comments: VERY LARGE DRAWDOWN WITH LOW PURGE VOLUME

Signature: JHA Date: 11/13/2017

Groundwater Low-Flow Sample Collection Form

Project Name:	Boeing Renton	Project Number:	0025217.099.099
Event:	Quarterly August 2017	Date/Time:	11/ 13 /2017 @ 1150
Sample Number:	RGW-241S 171113	Weather:	50S RAINY
Landau Representative:	SRB		

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 6.05 Time: 1118 Flow through cell vol. GW Meter No.(s HERON 3

Begin Purge: Date/Time: 11/ 13 /2017 1121 End Purge: Date/Time: 11/13 /2017 @ 1148 Gallons Purged: 0.5

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other te 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	
1124	14.9	306.6	3.13	6.32	-45.0		6.05		
1127	14.5	304.0	2.25	6.32	-49.0		6.05		
1130	14.1	303.0	2.25	6.32	-49.6		6.05		
1133	13.6	300.0	1.82	6.32	-50.0				
1136	13.4	299.0	3.20	6.32	-50.0				
1139	13.1	297.5	3.84	6.32	-50.8				
1142	13.1	297.3	3.90	6.32	-51.0				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED Geotech bladder pump

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	13.1	297.1	3.94	6.32	-52.0				
2	13.1	297.0	3.98	6.32	-51.0				
3	13.1	297.0	4.02	6.33	-53.0				
4	12.8	296.0	4.13	6.33	-53.0				
Average:	13.0	296.8	4.02	6.33	-52.3	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
6	(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: SRB Date: 11/13/2017

Groundwater Low-Flow Sample Collection Form

Project Name:	Boeing Renton	Project Number:	0025217.099.099
Event:	Quarterly August 2017	Date/Time:	11/ 13 /2017 @ 1220
Sample Number:	RGW-242I 171113	Weather:	50S RAINY
Landau Representative:	SRB		

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 6.15 Time: 1134 Flow through cell vol. GW Meter No.(s HERON 3

Begin Purge: Date/Time: 11/ 13 /2017 1150 End Purge: Date/Time: 11/13 /2017 @ 1216 Gallons Purged: 0.5

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other te 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	12.9	263.0	4.22	6.33	-34.0		6.15		
1156	12.6	262.0	4.42	6.32	-34.0		6.15		
1159	12.3	262.0	4.56	6.31	-35.0		6.15		

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED Geotech bladder pump

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	12.1	261.0	4.60	6.31	-31.0				
2	12.1	261.0	4.57	6.31	-31.2				
3	12.0	261.0	4.58	6.30	-31.2				
4	12.0	260.9	4.63	6.31	-34.3				
Average:	12.1	261.0	4.60	6.31	-31.9	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
6	(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: SRB Date: 11/13/2017

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton
Project Number: 0025217.099.099
Event: Quarterly August 2017
Date/Time: 11/ 13 /2017 @ 1436
Sample Number: RGW-243I 171113
Weather: 50'S, WINDY AND DRIZZLING
Landau Representative: JHA

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 5.21 Time: 1352 Flow through cell vol. GW Meter No.(s HERON 1

Begin Purge: Date/Time: 11/ 13 /2017 @ 1410 End Purge: Date/Time: 11/ 13 /2017 @ 1423 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	15.1	313.8	0.24	6.20	3.7	LOW		<0.25	
1416	15.1	318.4	0.22	6.34	-2.8		5.21	0.25	
1419	15.1	322.3	0.21	6.30	-11.4			<0.50	
1422	15.1	322.9	0.20	6.35	-16.4				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED Geotech bladder pump

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	15.1	322.8	0.20	6.35	-16.9				
2	15.0	323.4	0.19	6.35	-17.2				
3	15.1	323.0	0.19	6.35	-17.5				
4	15.1	323.2	0.19	6.36	-17.8				
Average:	15.1	323.1	0.19	6.35	-17.4	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
6	(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: 11/13/2017

Groundwater Low-Flow Sample Collection Form

Project Name:	Boeing Renton	Project Number:	0025217.099.099
Event:	Quarterly August 2017	Date/Time:	11/ 13 /2017 @ 1457
Sample Number:	RGW-244S 171113	Weather:	wind
Landau Representative:	DSB		

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 5.22 Time: 1430 Flow through cell vol. GW Meter No.(s 2

Begin Purge: Date/Time: 11/ 13 /2017 1433 End Purge: Date/Time: 11/13 /2017 @ 1452 Gallons Purged: 0.5

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ☒ Other site treatment

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	
1436	14.55	428	1.08	6.35	42.9		5.23		
1439	13.77	476	0.79	6.20	41.2		5.23		
1442	13.73	485	0.63	6.18	38.5		5.23		
1445	13.70	492	0.47	6.18	31.8				
1448	13.63	492	0.44	6.17	28.8				
1451	13.59	492	0.40	6.17	25.7				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ☒ Pump/Pump Type DED Geotech bladder pump

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	13.58	492	0.39	6.17	25.3				
2	13.58	492	0.39	6.17	25.0				
3	13.57	492	0.39	6.17	24.8				
4	13.56	492	0.38	6.17	24.6				
Average:	13.57	492	0.39	6.17	24.9	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
6	(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: 11/13/2017

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton
Project Number: 0025217.099.099
Event: Quarterly August 2017
Date/Time: 11/ 14 /2017 @ 1317
Sample Number: 10-71-MW1171114
Weather: OC
Landau Representative: DSB

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 8.33 Time: 1254 Flow through cell vol. GW Meter No.(s 2

Begin Purge: Date/Time: 11/ 14 /2017 1254 End Purge: Date/Time: 11/14 /2017 @ 1314 Gallons Purged: 0.5

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

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	
1257	15.98	220	0.33	6.18	104.1		8.34		
1300	15.91	221	0.16	6.23	84.2		8.34		
1303	15.23	224	0.39	6.19	78.2		8.34		
1306	14.80	224	0.33	6.17	76.4				
1309	14.10	223	0.26	6.13	74.3				
1312	13.81	223	0.25	6.12	72.9				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED Geotech bladder pump

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	13.78	220	0.25	6.11	72.6				
2	13.76	223	0.24	6.11	72.3				
3	13.74	222	0.24	6.11	72.1				
4	13.73	220	0.25	6.11	71.8				
Average:	13.75	221	0.25	6.11	72.2	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
3	(8260C) (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
	others

Duplicate Sample No(s):

Comments:

Signature: DSB Date: 11/14/2017

Groundwater Low-Flow Sample Collection Form

Project Name:	Boeing Renton	Project Number:	0025217.099.099
Event:	Quarterly August 2017	Date/Time:	11/ 14/2017 @ 1247
Sample Number:	10-71-MW2 171114	Weather:	OC
Landau Representative:	DSB		

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 8.6 Time: 1223 Flow through cell vol. GW Meter No.(s 2

Begin Purge: Date/Time: 11/ 14/2017 1223 End Purge: Date/Time: 11/ 14 /2017 @ 1240 Gallons Purged: 0.5

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ☒ Other TREATMENT CENTER

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	
1226	16.65	229	0.38	6.28	79.2		8.61		
1229	16.49	233	0.20	6.25	68.2		8.61		
1232	16.17	230	0.16	6.22	65.2		8.61		
1235	15.83	233	0.16	6.20	63.0				
1238	15.49	232	0.18	6.18	61.8				
1241									

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ☒ Pump/Pump Type DED Geotech bladder pump

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	15.42	229	0.18	6.18	61.7				
2	15.37	230	0.19	6.18	61.5				
3	15.31	233	0.19	6.17	61.4				
4	15.23	230	0.18	6.17	61.3				
Average:	15.33	231	0.19	6.18	61.5	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
3	(8260C) (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
	others

Duplicate Sample No(s):

Comments:

Signature: DSB Date: 11/14/2017

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton
Project Number: 0025217.099.099
Event: Quarterly August 2017
Date/Time: 11/ 14 /2017 @ 1217
Sample Number: 10-71-MW4 171114
Weather: OC
Landau Representative: DSB

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 8.42 Time: 1154 Flow through cell vol. GW Meter No.(s 2

Begin Purge: Date/Time: 11/ 14 /2017 1155 End Purge: Date/Time: 11/14 /2017 @ 1214 Gallons Purged: 0.5

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

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	
1158	17.07	345	0.96	6.31	70.6		8.42		
1201	16.80	341	0.57	6.31	62.4		8.42		
1204	15.45	339	0.43	6.26	60.0		8.42		
1207	14.74	336	0.38	6.23	59.2				
1210	14.48	333	0.35	6.22	58.4				
1213	14.41	331	0.33	6.21	57.6				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED Geotech bladder pump

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 CO,ORLESS 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	14.40	331	0.33	6.21	57.4				
2	14.40	330	0.33	6.21	57.4				
3	14.39	330	0.32	6.21	57.1				
4	14.39	330	0.31	6.21	56.9				
Average:	14.40	330	0.32	6.21	57.2	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
3	(8260C) (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
	others

Duplicate Sample No(s):

Comments:

Signature: DSB Date: 11/14/2017

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton
Project Number: 0025217.099.099
Event: Quarterly August 2017
Date/Time: 11/ 14 /2017 @ 856
Sample Number: RGW183S 171114
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) 8.7 Time: 825 Flow through cell vol. GW Meter No.(s HERON 1

Begin Purge: Date/Time: 11/ 14 /2017 @ 835 End Purge: Date/Time: 11/ 14 /2017 @ 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	
838	11.9	147.0	1.00	6.38	65.5	LOW	8.73	<0.25	
841	11.9	146.4	1.05	6.40	63.2				
844	12.1	145.3	1.10	6.43	60.3				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED Geotech bladder pump

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	12.1	145.0	1.08	6.44	59.9				
2	12.1	144.9	1.13	6.44	60.2				
3	12.1	144.7	1.10	6.44	59.7				
4	12.1	144.8	1.09	6.45	59.3				
Average:	12.1	144.9	1.10	6.44	59.8	#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 ☐
2	(8270) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) JET A 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: 11/14/2017

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton
Project Number: 0025217.099.099
Event: Quarterly August 2017
Date/Time: 11/ 14 /2017 @ 936
Sample Number: RGW184S 171114
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) 9.28 Time: 910 Flow through cell vol. GW Meter No.(s HERON 1

Begin Purge: Date/Time: 11/ 14 /2017 @ 913 End Purge: Date/Time: 11/ 14 /2017 @ 934 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	
916	13.1	183.1	4.35	6.53	71.9	LOW		<0.25	
919	13.7	171.6	1.63	6.60	58.1				
922	13.7	166.0	1.40	6.63	56.4		9.28	0.25	
925	13.7	163.6	1.32	6.64	55.7				
928	13.8	163.0	1.18	6.64	56.1		9.28		
931	13.8	163.3	1.12	6.64	56.3				
933	13.9	163.4	1.14	6.64	56.3				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED Geotech bladder pump

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	13.9	163.4	1.17	6.64	56.4				
2	13.9	163.6	1.16	6.63	56.5				
3	13.9	163.5	1.17	6.63	56.6				
4	13.9	163.7	1.14	6.63	56.7				
Average:	13.9	163.6	1.16	6.63	56.6	#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 ☐
2	(8270) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) JET A 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: 11/14/2017

Groundwater Low-Flow Sample Collection Form

Project Name:	Boeing Renton	Project Number:	0025217.099.099
Event:	Quarterly August 2017	Date/Time:	11/ 14 /2017 @ 1137
Sample Number:	RGW211S 171114	Weather:	OC
Landau Representative:	DSB		

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 9.91 Time: 1114 Flow through cell vol. GW Meter No.(s 2

Begin Purge: Date/Time: 11/ 14 /2017 1114 End Purge: Date/Time: 11/14 /2017 @ 1133 Gallons Purged: 0.25

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

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	
1117	15.87	288	1.13	6.77	49.5		9.93		
1120	15.33	284	0.73	6.55	50.9		9.93		
1123	14.11	279	0.45	6.33	52.7		9.93		
1126	13.67	276	0.39	6.27	52.7				
1129	13.52	275	0.37	6.26	52.6				
1132	13.39	274	0.36	6.24	52.4				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED Geotech bladder pump

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	13.35	274	0.36	6.23	52.3				
2	13.32	274	0.35	6.23	52.2				
3	13.30	274	0.35	6.23	52.2				
4	13.28	274	0.35	6.23	52.1				
Average:	13.31	274	0.35	6.23	52.2	#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 ☐
2	(8270) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) JET A 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: DSB Date: 11/14/2017

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly August 2017 | Date/Time: 11/14 /2017 @ 837
Sample Number: RGW212S 171114 | Weather: OC
Landau Representative: DSB

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 10.19 Time: 813 Flow through cell vol. GW Meter No.(s 3

Begin Purge: Date/Time: 11/14 /2017 815 End Purge: Date/Time: 11/ 14 /2017 @ 836 Gallons Purged: 0.5

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

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	
818	13.71	304	1.09	5.51	125.9		10.39		
821	12.52	309	0.66	5.38	130.1		10.39		
824	11.24	299	0.56	5.26	134.9		10.38		
827	10.50	287	0.45	5.18	137.6				
830	10.45	282	0.35	5.24	133.3				
833	10.47	281	0.34	5.25	132.7				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED Geotech bladder pump

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	10.48	281	0.34	5.26	132.4				
2	10.49	281	0.33	5.26	132.2				
3	10.51	281	0.34	5.26	132.0				
4	10.52	281	0.34	5.27	131.7				
Average:	10.50	281	0.34	5.26	132.1	#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 ☐
2	(8270) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) JET A 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: DSB Date: 11/14/2017

Groundwater Low-Flow Sample Collection Form

Project Name:	Boeing Renton	Project Number:	0025217.099.099
Event:	Quarterly August 2017	Date/Time:	11/14 /2017 @ 940
Sample Number:	RGW221S 171114	Weather:	40s/50s PC
Landau Representative:	SRB		

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 9.95 Time: 913 Flow through cell vol. GW Meter No.(s HERON 3

Begin Purge: Date/Time: 11/14 /2017 915 End Purge: Date/Time: 11/ 14 /2017 @ 937 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	
918	12.7	197.0	0.75	6.10	60.4		9.95		
921	12.7	200.0	0.68	6.11	55.0		9.95		
924	12.5	211.7	0.52	6.15	31.2		9.95		
927	12.4	215.0	0.87	6.16	22.8				
930	12.4	215.6	2.41	6.18	6.8				
933	12.4	216.0	3.26	6.18	14.0				
936	12.4	216.1	3.57	6.18	12.7				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED Geotech bladder pump

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 SLIGHT ODOR SLIGHT SHEEN

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	216.0	3.64	6.18	12.3				
2	12.4	216.0	3.71	6.80	11.6				
3	12.4	216.2	3.74	6.18	11.1				
4	12.4	216.0	3.78	6.18	10.7				
Average:	12.4	216.1	3.72	6.34	11.4	#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 ☐
2	(8270) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) JET A 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: 11/14/2017

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly August 2017 | Date/Time: 11/ 14 /2017 @ 757
Sample Number: RGW224S 171114 | Weather: oc
Landau Representative: DSB

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 10.5 Time: 734 Flow through cell vol. GW Meter No.(s 3

Begin Purge: Date/Time: 11/ 14 /2017 734 End Purge: Date/Time: 11/ 14 /2017 @ 754 Gallons Purged: 0.25

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

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	14.73	172	1.53	6.48	84.7		10.58		
740	14.26	183	1.67	6.28	73.3		10.55		
743	13.90	191	1.37	5.95	83.6		10.55		
746	13.54	198	1.15	5.73	94.7				
749	11.87	301	1.03	4.87	131.7				
752	10.55	328	0.88	4.52	146.3				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED Geotech bladder pump

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	10.38	328	0.87	4.49	147.2				
2	10.30	328	0.86	4.47	147.9				
3	10.20	329	0.86	4.45	148.6				
4	10.09	329	0.85	4.43	149.5				
Average:	10.24	329	0.86	4.46	148.3	#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 ☐
2	(8270) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) JET A 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 (RGWDUP3)

Comments:

Signature: DSB Date: 11/14/2017

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton
Project Number: 0025217.099.099
Event: Quarterly August 2017
Date/Time: 11/ 14 /2017 @ 836
Sample Number: RGW225I 171114
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) 9.11 Time: 812 Flow through cell vol. GW Meter No.(s HERON 1

Begin Purge: Date/Time: 11/ 14 /2017 @ 815 End Purge: Date/Time: 11/ 14 /2017 @ 828 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	
818	9.9	123.0	4.23	6.60	57.2	LOW		<0.25	
821	9.6	121.9	3.44	6.57	60.2		9.11	<0.25	
824	9.4	123.3	3.40	6.52	64.5				
827	9.3	126.6	3.24	6.44	66.2				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED Geotech bladder pump

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	9.3	126.9	3.23	6.44	66.2				
2	9.3	127.0	3.22	6.44	66.1				
3	9.3	127.0	3.22	6.43	66.1				
4	9.3	127.2	3.22	6.42	66.0				
Average:	9.3	127.0	3.22	6.43	66.1	#DIV/0!	9.13		

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 ☐
2	(8270) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) JET A 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: DO SEEMED A LITTLE HIGH COMPARED TO SURROUNDING WELLS.

Signature: JHA Date: 11/14/2017

Groundwater Low-Flow Sample Collection Form

Project Name:	Boeing Renton	Project Number:	0025217.099.099
Event:	Quarterly August 2017	Date/Time:	11/14 /2017 @ 750
Sample Number:	RGW255S 171114	Weather:	40s/50s PC
Landau Representative:	SRB		

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 9.95 Time: 724 Flow through cell vol. GW Meter No.(s HERON 3

Begin Purge: Date/Time: 11/14 /2017 725 End Purge: Date/Time: 11/ 14 /2017 @ 747 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	
728	14.2	191.5	0.31	5.79	58.0		10		
731	13.2	177.9	1.52	5.89	45.5		10		
734	12.7	172.2	2.77	5.93	43.4		10		
737	12.2	163.4	3.93	5.97	69.4				
740	12.1	160.2	3.95	6.02	66.4				
743	11.9	157.3	3.95	6.07	41.5				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED Geotech bladder pump

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	11.9	157.0	3.91	6.12	31.0				
2	11.9	157.0	3.90	6.12	31.1				
3	11.9	156.0	3.90	6.14	30.4				
4	11.9	156.0	3.90	6.14	30.3				
Average:	11.9	156.5	3.90	6.13	30.7	#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 ☐
2	(8270) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) JET A 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: 11/14/2017

Groundwater Low-Flow Sample Collection Form

Project Name:	Boeing Renton	Project Number:	0025217.099.099
Event:	Quarterly August 2017	Date/Time:	11/14 /2017 @ 820
Sample Number:	RGW256S 171114	Weather:	40s/50s PC
Landau Representative:	SRB		

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 8.82 Time: 741 Flow through cell vol. GW Meter No.(s HERON 3

Begin Purge: Date/Time: 11/14 /2017 752 End Purge: Date/Time: 11/ 14 /2017 @ 816 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	
755	12.5	137.0	0.83	6.09	54.8		8.82		
758	12.3	141.0	2.20	6.10	49.5		8.82		
801	12.2	144.0	3.60	6.12	44.6		8.82		
804	11.9	147.0	4.00	6.16	40.4				
807	11.9	147.0	4.00	6.16	40.2				
810	11.9	147.0	4.01	6.17	40.1				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED Geotech bladder pump

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 ROTTEN 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	11.9	147.0	4.02	6.17	40.6				
2	11.9	147.1	4.03	6.16	40.4				
3	11.9	147.2	4.02	6.17	40.2				
4	11.9	147.2	4.02	6.17	40.2				
Average:	11.9	147.1	4.02	6.17	40.4	#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 ☐
2	(8270) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) JET A 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: 11/14/2017

Groundwater Low-Flow Sample Collection Form

Project Name:	Boeing Renton	Project Number:	0025217.099.099
Event:	Quarterly August 2017	Date/Time:	11/14 /2017 @ 850
Sample Number:	RGW257S 171114	Weather:	40s/50s PC
Landau Representative:	SRB		

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 9.35 Time: 817 Flow through cell vol. GW Meter No.(s HERON 3

Begin Purge: Date/Time: 11/14 /2017 825 End Purge: Date/Time: 11/ 14 /2017 @ 847 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	
828	12.4	144.5	4.40	6.36	88.9		9.35		
831	12.2	144.6	4.04	6.41	93.3		9.35		
834	12.2	144.8	4.14	6.41	94.4		9.35		

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED Geotech bladder pump

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 ROTTEN 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	12.3	144.9	3.93	6.42	94.9				
2	12.3	145.1	3.81	6.42	95.6				
3	12.3	145.2	3.90	6.43	95.9				
4	12.3	145.4	3.76	6.44	96.0				
Average:	12.3	145.2	3.85	6.43	95.6	#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 ☐
2	(8270) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) JET A 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: 11/14/2017

Groundwater Low-Flow Sample Collection Form

Project Name:	Boeing Renton	Project Number:	0025217.099.099
Event:	Quarterly August 2017	Date/Time:	11/ 14 /2017 @ 801
Sample Number:	RGW258S 171114	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) 7.73 Time: 730 Flow through cell vol. GW Meter No.(s HERON 1

Begin Purge: Date/Time: 11/ 14 /2017 @ 738 End Purge: Date/Time: 11/ 14 /2017 @ 759 Gallons Purged: 1

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	
741	12.7	261.4	1.05	6.99	32.1	LOW		<0.25	
744	12.8	270.3	0.74	6.74	26.0		7.73	0.25	
747	13.1	271.0	0.58	6.60	29.0				
750	13.1	268.1	0.52	6.53	31.2		7.73	0.5	
753	13.1	265.9	0.43	6.48	32.2				
756	13.0	264.5	0.49	6.46	32.9				
758	13.0	263.3	0.45	6.44	32.3				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED Geotech bladder pump

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	13.0	262.8	0.42	6.43	32.8				
2	13.0	262.4	0.49	6.43	32.3				
3	13.0	262.6	0.56	6.43	32.7				
4	13.0	262.4	0.58	6.43	33.2				
Average:	13.0	262.6	0.51	6.43	32.8	#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 ☐
2	(8270) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) JET A 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): MSMSD Location

Comments:

Signature: JHA Date: 11/14/2017

Groundwater Low-Flow Sample Collection Form

Project Name:	Boeing Renton	Project Number:	0025217.099.099
Event:	Quarterly August 2017	Date/Time:	11/ 13 /2017 @ 1055
Sample Number:	RGW081S 171113	Weather:	50S PC
Landau Representative:	SRB		

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 8.71 Time: 1024 Flow through cell vol. GW Meter No.(s HERON3

Begin Purge: Date/Time: 11/ 13 /2017 1026 End Purge: Date/Time: 11/13 /2017 @ 1052 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		
1029	14.6	174.6	1.29	6.40	6.8		8.71		
1032	14.3	176.6	1.23	6.40	1.2		8.71		
1035	14.0	179.6	1.21	6.41	-5.1		8.71		

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED Geotech bladder pump

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	13.6	179.9	1.20	6.42	-7.2				
2	13.4	179.8	1.18	6.43	-8.6				
3	13.3	179.9	1.15	6.43	-11.5				
4	13.0	179.5	1.14	6.44	-13.3				
Average:	13.3	179.8	1.17	6.43	-10.2	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
3	(8260C -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: SRB Date: 11/13/2017

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton
Project Number: 0025217.099.099
Event: Quarterly August 2017
Date/Time: 11/ 13 /2017 @ 941
Sample Number: RGW152S 171113
Weather: 40'S, CLOUDY
Landau Representative: JHA

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 9.07 Time: 915 Flow through cell vol. GW Meter No.(s HERON 1

Begin Purge: Date/Time: 11/ 13 /2017 @ 917 End Purge: Date/Time: 11/ 13 /2017 @ 938 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	
920	13.1	91.7	1.01	6.30	42.9	LOW		<0.25	
923	13.0	86.3	0.93	6.27	45.3			<0.25	
926	13.0	85.6	0.99	6.26	45.7	MED	9.07	0.25	
929	13.0	83.8	0.88	6.24	47.3			<0.50	
932	12.8	79.4	0.81	6.20	51.3			<0.50	
935	12.8	78.4	0.83	6.19	52.6				
937	12.9	77.9	0.71	6.17	54.8				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED Geotech bladder pump

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	12.9	77.7	0.73	6.17	54.7				
2	12.9	77.5	0.64	6.17	55.1				
3	12.9	77.3	0.62	6.16	55.4				
4	12.8	77.0	0.65	6.16	55.7				
Average:	12.9	77.4	0.66	6.17	55.2	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
3	(8260C -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 (RGWDUP1)

Comments:

Signature: JHA Date: 11/13/2017

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton
Project Number: 0025217.099.099
Event: Quarterly August 2017
Date/Time: 11/13 /2017 @ 1020
Sample Number: RGW153S 171113
Weather: 50S RAINY
Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 9.55 Time: 951 Flow through cell vol. GW Meter No.(s HERON3

Begin Purge: Date/Time: 11/13 /2017 955 End Purge: Date/Time: 11/ 13 /2017 @ 1017 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	
958	14.4	109.0	4.62	6.28	34.3		9.5		
1001	13.1	131.1	3.35	6.30	15.2		9.5		
1004	12.5	128.2	2.37	6.34	12.9		9.5		
1007	12.4	125.1	2.10	6.34	15.6				
1010	12.2	121.6	1.95	6.33	20.0				
1013	12.2	120.8	1.84	6.33	21.0				
1016	12.2	120.2	1.81	6.34	21.8				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED Geotech bladder pump

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	12.1	119.8	1.78	6.33	22.1				
2	12.1	119.6	1.76	6.33	22.6				
3	12.1	110.3	1.72	6.33	23.0				
4	12.1	119.0	1.71	6.34	23.8				
Average:	12.1	117.2	1.74	6.33	22.9	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
3	(8260C -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: SRB Date: 11/13/2017

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton
Project Number: 0025217.099.099
Event: Quarterly August 2017
Date/Time: 11/13 /2017 @ 920
Sample Number: RGW172S 171113
Weather: 50S RAINY
Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 9.7 Time: 850 Flow through cell vol. GW Meter No.(s HERON3

Begin Purge: Date/Time: 11/13 /2017 851 End Purge: Date/Time: 11/ 13 /2017 @ 916 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		
854	13.5	202.1	2.63	6.56	-43.7	9.75			
857	13.4	202.2	2.68	6.56	-41.5	9.75			
900	12.2	199.0	2.43	6.50	-29.6	9.75			

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED Geotech bladder pump

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	12.1	198.7	2.31	6.49	-29.1				
2	11.8	198.6	2.30	6.49	-29.2				
3	11.8	198.9	2.04	6.48	-29.1				
4	11.6	199.0	1.95	6.48	-29.6				
Average:	11.8	198.8	2.15	6.49	-29.3	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
3	(8260C -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: SRB Date: 11/13/2017

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton
Project Number: 0025217.099.099
Event: Quarterly August 2017
Date/Time: 11/ 13 /2017 @ 1026
Sample Number: RGW173S 171113
Weather:
Landau Representative: JHA

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 9.73 Time: 956 Flow through cell vol. GW Meter No.(s HERON1

Begin Purge: Date/Time: 11/ 13 /2017 @ 1000 End Purge: Date/Time: 11/ 13 /2017 @ 1021 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	
1003	12.8	302.4	3.62	6.36	7.7	MED		<0.25	
1006	12.2	332.0	2.51	6.40	5.1		9.73		
1009	11.9	338.9	2.16	6.39	3.5			0.25	
1012	11.7	353.9	1.40	6.40	-0.1		9.75		
1015	12.4	372.7	0.83	6.45	-13.6				
1018	12.6	375.5	0.75	6.47	-17.1		9.75		
1020	12.7	376.5	0.71	6.48	-18.7				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED Geotech bladder pump

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	12.8	376.7	0.69	6.48	-19.3				
2	12.8	377.0	0.68	6.49	-19.8				
3	12.7	377.1	0.68	6.49	-20.2				
4	12.7	377.4	0.68	6.49	-20.5				
Average:	12.8	377.1	0.68	6.49	-20.0	#DIV/0!	9.87		

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
3	(8260C -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: 11/13/2017

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton
Project Number: 0025217.099.099
Event: Quarterly August 2017
Date/Time: 11/13 /2017 @ 950
Sample Number: RGW226S 171113
Weather: 50S RAINY
Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 8.9 Time: 921 Flow through cell vol. GW Meter No.(s HERON3

Begin Purge: Date/Time: 11/13 /2017 923 End Purge: Date/Time: 11/ 13 /2017 @ 948 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	
926	14.6	186.0	2.61	6.49	-13.2		8.9		
929	13.9	184.0	2.49	6.47	-10.9		8.9		
932	13.7	183.0	2.51	6.46	-12.9		8.9		

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED Geotech bladder pump

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.): SLIGHLTY 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	13.2	183.0	2.53	6.46	-13.4				
2	13.0	186.3	2.81	6.46	-12.6				
3	12.9	186.0	2.77	6.46	-12.6				
4	12.6	192.0	2.79	6.44	-12.1				
Average:	12.9	186.8	2.73	6.46	-12.7	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
3	(8260C -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: SRB Date: 11/13/2017

Groundwater Low-Flow Sample Collection Form

Project Name:	Boeing Renton	Project Number:	0025217.099.099
Event:	Quarterly August 2017	Date/Time:	11/ 13 /2017 @ 755
Sample Number:	RGW232S 1711	Weather:	50S RAINY
Landau Representative:	SRB		

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 7.9 Time: 721 Flow through cell vol. GW Meter No.(s HERON3

Begin Purge: Date/Time: 11/ 13 /2017 725 End Purge: Date/Time: 11/ 13 /2017 @ 745 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		
728	133.4	423.0	6.06	5.88	14.2		7.9		
731	13.4	445.0	6.70	5.93	-16.7		8.35		
734	13.6	538.0	6.49	6.25	-80.0		8.4		
737	13.3	535.0	6.57	6.27	-85.0		8.4		
740	12.4	520.0	6.84	6.26	-92.2		8.4		

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED Geotech bladder pump

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	515.0	6.87	6.25	-93.0				
2	11.9	512.0	6.98	6.25	-92.7				
3	11.8	510.0	6.92	6.24	-92.8				
4	11.4	507.0	7.02	6.24	-93.0				
Average:	11.8	511.0	6.95	6.25	-92.9	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
3	(8260C -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: SRB Date: 11/13/2017

Groundwater Low-Flow Sample Collection Form

Project Name:	Boeing Renton	Project Number:	0025217.099.099
Event:	Quarterly August 2017	Date/Time:	11/ 13 /2017 @ 751
Sample Number:	RGW233I 171113	Weather:	40'S, PARTLY CLOUDY
Landau Representative:	JHA		

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 7.49 Time: 73\25 Flow through cell vol. GW Meter No.(s HERON 1

Begin Purge: Date/Time: 11/ 13 /2017 @ 728 End Purge: Date/Time: 11/ 13 /2017 @ 748 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	
731	13.9	209.3	1.07	8.16	-71.3	LOW	7.49	<0.25	
734	14.1	203.8	0.58	7.47	-45.8				
737	14.0	198.3	0.63	7.23	-27.9		7.49	0.25	
740	14.0	196.8	0.66	7.15	-23.6				
743	14.1	196.7	0.48	7.08	-18.0				
746	14.2	195.9	0.48	6.94	-10.5		7.49		
748	14.1	194.9	0.48	6.92	-7.8				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ☒ Pump/Pump Type DED Geotech bladder pump

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	194.4	0.53	6.91	-6.9				
2	14.1	194.5	0.51	6.00	-6.8				
3	14.1	194.6	0.49	6.89	-6.7				
4	14.1	194.9	0.48	6.89	-6.0				
Average:	14.1	194.6	0.50	6.67	-6.6	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
3	(8260C -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: 11/13/2017

Groundwater Low-Flow Sample Collection Form

Project Name:	Boeing Renton	Project Number:	0025217.099.099
Event:	Quarterly August 2017	Date/Time:	11/ 13 /2017 @ 906
Sample Number:	RGW234S 171113	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) 8/.16 Time: 842 Flow through cell vol. GW Meter No.(s HERON 1

Begin Purge: Date/Time: 11/ 13 /2017 @ 845 End Purge: Date/Time: 11/ 13 /2017 @ 858 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	
848	12.7	148.5	3.99	6.37	48.1	LOW		<0.25	
851	13.0	114.4	4.87	6.40	43.2		8.16		
854	12.3	109.2	4.91	6.39	44.1		8.16		
857	12.7	109.3	4.90	6.39	44.2				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED Geotech bladder pump

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	12.7	109.3	4.90	6.39	44.2				
2	12.7	109.3	4.87	6.39	44.3				
3	12.7	109.3	4.86	6.39	44.3				
4	12.7	109.3	4.87	6.39	44.3				
Average:	12.7	109.3	4.88	6.39	44.3	#DIV/0!	8.21		

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
3	(8260C -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: DO IS HIGHER THAN SURROUNDING WELLS. CHECKED OUT FINE.

Signature: JHA Date: 11/13/2017

Groundwater Low-Flow Sample Collection Form

Project Name:	Boeing Renton	Project Number:	0025217.099.099
Event:	Quarterly August 2017	Date/Time:	11/ 13 /2017 @846
Sample Number:	RGW235I 171113	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) 7.7 Time: 820 Flow through cell vol. GW Meter No.(s HERON 1

Begin Purge: Date/Time: 11/ 13 /2017 @ 825 End Purge: Date/Time: 11/ 13 /2017 @ 837 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		
828	12.0	148.5	1.19	6.67	25.3	LOW		<0.25	
831	12.2	143.0	1.12	6.68	19.7		7.7		
834	12.3	140.1	1.09	6.66	13.5				
837	12.3	139.9	1.09	6.66	13.4				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED Geotech bladder pump

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	12.3	139.9	1.09	6.66	13.4				
2	12.3	139.8	1.09	6.66	13.3				
3	12.3	139.8	1.10	6.66	13.3				
4	12.3	139.7	1.12	6.66	13.3				
Average:	12.3	139.8	1.10	6.66	13.3	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
3	(8260C -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: 11/13/2017

Groundwater Low-Flow Sample Collection Form

Project Name:	Boeing Renton	Project Number:	0025217.099.099
Event:	Quarterly August 2017	Date/Time:	11/ 13 /2017 @ 840
Sample Number:	RGW236S 171113	Weather:	50S RAINY
Landau Representative:	SRB		

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 7.3 Time: 814 Flow through cell vol. GW Meter No.(s HERON3

Begin Purge: Date/Time: 11/ 13 /2017 815 End Purge: Date/Time: 11/ 13 /2017 @ 837 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		
818	14.1	311.0	2.32	6.46	-33.0		7.4		
821	12.0	326.6	3.20	6.52	-40.6		7.35		
824	11.3	324.0	3.93	6.52	-41.0		7.3		
827	10.7	319.0	4.69	6.52	-41.0				
830	10.1	311.7	4.90	6.51	-39.0				
833	9.9	308.7	4.83	6.51	-37.8				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED Geotech bladder pump

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	9.8	307.2	4.80	6.51	-37.4				
2	9.8	306.5	4.82	6.51	-37.2				
3	9.7	306.0	4.81	6.50	-36.9				
4	9.7	305.5	4.79	6.50	-36.7				
Average:	9.8	306.3	4.81	6.51	-37.1	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
3	(8260C -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: SRB Date: 11/13/2017

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:	January 11, 2018		

Subject: **Summary Data Quality Review**
November 2017 Boeing Renton Groundwater Sampling
SWMU-172/174
ARI Group Number: 17K0211

This memo presents the summary data quality review of 11 primary groundwater samples, one groundwater field duplicate, and one trip blank sample collected on November 13, 2017. 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) (cis-1,2-dichloroethene, tetrachloroethene, trichloroethene, and vinyl chloride) by U.S. Environmental Protection Agency (EPA) Method 8260C with selected ion monitoring (SIM);
- Total organic carbon (TOC) by Standard Method (SM) 5310; and
- Total metals (arsenic, copper, and lead) by EPA Method 6020A.

The samples and the analyses conducted on the samples are listed below.

Sample ID	Laboratory Sample ID	Requested Analyses
RGW233I-171113	17K0211-01	all
RGW232S-171113	17K0211-02	all
RGWDUP1-171113	17K0211-03	all
RGW236S-171113	17K0211-04	all
RGW235I-171113	17K0211-05	all
RGW234S-171113	17K0211-06	all
RGW172S-171113	17K0211-07	all
RGW152S-171113	17K0211-08	all
RGW226S-171113	17K0211-09	all
RGW153S-171113	17K0211-10	all
RGW173S-171113	17K0211-11	all
RGW081S-171113	17K0211-12	all
Trip Blanks	17K0211-13	VOCs

Amec Foster Wheeler Environment & Infrastructure, Inc.
600 University Street, Suite 600
Seattle, Washington
USA 98101-4107
Tel (206) 342-1760
Fax (206) 342-1761
www.amecfw.com

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 November 14, 2017. 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 (ng/L)	Duplicate Result (ng/L)	Reporting Limit (ng/L)	RPD (%)
RGW152-171113/ RGWDUP-171113	vinyl chloride	44.9	40.9	20	NC
	cis-1,2-dichloroethene	203	188	20	8
	trichloroethene	146	149	20	2
	tetrachloroethene	529	589	20	11

<u>Notes</u>
ng/L = nanograms per liter
NC = not calculated
RPD= relative percent difference

7. Reporting Limits and Laboratory Flags – Acceptable except as noted:

   The vinyl chloride results in samples RGW232S-171113, RGWDUP1-171113, RGW172S-171113, RGW152S-171113, RGW226S-171113, and RGW173S-171113 were flagged with an "M" by the laboratory to indicate that the results were estimated values detected and confirmed by an analyst but with a low spectral match. The results are reported as estimated and flagged with a "J."

INORGANIC ANALYSES

Samples were analyzed for total metals and TOC. 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, except for total arsenic, copper, and lead. The results for the affected analytes in samples RGW152S-170508 and RGWDUP-170508 are qualified as estimated and flagged with a "J."

Sample ID/ Field Duplicate ID	Analyte	Primary Result (µg/L)	Duplicate Result (µg/L)	Reporting Limit (µg/L)	RPD (%)
RGW152S-171113/ RGWDUP-171113	TOC	2.84	2.60	0.50	9
	total arsenic	1.56	1.69	0.200	8
	total copper	2.95	3.14	0.500	6
	total lead	1.54	1.79	0.100	15

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 work order number 17K0211 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-171113	none			
RGW232S-171113	vinyl chloride	621 J	ng/L	flagged “M” by laboratory
RGWDUP1-171113	vinyl chloride	40.9 J	ng/L	flagged “M” by laboratory
RGW236S-171113	none			
RGW235I-171113	none			
RGW234S-171113	none			
RGW172S-171113	vinyl chloride	286 J	ng/L	flagged “M” by laboratory
RGW152S-171113	vinyl chloride	44.9 J	ng/L	flagged “M” by laboratory
RGW226S-171113	vinyl chloride	48.3 J	ng/L	flagged “M” by laboratory
RGW153S-171113	none			
RGW173S-171113	vinyl chloride	70.5 J	ng/L	flagged “M” by laboratory
RGW081S-171113	none			
Trip Blanks	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), 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
From: Crystal Thimsen
Tel: (206) 342-1760
Fax: (206) 342-1761
Date: January 11, 2018

Project: 0088880100.2018
cc: Project File

Subject: **Summary Data Quality Review**
November 2017 Boeing Renton Groundwater Sampling
Building 4-78/79 SWMU/AOC Group
ARI Work Order Numbers: 17K0213 and 17K0264

This memo presents the summary data quality review of 17 primary groundwater samples, one field duplicate groundwater sample, and two trip blank samples collected on November 13 and 14, 2017. 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-G; and
- Total organic carbon (TOC) by Standard Method (SM) 5310B-00.

The samples and the analyses conducted on the samples are listed below.

Sample ID	Laboratory Sample ID	Requested Analyses
RGW234I-171113	17K0213-01	all
RGW-241S-171113	17K0213-02	all
RGW240D-171113	17K0213-03	all
RGW-242I-171113	17K0213-04	all
RGW143S-171113	17K0213-05	all
RGW238I-171113	17K0213-06	all
RGW033S-171113	17K0213-07	all
RGW237S-171113	17K0213-08	all
RGW209S-171113	17K0213-09	all
RGW039S-171113	17K0213-10	all
RGW034S-171113	17K0213-11	all
RGW243I-171113	17K0213-12	all
RGW038S-171113	17K0213-13	all

Amec Foster Wheeler Environment & Infrastructure, Inc.
600 University Street, Suite 600
Seattle, Washington
USA 98101-4107
Tel (206) 342-1760
Fax (206) 342-1761
www.amecfw.com

Sample ID	Laboratory Sample ID	Requested Analyses
RGW244S-171113	17K0213-14	all
Trip Blanks	17K0213-15	VOCs and TPH-G
RGWDUP2-171114	17K0264-01	all
RGW031S-171114	17K0264-02	all
RGW210S-171114	17K0264-03	all
Trip Blanks	17K0264-04	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 EPA guidelines (EPA, 2014a and b).

ARI received the samples on November 14 and 15, 2017. 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:

- A large air bubble (> than 2 millimeters) was noted in one of three vials submitted for sample RGW240D-171113, a pea-sized bubble (approximately 2 to 4 millimeters) was noted in one of three of three vials submitted analysis of sample RGW238I-171113, and pea-sized bubbles were noted in both of the 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:

   <u>VOCs by EPA 8260C:</u> The recoveries for one of four surrogates, 1,2-dichloroethane-d4, were 217 and 218 percent, respectively, in the initial analyses of samples RGWDUP2-171114 and RGW031S-171114, greater than the control limits of 80 to 129 percent. The samples were reanalyzed with similar surrogate recoveries. The results are reported from

the initial analysis and the detected results are qualified as estimated, due to the potential high bias. Non-detected results 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 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.

Sample ID/ Field Duplicate ID	Analyte	Primary Result (µg/L)	Duplicate Result (µg/L)	Primary/Duplicate Reporting Limit (µg/L)	RPD (%)
RGW031S-171114/ RGWDUP2-171114	benzene cis-1,2-dichloroethene TPH-G	59.9 0.47 3,040	59.2 0.38 2,940	0.2 0.2 100	1 NC 3

Notes
µg/L = micrograms per liter
NC = not calculated
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 vinyl chloride and cis-1,2-dichloroethene results in sample RGW033S-171113 with an "E" to indicate the results were greater than the calibration range of the instrument. The samples were diluted and reanalyzed. The "E" flagged results are reported from the diluted analyses and the remaining results are reported from the initial analyses.

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 (mg/L)	Duplicate Result (mg/L)	Reporting Limit (mg/L)	RPD (%)
RGW031S-171114/ RGWDUP2-171114	TOC	14.4	14.8	0.5	3

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 work order numbers 17K0213 and 17K0264 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	Qualifier Reason
RGW234I-171113	none		
RGW-241S-171113	none		
RGW240D-171113	none		
RGW-242I-171113	none		
RGW143S-171113	none		
RGW238I-171113	none		
RGW033S-171113	none		
RGW237S-171113	none		
RGW209S-171113	none		
RGW039S-171113	none		
RGW034S-171113	none		
RGW243I-171113	none		
RGW038S-171113	none		
RGW244S-171113	none		
Trip Blanks	none		
RGWDUP2-171114	cis-1,2-dichloroethene benzene	0.38 J 59.2 J	surrogate recovery
RGW031S-171114	vinyl chloride cis-1,2-dichloroethene benzene	0.20 J 0.47 J 59.9 J	surrogate recovery
RGW210S-171114	none		
Trip Blanks	none		

Notes
J = the value is an estimate

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:	January 11, 2018		

Subject: **Summary Data Quality Review**
November 2018 Boeing Renton Groundwater Sampling
Former Fuel Farm AOC Group
ARI Work Order Number: 17K0262

This memo presents the summary data quality review of 11 primary groundwater samples and one field duplicate collected on November 14, 2017. The samples were submitted to Analytical Resources Inc. (ARI), a Washington State Department of Ecology (Ecology)-accredited laboratory located in Tukwila, Washington. The samples were analyzed for total petroleum hydrocarbons as diesel (TPH-D), plus motor oil (TPH-O) and Jet-A (TPH-Jet A) ranges by Ecology Method NWTPH-Dx.

The samples and the analyses conducted on the samples are listed below.

Sample ID	Laboratory Sample ID	Requested Analyses
RGWDUP3-171114	17K0262-01	all
RGW255S-171114	17K0262-02	all
RGW224S-171114	17K0262-03	all
RGW258S-171114	17K0262-04	all
RGW256S-171114	17K0262-05	all
RGW225I-171114	17K0262-06	all
RGW212S-171114	17K0262-07	all
RGW183S-171114	17K0262-08	all
RGW257S-171114	17K0262-09	all
RGW184S-171114	17K0262-10	all
RGW221S-171114	17K0262-11	all
RGW211S-171114	17K0262-12	all

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 November 15, 2017. The temperatures of the coolers were recorded upon receipt and were below the maximum acceptable temperature of 6 degrees Celsius (6°C).

ORGANIC ANALYSES

Samples were analyzed for TPH-D plus TPH-O and TPH-Jet A ranges. Laboratory data were evaluated for the following parameters:

1. Preservation and Holding Times – Acceptable
2. Blanks – Acceptable
3. Surrogates – Acceptable
4. LCS – 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 5 percent, or one for every 20 samples. Primary and duplicate results are summarized in the table below. The field duplicate relative percent difference (RPD) is within the project-specific control limit of 30 percent for concentrations greater than five times the reporting limit.

Sample ID/ Field Duplicate ID	Analyte	Primary Result (mg/L)	Duplicate Result (mg/L)	Reporting Limit (mg/L)	RPD (%)
RGW224S-171114/ RGWDUP3-171114	DRO C12-C24	1.84	1.72	0.100	7
	TPH JetA C10-C18	1.97	1.72	0.100	14

Notes
mg/L = milligrams per liter
DRO = diesel range organics
RPD = relative percent difference
TPH = total petroleum hydrocarbons

7. Reporting Limits – Acceptable

OVERALL ASSESSMENT OF DATA

The table below summarizes the data review. The completeness of ARI work order number 17K0262 is 100 percent. Evaluation of the usefulness of these data is 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 meet the project's data quality objectives.

Sample ID	Qualified Analyte
RGWDUP3-171114	none
RGW255S-171114	none
RGW224S-171114	none
RGW258S-171114	none
RGW256S-171114	none
RGW225I-171114	none
RGW212S-171114	none
RGW183S-171114	none
RGW257S-171114	none
RGW184S-171114	none
RGW221S-171114	none
RGW211S-171114	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), 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:	January 11, 2018		

Subject: **Summary Data Quality Review**
November 2017 Boeing Renton Groundwater Sampling
AOC-001 and -002 and AOC-003
ARI Work Order Number: 17K0272

This memo presents the summary data quality review of eight primary groundwater samples, one field duplicate, and one trip blank sample collected on November 14, 2017. 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 from AOC-001 and -002 were analyzed for the following:

- Volatile organic compounds (VOCs) (benzene only) 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
RGWDUP4-171114	17K0272-01	all AOC-001 and -002 analyses
RGW247S-171114	17K0272-02	all AOC-003 analyses
RGW248I-171114	17K0272-03	all AOC-003 analyses
RGW194S-171114	17K0272-04	all AOC-001 and -002 analyses
RGW185S-171114	17K0272-05	all AOC-001 and -002 analyses
RGW197S-171114	17K0272-06	all AOC-001 and -002 analyses
RGW245S-171114	17K0272-07	all AOC-001 and -002 analyses
RGW195S-171114	17K0272-08	all AOC-001 and -002 analyses
RGW196D-171114	17K0272-09	all AOC-001 and -002 analyses

Amec Foster Wheeler Environment & Infrastructure, Inc.
600 University Street, Suite 600
Seattle, Washington
USA 98101-4107
Tel (206) 342-1760
Fax (206) 342-1761
www.amecfw.com

Sample ID	Laboratory Sample ID	Requested Analyses
Trip Blanks	17K0272-10	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 November 15, 2017. The temperatures of the coolers were recorded upon receipt and were below the maximum acceptable temperature of 6 degrees Celsius (°C). The laboratory noted the following upon sample receipt:

- A small air bubble (approximately 2 millimeters [mm]) was noted in one of five vials submitted for sample RGWDUP4-171114, three of nine vials submitted for sample RGW248I-171114 had small, pea-size (approximately 2 to 4 mm), and large (>4 mm) bubbles, one of five vials submitted for sample RGW194S-171114 had a small bubble, air bubbles ranging in size from small to large were noted in all five vials submitted for sample RGW185S-171114, air bubbles ranging in size from small to large were noted in three of five vials submitted for sample RGW197S-171114, a large air bubble was noted in one of five vials submitted for sample RGW195S-171114, air bubbles ranging in size from small to large were noted in four of five vials submitted for sample RGW196D-171114, and a large bubble was noted in one of six vials submitted for the trip blank. The laboratory proceeded with analysis using the least affected vials 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

   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 were both below detection; therefore, field duplicate relative percent differences could not be calculated.

7. Reporting Limits and Laboratory Flags – Acceptable except as noted:

   The vinyl chloride results in samples RGW247S-171114, RGW248I-171114, RGW185S-171114, RGW197S-171114, RGW245S-171114, RGW195S-171114, and RGW196D-171114 were flagged with an "M" by the laboratory to indicate that the results were estimated values detected and confirmed by an analyst but with a low spectral match. The results are reported 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 (%)
RGW194S-171114/ RGWDUP4-171114	TOC	14.7	14.6	0.50	1

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 work order number 17K0272is 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
RGWDUP4-171114	none			
RGW247S-171114	vinyl chloride	489 J	ng/L	flagged “M” by laboratory
RGW248I-171114	vinyl chloride	617 J	ng/L	flagged “M” by laboratory
RGW194S-171114	none			
RGW185S-171114	vinyl chloride	461 J	ng/L	flagged “M” by laboratory
RGW197S-171114	vinyl chloride	84.3 J	ng/L	flagged “M” by laboratory
RGW245S-171114	vinyl chloride	21.0 J	ng/L	flagged “M” by laboratory
RGW195S-171114	vinyl chloride	137 J	ng/L	flagged “M” by laboratory
RGW196D-171114	vinyl chloride	58.2 J	ng/L	flagged “M” by laboratory
Trip Blanks	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), 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:	January 10, 2018		

Subject: **Summary Data Quality Review**
November 2017 Boeing Renton Groundwater Sampling
AOC-034 and -035
ARI Work Order Number: 17K0265

This memo presents the summary data quality review of four primary groundwater samples and one trip blank collected on November 14, 2017. 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) (cis-1,2-dichloroethene and vinyl chloride) by U.S. Environmental Protection Agency (EPA) Method 8260C.

The samples and the analyses conducted on the samples are listed below.

Sample ID	Laboratory Sample ID	Requested Analyses
RGW217S-171114	17K0265-01	all
RGW216S-171114	17K0265-02	all
RGW218S-171114	17K0265-03	all
RGW251S-171114	17K0265-04	all
Trip Blank	17K0265-05	all

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 guidance documents (EPA, 2014).

Amec Foster Wheeler Environment & Infrastructure, Inc.
600 University Street, Suite 600
Seattle, Washington
USA 98101-4107
Tel (206) 342-1760
Fax (206) 342-1761
www.amecfw.com

ARI received the samples on November 15, 2017. The temperature of the cooler was recorded upon receipt and was below the maximum acceptable temperature of 6 degrees Celsius (°C). The laboratory noted the following upon sample receipt:

- A pea-sized bubble (approximately 2 to 4 millimeters [mm]) was noted in one of two vials submitted for the trip blank. The laboratory proceeded with analysis using the unaffected vail 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

   Extra volume was not submitted for project specific MS/MSD analyses. Sample precision is evaluated based on LCS and LCSD recoveries. The MS/MSD project frequency requirement of one MS/MSD for every 20 samples was achieved with extra volume submitted 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

OVERALL ASSESSMENT OF DATA

The table below summarizes the data review. The completeness of work order number 17K0265 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 meet the project's data quality objectives.

Sample ID	Qualified Analyte
RGW217S-171114	none
RGW216S-171114	none
RGW218S-171114	none
RGW251S-171114	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.

U.S. Environmental Protection Agency (EPA), 2014, 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:	January 11, 2018		

Subject: **Summary Data Quality Review**
November 2017 Boeing Renton Groundwater Sampling
Building 10-71 Parcel
ARI Work Order Number: 17K0266

This memo presents the summary data quality review of three primary groundwater samples and one trip blank sample collected on November 14, 2017. 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) (vinyl chloride, cis-1,2-dichloroethene, trichloroethene, and toluene) by U.S. Environmental Protection Agency (EPA) Method 8260C.

The samples and the analyses conducted on the samples are listed in the table below.

Sample ID	Laboratory Sample ID	Requested Analyses
10-71-MW4-171114	17K0266-01	VOCs
10-71-MW2-171114	17K0266-02	VOCs
10-71-MW1-171114	17K0266-03	VOCs
Trip Blank	17K0266-04	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 EPA guidelines (EPA, 2014).

ARI received the samples on November 15, 2017. The temperature of the cooler was recorded upon receipt and was 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

   Extra volume was not submitted for project specific MS/MSD analyses. Sample precision is evaluated based on LCS and LCSD recoveries. The MS/MSD project frequency requirement of one MS/MSD for every 20 samples was achieved with extra volume submitted 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

OVERALL ASSESSMENT OF DATA

The table below summarizes the data assessment. The completeness of work order number 17K0266 is 100 percent. Evaluation of the usefulness of these data is 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 are not qualified and meet the project's data quality objectives.

Sample ID	Qualified Analyte
10-71-MW4-171114	none
10-71-MW2-171114	none
10-71-MW1-171114	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.

U.S. Environmental Protection Agency (EPA), 2014, 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:	January 10, 2018		

Subject: **Summary Data Quality Review**
November 2017 Boeing Renton Groundwater Sampling
Apron A
ARI Work Order Number: 17K0267

This memo presents the summary data quality review of two primary groundwater samples and one trip blank sample collected on November 14, 2017. 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) (vinyl chloride and *cis*-1,2-dichloroethene) by U.S. Environmental Protection Agency (EPA) Method 8260C; and
- Total organic carbon (TOC) by Standard Method (SM) 5310B.

The samples and the analyses conducted on the samples are listed below.

Sample ID	Laboratory Sample ID	Requested Analyses
RGW262S-171114	17K0267-01	all
RGW264S-171114	17K0267-02	all
Trip Blank	17K0267-03	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).

Amec Foster Wheeler Environment & Infrastructure, Inc.
600 University Street, Suite 600
Seattle, Washington
USA 98101-4107
Tel (206) 342-1760
Fax (206) 342-1761
www.amecfw.com

ARI received the samples on November 15, 2017. The temperature of the cooler was recorded upon receipt and was below the maximum acceptable temperature of 6 degrees Celsius (°C). The laboratory noted the following upon sample receipt:

- Air bubbles ranging in size from small (approximately 2 millimeters [mm]) to large (>4 mm) were noted in three of three vials submitted for VOC analysis of sample RGW262S-171114, a pea-sized (approximately 2 to 4 mm) bubble was noted in one of three vials submitted for VOC analysis of sample RGW264S-171114, and both vials submitted for the trip blank also had pea-sized bubbles. The laboratory proceeded with analysis using the least impacted vials 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

   Extra volume was not submitted for project specific MS/MSD analyses. Sample precision is evaluated based on LCS and LCSD recoveries. The MS/MSD project frequency requirement of one MS/MSD for every 20 samples was achieved with extra volume submitted 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

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/MSD – Acceptable

   Extra volume was not submitted for project specific MS/MSD analyses. Sample precision is evaluated based on LCS and LCSD recoveries. The MS/MSD project frequency requirement of one MS/MSD for every 20 samples was achieved with extra volume submitted at other sites included in this sampling event.

5. Laboratory Duplicates – Acceptable

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 table below summarizes the data assessment. The completeness of work order number 17K0267 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
RGW262S-171114	none
RGW264S-171114	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.

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.

APPENDIX D

SVE Report

APPENDIX D

Summary of Remedial Actions at the Boeing Renton Facility
October - December 2017

Boeing Renton Site
Renton, Washington

Prepared for:
The Boeing Company
EHS Remediation

Prepared by:
CALIBRE Systems, Inc.
Project No. K0357000

February 13, 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 fourth quarter of 2017 (between October 1 and December 31, 2017). 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, and;
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 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).

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 fourth quarter of 2017. This includes operations and 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 – Recommended Next Steps for the SVE Systems
Section 4 – Groundwater Treatment
Section 5 – Conclusions and Recommendations
Section 6 – 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 period covered in this report, both systems were operated in a manner consistent with the goals and operating procedures presented in the EDR. The following sections summarize the operating conditions, operational changes, and performance monitoring/evaluation for the SVE systems.

2.1 Building 4-79/4-79 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.

Routine maintenance including oil changes, drive-belt tensioning and inspection, inspection of the air filter, and inspection of the moisture separator was completed per the Operations Manual (CALIBRE, 2014). System monitoring includes regular monitoring of total organic vapor concentrations with a calibrated photo-ionization detector (PID), a field instrument, coupled with selected vapor samples submitted for laboratory TO-15 analysis for VOCs.

2.1.1 TO-15 Laboratory Analysis of Vapor Samples

Four vapor samples were collected from the Building 4-78/79 SVE system for TO-15 analysis on December 8, 2017. The results showed TCE represented approximately 75% of the total VOCs in the air extracted from the SVE system influent sample. Table 2-1 summarizes the TO-15 detections for the Building 4-78/79 SVE system for nine TO-15 sampling events that have been implemented since system startup[1]. The data collected over time indicate that TCE is the primary VOC detected with two exceptions. Total petroleum hydrocarbons in the gasoline range (TPHg) were detected at relatively high concentrations in the Building 4-78/79 system influent in October 2015, and again in September 2016. TPHg was not detected in the current December 2017 sampling event. The samples were analyzed by EuroFins Air Toxics and the laboratory report is included in Attachment B.

---

[1] Multiple changes to SVE system operations have been implemented over the period where data are shown. Changes to extraction flow rates by SVE wells are used to maximize the VOC mass removal and the corresponding SVE influent concentration is highly dependent on the flow rate from selected wells.

2.1.2 Summary of Operations and Operational Changes

CALIBRE was onsite on October 4, 2017 to install the 4-78/79 benzene treatment wells. As a precautionary measure to avoid disrupting utilities, 'air-knifing' was completed by Holt Drilling using a vacuum truck, during which no utilities and no groundwater was encountered to a depth of approximately 6-7 ft below ground surface (bgs), however petroleum odors were observed at three of the new well locations in the shallow subsurface (B78-18, B78-19, and B78-20). An operational change to the Building 4-78/79 SVE system was initiated on October 5, 2017 to focus vapor removal in the area of these new wells. To accomplish this, the bleed valves at SVE wells SVE-10, SVE-11, and SVE-12 (located up gradient on Manifold 3) were opened and the operating valves on all Manifold 3 wells were closed. At Manifold 2 the operating valves at SVE wells SVE-7 and SVE-8, located in the area of the new benzene treatment wells, were opened 100% along with the primary valve controlling Manifold 2. The remaining wells on Manifold 2 were closed. The primary valve controlling wells at Manifold 1 was also closed. The recycle valve located inside the SVE trailer was opened slightly to control total vacuum of the system. These changes allowed ambient air to flush through the opened bleed valves at Manifold 3 and flush towards SVE-7 and SVE-8, focusing the entire vapor extraction in the area of the new treatment wells. PID measurements were collected at the influent, SVE-7 and SVE-8 before the adjustments were made and approximately 1 hour and 4 hours after adjustment on October 5, 2017. Concentrations measured with the PID showed an increase at the 1 hour and 4 hour mark indicating flushing through the area was occurring (see Table 2-2). The system was operated in this manner for the rest of October and November to allow thorough flushing of this area.

On December 8, 2017 the system was adjusted to allow air flow from all 15 wells of the Building 4-78/79 SVE system. PID measurements were collected from six wells which have historically shown higher concentrations (SVE-1, SVE-3, SVE-6, SVE-8, SVE-10, and SVE-12; see Attachment A). Based on those PID measurements, three wells (one from each manifold) and the influent were selected for TO-15 analysis to provide data for the planned rebound testing.

On December 15, 2017 the Building 4-78/79 SVE system was shut down to begin a 30 day rest period for the rebound testing. After shut down, approximately one teaspoon of blower oil was poured over the impeller and the system restarted momentarily to spread the oil over the impeller to prevent the blower from seizing during the rest period. This process was repeated two more times to ensure full coverage over the impeller. The condensate pump was run momentarily to ensure all water was removed to prevent the pump and hoses from freezing/cracking during the rest period as well.

Table 2-2 shows the PID readings for selected wells in the Building 4-78/79 SVE system. Table 2-3 shows the operational parameters (flow rate and PID readings) and a summary of the mass removal for the SVE system over this quarter.

2.1.3 Mass Removal Estimate

Between April 17, 2015 (system startup) and December 15, 2017 the Building 4-78/79 SVE system has recovered an estimated 17.3 pounds of VOCs (a mixture of TCE, other CVOCs, and fuel related compounds), as shown in Tables 2-1 and 2-3. Approximately 0.6 pounds of VOCs were removed during the current reporting period (fourth quarter 2017). The prior quarter showed a similar mass removal of VOCs, 0.4 lbs. The PID concentrations at the system influent during the current and previous quarter showed steady low-level concentrations. In this period, TCE accounted for 75% of the total VOCs detected in the TO-15 analysis (Table 2-1). The cumulative VOC mass removal for the Building 4-78/79 SVE system is shown in graphical form on Figure 2-2.

Figure 2-3 shows the total VOC and TCE mass removal for the Building 4-78/79 system, by calendar quarter. The solid bars on Figure 2-3 correspond to the total VOCs mass removed (as measured with a PID at the inlet to the SVE system). The hatched bars represent the TCE mass removed by quarter. The TCE values were calculated by applying a relative fraction of TCE to the total VOC values based on the TO-15 analytical results. The substantial difference between the total VOCs and the TCE fraction in the Fall of 2015 reflects a "slug" of TPHg that was measured in the October 13, 2015 TO-15 sample. At that time, TPHg represented 85% of the total VOCs, while TCE was slightly under 10% of the total VOCs. TPHg was not detected in the December 2017 TO-15 influent results and TCE represented 75% of the total VOCs. The lower/intermittent mass removal rate during winter 2016 was due to problems encountered when excess water was generated from the vapor extraction resulting in a temporary shutdown of the SVE system. The dashed line is an exponential curve fit to the bar chart of the TCE mass removal data. The general shape of the curve is consistent with an asymptotically declining TCE mass removal rate.

2.2 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 2-4. 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.

Routine maintenance including oil changes, drive-belt tensioning and inspection, and inspection of the moisture separator was completed as per the Operations Manual (CALIBRE, 2014). Similar to the 4-78/79 SVE system, screening includes regular monitoring of total organic vapor concentrations with a calibrated PID coupled with selected vapor samples submitted for laboratory TO-15 analysis for VOCs.

2.2.1 TO-15 Laboratory Analysis of Vapor Samples

Two vapor samples were collected from the SWMU-172/174 SVE system for TO-15 analysis on December 8, 2017. The results showed PCE represented approximately 90% of the total VOCs for the SWMU-172/174 SVE system influent sample. These current monitoring results show an 80% decrease in PCE and 84% decrease in total VOC concentrations compared to the rebound testing data collected in May 2017. Table

2-4 summarizes the TO-15 detections for the SWMU-172/174 SVE system for nine TO-15 sampling events[2] that have been implemented since system startup. The laboratory report is included in Attachment B.

2.2.2 Summary of Operations and Operational Changes

The SVE system operated nearly continuously (approximately 91%) throughout the fourth quarter 2017. The system shut down in November 2017 likely due to an electrical fault. Upon system startup on November 30, 2017 the influent concentration was measured with a PID and shown to have increased during the time the system was down (see Table 2-5). A PID measurement was collected approximately five hours after the restart and the levels had dropped marginally (1,720 ppbv to 1,545 ppbv). PID measurements were collected again on December 8, 2017 and had dropped to 1,220 ppbv indicating some rebound had occurred during the SVE system down time but concentrations were declining. Approximately 1 gallon of water was generated in the moisture separator at the SWMU-172/174 SVE system in this quarter.

On December 15, 2017 the SWMU-172/174 SVE system was shut down to begin a 30 day rest period for the rebound testing. Upon arrival at the site the system flow rate was at 0" H2O and the vacuum was elevated at 86" H2O (normally around 40" H2O). After inspection it was determined the air filter had become clogged. The air filter was removed and a replacement was ordered. At that point the system was shut down and approximately one tsp of blower oil was poured over the impeller and the system restarted momentarily to spread the oil over the impeller to prevent the blower from seizing during the rest period. This process was repeated two more times to ensure full coverage over the impeller. The condensate pump was run momentarily to ensure all water was removed to prevent the pump and hoses from freezing/cracking during the rest period as well.

Table 2-5 shows the PID readings for the wells in the SWMU-172/174 SVE system. Table 2-6 shows the operational parameters (flow rate and PID readings) and a summary of the mass removal for the SVE system over this quarter.

2.2.3 Mass Removal Estimate

Between initial startup on April 17, 2015 and December 8, 2017 the SWMU-172/174 SVE system has recovered an estimated 13.0 pounds of VOCs (primarily PCE), as shown in Table 2-6. Approximately 0.7 pounds of VOCs were removed during the current reporting period (fourth quarter 2017), which was identical to the VOC mass removal in the prior quarter. In this period, PCE accounted for 90% of the total VOCs detected in the TO-15 analysis (Table 2-4). The cumulative VOC mass removal for the SWMU-172/174 SVE system is shown in graphical form on Figure 2-5. Figure 2-6 shows the total VOC and PCE mass removal rate by quarter for the SWMU-172/174 SVE system. The general shape of the curve is consistent with an asymptotically declining PCE mass removal rate.

---

[2] Multiple changes to SVE system operations have been implemented over the period where data are shown. Changes to extraction flow rates by SVE wells are used to maximize the VOC mass removal and the corresponding SVE influent concentration is highly dependent on the flow rate from selected wells.

2.3 Recommended Next Steps for the SVE Systems

PID results from both systems show low-level VOC concentrations continue to be removed at asymptotically low levels. Given these data, a rebound test for both systems was started on December 15, 2017. The rebound test will follow the standard procedures outlined in the previous quarterly report. The next planned activities for both SVE systems is to monitor system concentrations (with PID and TO-15 analysis) in mid-January 2018 after a shutdown period of approximately 30 days.

3.0 Continuing Groundwater Treatment

Groundwater treatment is being implemented at several AOCs/SWMUs at the Renton Facility. The remedy being implemented is ERD of chlorinated solvents at targeted areas and most recently by anaerobic biodegradation of benzene by nitrate/sulfate injections at the 4-78/79 Building. The ERD treatment involves substrate injection using sucrose as a carbon source to stimulate biological degradation of the chlorinated solvents. Substrate injections were conducted in December 2014 through June 2016 and summarized in prior reports. No sucrose substrate injections were completed in this quarterly reporting period. In most areas, monitoring and injection wells show total organic carbon (TOC) levels are dropping to near background concentrations indicating the need for additional substrate injections to promote continued dechlorination in areas where VOCs are still present.

Boeing has proposed to implement continued bioremediation treatment in selected areas of the 4-78/79 area, focusing on elevated CVOC concentrations observed at monitoring well GW-033S (total CVOCs at 1,430 µg/L in November 2017). Injections will consist of approximately 500 gallons of 6-10% sugar substrate using existing IWs previously used for sugar substrate injections. Substrate will be derived from a concentrated sucrose/fructose syrup diluted to the desired concentrations. The planned IWs in the 4-78/79 area include: B78-12, B78-14, B78-15, and B78-16 (Figure 3-1) and substrate injections are planned for January 2018.

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.

3.1 4-78/79 Building Injection Well Installation, Monitoring and Injection 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 at this site involves the use of injected/added compounds to act as an electron acceptor (common amendments include nitrate and sulfate) while the hydrocarbon serves as the electron donor. Nitrate and sulfate injections were completed in October 2017 following the installation of five new injection wells in the area of the 4-78/79 Building area. Following approval of the Tech Memo, Boeing installed five injection wells (IWs) in the area of the benzene plume (detected at GW-031S, GW-244S, and B78-11) for the optimized remediation approach (Figure 3-1). Five two-inch diameter wells, screened from 5 to 20 feet below ground surface (ft bgs) were installed on October 5, 2017 (Well IDs: B78-17, B78-18, B78-19, B78-20, and B78-21). Soil cores were collected from three wells during installation and screened with a PID. Two soil samples were collected from depths where elevated detections with the PID were encountered. The first sample was collected from B78-21 at 10 feet below ground surface [ft bgs] where PID readings showed 6.7 ppmv and the other from B78-20 at 7 ft bgs where PID readings showed 0.5 ppmv. Results of both samples indicated all analytes were below applicable soil cleanup levels (see Attachment B). Per the Tech Memo, following well installation, development and baseline groundwater sampling, CALIBRE completed the first round of nitrate/sulfate injections (see Table 3-1 for wells injected and total mass of substrate amendment per well). The initial injection event was completed on October 11, 2017 and included injections at the five recently installed IWs in addition to two previous existing IWs in the immediate area (B78-11 and B78-13).

The baseline monitoring data was collected on October 6, 2017 and the first round of performance monitoring data was collected at wells in this area on November 29, 2017 (Table 3-2 and Attachment B). Samples collected during the baseline event were targeted at depths just below the shallow silt zone in the area (sample depths around 8 ft bgs) however those results showed lower levels of benzene (<10 µg/L) than have been historically detected from nearby monitoring wells (~ 30 µg/L). The sample depths for the first round of performance monitoring were adjusted to focus at depths near the bottom of the well screen intervals and those results indicated higher concentrations of benzene at most wells sampled (see Table 3-2). Subsequent performance monitoring will be conducted at these deeper sample depths to monitor trends of benzene treatment. The samples were analyzed by Analytical Resources, Incorporated and the laboratory report is included in Attachment B.

The results of the performance monitoring event showed concentrations of nitrate ranging from <0.1 mg/L to 2.93 mg/L. Sulfate concentrations ranged from <0.1 mg/L to 53.9 mg/L at these same wells. Table 3-3 presents recent benzene concentration trends in this area before and after the October 2017 nitrate/sulfate injection event. Monitoring well GW-031S was sampled in mid-November and again in late November (approximately 30 days and 45 days following the initial nitrate/sulfate injection in this area) and those results show benzene concentrations decreasing from 60 µg/L to 18 µg/L. This decrease may be associated with increased biological activity in response to the recent nitrate/sulfate injections; continued monitoring at this area will be used to monitor this trend.

The initial benzene treatment injection event completed in October 2017 was implemented with low target concentrations of nitrate and sulfate at ~100 mg/L applied to each of the IWs. The results of the performance monitoring event show the injected amendments were rapidly consumed and Boeing has proposed to optimize the remedial action to provide additional reagents for the benzene plume treatment. The reagent concentration for the remedial optimization event is proposed at 200 mg/L (twice the concentration used during the initial injection event) to provide additional nitrate and sulfate to the impacted area. The planned IWs include B78-11, B78-13, B78-17, B78-18, B78-19, B78-20, and B78-21. The next injection event is planned for January 2018.

3.2 Recommendations for Groundwater Treatment Actions in Specific Areas

Table 3-4 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, Building 4-78/79, and Apron A areas with sucrose substrate. Each of these areas showed TOC concentrations nearing background levels or VOC detections in recent sampling events. In addition, Boeing is planning a 2nd round of nitrate/sulfate injections for the benzene plume near Building 4-78/79.

4.0 Conclusions and Recommendations

Performance data from the Building 4-78/79 and SWMU-172/174 SVE systems indicate continued VOC mass removal from the vadose zone along with asymptotically declining VOC concentrations in the extracted air. A key objective of the SVE systems operation is mass removal from the vadose zone to assist in groundwater cleanup. The groundwater monitoring data indicate significantly declining VOC levels within most areas of the targeted treatment areas (see groundwater sampling summary in the main text of the report); this observed groundwater restoration is the combined effect of both SVE operations for source control and the ERD treatment of the plumes. Both SVE systems were turned off at the end of this reporting period to begin rebound testing of the SVE systems. Monitoring at both SVE systems will be completed after an approximately 30 day rest period and those results will be provided in the following quarterly report.

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, and Apron A 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.

California Department of Toxic Substance Control (CAL DTSC). 2006. Underground Storage Tank Program Standard Requirements for Site Assessment and Cleanup. California Environmental Protection Agency. September.

U.S. Army Corps of Engineers (USACE). 2002. Engineering and Design – Soil Vapor Extraction and Bioventing. Document ID: EM 1110-1-4001. 3 June.

TABLES

Table 2-1 TO-15 Analytical Results - 4-78/79 SVE System

VPC 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	Total VOCs
4/17/2015	2.9	280	5.2	ND	ND	8.0	ND	ND	ND	ND	98	ND	ND	1.2	ND	21	ND	ND					296	416
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					176	1,646
3/18/2016	ND	49	2.5	ND	ND	ND	ND	ND	19	ND	16	6.6	13	2.3	69	ND	ND	ND					52	177
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					112	200
9/12/2016	1.6	110	20	ND	5.9	2.2	ND	ND	ND	ND	54	26	100	ND	600	ND	ND	ND					140	920
12/14/2016	ND	17	6.3	ND	2.4	ND	ND	ND	ND	ND	18	4.5	33	ND	ND	ND	ND	ND					25.7	81.2
4/5/2017	ND	43	3.0	ND	ND	1.7	ND	ND	ND	ND	11	ND	ND	ND	ND	ND	ND	ND					47.7	58.7
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	118
12/8/2017	**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**	**56.3**

VPC Outlet

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	Total VOCs
4/17/2015	ND	ND	ND	ND	ND	ND	ND	ND	21	ND	ND	ND	ND	ND	ND	ND							ND	21
10/13/2015	ND	ND	ND	ND	ND	ND	ND	ND	21	ND	ND	ND	ND	ND	ND	ND	ND						ND	21
3/18/2016	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND						ND	ND
6/30/2016	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND						ND	ND
9/12/2016	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND						ND	ND
12/14/2016	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND						ND	ND
4/5/2017	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND						ND	ND
8/16/2017	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

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	Total VOCs
10/13/2015	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	11	ND	ND	2,100	ND	ND						ND	2,111
6/30/2016	ND	1.2	ND	ND	ND	ND	ND	ND	11	ND	ND	ND	ND	ND	ND	ND	ND						1.2	12.2
9/12/2016	ND	ND	ND	ND	ND	ND	ND	ND	14	ND	ND	62	160	1.3	1,800	ND	ND						ND	2,037
12/8/2017	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**11**	**27**	**2.0**	**250**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**290**

SVE-05

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	Total VOCs
8/16/2017	2.5	39	ND	ND	ND	ND	ND	ND	ND	ND	17	ND	ND	160	320	ND	ND	4.5	1.4	1.4	ND	ND	41.5	546

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	Total VOCs
9/12/2016	ND	98	ND	ND	190	ND	ND	ND	ND	ND	6,900	55	360	ND	ND	ND	ND						288	7,603
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	647
12/8/2017	**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**	**60**

SVE-8

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	Total VOCs
9/12/2016	ND	4.9	ND	ND	ND	ND	ND	ND	17	2.3	3.9	290	ND	6.2	ND	ND	ND						4.9	324
4/5/2017	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	6.1	ND	ND	ND	ND						ND	6.1

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	Total VOCs
3/18/2016	ND	250	13	ND	ND	6.9	ND	ND	ND	ND	16	ND	ND	ND	ND	ND	ND						270	286
6/30/2016	1.5	250	17	ND	7.1	6.2	ND	ND	ND	ND	120	ND	ND	ND	ND	ND	ND						282	402
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						452	584
12/16/2016	ND	91	95	1.4	28	3.3	1.6	1.4	ND	ND	95	ND	ND	ND	ND	ND	ND						222	317
4/5/2017	1.4	240	19	ND	ND	10	ND	ND	ND	ND	20	ND	ND	ND	ND	ND	ND						270	290
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	670
12/8/2017	**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**	**207**

SVE-12

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	Total VOCs
8/16/2017	2.8	320	16	ND	ND	7	ND	ND	ND	ND	4.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	346	350

Notes:
All results are in parts per billion by volume (ppbv).
ND denotes non-detect. Reporting limits ranges from 0.2 ppbv to 21 ppbv for CVOCs.
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 PID Monitoring - 4-78/79 SVE System

Date	Days in Operation Since Startup [1]	SVE-01	SVE-02	SVE-03	SVE-04	SVE-05	SVE-06	SVE-07	SVE-08	SVE-09	SVE-10	SVE-11	SVE-12	SVE-13	SVE-14	SVE-15	VPC Inlet	VPC Mid	VPC Outlet[2]
10/4/2017	745																224	118	32
10/5/2017	746							0	0								0		
10/5/2017 - 1 Hr	746							45	0								0		
10/5/2017 - 4 Hr	746							143	861								378		
10/6/2017	747							30	145								90		
11/30/2017	802																263		
12/8/2017	810	533		0			462		0		2,831		2,673				528		19
12/15/2017	817																389		

Notes:

[1] Days in operation since system startup on April 17, 2015.

[2] Concentrations measured are at the low end of the range of concentrations able to be measured by the PID. Data presented should be compared with analytical results presented in Table 2-1 which show no detections of COCs.

All PID results posted are reported in parts per billion by volume (ppbv).

PID values listed are field measurements calibrated to isobutylene that have not been corrected to the ionization potentials of the target compounds

Blank cells - Not all wells were measured with the PID during each sampling event.

Vapor samples for TO-15 analysis were collected on 12/8/2017.

Table 2-3 VOC Mass Removal Estimate - 4-78/4-79 SVE System

Date	PID Reading (ppbv)	Corrected Value (VOC) (ppbv) [1]	System Flow (cfm)	Cumulative Runtime Hours	VOCs removed in Operating Period Between Monitoring Events (lbs)	Cumulative VOC Mass Removed Since Start of SVE Operations in April, 2015 (lbs)
10/4/2017	224	146	105	17,382	0.06	16.74
10/5/2017	0	0	100	17,408	0.00	16.74
10/5/2017 - 1 Hr	0	0	100	17,409	0.00	16.74
10/5/2017 - 4 Hr	378	247	100	17,412	0.00	16.75
10/6/2017	90	59	63	17,436	0.00	16.75
11/30/2017	263	172	50	18,740	0.25	17.00
12/8/2017	528	345	119	18,928	0.17	17.17
12/15/2017	389	254	119	19,094	0.11	17.28

Notes:

PID = photoionization detector

ppbv = parts per billion by volume

cfm = cubic feet per minute

lbs = pounds

A correction factor of 0.65 has been applied to the PID vapor measurement for VOCs based on the mixture of analytes detected in the influent TO-15 analysis on 12/8/17.

TO-15 analysis results showed Trichloroethene made up of 75% of the total VOCs removed in the December 8, 2017 results.

Table 2-4 TO-15 Analytical Results for the SWMU-172/174 SVE System

VPC 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	Total VOCs
4/17/2015	1500	130	120	ND	ND	13	ND	ND	ND	ND	ND	ND	ND	ND	1,763	1,763
10/13/2015	400	31	13	ND	ND	3.3	ND	ND	ND	ND	ND	ND	ND	ND	447	447
3/8/2016	82	5.4	3.1	ND	ND	ND	ND	ND	1.1	2.2	ND	ND	ND	ND	91	94
6/30/2016	230	18	10	ND	ND	1.8	ND	11	ND	ND	2.4	ND	ND	ND	260	273
9/12/2016	230	16	8.3	ND	ND	1.9	ND	ND	ND	ND	1.2	ND	ND	ND	256	257
12/14/2016	100	6.2	3.8	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	110	110
5/30/2017 - 30 min	520	220	17	ND	ND	13	2.7	ND	ND	ND	ND	ND	ND	ND	773	773
5/30/2017 - 100 min	530	200	17	ND	ND	14	ND	ND	ND	ND	ND	ND	ND	ND	761	761
5/30/2017 - 225 min	510	130	16	ND	ND	12	ND	ND	ND	ND	ND	ND	ND	ND	668	668
8/16/2017	180	16	7.8	ND	ND	1.7	ND	ND	ND	ND	ND	ND	ND	ND	206	206
12/8/2017	**99**	**7.6**	**3.4**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**110**	**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	Total VOCs
5/30/2017 - 30 min	540	51	18	ND	ND	14	2.6	ND	2.2	ND	ND	ND	ND	ND	626	628
5/30/2017 - 100 min	200	16	6.5	ND	ND	5.5	ND	ND	ND	ND	ND	ND	ND	ND	228	228
8/16/2017	350	30	15	ND	ND	3.5	ND	ND	ND	ND	1.3	ND	ND	ND	399	400
12/8/2017	**170**	**13**	**5.8**	**ND**	**ND**	**1.7**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**191**	**191**

VPC Outlet

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	Total VOCs
4/17/2015	5.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5.1	5.1
10/13/2015	ND	ND	ND	ND	ND	ND	ND	11	ND	ND	ND	ND	ND	ND	ND	11
3/8/2016	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
6/30/2016	ND	ND	ND	ND	ND	ND	ND	ND	15	1.6	ND	1.2	6.2	1.2	ND	25.2
9/12/2016	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
12/14/2016	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
8/16/2017	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

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.

A remedial optimization operational change was made between the vapor sampling on 3/8/2016 and 6/30/2016 to increase VOC extraction.

Results from 5/30/17 represent rebound samples following system down time for blower and motor repairs. TO-15 samples were collected 30 and 100 minutes after system startup at the VPC inlet and SVE-3, and 225 minutes after startup at the VPC inlet.

Table 2-5 PID Monitoring - SWMU-172/174 SVE System

Date	Days in Operation Since Startup [1]	SVE-01	SVE-02	SVE-03	VPC Inlet	VPC Mid	VPC Outlet	Notes
10/4/2017	738	84	34	569	243	120	120	0.5 gal condensate in knockout tank
11/30/2017	795				1,720			System down; 0.5 gal condensate in knockout tank
11/30/2017	795				1,545			Check system at 1500; 5 hrs after restart.
12/8/2017	803			2,173	1,220		0	TO-15 samples from SVE-3 and influent.
12/15/2017	810							No readings collected; air filter had become clogged. Shut system down for rebound testing.

Notes:

[1] Days in operation since system startup on April 17, 2015.

[2] Concentrations measured are at the low end of the range of concentrations able to be measured by the PID. Data presented should be compared with analytical results presented in Table 2-4 which show no detections of COCs.

Blank cells - Not all wells were measured with the PID during each sampling event.

Table 2-6 VOC Mass Removal Estimate - SWMU 172/174 SVE System

Date	PID Reading (ppbv)	Corrected Value (PCE) (ppbv)[1]	System Flow (cfm)	Cumulative Runtime Hours	VOCs removed in Operating Period Between Monitoring Events (lbs)	Cumulative VOC Mass Removed Since Start of SVE Operations in April, 2015 (lbs)
10/4/2017	243	139	98	16,410	0.05	12.30
11/30/2017	1,720	985	90	17,522	0.37	12.67
11/30/2017	1,545	885	90	17,527	0.01	12.68
12/8/2017	1,220	699	86	17,716	0.28	12.95
12/15/2017		0	0	17,880	0.00	12.95

Notes:

PID = photoionization detector

ppbv = parts per billion by volume

cfm = cubic feet per minute

lbs = pounds

[1] A correction factor of 0.57 has been applied to the PID vapor measurement for VOCs based on the mixture of analytes detected in the TO-15 analysis at the influent sample point from 12/8/17.

TO-15 analysis results showed Tetrachloroethene made up 90% of the total VOCs removed at the influent on 12/8/17.

When comparing the August 2016 and December 2017 analytical results the PID readings recorded in November and December 2017 appear high. See Table 2-4 for analytical results.

Table 3-1. 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

Table 3-2. Baseline and Performance Monitoring Groundwater Data; Benzene Treatment Area Renton 4-78/79

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		
B78-13-15-112917	11/29/2017	15	0.24		1.29		2.02		9.92		0.135		<0.100	U	0.652		
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	
B78-18-8-100617	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
B78-19-9-100617	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		
B78-20-8-100617	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	
B78-21-8-100617	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	
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-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	

Table 3-3. Benzene in 4-78/79 Building groundwater monitoring wells (µg/L)

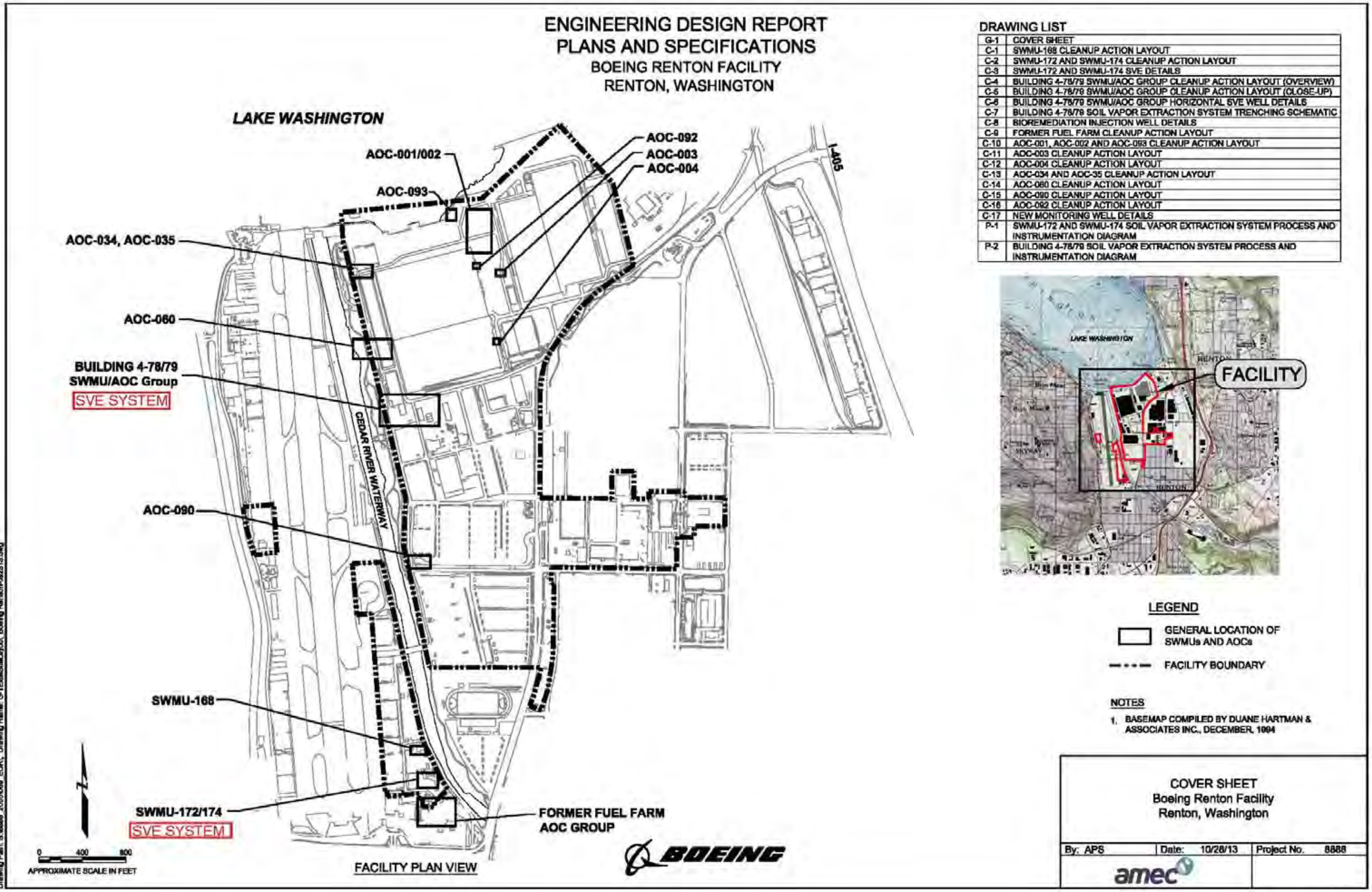
Sampling date	GW031S	GS244S	B78-11
2/3/2016	7.7	19	56
5/11/2016	23	19	NS
8/26/2016	7	21	NS
11/9/2016	79	22	NS
3/3/2017	75	13	NS
5/11/2017	29	11	28
8/16/2017	5.0	9.8	NS
October 2017 - Nitrate/Sulfate Injection			
11/13-11/14/2017	60	7.3	NS
11/29-11/30/2017	18	7.9	9.7

NS = Not Sampled

Table 3-4 Groundwater Monitoring Results Summary and Recommended ERD Treatment - November 2017

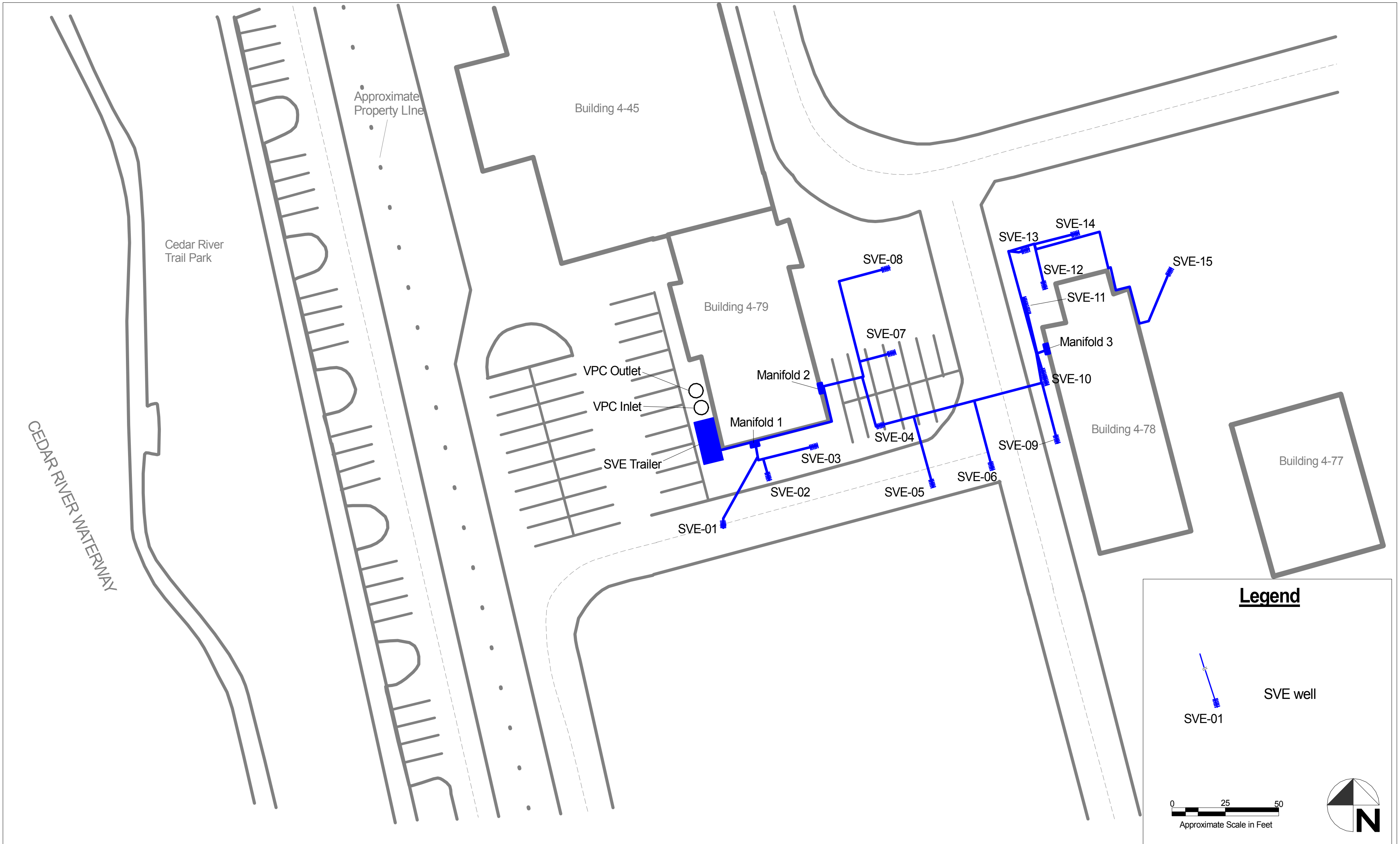
GW Treatment Area	Source and downgradient	CPOC wells	Treatment IWs	ERD Treatment
SWMU-172/174	All detections are less than 1.0 ug/L.	All detections are less than 1.2 ug/L.	*Prior data, in May 2017 central area IWS showed total CVOCs range from 5.3 ug/L to 17 ug/L. TOC near background.*	**Substrate injection in selected IWs/areas (B172-1 through B172-10, B172-13, and 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 an increase in total CVOCs at 1,430 ug/L. Benzene remains in selected wells/area (<10 typically). GW-031S saw significant drop from Nov 13 to Nov 29 sampling - 60 ug/L to 18 ug/L.	Six of seven CPOC wells are ND for CVOCs. The one well with detections of CVOCs is 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	*Prior data, MW near source at 2.1 ug/L; downgradient all detections are less than 3 ug/L (GW192S)*	All detections are less than 1.0 ug/L.	Not sampled	**Inject 2 infiltration galleries at source.**
AOC-003	Not sampled	Detections at 0.67 ug/L.	*Prior data, in May 2017 one of four IWs sampled – VC detection less than 0.3 ug/L*	**No action**
Lot 20 / former 10-71	All MWs are ND.			**No action**
AOC-60	*Prior data, detections less than or equal to 3 ug/L*	*Prior data, all detections less than 0.11 ug/L*		**Inject MWs GW-012S and GW-147S**
AOC – 90	*Prior data, Detections of VC are less than 1 ug/L; benzene in 1 well at 1.69 ug/L (GW189S), the rest are ND*	*Prior data, detection in GW208S at 0.33 ug/L, GW207S at 0.24 ug/L, all the rest are ND*		**No action**
Apron A	Two wells sampled, one is ND and the other with VC at 0.94 ug/L.			**No action**
Building 4-70		*Prior data, CVOCs at 0.9 ug/L and 0.2 ug/L.*		**No action**

FIGURES



CALIBRE Systems, Inc.

Figure 1-1 Site Location/ AOC Outlines



BOEING®

CALIBRE Systems Inc.

Boeing Renton
Spring 2017 SVE Quarterly Summary Report

Figure 2-1 Building 4-78/79

SVE System Layout

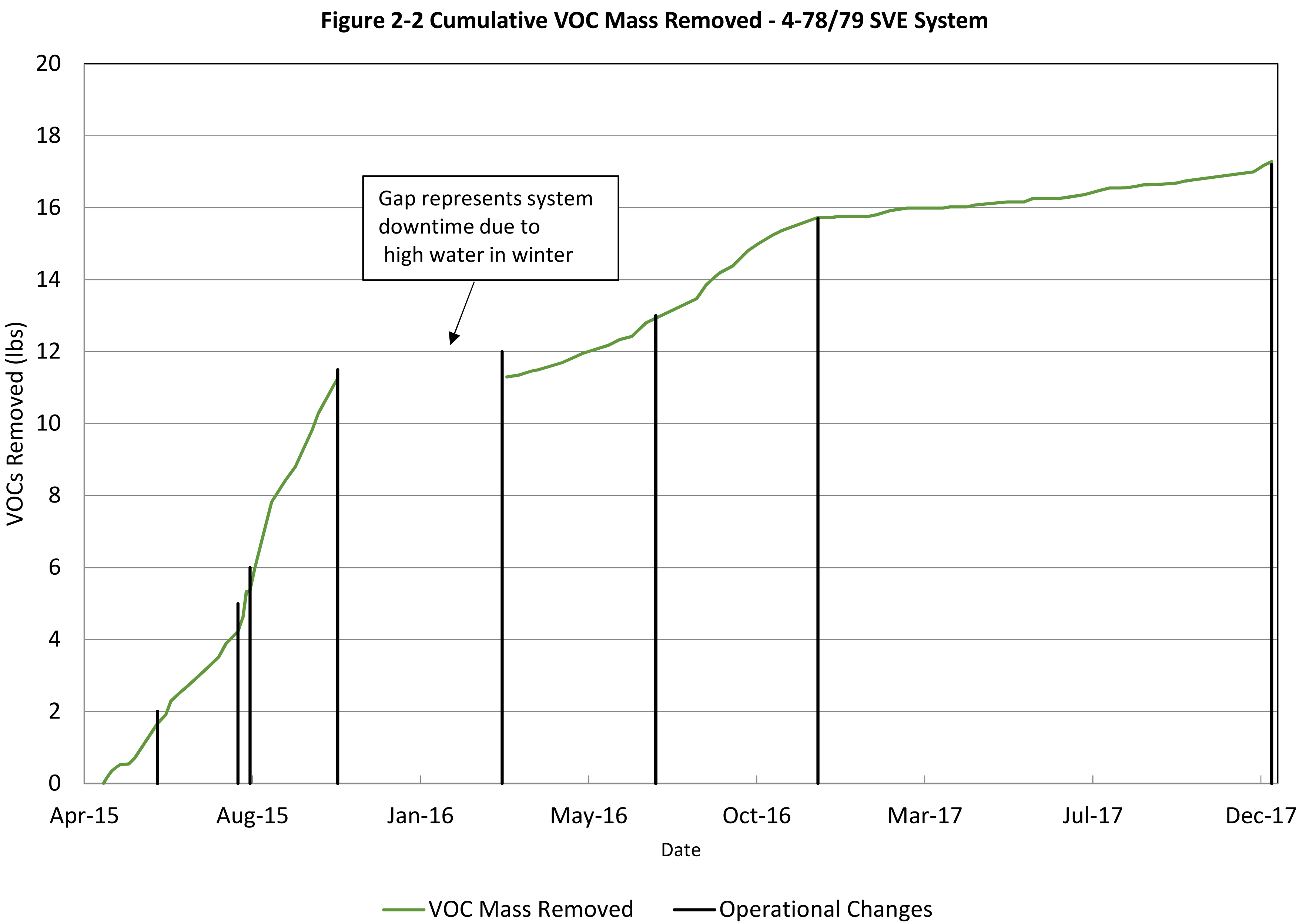
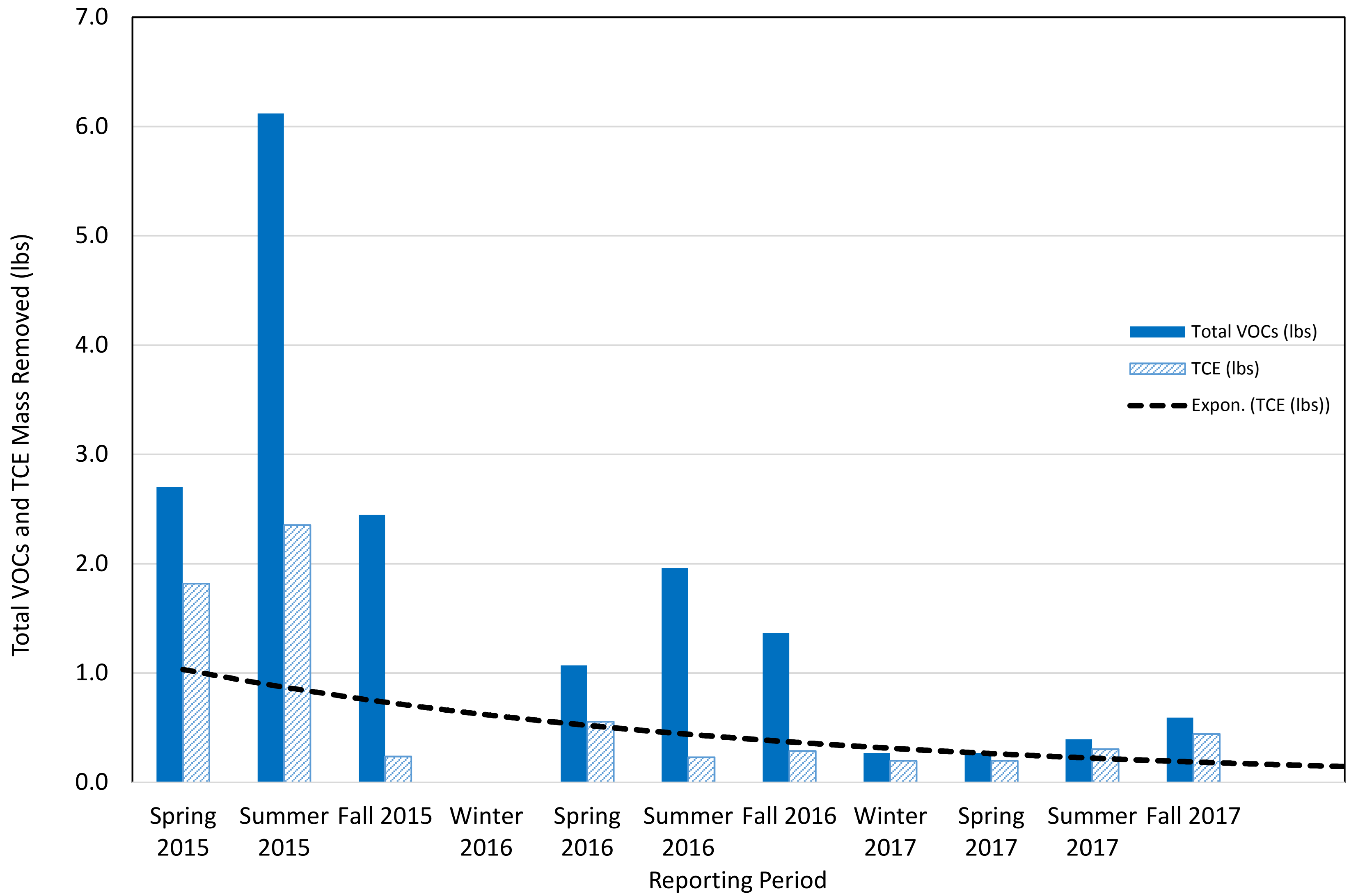


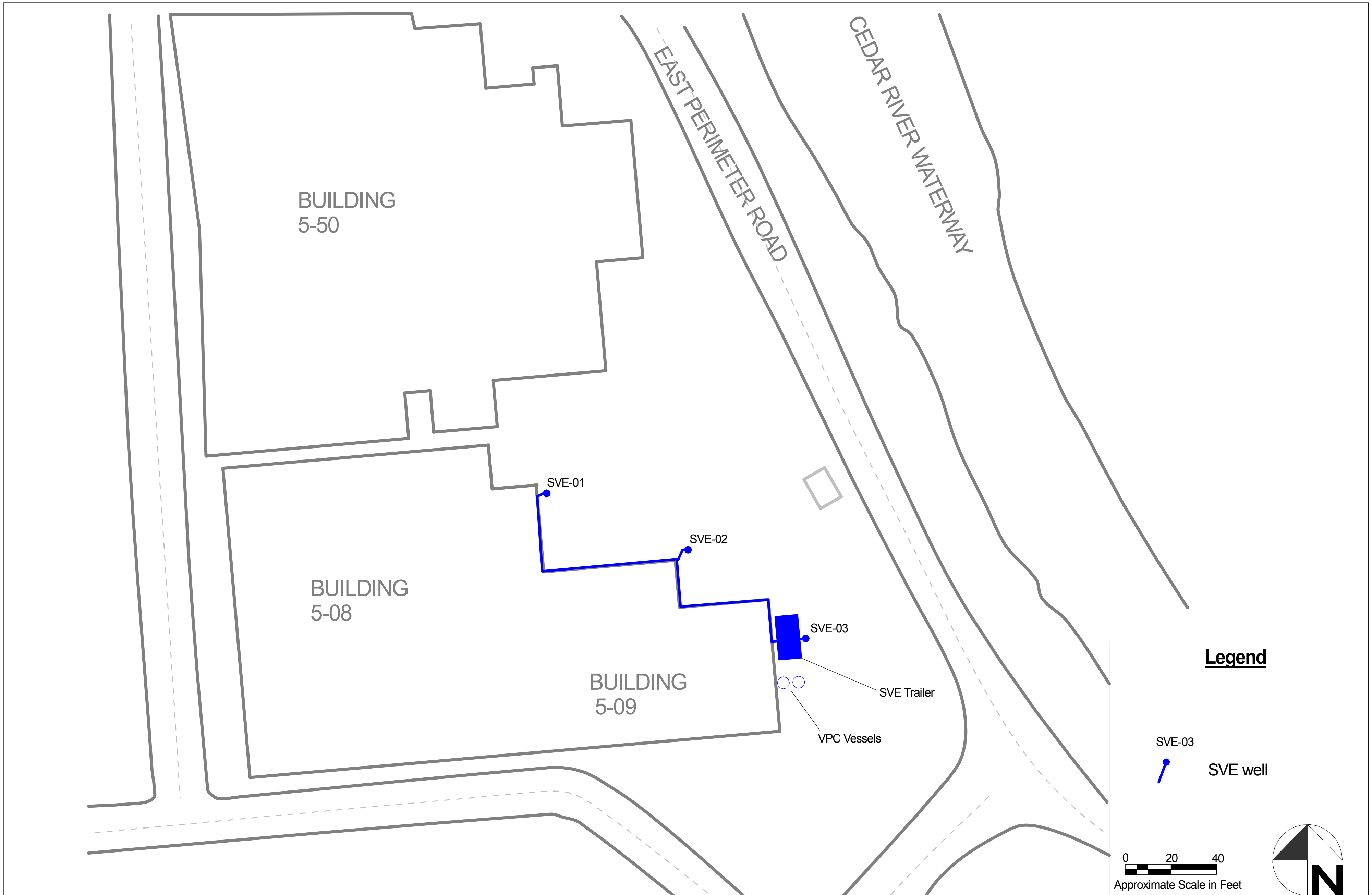
Figure 2-2 Cumulative VOC Mass Removed - 4-78/79 SVE System
20
18
16
14
12
10
8
6
4
2
0
VOCs Removed (lbs)
Gap represents system downtime due to high water in winter
Apr-15
Aug-15
Jan-16
May-16
Oct-16
Mar-17
Jul-17
Dec-17
Date
VOC Mass Removed
Operational Changes

Figure 2-3 Quarterly Mass Removal of Total VOCs and TCE - 4-78/79 SVE System



*The dashed line represents an exponential curve fit to the bar chart of the TCE mass removal data.

*Building 4-78/79 SVE system ran infrequently during Winter 2016 due to increased water generation.



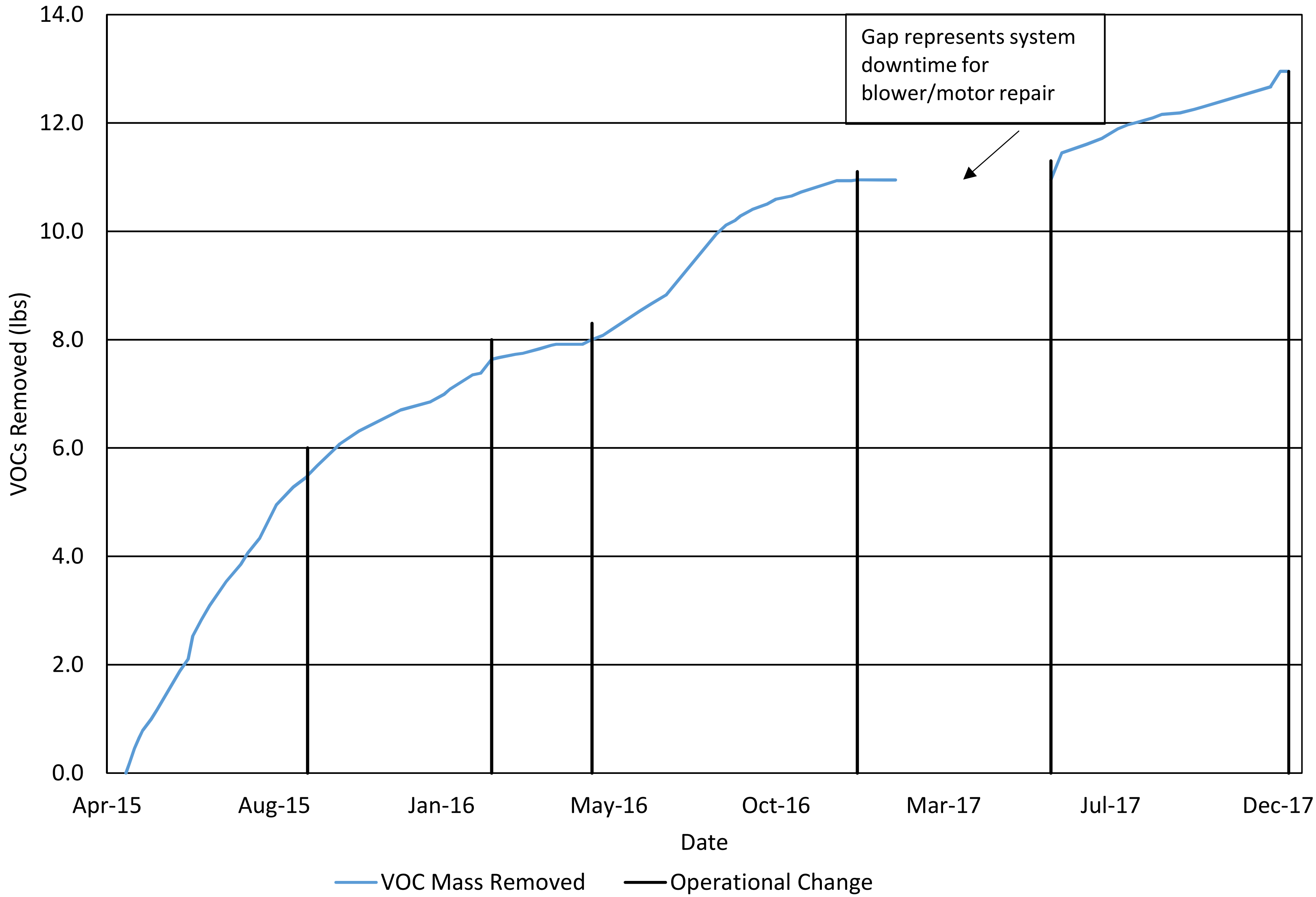
BOEING®

CALIBRE Systems Inc.

Boeing Renton
Spring 2017 SVE Quarterly Summary Report

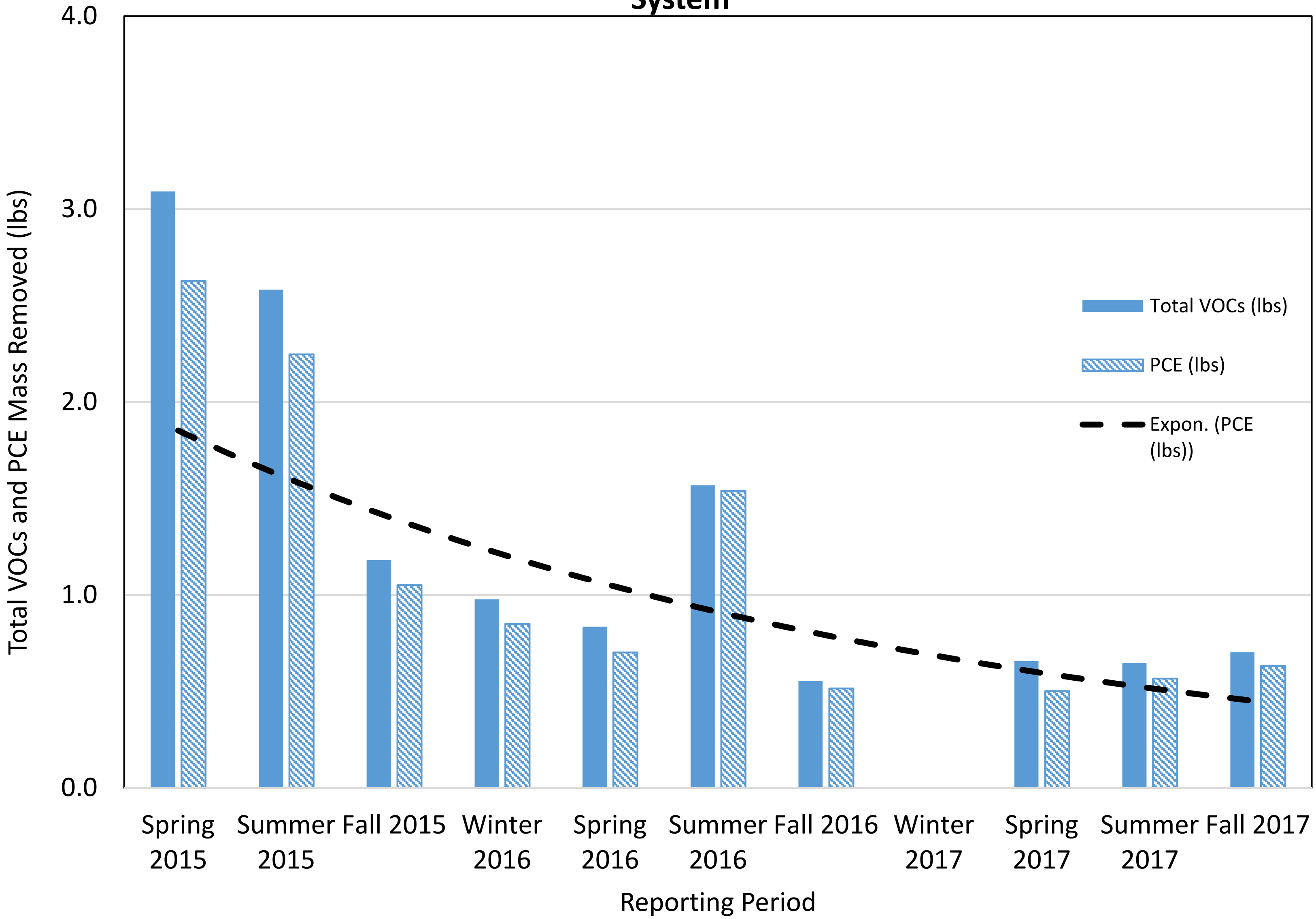
Figure 2-4 SWMU-172/174 Area
SVE System Layout

Figure 2-5 Cumulative VOC Mass Removed - SWMU-172/174 SVE System

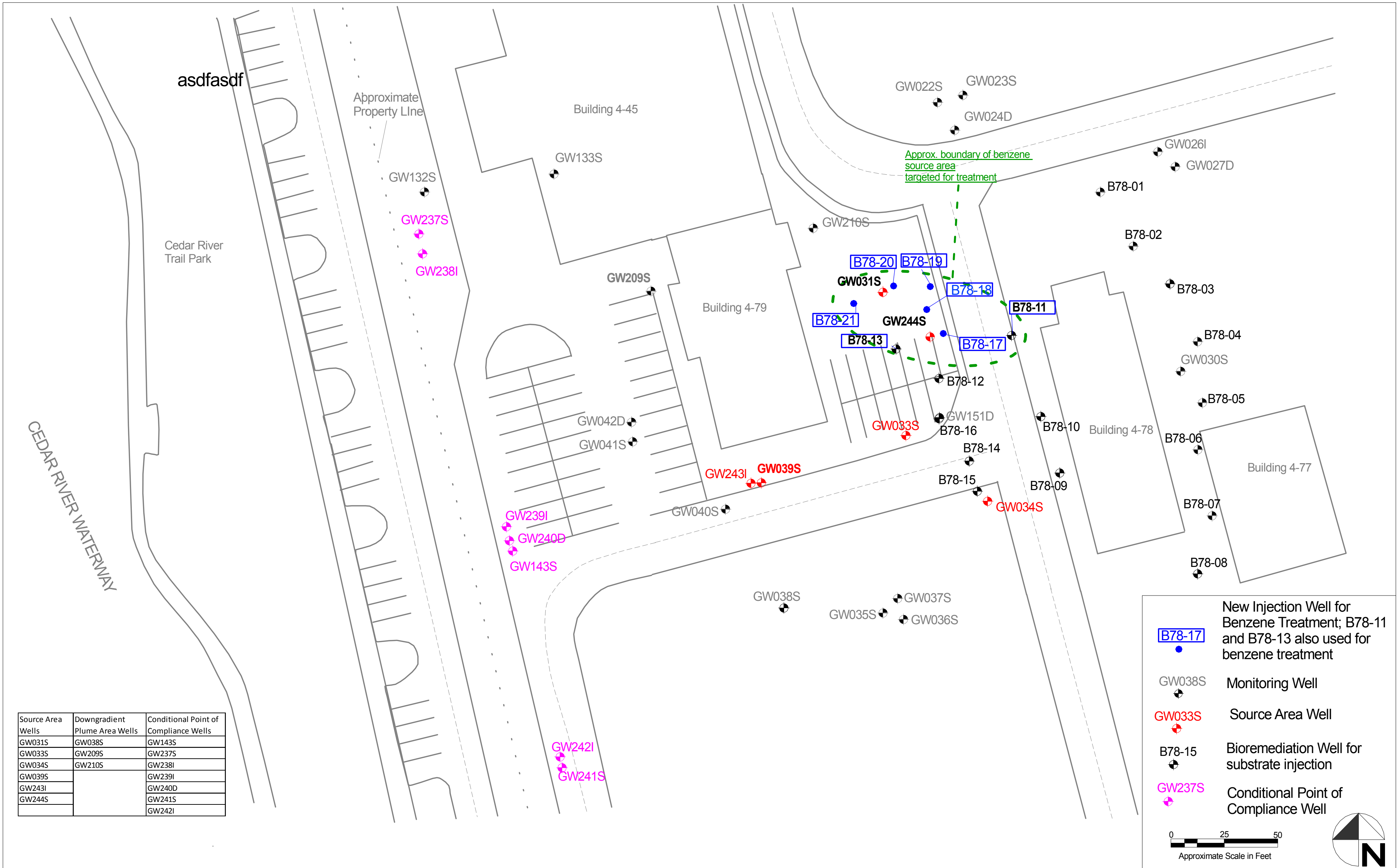


*SWMU 172/174 SVE system did not run Winter 2017 due to equipment failure.

Figure 2-6 Quarterly Mass Removal of Total VOCs and PCE - SWMU-172/174 SVE System



*The dashed line represents an exponential curve fit to the bar chart of the PCE mass removal data.
*SWMU 172/174 SVE system did not run Winter 2017 due to equipment failure



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

BOEING®

CALIBRE Systems Inc.

Boeing Renton
Fourth Quarter 2017 Summary Report

Figure 3-1 Building 4-78/79 Area
New Nitrate/Sulfate Injection Wells

Attachment A: Field Log Forms

Renton Cleanup Action SVE System – SWMU 172/174
Field Operations Log Form

Inspection Date: 10/4/17 Date of last inspection: 9/27/17

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: 1035		Motor Hours: 1582.6
Blower	**Current Value**	**Other Notes**
Vacuum gauge	37" H_2O	System on ~ 1/2 gal condensate in KO Tank
Pressure gauge	18" H_2O	
System flow rate	98 SCFM	
Blower Temperature	115°F	
Temp.at lag VPC discharge	1 = 93.2°F 2 = 75.9°F	
Other notes: check oil level, drive belts, TEFC motor fan, any unusual noise/vibration		

PID Model: PPB RAE 3000				Details: 0 ppb / 10.01 ppm			
Calibration time/ date: 10/4/17				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	1115	82 ppb	84 ppb	3" H_2O	14 CFM	2" H_2O	
SVE-02	1108	71 ppb	34 ppb	3.5" H_2O	16 CFM	2.5" H_2O	
SVE-03	1102	530 ppb	569 ppb	3" H_2O	>30 CFM	17.5" H_2O	
VPC Inlet	1054	237 ppb	243 ppb				
VPC Midpoint	1050	98 ppb	120 ppb				
VPC Outlet	1047	120 ppb	114 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] (Signature) 10/4/17 (Date)

Renton Cleanup Action SVE System – SWMU 172/174
Field Operations Log Form

Inspection Date: 11/30/17 Date of last inspection: ____________

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: 2695.2

Blower	Current Value	Other Notes
Vacuum gauge	37"H2O	System Down
Pressure gauge	18"H2O	Restarted system
System flow rate	90 CFM	~ 1/2 gal condensate in KO Tank
Blower Temperature	69°F climbing	
Temp.at lag VPC discharge		

Other notes: check oil level, drive belts, TEFC motor fan, any unusual noise/vibration

PID Model: Details:

Calibration time/ date: 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							
SVE-02							
SVE-03							
VPC Inlet	0953	1720ppb	1673ppb / @ 1500 - 1488ppb / 1545ppb				
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

Signature Justin Neste [signature] 11/30/17

Printed Name Signature Date

Renton Cleanup Action SVE System – SWMU 172/174
Field Operations Log Form

Inspection Date: 12/8/17 Date of last inspection: 11/30/17

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: 0900 Motor Hours: 2884.1

Blower	Current Value	Other Notes
Vacuum gauge	39" H2O	5-09-SVE-IN-120817 @ 0920 - TO-15
Pressure gauge	10" H2O	509-SVE-3-120817 @ 0930 - TO-15
System flow rate	86 scfm	
Blower Temperature	98°F	
Temperature VPC discharge		

Other notes: Check oil level, drive belts, TEFC motor fan, any unusual noise/vibration

PID Model: PPBRAE 3000 Details: 0 ppb / 10.08 ppm

Calibration time, date: 12/8/17 0910 PID check after monitoring

Sampling Point	Time	PID Reading (1)	PID Reading (2)	Vacuum	Flow Rate (gauge)	Differential Pressure	Flow Rate Calculated
SVE-01							
SVE-02							
SVE-03	0928	1,873 ppb	2,173 ppb				
VPC Inlet	0920	1196 ppb	1220 ppb				
VPC Midpoint							
VPC Outlet	0936	0 ppb	0 ppb				
Other (sample point)							

[illegible]

Questions? Call Justin Neste @ [illegible]

At the completion of a monitoring event scan monitoring forms and email to Justin Neste [illegible]

Justin Neste [signature] 12/8/17

Signature

Renton Cleanup Action SVE System – SWMU 172/174
Field Operations Log Form

Inspection Date: 12/15/17 Date of last inspection: 12/8/17

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: 0915			Motor Hours: 3047.9
Blower	**Current Value**		**Other Notes**
Vacuum gauge	86"H2O	w/o filter 36"H2O	High vac & no flow. Removed filter & turned system back on & flow responds. Filter is clogged. Replace filter housing cover & system parameters jump back to normal. Will order new filter. Added ~1 tsp oil to impellers to prevent seizing (x3) & emptied water pump @ KO Tank. Shut system down for rebound testing.
Pressure gauge	0"H2O	22"H2O	
System flow rate	0"H2O	77scfm	
Blower Temperature	180°F	102°F	
Temp.at lag VPC discharge			
Other notes: check oil level, drive belts, TEFC motor fan, any unusual noise/vibration			

PID Model: PPBRAE 3000	Details: 0 ppb / 10.08 ppm
Calibration time/ date: 12/15/17 0815	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							
SVE-02							
SVE-03							
VPC Inlet							
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

Signature Justin Neste (Printed Name) [signature] (Signature) 12/15/17 (Date)

Renton Cleanup Action SVE System – 4-78/79
Field Operations Log Form

Inspection Date: 10/4/17 Date of last inspection: 9/27/17

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: 0930		Motor Hours: 1,492.7
Blower	**Current Value**	**Other Notes**
Vacuum gauge	45" H_2O	System on, No condensate oil levels good.
Pressure gauge	26" H_2O	
System flow rate	105 SCFM	
Blower Temperature	122°F	
Temp.at lag VPC discharge	1=105.4°F 2=92.3°F	
Other notes: check oil level, drive belts, TEFC motor fan, any unusual noise/vibration		

PID Model: PPB RAE 3000	Details: 0 ppb /10.01 ppm
Calibration time/ date: 10/4/17 0955	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								
SVE-07								
SVE-08								
SVE-09								
SVE-10								
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	1000	224ppb	209ppb					
VPC Midpoint	1004	102ppb	118ppb					
VPC Outlet	1007	32ppb	24ppb					

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 [signature] 10/4/17

Printed Name Signature Date

Renton Cleanup Action SVE System -- 4-78/79
Field Operations Log Form

Inspection Date: 11/30/17 Date of last inspection: ______

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: 0917 Motor Hours: 2846.0

Blower	**Current Value**	**Other Notes**
Vacuum gauge	38" H2O	
Pressure gauge	7 "H2O	
System flow rate	50 CFM	
Blower Temperature	127°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

Calibration time/ date: 11/30/17 0915

Details: 0 ppb / 10.09 ppm

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								
SVE-07								
SVE-08								
SVE-09								
SVE-10								
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	0923	263ppb	258ppb					
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] (Signature) 11/30/17 (Date)

Renton Cleanup Action SVE System – 4-78/79
Field Operations Log Form

Inspection Date: 12/8/17 Date of last inspection: 12/5/17 (5th check)

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: 0840 Motor Hours: 3034.3

Blower	**Current Value**	**Other Notes**
Vacuum gauge	40 " H_2O	System Running
Pressure gauge	37 " H_2O	4-78-SVE-IN-120817 @1005 4-78-SVE-1-120817 @1015
System flow rate	119 SCFM	4-78-SVE-6-120817 @ 1048
Blower Temperature	110°F	4-78-SVE-10-120817 @ 1105
Temp.at lag VPC discharge		

Other notes: check oil level, drive belts, TEFC motor fan, any unusual noise/vibration

PID Model: PPBRAE 3000

Calibration time/ date: 12/8/17

Details: 0 ppb / 10.08 ppb
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	1012	~~510~~ 533 ppb	473 ppb					
SVE-02								
SVE-03	1027	0 ppb	0 ppb					
SVE-04								
SVE-05								
SVE-06	1040	310 ppb	462 ppb					
SVE-07								
SVE-08	1046	0 ppb						
SVE-09								
SVE-10	1052	2,624 ppb	2,831 ppb					
SVE-11								
SVE-12	1058	2,589 ppb	2,673 ppb					
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	1000	513 ppb	528 ppb					
VPC Midpoint								
VPC Outlet	1102	19 ppb	0 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

12/8/17
Date

Renton Cleanup Action SVE System – 4-78/79
Field Operations Log Form

Inspection Date: 12/15/17 Date of last inspection: 12/8/17

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: 0810		Motor Hours: 3200.4
Blower	**Current Value**	**Other Notes**
Vacuum gauge	36" H_2O	Onsite for system shut down to begin rebound testing. After measuring influent concentrations shut system down. Removed air filter & poured ~ 1 tsp oil on impeller. Closed filter cap & bumped system to spread oil on impeller to prevent seizing. Repeated 2 more times. Ran water pump @ KO tank to make sure pump is empty of water.
Pressure gauge	34" H_2O	
System flow rate	119 SCFM	
Blower Temperature	114° 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 / 10.08 ppm				
Calibration time/ date: 12/15/17 0815				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								
SVE-07								
SVE-08								
SVE-09								
SVE-10								
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	0830	389 ppb	350 ppb 357 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 12/15/17

Printed Name Signature Date

Well Sampling Data Sheet

Date	10 / 6 / 17	Site Location	Renton 4-79
Samplers	JN MP	Well ID	B78-21
Casing Material	PVC	Constructed Depth	20'
Casing Diameter	2"	Condition of Well	New

Field Measurements:

Time	0750
Depth to Water	5.32

Depth Measured From:	
	Top of access port
X	Mark on PVC casing
	Mark of protective casing
	Other

Purging Information:

Pump:		Dedicated		Non-dedicated		Peristaltic
Bailer:		PVC		Stainless Steel		Other:
Purge Start Time		Purge End Time				
Approximate Volume Purged						

Water Monitoring Conditions:

Time	Vol. Purged	Temperature (°C)	Conductivity ~~(mS/cm)~~ uS/cm	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)
0801	Ø	18.1°	377.5	0.46	5.55	-54.1	267.1
0806	0.5gal	18.0°	384.0	0.04	5.91	-99.7	190.8
0811	1.0gal	17.6	386.6	-0.04	6.09	-115.6	145.6
0816	1.5gal	17.4°	386.0	-0.04	6.12	-121.7	142.3

Sampling Data:

Time	0821	Sample ID	B78-21-8-100617
Vol. Purged	2.0gal	Duplicates	DUP01-100617 @0800
Temperature (°C)	17.2gal	QA/QC Volumes	
Conductivity ~~(mS/cm)~~ uS/cm	~~0.05~~ 384.4		
D.O. (mg/L)	-0.05		
pH	6.12		
ORP (mV)	-122.5		
Turbidity (NTU)	123.8		

Sampling Device:

PVC Bailer		SS Bailer		Dedicated Pump		Teflon Bailer	

Analyses to be Performed:

Volatile Organics	X	VOCs 8260B	SVOCs by 8270C		Sulfate 375.2	
Total Metals		RCRA 8 or	SVOCs by 8270C/SIM		RSK-175 (methane, ethane, ethene)	
Dissolved Metals		Priority Pollutants	Total Organic Carbon 415.1		Other	

Sampling Notes: 8' Sample

No odor

water clear

Well Diam.	Well Volume (Gal/ft)
1 inch	0.041
2 inch	0.163
4 inch	0.653
6 inch	1.469

Or: (total depth(ft) - DTW(ft)) x Well Dia^2 x 0.0408 = 1 Well Volume

Well Sampling Data Sheet

Date	10/ 06 / 17	Site Location	Renton
Samplers	JN MP	Well ID	B78-19
Casing Material	PVC	Constructed Depth	20'
Casing Diameter	2"	Condition of Well	New

Field Measurements:

Time	0845	Depth Measured From:	
Depth to Water	6.30		Top of access port
		X	Mark on PVC casing
			Mark of protective casing
			Other

Purging Information:

Pump:		Dedicated		Non-dedicated		Peristaltic	
Bailer:		PVC		Stainless Steel		Other:	
Purge Start Time		Purge End Time					
Approximate Volume Purged							

Water Monitoring Conditions:

Time	Vol. Purged	Temperature (°C)	Conductivity ~~(mS/cm)~~ uS/cm	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)
0850	Ø	18.7	420.8	0.56	6.12	-43.5	107.8
0855	0.5	18.2	431.7	0.15	6.16	-76.0	73.1
0900	1.0	18.2	430.9	0.13	6.20	-90.6	53.6
0905	1.5	18.1	429.4	0.11	6.21	-100.2	43.4

Sampling Data:

Time	0910	Sample ID	B78-19-9-100617
Vol. Purged	2.0	Duplicates	
Temperature (°C)	18.1	QA/QC Volumes	
Conductivity (mS/cm)	430.0		
D.O. (mg/L)	0.11		
pH	6.22		
ORP (mV)	-106.3		
Turbidity (NTU)	35.0		

Sampling Device:

PVC Bailer		SS Bailer		Dedicated Pump		Teflon Bailer	

Analyses to be Performed:

Volatile Organics	X	VOCs 8260B	SVOCs by 8270C		Sulfate 375.2	
Total Metals		RCRA 8 or	SVOCs by 8270C/SIM		RSK-175 (methane, ethane, ethene)	
Dissolved Metals		Priority Pollutants	Total Organic Carbon 415.1		Other	

Sampling Notes: 9' Sample

No odor, water clear

Well Diam.	Well Volume (Gal/ft)
1 inch	0.041
2 inch	0.163
4 inch	0.653
6 inch	1.469

Or: (total depth(ft) - DTW(ft)) x Well Dia^2 x 0.0408 = 1 Well Volume

Well Sampling Data Sheet

Date	10/06/17	Site Location	Renton 4-79
Samplers	JN MP	Well ID	B78-18
Casing Material	PVC	Constructed Depth	20'
Casing Diameter	2"	Condition of Well	New

Field Measurements:

Time	0932
Depth to Water	5.71

Depth Measured From:	
	Top of access port
X	Mark on PVC casing
	Mark of protective casing
	Other

Purging Information:

Pump:		Dedicated		Non-dedicated		Peristaltic	
Bailer:		PVC		Stainless Steel		Other:	
Purge Start Time		Purge End Time					
Approximate Volume Purged							

Water Monitoring Conditions:

Time	Vol. Purged	Temperature (°C)	Conductivity (~~mS/cm~~) uS/cm	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)
0937	Ø	18.6	480.7	0.53	6.28	-77.0	534.0
0942	0.5 gal	18.7	488.7	0.08	6.17	-84.2	481.0
0947	1.0 gal	18.7	492.5	0.01	6.15	-89.7	356.0
0952	1.5 gal	18.3	494.9	-0.05	6.15	-95.6	264.0

Sampling Data:

Time	0957	Sample ID	B78-18-8-100617
Vol. Purged	2.0 gal	Duplicates	
Temperature (°C)	17.8	QA/QC Volumes	
Conductivity (mS/cm)	483.2		
D.O. (mg/L)	-0.06		
pH	6.14		
ORP (mV)	-98.4		
Turbidity (NTU)	234.3		

Sampling Device:

PVC Bailer		SS Bailer		Dedicated Pump		Teflon Bailer	

Analyses to be Performed:

Volatile Organics	X	VOCs 8260B	SVOCs by 8270C		Sulfate 375.2	
Total Metals		RCRA 8 or	SVOCs by 8270C/SIM		RSK-175 (methane, ethane, ethene)	
Dissolved Metals		Priority Pollutants	Total Organic Carbon 415.1		Other	

Sampling Notes: 8' Sample.

Initial purge water is cloudy.

Well Diam.	Well Volume (Gal/ft)
1 inch	0.041
2 inch	0.163
4 inch	0.653
6 inch	1.469

Or: (total depth(ft) - DTW(ft)) x Well Dia^2 x 0.0408 = 1 Well Volume

Well Sampling Data Sheet

Date	10/06/17	Site Location	Renton
Samplers	JN MP	Well ID	B78-17
Casing Material	PVC	Constructed Depth	20'
Casing Diameter	2"	Condition of Well	New

Field Measurements:

Time	1013	Depth Measured From:	
Depth to Water	6.40		Top of access port
			Mark on PVC casing
			Mark of protective casing
			Other

Purging Information:

Pump:		Dedicated		Non-dedicated		Peristaltic
Bailer:		PVC		Stainless Steel		Other:
Purge Start Time		Purge End Time				
Approximate Volume Purged						

Water Monitoring Conditions:

Time	Vol. Purged	Temperature (°C)	Conductivity (~~mS/cm~~) µS/cm	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)
1020	Ø	18.7	453.9	1.03	6.42	-65.4	215.0
1030	1.0	18.6	462.5	0.03	6.11	-89.7	211.0
1035	1.5	18.5	462.1	0.05	6.11	-93.5	167.8

Sampling Data:

Time	1040	Sample ID	B78-17-9-100617
Vol. Purged	2.0	Duplicates	
Temperature (°C)	18.6	QA/QC Volumes	
Conductivity (~~mS/cm~~) µS/cm	462.5		
D.O. (mg/L)	0.04		
pH	6.12		
ORP (mV)	-95.3		
Turbidity (NTU)	151.8		

Sampling Device:

PVC Bailer		SS Bailer		Dedicated Pump		Teflon Bailer	

Analyses to be Performed:

Volatile Organics		VOCs 8260B	SVOCs by 8270C		Sulfate 375.2	
Total Metals		RCRA 8 or	SVOCs by 8270C/SIM		RSK-175 (methane, ethane, ethene)	
Dissolved Metals		Priority Pollutants	Total Organic Carbon 415.1		Other	

Sampling Notes:

Well Diam.	Well Volume (Gal/ft)	
1 inch	0.041	
2 inch	0.163	
4 inch	0.653	
6 inch	1.469	

Or: (total depth(ft) - DTW(ft)) x Well Dia^2 x 0.0408 = 1 Well Volume

Well Sampling Data Sheet

Date	10/06/17	Site Location	Renton 4-75
Samplers	JN	Well ID	~~B78-20-8-100617~~
Casing Material		Constructed Depth	
Casing Diameter		Condition of Well	

Field Measurements:

Time	
Depth to Water	5.71

Depth Measured From:	
	Top of access port
	Mark on PVC casing
	Mark of protective casing
	Other

Purging Information:

Pump:		Dedicated		Non-dedicated		Peristaltic
Bailer:		PVC		Stainless Steel		Other:
Purge Start Time		Purge End Time				
Approximate Volume Purged						

Water Monitoring Conditions:

Time	Vol. Purged	Temperature (ºC)	Conductivity (~~mS/cm~~) uS/cm	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)
1102	Ø	18.9	~~42~~375.6	0.83	6.27	-62.3	335.7
1107	0.5	18.8	376.3	0.46	6.19	-73.5	263.6
1112	1.0	18.5	377.0	0.44	6.18	-75.7	229.8
1117	1.25	18.2	378.1	0.40	6.16	-78.8	169.6
1122							

Sampling Data:

Time	1119	Sample ID	B78-20-8-100617
Vol. Purged		Duplicates	
Temperature (ºC)		QA/QC Volumes	
Conductivity (mS/cm)			
D.O. (mg/L)			
pH			
ORP (mV)			
Turbidity (NTU)			

Sampling Device:

PVC Bailer		SS Bailer		Dedicated Pump		Teflon Bailer	

Analyses to be Performed:

Volatile Organics		VOCs 8260B	SVOCs by 8270C		Sulfate 375.2	
Total Metals		RCRA 8 or	SVOCs by 8270C/SIM		RSK-175 (methane, ethane, ethene)	
Dissolved Metals		Priority Pollutants	Total Organic Carbon 415.1		Other	

Sampling Notes:

Well Diam.	Well Volume (Gal/ft)	
1 inch	0.041	
2 inch	0.163	
4 inch	0.653	
6 inch	1.469	

Or: (total depth(ft) - DTW(ft)) x Well Dia^2 x 0.0408 = 1 Well Volume

Well Sampling Data Sheet

Date	11 / 30 / 17	Site Location	Renton
Samplers	JN MP	Well ID	B78-20
Casing Material	PVC	Constructed Depth	20'
Casing Diameter	2"	Condition of Well	ok

Field Measurements:

Time	0654
Depth to Water	4.36

Depth Measured From:	
	Top of access port
x	Mark on PVC casing
	Mark of protective casing
	Other

Purging Information:

Pump:		Dedicated		Non-dedicated		Peristaltic
Bailer:		PVC		Stainless Steel		Other:
Purge Start Time		Purge End Time				
Approximate Volume Purged						

Water Monitoring Conditions:

Time	Vol. Purged	Temperature (°C)	Conductivity (mS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)
0703	ø	12.36	0.370	4.38	6.26	-338	72.3
0708	0.5gal	13.07	0.365	3.78	6.25	-401	57.2
0713	1.0gal	13.57	0.360	2.92	6.22	-494	45.2
0718	1.5gal	13.72	0.357	2.39	6.23	-583	36.7
0723	2.0gal	13.84	0.357	2.00	6.20	-629	36.0

Sampling Data:

Time	0728	Sample ID	B78-20-15-113017
Vol. Purged (gal)	2.5gal	Duplicates	
Temperature (°C)	13.75	QA/QC Volumes	
Conductivity (mS/cm)	0.358		
D.O. (mg/L)	1.83		
pH	6.19		
ORP (mV)	-686		
Turbidity (NTU)	33.0		

Sampling Device:

PVC Bailer		SS Bailer		Dedicated Pump		Teflon Bailer	

Analyses to be Performed:

Volatile Organics	↑	VOCs 8260B	SVOCs by 8270C		Sulfate 375.2	x
Total Metals		RCRA 8 or	SVOCs by 8270C/SIM		RSK-175 (methane, ethane, ethene)	
Dissolved Metals		Priority Pollutants	Total Organic Carbon 415.1		Other Benzene, Nitrate Nitrite	x

Sampling Notes:

15' sample

Clear, slight reducing odor

Calibrated notice however ORP values appear very low.

Well Diameter	Well Volume (Gal/ft)
1 inch	0.041
2 inch	0.163
4 inch	0.653
6 inch	1.469

Or:(total depth(ft) - DTW(ft)) x Well Dia^2 x 0.0408 = 1 Well Volume

Well Sampling Data Sheet

Date	11/30/17	Site Location	Renton
Samplers	JN MP	Well ID	GW-031S
Casing Material	PVC	Constructed Depth	25'
Casing Diameter	2"	Condition of Well	ok

Field Measurements:

Time	
Depth to Water	4.87

Depth Measured From:	
	Top of access port
X	Mark on PVC casing
	Mark of protective casing
	Other

Purging Information:

Pump:		Dedicated		Non-dedicated		Peristaltic	
Bailer:		PVC		Stainless Steel		Other:	
Purge Start Time		Purge End Time					
Approximate Volume Purged							

Water Monitoring Conditions:

Time	Vol. Purged	Temperature (°C)	Conductivity (mS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)
0745	∅	14.60	0.416	7.81	6.45	-87.2	48.0
0750	0.5	14.87	0.420	6.58	6.47	-93.0	55.0
0755	1.0	14.77	0.421	5.82	6.50	-98.1	40.8
0800	1.5	14.67	0.421	5.42	6.48	-101.2	39.6

Sampling Data:

Time	0805	Sample ID	GW-031S-23-113017
Vol. Purged (gal)	2.0	Duplicates	
Temperature (°C)	14.66	QA/QC Volumes	
Conductivity (mS/cm)	0.419		
D.O. (mg/L)	5.00		
pH	6.52		
ORP (mV)	-104.3		
Turbidity (NTU)	36.2		

Sampling Device:

PVC Bailer		SS Bailer		Dedicated Pump		Teflon Bailer	

Analyses to be Performed:

Volatile Organics	+	VOCs 8260B	SVOCs by 8270C		Sulfate 375.2	✓
Total Metals		RCRA 8 or Priority Pollutants	SVOCs by 8270C/SIM		RSK-175 (methane, ethane, ethene)	
Dissolved Metals			Total Organic Carbon 415.1		Other [illegible]	✓

Sampling Notes:

23' Sample

Well Diameter	Well Volume (Gal/ft)
1 inch	0.041
2 inch	0.163
4 inch	0.653
6 inch	1.469

Or:(total depth(ft) - DTW(ft)) x Well Dia^2 x 0.0408 = 1 Well Volume

Well Sampling Data Sheet

Date	11/30 / 17	Site Location	Renton
Samplers	JN MP	Well ID	B78-11
Casing Material	PVC	Constructed Depth	10'
Casing Diameter	2"	Condition of Well	OK

Field Measurements:

Time	0815	Depth Measured From:	
Depth to Water	7.62		Top of access port
		X	Mark on PVC casing
			Mark of protective casing
			Other

Purging Information:

Pump:		Dedicated		Non-dedicated		Peristaltic	
Bailer:		PVC		Stainless Steel		Other:	
Purge Start Time		Purge End Time					
Approximate Volume Purged							

Water Monitoring Conditions:

Time	Vol. Purged	Temperature (°C)	Conductivity (mS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)
0827	0	12.79	0.415	6.34	6.22	-114.2	998
0832	0.5 gal	13.21	0.410	7.31	6.41	-115.6	727
0837	1.0 gal	12.68	0.424	6.71	6.24	-117.1	436
0842	1.5 gal	12.62	0.431	6.53	6.32	-118.3	354

Sampling Data:

Time	0847	Sample ID	B78-11-8-113017
Vol. Purged (gal)	2.0 gal	Duplicates	
Temperature (°C)	12.57	QA/QC Volumes	
Conductivity (mS/cm)	0.450		
D.O. (mg/L)	6.26		
pH	6.39		
ORP (mV)	-120.0		
Turbidity (NTU)	387		

Sampling Device:

PVC Bailer		SS Bailer		Dedicated Pump		Teflon Bailer	

Analyses to be Performed:

Volatile Organics	X	VOCs 8260B	SVOCs by 8270C		Sulfate 375.2	
Total Metals		RCRA 8 or Priority Pollutants	SVOCs by 8270C/SIM		RSK-175 (methane, ethane, ethene)	
Dissolved Metals			Total Organic Carbon 415.1		Other	

Sampling Notes:

water very turbid initially.

8' Sample

Well Diameter	Well Volume (Gal/ft)
1 inch	0.041
2 inch	0.163
4 inch	0.653
6 inch	1.469

Or:(total depth(ft) - DTW(ft)) x Well Dia^2 x 0.0408 = 1 Well Volume

Well Sampling Data Sheet

Date	11/29/17	Site Location	Renton
Samplers	JN MP	Well ID	B78-21
Casing Material	PVC	Constructed Depth	20'
Casing Diameter	2"	Condition of Well	OK

Field Measurements:

Time	1230
Depth to Water	4.91

Depth Measured From:	
	Top of access port
X	Mark on PVC casing
	Mark of protective casing
	Other

Purging Information:

Pump:		Dedicated		Non-dedicated		Peristaltic	
Bailer:		PVC		Stainless Steel		Other:	
Purge Start Time		1235	Purge End Time				
Approximate Volume Purged							

Water Monitoring Conditions:

Time	Vol. Purged	Temperature (°C)	Conductivity (mS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)
1237	Ø	14.89	0.471 mS/cm	4.42	6.44	-520	119
1247	0.5 gal	15.55	0.469	3.24	6.40	-618	86.3
1257	1.0 gal	15.71	0.475	2.24	6.11	-552	30.3
1302	1.5 gal	15.85	0.476	1.80	6.15	-605	28.3

Sampling Data:

Time	1307	Sample ID	B78-21-15-112917
Vol. Purged (gal)	2.0 gal	Duplicates	
Temperature (°C)	15.89	QA/QC Volumes	
Conductivity (mS/cm)	0.478		
D.O. (mg/L)	1.69		
pH	6.16		
ORP (mV)	-633		
Turbidity (NTU)	22.8		

Sampling Device:

PVC Bailer		SS Bailer		Dedicated Pump		Teflon Bailer	

Analyses to be Performed:

Volatile Organics	X	VOCs 8260B	SVOCs by 8270C		Sulfate 375.2	X
Total Metals		RCRA 8 or Priority Pollutants	SVOCs by 8270C/SIM		RSK-175 (methane, ethane, ethene)	
Dissolved Metals			Total Organic Carbon 415.1		Other Bouzent, Nitrate, Nitrite	X

Sampling Notes:

15' sample

Clear water w/ reducing odor

Well Diameter	Well Volume (Gal/ft)
1 inch	0.041
2 inch	0.163
4 inch	0.653
6 inch	1.469

Or:(total depth(ft) - DTW(ft)) x Well Dia^2 x 0.0408 = 1 Well Volume

Well Sampling Data Sheet

Date	11 / 29 /17	Site Location	Renton
Samplers	JN MP	Well ID	B78-13
Casing Material	PVC	Constructed Depth	
Casing Diameter	2"	Condition of Well	OK

Field Measurements:

Time	1318
Depth to Water	4.90

Depth Measured From:	
	Top of access port
X	Mark on PVC casing
	Mark of protective casing
	Other

Purging Information:

Pump:		Dedicated		Non-dedicated		Peristaltic
Bailer:		PVC		Stainless Steel		Other:
Purge Start Time		Purge End Time				
Approximate Volume Purged						

Water Monitoring Conditions:

Time	Vol. Purged	Temperature (°C)	Conductivity (mS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)
1320	Ø	14.31	0.544	3.89	5.64	-720	17.7
1325	0.5gal	15.18	0.560	3.02	5.82	-799	10.3
1330	1.0gal	15.55	0.552	3.02	6.17	-860	12.5
1335	1.5gal	15.70	0.539	3.36	6.19	-883	12.9
1340	2.0gal	15.83	0.518	3.23	6.19	-912	12.8

Sampling Data:

Time	1345	Sample ID	B78-13-15-112917
Vol. Purged (gal)	2.5gal	Duplicates	
Temperature (°C)	15.89	QA/QC Volumes	
Conductivity (mS/cm)	0.509		
D.O. (mg/L)	3.14		
pH	6.28		
ORP (mV)	-736		
Turbidity (NTU)	12.2		

Sampling Device:

PVC Bailer		SS Bailer		Dedicated Pump		Teflon Bailer	

Analyses to be Performed:

Volatile Organics	X	VOCs 8260B	SVOCs by 8270C		Sulfate 375.2	X
Total Metals		RCRA 8 or Priority Pollutants	SVOCs by 8270C/SIM		RSK-175 (methane, ethane, ethene)	
Dissolved Metals			Total Organic Carbon 415.1		Benzene, Nitrate Nitrite Other	X

Sampling Notes:

15' sample

clear water reducing odor

Well Diameter	Well Volume (Gal/ft)
1 inch	0.041
2 inch	0.163
4 inch	0.653
6 inch	1.469

Or:(total depth(ft) - DTW(ft)) x Well Dia^2 x 0.0408 = 1 Well Volume

Well Sampling Data Sheet

Date	11/29/17	Site Location	Renton
Samplers	JN mP	Well ID	GW-244S
Casing Material	PVC	Constructed Depth	15'
Casing Diameter	2"	Condition of Well	OK

Field Measurements:

Time	1350
Depth to Water	4.89

Depth Measured From:	
	Top of access port
x	Mark on PVC casing
	Mark of protective casing
	Other

Purging Information:

Pump:		Dedicated		Non-dedicated		Peristaltic	
Bailer:		PVC		Stainless Steel		Other:	
Purge Start Time			Purge End Time				
Approximate Volume Purged							

Water Monitoring Conditions:

Time	Vol. Purged	Temperature (ºC)	Conductivity (mS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)
1353	Ø gal	15.18	0.448	7.18	6.04	-92.9	193
1358	0.5 gal	15.92	0.456	5.97	6.36	-98.1	173
1403	1.0 gal	16.07	0.468	5.08	6.20	-100.2	143
1408	1.5 gal	16.05	0.474	4.55	6.18	-101.7	118

Sampling Data:

Time	1413	Sample ID	GW-244S-13-112917
Vol. Purged (gal)	2.0 gal	Duplicates	
Temperature (ºC)	16.13	QA/QC Volumes	
Conductivity (mS/cm)	0.477		
D.O. (mg/L)	4.17		
pH	6.14		
ORP (mV)	-103.3		
Turbidity (NTU)	140		

Sampling Device:

PVC Bailer		SS Bailer		Dedicated Pump		Teflon Bailer	

Analyses to be Performed:

Volatile Organics	X	VOCs 8260B	SVOCs by 8270C		Sulfate 375.2	X
Total Metals		RCRA 8 or	SVOCs by 8270C/SIM		RSK-175 (methane, ethane, ethene)	
Dissolved Metals		Priority Pollutants	Total Organic Carbon 415.1		Benzene, Nitrate Nitrite Other	X

Sampling Notes:

13' sample

Clear water, No odor

Well Diameter	Well Volume (Gal/ft)
1 inch	0.041
2 inch	0.163
4 inch	0.653
6 inch	1.469

Or:(total depth(ft) - DTW(ft)) x Well Dia^2 x 0.0408 = 1 Well Volume

Well Sampling Data Sheet

Date	11/29/17	Site Location	Benton
Samplers	JN mp	Well ID	B78-17
Casing Material	PVC	Constructed Depth	20'
Casing Diameter	2"	Condition of Well	ok

Field Measurements:

Time	1359
Depth to Water	4.55

Depth Measured From:	
	Top of access port
x	Mark on PVC casing
	Mark of protective casing
	Other

Purging Information:

Pump:		Dedicated		Non-dedicated		Peristaltic
Bailer:		PVC		Stainless Steel		Other:
Purge Start Time		Purge End Time				
Approximate Volume Purged						

Water Monitoring Conditions:

Time	Vol. Purged	Temperature (°C)	Conductivity (mS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)
1422	Ø	14.86	0.593	4.27	9.11	-1094	79.8
1427	0.5gal	14.77	0.688	3.99	9.27	-1217	76.3
1432	1.0gal	15.20	0.718	3.59	7.42	-1212	81.2
1437	1.5gal	15.61	0.684	3.21	6.80	-1211	110

Sampling Data:

Time	1447	Sample ID	B78-17-15-112917
Vol. Purged (gal)	2.0 gal	Duplicates	
Temperature (°C)	15.73	QA/QC Volumes	
Conductivity (mS/cm)	0.666		
D.O. (mg/L)	2.94		
pH	6.57		
ORP (mV)	-1208		
Turbidity (NTU)	111		

Sampling Device:

PVC Bailer		SS Bailer		Dedicated Pump		Teflon Bailer	

Analyses to be Performed:

Volatile Organics	X	VOCs 8260B	SVOCs by 8270C		Sulfate 375.2	x
Total Metals		RCRA 8 or Priority Pollutants	SVOCs by 8270C/SIM		RSK-175 (methane, ethane, ethene)	
Dissolved Metals			Total Organic Carbon 415.1		Benzene, Nitrate Nitrite Other	x

Sampling Notes:

15' sample

clear water. reducing odor.

Well Diameter	Well Volume (Gal/ft)
1 inch	0.041
2 inch	0.163
4 inch	0.653
6 inch	1.469

Or:(total depth(ft) - DTW(ft)) x Well Dia^2 x 0.0408 = 1 Well Volume

Well Sampling Data Sheet

Date	11/29/17	Site Location	Renton
Samplers	JNMP	Well ID	B78-18
Casing Material	PVC	Constructed Depth	20'
Casing Diameter	2"	Condition of Well	OK

Field Measurements:

Time	1430
Depth to Water	4.78

Depth Measured From:	
	Top of access port
X	Mark on PVC casing
	Mark of protective casing
	Other

Purging Information:

Pump:		Dedicated		Non-dedicated		Peristaltic
Bailer:		PVC		Stainless Steel		Other:
Purge Start Time		Purge End Time				
Approximate Volume Purged						

Water Monitoring Conditions:

Time	Vol. Purged	Temperature (°C)	Conductivity (mS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)
1450	0 gal	16.15	0.714	8.30	6.33	-1210	116
1455	0.5 gal	16.47	0.730	7.53	6.33	-1216	61.5
1500	1.0 gal	16.52	0.732	6.76	6.33	-1232	68.7
1505	1.5 gal	16.50	0.727	6.03	6.39	-1246	75.9
1510	2.0 gal	16.50	0.716	5.39	6.28	-1255	79.8

Sampling Data:

Time	1515	Sample ID	B78-18-15-112917
Vol. Purged (gal)	2.5 gal	Duplicates	Dup-01-112917
Temperature (°C)	16.43	QA/QC Volumes	
Conductivity (mS/cm)	0.703		
D.O. (mg/L)	4.87		
pH	6.45		
ORP (mV)	-1280		
Turbidity (NTU)	81.4		

Sampling Device:

PVC Bailer		SS Bailer		Dedicated Pump		Teflon Bailer	

Analyses to be Performed:

Volatile Organics	X	VOCs 8260B	SVOCs by 8270C		Sulfate 375.2	X
Total Metals		RCRA 8 or Priority Pollutants	SVOCs by 8270C/SIM		RSK-175 (methane, ethane, ethene)	
Dissolved Metals			Total Organic Carbon 415.1		Benzene, Nitrate, Nitrite Other	X

Sampling Notes:

15' Sample

Clear water, reducing odor

Well Diameter	Well Volume (Gal/ft)
1 inch	0.041
2 inch	0.163
4 inch	0.653
6 inch	1.469

Or:(total depth(ft) - DTW(ft)) x Well Dia^2 x 0.0408 = 1 Well Volume

Well Sampling Data Sheet

Date	11/29/17	Site Location	Renton
Samplers	JN MP	Well ID	B78-19-15
Casing Material	PVC	Constructed Depth	20'
Casing Diameter	2"	Condition of Well	OK

Field Measurements:

Time	1500
Depth to Water	4.42

Depth Measured From:	
	Top of access port
X	Mark on PVC casing
	Mark of protective casing
	Other

Purging Information:

Pump:		Dedicated		Non-dedicated		Peristaltic	
Bailer:		PVC		Stainless Steel		Other:	
Purge Start Time		Purge End Time					
Approximate Volume Purged							

Water Monitoring Conditions:

Time	Vol. Purged	Temperature (ºC)	Conductivity (mS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)
1529	Ø	16.22	0.730	1.83	6.45	-131.1	87.1
1534	0.5 gal	16.26	0.721	1.33	6.56	-132.9	65.3
1539	1.0 gal	16.28	0.684	1.08	6.54	-58.0	79.9
1544	1.5 gal	16.15	0.651	1.94	6.54	-67.3	101
1549	2.0 gal	16.34	0.622	0.74	6.53	-79.4	65.8

Sampling Data:

Time	1554	Sample ID	B78-19-15-112917
Vol. Purged (gal)	2.5 gal	Duplicates	
Temperature (ºC)	16.33	QA/QC Volumes	
Conductivity (mS/cm)	0.597		
D.O. (mg/L)	0.70		
pH	6.62		
ORP (mV)	-89.6		
Turbidity (NTU)	59.1		

Sampling Device:

PVC Bailer		SS Bailer		Dedicated Pump		Teflon Bailer	

Analyses to be Performed:

Volatile Organics	X	VOCs 8260B	SVOCs by 8270C		Sulfate 375.2	X
Total Metals		RCRA 8 or Priority Pollutants	SVOCs by 8270C/SIM		RSK-175 (methane, ethane, ethene)	
Dissolved Metals			Total Organic Carbon 415.1		Benzene Nitrate Nitrite Other	X

Sampling Notes:

15' sample
Clear, reducing odor

Well Diameter	Well Volume (Gal/ft)
1 inch	0.041
2 inch	0.163
4 inch	0.653
6 inch	1.469

Or:(total depth(ft) - DTW(ft)) x Well Dia^2 x 0.0408 = 1 Well Volume

Attachment B: Laboratory Data Package

Analytical Resources, Incorporated
Analytical Chemists and Consultants

12 October 2017

Carl Bach
The Boeing Company
P.O. Box 3707 MC 9U4-26
Seattle, WA 98124

RE: Boeing Renton 4-79

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)
17J0113	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 reqirements 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.

Cert# 100006

PJLA Testing
Accreditation # 66169

Chain of Custody Record & Laboratory Analysis Request

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

ARI Assigned Number: 17J0113	Turn-around Requested: Standard
ARI Client Company: Boeing	Phone: (206) 898-0438
Client Contact: Carl Bach	
Client Project Name: Renton 4-79 IW	
Client Project #:	Samplers: J Neste M Pagel

Page: 1	of 1
Date: 10/06/17	Ice Present?
No. of Coolers:	Cooler Temps:

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: VOCs								Notes/Comments
B78-21-8-100617	10/06/17	0821	GW	3	X								
B78-19-9-100617	10/06/17	0910	GW	3	X								
B78-18-8-100617	10/06/17	0957	GW	3	X								
B78-17-9-100617	10/06/17	1040	GW	3	X								
B78-20-8-100617	10/06/17	1119	GW	3	X								
Dup01-100617	10/06/17	0800	GW	3	X								
TripBlank	10/06/17		AQ	3	X								
4-79-IDW-100617	10/06/17	1136	GW	3	X								

Comments/Special Instructions	Relinquished by:	Received by:	Relinquished by:	Received by:
cc Justin Neste & Tom McKeon	(Signature)	(Signature) Brittney Hall	(Signature)	(Signature)
	Printed Name: Justin Neste	Printed Name: Brittney Hall	Printed Name:	Printed Name:
	Company: CALIBRE	Company: ARI	Company:	Company:
	Date & Time: 10/06/17 1257	Date & Time: 10/6/17 12:57	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.

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Calibre ~~Boeing~~ B.H.

COC No(s): ______________ NA

Assigned ARI Job No: 17J0113

Project Name: Boeing Renton

Delivered by: Fed-Ex UPS Courier Hand Delivered Other: ______

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) 10.4

Time: 12:57

If cooler temperature is out of compliance fill out form 00070F

Temp Gun ID#: D005266

Cooler Accepted by: B.H. Date: 10/6/17 Time: 12:57

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 10/2/17

Was Sample Split by ARI : NA YES Date/Time: ______ Equipment: ______ Split by: ______

Samples Logged by: B.H. Date: 10/9/17 Time: 6:55

*** 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:

Two vials of B78-19-9-100617 and one vial of B78-18-8-100617 had peabubbles.

By: B.H. Date: ~~10/10~~ 10/9/17 B.H.

Small Air Bubbles ~2mm	Peabubbles 2-4 mm	LARGE Air Bubbles > 4 mm	Small → "sm" (< 2 mm) Peabubbles → "pb" (2 to < 4 mm) Large → "lg" (4 to < 6 mm) Headspace → "hs" (> 6 mm)

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Temperature Compliance Form

17J0113

Cooler#: 1	Temperature(°C): 10.4°C	
Sample ID	Bottle Count	Bottle Type
Samples had temp		
above 6°C.		

Cooler#:	Temperature(°C):	
Sample ID	Bottle Count	Bottle Type

Cooler#:	Temperature(°C):	
Sample ID	Bottle Count	Bottle Type

Cooler#:	Temperature(°C):	
Sample ID	Bottle Count	Bottle Type

Completed by: B.H. Date: 10/6/17 Time: 12:57

Analytical Report

The Boeing Company	Project: Boeing Renton 4-79	
P.O. Box 3707 MC 9U4-26	Project Number: [none]	**Reported:**
Seattle WA, 98124	Project Manager: Carl Bach	12-Oct-2017 14:51

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
B78-21-8-100617	17J0113-01	Water	06-Oct-2017 08:21	06-Oct-2017 12:57
B78-19-9-100617	17J0113-02	Water	06-Oct-2017 09:10	06-Oct-2017 12:57
B78-18-8-100617	17J0113-03	Water	06-Oct-2017 09:57	06-Oct-2017 12:57
B78-17-9-100617	17J0113-04	Water	06-Oct-2017 10:40	06-Oct-2017 12:57
B78-20-8-100617	17J0113-05	Water	06-Oct-2017 11:19	06-Oct-2017 12:57
Dup01-100617	17J0113-06	Water	06-Oct-2017 08:00	06-Oct-2017 12:57
TripBlank	17J0113-07	Water	06-Oct-2017 00:00	06-Oct-2017 12:57
4-79-IDW-100617	17J0113-08	Water	06-Oct-2017 11:36	06-Oct-2017 12:57

The Boeing Company	Project: Boeing Renton 4-79	
P.O. Box 3707 MC 9U4-26	Project Number: [none]	**Reported:**
Seattle WA, 98124	Project Manager: Carl Bach	12-Oct-2017 14:51

Case Narrative

Volatiles - EPA Method SW8260C

The sample(s) were run within the recommended holding times.

Initial and continuing calibrations were within method requirements with the exception flagged analytes in the associated forms. All samples which contain analyte are flagged with a "Q" qualifier and all are out of control low.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The LCS/LCSD percent recoveries and RPD were within control limits with the exception of Idomethane RPD which is flagged in the associated forms.

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Analytical Report

The Boeing Company	Project: Boeing Renton 4-79	
P.O. Box 3707 MC 9U4-26	Project Number: [none]	**Reported:**
Seattle WA, 98124	Project Manager: Carl Bach	12-Oct-2017 14:51

B78-21-8-100617

17J0113-01 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 10/06/2017 08:21

Instrument: NT2 — Analyzed: 11-Oct-2017 16:03

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)
Preparation Batch: BFJ0288 — Sample Size: 10 mL
Prepared: 11-Oct-2017 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Chloromethane	74-87-3	1	0.09	0.50	**0.17**	ug/L	J
Vinyl Chloride	75-01-4	1	0.06	0.20	**0.21**	ug/L	
Bromomethane	74-83-9	1	0.25	1.00	ND	ug/L	U
Chloroethane	75-00-3	1	0.09	0.20	**1.95**	ug/L	
Trichlorofluoromethane	75-69-4	1	0.04	0.20	ND	ug/L	U
Acrolein	107-02-8	1	2.48	5.00	ND	ug/L	U
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	1	0.04	0.20	ND	ug/L	U
Acetone	67-64-1	1	2.06	5.00	**2.85**	ug/L	J
1,1-Dichloroethene	75-35-4	1	0.05	0.20	ND	ug/L	U
Bromoethane	74-96-4	1	0.04	0.20	ND	ug/L	U
Iodomethane	74-88-4	1	0.23	1.00	ND	ug/L	U
Methylene Chloride	75-09-2	1	0.49	1.00	ND	ug/L	U
Acrylonitrile	107-13-1	1	0.60	1.00	ND	ug/L	U
Carbon Disulfide	75-15-0	1	0.04	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.05	0.20	**0.16**	ug/L	J
Vinyl Acetate	108-05-4	1	0.07	0.20	ND	ug/L	U
1,1-Dichloroethane	75-34-3	1	0.05	0.20	**0.09**	ug/L	J
2-Butanone	78-93-3	1	0.81	5.00	ND	ug/L	U
2,2-Dichloropropane	594-20-7	1	0.05	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.04	0.20	**0.13**	ug/L	J
Chloroform	67-66-3	1	0.03	0.20	ND	ug/L	U
Bromochloromethane	74-97-5	1	0.06	0.20	ND	ug/L	U
1,1,1-Trichloroethane	71-55-6	1	0.04	0.20	ND	ug/L	U
1,1-Dichloropropene	563-58-6	1	0.03	0.20	ND	ug/L	U
Carbon tetrachloride	56-23-5	1	0.04	0.20	ND	ug/L	U
1,2-Dichloroethane	107-06-2	1	0.07	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.03	0.20	**1.42**	ug/L	
Trichloroethene	79-01-6	1	0.05	0.20	ND	ug/L	U
1,2-Dichloropropane	78-87-5	1	0.04	0.20	ND	ug/L	U
Bromodichloromethane	75-27-4	1	0.05	0.20	ND	ug/L	U
Dibromomethane	74-95-3	1	0.15	0.20	ND	ug/L	U
2-Chloroethyl vinyl ether	110-75-8	1	0.25	1.00	ND	ug/L	U
4-Methyl-2-Pentanone	108-10-1	1	0.97	5.00	ND	ug/L	U
cis-1,3-Dichloropropene	10061-01-5	1	0.06	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.04	0.20	**0.57**	ug/L	

4611 S 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6202

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Analytical Report

The Boeing Company	Project: Boeing Renton 4-79	
P.O. Box 3707 MC 9U4-26	Project Number: [none]	**Reported:**
Seattle WA, 98124	Project Manager: Carl Bach	12-Oct-2017 14:51

B78-21-8-100617

17J0113-01 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 10/06/2017 08:21

Instrument: NT2 — Analyzed: 11-Oct-2017 16:03

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
trans-1,3-Dichloropropene	10061-02-6	1	0.08	0.20	ND	ug/L	U
2-Hexanone	591-78-6	1	0.90	5.00	ND	ug/L	U
1,1,2-Trichloroethane	79-00-5	1	0.13	0.20	ND	ug/L	U
1,3-Dichloropropane	142-28-9	1	0.06	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.05	0.20	ND	ug/L	U
Dibromochloromethane	124-48-1	1	0.05	0.20	ND	ug/L	U
1,2-Dibromoethane	106-93-4	1	0.07	0.20	ND	ug/L	U
Chlorobenzene	108-90-7	1	0.02	0.20	**1.81**	ug/L	
Ethylbenzene	100-41-4	1	0.04	0.20	**0.25**	ug/L	
1,1,1,2-Tetrachloroethane	630-20-6	1	0.04	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.05	0.40	**1.79**	ug/L	
o-Xylene	95-47-6	1	0.03	0.20	**0.42**	ug/L	
Xylenes, total	1330-20-7	1	0.09	0.60	**2.20**	ug/L	
Styrene	100-42-5	1	0.05	0.20	ND	ug/L	U
Bromoform	75-25-2	1	0.06	0.20	ND	ug/L	U
1,1,2,2-Tetrachloroethane	79-34-5	1	0.06	0.20	ND	ug/L	U
1,2,3-Trichloropropane	96-18-4	1	0.13	0.50	ND	ug/L	U
trans-1,4-Dichloro 2-Butene	110-57-6	1	0.32	1.00	ND	ug/L	U
n-Propylbenzene	103-65-1	1	0.02	0.20	**1.06**	ug/L	
Bromobenzene	108-86-1	1	0.06	0.20	ND	ug/L	U
Isopropyl Benzene	98-82-8	1	0.02	0.20	**0.40**	ug/L	
2-Chlorotoluene	95-49-8	1	0.02	0.20	ND	ug/L	U
4-Chlorotoluene	106-43-4	1	0.02	0.20	ND	ug/L	U
t-Butylbenzene	98-06-6	1	0.03	0.20	ND	ug/L	U
1,3,5-Trimethylbenzene	108-67-8	1	0.02	0.20	**0.35**	ug/L	
1,2,4-Trimethylbenzene	95-63-6	1	0.02	0.20	**0.51**	ug/L	
s-Butylbenzene	135-98-8	1	0.02	0.20	ND	ug/L	U
4-Isopropyl Toluene	99-87-6	1	0.03	0.20	**0.12**	ug/L	J
1,3-Dichlorobenzene	541-73-1	1	0.04	0.20	ND	ug/L	U
1,4-Dichlorobenzene	106-46-7	1	0.04	0.20	**0.16**	ug/L	J
n-Butylbenzene	104-51-8	1	0.02	0.20	ND	ug/L	U
1,2-Dichlorobenzene	95-50-1	1	0.04	0.20	**0.09**	ug/L	J
1,2-Dibromo-3-chloropropane	96-12-8	1	0.37	0.50	ND	ug/L	U
1,2,4-Trichlorobenzene	120-82-1	1	0.11	0.50	ND	ug/L	U
Hexachloro-1,3-Butadiene	87-68-3	1	0.07	0.50	ND	ug/L	U
Naphthalene	91-20-3	1	0.12	0.50	**0.52**	ug/L	
1,2,3-Trichlorobenzene	87-61-6	1	0.11	0.50	ND	ug/L	U
Dichlorodifluoromethane	75-71-8	1	0.05	0.20	ND	ug/L	U

4611 S. 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6202

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Analytical Report

The Boeing Company	Project: Boeing Renton 4-79	
P.O. Box 3707 MC 9U4-26	Project Number: [none]	**Reported:**
Seattle WA, 98124	Project Manager: Carl Bach	12-Oct-2017 14:51

B78-21-8-100617

17J0113-01 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 10/06/2017 08:21

Instrument: NT2 — Analyzed: 11-Oct-2017 16:03

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Methyl tert-butyl Ether	1634-04-4	1	0.07	0.50	ND	ug/L	U
2-Pentanone	107-87-9	1	5.00	5.00	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4				*80-129 %*	*100*	*%*	
Surrogate: Toluene-d8				*80-120 %*	*99.0*	*%*	
Surrogate: 4-Bromofluorobenzene				*80-120 %*	*95.2*	*%*	
Surrogate: 1,2-Dichlorobenzene-d4				*80-120 %*	*99.9*	*%*	

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.

4611 S. 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6202

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Analytical Report

The Boeing Company	Project: Boeing Renton 4-79	
P.O. Box 3707 MC 9U4-26	Project Number: [none]	**Reported:**
Seattle WA, 98124	Project Manager: Carl Bach	12-Oct-2017 14:51

B78-19-9-100617

17J0113-02 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 10/06/2017 09:10

Instrument: NT2 — Analyzed: 11-Oct-2017 16:23

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)
Preparation Batch: BFJ0288 — Sample Size: 10 mL
Prepared: 11-Oct-2017 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Chloromethane	74-87-3	1	0.09	0.50	**0.14**	ug/L	J
Vinyl Chloride	75-01-4	1	0.06	0.20	**0.22**	ug/L	
Bromomethane	74-83-9	1	0.25	1.00	ND	ug/L	U
Chloroethane	75-00-3	1	0.09	0.20	**3.71**	ug/L	
Trichlorofluoromethane	75-69-4	1	0.04	0.20	ND	ug/L	U
Acrolein	107-02-8	1	2.48	5.00	ND	ug/L	U
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	1	0.04	0.20	ND	ug/L	U
Acetone	67-64-1	1	2.06	5.00	**4.19**	ug/L	J
1,1-Dichloroethene	75-35-4	1	0.05	0.20	ND	ug/L	U
Bromoethane	74-96-4	1	0.04	0.20	ND	ug/L	U
Iodomethane	74-88-4	1	0.23	1.00	ND	ug/L	U
Methylene Chloride	75-09-2	1	0.49	1.00	ND	ug/L	U
Acrylonitrile	107-13-1	1	0.60	1.00	ND	ug/L	U
Carbon Disulfide	75-15-0	1	0.04	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.05	0.20	**0.18**	ug/L	J
Vinyl Acetate	108-05-4	1	0.07	0.20	ND	ug/L	U
1,1-Dichloroethane	75-34-3	1	0.05	0.20	**0.16**	ug/L	J
2-Butanone	78-93-3	1	0.81	5.00	ND	ug/L	U
2,2-Dichloropropane	594-20-7	1	0.05	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.04	0.20	**0.06**	ug/L	J
Chloroform	67-66-3	1	0.03	0.20	ND	ug/L	U
Bromochloromethane	74-97-5	1	0.06	0.20	ND	ug/L	U
1,1,1-Trichloroethane	71-55-6	1	0.04	0.20	ND	ug/L	U
1,1-Dichloropropene	563-58-6	1	0.03	0.20	ND	ug/L	U
Carbon tetrachloride	56-23-5	1	0.04	0.20	ND	ug/L	U
1,2-Dichloroethane	107-06-2	1	0.07	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.03	0.20	**0.69**	ug/L	
Trichloroethene	79-01-6	1	0.05	0.20	ND	ug/L	U
1,2-Dichloropropane	78-87-5	1	0.04	0.20	ND	ug/L	U
Bromodichloromethane	75-27-4	1	0.05	0.20	ND	ug/L	U
Dibromomethane	74-95-3	1	0.15	0.20	ND	ug/L	U
2-Chloroethyl vinyl ether	110-75-8	1	0.25	1.00	ND	ug/L	U
4-Methyl-2-Pentanone	108-10-1	1	0.97	5.00	ND	ug/L	U
cis-1,3-Dichloropropene	10061-01-5	1	0.06	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.04	0.20	**0.44**	ug/L	

4611 S 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6202

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Analytical Report

The Boeing Company	Project: Boeing Renton 4-79	
P.O. Box 3707 MC 9U4-26	Project Number: [none]	**Reported:**
Seattle WA, 98124	Project Manager: Carl Bach	12-Oct-2017 14:51

B78-19-9-100617

17J0113-02 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 10/06/2017 09:10

Instrument: NT2 — Analyzed: 11-Oct-2017 16:23

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
trans-1,3-Dichloropropene	10061-02-6	1	0.08	0.20	ND	ug/L	U
2-Hexanone	591-78-6	1	0.90	5.00	ND	ug/L	U
1,1,2-Trichloroethane	79-00-5	1	0.13	0.20	ND	ug/L	U
1,3-Dichloropropane	142-28-9	1	0.06	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.05	0.20	ND	ug/L	U
Dibromochloromethane	124-48-1	1	0.05	0.20	ND	ug/L	U
1,2-Dibromoethane	106-93-4	1	0.07	0.20	ND	ug/L	U
Chlorobenzene	108-90-7	1	0.02	0.20	**0.47**	ug/L	
Ethylbenzene	100-41-4	1	0.04	0.20	**0.36**	ug/L	
1,1,1,2-Tetrachloroethane	630-20-6	1	0.04	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.05	0.40	**2.57**	ug/L	
o-Xylene	95-47-6	1	0.03	0.20	**0.78**	ug/L	
Xylenes, total	1330-20-7	1	0.09	0.60	**3.35**	ug/L	
Styrene	100-42-5	1	0.05	0.20	ND	ug/L	U
Bromoform	75-25-2	1	0.06	0.20	ND	ug/L	U
1,1,2,2-Tetrachloroethane	79-34-5	1	0.06	0.20	ND	ug/L	U
1,2,3-Trichloropropane	96-18-4	1	0.13	0.50	ND	ug/L	U
trans-1,4-Dichloro 2-Butene	110-57-6	1	0.32	1.00	ND	ug/L	U
n-Propylbenzene	103-65-1	1	0.02	0.20	**0.26**	ug/L	
Bromobenzene	108-86-1	1	0.06	0.20	ND	ug/L	U
Isopropyl Benzene	98-82-8	1	0.02	0.20	**0.16**	ug/L	J
2-Chlorotoluene	95-49-8	1	0.02	0.20	ND	ug/L	U
4-Chlorotoluene	106-43-4	1	0.02	0.20	ND	ug/L	U
t-Butylbenzene	98-06-6	1	0.03	0.20	ND	ug/L	U
1,3,5-Trimethylbenzene	108-67-8	1	0.02	0.20	**0.83**	ug/L	
1,2,4-Trimethylbenzene	95-63-6	1	0.02	0.20	**3.53**	ug/L	
s-Butylbenzene	135-98-8	1	0.02	0.20	**0.03**	ug/L	J
4-Isopropyl Toluene	99-87-6	1	0.03	0.20	**0.08**	ug/L	J
1,3-Dichlorobenzene	541-73-1	1	0.04	0.20	ND	ug/L	U
1,4-Dichlorobenzene	106-46-7	1	0.04	0.20	ND	ug/L	U
n-Butylbenzene	104-51-8	1	0.02	0.20	ND	ug/L	U
1,2-Dichlorobenzene	95-50-1	1	0.04	0.20	ND	ug/L	U
1,2-Dibromo-3-chloropropane	96-12-8	1	0.37	0.50	ND	ug/L	U
1,2,4-Trichlorobenzene	120-82-1	1	0.11	0.50	ND	ug/L	U
Hexachloro-1,3-Butadiene	87-68-3	1	0.07	0.50	ND	ug/L	U
Naphthalene	91-20-3	1	0.12	0.50	**1.10**	ug/L	
1,2,3-Trichlorobenzene	87-61-6	1	0.11	0.50	ND	ug/L	U
Dichlorodifluoromethane	75-71-8	1	0.05	0.20	ND	ug/L	U

4611 S 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6202

Analytical Report

The Boeing Company	Project: Boeing Renton 4-79	
P.O. Box 3707 MC 9U4-26	Project Number: [none]	**Reported:**
Seattle WA, 98124	Project Manager: Carl Bach	12-Oct-2017 14:51

B78-19-9-100617

17J0113-02 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 10/06/2017 09:10

Instrument: NT2 — Analyzed: 11-Oct-2017 16:23

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Methyl tert-butyl Ether	1634-04-4	1	0.07	0.50	ND	ug/L	U
2-Pentanone	107-87-9	1	5.00	5.00	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4				*80-129 %*	*96.9*	*%*	
Surrogate: Toluene-d8				*80-120 %*	*99.2*	*%*	
Surrogate: 4-Bromofluorobenzene				*80-120 %*	*96.7*	*%*	
Surrogate: 1,2-Dichlorobenzene-d4				*80-120 %*	*100*	*%*	

4611 S 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6202

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Analytical Report

The Boeing Company	Project: Boeing Renton 4-79	
P.O. Box 3707 MC 9U4-26	Project Number: [none]	**Reported:**
Seattle WA, 98124	Project Manager: Carl Bach	12-Oct-2017 14:51

B78-18-8-100617

17J0113-03 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 10/06/2017 09:57

Instrument: NT2 — Analyzed: 11-Oct-2017 16:43

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)
Preparation Batch: BFJ0288 — Sample Size: 10 mL
Prepared: 11-Oct-2017 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Chloromethane	74-87-3	1	0.09	0.50	ND	ug/L	U
Vinyl Chloride	75-01-4	1	0.06	0.20	**0.29**	ug/L	
Bromomethane	74-83-9	1	0.25	1.00	ND	ug/L	U
Chloroethane	75-00-3	1	0.09	0.20	**7.39**	ug/L	
Trichlorofluoromethane	75-69-4	1	0.04	0.20	ND	ug/L	U
Acrolein	107-02-8	1	2.48	5.00	ND	ug/L	U
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	1	0.04	0.20	ND	ug/L	U
Acetone	67-64-1	1	2.06	5.00	**2.84**	ug/L	J
1,1-Dichloroethene	75-35-4	1	0.05	0.20	ND	ug/L	U
Bromoethane	74-96-4	1	0.04	0.20	ND	ug/L	U
Iodomethane	74-88-4	1	0.23	1.00	ND	ug/L	U
Methylene Chloride	75-09-2	1	0.49	1.00	**0.58**	ug/L	J
Acrylonitrile	107-13-1	1	0.60	1.00	ND	ug/L	U
Carbon Disulfide	75-15-0	1	0.04	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.05	0.20	**0.47**	ug/L	
Vinyl Acetate	108-05-4	1	0.07	0.20	ND	ug/L	U
1,1-Dichloroethane	75-34-3	1	0.05	0.20	**0.08**	ug/L	J
2-Butanone	78-93-3	1	0.81	5.00	ND	ug/L	U
2,2-Dichloropropane	594-20-7	1	0.05	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.04	0.20	**0.07**	ug/L	J
Chloroform	67-66-3	1	0.03	0.20	ND	ug/L	U
Bromochloromethane	74-97-5	1	0.06	0.20	ND	ug/L	U
1,1,1-Trichloroethane	71-55-6	1	0.04	0.20	ND	ug/L	U
1,1-Dichloropropene	563-58-6	1	0.03	0.20	ND	ug/L	U
Carbon tetrachloride	56-23-5	1	0.04	0.20	ND	ug/L	U
1,2-Dichloroethane	107-06-2	1	0.07	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.03	0.20	**0.72**	ug/L	
Trichloroethene	79-01-6	1	0.05	0.20	ND	ug/L	U
1,2-Dichloropropane	78-87-5	1	0.04	0.20	ND	ug/L	U
Bromodichloromethane	75-27-4	1	0.05	0.20	ND	ug/L	U
Dibromomethane	74-95-3	1	0.15	0.20	ND	ug/L	U
2-Chloroethyl vinyl ether	110-75-8	1	0.25	1.00	ND	ug/L	U
4-Methyl-2-Pentanone	108-10-1	1	0.97	5.00	ND	ug/L	U
cis-1,3-Dichloropropene	10061-01-5	1	0.06	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.04	0.20	**0.65**	ug/L	

4611 S 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6202

The Boeing Company	Project: Boeing Renton 4-79	
P.O. Box 3707 MC 9U4-26	Project Number: [none]	Reported:
Seattle WA, 98124	Project Manager: Carl Bach	12-Oct-2017 14:51

B78-18-8-100617

17J0113-03 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 10/06/2017 09:57

Instrument: NT2 — Analyzed: 11-Oct-2017 16:43

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
trans-1,3-Dichloropropene	10061-02-6	1	0.08	0.20	ND	ug/L	U
2-Hexanone	591-78-6	1	0.90	5.00	ND	ug/L	U
1,1,2-Trichloroethane	79-00-5	1	0.13	0.20	ND	ug/L	U
1,3-Dichloropropane	142-28-9	1	0.06	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.05	0.20	ND	ug/L	U
Dibromochloromethane	124-48-1	1	0.05	0.20	ND	ug/L	U
1,2-Dibromoethane	106-93-4	1	0.07	0.20	ND	ug/L	U
Chlorobenzene	108-90-7	1	0.02	0.20	**2.22**	ug/L	
Ethylbenzene	100-41-4	1	0.04	0.20	**0.36**	ug/L	
1,1,1,2-Tetrachloroethane	630-20-6	1	0.04	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.05	0.40	**1.41**	ug/L	
o-Xylene	95-47-6	1	0.03	0.20	**0.38**	ug/L	
Xylenes, total	1330-20-7	1	0.09	0.60	**1.80**	ug/L	
Styrene	100-42-5	1	0.05	0.20	ND	ug/L	U
Bromoform	75-25-2	1	0.06	0.20	ND	ug/L	U
1,1,2,2-Tetrachloroethane	79-34-5	1	0.06	0.20	ND	ug/L	U
1,2,3-Trichloropropane	96-18-4	1	0.13	0.50	ND	ug/L	U
trans-1,4-Dichloro 2-Butene	110-57-6	1	0.32	1.00	ND	ug/L	U
n-Propylbenzene	103-65-1	1	0.02	0.20	**0.19**	ug/L	J
Bromobenzene	108-86-1	1	0.06	0.20	ND	ug/L	U
Isopropyl Benzene	98-82-8	1	0.02	0.20	**0.06**	ug/L	J
2-Chlorotoluene	95-49-8	1	0.02	0.20	ND	ug/L	U
4-Chlorotoluene	106-43-4	1	0.02	0.20	ND	ug/L	U
t-Butylbenzene	98-06-6	1	0.03	0.20	ND	ug/L	U
1,3,5-Trimethylbenzene	108-67-8	1	0.02	0.20	**0.66**	ug/L	
1,2,4-Trimethylbenzene	95-63-6	1	0.02	0.20	**2.71**	ug/L	
s-Butylbenzene	135-98-8	1	0.02	0.20	ND	ug/L	U
4-Isopropyl Toluene	99-87-6	1	0.03	0.20	**0.06**	ug/L	J
1,3-Dichlorobenzene	541-73-1	1	0.04	0.20	ND	ug/L	U
1,4-Dichlorobenzene	106-46-7	1	0.04	0.20	**0.19**	ug/L	J
n-Butylbenzene	104-51-8	1	0.02	0.20	**0.14**	ug/L	J
1,2-Dichlorobenzene	95-50-1	1	0.04	0.20	ND	ug/L	U
1,2-Dibromo-3-chloropropane	96-12-8	1	0.37	0.50	ND	ug/L	U
1,2,4-Trichlorobenzene	120-82-1	1	0.11	0.50	ND	ug/L	U
Hexachloro-1,3-Butadiene	87-68-3	1	0.07	0.50	ND	ug/L	U
Naphthalene	91-20-3	1	0.12	0.50	**1.29**	ug/L	
1,2,3-Trichlorobenzene	87-61-6	1	0.11	0.50	ND	ug/L	U
Dichlorodifluoromethane	75-71-8	1	0.05	0.20	**0.11**	ug/L	J

4611 S 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6202

Analytical Report

The Boeing Company	Project: Boeing Renton 4-79	
P.O. Box 3707 MC 9U4-26	Project Number: [none]	**Reported:**
Seattle WA, 98124	Project Manager: Carl Bach	12-Oct-2017 14:51

B78-18-8-100617

17J0113-03 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 10/06/2017 09:57

Instrument: NT2 — Analyzed: 11-Oct-2017 16:43

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Methyl tert-butyl Ether	1634-04-4	1	0.07	0.50	ND	ug/L	U
2-Pentanone	107-87-9	1	5.00	5.00	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4				*80-129 %*	*98.3*	*%*	
Surrogate: Toluene-d8				*80-120 %*	*99.6*	*%*	
Surrogate: 4-Bromofluorobenzene				*80-120 %*	*95.4*	*%*	
Surrogate: 1,2-Dichlorobenzene-d4				*80-120 %*	*102*	*%*	

4611 S 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6202

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Analytical Report

The Boeing Company	Project: Boeing Renton 4-79	
P.O. Box 3707 MC 9U4-26	Project Number: [none]	Reported:
Seattle WA, 98124	Project Manager: Carl Bach	12-Oct-2017 14:51

B78-17-9-100617

17J0113-04 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 10/06/2017 10:40

Instrument: NT2 — Analyzed: 11-Oct-2017 13:20

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)
Preparation Batch: BFJ0288 — Sample Size: 10 mL
Prepared: 11-Oct-2017 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Chloromethane	74-87-3	1	0.09	0.50	ND	ug/L	U
Vinyl Chloride	75-01-4	1	0.06	0.20	**0.33**	ug/L	
Bromomethane	74-83-9	1	0.25	1.00	ND	ug/L	U
Chloroethane	75-00-3	1	0.09	0.20	**8.23**	ug/L	
Trichlorofluoromethane	75-69-4	1	0.04	0.20	ND	ug/L	U
Acrolein	107-02-8	1	2.48	5.00	ND	ug/L	U
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	1	0.04	0.20	ND	ug/L	U
Acetone	67-64-1	1	2.06	5.00	**2.11**	ug/L	J
1,1-Dichloroethene	75-35-4	1	0.05	0.20	ND	ug/L	U
Bromoethane	74-96-4	1	0.04	0.20	ND	ug/L	U
Iodomethane	74-88-4	1	0.23	1.00	ND	ug/L	U
Methylene Chloride	75-09-2	1	0.49	1.00	ND	ug/L	U
Acrylonitrile	107-13-1	1	0.60	1.00	ND	ug/L	U
Carbon Disulfide	75-15-0	1	0.04	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.05	0.20	**0.57**	ug/L	
Vinyl Acetate	108-05-4	1	0.07	0.20	ND	ug/L	U
1,1-Dichloroethane	75-34-3	1	0.05	0.20	**0.26**	ug/L	
2-Butanone	78-93-3	1	0.81	5.00	ND	ug/L	U
2,2-Dichloropropane	594-20-7	1	0.05	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.04	0.20	**0.17**	ug/L	J
Chloroform	67-66-3	1	0.03	0.20	ND	ug/L	U
Bromochloromethane	74-97-5	1	0.06	0.20	ND	ug/L	U
1,1,1-Trichloroethane	71-55-6	1	0.04	0.20	ND	ug/L	U
1,1-Dichloropropene	563-58-6	1	0.03	0.20	ND	ug/L	U
Carbon tetrachloride	56-23-5	1	0.04	0.20	ND	ug/L	U
1,2-Dichloroethane	107-06-2	1	0.07	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.03	0.20	**4.84**	ug/L	
Trichloroethene	79-01-6	1	0.05	0.20	ND	ug/L	U
1,2-Dichloropropane	78-87-5	1	0.04	0.20	ND	ug/L	U
Bromodichloromethane	75-27-4	1	0.05	0.20	ND	ug/L	U
Dibromomethane	74-95-3	1	0.15	0.20	ND	ug/L	U
2-Chloroethyl vinyl ether	110-75-8	1	0.25	1.00	ND	ug/L	U
4-Methyl-2-Pentanone	108-10-1	1	0.97	5.00	ND	ug/L	U
cis-1,3-Dichloropropene	10061-01-5	1	0.06	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.04	0.20	**1.25**	ug/L	

4611 S 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6202

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Analytical Report

The Boeing Company	Project: Boeing Renton 4-79	
P.O. Box 3707 MC 9U4-26	Project Number: [none]	**Reported:**
Seattle WA, 98124	Project Manager: Carl Bach	12-Oct-2017 14:51

B78-17-9-100617

17J0113-04 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 10/06/2017 10:40

Instrument: NT2 — Analyzed: 11-Oct-2017 13:20

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
trans-1,3-Dichloropropene	10061-02-6	1	0.08	0.20	ND	ug/L	U
2-Hexanone	591-78-6	1	0.90	5.00	ND	ug/L	U
1,1,2-Trichloroethane	79-00-5	1	0.13	0.20	ND	ug/L	U
1,3-Dichloropropane	142-28-9	1	0.06	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.05	0.20	ND	ug/L	U
Dibromochloromethane	124-48-1	1	0.05	0.20	ND	ug/L	U
1,2-Dibromoethane	106-93-4	1	0.07	0.20	ND	ug/L	U
Chlorobenzene	108-90-7	1	0.02	0.20	**1.78**	ug/L	
Ethylbenzene	100-41-4	1	0.04	0.20	**0.13**	ug/L	J
1,1,1,2-Tetrachloroethane	630-20-6	1	0.04	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.05	0.40	**0.43**	ug/L	
o-Xylene	95-47-6	1	0.03	0.20	**0.20**	ug/L	J
Xylenes, total	1330-20-7	1	0.09	0.60	**0.63**	ug/L	
Styrene	100-42-5	1	0.05	0.20	ND	ug/L	U
Bromoform	75-25-2	1	0.06	0.20	ND	ug/L	U
1,1,2,2-Tetrachloroethane	79-34-5	1	0.06	0.20	ND	ug/L	U
1,2,3-Trichloropropane	96-18-4	1	0.13	0.50	ND	ug/L	U
trans-1,4-Dichloro 2-Butene	110-57-6	1	0.32	1.00	ND	ug/L	U
n-Propylbenzene	103-65-1	1	0.02	0.20	**0.03**	ug/L	J
Bromobenzene	108-86-1	1	0.06	0.20	ND	ug/L	U
Isopropyl Benzene	98-82-8	1	0.02	0.20	**0.04**	ug/L	J
2-Chlorotoluene	95-49-8	1	0.02	0.20	ND	ug/L	U
4-Chlorotoluene	106-43-4	1	0.02	0.20	ND	ug/L	U
t-Butylbenzene	98-06-6	1	0.03	0.20	ND	ug/L	U
1,3,5-Trimethylbenzene	108-67-8	1	0.02	0.20	**0.10**	ug/L	J
1,2,4-Trimethylbenzene	95-63-6	1	0.02	0.20	**0.15**	ug/L	J
s-Butylbenzene	135-98-8	1	0.02	0.20	ND	ug/L	U
4-Isopropyl Toluene	99-87-6	1	0.03	0.20	**0.04**	ug/L	J
1,3-Dichlorobenzene	541-73-1	1	0.04	0.20	ND	ug/L	U
1,4-Dichlorobenzene	106-46-7	1	0.04	0.20	**0.11**	ug/L	J
n-Butylbenzene	104-51-8	1	0.02	0.20	ND	ug/L	U
1,2-Dichlorobenzene	95-50-1	1	0.04	0.20	ND	ug/L	U
1,2-Dibromo-3-chloropropane	96-12-8	1	0.37	0.50	ND	ug/L	U
1,2,4-Trichlorobenzene	120-82-1	1	0.11	0.50	ND	ug/L	U
Hexachloro-1,3-Butadiene	87-68-3	1	0.07	0.50	ND	ug/L	U
Naphthalene	91-20-3	1	0.12	0.50	ND	ug/L	U
1,2,3-Trichlorobenzene	87-61-6	1	0.11	0.50	ND	ug/L	U
Dichlorodifluoromethane	75-71-8	1	0.05	0.20	ND	ug/L	U

4611 S 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6202

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Analytical Report

The Boeing Company	Project: Boeing Renton 4-79	
P.O. Box 3707 MC 9U4-26	Project Number: [none]	**Reported:**
Seattle WA, 98124	Project Manager: Carl Bach	12-Oct-2017 14:51

B78-17-9-100617

17J0113-04 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 10/06/2017 10:40

Instrument: NT2 — Analyzed: 11-Oct-2017 13:20

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Methyl tert-butyl Ether	1634-04-4	1	0.07	0.50	ND	ug/L	U
2-Pentanone	107-87-9	1	5.00	5.00	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4				*80-129 %*	*96.7*	*%*	
Surrogate: Toluene-d8				*80-120 %*	*96.4*	*%*	
Surrogate: 4-Bromofluorobenzene				*80-120 %*	*97.8*	*%*	
Surrogate: 1,2-Dichlorobenzene-d4				*80-120 %*	*103*	*%*	

4611 S 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6202

The Boeing Company	Project: Boeing Renton 4-79	
P.O. Box 3707 MC 9U4-26	Project Number: [none]	**Reported:**
Seattle WA, 98124	Project Manager: Carl Bach	12-Oct-2017 14:51

B78-20-8-100617

17J0113-05 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 10/06/2017 11:19

Instrument: NT2 — Analyzed: 11-Oct-2017 13:41

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)
Preparation Batch: BFJ0288 — Sample Size: 10 mL
Prepared: 11-Oct-2017 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Chloromethane	74-87-3	1	0.09	0.50	ND	ug/L	U
Vinyl Chloride	75-01-4	1	0.06	0.20	**0.14**	ug/L	J
Bromomethane	74-83-9	1	0.25	1.00	ND	ug/L	U
Chloroethane	75-00-3	1	0.09	0.20	**1.09**	ug/L	
Trichlorofluoromethane	75-69-4	1	0.04	0.20	ND	ug/L	U
Acrolein	107-02-8	1	2.48	5.00	ND	ug/L	U
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	1	0.04	0.20	ND	ug/L	U
Acetone	67-64-1	1	2.06	5.00	**3.39**	ug/L	J
1,1-Dichloroethene	75-35-4	1	0.05	0.20	ND	ug/L	U
Bromoethane	74-96-4	1	0.04	0.20	ND	ug/L	U
Iodomethane	74-88-4	1	0.23	1.00	ND	ug/L	U
Methylene Chloride	75-09-2	1	0.49	1.00	**0.58**	ug/L	J
Acrylonitrile	107-13-1	1	0.60	1.00	ND	ug/L	U
Carbon Disulfide	75-15-0	1	0.04	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.05	0.20	**0.08**	ug/L	J
Vinyl Acetate	108-05-4	1	0.07	0.20	ND	ug/L	U
1,1-Dichloroethane	75-34-3	1	0.05	0.20	ND	ug/L	U
2-Butanone	78-93-3	1	0.81	5.00	ND	ug/L	U
2,2-Dichloropropane	594-20-7	1	0.05	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.04	0.20	ND	ug/L	U
Chloroform	67-66-3	1	0.03	0.20	ND	ug/L	U
Bromochloromethane	74-97-5	1	0.06	0.20	ND	ug/L	U
1,1,1-Trichloroethane	71-55-6	1	0.04	0.20	ND	ug/L	U
1,1-Dichloropropene	563-58-6	1	0.03	0.20	ND	ug/L	U
Carbon tetrachloride	56-23-5	1	0.04	0.20	ND	ug/L	U
1,2-Dichloroethane	107-06-2	1	0.07	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.03	0.20	**8.81**	ug/L	
Trichloroethene	79-01-6	1	0.05	0.20	ND	ug/L	U
1,2-Dichloropropane	78-87-5	1	0.04	0.20	ND	ug/L	U
Bromodichloromethane	75-27-4	1	0.05	0.20	ND	ug/L	U
Dibromomethane	74-95-3	1	0.15	0.20	ND	ug/L	U
2-Chloroethyl vinyl ether	110-75-8	1	0.25	1.00	ND	ug/L	U
4-Methyl-2-Pentanone	108-10-1	1	0.97	5.00	ND	ug/L	U
cis-1,3-Dichloropropene	10061-01-5	1	0.06	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.04	0.20	**0.79**	ug/L	

4611 S 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6202

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Analytical Report

The Boeing Company	Project: Boeing Renton 4-79	
P.O. Box 3707 MC 9U4-26	Project Number: [none]	**Reported:**
Seattle WA, 98124	Project Manager: Carl Bach	12-Oct-2017 14:51

B78-20-8-100617

17J0113-05 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 10/06/2017 11:19

Instrument: NT2 — Analyzed: 11-Oct-2017 13:41

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
trans-1,3-Dichloropropene	10061-02-6	1	0.08	0.20	ND	ug/L	U
2-Hexanone	591-78-6	1	0.90	5.00	ND	ug/L	U
1,1,2-Trichloroethane	79-00-5	1	0.13	0.20	ND	ug/L	U
1,3-Dichloropropane	142-28-9	1	0.06	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.05	0.20	ND	ug/L	U
Dibromochloromethane	124-48-1	1	0.05	0.20	ND	ug/L	U
1,2-Dibromoethane	106-93-4	1	0.07	0.20	ND	ug/L	U
Chlorobenzene	108-90-7	1	0.02	0.20	**1.15**	ug/L	
Ethylbenzene	100-41-4	1	0.04	0.20	**0.75**	ug/L	
1,1,1,2-Tetrachloroethane	630-20-6	1	0.04	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.05	0.40	**3.42**	ug/L	
o-Xylene	95-47-6	1	0.03	0.20	**0.67**	ug/L	
Xylenes, total	1330-20-7	1	0.09	0.60	**4.10**	ug/L	
Styrene	100-42-5	1	0.05	0.20	ND	ug/L	U
Bromoform	75-25-2	1	0.06	0.20	ND	ug/L	U
1,1,2,2-Tetrachloroethane	79-34-5	1	0.06	0.20	ND	ug/L	U
1,2,3-Trichloropropane	96-18-4	1	0.13	0.50	ND	ug/L	U
trans-1,4-Dichloro 2-Butene	110-57-6	1	0.32	1.00	ND	ug/L	U
n-Propylbenzene	103-65-1	1	0.02	0.20	**1.82**	ug/L	
Bromobenzene	108-86-1	1	0.06	0.20	ND	ug/L	U
Isopropyl Benzene	98-82-8	1	0.02	0.20	**0.42**	ug/L	
2-Chlorotoluene	95-49-8	1	0.02	0.20	ND	ug/L	U
4-Chlorotoluene	106-43-4	1	0.02	0.20	ND	ug/L	U
t-Butylbenzene	98-06-6	1	0.03	0.20	ND	ug/L	U
1,3,5-Trimethylbenzene	108-67-8	1	0.02	0.20	**0.18**	ug/L	J
1,2,4-Trimethylbenzene	95-63-6	1	0.02	0.20	**0.61**	ug/L	
s-Butylbenzene	135-98-8	1	0.02	0.20	**0.10**	ug/L	J
4-Isopropyl Toluene	99-87-6	1	0.03	0.20	**0.15**	ug/L	J
1,3-Dichlorobenzene	541-73-1	1	0.04	0.20	ND	ug/L	U
1,4-Dichlorobenzene	106-46-7	1	0.04	0.20	**0.06**	ug/L	J
n-Butylbenzene	104-51-8	1	0.02	0.20	**0.42**	ug/L	
1,2-Dichlorobenzene	95-50-1	1	0.04	0.20	ND	ug/L	U
1,2-Dibromo-3-chloropropane	96-12-8	1	0.37	0.50	ND	ug/L	U
1,2,4-Trichlorobenzene	120-82-1	1	0.11	0.50	ND	ug/L	U
Hexachloro-1,3-Butadiene	87-68-3	1	0.07	0.50	ND	ug/L	U
Naphthalene	91-20-3	1	0.12	0.50	**1.09**	ug/L	
1,2,3-Trichlorobenzene	87-61-6	1	0.11	0.50	ND	ug/L	U
Dichlorodifluoromethane	75-71-8	1	0.05	0.20	ND	ug/L	U

4611 S 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6202

Analytical Report

The Boeing Company	Project: Boeing Renton 4-79	
P.O. Box 3707 MC 9U4-26	Project Number: [none]	**Reported:**
Seattle WA, 98124	Project Manager: Carl Bach	12-Oct-2017 14:51

B78-20-8-100617

17J0113-05 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 10/06/2017 11:19

Instrument: NT2 — Analyzed: 11-Oct-2017 13:41

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Methyl tert-butyl Ether	1634-04-4	1	0.07	0.50	ND	ug/L	U
2-Pentanone	107-87-9	1	5.00	5.00	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4				*80-129 %*	*106*	*%*	
Surrogate: Toluene-d8				*80-120 %*	*99.8*	*%*	
Surrogate: 4-Bromofluorobenzene				*80-120 %*	*94.1*	*%*	
Surrogate: 1,2-Dichlorobenzene-d4				*80-120 %*	*102*	*%*	

4611 S 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6202

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Analytical Report

The Boeing Company	Project: Boeing Renton 4-79	
P.O. Box 3707 MC 9U4-26	Project Number: [none]	Reported:
Seattle WA, 98124	Project Manager: Carl Bach	12-Oct-2017 14:51

Dup01-100617

17J0113-06 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 10/06/2017 08:00

Instrument: NT2 — Analyzed: 11-Oct-2017 14:01

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)
Preparation Batch: BFJ0288 — Sample Size: 10 mL
Prepared: 11-Oct-2017 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Chloromethane	74-87-3	1	0.09	0.50	**0.16**	ug/L	J
Vinyl Chloride	75-01-4	1	0.06	0.20	**0.20**	ug/L	J
Bromomethane	74-83-9	1	0.25	1.00	ND	ug/L	U
Chloroethane	75-00-3	1	0.09	0.20	**2.16**	ug/L	
Trichlorofluoromethane	75-69-4	1	0.04	0.20	ND	ug/L	U
Acrolein	107-02-8	1	2.48	5.00	ND	ug/L	U
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	1	0.04	0.20	ND	ug/L	U
Acetone	67-64-1	1	2.06	5.00	**2.85**	ug/L	J
1,1-Dichloroethene	75-35-4	1	0.05	0.20	ND	ug/L	U
Bromoethane	74-96-4	1	0.04	0.20	ND	ug/L	U
Iodomethane	74-88-4	1	0.23	1.00	ND	ug/L	U
Methylene Chloride	75-09-2	1	0.49	1.00	ND	ug/L	U
Acrylonitrile	107-13-1	1	0.60	1.00	ND	ug/L	U
Carbon Disulfide	75-15-0	1	0.04	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.05	0.20	**0.15**	ug/L	J
Vinyl Acetate	108-05-4	1	0.07	0.20	ND	ug/L	U
1,1-Dichloroethane	75-34-3	1	0.05	0.20	ND	ug/L	U
2-Butanone	78-93-3	1	0.81	5.00	ND	ug/L	U
2,2-Dichloropropane	594-20-7	1	0.05	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.04	0.20	**0.15**	ug/L	J
Chloroform	67-66-3	1	0.03	0.20	ND	ug/L	U
Bromochloromethane	74-97-5	1	0.06	0.20	ND	ug/L	U
1,1,1-Trichloroethane	71-55-6	1	0.04	0.20	ND	ug/L	U
1,1-Dichloropropene	563-58-6	1	0.03	0.20	ND	ug/L	U
Carbon tetrachloride	56-23-5	1	0.04	0.20	ND	ug/L	U
1,2-Dichloroethane	107-06-2	1	0.07	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.03	0.20	**2.01**	ug/L	
Trichloroethene	79-01-6	1	0.05	0.20	ND	ug/L	U
1,2-Dichloropropane	78-87-5	1	0.04	0.20	ND	ug/L	U
Bromodichloromethane	75-27-4	1	0.05	0.20	ND	ug/L	U
Dibromomethane	74-95-3	1	0.15	0.20	ND	ug/L	U
2-Chloroethyl vinyl ether	110-75-8	1	0.25	1.00	ND	ug/L	U
4-Methyl-2-Pentanone	108-10-1	1	0.97	5.00	ND	ug/L	U
cis-1,3-Dichloropropene	10061-01-5	1	0.06	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.04	0.20	**0.73**	ug/L	

4611 S 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6202

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Analytical Report

The Boeing Company	Project: Boeing Renton 4-79	
P.O. Box 3707 MC 9U4-26	Project Number: [none]	**Reported:**
Seattle WA, 98124	Project Manager: Carl Bach	12-Oct-2017 14:51

Dup01-100617

17J0113-06 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 10/06/2017 08:00

Instrument: NT2 — Analyzed: 11-Oct-2017 14:01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
trans-1,3-Dichloropropene	10061-02-6	1	0.08	0.20	ND	ug/L	U
2-Hexanone	591-78-6	1	0.90	5.00	ND	ug/L	U
1,1,2-Trichloroethane	79-00-5	1	0.13	0.20	ND	ug/L	U
1,3-Dichloropropane	142-28-9	1	0.06	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.05	0.20	ND	ug/L	U
Dibromochloromethane	124-48-1	1	0.05	0.20	ND	ug/L	U
1,2-Dibromoethane	106-93-4	1	0.07	0.20	ND	ug/L	U
Chlorobenzene	108-90-7	1	0.02	0.20	**1.83**	ug/L	
Ethylbenzene	100-41-4	1	0.04	0.20	**0.29**	ug/L	
1,1,1,2-Tetrachloroethane	630-20-6	1	0.04	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.05	0.40	**2.39**	ug/L	
o-Xylene	95-47-6	1	0.03	0.20	**0.50**	ug/L	
Xylenes, total	1330-20-7	1	0.09	0.60	**2.89**	ug/L	
Styrene	100-42-5	1	0.05	0.20	ND	ug/L	U
Bromoform	75-25-2	1	0.06	0.20	ND	ug/L	U
1,1,2,2-Tetrachloroethane	79-34-5	1	0.06	0.20	ND	ug/L	U
1,2,3-Trichloropropane	96-18-4	1	0.13	0.50	ND	ug/L	U
trans-1,4-Dichloro 2-Butene	110-57-6	1	0.32	1.00	ND	ug/L	U
n-Propylbenzene	103-65-1	1	0.02	0.20	**1.51**	ug/L	
Bromobenzene	108-86-1	1	0.06	0.20	ND	ug/L	U
Isopropyl Benzene	98-82-8	1	0.02	0.20	**0.53**	ug/L	
2-Chlorotoluene	95-49-8	1	0.02	0.20	ND	ug/L	U
4-Chlorotoluene	106-43-4	1	0.02	0.20	ND	ug/L	U
t-Butylbenzene	98-06-6	1	0.03	0.20	ND	ug/L	U
1,3,5-Trimethylbenzene	108-67-8	1	0.02	0.20	**0.45**	ug/L	
1,2,4-Trimethylbenzene	95-63-6	1	0.02	0.20	**0.63**	ug/L	
s-Butylbenzene	135-98-8	1	0.02	0.20	**0.02**	ug/L	J
4-Isopropyl Toluene	99-87-6	1	0.03	0.20	**0.12**	ug/L	J
1,3-Dichlorobenzene	541-73-1	1	0.04	0.20	ND	ug/L	U
1,4-Dichlorobenzene	106-46-7	1	0.04	0.20	**0.17**	ug/L	J
n-Butylbenzene	104-51-8	1	0.02	0.20	ND	ug/L	U
1,2-Dichlorobenzene	95-50-1	1	0.04	0.20	**0.10**	ug/L	J
1,2-Dibromo-3-chloropropane	96-12-8	1	0.37	0.50	ND	ug/L	U
1,2,4-Trichlorobenzene	120-82-1	1	0.11	0.50	ND	ug/L	U
Hexachloro-1,3-Butadiene	87-68-3	1	0.07	0.50	ND	ug/L	U
Naphthalene	91-20-3	1	0.12	0.50	**0.68**	ug/L	
1,2,3-Trichlorobenzene	87-61-6	1	0.11	0.50	ND	ug/L	U
Dichlorodifluoromethane	75-71-8	1	0.05	0.20	ND	ug/L	U

4611 S 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6202

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Analytical Report

The Boeing Company	Project: Boeing Renton 4-79	
P.O. Box 3707 MC 9U4-26	Project Number: [none]	**Reported:**
Seattle WA, 98124	Project Manager: Carl Bach	12-Oct-2017 14:51

Dup01-100617

17J0113-06 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 10/06/2017 08:00

Instrument: NT2 — Analyzed: 11-Oct-2017 14:01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Methyl tert-butyl Ether	1634-04-4	1	0.07	0.50	ND	ug/L	U
2-Pentanone	107-87-9	1	5.00	5.00	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4				*80-129 %*	*98.6*	*%*	
Surrogate: Toluene-d8				*80-120 %*	*99.5*	*%*	
Surrogate: 4-Bromofluorobenzene				*80-120 %*	*99.1*	*%*	
Surrogate: 1,2-Dichlorobenzene-d4				*80-120 %*	*99.4*	*%*	

4611 S. 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6202

The Boeing Company	Project: Boeing Renton 4-79	
P.O. Box 3707 MC 9U4-26	Project Number: [none]	**Reported:**
Seattle WA, 98124	Project Manager: Carl Bach	12-Oct-2017 14:51

TripBlank

17J0113-07 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 10/06/2017 00:00

Instrument: NT2 — Analyzed: 11-Oct-2017 10:23

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)
Preparation Batch: BFJ0288 — Sample Size: 10 mL
Prepared: 11-Oct-2017 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Chloromethane	74-87-3	1	0.09	0.50	ND	ug/L	U
Vinyl Chloride	75-01-4	1	0.06	0.20	ND	ug/L	U
Bromomethane	74-83-9	1	0.25	1.00	ND	ug/L	U
Chloroethane	75-00-3	1	0.09	0.20	ND	ug/L	U
Trichlorofluoromethane	75-69-4	1	0.04	0.20	ND	ug/L	U
Acrolein	107-02-8	1	2.48	5.00	ND	ug/L	U
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	1	0.04	0.20	ND	ug/L	U
Acetone	67-64-1	1	2.06	5.00	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.05	0.20	ND	ug/L	U
Bromoethane	74-96-4	1	0.04	0.20	ND	ug/L	U
Iodomethane	74-88-4	1	0.23	1.00	ND	ug/L	U
Methylene Chloride	75-09-2	1	0.49	1.00	**0.81**	ug/L	J
Acrylonitrile	107-13-1	1	0.60	1.00	ND	ug/L	U
Carbon Disulfide	75-15-0	1	0.04	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.05	0.20	ND	ug/L	U
Vinyl Acetate	108-05-4	1	0.07	0.20	ND	ug/L	U
1,1-Dichloroethane	75-34-3	1	0.05	0.20	ND	ug/L	U
2-Butanone	78-93-3	1	0.81	5.00	ND	ug/L	U
2,2-Dichloropropane	594-20-7	1	0.05	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.04	0.20	ND	ug/L	U
Chloroform	67-66-3	1	0.03	0.20	ND	ug/L	U
Bromochloromethane	74-97-5	1	0.06	0.20	ND	ug/L	U
1,1,1-Trichloroethane	71-55-6	1	0.04	0.20	ND	ug/L	U
1,1-Dichloropropene	563-58-6	1	0.03	0.20	ND	ug/L	U
Carbon tetrachloride	56-23-5	1	0.04	0.20	ND	ug/L	U
1,2-Dichloroethane	107-06-2	1	0.07	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.03	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.05	0.20	ND	ug/L	U
1,2-Dichloropropane	78-87-5	1	0.04	0.20	ND	ug/L	U
Bromodichloromethane	75-27-4	1	0.05	0.20	ND	ug/L	U
Dibromomethane	74-95-3	1	0.15	0.20	ND	ug/L	U
2-Chloroethyl vinyl ether	110-75-8	1	0.25	1.00	ND	ug/L	U
4-Methyl-2-Pentanone	108-10-1	1	0.97	5.00	ND	ug/L	U
cis-1,3-Dichloropropene	10061-01-5	1	0.06	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.04	0.20	ND	ug/L	U

4611 S. 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6202

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Analytical Report

The Boeing Company	Project: Boeing Renton 4-79	
P.O. Box 3707 MC 9U4-26	Project Number: [none]	**Reported:**
Seattle WA, 98124	Project Manager: Carl Bach	12-Oct-2017 14:51

TripBlank

17J0113-07 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 10/06/2017 00:00

Instrument: NT2 — Analyzed: 11-Oct-2017 10:23

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
trans-1,3-Dichloropropene	10061-02-6	1	0.08	0.20	ND	ug/L	U
2-Hexanone	591-78-6	1	0.90	5.00	ND	ug/L	U
1,1,2-Trichloroethane	79-00-5	1	0.13	0.20	ND	ug/L	U
1,3-Dichloropropane	142-28-9	1	0.06	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.05	0.20	ND	ug/L	U
Dibromochloromethane	124-48-1	1	0.05	0.20	ND	ug/L	U
1,2-Dibromoethane	106-93-4	1	0.07	0.20	ND	ug/L	U
Chlorobenzene	108-90-7	1	0.02	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.04	0.20	ND	ug/L	U
1,1,1,2-Tetrachloroethane	630-20-6	1	0.04	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.05	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.03	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.09	0.60	ND	ug/L	U
Styrene	100-42-5	1	0.05	0.20	ND	ug/L	U
Bromoform	75-25-2	1	0.06	0.20	ND	ug/L	U
1,1,2,2-Tetrachloroethane	79-34-5	1	0.06	0.20	ND	ug/L	U
1,2,3-Trichloropropane	96-18-4	1	0.13	0.50	ND	ug/L	U
trans-1,4-Dichloro 2-Butene	110-57-6	1	0.32	1.00	ND	ug/L	U
n-Propylbenzene	103-65-1	1	0.02	0.20	ND	ug/L	U
Bromobenzene	108-86-1	1	0.06	0.20	ND	ug/L	U
Isopropyl Benzene	98-82-8	1	0.02	0.20	ND	ug/L	U
2-Chlorotoluene	95-49-8	1	0.02	0.20	ND	ug/L	U
4-Chlorotoluene	106-43-4	1	0.02	0.20	ND	ug/L	U
t-Butylbenzene	98-06-6	1	0.03	0.20	ND	ug/L	U
1,3,5-Trimethylbenzene	108-67-8	1	0.02	0.20	ND	ug/L	U
1,2,4-Trimethylbenzene	95-63-6	1	0.02	0.20	ND	ug/L	U
s-Butylbenzene	135-98-8	1	0.02	0.20	ND	ug/L	U
4-Isopropyl Toluene	99-87-6	1	0.03	0.20	**0.04**	ug/L	J
1,3-Dichlorobenzene	541-73-1	1	0.04	0.20	ND	ug/L	U
1,4-Dichlorobenzene	106-46-7	1	0.04	0.20	ND	ug/L	U
n-Butylbenzene	104-51-8	1	0.02	0.20	ND	ug/L	U
1,2-Dichlorobenzene	95-50-1	1	0.04	0.20	ND	ug/L	U
1,2-Dibromo-3-chloropropane	96-12-8	1	0.37	0.50	ND	ug/L	U
1,2,4-Trichlorobenzene	120-82-1	1	0.11	0.50	ND	ug/L	U
Hexachloro-1,3-Butadiene	87-68-3	1	0.07	0.50	ND	ug/L	U
Naphthalene	91-20-3	1	0.12	0.50	ND	ug/L	U
1,2,3-Trichlorobenzene	87-61-6	1	0.11	0.50	ND	ug/L	U
Dichlorodifluoromethane	75-71-8	1	0.05	0.20	ND	ug/L	U

4611 S 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6202

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Analytical Report

The Boeing Company	Project: Boeing Renton 4-79	
P.O. Box 3707 MC 9U4-26	Project Number: [none]	**Reported:**
Seattle WA, 98124	Project Manager: Carl Bach	12-Oct-2017 14:51

TripBlank

17J0113-07 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 10/06/2017 00:00

Instrument: NT2 — Analyzed: 11-Oct-2017 10:23

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Methyl tert-butyl Ether	1634-04-4	1	0.07	0.50	ND	ug/L	U
2-Pentanone	107-87-9	1	5.00	5.00	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4				*80-129 %*	*93.7*	*%*	
Surrogate: Toluene-d8				*80-120 %*	*98.3*	*%*	
Surrogate: 4-Bromofluorobenzene				*80-120 %*	*97.3*	*%*	
Surrogate: 1,2-Dichlorobenzene-d4				*80-120 %*	*101*	*%*	

4611 S. 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6202

Analytical Report

The Boeing Company	Project: Boeing Renton 4-79	
P.O. Box 3707 MC 9U4-26	Project Number: [none]	Reported:
Seattle WA, 98124	Project Manager: Carl Bach	12-Oct-2017 14:51

4-79-IDW-100617

17J0113-08 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 10/06/2017 11:36

Instrument: NT2 — Analyzed: 11-Oct-2017 14:22

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)
Preparation Batch: BFJ0288 — Sample Size: 10 mL
Prepared: 11-Oct-2017 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Chloromethane	74-87-3	1	0.09	0.50	ND	ug/L	U
Vinyl Chloride	75-01-4	1	0.06	0.20	**0.15**	ug/L	J
Bromomethane	74-83-9	1	0.25	1.00	ND	ug/L	U
Chloroethane	75-00-3	1	0.09	0.20	**3.76**	ug/L	
Trichlorofluoromethane	75-69-4	1	0.04	0.20	ND	ug/L	U
Acrolein	107-02-8	1	2.48	5.00	ND	ug/L	U
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	1	0.04	0.20	ND	ug/L	U
Acetone	67-64-1	1	2.06	5.00	**4.75**	ug/L	J
1,1-Dichloroethene	75-35-4	1	0.05	0.20	ND	ug/L	U
Bromoethane	74-96-4	1	0.04	0.20	ND	ug/L	U
Iodomethane	74-88-4	1	0.23	1.00	ND	ug/L	U
Methylene Chloride	75-09-2	1	0.49	1.00	ND	ug/L	U
Acrylonitrile	107-13-1	1	0.60	1.00	ND	ug/L	U
Carbon Disulfide	75-15-0	1	0.04	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.05	0.20	**0.22**	ug/L	
Vinyl Acetate	108-05-4	1	0.07	0.20	ND	ug/L	U
1,1-Dichloroethane	75-34-3	1	0.05	0.20	**0.07**	ug/L	J
2-Butanone	78-93-3	1	0.81	5.00	**1.00**	ug/L	J
2,2-Dichloropropane	594-20-7	1	0.05	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.04	0.20	**0.06**	ug/L	J
Chloroform	67-66-3	1	0.03	0.20	ND	ug/L	U
Bromochloromethane	74-97-5	1	0.06	0.20	ND	ug/L	U
1,1,1-Trichloroethane	71-55-6	1	0.04	0.20	ND	ug/L	U
1,1-Dichloropropene	563-58-6	1	0.03	0.20	ND	ug/L	U
Carbon tetrachloride	56-23-5	1	0.04	0.20	ND	ug/L	U
1,2-Dichloroethane	107-06-2	1	0.07	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.03	0.20	**2.63**	ug/L	
Trichloroethene	79-01-6	1	0.05	0.20	ND	ug/L	U
1,2-Dichloropropane	78-87-5	1	0.04	0.20	ND	ug/L	U
Bromodichloromethane	75-27-4	1	0.05	0.20	ND	ug/L	U
Dibromomethane	74-95-3	1	0.15	0.20	ND	ug/L	U
2-Chloroethyl vinyl ether	110-75-8	1	0.25	1.00	ND	ug/L	U
4-Methyl-2-Pentanone	108-10-1	1	0.97	5.00	ND	ug/L	U
cis-1,3-Dichloropropene	10061-01-5	1	0.06	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.04	0.20	**0.59**	ug/L	

4611 S 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6202

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Analytical Report

The Boeing Company	Project: Boeing Renton 4-79	
P.O. Box 3707 MC 9U4-26	Project Number: [none]	**Reported:**
Seattle WA, 98124	Project Manager: Carl Bach	12-Oct-2017 14:51

4-79-IDW-100617

17J0113-08 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 10/06/2017 11:36

Instrument: NT2 — Analyzed: 11-Oct-2017 14:22

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
trans-1,3-Dichloropropene	10061-02-6	1	0.08	0.20	ND	ug/L	U
2-Hexanone	591-78-6	1	0.90	5.00	ND	ug/L	U
1,1,2-Trichloroethane	79-00-5	1	0.13	0.20	ND	ug/L	U
1,3-Dichloropropane	142-28-9	1	0.06	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.05	0.20	ND	ug/L	U
Dibromochloromethane	124-48-1	1	0.05	0.20	ND	ug/L	U
1,2-Dibromoethane	106-93-4	1	0.07	0.20	ND	ug/L	U
Chlorobenzene	108-90-7	1	0.02	0.20	**1.19**	ug/L	
Ethylbenzene	100-41-4	1	0.04	0.20	**0.31**	ug/L	
1,1,1,2-Tetrachloroethane	630-20-6	1	0.04	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.05	0.40	**1.47**	ug/L	
o-Xylene	95-47-6	1	0.03	0.20	**0.36**	ug/L	
Xylenes, total	1330-20-7	1	0.09	0.60	**1.83**	ug/L	
Styrene	100-42-5	1	0.05	0.20	ND	ug/L	U
Bromoform	75-25-2	1	0.06	0.20	ND	ug/L	U
1,1,2,2-Tetrachloroethane	79-34-5	1	0.06	0.20	ND	ug/L	U
1,2,3-Trichloropropane	96-18-4	1	0.13	0.50	ND	ug/L	U
trans-1,4-Dichloro 2-Butene	110-57-6	1	0.32	1.00	ND	ug/L	U
n-Propylbenzene	103-65-1	1	0.02	0.20	**0.45**	ug/L	
Bromobenzene	108-86-1	1	0.06	0.20	ND	ug/L	U
Isopropyl Benzene	98-82-8	1	0.02	0.20	**0.12**	ug/L	J
2-Chlorotoluene	95-49-8	1	0.02	0.20	ND	ug/L	U
4-Chlorotoluene	106-43-4	1	0.02	0.20	ND	ug/L	U
t-Butylbenzene	98-06-6	1	0.03	0.20	ND	ug/L	U
1,3,5-Trimethylbenzene	108-67-8	1	0.02	0.20	**0.40**	ug/L	
1,2,4-Trimethylbenzene	95-63-6	1	0.02	0.20	**1.45**	ug/L	
s-Butylbenzene	135-98-8	1	0.02	0.20	**0.04**	ug/L	J
4-Isopropyl Toluene	99-87-6	1	0.03	0.20	**0.09**	ug/L	J
1,3-Dichlorobenzene	541-73-1	1	0.04	0.20	ND	ug/L	U
1,4-Dichlorobenzene	106-46-7	1	0.04	0.20	**0.09**	ug/L	J
n-Butylbenzene	104-51-8	1	0.02	0.20	**0.09**	ug/L	J
1,2-Dichlorobenzene	95-50-1	1	0.04	0.20	ND	ug/L	U
1,2-Dibromo-3-chloropropane	96-12-8	1	0.37	0.50	ND	ug/L	U
1,2,4-Trichlorobenzene	120-82-1	1	0.11	0.50	ND	ug/L	U
Hexachloro-1,3-Butadiene	87-68-3	1	0.07	0.50	ND	ug/L	U
Naphthalene	91-20-3	1	0.12	0.50	**0.82**	ug/L	
1,2,3-Trichlorobenzene	87-61-6	1	0.11	0.50	ND	ug/L	U
Dichlorodifluoromethane	75-71-8	1	0.05	0.20	ND	ug/L	U

4611 S 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6202

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Analytical Report

The Boeing Company	Project: Boeing Renton 4-79	
P.O. Box 3707 MC 9U4-26	Project Number: [none]	**Reported:**
Seattle WA, 98124	Project Manager: Carl Bach	12-Oct-2017 14:51

4-79-IDW-100617

17J0113-08 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 10/06/2017 11:36

Instrument: NT2 — Analyzed: 11-Oct-2017 14:22

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Methyl tert-butyl Ether	1634-04-4	1	0.07	0.50	ND	ug/L	U
2-Pentanone	107-87-9	1	5.00	5.00	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4				*80-129 %*	*99.7*	*%*	
Surrogate: Toluene-d8				*80-120 %*	*96.6*	*%*	
Surrogate: 4-Bromofluorobenzene				*80-120 %*	*98.1*	*%*	
Surrogate: 1,2-Dichlorobenzene-d4				*80-120 %*	*102*	*%*	

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.

4611 S. 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6202

The Boeing Company	Project: Boeing Renton 4-79	
P.O. Box 3707 MC 9U4-26	Project Number: [none]	**Reported:**
Seattle WA, 98124	Project Manager: Carl Bach	12-Oct-2017 14:51

Volatile Organic Compounds - Quality Control

Batch BFJ0288 - EPA 5030 (Purge and Trap)

Instrument: NT2 Analyst: LH

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BFJ0288-BLK2)					Prepared: 11-Oct-2017 Analyzed: 11-Oct-2017 09:19						
Chloromethane	ND	0.09	0.50	ug/L							U
Vinyl Chloride	ND	0.06	0.20	ug/L							U
Bromomethane	ND	0.25	1.00	ug/L							U
Chloroethane	ND	0.09	0.20	ug/L							U
Trichlorofluoromethane	ND	0.04	0.20	ug/L							U
Acrolein	ND	2.48	5.00	ug/L							U
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND	0.04	0.20	ug/L							U
Acetone	ND	2.06	5.00	ug/L							U
1,1-Dichloroethene	ND	0.05	0.20	ug/L							U
Bromoethane	ND	0.04	0.20	ug/L							U
Iodomethane	ND	0.23	1.00	ug/L							U
Methylene Chloride	ND	0.49	1.00	ug/L							U
Acrylonitrile	ND	0.60	1.00	ug/L							U
Carbon Disulfide	0.08	0.04	0.20	ug/L							J
trans-1,2-Dichloroethene	ND	0.05	0.20	ug/L							U
Vinyl Acetate	ND	0.07	0.20	ug/L							U
1,1-Dichloroethane	ND	0.05	0.20	ug/L							U
2-Butanone	ND	0.81	5.00	ug/L							U
2,2-Dichloropropane	ND	0.05	0.20	ug/L							U
cis-1,2-Dichloroethene	ND	0.04	0.20	ug/L							U
Chloroform	ND	0.03	0.20	ug/L							U
Bromochloromethane	ND	0.06	0.20	ug/L							U
1,1,1-Trichloroethane	ND	0.04	0.20	ug/L							U
1,1-Dichloropropene	ND	0.03	0.20	ug/L							U
Carbon tetrachloride	ND	0.04	0.20	ug/L							U
1,2-Dichloroethane	ND	0.07	0.20	ug/L							U
Benzene	ND	0.03	0.20	ug/L							U
Trichloroethene	ND	0.05	0.20	ug/L							U
1,2-Dichloropropane	ND	0.04	0.20	ug/L							U
Bromodichloromethane	ND	0.05	0.20	ug/L							U
Dibromomethane	ND	0.15	0.20	ug/L							U
2-Chloroethyl vinyl ether	ND	0.25	1.00	ug/L							U
4-Methyl-2-Pentanone	ND	0.97	5.00	ug/L							U
cis-1,3-Dichloropropene	ND	0.06	0.20	ug/L							U
Toluene	ND	0.04	0.20	ug/L							U

4611 S 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6202

The Boeing Company	Project: Boeing Renton 4-79	
P.O. Box 3707 MC 9U4-26	Project Number: [none]	**Reported:**
Seattle WA, 98124	Project Manager: Carl Bach	12-Oct-2017 14:51

Volatile Organic Compounds - Quality Control

Batch BFJ0288 - EPA 5030 (Purge and Trap)

Instrument: NT2 Analyst: LH

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BFJ0288-BLK2)					Prepared: 11-Oct-2017 Analyzed: 11-Oct-2017 09:19						
trans-1,3-Dichloropropene	ND	0.08	0.20	ug/L							U
2-Hexanone	ND	0.90	5.00	ug/L							U
1,1,2-Trichloroethane	ND	0.13	0.20	ug/L							U
1,3-Dichloropropane	ND	0.06	0.20	ug/L							U
Tetrachloroethene	ND	0.05	0.20	ug/L							U
Dibromochloromethane	ND	0.05	0.20	ug/L							U
1,2-Dibromoethane	ND	0.07	0.20	ug/L							U
Chlorobenzene	ND	0.02	0.20	ug/L							U
Ethylbenzene	ND	0.04	0.20	ug/L							U
1,1,1,2-Tetrachloroethane	ND	0.04	0.20	ug/L							U
m,p-Xylene	0.07	0.05	0.40	ug/L							J
o-Xylene	ND	0.03	0.20	ug/L							U
Xylenes, total	0.09	0.09	0.60	ug/L							J
Styrene	ND	0.05	0.20	ug/L							U
Bromoform	ND	0.06	0.20	ug/L							U
1,1,2,2-Tetrachloroethane	ND	0.06	0.20	ug/L							U
1,2,3-Trichloropropane	ND	0.13	0.50	ug/L							U
trans-1,4-Dichloro 2-Butene	ND	0.32	1.00	ug/L							U
n-Propylbenzene	0.04	0.02	0.20	ug/L							J
Bromobenzene	ND	0.06	0.20	ug/L							U
Isopropyl Benzene	ND	0.02	0.20	ug/L							U
2-Chlorotoluene	0.03	0.02	0.20	ug/L							J
4-Chlorotoluene	ND	0.02	0.20	ug/L							U
t-Butylbenzene	0.03	0.03	0.20	ug/L							J
1,3,5-Trimethylbenzene	ND	0.02	0.20	ug/L							U
1,2,4-Trimethylbenzene	0.03	0.02	0.20	ug/L							J
s-Butylbenzene	0.04	0.02	0.20	ug/L							J
4-Isopropyl Toluene	0.05	0.03	0.20	ug/L							J
1,3-Dichlorobenzene	0.05	0.04	0.20	ug/L							J
1,4-Dichlorobenzene	0.06	0.04	0.20	ug/L							J
n-Butylbenzene	0.09	0.02	0.20	ug/L							J
1,2-Dichlorobenzene	0.05	0.04	0.20	ug/L							J
1,2-Dibromo-3-chloropropane	ND	0.37	0.50	ug/L							U
1,2,4-Trichlorobenzene	0.17	0.11	0.50	ug/L							J
Hexachloro-1,3-Butadiene	0.45	0.07	0.50	ug/L							J

4611 S 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6202

Volatile Organic Compounds - Quality Control

Batch BFJ0288 - EPA 5030 (Purge and Trap)

Instrument: NT2 Analyst: LH

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BFJ0288-BLK2)					Prepared: 11-Oct-2017 Analyzed: 11-Oct-2017 09:19						
Naphthalene	0.24	0.12	0.50	ug/L							J
1,2,3-Trichlorobenzene	0.20	0.11	0.50	ug/L							J
Dichlorodifluoromethane	ND	0.05	0.20	ug/L							U
Methyl tert-butyl Ether	ND	0.07	0.50	ug/L							U
2-Pentanone	ND	5.00	5.00	ug/L							U
Surrogate: 1,2-Dichloroethane-d4		5.15		ug/L	*5.00*		*103*	*80-129*			
Surrogate: Toluene-d8		4.78		ug/L	*5.00*		*95.6*	*80-120*			
Surrogate: 4-Bromofluorobenzene		4.90		ug/L	*5.00*		*98.0*	*80-120*			
Surrogate: 1,2-Dichlorobenzene-d4		4.91		ug/L	*5.00*		*98.2*	*80-120*			
LCS (BFJ0288-BS2)					Prepared: 11-Oct-2017 Analyzed: 11-Oct-2017 08:39						
Chloromethane	8.83	0.09	0.50	ug/L	10.0		88.3	60-138			
Vinyl Chloride	9.26	0.06	0.20	ug/L	10.0		92.6	66-133			
Bromomethane	7.64	0.25	1.00	ug/L	10.0		76.4	72-131			Q
Chloroethane	9.87	0.09	0.20	ug/L	10.0		98.7	60-155			
Trichlorofluoromethane	9.24	0.04	0.20	ug/L	10.0		92.4	80-129			
Acrolein	43.9	2.48	5.00	ug/L	50.0		87.9	52-144			
1,1,2-Trichloro-1,2,2-Trifluoroethane	9.70	0.04	0.20	ug/L	10.0		97.0	76-129			
Acetone	46.6	2.06	5.00	ug/L	50.0		93.1	58-142			
1,1-Dichloroethene	9.21	0.05	0.20	ug/L	10.0		92.1	69-135			
Bromoethane	9.11	0.04	0.20	ug/L	10.0		91.1	78-128			
Iodomethane	5.79	0.23	1.00	ug/L	10.0		57.9	56-147			Q
Methylene Chloride	9.38	0.49	1.00	ug/L	10.0		93.8	65-135			
Acrylonitrile	8.55	0.60	1.00	ug/L	10.0		85.5	64-134			
Carbon Disulfide	9.03	0.04	0.20	ug/L	10.0		90.3	78-125			
trans-1,2-Dichloroethene	9.13	0.05	0.20	ug/L	10.0		91.3	78-128			
Vinyl Acetate	7.33	0.07	0.20	ug/L	10.0		73.3	55-138			Q
1,1-Dichloroethane	9.35	0.05	0.20	ug/L	10.0		93.5	76-124			
2-Butanone	48.2	0.81	5.00	ug/L	50.0		96.4	61-140			
2,2-Dichloropropane	8.73	0.05	0.20	ug/L	10.0		87.3	78-125			
cis-1,2-Dichloroethene	9.56	0.04	0.20	ug/L	10.0		95.6	80-121			
Chloroform	9.07	0.03	0.20	ug/L	10.0		90.7	80-122			
Bromochloromethane	9.87	0.06	0.20	ug/L	10.0		98.7	80-121			
1,1,1-Trichloroethane	8.95	0.04	0.20	ug/L	10.0		89.5	79-123			
1,1-Dichloropropene	9.60	0.03	0.20	ug/L	10.0		96.0	80-120			

The Boeing Company	Project: Boeing Renton 4-79	
P.O. Box 3707 MC 9U4-26	Project Number: [none]	**Reported:**
Seattle WA, 98124	Project Manager: Carl Bach	12-Oct-2017 14:51

Volatile Organic Compounds - Quality Control

Batch BFJ0288 - EPA 5030 (Purge and Trap)

Instrument: NT2 Analyst: LH

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BFJ0288-BS2)					Prepared: 11-Oct-2017 Analyzed: 11-Oct-2017 08:39						
Carbon tetrachloride	7.97	0.04	0.20	ug/L	10.0		79.7	53-137			Q
1,2-Dichloroethane	9.02	0.07	0.20	ug/L	10.0		90.2	75-123			
Benzene	9.52	0.03	0.20	ug/L	10.0		95.2	80-120			
Trichloroethene	10.1	0.05	0.20	ug/L	10.0		101	80-120			
1,2-Dichloropropane	9.30	0.04	0.20	ug/L	10.0		93.0	80-120			
Bromodichloromethane	8.78	0.05	0.20	ug/L	10.0		87.8	80-121			
Dibromomethane	9.32	0.15	0.20	ug/L	10.0		93.2	80-120			
2-Chloroethyl vinyl ether	9.10	0.25	1.00	ug/L	10.0		91.0	74-127			
4-Methyl-2-Pentanone	46.2	0.97	5.00	ug/L	50.0		92.4	67-133			
cis-1,3-Dichloropropene	9.28	0.06	0.20	ug/L	10.0		92.8	80-124			
Toluene	9.21	0.04	0.20	ug/L	10.0		92.1	80-120			
trans-1,3-Dichloropropene	8.83	0.08	0.20	ug/L	10.0		88.3	71-127			
2-Hexanone	45.4	0.90	5.00	ug/L	50.0		90.8	69-133			
1,1,2-Trichloroethane	9.40	0.13	0.20	ug/L	10.0		94.0	80-121			
1,3-Dichloropropane	10.0	0.06	0.20	ug/L	10.0		100	80-120			
Tetrachloroethene	9.81	0.05	0.20	ug/L	10.0		98.1	80-120			
Dibromochloromethane	9.35	0.05	0.20	ug/L	10.0		93.5	65-135			
1,2-Dibromoethane	9.46	0.07	0.20	ug/L	10.0		94.6	80-121			
Chlorobenzene	9.95	0.02	0.20	ug/L	10.0		99.5	80-120			
Ethylbenzene	9.73	0.04	0.20	ug/L	10.0		97.3	80-120			
1,1,1,2-Tetrachloroethane	9.19	0.04	0.20	ug/L	10.0		91.9	80-120			
m,p-Xylene	20.4	0.05	0.40	ug/L	20.0		102	80-121			
o-Xylene	9.88	0.03	0.20	ug/L	10.0		98.8	80-121			
Xylenes, total	30.3	0.09	0.60	ug/L	30.0		101	76-127			
Styrene	10.1	0.05	0.20	ug/L	10.0		101	80-124			
Bromoform	6.65	0.06	0.20	ug/L	10.0		66.5	51-134			Q
1,1,2,2-Tetrachloroethane	8.99	0.06	0.20	ug/L	10.0		89.9	77-123			
1,2,3-Trichloropropane	8.73	0.13	0.50	ug/L	10.0		87.3	76-125			
trans-1,4-Dichloro 2-Butene	7.65	0.32	1.00	ug/L	10.0		76.5	55-129			Q
n-Propylbenzene	9.55	0.02	0.20	ug/L	10.0		95.5	78-130			
Bromobenzene	9.20	0.06	0.20	ug/L	10.0		92.0	80-120			
Isopropyl Benzene	9.54	0.02	0.20	ug/L	10.0		95.4	80-128			
2-Chlorotoluene	9.22	0.02	0.20	ug/L	10.0		92.2	78-122			
4-Chlorotoluene	9.21	0.02	0.20	ug/L	10.0		92.1	80-121			
t-Butylbenzene	9.42	0.03	0.20	ug/L	10.0		94.2	78-125			

The Boeing Company	Project: Boeing Renton 4-79	
P.O. Box 3707 MC 9U4-26	Project Number: [none]	Reported:
Seattle WA, 98124	Project Manager: Carl Bach	12-Oct-2017 14:51

Volatile Organic Compounds - Quality Control

Batch BFJ0288 - EPA 5030 (Purge and Trap)

Instrument: NT2 Analyst: LH

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BFJ0288-BS2)					Prepared: 11-Oct-2017 Analyzed: 11-Oct-2017 08:39						
1,3,5-Trimethylbenzene	9.48	0.02	0.20	ug/L	10.0		94.8	80-129			
1,2,4-Trimethylbenzene	9.33	0.02	0.20	ug/L	10.0		93.3	80-127			
s-Butylbenzene	9.56	0.02	0.20	ug/L	10.0		95.6	78-129			
4-Isopropyl Toluene	9.71	0.03	0.20	ug/L	10.0		97.1	79-130			
1,3-Dichlorobenzene	9.41	0.04	0.20	ug/L	10.0		94.1	80-120			
1,4-Dichlorobenzene	9.34	0.04	0.20	ug/L	10.0		93.4	80-120			
n-Butylbenzene	9.84	0.02	0.20	ug/L	10.0		98.4	74-129			
1,2-Dichlorobenzene	9.21	0.04	0.20	ug/L	10.0		92.1	80-120			
1,2-Dibromo-3-chloropropane	7.39	0.37	0.50	ug/L	10.0		73.9	62-123			Q
1,2,4-Trichlorobenzene	9.97	0.11	0.50	ug/L	10.0		99.7	64-124			
Hexachloro-1,3-Butadiene	9.69	0.07	0.50	ug/L	10.0		96.9	58-123			
Naphthalene	9.99	0.12	0.50	ug/L	10.0		99.9	50-134			
1,2,3-Trichlorobenzene	9.77	0.11	0.50	ug/L	10.0		97.7	49-133			
Dichlorodifluoromethane	7.73	0.05	0.20	ug/L	10.0		77.3	48-147			Q
Methyl tert-butyl Ether	8.95	0.07	0.50	ug/L	10.0		89.5	71-132			
2-Pentanone	38.4	5.00	5.00	ug/L	50.0		76.8	69-134			Q
Surrogate: 1,2-Dichloroethane-d4		4.80		ug/L	*5.00*		*95.9*	*80-129*			
Surrogate: Toluene-d8		4.89		ug/L	*5.00*		*97.7*	*80-120*			
Surrogate: 4-Bromofluorobenzene		5.25		ug/L	*5.00*		*105*	*80-120*			
Surrogate: 1,2-Dichlorobenzene-d4		4.89		ug/L	*5.00*		*97.9*	*80-120*			
LCS Dup (BFJ0288-BSD2)					Prepared: 11-Oct-2017 Analyzed: 11-Oct-2017 08:59						
Chloromethane	8.94	0.09	0.50	ug/L	10.0		89.4	60-138	1.26	30	
Vinyl Chloride	10.1	0.06	0.20	ug/L	10.0		101	66-133	8.80	30	
Bromomethane	9.01	0.25	1.00	ug/L	10.0		90.1	72-131	16.60	30	Q
Chloroethane	10.7	0.09	0.20	ug/L	10.0		107	60-155	7.61	30	
Trichlorofluoromethane	10.1	0.04	0.20	ug/L	10.0		101	80-129	9.34	30	
Acrolein	49.1	2.48	5.00	ug/L	50.0		98.2	52-144	11.10	30	
1,1,2-Trichloro-1,2,2-Trifluoroethane	10.5	0.04	0.20	ug/L	10.0		105	76-129	7.59	30	
Acetone	52.8	2.06	5.00	ug/L	50.0		106	58-142	12.60	30	
1,1-Dichloroethene	10.1	0.05	0.20	ug/L	10.0		101	69-135	9.41	30	
Bromoethane	10.3	0.04	0.20	ug/L	10.0		103	78-128	12.40	30	
Iodomethane	7.86	0.23	1.00	ug/L	10.0		78.6	56-147	30.30	30	*, Q
Methylene Chloride	10.3	0.49	1.00	ug/L	10.0		103	65-135	9.76	30	
Acrylonitrile	9.39	0.60	1.00	ug/L	10.0		93.9	64-134	9.33	30	

4611 S 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6202

The Boeing Company	Project: Boeing Renton 4-79	
P.O. Box 3707 MC 9U4-26	Project Number: [none]	Reported:
Seattle WA, 98124	Project Manager: Carl Bach	12-Oct-2017 14:51

Volatile Organic Compounds - Quality Control

Batch BFJ0288 - EPA 5030 (Purge and Trap)

Instrument: NT2   Analyst: LH

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS Dup (BFJ0288-BSD2)					Prepared: 11-Oct-2017 Analyzed: 11-Oct-2017 08:59						
Carbon Disulfide	9.79	0.04	0.20	ug/L	10.0		97.9	78-125	8.08	30	
trans-1,2-Dichloroethene	9.89	0.05	0.20	ug/L	10.0		98.9	78-128	7.92	30	
Vinyl Acetate	8.10	0.07	0.20	ug/L	10.0		81.0	55-138	10.00	30	Q
1,1-Dichloroethane	10.4	0.05	0.20	ug/L	10.0		104	76-124	11.10	30	
2-Butanone	51.8	0.81	5.00	ug/L	50.0		104	61-140	7.10	30	
2,2-Dichloropropane	9.79	0.05	0.20	ug/L	10.0		97.9	78-125	11.50	30	
cis-1,2-Dichloroethene	10.5	0.04	0.20	ug/L	10.0		105	80-121	9.23	30	
Chloroform	10.3	0.03	0.20	ug/L	10.0		103	80-122	12.60	30	
Bromochloromethane	11.1	0.06	0.20	ug/L	10.0		111	80-121	11.50	30	
1,1,1-Trichloroethane	9.87	0.04	0.20	ug/L	10.0		98.7	79-123	9.84	30	
1,1-Dichloropropene	10.5	0.03	0.20	ug/L	10.0		105	80-120	8.93	30	
Carbon tetrachloride	9.20	0.04	0.20	ug/L	10.0		92.0	53-137	14.40	30	Q
1,2-Dichloroethane	9.82	0.07	0.20	ug/L	10.0		98.2	75-123	8.47	30	
Benzene	10.6	0.03	0.20	ug/L	10.0		106	80-120	10.80	30	
Trichloroethene	10.7	0.05	0.20	ug/L	10.0		107	80-120	4.98	30	
1,2-Dichloropropane	10.6	0.04	0.20	ug/L	10.0		106	80-120	13.00	30	
Bromodichloromethane	9.76	0.05	0.20	ug/L	10.0		97.6	80-121	10.60	30	
Dibromomethane	10.0	0.15	0.20	ug/L	10.0		100	80-120	7.05	30	
2-Chloroethyl vinyl ether	10.3	0.25	1.00	ug/L	10.0		103	74-127	12.60	30	
4-Methyl-2-Pentanone	51.0	0.97	5.00	ug/L	50.0		102	67-133	9.88	30	
cis-1,3-Dichloropropene	10.3	0.06	0.20	ug/L	10.0		103	80-124	10.20	30	
Toluene	10.1	0.04	0.20	ug/L	10.0		101	80-120	9.16	30	
trans-1,3-Dichloropropene	9.87	0.08	0.20	ug/L	10.0		98.7	71-127	11.10	30	
2-Hexanone	52.0	0.90	5.00	ug/L	50.0		104	69-133	13.50	30	
1,1,2-Trichloroethane	10.5	0.13	0.20	ug/L	10.0		105	80-121	10.70	30	
1,3-Dichloropropane	11.0	0.06	0.20	ug/L	10.0		110	80-120	8.88	30	
Tetrachloroethene	11.2	0.05	0.20	ug/L	10.0		112	80-120	13.50	30	
Dibromochloromethane	10.4	0.05	0.20	ug/L	10.0		104	65-135	10.70	30	
1,2-Dibromoethane	10.4	0.07	0.20	ug/L	10.0		104	80-121	9.92	30	
Chlorobenzene	10.8	0.02	0.20	ug/L	10.0		108	80-120	8.25	30	
Ethylbenzene	10.5	0.04	0.20	ug/L	10.0		105	80-120	7.87	30	
1,1,1,2-Tetrachloroethane	10.1	0.04	0.20	ug/L	10.0		101	80-120	9.73	30	
m,p-Xylene	21.6	0.05	0.40	ug/L	20.0		108	80-121	5.40	30	
o-Xylene	10.8	0.03	0.20	ug/L	10.0		108	80-121	8.67	30	
Xylenes, total	32.4	0.09	0.60	ug/L	30.0		108	76-127	6.48	30	

4611 S 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6202

Volatile Organic Compounds - Quality Control

Batch BFJ0288 - EPA 5030 (Purge and Trap)

Instrument: NT2 Analyst: LH

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS Dup (BFJ0288-BSD2)					Prepared: 11-Oct-2017 Analyzed: 11-Oct-2017 08:59						
Styrene	11.0	0.05	0.20	ug/L	10.0		110	80-124	8.29	30	
Bromoform	7.38	0.06	0.20	ug/L	10.0		73.8	51-134	10.40	30	Q
1,1,2,2-Tetrachloroethane	9.94	0.06	0.20	ug/L	10.0		99.4	77-123	10.00	30	
1,2,3-Trichloropropane	9.38	0.13	0.50	ug/L	10.0		93.8	76-125	7.11	30	
trans-1,4-Dichloro 2-Butene	8.14	0.32	1.00	ug/L	10.0		81.4	55-129	6.17	30	Q
n-Propylbenzene	10.0	0.02	0.20	ug/L	10.0		100	78-130	4.77	30	
Bromobenzene	10.0	0.06	0.20	ug/L	10.0		100	80-120	8.43	30	
Isopropyl Benzene	10.1	0.02	0.20	ug/L	10.0		101	80-128	5.61	30	
2-Chlorotoluene	9.79	0.02	0.20	ug/L	10.0		97.9	78-122	5.93	30	
4-Chlorotoluene	9.82	0.02	0.20	ug/L	10.0		98.2	80-121	6.34	30	
t-Butylbenzene	9.93	0.03	0.20	ug/L	10.0		99.3	78-125	5.25	30	
1,3,5-Trimethylbenzene	10.2	0.02	0.20	ug/L	10.0		102	80-129	7.33	30	
1,2,4-Trimethylbenzene	9.89	0.02	0.20	ug/L	10.0		98.9	80-127	5.81	30	
s-Butylbenzene	10.2	0.02	0.20	ug/L	10.0		102	78-129	6.60	30	
4-Isopropyl Toluene	10.3	0.03	0.20	ug/L	10.0		103	79-130	5.88	30	
1,3-Dichlorobenzene	10.2	0.04	0.20	ug/L	10.0		102	80-120	7.74	30	
1,4-Dichlorobenzene	9.99	0.04	0.20	ug/L	10.0		99.9	80-120	6.74	30	
n-Butylbenzene	10.4	0.02	0.20	ug/L	10.0		104	74-129	5.69	30	
1,2-Dichlorobenzene	9.93	0.04	0.20	ug/L	10.0		99.3	80-120	7.53	30	
1,2-Dibromo-3-chloropropane	8.55	0.37	0.50	ug/L	10.0		85.5	62-123	14.50	30	Q
1,2,4-Trichlorobenzene	10.7	0.11	0.50	ug/L	10.0		107	64-124	7.47	30	
Hexachloro-1,3-Butadiene	10.3	0.07	0.50	ug/L	10.0		103	58-123	5.90	30	
Naphthalene	10.9	0.12	0.50	ug/L	10.0		109	50-134	8.98	30	
1,2,3-Trichlorobenzene	10.8	0.11	0.50	ug/L	10.0		108	49-133	9.80	30	
Dichlorodifluoromethane	8.22	0.05	0.20	ug/L	10.0		82.2	48-147	6.21	30	Q
Methyl tert-butyl Ether	9.93	0.07	0.50	ug/L	10.0		99.3	71-132	10.40	30	
2-Pentanone	45.0	5.00	5.00	ug/L	50.0		90.0	69-134	15.80	30	Q
Surrogate: 1,2-Dichloroethane-d4		4.98		ug/L	*5.00*		*99.6*	*80-129*			
Surrogate: Toluene-d8		5.11		ug/L	*5.00*		*102*	*80-120*			
Surrogate: 4-Bromofluorobenzene		5.20		ug/L	*5.00*		*104*	*80-120*			
Surrogate: 1,2-Dichlorobenzene-d4		4.83		ug/L	*5.00*		*96.6*	*80-120*			

Analytical Report

The Boeing Company	Project: Boeing Renton 4-79	
P.O. Box 3707 MC 9U4-26	Project Number: [none]	Reported:
Seattle WA, 98124	Project Manager: Carl Bach	12-Oct-2017 14:51

Certified Analyses included in this Report

Analyte	Certifications
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
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
Dichlorodifluoromethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Methyl tert-butyl Ether	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
n-Hexane	WADOE
2-Pentanone	WADOE

The Boeing Company	Project: Boeing Renton 4-79	
P.O. Box 3707 MC 9U4-26	Project Number: [none]	Reported:
Seattle WA, 98124	Project Manager: Carl Bach	12-Oct-2017 14:51

Code	Description	Number	Expires
ADEC	Alaska Dept of Environmental Conservation	UST-033	09/01/2017
CALAP	California Department of Public Health CAELAP	2748	02/28/2018
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

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Analytical Report

The Boeing Company	Project: Boeing Renton 4-79	
P.O. Box 3707 MC 9U4-26	Project Number: [none]	**Reported:**
Seattle WA, 98124	Project Manager: Carl Bach	12-Oct-2017 14:51

Notes and Definitions

U	This analyte is not detected above the applicable reporting or detection limit.
Q	Indicates a detected analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20% RSD, <20% drift or minimum RRF)
J	Estimated concentration value detected below the reporting limit.
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.

Analytical Resources, Incorporated
Analytical Chemists and Consultants

06 November 2017

Carl Bach
The Boeing Company
P.O. Box 3707 MC 9U4-26
Seattle, WA 98124

RE: Boeing Renton 4-79

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)
17J0089	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 reqirements 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.

nelac Cert# 100006

PJLA Testing Accreditation # 66169

Chain of Custody Record & Laboratory Analysis Request

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

ARI Assigned Number: 17J0089	Turn-around Requested: Standard	Page: 1	of 1
ARI Client Company: Boeing	Phone: 206-898-0438	Date: 10/05/17	Ice Present?
Client Contact: Carl Bach		No. of Coolers:	Cooler Temps:
Client Project Name: Renton 4-79			
Client Project #:	Samplers: JNeste		

Sample ID	Date	Time	Matrix	No. Containers	VOCs	TPH-D	TPH-G						Notes/Comments
B78-21-7-100515	10/05/17	1015	soil	2	x	x	x						
B78-20-10-100515	10/05/17	1150	soil	2	x	x	x						

Comments/Special Instructions	Relinquished by:	Received by:	Relinquished by:	Received by:
cc Tom McKeon & Justin Neste	(Signature) [signature]	(Signature) [signature]	(Signature)	(Signature)
	Printed Name: Justin Neste	Printed Name: Stephanie Fishel	Printed Name:	Printed Name:
	Company: CALIBRE	Company: ARI	Company:	Company:
	Date & Time: 10/05/17 1415	Date & Time: 10/5/17 1415	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.

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Boeing

COC No(s): NA

Assigned ARI Job No: 17J0089

Project Name: Renton 4-79

Delivered by: Fed-Ex UPS Courier Hand Delivered Other:

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) 14.7
Time: 1415

If cooler temperature is out of compliance fill out form 00070F

Temp Gun ID#: D002565

Cooler Accepted by: SF Date: 10/5/17 Time: 1415

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		

Was Sample Split by ARI: NA YES Date/Time: Equipment: Split by:

Samples Logged by: SF Date: 10/5/17 Time: 1717

*** 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 Air Bubbles ~2mm	Peabubbles' 2-4 mm	LARGE Air Bubbles > 4 mm	
			Small → "sm" (< 2 mm)
			Peabubbles → "pb" (2 to < 4 mm)
			Large → "lg" (4 to < 6 mm)
			Headspace → "hs" (> 6 mm)

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Temperature Compliance Form

Cooler#: ______ Temperature(°C): 14.7

Sample ID	Bottle Count	Bottle Type
Samples received		
above 6°C		

Cooler#: ______ Temperature(°C): ______

Sample ID	Bottle Count	Bottle Type

Cooler#: ______ Temperature(°C): ______

Sample ID	Bottle Count	Bottle Type

Cooler#: ______ Temperature(°C): ______

Sample ID	Bottle Count	Bottle Type

Completed by: SF Date: 10/5/17 Time: 1415

Analytical Report

The Boeing Company	Project: Boeing Renton 4-79	
P.O. Box 3707 MC 9U4-26	Project Number: [none]	**Reported:**
Seattle WA, 98124	Project Manager: Carl Bach	06-Nov-2017 10:09

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
B78-21-7-100515	17J0089-01	Solid	05-Oct-2017 10:15	05-Oct-2017 14:15
B78-20-10-100515	17J0089-02	Solid	05-Oct-2017 11:50	05-Oct-2017 14:15

4611 S. 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6202

The Boeing Company	Project: Boeing Renton 4-79	
P.O. Box 3707 MC 9U4-26	Project Number: [none]	**Reported:**
Seattle WA, 98124	Project Manager: Carl Bach	06-Nov-2017 10:09

Case Narrative

Volatiles - EPA Method SW8260C

The sample(s) were run within the recommended holding times.

Initial and continuing calibrations were within method requirements with the exception of Chloromethane, Vinyl Chloride, Bromomethane, Chloroethane, Trichlorofluoromethane, Carbon Tetrachloride and Styrene which were all out of control high. All samples which contain analyte are flagged with a "Q" qualifier within this report.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The LCS/LCSD percent recoveries and RPD were within control limits with the exception of those analytes flagged in the associated forms.

Samples 17J0089-01 and 17J0089-02 were reanalyzed due to analytes flagged with "E" qualifiers which indicates analytes exceeded the initial calibration range. The samples were reanalyzed and labeled 17J0089-01RE1 and 17J0089-02RE1. This resulted in all analytes falling within calibration range.

Diesel/Heavy Oil Range Organics - WA-Ecology Method NW-TPHDx

The sample(s) were extracted and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The LCS percent recoveries were within control limits.

Gasoline Range Organics - WA-Ecology Method NW-TPHG

The sample(s) were run within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The LCS percent recoveries were within control limits.

4611 S 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6202

The Boeing Company	Project: Boeing Renton 4-79	
P.O. Box 3707 MC 9U4-26	Project Number: [none]	**Reported:**
Seattle WA, 98124	Project Manager: Carl Bach	06-Nov-2017 10:09

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Analytical Report

The Boeing Company	Project: Boeing Renton 4-79	
P.O. Box 3707 MC 9U4-26	Project Number: [none]	**Reported:**
Seattle WA, 98124	Project Manager: Carl Bach	06-Nov-2017 10:09

B78-21-7-100515

17J0089-01 (Solid)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 10/05/2017 10:15

Instrument: NT5 — Analyzed: 06-Oct-2017 19:24

Sample Preparation: Preparation Method: No Prep - Volatiles
Preparation Batch: BFJ0196 — Sample Size: 5.27 g (wet) — Dry Weight:3.56 g
Prepared: 06-Oct-2017 — Final Volume: 5 g — % Solids: 67.55

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Chloromethane	74-87-3	1	0.37	1.40	ND	ug/kg	U
Vinyl Chloride	75-01-4	1	0.33	1.40	ND	ug/kg	U
Bromomethane	74-83-9	1	0.26	1.40	ND	ug/kg	U
Chloroethane	75-00-3	1	0.65	1.40	ND	ug/kg	U
Trichlorofluoromethane	75-69-4	1	0.37	1.40	ND	ug/kg	U
Acrolein	107-02-8	1	5.35	7.02	ND	ug/kg	U
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	1	0.40	2.81	ND	ug/kg	U
Acetone	67-64-1	1	0.68	7.02	**138**	ug/kg	
1,1-Dichloroethene	75-35-4	1	0.47	1.40	ND	ug/kg	U
Bromoethane	74-96-4	1	0.62	2.81	ND	ug/kg	U
Iodomethane	74-88-4	1	0.30	1.40	ND	ug/kg	U
Methylene Chloride	75-09-2	1	0.89	2.81	ND	ug/kg	U
Acrylonitrile	107-13-1	1	1.45	7.02	ND	ug/kg	U
Carbon Disulfide	75-15-0	1	0.79	1.40	ND	ug/kg	U
trans-1,2-Dichloroethene	156-60-5	1	0.37	1.40	ND	ug/kg	U
Vinyl Acetate	108-05-4	1	0.54	7.02	ND	ug/kg	U
1,1-Dichloroethane	75-34-3	1	0.29	1.40	ND	ug/kg	U
2-Butanone	78-93-3	1	0.72	7.02	**48.1**	ug/kg	
2,2-Dichloropropane	594-20-7	1	0.41	1.40	ND	ug/kg	U
cis-1,2-Dichloroethene	156-59-2	1	0.34	1.40	ND	ug/kg	U
Chloroform	67-66-3	1	0.33	1.40	ND	ug/kg	U
Bromochloromethane	74-97-5	1	0.45	1.40	ND	ug/kg	U
1,1,1-Trichloroethane	71-55-6	1	0.32	1.40	ND	ug/kg	U
1,1-Dichloropropene	563-58-6	1	0.44	1.40	ND	ug/kg	U
Carbon tetrachloride	56-23-5	1	0.30	1.40	ND	ug/kg	U
1,2-Dichloroethane	107-06-2	1	0.27	1.40	ND	ug/kg	U
Benzene	71-43-2	1	0.42	1.40	**4.43**	ug/kg	
Trichloroethene	79-01-6	1	0.30	1.40	ND	ug/kg	U
1,2-Dichloropropane	78-87-5	1	0.23	1.40	ND	ug/kg	U
Bromodichloromethane	75-27-4	1	0.36	1.40	ND	ug/kg	U
Dibromomethane	74-95-3	1	0.21	1.40	ND	ug/kg	U
2-Chloroethyl vinyl ether	110-75-8	1	0.39	7.02	ND	ug/kg	U
4-Methyl-2-Pentanone	108-10-1	1	0.59	7.02	ND	ug/kg	U
cis-1,3-Dichloropropene	10061-01-5	1	0.32	1.40	ND	ug/kg	U
Toluene	108-88-3	1	0.21	1.40	**1.32**	ug/kg	J

4611 S 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6202

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Analytical Report

The Boeing Company	Project: Boeing Renton 4-79	
P.O. Box 3707 MC 9U4-26	Project Number: [none]	**Reported:**
Seattle WA, 98124	Project Manager: Carl Bach	06-Nov-2017 10:09

B78-21-7-100515

17J0089-01 (Solid)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 10/05/2017 10:15

Instrument: NT5 — Analyzed: 06-Oct-2017 19:24

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
trans-1,3-Dichloropropene	10061-02-6	1	0.30	1.40	ND	ug/kg	U
2-Hexanone	591-78-6	1	0.62	7.02	ND	ug/kg	U
1,1,2-Trichloroethane	79-00-5	1	0.40	1.40	ND	ug/kg	U
1,3-Dichloropropane	142-28-9	1	0.29	1.40	ND	ug/kg	U
Tetrachloroethene	127-18-4	1	0.36	1.40	ND	ug/kg	U
Dibromochloromethane	124-48-1	1	0.37	1.40	ND	ug/kg	U
1,2-Dibromoethane	106-93-4	1	0.25	1.40	ND	ug/kg	U
Chlorobenzene	108-90-7	1	0.31	1.40	ND	ug/kg	U
Ethylbenzene	100-41-4	1	0.28	1.40	**45.3**	ug/kg	
1,1,1,2-Tetrachloroethane	630-20-6	1	0.33	1.40	ND	ug/kg	U
m,p-Xylene	179601-23-1	1	0.55	2.81	**100**	ug/kg	
o-Xylene	95-47-6	1	0.31	1.40	**15.9**	ug/kg	
Xylenes, total	1330-20-7	1	0.87	2.81	**116**	ug/kg	
Styrene	100-42-5	1	0.19	1.40	ND	ug/kg	U
Bromoform	75-25-2	1	0.42	1.40	ND	ug/kg	U
1,1,2,2-Tetrachloroethane	79-34-5	1	0.36	1.40	ND	ug/kg	U
1,2,3-Trichloropropane	96-18-4	1	0.73	2.81	ND	ug/kg	U
trans-1,4-Dichloro 2-Butene	110-57-6	1	0.61	7.02	ND	ug/kg	U
n-Propylbenzene	103-65-1	1	0.38	1.40	**101**	ug/kg	
Bromobenzene	108-86-1	1	0.21	1.40	ND	ug/kg	U
Isopropyl Benzene	98-82-8	1	0.33	1.40	**18.6**	ug/kg	
2-Chlorotoluene	95-49-8	1	0.42	1.40	ND	ug/kg	U
4-Chlorotoluene	106-43-4	1	0.39	1.40	ND	ug/kg	U
t-Butylbenzene	98-06-6	1	0.43	1.40	ND	ug/kg	U
1,3,5-Trimethylbenzene	108-67-8	1	0.36	1.40	**166**	ug/kg	
1,2,4-Trimethylbenzene	95-63-6	1	0.32	1.40	**352**	ug/kg	E
s-Butylbenzene	135-98-8	1	0.34	1.40	**3.01**	ug/kg	
4-Isopropyl Toluene	99-87-6	1	0.33	1.40	**4.57**	ug/kg	
1,3-Dichlorobenzene	541-73-1	1	0.32	1.40	ND	ug/kg	U
1,4-Dichlorobenzene	106-46-7	1	0.33	1.40	ND	ug/kg	U
n-Butylbenzene	104-51-8	1	0.37	1.40	ND	ug/kg	U
1,2-Dichlorobenzene	95-50-1	1	0.41	1.40	ND	ug/kg	U
1,2-Dibromo-3-chloropropane	96-12-8	1	0.82	7.02	ND	ug/kg	U
1,2,4-Trichlorobenzene	120-82-1	1	0.47	7.02	ND	ug/kg	U
Hexachloro-1,3-Butadiene	87-68-3	1	0.58	7.02	ND	ug/kg	U
Naphthalene	91-20-3	1	0.60	7.02	**219**	ug/kg	
1,2,3-Trichlorobenzene	87-61-6	1	0.43	7.02	ND	ug/kg	U
Dichlorodifluoromethane	75-71-8	1	0.29	1.40	ND	ug/kg	U

4611 S 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6202

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Analytical Report

The Boeing Company	Project: Boeing Renton 4-79	
P.O. Box 3707 MC 9U4-26	Project Number: [none]	**Reported:**
Seattle WA, 98124	Project Manager: Carl Bach	06-Nov-2017 10:09

B78-21-7-100515

17J0089-01 (Solid)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 10/05/2017 10:15

Instrument: NT5 — Analyzed: 06-Oct-2017 19:24

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Methyl tert-butyl Ether	1634-04-4	1	0.32	1.40	ND	ug/kg	U
2-Pentanone	107-87-9	1	7.02	7.02	ND	ug/kg	U
Surrogate: 1,2-Dichloroethane-d4				*80-149 %*	*108*	*%*	
Surrogate: Toluene-d8				*77-120 %*	*103*	*%*	
Surrogate: 4-Bromofluorobenzene				*80-120 %*	*92.6*	*%*	
Surrogate: 1,2-Dichlorobenzene-d4				*80-120 %*	*98.7*	*%*	

4611 S. 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6202

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Analytical Report

The Boeing Company	Project: Boeing Renton 4-79	
P.O. Box 3707 MC 9U4-26	Project Number: [none]	**Reported:**
Seattle WA, 98124	Project Manager: Carl Bach	06-Nov-2017 10:09

B78-21-7-100515

17J0089-01 (Solid)

Volatile Organic Compounds

Method: NWTPHg — Sampled: 10/05/2017 10:15

Instrument: NT2 — Analyzed: 11-Oct-2017 15:23

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)

Preparation Batch: BFJ0290 — Sample Size: 5.63 g (wet) — Dry Weight:3.80 g

Prepared: 11-Oct-2017 — Final Volume: 5 mL — % Solids: 67.55

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Gasoline Range Organics (Tol-Nap)		50	8980	**25300**	ug/kg	
HC ID: GRO						
Surrogate: Toluene-d8			*80-120 %*	*104*	*%*	
Surrogate: 4-Bromofluorobenzene			*78-123 %*	*105*	*%*	

4611 S 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6202

Analytical Report

The Boeing Company	Project: Boeing Renton 4-79	
P.O. Box 3707 MC 9U4-26	Project Number: [none]	**Reported:**
Seattle WA, 98124	Project Manager: Carl Bach	06-Nov-2017 10:09

B78-21-7-100515

17J0089-01 (Solid)

Petroleum Hydrocarbons

Method: NWTPH-Dx — Sampled: 10/05/2017 10:15

Instrument: FID4 — Analyzed: 16-Oct-2017 14:01

Sample Preparation:	Preparation Method: EPA 3546 (Microwave)		
	Preparation Batch: BFJ0213	Sample Size: 10.12 g (wet)	Dry Weight:6.84 g
	Prepared: 09-Oct-2017	Final Volume: 1 mL	% Solids: 67.55

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Diesel Range Organics (C12-C24)		1	7.31	**11.9**	mg/kg	
HC ID: DRO						
Motor Oil Range Organics (C24-C38)		1	14.6	**73.6**	mg/kg	
HC ID: RRO						
Surrogate: o-Terphenyl			*50-150 %*	*93.0*	*%*	

4611 S 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6202

Analytical Report

The Boeing Company	Project: Boeing Renton 4-79	
P.O. Box 3707 MC 9U4-26	Project Number: [none]	**Reported:**
Seattle WA, 98124	Project Manager: Carl Bach	06-Nov-2017 10:09

B78-21-7-100515

17J0089-01 (Solid)

Extractions

Method: PSEP 1986 — Sampled: 10/05/2017 10:15

Instrument: N/A — Analyzed: 06-Oct-2017 13:01

Sample Preparation: Preparation Method: No Prep-Organics
Preparation Batch: BFJ0189 — Sample Size: 1 g (wet)
Prepared: 06-Oct-2017 — Final Volume: 1 g

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Total Solids		1	0.01	**67.55**	%	

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.

4611 S 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6202

The Boeing Company	Project: Boeing Renton 4-79	
P.O. Box 3707 MC 9U4-26	Project Number: [none]	**Reported:**
Seattle WA, 98124	Project Manager: Carl Bach	06-Nov-2017 10:09

B78-21-7-100515

17J0089-01RE1 (Solid)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 10/05/2017 10:15

Instrument: NT5 — Analyzed: 13-Oct-2017 16:58

Sample Preparation: Preparation Method: No Prep - Volatiles
Preparation Batch: BFJ0269 — Sample Size: 5.1 g (wet) — Dry Weight:3.45 g
Prepared: 13-Oct-2017 — Final Volume: 5 g — % Solids: 67.55

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Chloromethane	74-87-3	1	0.38	1.45	ND	ug/kg	U
Vinyl Chloride	75-01-4	1	0.34	1.45	ND	ug/kg	U
Bromomethane	74-83-9	1	0.27	1.45	ND	ug/kg	U
Chloroethane	75-00-3	1	0.67	1.45	ND	ug/kg	U
Trichlorofluoromethane	75-69-4	1	0.39	1.45	ND	ug/kg	U
Acrolein	107-02-8	1	5.53	7.26	ND	ug/kg	U
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	1	0.42	2.90	ND	ug/kg	U
Acetone	67-64-1	1	0.70	7.26	**772**	ug/kg	
1,1-Dichloroethene	75-35-4	1	0.49	1.45	ND	ug/kg	U
Bromoethane	74-96-4	1	0.64	2.90	ND	ug/kg	U
Iodomethane	74-88-4	1	0.31	1.45	ND	ug/kg	U
Methylene Chloride	75-09-2	1	0.92	2.90	**1.73**	ug/kg	J
Acrylonitrile	107-13-1	1	1.49	7.26	ND	ug/kg	U
Carbon Disulfide	75-15-0	1	0.81	1.45	**1.30**	ug/kg	J
trans-1,2-Dichloroethene	156-60-5	1	0.39	1.45	ND	ug/kg	U
Vinyl Acetate	108-05-4	1	0.55	7.26	ND	ug/kg	U
1,1-Dichloroethane	75-34-3	1	0.29	1.45	ND	ug/kg	U
2-Butanone	78-93-3	1	0.74	7.26	**234**	ug/kg	
2,2-Dichloropropane	594-20-7	1	0.42	1.45	ND	ug/kg	U
cis-1,2-Dichloroethene	156-59-2	1	0.35	1.45	ND	ug/kg	U
Chloroform	67-66-3	1	0.34	1.45	ND	ug/kg	U
Bromochloromethane	74-97-5	1	0.47	1.45	ND	ug/kg	U
1,1,1-Trichloroethane	71-55-6	1	0.33	1.45	ND	ug/kg	U
1,1-Dichloropropene	563-58-6	1	0.45	1.45	ND	ug/kg	U
Carbon tetrachloride	56-23-5	1	0.31	1.45	ND	ug/kg	U
1,2-Dichloroethane	107-06-2	1	0.28	1.45	ND	ug/kg	U
Benzene	71-43-2	1	0.43	1.45	**141**	ug/kg	
Trichloroethene	79-01-6	1	0.31	1.45	ND	ug/kg	U
1,2-Dichloropropane	78-87-5	1	0.24	1.45	ND	ug/kg	U
Bromodichloromethane	75-27-4	1	0.37	1.45	ND	ug/kg	U
Dibromomethane	74-95-3	1	0.21	1.45	ND	ug/kg	U
2-Chloroethyl vinyl ether	110-75-8	1	0.40	7.26	ND	ug/kg	U
4-Methyl-2-Pentanone	108-10-1	1	0.61	7.26	ND	ug/kg	U
cis-1,3-Dichloropropene	10061-01-5	1	0.33	1.45	ND	ug/kg	U
Toluene	108-88-3	1	0.22	1.45	**11.1**	ug/kg	

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Analytical Report

The Boeing Company	Project: Boeing Renton 4-79	
P.O. Box 3707 MC 9U4-26	Project Number: [none]	**Reported:**
Seattle WA, 98124	Project Manager: Carl Bach	06-Nov-2017 10:09

B78-21-7-100515

17J0089-01RE1 (Solid)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 10/05/2017 10:15

Instrument: NT5 — Analyzed: 13-Oct-2017 16:58

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
trans-1,3-Dichloropropene	10061-02-6	1	0.31	1.45	ND	ug/kg	U
2-Hexanone	591-78-6	1	0.64	7.26	ND	ug/kg	U
1,1,2-Trichloroethane	79-00-5	1	0.42	1.45	ND	ug/kg	U
1,3-Dichloropropane	142-28-9	1	0.30	1.45	ND	ug/kg	U
Tetrachloroethene	127-18-4	1	0.37	1.45	ND	ug/kg	U
Dibromochloromethane	124-48-1	1	0.39	1.45	ND	ug/kg	U
1,2-Dibromoethane	106-93-4	1	0.26	1.45	ND	ug/kg	U
Chlorobenzene	108-90-7	1	0.32	1.45	ND	ug/kg	U
Ethylbenzene	100-41-4	1	0.29	1.45	**18.3**	ug/kg	
1,1,1,2-Tetrachloroethane	630-20-6	1	0.34	1.45	ND	ug/kg	U
m,p-Xylene	179601-23-1	1	0.57	2.90	**440**	ug/kg	
o-Xylene	95-47-6	1	0.33	1.45	**62.7**	ug/kg	
Xylenes, total	1330-20-7	1	0.89	2.90	**502**	ug/kg	
Styrene	100-42-5	1	0.20	1.45	ND	ug/kg	U
Bromoform	75-25-2	1	0.43	1.45	ND	ug/kg	U
1,1,2,2-Tetrachloroethane	79-34-5	1	0.37	1.45	ND	ug/kg	U
1,2,3-Trichloropropane	96-18-4	1	0.75	2.90	ND	ug/kg	U
trans-1,4-Dichloro 2-Butene	110-57-6	1	0.63	7.26	ND	ug/kg	U
n-Propylbenzene	103-65-1	1	0.39	1.45	**48.8**	ug/kg	
Bromobenzene	108-86-1	1	0.22	1.45	ND	ug/kg	U
Isopropyl Benzene	98-82-8	1	0.34	1.45	**18.4**	ug/kg	
2-Chlorotoluene	95-49-8	1	0.44	1.45	ND	ug/kg	U
4-Chlorotoluene	106-43-4	1	0.40	1.45	ND	ug/kg	U
t-Butylbenzene	98-06-6	1	0.44	1.45	ND	ug/kg	U
1,3,5-Trimethylbenzene	108-67-8	1	0.37	1.45	**22.7**	ug/kg	
1,2,4-Trimethylbenzene	95-63-6	1	0.33	1.45	**33.6**	ug/kg	
s-Butylbenzene	135-98-8	1	0.35	1.45	ND	ug/kg	U
4-Isopropyl Toluene	99-87-6	1	0.34	1.45	ND	ug/kg	U
1,3-Dichlorobenzene	541-73-1	1	0.33	1.45	ND	ug/kg	U
1,4-Dichlorobenzene	106-46-7	1	0.34	1.45	ND	ug/kg	U
n-Butylbenzene	104-51-8	1	0.38	1.45	**4.75**	ug/kg	
1,2-Dichlorobenzene	95-50-1	1	0.43	1.45	ND	ug/kg	U
1,2-Dibromo-3-chloropropane	96-12-8	1	0.85	7.26	ND	ug/kg	U
1,2,4-Trichlorobenzene	120-82-1	1	0.48	7.26	ND	ug/kg	U
Hexachloro-1,3-Butadiene	87-68-3	1	0.60	7.26	ND	ug/kg	U
Naphthalene	91-20-3	1	0.62	7.26	**5.90**	ug/kg	J
1,2,3-Trichlorobenzene	87-61-6	1	0.44	7.26	ND	ug/kg	U
Dichlorodifluoromethane	75-71-8	1	0.30	1.45	ND	ug/kg	U

The Boeing Company	Project: Boeing Renton 4-79	
P.O. Box 3707 MC 9U4-26	Project Number: [none]	**Reported:**
Seattle WA, 98124	Project Manager: Carl Bach	06-Nov-2017 10:09

B78-21-7-100515

17J0089-01RE1 (Solid)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 10/05/2017 10:15

Instrument: NT5 — Analyzed: 13-Oct-2017 16:58

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Methyl tert-butyl Ether	1634-04-4	1	0.34	1.45	ND	ug/kg	U
2-Pentanone	107-87-9	1	7.26	7.26	ND	ug/kg	U
Surrogate: 1,2-Dichloroethane-d4				*80-149 %*	*99.8*	*%*	
Surrogate: Toluene-d8				*77-120 %*	*96.3*	*%*	
Surrogate: 4-Bromofluorobenzene				*80-120 %*	*91.3*	*%*	
Surrogate: 1,2-Dichlorobenzene-d4				*80-120 %*	*94.3*	*%*	

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Analytical Report

The Boeing Company	Project: Boeing Renton 4-79	
P.O. Box 3707 MC 9U4-26	Project Number: [none]	**Reported:**
Seattle WA, 98124	Project Manager: Carl Bach	06-Nov-2017 10:09

B78-20-10-100515

17J0089-02 (Solid)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 10/05/2017 11:50

Instrument: NT5 — Analyzed: 06-Oct-2017 19:46

Sample Preparation: Preparation Method: No Prep - Volatiles
Preparation Batch: BFJ0196 — Sample Size: 5.59 g (wet) — Dry Weight:2.93 g
Prepared: 06-Oct-2017 — Final Volume: 5 g — % Solids: 52.49

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Chloromethane	74-87-3	1	0.45	1.70	ND	ug/kg	U
Vinyl Chloride	75-01-4	1	0.40	1.70	ND	ug/kg	U
Bromomethane	74-83-9	1	0.32	1.70	ND	ug/kg	U
Chloroethane	75-00-3	1	0.79	1.70	ND	ug/kg	U
Trichlorofluoromethane	75-69-4	1	0.45	1.70	ND	ug/kg	U
Acrolein	107-02-8	1	6.49	8.52	ND	ug/kg	U
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	1	0.49	3.41	ND	ug/kg	U
Acetone	67-64-1	1	0.82	8.52	**865**	ug/kg	
1,1-Dichloroethene	75-35-4	1	0.57	1.70	ND	ug/kg	U
Bromoethane	74-96-4	1	0.75	3.41	ND	ug/kg	U
Iodomethane	74-88-4	1	0.37	1.70	ND	ug/kg	U
Methylene Chloride	75-09-2	1	1.08	3.41	ND	ug/kg	U
Acrylonitrile	107-13-1	1	1.76	8.52	ND	ug/kg	U
Carbon Disulfide	75-15-0	1	0.95	1.70	**1.51**	ug/kg	J
trans-1,2-Dichloroethene	156-60-5	1	0.45	1.70	ND	ug/kg	U
Vinyl Acetate	108-05-4	1	0.65	8.52	ND	ug/kg	U
1,1-Dichloroethane	75-34-3	1	0.35	1.70	ND	ug/kg	U
2-Butanone	78-93-3	1	0.87	8.52	**245**	ug/kg	
2,2-Dichloropropane	594-20-7	1	0.50	1.70	ND	ug/kg	U
cis-1,2-Dichloroethene	156-59-2	1	0.41	1.70	ND	ug/kg	U
Chloroform	67-66-3	1	0.40	1.70	ND	ug/kg	U
Bromochloromethane	74-97-5	1	0.55	1.70	ND	ug/kg	U
1,1,1-Trichloroethane	71-55-6	1	0.39	1.70	ND	ug/kg	U
1,1-Dichloropropene	563-58-6	1	0.53	1.70	ND	ug/kg	U
Carbon tetrachloride	56-23-5	1	0.36	1.70	ND	ug/kg	U
1,2-Dichloroethane	107-06-2	1	0.33	1.70	ND	ug/kg	U
Benzene	71-43-2	1	0.50	1.70	**468**	ug/kg	E
Trichloroethene	79-01-6	1	0.36	1.70	ND	ug/kg	U
1,2-Dichloropropane	78-87-5	1	0.28	1.70	ND	ug/kg	U
Bromodichloromethane	75-27-4	1	0.43	1.70	ND	ug/kg	U
Dibromomethane	74-95-3	1	0.25	1.70	ND	ug/kg	U
2-Chloroethyl vinyl ether	110-75-8	1	0.47	8.52	ND	ug/kg	U
4-Methyl-2-Pentanone	108-10-1	1	0.72	8.52	ND	ug/kg	U
cis-1,3-Dichloropropene	10061-01-5	1	0.39	1.70	ND	ug/kg	U
Toluene	108-88-3	1	0.26	1.70	**24.2**	ug/kg	

The Boeing Company	Project: Boeing Renton 4-79	
P.O. Box 3707 MC 9U4-26	Project Number: [none]	**Reported:**
Seattle WA, 98124	Project Manager: Carl Bach	06-Nov-2017 10:09

B78-20-10-100515

17J0089-02 (Solid)

Volatile Organic Compounds

Method: EPA 8260C
Sampled: 10/05/2017 11:50

Instrument: NT5
Analyzed: 06-Oct-2017 19:46

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
trans-1,3-Dichloropropene	10061-02-6	1	0.37	1.70	ND	ug/kg	U
2-Hexanone	591-78-6	1	0.75	8.52	ND	ug/kg	U
1,1,2-Trichloroethane	79-00-5	1	0.49	1.70	ND	ug/kg	U
1,3-Dichloropropane	142-28-9	1	0.36	1.70	ND	ug/kg	U
Tetrachloroethene	127-18-4	1	0.44	1.70	ND	ug/kg	U
Dibromochloromethane	124-48-1	1	0.45	1.70	ND	ug/kg	U
1,2-Dibromoethane	106-93-4	1	0.30	1.70	ND	ug/kg	U
Chlorobenzene	108-90-7	1	0.37	1.70	ND	ug/kg	U
Ethylbenzene	100-41-4	1	0.34	1.70	**26.1**	ug/kg	
1,1,1,2-Tetrachloroethane	630-20-6	1	0.40	1.70	ND	ug/kg	U
m,p-Xylene	179601-23-1	1	0.67	3.41	**498**	ug/kg	
o-Xylene	95-47-6	1	0.38	1.70	**75.5**	ug/kg	
Xylenes, total	1330-20-7	1	1.05	3.41	**574**	ug/kg	
Styrene	100-42-5	1	0.24	1.70	ND	ug/kg	U
Bromoform	75-25-2	1	0.51	1.70	ND	ug/kg	U
1,1,2,2-Tetrachloroethane	79-34-5	1	0.43	1.70	ND	ug/kg	U
1,2,3-Trichloropropane	96-18-4	1	0.88	3.41	ND	ug/kg	U
trans-1,4-Dichloro 2-Butene	110-57-6	1	0.74	8.52	ND	ug/kg	U
n-Propylbenzene	103-65-1	1	0.46	1.70	**46.5**	ug/kg	
Bromobenzene	108-86-1	1	0.26	1.70	ND	ug/kg	U
Isopropyl Benzene	98-82-8	1	0.40	1.70	**19.9**	ug/kg	
2-Chlorotoluene	95-49-8	1	0.51	1.70	ND	ug/kg	U
4-Chlorotoluene	106-43-4	1	0.47	1.70	ND	ug/kg	U
t-Butylbenzene	98-06-6	1	0.52	1.70	ND	ug/kg	U
1,3,5-Trimethylbenzene	108-67-8	1	0.43	1.70	**20.2**	ug/kg	
1,2,4-Trimethylbenzene	95-63-6	1	0.39	1.70	**33.5**	ug/kg	
s-Butylbenzene	135-98-8	1	0.41	1.70	ND	ug/kg	U
4-Isopropyl Toluene	99-87-6	1	0.40	1.70	**1.51**	ug/kg	J
1,3-Dichlorobenzene	541-73-1	1	0.39	1.70	ND	ug/kg	U
1,4-Dichlorobenzene	106-46-7	1	0.40	1.70	ND	ug/kg	U
n-Butylbenzene	104-51-8	1	0.45	1.70	**3.82**	ug/kg	
1,2-Dichlorobenzene	95-50-1	1	0.50	1.70	ND	ug/kg	U
1,2-Dibromo-3-chloropropane	96-12-8	1	1.00	8.52	ND	ug/kg	U
1,2,4-Trichlorobenzene	120-82-1	1	0.57	8.52	ND	ug/kg	U
Hexachloro-1,3-Butadiene	87-68-3	1	0.70	8.52	ND	ug/kg	U
Naphthalene	91-20-3	1	0.73	8.52	**12.1**	ug/kg	
1,2,3-Trichlorobenzene	87-61-6	1	0.52	8.52	ND	ug/kg	U
Dichlorodifluoromethane	75-71-8	1	0.35	1.70	ND	ug/kg	U

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Analytical Report

The Boeing Company	Project: Boeing Renton 4-79	
P.O. Box 3707 MC 9U4-26	Project Number: [none]	**Reported:**
Seattle WA, 98124	Project Manager: Carl Bach	06-Nov-2017 10:09

B78-20-10-100515

17J0089-02 (Solid)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 10/05/2017 11:50

Instrument: NT5 — Analyzed: 06-Oct-2017 19:46

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Methyl tert-butyl Ether	1634-04-4	1	0.39	1.70	ND	ug/kg	U
2-Pentanone	107-87-9	1	8.52	8.52	ND	ug/kg	U
Surrogate: 1,2-Dichloroethane-d4				*80-149 %*	*123*	*%*	
Surrogate: Toluene-d8				*77-120 %*	*108*	*%*	
Surrogate: 4-Bromofluorobenzene				*80-120 %*	*91.0*	*%*	
Surrogate: 1,2-Dichlorobenzene-d4				*80-120 %*	*97.7*	*%*	

The Boeing Company	Project: Boeing Renton 4-79	
P.O. Box 3707 MC 9U4-26	Project Number: [none]	Reported:
Seattle WA, 98124	Project Manager: Carl Bach	06-Nov-2017 10:09

B78-20-10-100515

17J0089-02 (Solid)

Volatile Organic Compounds

Method: NWTPHg — Sampled: 10/05/2017 11:50

Instrument: NT2 — Analyzed: 11-Oct-2017 15:43

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)

Preparation Batch: BFJ0290 — Sample Size: 5.13 g (wet) — Dry Weight:2.69 g

Prepared: 11-Oct-2017 — Final Volume: 5 mL — % Solids: 52.49

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Gasoline Range Organics (Tol-Nap)		50	13800	**14200**	ug/kg	
HC ID: GRO						
Surrogate: Toluene-d8			*80-120 %*	*104*	*%*	
Surrogate: 4-Bromofluorobenzene			*78-123 %*	*102*	*%*	

Analytical Report

The Boeing Company	Project: Boeing Renton 4-79	
P.O. Box 3707 MC 9U4-26	Project Number: [none]	**Reported:**
Seattle WA, 98124	Project Manager: Carl Bach	06-Nov-2017 10:09

B78-20-10-100515

17J0089-02 (Solid)

Petroleum Hydrocarbons

Method: NWTPH-Dx — Sampled: 10/05/2017 11:50

Instrument: FID4 — Analyzed: 16-Oct-2017 14:23

Sample Preparation:			
	Preparation Method: EPA 3546 (Microwave)		
	Preparation Batch: BFJ0213	Sample Size: 10.11 g (wet)	Dry Weight:5.31 g
	Prepared: 09-Oct-2017	Final Volume: 1 mL	% Solids: 52.49

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Diesel Range Organics (C12-C24)		1	9.42	**33.7**	mg/kg	
HC ID: DRO						
Motor Oil Range Organics (C24-C38)		1	18.8	**373**	mg/kg	
HC ID: RRO						
Surrogate: o-Terphenyl			*50-150 %*	*84.5*	*%*	

Analytical Report

The Boeing Company	Project: Boeing Renton 4-79	
P.O. Box 3707 MC 9U4-26	Project Number: [none]	**Reported:**
Seattle WA, 98124	Project Manager: Carl Bach	06-Nov-2017 10:09

B78-20-10-100515

17J0089-02 (Solid)

Extractions

Method: PSEP 1986 | Sampled: 10/05/2017 11:50

Instrument: N/A | Analyzed: 06-Oct-2017 13:01

Sample Preparation: Preparation Method: No Prep-Organics
Preparation Batch: BFJ0189 | Sample Size: 1 g (wet)
Prepared: 06-Oct-2017 | Final Volume: 1 g

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Total Solids		1	0.01	**52.49**	%	

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Analytical Report

The Boeing Company	Project: Boeing Renton 4-79	
P.O. Box 3707 MC 9U4-26	Project Number: [none]	Reported:
Seattle WA, 98124	Project Manager: Carl Bach	06-Nov-2017 10:09

B78-20-10-100515

17J0089-02RE1 (Solid)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 10/05/2017 11:50

Instrument: NT5 — Analyzed: 13-Oct-2017 17:20

Sample Preparation: Preparation Method: No Prep - Volatiles
Preparation Batch: BFJ0269 — Sample Size: 5.4 g (wet) — Dry Weight:2.83 g
Prepared: 13-Oct-2017 — Final Volume: 5 g — % Solids: 52.49

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Chloromethane	74-87-3	1	0.46	1.76	ND	ug/kg	U
Vinyl Chloride	75-01-4	1	0.41	1.76	ND	ug/kg	U
Bromomethane	74-83-9	1	0.33	1.76	ND	ug/kg	U
Chloroethane	75-00-3	1	0.81	1.76	ND	ug/kg	U
Trichlorofluoromethane	75-69-4	1	0.47	1.76	ND	ug/kg	U
Acrolein	107-02-8	1	6.72	8.82	ND	ug/kg	U
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	1	0.51	3.53	ND	ug/kg	U
Acetone	67-64-1	1	0.85	8.82	**225**	ug/kg	
1,1-Dichloroethene	75-35-4	1	0.59	1.76	ND	ug/kg	U
Bromoethane	74-96-4	1	0.78	3.53	ND	ug/kg	U
Iodomethane	74-88-4	1	0.38	1.76	ND	ug/kg	U
Methylene Chloride	75-09-2	1	1.12	3.53	**1.83**	ug/kg	J
Acrylonitrile	107-13-1	1	1.82	8.82	ND	ug/kg	U
Carbon Disulfide	75-15-0	1	0.99	1.76	ND	ug/kg	U
trans-1,2-Dichloroethene	156-60-5	1	0.47	1.76	ND	ug/kg	U
Vinyl Acetate	108-05-4	1	0.67	8.82	ND	ug/kg	U
1,1-Dichloroethane	75-34-3	1	0.36	1.76	ND	ug/kg	U
2-Butanone	78-93-3	1	0.90	8.82	ND	ug/kg	U
2,2-Dichloropropane	594-20-7	1	0.52	1.76	ND	ug/kg	U
cis-1,2-Dichloroethene	156-59-2	1	0.42	1.76	ND	ug/kg	U
Chloroform	67-66-3	1	0.41	1.76	ND	ug/kg	U
Bromochloromethane	74-97-5	1	0.57	1.76	ND	ug/kg	U
1,1,1-Trichloroethane	71-55-6	1	0.40	1.76	ND	ug/kg	U
1,1-Dichloropropene	563-58-6	1	0.55	1.76	ND	ug/kg	U
Carbon tetrachloride	56-23-5	1	0.38	1.76	ND	ug/kg	U
1,2-Dichloroethane	107-06-2	1	0.34	1.76	ND	ug/kg	U
Benzene	71-43-2	1	0.52	1.76	**0.91**	ug/kg	J
Trichloroethene	79-01-6	1	0.37	1.76	ND	ug/kg	U
1,2-Dichloropropane	78-87-5	1	0.29	1.76	ND	ug/kg	U
Bromodichloromethane	75-27-4	1	0.45	1.76	ND	ug/kg	U
Dibromomethane	74-95-3	1	0.26	1.76	ND	ug/kg	U
2-Chloroethyl vinyl ether	110-75-8	1	0.49	8.82	ND	ug/kg	U
4-Methyl-2-Pentanone	108-10-1	1	0.74	8.82	ND	ug/kg	U
cis-1,3-Dichloropropene	10061-01-5	1	0.40	1.76	ND	ug/kg	U
Toluene	108-88-3	1	0.27	1.76	ND	ug/kg	U

4611 S 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6202

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Analytical Report

The Boeing Company	Project: Boeing Renton 4-79	
P.O. Box 3707 MC 9U4-26	Project Number: [none]	**Reported:**
Seattle WA, 98124	Project Manager: Carl Bach	06-Nov-2017 10:09

B78-20-10-100515

17J0089-02RE1 (Solid)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 10/05/2017 11:50

Instrument: NT5 — Analyzed: 13-Oct-2017 17:20

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
trans-1,3-Dichloropropene	10061-02-6	1	0.38	1.76	ND	ug/kg	U
2-Hexanone	591-78-6	1	0.77	8.82	ND	ug/kg	U
1,1,2-Trichloroethane	79-00-5	1	0.50	1.76	ND	ug/kg	U
1,3-Dichloropropane	142-28-9	1	0.37	1.76	ND	ug/kg	U
Tetrachloroethene	127-18-4	1	0.45	1.76	ND	ug/kg	U
Dibromochloromethane	124-48-1	1	0.47	1.76	ND	ug/kg	U
1,2-Dibromoethane	106-93-4	1	0.31	1.76	ND	ug/kg	U
Chlorobenzene	108-90-7	1	0.39	1.76	ND	ug/kg	U
Ethylbenzene	100-41-4	1	0.36	1.76	**4.69**	ug/kg	
1,1,1,2-Tetrachloroethane	630-20-6	1	0.41	1.76	ND	ug/kg	U
m,p-Xylene	179601-23-1	1	0.69	3.53	**43.4**	ug/kg	
o-Xylene	95-47-6	1	0.40	1.76	**7.94**	ug/kg	
Xylenes, total	1330-20-7	1	1.09	3.53	**51.3**	ug/kg	
Styrene	100-42-5	1	0.24	1.76	ND	ug/kg	U
Bromoform	75-25-2	1	0.52	1.76	ND	ug/kg	U
1,1,2,2-Tetrachloroethane	79-34-5	1	0.45	1.76	ND	ug/kg	U
1,2,3-Trichloropropane	96-18-4	1	0.91	3.53	ND	ug/kg	U
trans-1,4-Dichloro 2-Butene	110-57-6	1	0.77	8.82	ND	ug/kg	U
n-Propylbenzene	103-65-1	1	0.48	1.76	**21.0**	ug/kg	
Bromobenzene	108-86-1	1	0.27	1.76	ND	ug/kg	U
Isopropyl Benzene	98-82-8	1	0.41	1.76	ND	ug/kg	U
2-Chlorotoluene	95-49-8	1	0.53	1.76	ND	ug/kg	U
4-Chlorotoluene	106-43-4	1	0.49	1.76	ND	ug/kg	U
t-Butylbenzene	98-06-6	1	0.54	1.76	ND	ug/kg	U
1,3,5-Trimethylbenzene	108-67-8	1	0.45	1.76	**123**	ug/kg	
1,2,4-Trimethylbenzene	95-63-6	1	0.41	1.76	**218**	ug/kg	
s-Butylbenzene	135-98-8	1	0.42	1.76	ND	ug/kg	U
4-Isopropyl Toluene	99-87-6	1	0.42	1.76	**1.60**	ug/kg	J
1,3-Dichlorobenzene	541-73-1	1	0.40	1.76	ND	ug/kg	U
1,4-Dichlorobenzene	106-46-7	1	0.41	1.76	ND	ug/kg	U
n-Butylbenzene	104-51-8	1	0.46	1.76	ND	ug/kg	U
1,2-Dichlorobenzene	95-50-1	1	0.52	1.76	ND	ug/kg	U
1,2-Dibromo-3-chloropropane	96-12-8	1	1.03	8.82	ND	ug/kg	U
1,2,4-Trichlorobenzene	120-82-1	1	0.59	8.82	ND	ug/kg	U
Hexachloro-1,3-Butadiene	87-68-3	1	0.72	8.82	ND	ug/kg	U
Naphthalene	91-20-3	1	0.76	8.82	**59.0**	ug/kg	
1,2,3-Trichlorobenzene	87-61-6	1	0.54	8.82	ND	ug/kg	U
Dichlorodifluoromethane	75-71-8	1	0.37	1.76	ND	ug/kg	U

4611 S 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6202

The Boeing Company	Project: Boeing Renton 4-79	
P.O. Box 3707 MC 9U4-26	Project Number: [none]	**Reported:**
Seattle WA, 98124	Project Manager: Carl Bach	06-Nov-2017 10:09

B78-20-10-100515

17J0089-02RE1 (Solid)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 10/05/2017 11:50

Instrument: NT5 — Analyzed: 13-Oct-2017 17:20

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Methyl tert-butyl Ether	1634-04-4	1	0.41	1.76	ND	ug/kg	U
2-Pentanone	107-87-9	1	8.82	8.82	ND	ug/kg	U
Surrogate: 1,2-Dichloroethane-d4				*80-149 %*	*108*	*%*	
Surrogate: Toluene-d8				*77-120 %*	*102*	*%*	
Surrogate: 4-Bromofluorobenzene				*80-120 %*	*98.4*	*%*	
Surrogate: 1,2-Dichlorobenzene-d4				*80-120 %*	*101*	*%*	

The Boeing Company	Project: Boeing Renton 4-79	
P.O. Box 3707 MC 9U4-26	Project Number: [none]	Reported:
Seattle WA, 98124	Project Manager: Carl Bach	06-Nov-2017 10:09

Volatile Organic Compounds - Quality Control

Batch BFJ0196 - No Prep - Volatiles

Instrument: NT5 Analyst: PB

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BFJ0196-BLK1)					Prepared: 06-Oct-2017 Analyzed: 06-Oct-2017 17:18						
Chloromethane	ND	0.26	1.00	ug/kg							U
Vinyl Chloride	ND	0.24	1.00	ug/kg							U
Bromomethane	ND	0.19	1.00	ug/kg							U
Chloroethane	ND	0.46	1.00	ug/kg							U
Trichlorofluoromethane	ND	0.27	1.00	ug/kg							U
Acrolein	ND	3.81	5.00	ug/kg							U
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND	0.29	2.00	ug/kg							U
Acetone	ND	0.48	5.00	ug/kg							U
1,1-Dichloroethene	ND	0.34	1.00	ug/kg							U
Bromoethane	ND	0.44	2.00	ug/kg							U
Iodomethane	ND	0.22	1.00	ug/kg							U
Methylene Chloride	ND	0.64	2.00	ug/kg							U
Acrylonitrile	ND	1.03	5.00	ug/kg							U
Carbon Disulfide	ND	0.56	1.00	ug/kg							U
trans-1,2-Dichloroethene	ND	0.27	1.00	ug/kg							U
Vinyl Acetate	ND	0.38	5.00	ug/kg							U
1,1-Dichloroethane	ND	0.20	1.00	ug/kg							U
2-Butanone	ND	0.51	5.00	ug/kg							U
2,2-Dichloropropane	ND	0.29	1.00	ug/kg							U
cis-1,2-Dichloroethene	ND	0.24	1.00	ug/kg							U
Chloroform	ND	0.23	1.00	ug/kg							U
Bromochloromethane	ND	0.32	1.00	ug/kg							U
1,1,1-Trichloroethane	ND	0.23	1.00	ug/kg							U
1,1-Dichloropropene	ND	0.31	1.00	ug/kg							U
Carbon tetrachloride	ND	0.21	1.00	ug/kg							U
1,2-Dichloroethane	ND	0.19	1.00	ug/kg							U
Benzene	ND	0.30	1.00	ug/kg							U
Trichloroethene	ND	0.21	1.00	ug/kg							U
1,2-Dichloropropane	ND	0.16	1.00	ug/kg							U
Bromodichloromethane	ND	0.25	1.00	ug/kg							U
Dibromomethane	ND	0.15	1.00	ug/kg							U
2-Chloroethyl vinyl ether	ND	0.28	5.00	ug/kg							U
4-Methyl-2-Pentanone	ND	0.42	5.00	ug/kg							U
cis-1,3-Dichloropropene	ND	0.23	1.00	ug/kg							U
Toluene	ND	0.15	1.00	ug/kg							U

The Boeing Company	Project: Boeing Renton 4-79	
P.O. Box 3707 MC 9U4-26	Project Number: [none]	Reported:
Seattle WA, 98124	Project Manager: Carl Bach	06-Nov-2017 10:09

Volatile Organic Compounds - Quality Control

Batch BFJ0196 - No Prep - Volatiles

Instrument: NT5 Analyst: PB

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BFJ0196-BLK1)					Prepared: 06-Oct-2017 Analyzed: 06-Oct-2017 17:18						
trans-1,3-Dichloropropene	ND	0.22	1.00	ug/kg							U
2-Hexanone	ND	0.44	5.00	ug/kg							U
1,1,2-Trichloroethane	ND	0.29	1.00	ug/kg							U
1,3-Dichloropropane	ND	0.21	1.00	ug/kg							U
Tetrachloroethene	ND	0.26	1.00	ug/kg							U
Dibromochloromethane	ND	0.27	1.00	ug/kg							U
1,2-Dibromoethane	ND	0.18	1.00	ug/kg							U
Chlorobenzene	ND	0.22	1.00	ug/kg							U
Ethylbenzene	ND	0.20	1.00	ug/kg							U
1,1,1,2-Tetrachloroethane	ND	0.23	1.00	ug/kg							U
m,p-Xylene	ND	0.39	2.00	ug/kg							U
o-Xylene	ND	0.22	1.00	ug/kg							U
Xylenes, total	ND	0.62	2.00	ug/kg							U
Styrene	ND	0.14	1.00	ug/kg							U
Bromoform	ND	0.30	1.00	ug/kg							U
1,1,2,2-Tetrachloroethane	ND	0.25	1.00	ug/kg							U
1,2,3-Trichloropropane	ND	0.52	2.00	ug/kg							U
trans-1,4-Dichloro 2-Butene	ND	0.44	5.00	ug/kg							U
n-Propylbenzene	ND	0.27	1.00	ug/kg							U
Bromobenzene	ND	0.15	1.00	ug/kg							U
Isopropyl Benzene	ND	0.23	1.00	ug/kg							U
2-Chlorotoluene	ND	0.30	1.00	ug/kg							U
4-Chlorotoluene	ND	0.28	1.00	ug/kg							U
t-Butylbenzene	ND	0.31	1.00	ug/kg							U
1,3,5-Trimethylbenzene	ND	0.25	1.00	ug/kg							U
1,2,4-Trimethylbenzene	ND	0.23	1.00	ug/kg							U
s-Butylbenzene	ND	0.24	1.00	ug/kg							U
4-Isopropyl Toluene	ND	0.24	1.00	ug/kg							U
1,3-Dichlorobenzene	ND	0.23	1.00	ug/kg							U
1,4-Dichlorobenzene	ND	0.23	1.00	ug/kg							U
n-Butylbenzene	ND	0.26	1.00	ug/kg							U
1,2-Dichlorobenzene	ND	0.29	1.00	ug/kg							U
1,2-Dibromo-3-chloropropane	ND	0.59	5.00	ug/kg							U
1,2,4-Trichlorobenzene	0.88	0.33	5.00	ug/kg							J
Hexachloro-1,3-Butadiene	0.57	0.41	5.00	ug/kg							J

4611 S 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6202

The Boeing Company	Project: Boeing Renton 4-79	
P.O. Box 3707 MC 9U4-26	Project Number: [none]	Reported:
Seattle WA, 98124	Project Manager: Carl Bach	06-Nov-2017 10:09

Volatile Organic Compounds - Quality Control

Batch BFJ0196 - No Prep - Volatiles

Instrument: NT5 Analyst: PB

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BFJ0196-BLK1)					Prepared: 06-Oct-2017	Analyzed: 06-Oct-2017 17:18					
Naphthalene	1.09	0.43	5.00	ug/kg							J
1,2,3-Trichlorobenzene	1.01	0.31	5.00	ug/kg							J
Dichlorodifluoromethane	ND	0.21	1.00	ug/kg							U
Methyl tert-butyl Ether	ND	0.23	1.00	ug/kg							U
2-Pentanone	ND	5.00	5.00	ug/kg							U
Surrogate: 1,2-Dichloroethane-d4		51.7		ug/kg	*50.0*		*103*	*80-149*			
Surrogate: Toluene-d8		50.6		ug/kg	*50.0*		*101*	*77-120*			
Surrogate: 4-Bromofluorobenzene		48.4		ug/kg	*50.0*		*96.8*	*80-120*			
Surrogate: 1,2-Dichlorobenzene-d4		50.2		ug/kg	*50.0*		*100*	*80-120*			
LCS (BFJ0196-BS1)					Prepared: 06-Oct-2017	Analyzed: 06-Oct-2017 16:20					
Chloromethane	67.8			ug/kg	50.0		136	64-132			*, Q
Vinyl Chloride	70.0			ug/kg	50.0		140	74-135			*, Q
Bromomethane	62.3			ug/kg	50.0		125	53-144			Q
Chloroethane	62.9			ug/kg	50.0		126	55-149			Q
Trichlorofluoromethane	60.6			ug/kg	50.0		121	61-164			Q
Acrolein	258			ug/kg	250		103	59-140			
1,1,2-Trichloro-1,2,2-Trifluoroethane	56.1			ug/kg	50.0		112	74-143			
Acetone	249			ug/kg	250		99.7	48-137			
1,1-Dichloroethene	53.3			ug/kg	50.0		107	77-134			
Bromoethane	53.3			ug/kg	50.0		107	65-145			
Iodomethane	51.8			ug/kg	50.0		104	31-162			
Methylene Chloride	47.2			ug/kg	50.0		94.4	69-129			
Acrylonitrile	48.9			ug/kg	50.0		97.7	69-134			
Carbon Disulfide	53.9			ug/kg	50.0		108	71-137			
trans-1,2-Dichloroethene	50.3			ug/kg	50.0		101	79-130			
Vinyl Acetate	53.3			ug/kg	50.0		107	66-141			
1,1-Dichloroethane	51.9			ug/kg	50.0		104	80-126			
2-Butanone	220			ug/kg	250		87.9	70-132			
2,2-Dichloropropane	52.5			ug/kg	50.0		105	77-138			
cis-1,2-Dichloroethene	45.0			ug/kg	50.0		90.0	80-125			
Chloroform	50.8			ug/kg	50.0		102	80-126			
Bromochloromethane	49.6			ug/kg	50.0		99.2	80-129			
1,1,1-Trichloroethane	56.0			ug/kg	50.0		112	78-133			
1,1-Dichloropropene	53.8			ug/kg	50.0		108	79-120			

4611 S 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6202

Volatile Organic Compounds - Quality Control

Batch BFJ0196 - No Prep - Volatiles

Instrument: NT5 Analyst: PB

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BFJ0196-BS1)					Prepared: 06-Oct-2017	Analyzed: 06-Oct-2017 16:20					
Carbon tetrachloride	60.7			ug/kg	50.0		121	71-129			Q
1,2-Dichloroethane	54.7			ug/kg	50.0		109	76-120			
Benzene	49.1			ug/kg	50.0		98.2	80-120			
Trichloroethene	53.4			ug/kg	50.0		107	80-120			
1,2-Dichloropropane	49.0			ug/kg	50.0		97.9	79-120			
Bromodichloromethane	53.7			ug/kg	50.0		107	80-122			
Dibromomethane	48.6			ug/kg	50.0		97.3	80-120			
2-Chloroethyl vinyl ether	57.0			ug/kg	50.0		114	51-129			
4-Methyl-2-Pentanone	273			ug/kg	250		109	73-121			
cis-1,3-Dichloropropene	52.3			ug/kg	50.0		105	80-120			
Toluene	52.8			ug/kg	50.0		106	75-120			
trans-1,3-Dichloropropene	57.9			ug/kg	50.0		116	80-124			
2-Hexanone	258			ug/kg	250		103	68-122			
1,1,2-Trichloroethane	54.3			ug/kg	50.0		109	79-120			
1,3-Dichloropropane	46.1			ug/kg	50.0		92.2	78-120			
Tetrachloroethene	53.8			ug/kg	50.0		108	74-124			
Dibromochloromethane	50.7			ug/kg	50.0		101	74-125			
1,2-Dibromoethane	57.1			ug/kg	50.0		114	80-120			
Chlorobenzene	51.0			ug/kg	50.0		102	78-120			
Ethylbenzene	52.0			ug/kg	50.0		104	80-125			
1,1,1,2-Tetrachloroethane	50.3			ug/kg	50.0		101	80-120			
m,p-Xylene	110			ug/kg	100		110	76-121			
o-Xylene	59.5			ug/kg	50.0		119	67-132			
Xylenes, total	169			ug/kg	150		113	67-132			
Styrene	61.6			ug/kg	50.0		123	80-120			*, Q
Bromoform	47.9			ug/kg	50.0		95.8	64-128			
1,1,2,2-Tetrachloroethane	47.8			ug/kg	50.0		95.5	74-120			
1,2,3-Trichloropropane	49.5			ug/kg	50.0		98.9	73-120			
trans-1,4-Dichloro 2-Butene	51.0			ug/kg	50.0		102	65-125			
n-Propylbenzene	54.2			ug/kg	50.0		108	72-124			
Bromobenzene	50.4			ug/kg	50.0		101	76-120			
Isopropyl Benzene	54.2			ug/kg	50.0		108	74-121			
2-Chlorotoluene	53.3			ug/kg	50.0		107	75-120			
4-Chlorotoluene	53.9			ug/kg	50.0		108	69-124			
t-Butylbenzene	54.1			ug/kg	50.0		108	72-122			

4611 S 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6202

The Boeing Company	Project: Boeing Renton 4-79	
P.O. Box 3707 MC 9U4-26	Project Number: [none]	**Reported:**
Seattle WA, 98124	Project Manager: Carl Bach	06-Nov-2017 10:09

Volatile Organic Compounds - Quality Control

Batch BFJ0196 - No Prep - Volatiles

Instrument: NT5 Analyst: PB

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BFJ0196-BS1)					Prepared: 06-Oct-2017	Analyzed: 06-Oct-2017 16:20					
1,3,5-Trimethylbenzene	52.9			ug/kg	50.0		106	74-122			
1,2,4-Trimethylbenzene	53.0			ug/kg	50.0		106	75-121			
s-Butylbenzene	54.3			ug/kg	50.0		109	70-128			
4-Isopropyl Toluene	55.5			ug/kg	50.0		111	75-125			
1,3-Dichlorobenzene	51.0			ug/kg	50.0		102	75-120			
1,4-Dichlorobenzene	50.7			ug/kg	50.0		101	73-120			
n-Butylbenzene	56.9			ug/kg	50.0		114	73-130			
1,2-Dichlorobenzene	48.4			ug/kg	50.0		96.7	76-120			
1,2-Dibromo-3-chloropropane	44.7			ug/kg	50.0		89.5	65-126			
1,2,4-Trichlorobenzene	55.9			ug/kg	50.0		112	66-140			
Hexachloro-1,3-Butadiene	56.1			ug/kg	50.0		112	67-133			
Naphthalene	51.2			ug/kg	50.0		102	69-125			
1,2,3-Trichlorobenzene	53.4			ug/kg	50.0		107	68-132			
Dichlorodifluoromethane	67.6			ug/kg	50.0		135	67-142			
Methyl tert-butyl Ether	53.3			ug/kg	50.0		107	79-127			
2-Pentanone	282			ug/kg	250		113	77-120			
Surrogate: 1,2-Dichloroethane-d4		56.3		ug/kg	*50.0*		*113*	*80-149*			
Surrogate: Toluene-d8		52.0		ug/kg	*50.0*		*104*	*77-120*			
Surrogate: 4-Bromofluorobenzene		59.4		ug/kg	*50.0*		*119*	*80-120*			
Surrogate: 1,2-Dichlorobenzene-d4		50.3		ug/kg	*50.0*		*101*	*80-120*			
LCS Dup (BFJ0196-BSD1)					Prepared: 06-Oct-2017	Analyzed: 06-Oct-2017 16:56					
Chloromethane	51.4			ug/kg	50.0		103	64-132	27.40	30	Q
Vinyl Chloride	52.0			ug/kg	50.0		104	74-135	29.60	30	Q
Bromomethane	43.6			ug/kg	50.0		87.3	53-144	35.20	30	*, Q
Chloroethane	50.9			ug/kg	50.0		102	55-149	21.10	30	Q
Trichlorofluoromethane	47.5			ug/kg	50.0		95.0	61-164	24.30	30	Q
Acrolein	245			ug/kg	250		98.0	59-140	5.11	30	
1,1,2-Trichloro-1,2,2-Trifluoroethane	49.8			ug/kg	50.0		99.7	74-143	11.90	30	
Acetone	217			ug/kg	250		86.8	48-137	13.80	30	
1,1-Dichloroethene	49.0			ug/kg	50.0		97.9	77-134	8.43	30	
Bromoethane	53.4			ug/kg	50.0		107	65-145	0.26	30	
Iodomethane	49.5			ug/kg	50.0		98.9	31-162	4.53	30	
Methylene Chloride	48.9			ug/kg	50.0		97.8	69-129	3.55	30	
Acrylonitrile	35.8			ug/kg	50.0		71.6	69-134	30.90	30	*

4611 S 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6202

The Boeing Company	Project: Boeing Renton 4-79	
P.O. Box 3707 MC 9U4-26	Project Number: [none]	Reported:
Seattle WA, 98124	Project Manager: Carl Bach	06-Nov-2017 10:09

Volatile Organic Compounds - Quality Control

Batch BFJ0196 - No Prep - Volatiles

Instrument: NT5 Analyst: PB

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS Dup (BFJ0196-BSD1)				Prepared: 06-Oct-2017 Analyzed: 06-Oct-2017 16:56							
Carbon Disulfide	50.6			ug/kg	50.0		101	71-137	6.35	30	
trans-1,2-Dichloroethene	49.6			ug/kg	50.0		99.3	79-130	1.26	30	
Vinyl Acetate	38.8			ug/kg	50.0		77.6	66-141	31.40	30	*
1,1-Dichloroethane	40.3			ug/kg	50.0		80.6	80-126	25.10	30	
2-Butanone	206			ug/kg	250		82.3	70-132	6.56	30	
2,2-Dichloropropane	40.8			ug/kg	50.0		81.7	77-138	24.90	30	
cis-1,2-Dichloroethene	35.7			ug/kg	50.0		71.3	80-125	23.10	30	*
Chloroform	40.0			ug/kg	50.0		80.0	80-126	23.70	30	
Bromochloromethane	37.6			ug/kg	50.0		75.2	80-129	27.60	30	*
1,1,1-Trichloroethane	44.7			ug/kg	50.0		89.4	78-133	22.40	30	
1,1-Dichloropropene	45.3			ug/kg	50.0		90.6	79-120	17.20	30	
Carbon tetrachloride	44.2			ug/kg	50.0		88.3	71-129	31.60	30	*, Q
1,2-Dichloroethane	47.1			ug/kg	50.0		94.3	76-120	14.90	30	
Benzene	51.8			ug/kg	50.0		104	80-120	5.46	30	
Trichloroethene	54.5			ug/kg	50.0		109	80-120	1.95	30	
1,2-Dichloropropane	54.7			ug/kg	50.0		109	79-120	11.10	30	
Bromodichloromethane	50.5			ug/kg	50.0		101	80-122	6.09	30	
Dibromomethane	48.2			ug/kg	50.0		96.4	80-120	0.94	30	
2-Chloroethyl vinyl ether	54.5			ug/kg	50.0		109	51-129	4.35	30	
4-Methyl-2-Pentanone	254			ug/kg	250		102	73-121	7.48	30	
cis-1,3-Dichloropropene	52.6			ug/kg	50.0		105	80-120	0.69	30	
Toluene	52.8			ug/kg	50.0		106	75-120	0.03	30	
trans-1,3-Dichloropropene	52.4			ug/kg	50.0		105	80-124	9.84	30	
2-Hexanone	259			ug/kg	250		104	68-122	0.49	30	
1,1,2-Trichloroethane	49.5			ug/kg	50.0		99.0	79-120	9.23	30	
1,3-Dichloropropane	49.2			ug/kg	50.0		98.4	78-120	6.46	30	
Tetrachloroethene	56.2			ug/kg	50.0		112	74-124	4.24	30	
Dibromochloromethane	51.0			ug/kg	50.0		102	74-125	0.64	30	
1,2-Dibromoethane	49.1			ug/kg	50.0		98.3	80-120	15.00	30	
Chlorobenzene	52.2			ug/kg	50.0		104	78-120	2.41	30	
Ethylbenzene	54.4			ug/kg	50.0		109	80-125	4.46	30	
1,1,1,2-Tetrachloroethane	50.1			ug/kg	50.0		100	80-120	0.43	30	
m,p-Xylene	111			ug/kg	100		111	76-121	0.94	30	
o-Xylene	52.9			ug/kg	50.0		106	67-132	11.90	30	
Xylenes, total	164			ug/kg	150		109	67-132	3.38	30	

4611 S 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6202

The Boeing Company	Project: Boeing Renton 4-79	
P.O. Box 3707 MC 9U4-26	Project Number: [none]	Reported:
Seattle WA, 98124	Project Manager: Carl Bach	06-Nov-2017 10:09

Volatile Organic Compounds - Quality Control

Batch BFJ0196 - No Prep - Volatiles

Instrument: NT5 Analyst: PB

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS Dup (BFJ0196-BSD1)					Prepared: 06-Oct-2017 Analyzed: 06-Oct-2017 16:56						
Styrene	54.6			ug/kg	50.0		109	80-120	12.00	30	Q
Bromoform	47.5			ug/kg	50.0		95.0	64-128	0.75	30	
1,1,2,2-Tetrachloroethane	47.1			ug/kg	50.0		94.2	74-120	1.44	30	
1,2,3-Trichloropropane	46.4			ug/kg	50.0		92.8	73-120	6.45	30	
trans-1,4-Dichloro 2-Butene	48.3			ug/kg	50.0		96.6	65-125	5.55	30	
n-Propylbenzene	55.4			ug/kg	50.0		111	72-124	2.19	30	
Bromobenzene	50.1			ug/kg	50.0		100	76-120	0.61	30	
Isopropyl Benzene	55.3			ug/kg	50.0		111	74-121	2.09	30	
2-Chlorotoluene	55.1			ug/kg	50.0		110	75-120	3.36	30	
4-Chlorotoluene	55.3			ug/kg	50.0		111	69-124	2.57	30	
t-Butylbenzene	55.5			ug/kg	50.0		111	72-122	2.52	30	
1,3,5-Trimethylbenzene	54.8			ug/kg	50.0		110	74-122	3.54	30	
1,2,4-Trimethylbenzene	54.7			ug/kg	50.0		109	75-121	3.03	30	
s-Butylbenzene	56.1			ug/kg	50.0		112	70-128	3.24	30	
4-Isopropyl Toluene	57.4			ug/kg	50.0		115	75-125	3.48	30	
1,3-Dichlorobenzene	53.0			ug/kg	50.0		106	75-120	3.67	30	
1,4-Dichlorobenzene	51.7			ug/kg	50.0		103	73-120	2.02	30	
n-Butylbenzene	59.6			ug/kg	50.0		119	73-130	4.64	30	
1,2-Dichlorobenzene	50.4			ug/kg	50.0		101	76-120	4.19	30	
1,2-Dibromo-3-chloropropane	43.6			ug/kg	50.0		87.1	65-126	2.61	30	
1,2,4-Trichlorobenzene	57.4			ug/kg	50.0		115	66-140	2.62	30	
Hexachloro-1,3-Butadiene	58.8			ug/kg	50.0		118	67-133	4.69	30	
Naphthalene	50.6			ug/kg	50.0		101	69-125	1.13	30	
1,2,3-Trichlorobenzene	54.3			ug/kg	50.0		109	68-132	1.78	30	
Dichlorodifluoromethane	52.1			ug/kg	50.0		104	67-142	25.80	30	
Methyl tert-butyl Ether	45.7			ug/kg	50.0		91.4	79-127	15.30	30	
2-Pentanone	269			ug/kg	250		108	77-120	4.77	30	
Surrogate: 1,2-Dichloroethane-d4		49.9		ug/kg	*50.0*		*99.9*	*80-149*			
Surrogate: Toluene-d8		51.1		ug/kg	*50.0*		*102*	*77-120*			
Surrogate: 4-Bromofluorobenzene		50.9		ug/kg	*50.0*		*102*	*80-120*			
Surrogate: 1,2-Dichlorobenzene-d4		49.9		ug/kg	*50.0*		*99.9*	*80-120*			

4611 S 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6202

The Boeing Company	Project: Boeing Renton 4-79	
P.O. Box 3707 MC 9U4-26	Project Number: [none]	**Reported:**
Seattle WA, 98124	Project Manager: Carl Bach	06-Nov-2017 10:09

Volatile Organic Compounds - Quality Control

Batch BFJ0269 - No Prep - Volatiles

Instrument: NT5 Analyst: PB

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BFJ0269-BLK1)					Prepared: 13-Oct-2017 Analyzed: 13-Oct-2017 12:38						
Chloromethane	ND	0.26	1.00	ug/kg							U
Vinyl Chloride	ND	0.24	1.00	ug/kg							U
Bromomethane	ND	0.19	1.00	ug/kg							U
Chloroethane	ND	0.46	1.00	ug/kg							U
Trichlorofluoromethane	ND	0.27	1.00	ug/kg							U
Acrolein	ND	3.81	5.00	ug/kg							U
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND	0.29	2.00	ug/kg							U
Acetone	ND	0.48	5.00	ug/kg							U
1,1-Dichloroethene	ND	0.34	1.00	ug/kg							U
Bromoethane	ND	0.44	2.00	ug/kg							U
Iodomethane	ND	0.22	1.00	ug/kg							U
Methylene Chloride	1.08	0.64	2.00	ug/kg							J
Acrylonitrile	ND	1.03	5.00	ug/kg							U
Carbon Disulfide	ND	0.56	1.00	ug/kg							U
trans-1,2-Dichloroethene	ND	0.27	1.00	ug/kg							U
Vinyl Acetate	ND	0.38	5.00	ug/kg							U
1,1-Dichloroethane	ND	0.20	1.00	ug/kg							U
2-Butanone	ND	0.51	5.00	ug/kg							U
2,2-Dichloropropane	ND	0.29	1.00	ug/kg							U
cis-1,2-Dichloroethene	ND	0.24	1.00	ug/kg							U
Chloroform	ND	0.23	1.00	ug/kg							U
Bromochloromethane	ND	0.32	1.00	ug/kg							U
1,1,1-Trichloroethane	ND	0.23	1.00	ug/kg							U
1,1-Dichloropropene	ND	0.31	1.00	ug/kg							U
Carbon tetrachloride	ND	0.21	1.00	ug/kg							U
1,2-Dichloroethane	ND	0.19	1.00	ug/kg							U
Benzene	ND	0.30	1.00	ug/kg							U
Trichloroethene	ND	0.21	1.00	ug/kg							U
1,2-Dichloropropane	ND	0.16	1.00	ug/kg							U
Bromodichloromethane	ND	0.25	1.00	ug/kg							U
Dibromomethane	ND	0.15	1.00	ug/kg							U
2-Chloroethyl vinyl ether	ND	0.28	5.00	ug/kg							U
4-Methyl-2-Pentanone	ND	0.42	5.00	ug/kg							U
cis-1,3-Dichloropropene	ND	0.23	1.00	ug/kg							U
Toluene	ND	0.15	1.00	ug/kg							U

4611 S 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6202

The Boeing Company	Project: Boeing Renton 4-79	
P.O. Box 3707 MC 9U4-26	Project Number: [none]	Reported:
Seattle WA, 98124	Project Manager: Carl Bach	06-Nov-2017 10:09

Volatile Organic Compounds - Quality Control

Batch BFJ0269 - No Prep - Volatiles

Instrument: NT5 Analyst: PB

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BFJ0269-BLK1)					Prepared: 13-Oct-2017 Analyzed: 13-Oct-2017 12:38						
trans-1,3-Dichloropropene	ND	0.22	1.00	ug/kg							U
2-Hexanone	2.15	0.44	5.00	ug/kg							J
1,1,2-Trichloroethane	ND	0.29	1.00	ug/kg							U
1,3-Dichloropropane	ND	0.21	1.00	ug/kg							U
Tetrachloroethene	ND	0.26	1.00	ug/kg							U
Dibromochloromethane	ND	0.27	1.00	ug/kg							U
1,2-Dibromoethane	ND	0.18	1.00	ug/kg							U
Chlorobenzene	ND	0.22	1.00	ug/kg							U
Ethylbenzene	ND	0.20	1.00	ug/kg							U
1,1,1,2-Tetrachloroethane	ND	0.23	1.00	ug/kg							U
m,p-Xylene	ND	0.39	2.00	ug/kg							U
o-Xylene	ND	0.22	1.00	ug/kg							U
Xylenes, total	ND	0.62	2.00	ug/kg							U
Styrene	ND	0.14	1.00	ug/kg							U
Bromoform	ND	0.30	1.00	ug/kg							U
1,1,2,2-Tetrachloroethane	ND	0.25	1.00	ug/kg							U
1,2,3-Trichloropropane	ND	0.52	2.00	ug/kg							U
trans-1,4-Dichloro 2-Butene	ND	0.44	5.00	ug/kg							U
n-Propylbenzene	ND	0.27	1.00	ug/kg							U
Bromobenzene	ND	0.15	1.00	ug/kg							U
Isopropyl Benzene	ND	0.23	1.00	ug/kg							U
2-Chlorotoluene	ND	0.30	1.00	ug/kg							U
4-Chlorotoluene	ND	0.28	1.00	ug/kg							U
t-Butylbenzene	ND	0.31	1.00	ug/kg							U
1,3,5-Trimethylbenzene	ND	0.25	1.00	ug/kg							U
1,2,4-Trimethylbenzene	ND	0.23	1.00	ug/kg							U
s-Butylbenzene	ND	0.24	1.00	ug/kg							U
4-Isopropyl Toluene	ND	0.24	1.00	ug/kg							U
1,3-Dichlorobenzene	ND	0.23	1.00	ug/kg							U
1,4-Dichlorobenzene	ND	0.23	1.00	ug/kg							U
n-Butylbenzene	ND	0.26	1.00	ug/kg							U
1,2-Dichlorobenzene	ND	0.29	1.00	ug/kg							U
1,2-Dibromo-3-chloropropane	ND	0.59	5.00	ug/kg							U
1,2,4-Trichlorobenzene	0.79	0.33	5.00	ug/kg							J
Hexachloro-1,3-Butadiene	ND	0.41	5.00	ug/kg							U

4611 S 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6202

The Boeing Company	Project: Boeing Renton 4-79	
P.O. Box 3707 MC 9U4-26	Project Number: [none]	**Reported:**
Seattle WA, 98124	Project Manager: Carl Bach	06-Nov-2017 10:09

Volatile Organic Compounds - Quality Control

Batch BFJ0269 - No Prep - Volatiles

Instrument: NT5 Analyst: PB

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BFJ0269-BLK1)					Prepared: 13-Oct-2017		Analyzed: 13-Oct-2017 12:38				
Naphthalene	1.15	0.43	5.00	ug/kg							J
1,2,3-Trichlorobenzene	0.89	0.31	5.00	ug/kg							J
Dichlorodifluoromethane	ND	0.21	1.00	ug/kg							U
Methyl tert-butyl Ether	ND	0.23	1.00	ug/kg							U
2-Pentanone	ND	5.00	5.00	ug/kg							U
Surrogate: 1,2-Dichloroethane-d4		50.8		ug/kg	*50.0*		*102*	*80-149*			
Surrogate: Toluene-d8		48.9		ug/kg	*50.0*		*97.9*	*77-120*			
Surrogate: 4-Bromofluorobenzene		49.1		ug/kg	*50.0*		*98.2*	*80-120*			
Surrogate: 1,2-Dichlorobenzene-d4		50.0		ug/kg	*50.0*		*100*	*80-120*			
LCS (BFJ0269-BS1)					Prepared: 13-Oct-2017		Analyzed: 13-Oct-2017 11:39				
Chloromethane	51.8			ug/kg	50.0		104	64-132			
Vinyl Chloride	58.1			ug/kg	50.0		116	74-135			
Bromomethane	49.4			ug/kg	50.0		98.9	53-144			
Chloroethane	56.8			ug/kg	50.0		114	55-149			
Trichlorofluoromethane	65.2			ug/kg	50.0		130	61-164			Q
Acrolein	256			ug/kg	250		103	59-140			
1,1,2-Trichloro-1,2,2-Trifluoroethane	56.7			ug/kg	50.0		113	74-143			
Acetone	229			ug/kg	250		91.5	48-137			
1,1-Dichloroethene	55.9			ug/kg	50.0		112	77-134			
Bromoethane	55.1			ug/kg	50.0		110	65-145			
Iodomethane	70.2			ug/kg	50.0		140	31-162			Q
Methylene Chloride	54.8			ug/kg	50.0		110	69-129			
Acrylonitrile	47.9			ug/kg	50.0		95.8	69-134			
Carbon Disulfide	57.3			ug/kg	50.0		115	71-137			
trans-1,2-Dichloroethene	53.3			ug/kg	50.0		107	79-130			
Vinyl Acetate	51.7			ug/kg	50.0		103	66-141			
1,1-Dichloroethane	53.0			ug/kg	50.0		106	80-126			
2-Butanone	255			ug/kg	250		102	70-132			
2,2-Dichloropropane	53.6			ug/kg	50.0		107	77-138			
cis-1,2-Dichloroethene	53.2			ug/kg	50.0		106	80-125			
Chloroform	54.5			ug/kg	50.0		109	80-126			
Bromochloromethane	52.5			ug/kg	50.0		105	80-129			
1,1,1-Trichloroethane	56.2			ug/kg	50.0		112	78-133			
1,1-Dichloropropene	52.6			ug/kg	50.0		105	79-120			

4611 S 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6202

The Boeing Company	Project: Boeing Renton 4-79	
P.O. Box 3707 MC 9U4-26	Project Number: [none]	Reported:
Seattle WA, 98124	Project Manager: Carl Bach	06-Nov-2017 10:09

Volatile Organic Compounds - Quality Control

Batch BFJ0269 - No Prep - Volatiles

Instrument: NT5 Analyst: PB

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BFJ0269-BS1)					Prepared: 13-Oct-2017	Analyzed: 13-Oct-2017 11:39					
Carbon tetrachloride	53.9			ug/kg	50.0		108	71-129			
1,2-Dichloroethane	46.8			ug/kg	50.0		93.7	76-120			
Benzene	52.7			ug/kg	50.0		105	80-120			
Trichloroethene	52.5			ug/kg	50.0		105	80-120			
1,2-Dichloropropane	49.0			ug/kg	50.0		98.0	79-120			
Bromodichloromethane	51.7			ug/kg	50.0		103	80-122			
Dibromomethane	50.7			ug/kg	50.0		101	80-120			
2-Chloroethyl vinyl ether	51.3			ug/kg	50.0		103	51-129			
4-Methyl-2-Pentanone	230			ug/kg	250		92.0	73-121			
cis-1,3-Dichloropropene	52.6			ug/kg	50.0		105	80-120			
Toluene	51.6			ug/kg	50.0		103	75-120			
trans-1,3-Dichloropropene	51.9			ug/kg	50.0		104	80-124			
2-Hexanone	252			ug/kg	250		101	68-122			
1,1,2-Trichloroethane	47.9			ug/kg	50.0		95.9	79-120			
1,3-Dichloropropane	52.3			ug/kg	50.0		105	78-120			
Tetrachloroethene	56.9			ug/kg	50.0		114	74-124			
Dibromochloromethane	51.2			ug/kg	50.0		102	74-125			
1,2-Dibromoethane	48.9			ug/kg	50.0		97.8	80-120			
Chlorobenzene	53.8			ug/kg	50.0		108	78-120			
Ethylbenzene	54.4			ug/kg	50.0		109	80-125			
1,1,1,2-Tetrachloroethane	54.1			ug/kg	50.0		108	80-120			
m,p-Xylene	107			ug/kg	100		107	76-121			
o-Xylene	53.6			ug/kg	50.0		107	67-132			
Xylenes, total	160			ug/kg	150		107	67-132			
Styrene	54.6			ug/kg	50.0		109	80-120			
Bromoform	48.2			ug/kg	50.0		96.4	64-128			
1,1,2,2-Tetrachloroethane	51.6			ug/kg	50.0		103	74-120			
1,2,3-Trichloropropane	51.7			ug/kg	50.0		103	73-120			
trans-1,4-Dichloro 2-Butene	52.8			ug/kg	50.0		106	65-125			
n-Propylbenzene	56.2			ug/kg	50.0		112	72-124			
Bromobenzene	52.9			ug/kg	50.0		106	76-120			
Isopropyl Benzene	56.6			ug/kg	50.0		113	74-121			
2-Chlorotoluene	53.8			ug/kg	50.0		108	75-120			
4-Chlorotoluene	56.4			ug/kg	50.0		113	69-124			
t-Butylbenzene	56.8			ug/kg	50.0		114	72-122			

The Boeing Company	Project: Boeing Renton 4-79	
P.O. Box 3707 MC 9U4-26	Project Number: [none]	**Reported:**
Seattle WA, 98124	Project Manager: Carl Bach	06-Nov-2017 10:09

Volatile Organic Compounds - Quality Control

Batch BFJ0269 - No Prep - Volatiles

Instrument: NT5 Analyst: PB

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BFJ0269-BS1)					Prepared: 13-Oct-2017 Analyzed: 13-Oct-2017 11:39						
1,3,5-Trimethylbenzene	56.6			ug/kg	50.0		113	74-122			
1,2,4-Trimethylbenzene	56.3			ug/kg	50.0		113	75-121			
s-Butylbenzene	56.8			ug/kg	50.0		114	70-128			
4-Isopropyl Toluene	58.8			ug/kg	50.0		118	75-125			
1,3-Dichlorobenzene	54.7			ug/kg	50.0		109	75-120			
1,4-Dichlorobenzene	51.9			ug/kg	50.0		104	73-120			
n-Butylbenzene	58.3			ug/kg	50.0		117	73-130			
1,2-Dichlorobenzene	51.6			ug/kg	50.0		103	76-120			
1,2-Dibromo-3-chloropropane	49.3			ug/kg	50.0		98.6	65-126			
1,2,4-Trichlorobenzene	56.2			ug/kg	50.0		112	66-140			
Hexachloro-1,3-Butadiene	58.1			ug/kg	50.0		116	67-133			
Naphthalene	52.7			ug/kg	50.0		105	69-125			
1,2,3-Trichlorobenzene	56.8			ug/kg	50.0		114	68-132			
Dichlorodifluoromethane	51.7			ug/kg	50.0		103	67-142			
Methyl tert-butyl Ether	53.2			ug/kg	50.0		106	79-127			
2-Pentanone	225			ug/kg	250		89.8	77-120			
Surrogate: 1,2-Dichloroethane-d4		49.3		ug/kg	*50.0*		*98.7*	*80-149*			
Surrogate: Toluene-d8		48.1		ug/kg	*50.0*		*96.2*	*77-120*			
Surrogate: 4-Bromofluorobenzene		51.3		ug/kg	*50.0*		*103*	*80-120*			
Surrogate: 1,2-Dichlorobenzene-d4		51.1		ug/kg	*50.0*		*102*	*80-120*			
LCS Dup (BFJ0269-BSD1)					Prepared: 13-Oct-2017 Analyzed: 13-Oct-2017 12:15						
Chloromethane	52.8			ug/kg	50.0		106	64-132	1.95	30	
Vinyl Chloride	60.3			ug/kg	50.0		121	74-135	3.61	30	
Bromomethane	51.4			ug/kg	50.0		103	53-144	3.82	30	
Chloroethane	56.6			ug/kg	50.0		113	55-149	0.35	30	
Trichlorofluoromethane	65.5			ug/kg	50.0		131	61-164	0.46	30	Q
Acrolein	247			ug/kg	250		98.7	59-140	3.88	30	
1,1,2-Trichloro-1,2,2-Trifluoroethane	59.2			ug/kg	50.0		118	74-143	4.36	30	
Acetone	222			ug/kg	250		88.8	48-137	3.01	30	
1,1-Dichloroethene	54.9			ug/kg	50.0		110	77-134	1.77	30	
Bromoethane	56.8			ug/kg	50.0		114	65-145	3.08	30	
Iodomethane	66.0			ug/kg	50.0		132	31-162	6.18	30	Q
Methylene Chloride	53.6			ug/kg	50.0		107	69-129	2.29	30	
Acrylonitrile	46.8			ug/kg	50.0		93.6	69-134	2.30	30	

The Boeing Company	Project: Boeing Renton 4-79	
P.O. Box 3707 MC 9U4-26	Project Number: [none]	Reported:
Seattle WA, 98124	Project Manager: Carl Bach	06-Nov-2017 10:09

Volatile Organic Compounds - Quality Control

Batch BFJ0269 - No Prep - Volatiles

Instrument: NT5 Analyst: PB

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS Dup (BFJ0269-BSD1)					Prepared: 13-Oct-2017 Analyzed: 13-Oct-2017 12:15						
Carbon Disulfide	56.8			ug/kg	50.0		114	71-137	0.79	30	
trans-1,2-Dichloroethene	54.1			ug/kg	50.0		108	79-130	1.34	30	
Vinyl Acetate	50.7			ug/kg	50.0		101	66-141	2.02	30	
1,1-Dichloroethane	52.7			ug/kg	50.0		105	80-126	0.41	30	
2-Butanone	242			ug/kg	250		96.8	70-132	5.24	30	
2,2-Dichloropropane	54.5			ug/kg	50.0		109	77-138	1.62	30	
cis-1,2-Dichloroethene	53.5			ug/kg	50.0		107	80-125	0.45	30	
Chloroform	53.5			ug/kg	50.0		107	80-126	1.92	30	
Bromochloromethane	50.2			ug/kg	50.0		100	80-129	4.35	30	
1,1,1-Trichloroethane	54.3			ug/kg	50.0		109	78-133	3.44	30	
1,1-Dichloropropene	53.6			ug/kg	50.0		107	79-120	1.89	30	
Carbon tetrachloride	55.1			ug/kg	50.0		110	71-129	2.23	30	
1,2-Dichloroethane	47.1			ug/kg	50.0		94.1	76-120	0.48	30	
Benzene	52.5			ug/kg	50.0		105	80-120	0.33	30	
Trichloroethene	53.4			ug/kg	50.0		107	80-120	1.71	30	
1,2-Dichloropropane	49.0			ug/kg	50.0		98.0	79-120	0.05	30	
Bromodichloromethane	50.5			ug/kg	50.0		101	80-122	2.33	30	
Dibromomethane	49.9			ug/kg	50.0		99.8	80-120	1.55	30	
2-Chloroethyl vinyl ether	49.1			ug/kg	50.0		98.3	51-129	4.28	30	
4-Methyl-2-Pentanone	234			ug/kg	250		93.4	73-121	1.58	30	
cis-1,3-Dichloropropene	51.0			ug/kg	50.0		102	80-120	2.95	30	
Toluene	52.1			ug/kg	50.0		104	75-120	0.93	30	
trans-1,3-Dichloropropene	50.6			ug/kg	50.0		101	80-124	2.53	30	
2-Hexanone	249			ug/kg	250		99.6	68-122	1.29	30	
1,1,2-Trichloroethane	47.2			ug/kg	50.0		94.3	79-120	1.63	30	
1,3-Dichloropropane	48.9			ug/kg	50.0		97.9	78-120	6.70	30	
Tetrachloroethene	57.2			ug/kg	50.0		114	74-124	0.63	30	
Dibromochloromethane	50.0			ug/kg	50.0		100	74-125	2.40	30	
1,2-Dibromoethane	46.2			ug/kg	50.0		92.4	80-120	5.65	30	
Chlorobenzene	53.4			ug/kg	50.0		107	78-120	0.87	30	
Ethylbenzene	55.9			ug/kg	50.0		112	80-125	2.61	30	
1,1,1,2-Tetrachloroethane	52.7			ug/kg	50.0		105	80-120	2.65	30	
m,p-Xylene	109			ug/kg	100		109	76-121	2.22	30	
o-Xylene	53.5			ug/kg	50.0		107	67-132	0.12	30	
Xylenes, total	162			ug/kg	150		108	67-132	1.44	30	

Volatile Organic Compounds - Quality Control

Batch BFJ0269 - No Prep - Volatiles

Instrument: NT5 Analyst: PB

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS Dup (BFJ0269-BSD1)					Prepared: 13-Oct-2017 Analyzed: 13-Oct-2017 12:15						
Styrene	53.3			ug/kg	50.0		107	80-120	2.35	30	
Bromoform	45.7			ug/kg	50.0		91.3	64-128	5.44	30	
1,1,2,2-Tetrachloroethane	49.5			ug/kg	50.0		99.1	74-120	4.03	30	
1,2,3-Trichloropropane	49.5			ug/kg	50.0		99.0	73-120	4.24	30	
trans-1,4-Dichloro 2-Butene	51.0			ug/kg	50.0		102	65-125	3.38	30	
n-Propylbenzene	58.0			ug/kg	50.0		116	72-124	3.07	30	
Bromobenzene	52.3			ug/kg	50.0		105	76-120	1.27	30	
Isopropyl Benzene	56.7			ug/kg	50.0		113	74-121	0.16	30	
2-Chlorotoluene	54.1			ug/kg	50.0		108	75-120	0.57	30	
4-Chlorotoluene	58.1			ug/kg	50.0		116	69-124	2.92	30	
t-Butylbenzene	56.3			ug/kg	50.0		113	72-122	0.89	30	
1,3,5-Trimethylbenzene	57.5			ug/kg	50.0		115	74-122	1.58	30	
1,2,4-Trimethylbenzene	56.6			ug/kg	50.0		113	75-121	0.49	30	
s-Butylbenzene	58.6			ug/kg	50.0		117	70-128	3.09	30	
4-Isopropyl Toluene	60.6			ug/kg	50.0		121	75-125	2.96	30	
1,3-Dichlorobenzene	55.8			ug/kg	50.0		112	75-120	1.92	30	
1,4-Dichlorobenzene	52.7			ug/kg	50.0		105	73-120	1.54	30	
n-Butylbenzene	62.9			ug/kg	50.0		126	73-130	7.61	30	
1,2-Dichlorobenzene	52.4			ug/kg	50.0		105	76-120	1.54	30	
1,2-Dibromo-3-chloropropane	46.8			ug/kg	50.0		93.6	65-126	5.14	30	
1,2,4-Trichlorobenzene	62.1			ug/kg	50.0		124	66-140	10.00	30	
Hexachloro-1,3-Butadiene	62.1			ug/kg	50.0		124	67-133	6.61	30	
Naphthalene	51.2			ug/kg	50.0		102	69-125	2.87	30	
1,2,3-Trichlorobenzene	56.3			ug/kg	50.0		113	68-132	0.85	30	
Dichlorodifluoromethane	60.8			ug/kg	50.0		122	67-142	16.10	30	
Methyl tert-butyl Ether	51.3			ug/kg	50.0		103	79-127	3.57	30	
2-Pentanone	239			ug/kg	250		95.7	77-120	6.28	30	
Surrogate: 1,2-Dichloroethane-d4		50.1		ug/kg	*50.0*		*100*	*80-149*			
Surrogate: Toluene-d8		49.2		ug/kg	*50.0*		*98.5*	*77-120*			
Surrogate: 4-Bromofluorobenzene		49.9		ug/kg	*50.0*		*99.8*	*80-120*			
Surrogate: 1,2-Dichlorobenzene-d4		49.9		ug/kg	*50.0*		*99.8*	*80-120*			

The Boeing Company	Project: Boeing Renton 4-79	
P.O. Box 3707 MC 9U4-26	Project Number: [none]	**Reported:**
Seattle WA, 98124	Project Manager: Carl Bach	06-Nov-2017 10:09

Volatile Organic Compounds - Quality Control

Batch BFJ0290 - EPA 5030 (Purge and Trap)

Instrument: NT2 Analyst: LH

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BFJ0290-BLK1)				Prepared: 11-Oct-2017 Analyzed: 11-Oct-2017 09:19						
Gasoline Range Organics (Tol-Nap)	ND	5000	ug/kg							U
Surrogate: Toluene-d8	4.78		ug/kg	*5.00*		*95.6*	*80-120*			
Surrogate: 4-Bromofluorobenzene	4.90		ug/kg	*5.00*		*98.0*	*78-123*			
LCS (BFJ0290-BS1)				Prepared: 11-Oct-2017 Analyzed: 11-Oct-2017 07:33						
Gasoline Range Organics (Tol-Nap)	51600		ug/kg	50000		103	70-121			
Surrogate: Toluene-d8	4.75		ug/kg	*5.00*		*95.0*	*80-120*			
Surrogate: 4-Bromofluorobenzene	4.96		ug/kg	*5.00*		*99.2*	*78-123*			
LCS Dup (BFJ0290-BSD1)				Prepared: 11-Oct-2017 Analyzed: 11-Oct-2017 08:14						
Gasoline Range Organics (Tol-Nap)	53400		ug/kg	50000		107	70-121	3.51	30	
Surrogate: Toluene-d8	4.77		ug/kg	*5.00*		*95.3*	*80-120*			
Surrogate: 4-Bromofluorobenzene	5.08		ug/kg	*5.00*		*102*	*78-123*			

4611 S 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6202

The Boeing Company	Project: Boeing Renton 4-79	
P.O. Box 3707 MC 9U4-26	Project Number: [none]	Reported:
Seattle WA, 98124	Project Manager: Carl Bach	06-Nov-2017 10:09

Petroleum Hydrocarbons - Quality Control

Batch BFJ0213 - EPA 3546 (Microwave)

Instrument: FID4 Analyst: ML

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BFJ0213-BLK1)				Prepared: 09-Oct-2017 Analyzed: 16-Oct-2017 11:58						
Diesel Range Organics (C12-C24)	ND	5.00	mg/kg							U
Motor Oil Range Organics (C24-C38)	ND	10.0	mg/kg							U
Surrogate: o-Terphenyl	19.8		mg/kg	*22.5*		*87.8*	*50-150*			
LCS (BFJ0213-BS1)				Prepared: 09-Oct-2017 Analyzed: 16-Oct-2017 12:21						
Diesel Range Organics (C12-C24)	115	5.00	mg/kg	150		76.5	63-120			
Surrogate: o-Terphenyl	21.5		mg/kg	*22.5*		*95.5*	*50-150*			

4611 S 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6202

The Boeing Company	Project: Boeing Renton 4-79	
P.O. Box 3707 MC 9U4-26	Project Number: [none]	**Reported:**
Seattle WA, 98124	Project Manager: Carl Bach	06-Nov-2017 10:09

Certified Analyses included in this Report

Analyte	Certifications
EPA 8260C in Solid	
Chloromethane	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
Vinyl Chloride	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
Bromomethane	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
Chloroethane	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
Trichlorofluoromethane	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
Acrolein	WADOE,DoD-ELAP,NELAP,CALAP
1,1,2-Trichloro-1,2,2-Trifluoroethane	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
Acetone	WADOE,DoD-ELAP,NELAP,CALAP
1,1-Dichloroethene	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
Bromoethane	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
Iodomethane	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
Methylene Chloride	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
Acrylonitrile	WADOE,DoD-ELAP,NELAP,CALAP
Carbon Disulfide	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
trans-1,2-Dichloroethene	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
Vinyl Acetate	WADOE,DoD-ELAP,NELAP,CALAP
1,1-Dichloroethane	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
2-Butanone	WADOE,DoD-ELAP,NELAP,CALAP
2,2-Dichloropropane	WADOE,DoD-ELAP,NELAP,CALAP
cis-1,2-Dichloroethene	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
Chloroform	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
Bromochloromethane	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
1,1,1-Trichloroethane	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
1,1-Dichloropropene	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
Carbon tetrachloride	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
1,2-Dichloroethane	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
Benzene	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
Trichloroethene	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
1,2-Dichloropropane	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
Bromodichloromethane	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
Dibromomethane	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
2-Chloroethyl vinyl ether	WADOE,DoD-ELAP,NELAP
4-Methyl-2-Pentanone	WADOE,DoD-ELAP,NELAP,CALAP
cis-1,3-Dichloropropene	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
Toluene	WADOE,DoD-ELAP,NELAP,CALAP,ADEC

4611 S 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6202

The Boeing Company	Project: Boeing Renton 4-79	
P.O. Box 3707 MC 9U4-26	Project Number: [none]	Reported:
Seattle WA, 98124	Project Manager: Carl Bach	06-Nov-2017 10:09

trans-1,3-Dichloropropene	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
2-Hexanone	WADOE,DoD-ELAP,NELAP,CALAP
1,1,2-Trichloroethane	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
1,3-Dichloropropane	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
Tetrachloroethene	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
Dibromochloromethane	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
1,2-Dibromoethane	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
Chlorobenzene	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
Ethylbenzene	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
1,1,1,2-Tetrachloroethane	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
m,p-Xylene	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
o-Xylene	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
Xylenes, total	WADOE
Styrene	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
Bromoform	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
1,1,2,2-Tetrachloroethane	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
1,2,3-Trichloropropane	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
trans-1,4-Dichloro 2-Butene	WADOE,DoD-ELAP,NELAP
n-Propylbenzene	WADOE,DoD-ELAP,NELAP,CALAP
Bromobenzene	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
Isopropyl Benzene	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
2-Chlorotoluene	WADOE,DoD-ELAP,NELAP,CALAP
4-Chlorotoluene	WADOE,DoD-ELAP,NELAP,CALAP
t-Butylbenzene	WADOE,DoD-ELAP,NELAP,CALAP
1,3,5-Trimethylbenzene	WADOE,DoD-ELAP,NELAP,CALAP
1,2,4-Trimethylbenzene	WADOE,DoD-ELAP,NELAP,CALAP
s-Butylbenzene	WADOE,DoD-ELAP,NELAP,CALAP
4-Isopropyl Toluene	WADOE,DoD-ELAP,NELAP,CALAP
1,3-Dichlorobenzene	WADOE,DoD-ELAP,NELAP,CALAP
1,4-Dichlorobenzene	WADOE,DoD-ELAP,NELAP,CALAP
n-Butylbenzene	WADOE,DoD-ELAP,NELAP,CALAP
1,2-Dichlorobenzene	WADOE,DoD-ELAP,NELAP,CALAP
1,2-Dibromo-3-chloropropane	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
1,2,4-Trichlorobenzene	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
Hexachloro-1,3-Butadiene	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
Naphthalene	WADOE,DoD-ELAP,NELAP,CALAP
1,2,3-Trichlorobenzene	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
Dichlorodifluoromethane	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
Methyl tert-butyl Ether	WADOE,DoD-ELAP,NELAP,CALAP
n-Hexane	WADOE

4611 S 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6202

2-Pentanone	WADOE
Dibromofluoromethane	WADOE
4-Bromofluorobenzene	WADOE

NWTPH-Dx in Solid

Diesel Range Organics (C12-C24)	DoD-ELAP,NELAP,WADOE
Diesel Range Organics (C10-C25)	DoD-ELAP,NELAP,WADOE
Diesel Range Organics (Tol-C18)	DoD-ELAP,NELAP,WADOE
Diesel Range Organics (C10-24)	DoD-ELAP,NELAP,WADOE
Diesel Range Organics (C10-C28)	DoD-ELAP,NELAP,WADOE
Motor Oil Range Organics (C24-C38)	DoD-ELAP,NELAP,WADOE
Motor Oil Range Organics (C25-C36)	DoD-ELAP,NELAP,WADOE
Motor Oil Range Organics (C24-C40)	DoD-ELAP,NELAP,WADOE
Mineral Oil Range Organics (C16-C28)	DoD-ELAP,NELAP,WADOE
Mineral Spirits Range Organics (Tol-C12)	DoD-ELAP,NELAP,WADOE
JP8 Range Organics (C8-C18)	DoD-ELAP,NELAP,WADOE
JP5 Range Organics (C10-C16)	DoD-ELAP,NELAP,WADOE
JP4 Range Organics (Tol-C14)	DoD-ELAP,NELAP,WADOE
Jet-A Range Organics (C10-C18)	DoD-ELAP,NELAP,WADOE
Kerosene Range Organics (Tol-C18)	DoD-ELAP,NELAP,WADOE
Stoddard Range Organics (C8-C12)	DoD-ELAP,NELAP,WADOE
Creosote Range Organics (C12-C22)	DoD-ELAP,NELAP,WADOE
Bunker C Range Organics (C10-C38)	DoD-ELAP,NELAP,WADOE
Transformer Oil Range Organics (C12-C28)	DoD-ELAP,NELAP,WADOE

Code	Description	Number	Expires
ADEC	Alaska Dept of Environmental Conservation	UST-033	09/01/2017
CALAP	California Department of Public Health CAELAP	2748	02/28/2018
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

4611 S 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6202

Notes and Definitions

U	This analyte is not detected above the applicable reporting or detection limit.
Q	Indicates a detected analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20% RSD, <20% drift or minimum RRF)
J	Estimated concentration value detected below the reporting limit.
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.

Analytical Resources, Incorporated
Analytical Chemists and Consultants

14 December 2017

Jennifer Parsons
The Boeing Company
PO Box 3703 MS 2R-96
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)
17K0648	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 reqirements 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.

Cert# 100006

PJLA Testing
Accreditation # 66169

Chain of Custody Record & Laboratory Analysis Request

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

ARI Assigned Number: 17K0648	Turn-around Requested: Standard	Page: 1	of 2
ARI Client Company: Boeing	Phone: (206) 898-0438	Date: 11/29/17	Ice Present?
Client Contact: Carl Bach		No. of Coolers: 1	Cooler Temps:
Client Project Name: Renton 4-79			
Client Project #:	Samplers: J Nestor M Pagel		

Sample ID	Date	Time	Matrix	No. Containers	VOCs-8260, ~~Benzene~~	Nitrate	Nitrite	Sulfate					Notes/Comments
B78-21-15-112917	11/29/17	1307	Aq	4	X	X	X	X					15'
B78-13-15-112917	11/29/17	1345	Aq	4	X	X	X	X					15'
GW-2445-13-112917	11/29/17	1413	Aq	4	X	X	X	X					13'
B78-17-15-112917	11/29/17	1442	Aq	4	X	X	X	X					15'
B78-18-15-112917	11/29/17	1515	Aq	4	X	X	X	X					15
B78-19-15-112917	11/29/17	1554	Aq	4	X	X	X	X					15'
B78-20-15-113017	11/30/17	0728	Aq	4	X	X	X	X					15'
GW-0315-23-113017	11/30/17	0805	Aq	4	X	X	X	X					23'
B78-11-8-113017	11/30/17	0847	Aq	4	X	X	X	X					8'
DUP-01-112917	11/29/17	0800	Aq	4	X	X	X	X					

Comments/Special Instructions	Relinquished by:	Received by:	Relinquished by:	Received by:
	(Signature) [signature]	(Signature) [signature]	(Signature)	(Signature)
	Printed Name: Michael Pagel	Printed Name: Stephanie Fisher	Printed Name:	Printed Name:
	Company: Calibre	Company: ARI	Company:	Company:
	Date & Time: 11/30/17 @ 1002	Date & Time: 11/30/17 1002	Date & Time:	Date & Time:

Chain of Custody Record & Laboratory Analysis Request

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

ARI Assigned Number: 17K0648	Turn-around Requested: Standard	Page: 2 of 2	
ARI Client Company: Boeing	Phone: 206 898-0138	Date: 11/30/17	Ice Present?
Client Contact: Carl Bach		No. of Coolers: 1	Cooler Temps:
Client Project Name: Renton 4-79			
Client Project #:	Samplers: J Vargas M Pagel		

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: VOCs								Notes/Comments
Trip Blank	11/29/17		Air	1	X								

Comments/Special Instructions	Relinquished by:	Received by:	Relinquished by:	Received by:
	(Signature) [signature]	(Signature) [signature]	(Signature)	(Signature)
	Printed Name: Michael Pagel	Printed Name: Stephanie Fisher	Printed Name:	Printed Name:
	Company: Calibre	Company: ARI	Company:	Company:
	Date & Time: 11/30/17 @ 1002	Date & Time: 11/30/17 1002	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.

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Boeing

COC No(s): NA

Assigned ARI Job No: 17K0648

Project Name:

Delivered by: Fed-Ex UPS Courier Hand Delivered Other:

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) 3.4

Time:

If cooler temperature is out of compliance fill out form 00070F

Temp Gun ID#: D002565

Cooler Accepted by: SF Date: 11/30/17 Time: 1002

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	11/29/17	

Was Sample Split by ARI : NA YES Date/Time: Equipment: Split by:

Samples Logged by: SF Date: 11/30/17 Time: 1214

*** 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 Air Bubbles ~2mm	Peabubbles' 2-4 mm	LARGE Air Bubbles > 4 mm	
			Small → "sm" (< 2 mm)
			Peabubbles → "pb" (2 to < 4 mm)
			Large → "lg" (4 to < 6 mm)
			Headspace → "hs" (> 6 mm)

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Analytical Report

The Boeing Company	Project: Boeing Renton Regional GW Building 4-78/79	
PO Box 3703 MS 2R-96	Project Number: Boeing Renton Regional GW Building 4-78/79	**Reported:**
Seattle WA, 98124	Project Manager: Jennifer Parsons	14-Dec-2017 09:10

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
B78-21-15-112917	17K0648-01	Water	29-Nov-2017 13:07	30-Nov-2017 10:02
B78-13-15-112917	17K0648-02	Water	29-Nov-2017 13:45	30-Nov-2017 10:02
GW-2445-13-112917	17K0648-03	Water	29-Nov-2017 14:13	30-Nov-2017 10:02
B78-17-15-112917	17K0648-04	Water	29-Nov-2017 14:42	30-Nov-2017 10:02
B78-18-15-112917	17K0648-05	Water	29-Nov-2017 15:15	30-Nov-2017 10:02
B78-19-15-112917	17K0648-06	Water	29-Nov-2017 15:54	30-Nov-2017 10:02
B78-20-15-113017	17K0648-07	Water	30-Nov-2017 07:28	30-Nov-2017 10:02
GW-0315-23-113017	17K0648-08	Water	30-Nov-2017 08:05	30-Nov-2017 10:02
B78-11-8-113017	17K0648-09	Water	30-Nov-2017 08:47	30-Nov-2017 10:02
DUP-01-112917	17K0648-10	Water	29-Nov-2017 08:00	30-Nov-2017 10:02
Trip Blank	17K0648-11	Water	29-Nov-2017 00:00	30-Nov-2017 10:02

4611 S 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6202

The Boeing Company	Project: Boeing Renton Regional GW Building 4-78/79	
PO Box 3703 MS 2R-96	Project Number: Boeing Renton Regional GW Building 4-78/79	**Reported:**
Seattle WA, 98124	Project Manager: Jennifer Parsons	14-Dec-2017 09:10

Case Narrative

<u>Volatiles - EPA Method SW8260C</u>

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.

The method blank(s) were clean at the reporting limits.

The LCS/LCSD percent recoveries and RPD were within control limits.

<u>Wet Chemistry</u>

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.

Analytical Report

The Boeing Company	Project: Boeing Renton Regional GW Building 4-78/79	
PO Box 3703 MS 2R-96	Project Number: Boeing Renton Regional GW Building 4-78/79	**Reported:**
Seattle WA, 98124	Project Manager: Jennifer Parsons	14-Dec-2017 09:10

B78-21-15-112917

17K0648-01 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 11/29/2017 13:07

Instrument: NT2 — Analyzed: 30-Nov-2017 13:13

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)
Preparation Batch: BFK0766 — Sample Size: 10 mL
Prepared: 30-Nov-2017 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.20	**0.26**	ug/L	
cis-1,2-Dichloroethene	156-59-2	1	0.20	**0.31**	ug/L	M
Benzene	71-43-2	1	0.20	**2.27**	ug/L	
Trichloroethene	79-01-6	1	0.20	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*118*	*%*	
Surrogate: Toluene-d8			*80-120 %*	*101*	*%*	
Surrogate: 4-Bromofluorobenzene			*80-120 %*	*92.2*	*%*	
Surrogate: 1,2-Dichlorobenzene-d4			*80-120 %*	*97.1*	*%*	

4611 S 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6202

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Analytical Report

The Boeing Company	Project: Boeing Renton Regional GW Building 4-78/79	
PO Box 3703 MS 2R-96	Project Number: Boeing Renton Regional GW Building 4-78/79	**Reported:**
Seattle WA, 98124	Project Manager: Jennifer Parsons	14-Dec-2017 09:10

B78-21-15-112917

17K0648-01 (Water)

Wet Chemistry

Method: EPA 300.0 Sampled: 11/29/2017 13:07

Instrument: DX500 Analyzed: 30-Nov-2017 17:47

Sample Preparation: Preparation Method: No Prep Wet Chem

Preparation Batch: BFK0784 Sample Size: 5 mL

Prepared: 30-Nov-2017 Final Volume: 5 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Sulfate	14808-79-8	10	1.00	**4.43**	mg/L	D

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Analytical Report

The Boeing Company	Project: Boeing Renton Regional GW Building 4-78/79	
PO Box 3703 MS 2R-96	Project Number: Boeing Renton Regional GW Building 4-78/79	**Reported:**
Seattle WA, 98124	Project Manager: Jennifer Parsons	14-Dec-2017 09:10

B78-21-15-112917

17K0648-01RE1 (Water)

Wet Chemistry

Method: EPA 300.0 — Sampled: 11/29/2017 13:07

Instrument: DX500 — Analyzed: 01-Dec-2017 10:36

Sample Preparation: Preparation Method: No Prep Wet Chem
Preparation Batch: BFK0784 — Sample Size: 5 mL
Prepared: 30-Nov-2017 — Final Volume: 5 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Nitrate-N	14797-55-8	1	0.100	**0.101**	mg-N/L	

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Nitrite-N	14797-65-0	1	0.100	ND	mg-N/L	U

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Analytical Report

The Boeing Company	Project: Boeing Renton Regional GW Building 4-78/79	
PO Box 3703 MS 2R-96	Project Number: Boeing Renton Regional GW Building 4-78/79	**Reported:**
Seattle WA, 98124	Project Manager: Jennifer Parsons	14-Dec-2017 09:10

B78-13-15-112917

17K0648-02 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 11/29/2017 13:45

Instrument: NT2 — Analyzed: 30-Nov-2017 13:33

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)
Preparation Batch: BFK0766 — Sample Size: 10 mL
Prepared: 30-Nov-2017 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.20	**2.02**	ug/L	
cis-1,2-Dichloroethene	156-59-2	1	0.20	**1.29**	ug/L	
Benzene	71-43-2	1	0.20	**9.92**	ug/L	
Trichloroethene	79-01-6	1	0.20	**0.24**	ug/L	
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*109*	*%*	
Surrogate: Toluene-d8			*80-120 %*	*97.0*	*%*	
Surrogate: 4-Bromofluorobenzene			*80-120 %*	*92.8*	*%*	
Surrogate: 1,2-Dichlorobenzene-d4			*80-120 %*	*101*	*%*	

4611 S 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6202

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Analytical Report

The Boeing Company	Project: Boeing Renton Regional GW Building 4-78/79	
PO Box 3703 MS 2R-96	Project Number: Boeing Renton Regional GW Building 4-78/79	**Reported:**
Seattle WA, 98124	Project Manager: Jennifer Parsons	14-Dec-2017 09:10

B78-13-15-112917

17K0648-02RE1 (Water)

Wet Chemistry

Method: EPA 300.0 | Sampled: 11/29/2017 13:45

Instrument: DX500 | Analyzed: 01-Dec-2017 10:53

Sample Preparation: Preparation Method: No Prep Wet Chem
Preparation Batch: BFK0784 | Sample Size: 5 mL
Prepared: 30-Nov-2017 | Final Volume: 5 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Nitrate-N	14797-55-8	1	0.100	**0.135**	mg-N/L	

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	**0.652**	mg/L	

4611 S 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6202

The Boeing Company	Project: Boeing Renton Regional GW Building 4-78/79	
PO Box 3703 MS 2R-96	Project Number: Boeing Renton Regional GW Building 4-78/79	**Reported:**
Seattle WA, 98124	Project Manager: Jennifer Parsons	14-Dec-2017 09:10

GW-2445-13-112917

17K0648-03 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 11/29/2017 14:13

Instrument: NT2 — Analyzed: 30-Nov-2017 13:53

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)
Preparation Batch: BFK0766 — Sample Size: 10 mL
Prepared: 30-Nov-2017 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.20	**5.68**	ug/L	
cis-1,2-Dichloroethene	156-59-2	1	0.20	**8.06**	ug/L	
Benzene	71-43-2	1	0.20	**7.97**	ug/L	
Trichloroethene	79-01-6	1	0.20	**3.48**	ug/L	
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*107*	*%*	
Surrogate: Toluene-d8			*80-120 %*	*97.2*	*%*	
Surrogate: 4-Bromofluorobenzene			*80-120 %*	*92.6*	*%*	
Surrogate: 1,2-Dichlorobenzene-d4			*80-120 %*	*103*	*%*	

4611 S 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6202

Analytical Report

The Boeing Company	Project: Boeing Renton Regional GW Building 4-78/79	
PO Box 3703 MS 2R-96	Project Number: Boeing Renton Regional GW Building 4-78/79	**Reported:**
Seattle WA, 98124	Project Manager: Jennifer Parsons	14-Dec-2017 09:10

GW-2445-13-112917

17K0648-03RE1 (Water)

Wet Chemistry

Method: EPA 300.0 — Sampled: 11/29/2017 14:13

Instrument: DX500 — Analyzed: 01-Dec-2017 11:10

Sample Preparation: Preparation Method: No Prep Wet Chem
Preparation Batch: BFK0784 — Sample Size: 5 mL
Prepared: 30-Nov-2017 — 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	**0.753**	mg/L	

4611 S. 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6202

The Boeing Company	Project: Boeing Renton Regional GW Building 4-78/79	
PO Box 3703 MS 2R-96	Project Number: Boeing Renton Regional GW Building 4-78/79	**Reported:**
Seattle WA, 98124	Project Manager: Jennifer Parsons	14-Dec-2017 09:10

B78-17-15-112917

17K0648-04 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 11/29/2017 14:42

Instrument: NT2 — Analyzed: 30-Nov-2017 14:13

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)
Preparation Batch: BFK0766 — Sample Size: 10 mL
Prepared: 30-Nov-2017 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.20	**1.31**	ug/L	
cis-1,2-Dichloroethene	156-59-2	1	0.20	**0.81**	ug/L	
Benzene	71-43-2	1	0.20	**6.52**	ug/L	
Trichloroethene	79-01-6	1	0.20	**1.25**	ug/L	
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*115*	*%*	
Surrogate: Toluene-d8			*80-120 %*	*100*	*%*	
Surrogate: 4-Bromofluorobenzene			*80-120 %*	*90.1*	*%*	
Surrogate: 1,2-Dichlorobenzene-d4			*80-120 %*	*102*	*%*	

Analytical Report

The Boeing Company	Project: Boeing Renton Regional GW Building 4-78/79	
PO Box 3703 MS 2R-96	Project Number: Boeing Renton Regional GW Building 4-78/79	**Reported:**
Seattle WA, 98124	Project Manager: Jennifer Parsons	14-Dec-2017 09:10

B78-17-15-112917

17K0648-04 (Water)

Wet Chemistry

Method: EPA 300.0
Sampled: 11/29/2017 14:42

Instrument: DX500
Analyzed: 30-Nov-2017 18:37

Sample Preparation: Preparation Method: No Prep Wet Chem
Preparation Batch: BFK0784 Sample Size: 5 mL
Prepared: 30-Nov-2017 Final Volume: 5 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Sulfate	14808-79-8	10	1.00	**17.1**	mg/L	D

The Boeing Company	Project: Boeing Renton Regional GW Building 4-78/79	
PO Box 3703 MS 2R-96	Project Number: Boeing Renton Regional GW Building 4-78/79	**Reported:**
Seattle WA, 98124	Project Manager: Jennifer Parsons	14-Dec-2017 09:10

B78-17-15-112917

17K0648-04RE1 (Water)

Wet Chemistry

Method: EPA 300.0 — Sampled: 11/29/2017 14:42

Instrument: DX500 — Analyzed: 01-Dec-2017 11:27

Sample Preparation: Preparation Method: No Prep Wet Chem
Preparation Batch: BFK0784 — Sample Size: 5 mL
Prepared: 30-Nov-2017 — 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

4611 S 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6202

Analytical Report

The Boeing Company	Project: Boeing Renton Regional GW Building 4-78/79	
PO Box 3703 MS 2R-96	Project Number: Boeing Renton Regional GW Building 4-78/79	**Reported:**
Seattle WA, 98124	Project Manager: Jennifer Parsons	14-Dec-2017 09:10

B78-18-15-112917

17K0648-05 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 11/29/2017 15:15

Instrument: NT2 — Analyzed: 30-Nov-2017 14:34

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)
Preparation Batch: BFK0766 — Sample Size: 10 mL
Prepared: 30-Nov-2017 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.20	**0.35**	ug/L	M
cis-1,2-Dichloroethene	156-59-2	1	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.20	**3.10**	ug/L	
Trichloroethene	79-01-6	1	0.20	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*111*	*%*	
Surrogate: Toluene-d8			*80-120 %*	*101*	*%*	
Surrogate: 4-Bromofluorobenzene			*80-120 %*	*93.4*	*%*	
Surrogate: 1,2-Dichlorobenzene-d4			*80-120 %*	*100*	*%*	

4611 S 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6202

Analytical Report

The Boeing Company	Project: Boeing Renton Regional GW Building 4-78/79	
PO Box 3703 MS 2R-96	Project Number: Boeing Renton Regional GW Building 4-78/79	**Reported:**
Seattle WA, 98124	Project Manager: Jennifer Parsons	14-Dec-2017 09:10

B78-18-15-112917

17K0648-05RE1 (Water)

Wet Chemistry

Method: EPA 300.0 — Sampled: 11/29/2017 15:15

Instrument: DX500 — Analyzed: 01-Dec-2017 11:43

Sample Preparation: Preparation Method: No Prep Wet Chem
Preparation Batch: BFK0784 — Sample Size: 5 mL
Prepared: 30-Nov-2017 — 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	**0.343**	mg/L	

4611 S. 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6202

Analytical Report

The Boeing Company	Project: Boeing Renton Regional GW Building 4-78/79	
PO Box 3703 MS 2R-96	Project Number: Boeing Renton Regional GW Building 4-78/79	**Reported:**
Seattle WA, 98124	Project Manager: Jennifer Parsons	14-Dec-2017 09:10

B78-19-15-112917

17K0648-06 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 11/29/2017 15:54

Instrument: NT2 — Analyzed: 30-Nov-2017 14:54

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)
Preparation Batch: BFK0766 — Sample Size: 10 mL
Prepared: 30-Nov-2017 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.20	**0.27**	ug/L	M
cis-1,2-Dichloroethene	156-59-2	1	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.20	**0.36**	ug/L	
Trichloroethene	79-01-6	1	0.20	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*113*	*%*	
Surrogate: Toluene-d8			*80-120 %*	*96.3*	*%*	
Surrogate: 4-Bromofluorobenzene			*80-120 %*	*92.7*	*%*	
Surrogate: 1,2-Dichlorobenzene-d4			*80-120 %*	*100*	*%*	

4611 S 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6202

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Analytical Report

The Boeing Company	Project: Boeing Renton Regional GW Building 4-78/79	
PO Box 3703 MS 2R-96	Project Number: Boeing Renton Regional GW Building 4-78/79	**Reported:**
Seattle WA, 98124	Project Manager: Jennifer Parsons	14-Dec-2017 09:10

B78-19-15-112917

17K0648-06RE1 (Water)

Wet Chemistry

Method: EPA 300.0 — Sampled: 11/29/2017 15:54

Instrument: DX500 — Analyzed: 01-Dec-2017 12:00

Sample Preparation: Preparation Method: No Prep Wet Chem
Preparation Batch: BFK0784 — Sample Size: 5 mL
Prepared: 30-Nov-2017 — 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	**0.255**	mg/L	

The Boeing Company	Project: Boeing Renton Regional GW Building 4-78/79	
PO Box 3703 MS 2R-96	Project Number: Boeing Renton Regional GW Building 4-78/79	**Reported:**
Seattle WA, 98124	Project Manager: Jennifer Parsons	14-Dec-2017 09:10

B78-20-15-113017

17K0648-07 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 11/30/2017 07:28

Instrument: NT2 — Analyzed: 30-Nov-2017 15:14

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)
Preparation Batch: BFK0766 — Sample Size: 10 mL
Prepared: 30-Nov-2017 — 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	**25.9**	ug/L	
Trichloroethene	79-01-6	1	0.20	**0.41**	ug/L	
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*98.8*	*%*	
Surrogate: Toluene-d8			*80-120 %*	*97.7*	*%*	
Surrogate: 4-Bromofluorobenzene			*80-120 %*	*96.5*	*%*	
Surrogate: 1,2-Dichlorobenzene-d4			*80-120 %*	*101*	*%*	

4611 S 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6202

The Boeing Company	Project: Boeing Renton Regional GW Building 4-78/79	
PO Box 3703 MS 2R-96	Project Number: Boeing Renton Regional GW Building 4-78/79	**Reported:**
Seattle WA, 98124	Project Manager: Jennifer Parsons	14-Dec-2017 09:10

B78-20-15-113017

17K0648-07 (Water)

Wet Chemistry

Method: EPA 300.0 — Sampled: 11/30/2017 07:28

Instrument: DX500 — Analyzed: 30-Nov-2017 19:28

Sample Preparation: Preparation Method: No Prep Wet Chem
Preparation Batch: BFK0784 — Sample Size: 5 mL
Prepared: 30-Nov-2017 — Final Volume: 5 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Nitrate-N	14797-55-8	10	1.00	**2.93**	mg-N/L	D

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Analytical Report

The Boeing Company	Project: Boeing Renton Regional GW Building 4-78/79	
PO Box 3703 MS 2R-96	Project Number: Boeing Renton Regional GW Building 4-78/79	**Reported:**
Seattle WA, 98124	Project Manager: Jennifer Parsons	14-Dec-2017 09:10

B78-20-15-113017

17K0648-07RE1 (Water)

Wet Chemistry

Method: EPA 300.0 Sampled: 11/30/2017 07:28
Instrument: DX500 Analyzed: 01-Dec-2017 12:17

Sample Preparation: Preparation Method: No Prep Wet Chem
Preparation Batch: BFK0784 Sample Size: 5 mL
Prepared: 30-Nov-2017 Final Volume: 5 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Nitrite-N	14797-65-0	1	0.100	ND	mg-N/L	U

Analytical Report

The Boeing Company	Project: Boeing Renton Regional GW Building 4-78/79	
PO Box 3703 MS 2R-96	Project Number: Boeing Renton Regional GW Building 4-78/79	**Reported:**
Seattle WA, 98124	Project Manager: Jennifer Parsons	14-Dec-2017 09:10

B78-20-15-113017

17K0648-07RE2 (Water)

Wet Chemistry

Method: EPA 300.0 Sampled: 11/30/2017 07:28

Instrument: DX500 Analyzed: 01-Dec-2017 13:58

Sample Preparation: Preparation Method: No Prep Wet Chem

Preparation Batch: BFK0784 Sample Size: 5 mL

Prepared: 30-Nov-2017 Final Volume: 5 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Sulfate	14808-79-8	50	5.00	**53.9**	mg/L	D

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.

4611 S 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6202

The Boeing Company	Project: Boeing Renton Regional GW Building 4-78/79	
PO Box 3703 MS 2R-96	Project Number: Boeing Renton Regional GW Building 4-78/79	**Reported:**
Seattle WA, 98124	Project Manager: Jennifer Parsons	14-Dec-2017 09:10

GW-0315-23-113017

17K0648-08 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 11/30/2017 08:05

Instrument: NT2 — Analyzed: 30-Nov-2017 15:35

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)
Preparation Batch: BFK0766 Sample Size: 10 mL
Prepared: 30-Nov-2017 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	**17.6**	ug/L	
Trichloroethene	79-01-6	1	0.20	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*102*	*%*	
Surrogate: Toluene-d8			*80-120 %*	*98.6*	*%*	
Surrogate: 4-Bromofluorobenzene			*80-120 %*	*96.5*	*%*	
Surrogate: 1,2-Dichlorobenzene-d4			*80-120 %*	*101*	*%*	

4611 S 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6202

The Boeing Company	Project: Boeing Renton Regional GW Building 4-78/79	
PO Box 3703 MS 2R-96	Project Number: Boeing Renton Regional GW Building 4-78/79	**Reported:**
Seattle WA, 98124	Project Manager: Jennifer Parsons	14-Dec-2017 09:10

GW-0315-23-113017

17K0648-08 (Water)

Wet Chemistry

Method: EPA 300.0 — Sampled: 11/30/2017 08:05

Instrument: DX500 — Analyzed: 30-Nov-2017 20:18

Sample Preparation: Preparation Method: No Prep Wet Chem
Preparation Batch: BFK0784 — Sample Size: 5 mL
Prepared: 30-Nov-2017 — Final Volume: 5 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Sulfate	14808-79-8	10	1.00	**2.54**	mg/L	D

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Analytical Report

The Boeing Company	Project: Boeing Renton Regional GW Building 4-78/79	
PO Box 3703 MS 2R-96	Project Number: Boeing Renton Regional GW Building 4-78/79	**Reported:**
Seattle WA, 98124	Project Manager: Jennifer Parsons	14-Dec-2017 09:10

GW-0315-23-113017

17K0648-08RE1 (Water)

Wet Chemistry

Method: EPA 300.0 Sampled: 11/30/2017 08:05

Instrument: DX500 Analyzed: 01-Dec-2017 12:34

Sample Preparation: Preparation Method: No Prep Wet Chem
Preparation Batch: BFK0784 Sample Size: 5 mL
Prepared: 30-Nov-2017 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

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Analytical Report

The Boeing Company	Project: Boeing Renton Regional GW Building 4-78/79	
PO Box 3703 MS 2R-96	Project Number: Boeing Renton Regional GW Building 4-78/79	**Reported:**
Seattle WA, 98124	Project Manager: Jennifer Parsons	14-Dec-2017 09:10

B78-11-8-113017

17K0648-09 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 11/30/2017 08:47

Instrument: NT2 — Analyzed: 30-Nov-2017 15:55

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)
Preparation Batch: BFK0766 — Sample Size: 10 mL
Prepared: 30-Nov-2017 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.20	**1.11**	ug/L	
cis-1,2-Dichloroethene	156-59-2	1	0.20	**0.98**	ug/L	
Benzene	71-43-2	1	0.20	**9.66**	ug/L	
Trichloroethene	79-01-6	1	0.20	**0.42**	ug/L	
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*111*	*%*	
Surrogate: Toluene-d8			*80-120 %*	*98.4*	*%*	
Surrogate: 4-Bromofluorobenzene			*80-120 %*	*93.2*	*%*	
Surrogate: 1,2-Dichlorobenzene-d4			*80-120 %*	*104*	*%*	

4611 S 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6202

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Analytical Report

The Boeing Company	Project: Boeing Renton Regional GW Building 4-78/79	
PO Box 3703 MS 2R-96	Project Number: Boeing Renton Regional GW Building 4-78/79	**Reported:**
Seattle WA, 98124	Project Manager: Jennifer Parsons	14-Dec-2017 09:10

B78-11-8-113017

17K0648-09RE1 (Water)

Wet Chemistry

Method: EPA 300.0 — Sampled: 11/30/2017 08:47

Instrument: DX500 — Analyzed: 01-Dec-2017 12:51

Sample Preparation: Preparation Method: No Prep Wet Chem
Preparation Batch: BFK0784 — Sample Size: 5 mL
Prepared: 30-Nov-2017 — 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	**1.94**	mg/L	

4611 S 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6202

The Boeing Company	Project: Boeing Renton Regional GW Building 4-78/79	
PO Box 3703 MS 2R-96	Project Number: Boeing Renton Regional GW Building 4-78/79	**Reported:**
Seattle WA, 98124	Project Manager: Jennifer Parsons	14-Dec-2017 09:10

DUP-01-112917

17K0648-10 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 11/29/2017 08:00

Instrument: NT2 — Analyzed: 30-Nov-2017 16:15

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)

Preparation Batch: BFK0766 — Sample Size: 10 mL

Prepared: 30-Nov-2017 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.20	**0.36**	ug/L	
cis-1,2-Dichloroethene	156-59-2	1	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.20	**2.96**	ug/L	
Trichloroethene	79-01-6	1	0.20	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*112*	*%*	
Surrogate: Toluene-d8			*80-120 %*	*96.5*	*%*	
Surrogate: 4-Bromofluorobenzene			*80-120 %*	*95.4*	*%*	
Surrogate: 1,2-Dichlorobenzene-d4			*80-120 %*	*101*	*%*	

4611 S 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6202

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Analytical Report

The Boeing Company	Project: Boeing Renton Regional GW Building 4-78/79	
PO Box 3703 MS 2R-96	Project Number: Boeing Renton Regional GW Building 4-78/79	**Reported:**
Seattle WA, 98124	Project Manager: Jennifer Parsons	14-Dec-2017 09:10

DUP-01-112917

17K0648-10RE1 (Water)

Wet Chemistry

Method: EPA 300.0 Sampled: 11/29/2017 08:00

Instrument: DX500 Analyzed: 01-Dec-2017 13:07

Sample Preparation: Preparation Method: No Prep Wet Chem
Preparation Batch: BFK0784 Sample Size: 5 mL
Prepared: 30-Nov-2017 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	H, U

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Nitrite-N	14797-65-0	1	0.100	ND	mg-N/L	H, U

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Sulfate	14808-79-8	1	0.100	**1.68**	mg/L	

4611 S 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6202

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Analytical Report

The Boeing Company	Project: Boeing Renton Regional GW Building 4-78/79	
PO Box 3703 MS 2R-96	Project Number: Boeing Renton Regional GW Building 4-78/79	**Reported:**
Seattle WA, 98124	Project Manager: Jennifer Parsons	14-Dec-2017 09:10

Trip Blank

17K0648-11 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 11/29/2017 00:00

Instrument: NT2 — Analyzed: 30-Nov-2017 16:56

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)
Preparation Batch: BFK0766 — Sample Size: 10 mL
Prepared: 30-Nov-2017 — 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 %*	*117*	*%*	
Surrogate: Toluene-d8			*80-120 %*	*97.0*	*%*	
Surrogate: 4-Bromofluorobenzene			*80-120 %*	*89.6*	*%*	
Surrogate: 1,2-Dichlorobenzene-d4			*80-120 %*	*101*	*%*	

4611 S 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6202

The Boeing Company	Project: Boeing Renton Regional GW Building 4-78/79	
PO Box 3703 MS 2R-96	Project Number: Boeing Renton Regional GW Building 4-78/79	**Reported:**
Seattle WA, 98124	Project Manager: Jennifer Parsons	14-Dec-2017 09:10

Volatile Organic Compounds - Quality Control

Batch BFK0766 - EPA 5030 (Purge and Trap)

Instrument: NT2 Analyst: LH

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BFK0766-BLK1)				Prepared: 30-Nov-2017		Analyzed: 30-Nov-2017 09:25				
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	5.69		ug/L	*5.00*		*114*	*80-129*			
Surrogate: Toluene-d8	4.86		ug/L	*5.00*		*97.3*	*80-120*			
Surrogate: 4-Bromofluorobenzene	4.44		ug/L	*5.00*		*88.7*	*80-120*			
Surrogate: 1,2-Dichlorobenzene-d4	5.06		ug/L	*5.00*		*101*	*80-120*			
LCS (BFK0766-BS1)				Prepared: 30-Nov-2017		Analyzed: 30-Nov-2017 08:03				
Vinyl Chloride	11.1	0.20	ug/L	10.0		111	66-133			
cis-1,2-Dichloroethene	10.6	0.20	ug/L	10.0		106	80-121			
Benzene	10.9	0.20	ug/L	10.0		109	80-120			
Trichloroethene	10.3	0.20	ug/L	10.0		103	80-120			
Surrogate: 1,2-Dichloroethane-d4	5.22		ug/L	*5.00*		*104*	*80-129*			
Surrogate: Toluene-d8	5.11		ug/L	*5.00*		*102*	*80-120*			
Surrogate: 4-Bromofluorobenzene	4.81		ug/L	*5.00*		*96.2*	*80-120*			
Surrogate: 1,2-Dichlorobenzene-d4	4.96		ug/L	*5.00*		*99.3*	*80-120*			
LCS Dup (BFK0766-BSD1)				Prepared: 30-Nov-2017		Analyzed: 30-Nov-2017 08:44				
Vinyl Chloride	11.3	0.20	ug/L	10.0		113	66-133	1.29	30	
cis-1,2-Dichloroethene	10.9	0.20	ug/L	10.0		109	80-121	2.38	30	
Benzene	10.9	0.20	ug/L	10.0		109	80-120	0.17	30	
Trichloroethene	10.4	0.20	ug/L	10.0		104	80-120	0.31	30	
Surrogate: 1,2-Dichloroethane-d4	5.34		ug/L	*5.00*		*107*	*80-129*			
Surrogate: Toluene-d8	5.11		ug/L	*5.00*		*102*	*80-120*			
Surrogate: 4-Bromofluorobenzene	4.98		ug/L	*5.00*		*99.6*	*80-120*			
Surrogate: 1,2-Dichlorobenzene-d4	4.98		ug/L	*5.00*		*99.5*	*80-120*			

The Boeing Company	Project: Boeing Renton Regional GW Building 4-78/79	
PO Box 3703 MS 2R-96	Project Number: Boeing Renton Regional GW Building 4-78/79	**Reported:**
Seattle WA, 98124	Project Manager: Jennifer Parsons	14-Dec-2017 09:10

Wet Chemistry - Quality Control

Batch BFK0784 - 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 (BFK0784-BLK1)				Prepared: 30-Nov-2017 Analyzed: 30-Nov-2017 17:13						
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 (BFK0784-BS1)				Prepared: 30-Nov-2017 Analyzed: 30-Nov-2017 17:30						
Nitrate-N	1.51	0.100	mg-N/L	1.50		101	90-110			
Nitrite-N	1.48	0.100	mg-N/L	1.50		98.5	90-110			
Sulfate	1.53	0.100	mg/L	1.50		102	90-110			

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Analytical Report

The Boeing Company	Project: Boeing Renton Regional GW Building 4-78/79	
PO Box 3703 MS 2R-96	Project Number: Boeing Renton Regional GW Building 4-78/79	**Reported:**
Seattle WA, 98124	Project Manager: Jennifer Parsons	14-Dec-2017 09:10

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

The Boeing Company	Project: Boeing Renton Regional GW Building 4-78/79	
PO Box 3703 MS 2R-96	Project Number: Boeing Renton Regional GW Building 4-78/79	Reported:
Seattle WA, 98124	Project Manager: Jennifer Parsons	14-Dec-2017 09:10

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

4611 S 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6202

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	02/28/2018
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

The Boeing Company	Project: Boeing Renton Regional GW Building 4-78/79	
PO Box 3703 MS 2R-96	Project Number: Boeing Renton Regional GW Building 4-78/79	**Reported:**
Seattle WA, 98124	Project Manager: Jennifer Parsons	14-Dec-2017 09:10

Notes and Definitions

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.
H	Hold time violation - Hold time was exceeded.
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.

12/21/2017

Mr. Justin Neste

CALIBRE, Environmental Technology Solutions

20926 Pugh Rd NE

Poulsbo WA 98370

Project Name: Boeing Renton

Project #:

Workorder #: 1712213

Dear Mr. Justin Neste

The following report includes the data for the above referenced project for sample(s) received on 12/11/2017 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

Eurofins Air Toxics, Inc.
180 Blue Ravine Road, Suite B
Folsom, CA 95630
T | 916-985-1000
F | 916-985-1020
www.airtoxics.com

WORK ORDER #: 1712213

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. #**	
FAX:		**PROJECT #**	Boeing Renton
DATE RECEIVED:	12/11/2017	**CONTACT:**	Kelly Buettner
DATE COMPLETED:	12/21/2017		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	5-09-SVE-IN-120817	TO-15	2.2 "Hg	15.4 psi
02A	5-09-SVE-3-120817	TO-15	4.1 "Hg	15 psi
03A	4-78-SVE-IN-120817	TO-15	5.5 "Hg	14.8 psi
04A	4-78-SVE-1-120817	TO-15	3.1 "Hg	14.6 psi
05A	4-78-SVE-6-120817	TO-15	3.1 "Hg	14.7 psi
06A	4-78-SVE-10-120817	TO-15	3.7 "Hg	15.5 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: ______________________ DATE: 12/21/17

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# 1712213

Six 1 Liter Summa Canister samples were received on December 11, 2017. 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.

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

Summary of Detected Compounds
EPA METHOD TO-15 GC/MS FULL SCAN

Client Sample ID: 5-09-SVE-IN-120817

Lab ID#: 1712213-01A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
cis-1,2-Dichloroethene	1.1	3.4	4.4	13
Trichloroethene	1.1	7.6	5.9	41
Tetrachloroethene	1.1	99	7.5	670

Client Sample ID: 5-09-SVE-3-120817

Lab ID#: 1712213-02A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
cis-1,2-Dichloroethene	1.2	5.8	4.6	23
1,1,1-Trichloroethane	1.2	1.7	6.4	9.3
Trichloroethene	1.2	13	6.3	68
Tetrachloroethene	1.2	170	7.9	1100

Client Sample ID: 4-78-SVE-IN-120817

Lab ID#: 1712213-03A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 113	1.2	1.7	9.4	13
Hexane	1.2	1.7	4.3	6.1
cis-1,2-Dichloroethene	1.2	2.5	4.9	10
1,1,1-Trichloroethane	1.2	1.3	6.7	7.2
Trichloroethene	1.2	42	6.6	230
Toluene	1.2	1.9	4.6	7.1
Pentane	4.9	5.2	14	15

Client Sample ID: 4-78-SVE-1-120817

Lab ID#: 1712213-04A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Hexane	1.1	11	3.9	38
Toluene	1.1	2.0	4.2	7.6
TPH ref. to Gasoline (MW=100)	110	250	450	1000

Air Toxics

Summary of Detected Compounds
EPA METHOD TO-15 GC/MS FULL SCAN

Client Sample ID: 4-78-SVE-1-120817

Lab ID#: 1712213-04A

Pentane	4.4	27	13	79

Client Sample ID: 4-78-SVE-6-120817

Lab ID#: 1712213-05A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 113	1.1	7.2	8.5	55
Chloroform	1.1	1.2	5.4	5.7
1,1,1-Trichloroethane	1.1	2.7	6.1	15
Trichloroethene	1.1	37	6.0	200
Toluene	1.1	6.4	4.2	24
Tetrachloroethene	1.1	5.4	7.6	36

Client Sample ID: 4-78-SVE-10-120817

Lab ID#: 1712213-06A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 113	1.2	8.9	9.0	68
cis-1,2-Dichloroethene	1.2	11	4.6	45
1,1,1-Trichloroethane	1.2	6.3	6.4	34
Trichloroethene	1.2	180	6.3	960
Toluene	1.2	1.2	4.4	4.7

eurofins | Air Toxics

Client Sample ID: 5-09-SVE-IN-120817

Lab ID#: 1712213-01A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17121410**	**Date of Collection: 12/8/17 9:20:00 AM**
Dil. Factor:	**2.21**	**Date of Analysis: 12/14/17 03:56 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Chloromethane	11	Not Detected	23	Not Detected
Vinyl Chloride	1.1	Not Detected	2.8	Not Detected
Freon 113	1.1	Not Detected	8.5	Not Detected
1,1-Dichloroethene	1.1	Not Detected	4.4	Not Detected
Acetone	11	Not Detected	26	Not Detected
Carbon Disulfide	4.4	Not Detected	14	Not Detected
Methylene Chloride	11	Not Detected	38	Not Detected
trans-1,2-Dichloroethene	1.1	Not Detected	4.4	Not Detected
Hexane	1.1	Not Detected	3.9	Not Detected
1,1-Dichloroethane	1.1	Not Detected	4.5	Not Detected
2-Butanone (Methyl Ethyl Ketone)	4.4	Not Detected	13	Not Detected
cis-1,2-Dichloroethene	1.1	3.4	4.4	13
Chloroform	1.1	Not Detected	5.4	Not Detected
1,1,1-Trichloroethane	1.1	Not Detected	6.0	Not Detected
Benzene	1.1	Not Detected	3.5	Not Detected
Trichloroethene	1.1	7.6	5.9	41
Toluene	1.1	Not Detected	4.2	Not Detected
1,1,2-Trichloroethane	1.1	Not Detected	6.0	Not Detected
Tetrachloroethene	1.1	99	7.5	670
Chlorobenzene	1.1	Not Detected	5.1	Not Detected
Ethyl Benzene	1.1	Not Detected	4.8	Not Detected
m,p-Xylene	1.1	Not Detected	4.8	Not Detected
o-Xylene	1.1	Not Detected	4.8	Not Detected
Styrene	1.1	Not Detected	4.7	Not Detected
Cumene	1.1	Not Detected	5.4	Not Detected
Propylbenzene	1.1	Not Detected	5.4	Not Detected
1,3,5-Trimethylbenzene	1.1	Not Detected	5.4	Not Detected
1,2,4-Trimethylbenzene	1.1	Not Detected	5.4	Not Detected
TPH ref. to Gasoline (MW=100)	110	Not Detected	450	Not Detected
Acetonitrile	11	Not Detected	18	Not Detected
Vinyl Acetate	4.4	Not Detected	16	Not Detected
Octane	4.4	Not Detected	21	Not Detected
Pentane	4.4	Not Detected	13	Not Detected
Butylbenzene	4.4	Not Detected	24	Not Detected
Decane	4.4	Not Detected	26	Not Detected
Dodecane	11	Not Detected	77	Not Detected
sec-Butylbenzene	4.4	Not Detected	24	Not Detected
p-Cymene	4.4	Not Detected	24	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits

eurofins | Air Toxics

Client Sample ID: 5-09-SVE-IN-120817

Lab ID#: 1712213-01A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17121410**	**Date of Collection: 12/8/17 9:20:00 AM**
Dil. Factor:	**2.21**	**Date of Analysis: 12/14/17 03:56 PM**

Surrogates	%Recovery	Method Limits
Toluene-d8	101	70-130
1,2-Dichloroethane-d4	100	70-130
4-Bromofluorobenzene	93	70-130

eurofins | Air Toxics

Client Sample ID: 5-09-SVE-3-120817

Lab ID#: 1712213-02A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17121411**	**Date of Collection:**	**12/8/17 9:30:00 AM**
Dil. Factor:	**2.34**	**Date of Analysis:**	**12/14/17 04:26 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Chloromethane	12	Not Detected	24	Not Detected
Vinyl Chloride	1.2	Not Detected	3.0	Not Detected
Freon 113	1.2	Not Detected	9.0	Not Detected
1,1-Dichloroethene	1.2	Not Detected	4.6	Not Detected
Acetone	12	Not Detected	28	Not Detected
Carbon Disulfide	4.7	Not Detected	14	Not Detected
Methylene Chloride	12	Not Detected	41	Not Detected
trans-1,2-Dichloroethene	1.2	Not Detected	4.6	Not Detected
Hexane	1.2	Not Detected	4.1	Not Detected
1,1-Dichloroethane	1.2	Not Detected	4.7	Not Detected
2-Butanone (Methyl Ethyl Ketone)	4.7	Not Detected	14	Not Detected
cis-1,2-Dichloroethene	1.2	5.8	4.6	23
Chloroform	1.2	Not Detected	5.7	Not Detected
1,1,1-Trichloroethane	1.2	1.7	6.4	9.3
Benzene	1.2	Not Detected	3.7	Not Detected
Trichloroethene	1.2	13	6.3	68
Toluene	1.2	Not Detected	4.4	Not Detected
1,1,2-Trichloroethane	1.2	Not Detected	6.4	Not Detected
Tetrachloroethene	1.2	170	7.9	1100
Chlorobenzene	1.2	Not Detected	5.4	Not Detected
Ethyl Benzene	1.2	Not Detected	5.1	Not Detected
m,p-Xylene	1.2	Not Detected	5.1	Not Detected
o-Xylene	1.2	Not Detected	5.1	Not Detected
Styrene	1.2	Not Detected	5.0	Not Detected
Cumene	1.2	Not Detected	5.8	Not Detected
Propylbenzene	1.2	Not Detected	5.8	Not Detected
1,3,5-Trimethylbenzene	1.2	Not Detected	5.8	Not Detected
1,2,4-Trimethylbenzene	1.2	Not Detected	5.8	Not Detected
TPH ref. to Gasoline (MW=100)	120	Not Detected	480	Not Detected
Acetonitrile	12	Not Detected	20	Not Detected
Vinyl Acetate	4.7	Not Detected	16	Not Detected
Octane	4.7	Not Detected	22	Not Detected
Pentane	4.7	Not Detected	14	Not Detected
Butylbenzene	4.7	Not Detected	26	Not Detected
Decane	4.7	Not Detected	27	Not Detected
Dodecane	12	Not Detected	82	Not Detected
sec-Butylbenzene	4.7	Not Detected	26	Not Detected
p-Cymene	4.7	Not Detected	26	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits

eurofins | Air Toxics

Client Sample ID: 5-09-SVE-3-120817

Lab ID#: 1712213-02A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17121411**	**Date of Collection: 12/8/17 9:30:00 AM**
Dil. Factor:	**2.34**	**Date of Analysis: 12/14/17 04:26 PM**

Surrogates	%Recovery	Method Limits
Toluene-d8	100	70-130
1,2-Dichloroethane-d4	102	70-130
4-Bromofluorobenzene	94	70-130

Air Toxics

Client Sample ID: 4-78-SVE-IN-120817

Lab ID#: 1712213-03A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17121412**	**Date of Collection:**	**12/8/17 10:05:00 AM**
Dil. Factor:	**2.46**	**Date of Analysis:**	**12/14/17 04:58 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Chloromethane	12	Not Detected	25	Not Detected
Vinyl Chloride	1.2	Not Detected	3.1	Not Detected
Freon 113	1.2	1.7	9.4	13
1,1-Dichloroethene	1.2	Not Detected	4.9	Not Detected
Acetone	12	Not Detected	29	Not Detected
Carbon Disulfide	4.9	Not Detected	15	Not Detected
Methylene Chloride	12	Not Detected	43	Not Detected
trans-1,2-Dichloroethene	1.2	Not Detected	4.9	Not Detected
Hexane	1.2	1.7	4.3	6.1
1,1-Dichloroethane	1.2	Not Detected	5.0	Not Detected
2-Butanone (Methyl Ethyl Ketone)	4.9	Not Detected	14	Not Detected
cis-1,2-Dichloroethene	1.2	2.5	4.9	10
Chloroform	1.2	Not Detected	6.0	Not Detected
1,1,1-Trichloroethane	1.2	1.3	6.7	7.2
Benzene	1.2	Not Detected	3.9	Not Detected
Trichloroethene	1.2	42	6.6	230
Toluene	1.2	1.9	4.6	7.1
1,1,2-Trichloroethane	1.2	Not Detected	6.7	Not Detected
Tetrachloroethene	1.2	Not Detected	8.3	Not Detected
Chlorobenzene	1.2	Not Detected	5.7	Not Detected
Ethyl Benzene	1.2	Not Detected	5.3	Not Detected
m,p-Xylene	1.2	Not Detected	5.3	Not Detected
o-Xylene	1.2	Not Detected	5.3	Not Detected
Styrene	1.2	Not Detected	5.2	Not Detected
Cumene	1.2	Not Detected	6.0	Not Detected
Propylbenzene	1.2	Not Detected	6.0	Not Detected
1,3,5-Trimethylbenzene	1.2	Not Detected	6.0	Not Detected
1,2,4-Trimethylbenzene	1.2	Not Detected	6.0	Not Detected
TPH ref. to Gasoline (MW=100)	120	Not Detected	500	Not Detected
Acetonitrile	12	Not Detected	21	Not Detected
Vinyl Acetate	4.9	Not Detected	17	Not Detected
Octane	4.9	Not Detected	23	Not Detected
Pentane	4.9	5.2	14	15
Butylbenzene	4.9	Not Detected	27	Not Detected
Decane	4.9	Not Detected	29	Not Detected
Dodecane	12	Not Detected	86	Not Detected
sec-Butylbenzene	4.9	Not Detected	27	Not Detected
p-Cymene	4.9	Not Detected	27	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits

Client Sample ID: 4-78-SVE-IN-120817

Lab ID#: 1712213-03A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17121412**	**Date of Collection: 12/8/17 10:05:00 AM**
Dil. Factor:	**2.46**	**Date of Analysis: 12/14/17 04:58 PM**

Surrogates	%Recovery	Method Limits
Toluene-d8	101	70-130
1,2-Dichloroethane-d4	104	70-130
4-Bromofluorobenzene	94	70-130

eurofins | Air Toxics

Client Sample ID: 4-78-SVE-1-120817

Lab ID#: 1712213-04A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17121416**	**Date of Collection: 12/8/17 10:15:00 AM**
Dil. Factor:	**2.22**	**Date of Analysis: 12/14/17 08:19 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Chloromethane	11	Not Detected	23	Not Detected
Vinyl Chloride	1.1	Not Detected	2.8	Not Detected
Freon 113	1.1	Not Detected	8.5	Not Detected
1,1-Dichloroethene	1.1	Not Detected	4.4	Not Detected
Acetone	11	Not Detected	26	Not Detected
Carbon Disulfide	4.4	Not Detected	14	Not Detected
Methylene Chloride	11	Not Detected	38	Not Detected
trans-1,2-Dichloroethene	1.1	Not Detected	4.4	Not Detected
Hexane	1.1	11	3.9	38
1,1-Dichloroethane	1.1	Not Detected	4.5	Not Detected
2-Butanone (Methyl Ethyl Ketone)	4.4	Not Detected	13	Not Detected
cis-1,2-Dichloroethene	1.1	Not Detected	4.4	Not Detected
Chloroform	1.1	Not Detected	5.4	Not Detected
1,1,1-Trichloroethane	1.1	Not Detected	6.0	Not Detected
Benzene	1.1	Not Detected	3.5	Not Detected
Trichloroethene	1.1	Not Detected	6.0	Not Detected
Toluene	1.1	2.0	4.2	7.6
1,1,2-Trichloroethane	1.1	Not Detected	6.0	Not Detected
Tetrachloroethene	1.1	Not Detected	7.5	Not Detected
Chlorobenzene	1.1	Not Detected	5.1	Not Detected
Ethyl Benzene	1.1	Not Detected	4.8	Not Detected
m,p-Xylene	1.1	Not Detected	4.8	Not Detected
o-Xylene	1.1	Not Detected	4.8	Not Detected
Styrene	1.1	Not Detected	4.7	Not Detected
Cumene	1.1	Not Detected	5.4	Not Detected
Propylbenzene	1.1	Not Detected	5.4	Not Detected
1,3,5-Trimethylbenzene	1.1	Not Detected	5.4	Not Detected
1,2,4-Trimethylbenzene	1.1	Not Detected	5.4	Not Detected
TPH ref. to Gasoline (MW=100)	110	250	450	1000
Acetonitrile	11	Not Detected	19	Not Detected
Vinyl Acetate	4.4	Not Detected	16	Not Detected
Octane	4.4	Not Detected	21	Not Detected
Pentane	4.4	27	13	79
Butylbenzene	4.4	Not Detected	24	Not Detected
Decane	4.4	Not Detected	26	Not Detected
Dodecane	11	Not Detected	77	Not Detected
sec-Butylbenzene	4.4	Not Detected	24	Not Detected
p-Cymene	4.4	Not Detected	24	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits

eurofins | Air Toxics

Client Sample ID: 4-78-SVE-1-120817

Lab ID#: 1712213-04A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17121416**	**Date of Collection:**	**12/8/17 10:15:00 AM**
Dil. Factor:	**2.22**	**Date of Analysis:**	**12/14/17 08:19 PM**

Surrogates	%Recovery	Method Limits
Toluene-d8	101	70-130
1,2-Dichloroethane-d4	102	70-130
4-Bromofluorobenzene	93	70-130

eurofins | Air Toxics

Client Sample ID: 4-78-SVE-6-120817

Lab ID#: 1712213-05A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17121417**	**Date of Collection: 12/8/17 10:48:00 AM**
Dil. Factor:	**2.23**	**Date of Analysis: 12/14/17 08:48 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Chloromethane	11	Not Detected	23	Not Detected
Vinyl Chloride	1.1	Not Detected	2.8	Not Detected
Freon 113	1.1	7.2	8.5	55
1,1-Dichloroethene	1.1	Not Detected	4.4	Not Detected
Acetone	11	Not Detected	26	Not Detected
Carbon Disulfide	4.5	Not Detected	14	Not Detected
Methylene Chloride	11	Not Detected	39	Not Detected
trans-1,2-Dichloroethene	1.1	Not Detected	4.4	Not Detected
Hexane	1.1	Not Detected	3.9	Not Detected
1,1-Dichloroethane	1.1	Not Detected	4.5	Not Detected
2-Butanone (Methyl Ethyl Ketone)	4.5	Not Detected	13	Not Detected
cis-1,2-Dichloroethene	1.1	Not Detected	4.4	Not Detected
Chloroform	1.1	1.2	5.4	5.7
1,1,1-Trichloroethane	1.1	2.7	6.1	15
Benzene	1.1	Not Detected	3.6	Not Detected
Trichloroethene	1.1	37	6.0	200
Toluene	1.1	6.4	4.2	24
1,1,2-Trichloroethane	1.1	Not Detected	6.1	Not Detected
Tetrachloroethene	1.1	5.4	7.6	36
Chlorobenzene	1.1	Not Detected	5.1	Not Detected
Ethyl Benzene	1.1	Not Detected	4.8	Not Detected
m,p-Xylene	1.1	Not Detected	4.8	Not Detected
o-Xylene	1.1	Not Detected	4.8	Not Detected
Styrene	1.1	Not Detected	4.7	Not Detected
Cumene	1.1	Not Detected	5.5	Not Detected
Propylbenzene	1.1	Not Detected	5.5	Not Detected
1,3,5-Trimethylbenzene	1.1	Not Detected	5.5	Not Detected
1,2,4-Trimethylbenzene	1.1	Not Detected	5.5	Not Detected
TPH ref. to Gasoline (MW=100)	110	Not Detected	460	Not Detected
Acetonitrile	11	Not Detected	19	Not Detected
Vinyl Acetate	4.5	Not Detected	16	Not Detected
Octane	4.5	Not Detected	21	Not Detected
Pentane	4.5	Not Detected	13	Not Detected
Butylbenzene	4.5	Not Detected	24	Not Detected
Decane	4.5	Not Detected	26	Not Detected
Dodecane	11	Not Detected	78	Not Detected
sec-Butylbenzene	4.5	Not Detected	24	Not Detected
p-Cymene	4.5	Not Detected	24	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits

Client Sample ID: 4-78-SVE-6-120817

Lab ID#: 1712213-05A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17121417**	**Date of Collection: 12/8/17 10:48:00 AM**
Dil. Factor:	**2.23**	**Date of Analysis: 12/14/17 08:48 PM**

Surrogates	%Recovery	Method Limits
Toluene-d8	102	70-130
1,2-Dichloroethane-d4	104	70-130
4-Bromofluorobenzene	93	70-130

eurofins | Air Toxics

Client Sample ID: 4-78-SVE-10-120817

Lab ID#: 1712213-06A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17121422**	**Date of Collection: 12/8/17 11:05:00 AM**
Dil. Factor:	**2.34**	**Date of Analysis: 12/15/17 09:13 AM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Chloromethane	12	Not Detected	24	Not Detected
Vinyl Chloride	1.2	Not Detected	3.0	Not Detected
Freon 113	1.2	8.9	9.0	68
1,1-Dichloroethene	1.2	Not Detected	4.6	Not Detected
Acetone	12	Not Detected	28	Not Detected
Carbon Disulfide	4.7	Not Detected	14	Not Detected
Methylene Chloride	12	Not Detected	41	Not Detected
trans-1,2-Dichloroethene	1.2	Not Detected	4.6	Not Detected
Hexane	1.2	Not Detected	4.1	Not Detected
1,1-Dichloroethane	1.2	Not Detected	4.7	Not Detected
2-Butanone (Methyl Ethyl Ketone)	4.7	Not Detected	14	Not Detected
cis-1,2-Dichloroethene	1.2	11	4.6	45
Chloroform	1.2	Not Detected	5.7	Not Detected
1,1,1-Trichloroethane	1.2	6.3	6.4	34
Benzene	1.2	Not Detected	3.7	Not Detected
Trichloroethene	1.2	180	6.3	960
Toluene	1.2	1.2	4.4	4.7
1,1,2-Trichloroethane	1.2	Not Detected	6.4	Not Detected
Tetrachloroethene	1.2	Not Detected	7.9	Not Detected
Chlorobenzene	1.2	Not Detected	5.4	Not Detected
Ethyl Benzene	1.2	Not Detected	5.1	Not Detected
m,p-Xylene	1.2	Not Detected	5.1	Not Detected
o-Xylene	1.2	Not Detected	5.1	Not Detected
Styrene	1.2	Not Detected	5.0	Not Detected
Cumene	1.2	Not Detected	5.8	Not Detected
Propylbenzene	1.2	Not Detected	5.8	Not Detected
1,3,5-Trimethylbenzene	1.2	Not Detected	5.8	Not Detected
1,2,4-Trimethylbenzene	1.2	Not Detected	5.8	Not Detected
TPH ref. to Gasoline (MW=100)	120	Not Detected	480	Not Detected
Acetonitrile	12	Not Detected	20	Not Detected
Vinyl Acetate	4.7	Not Detected	16	Not Detected
Octane	4.7	Not Detected	22	Not Detected
Pentane	4.7	Not Detected	14	Not Detected
Butylbenzene	4.7	Not Detected	26	Not Detected
Decane	4.7	Not Detected	27	Not Detected
Dodecane	12	Not Detected	82	Not Detected
sec-Butylbenzene	4.7	Not Detected	26	Not Detected
p-Cymene	4.7	Not Detected	26	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits

Client Sample ID: 4-78-SVE-10-120817

Lab ID#: 1712213-06A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17121422**	**Date of Collection: 12/8/17 11:05:00 AM**
Dil. Factor:	**2.34**	**Date of Analysis: 12/15/17 09:13 AM**

Surrogates	%Recovery	Method Limits
Toluene-d8	102	70-130
1,2-Dichloroethane-d4	100	70-130
4-Bromofluorobenzene	95	70-130

eurofins | Air Toxics

Client Sample ID: Lab Blank

Lab ID#: 1712213-07A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17121409c**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 12/14/17 02:53 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#: 1712213-07A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17121409c**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 12/14/17 02:53 PM**

Surrogates	**%Recovery**	**Method Limits**
Toluene-d8	100	70-130
1,2-Dichloroethane-d4	104	70-130
4-Bromofluorobenzene	95	70-130

eurofins | Air Toxics

Client Sample ID: CCV

Lab ID#: 1712213-08A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17121402**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 12/14/17 09:42 AM**

Compound	%Recovery
Chloromethane	106
Vinyl Chloride	107
Freon 113	104
1,1-Dichloroethene	105
Acetone	100
Carbon Disulfide	102
Methylene Chloride	96
trans-1,2-Dichloroethene	92
Hexane	96
1,1-Dichloroethane	94
2-Butanone (Methyl Ethyl Ketone)	94
cis-1,2-Dichloroethene	93
Chloroform	93
1,1,1-Trichloroethane	92
Benzene	93
Trichloroethene	91
Toluene	94
1,1,2-Trichloroethane	92
Tetrachloroethene	92
Chlorobenzene	94
Ethyl Benzene	98
m,p-Xylene	102
o-Xylene	100
Styrene	107
Cumene	103
Propylbenzene	100
1,3,5-Trimethylbenzene	102
1,2,4-Trimethylbenzene	104
TPH ref. to Gasoline (MW=100)	100
Acetonitrile	120
Vinyl Acetate	91
Octane	87
Pentane	115
Butylbenzene	90
Decane	108
Dodecane	73
sec-Butylbenzene	82
p-Cymene	93

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits

eurofins | Air Toxics

Client Sample ID: CCV

Lab ID#: 1712213-08A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17121402**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 12/14/17 09:42 AM**	

Surrogates	%Recovery	Method Limits
Toluene-d8	104	70-130
1,2-Dichloroethane-d4	107	70-130
4-Bromofluorobenzene	102	70-130

eurofins | Air Toxics

Client Sample ID: LCS

Lab ID#: 1712213-09A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17121403**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 12/14/17 10:10 AM**

Compound	%Recovery	Method Limits
Chloromethane	94	70-130
Vinyl Chloride	94	70-130
Freon 113	96	70-130
1,1-Dichloroethene	98	70-130
Acetone	94	70-130
Carbon Disulfide	84	70-130
Methylene Chloride	94	70-130
trans-1,2-Dichloroethene	86	70-130
Hexane	103	70-130
1,1-Dichloroethane	98	70-130
2-Butanone (Methyl Ethyl Ketone)	93	70-130
cis-1,2-Dichloroethene	106	70-130
Chloroform	86	70-130
1,1,1-Trichloroethane	84	70-130
Benzene	87	70-130
Trichloroethene	86	70-130
Toluene	88	70-130
1,1,2-Trichloroethane	86	70-130
Tetrachloroethene	87	70-130
Chlorobenzene	87	70-130
Ethyl Benzene	91	70-130
m,p-Xylene	95	70-130
o-Xylene	96	70-130
Styrene	99	70-130
Cumene	96	70-130
Propylbenzene	95	70-130
1,3,5-Trimethylbenzene	96	70-130
1,2,4-Trimethylbenzene	97	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

Client Sample ID: LCS

Lab ID#: 1712213-09A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17121403**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 12/14/17 10:10 AM**

Surrogates	%Recovery	Method Limits
Toluene-d8	102	70-130
1,2-Dichloroethane-d4	99	70-130
4-Bromofluorobenzene	101	70-130

Client Sample ID: LCSD

Lab ID#: 1712213-09AA

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	17121404	Date of Collection: NA
Dil. Factor:	1.00	Date of Analysis: 12/14/17 10:37 AM

Compound	%Recovery	Method Limits
Chloromethane	89	70-130
Vinyl Chloride	92	70-130
Freon 113	81	70-130
1,1-Dichloroethene	86	70-130
Acetone	83	70-130
Carbon Disulfide	74	70-130
Methylene Chloride	85	70-130
trans-1,2-Dichloroethene	76	70-130
Hexane	91	70-130
1,1-Dichloroethane	87	70-130
2-Butanone (Methyl Ethyl Ketone)	85	70-130
cis-1,2-Dichloroethene	95	70-130
Chloroform	88	70-130
1,1,1-Trichloroethane	85	70-130
Benzene	89	70-130
Trichloroethene	88	70-130
Toluene	89	70-130
1,1,2-Trichloroethane	88	70-130
Tetrachloroethene	90	70-130
Chlorobenzene	89	70-130
Ethyl Benzene	93	70-130
m,p-Xylene	98	70-130
o-Xylene	100	70-130
Styrene	102	70-130
Cumene	98	70-130
Propylbenzene	98	70-130
1,3,5-Trimethylbenzene	98	70-130
1,2,4-Trimethylbenzene	100	70-130
TPH ref. to Gasoline (MW=100)	Not Spiked	
Acetonitrile	Not Spiked	
Vinyl Acetate	86	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

Client Sample ID: LCSD
Lab ID#: 1712213-09AA
EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17121404**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 12/14/17 10:37 AM**	

Surrogates	%Recovery	Method Limits
Toluene-d8	102	70-130
1,2-Dichloroethane-d4	104	70-130
4-Bromofluorobenzene	102	70-130