Quarterly report, third quarter 2018

RCRA Corrective Action Program
Boeing Renton Facility
Project # 0088880100.2018 The Boeing Company

Prepared for:

The Boeing Company
Seattle, Washington

November 15, 2018

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

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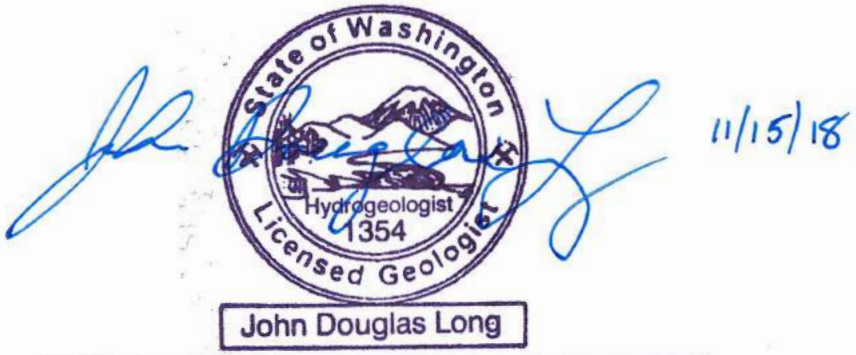

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1.0 Introduction

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 third quarter 2018. This work is required under the Resource Conservation and Recovery Act (RCRA) Corrective Action Program being performed at the Boeing Renton Facility in Renton, Washington. Corrective action activities are performed for those solid waste management units (SWMUs), areas of concern (AOCs), and other areas where cleanup actions are ongoing. Monitoring, cleanup activities, and reporting are being conducted as part of the final remedy implementation described in the Engineering Design Report (EDR) (AMEC, 2014). The groundwater monitoring program is detailed in the Addendum to the Compliance Monitoring Plan (Amec Foster Wheeler, 2017) which contains changes to the revised Compliance Monitoring Plan (Amec Foster Wheeler, 2016a) that superseded the original plan presented in Appendix D of the EDR (AMEC, 2014).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 third quarter of 2018—the period from July through September 2018.

1.1 Quarterly progress reporting

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

1.1.1 Work completed in the third quarter 2018

The following work was completed during the third quarter of 2018, the period from July through September 2018:

- On behalf of Boeing, Wood submitted the second quarter 2018 report to Ecology on August 15, 2018.
- Groundwater monitoring for the third quarter of 2018 was completed during August 2018.
- A fourth round of nitrate/sulfate injections was completed in Building 4-78/79 injection wells B78-11, B78-13, and B78-17 through B78-21 in July 2018. Groundwater samples were collected from these injection wells and from monitoring wells GW244S and GW031S in September 2018.
- Substrate injections were performed in July 2018 at SWMU 172/174, Building 4-78/79, AOC-60, and AOC-90.

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 fourth quarter of 2018:

- Reporting will be completed in accordance with the Order, CAP, EDR, Addendum to the Compliance Monitoring Plan, and any changes approved by Ecology.
- Groundwater sampling and analysis for the fourth quarter of 2018 will be completed.

2.0 Groundwater sampling methodology

Groundwater was sampled and analyzed as described in Appendix A. These procedures are in accordance with the methods specified in the soil and groundwater sampling methodology, which is described in more detail in the revised Compliance Monitoring Plan (Amec Foster Wheeler, 2016a). Table A-1 summarizes the current groundwater monitoring program and constituents of concern (COCs) specified in the CAP and revised in the Addendum to the Compliance Monitoring Plan (Amec Foster Wheeler, 2017) 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 third quarter of 2018. Operation of the SVE systems at the SWMU-172/174 and Building 4-78/79 areas continued during the third quarter, as discussed in Sections 3.2.1.2 and 3.3.1.2. Quarterly compliance monitoring was also conducted in accordance with the Addendum to the Compliance Monitoring Plan (Amec Foster Wheeler, 2017).

3.1 SWMU-168

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

3.1.1 Cleanup action activities

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

3.1.2 Compliance monitoring plan deviations

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

3.1.3 Water levels

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

3.1.4 Groundwater monitoring results

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

3.1.4.1 Natural attenuation/geochemical indicators

The geochemical indicator results are presented in Table 2. Data from the CPOC wells indicate that conditions are conducive to natural attenuation of vinyl chloride (VC) in this SWMU. The results for dissolved oxygen (DO) and oxidation reduction potential (ORP) measurements indicate reducing conditions. The pH values measured in all wells were near neutral.

3.1.4.2 COC results for source area

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

3.1.4.3 COC results for conditional point of compliance area

Monitoring results for the CPOC area monitoring wells are shown in Table 3. VC was detected in the groundwater collected from CPOC wells GW230I and GW231S at an estimated concentration of 0.140 and

0.0326 micrograms per liter (µg/L), respectively. The concentration of VC detected in the groundwater collected from CPOC well GW230I was above the CUL of 0.11 µg/L. .

3.2 SWMU-172 and SWMU-174

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

3.2.1 Cleanup action activities

3.2.1.1 Installation/construction activities

No installation/construction activities were conducted for these SWMUs during the third quarter. Substrate injections were performed between July 23 and 25, 2018 at SWMU-172 and -174.

3.2.1.2 Soil vapor extraction and bioremediation operations

After rebound testing of the SVE system at SWMU-172 and SWMU-174 during the first quarter and soil COC sampling during the second quarter, it was determined that the SVE system should be restarted to achieve soil and groundwater concentrations below the CULs. The SVE system was restarted during the second quarter, on June 20, 2018. 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 third quarter.

3.2.3 Water levels

Groundwater elevations for the SWMU-172 and SWMU-174 area measured during the third quarter 2018 are summarized in Table 4 and shown on Figure 2. The contoured data for August 2018 show that groundwater is generally flowing east from SWMU-172 and SWMU-174, toward the Cedar River Waterway, with an approximate horizontal gradient of 0.008.

3.2.4 Groundwater monitoring results

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

3.2.4.1 Monitored attenuation/geochemical indicators

The geochemical indicator results are presented in Table 5. Total organic carbon (TOC) concentrations ranged from 10,860 milligrams per liter (mg/L) to 0.76 mg/L for all SWMU-172 and SWMU-174 monitoring wells. Substrate injection was performed in SWMU-172 and SWMU-174 wells between July 23 and 25, 2018, as reflected in the high TOC values and low pH values, particularly in source area wells GW152S and GW153S. 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 DO and ORP indicate reducing conditions were present.

3.2.4.2 COC results for source and downgradient plume areas

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

As shown in Table 6, *cis*-1,2-DCE, TCE, PCE, and VC concentrations exceeded the CULs in the groundwater collected from both source area and downgradient plume area wells. As shown in Figure 3, the concentrations of COCs in groundwater from source area wells generally increased during 2018. As shown in Figure 4, COC concentrations increased in the groundwater samples collected from downgradient plume area wells GW172S and GW173S during the third quarter, except for PCE, *cis*-1,2-DCE, and VC in the groundwater from downgradient well GW172S and PCE in the groundwater from downgradient well GW173S. Even with the increases in concentrations observed during the third quarter, the concentrations are within the range of concentrations observed over the last two years.

Arsenic was detected above the CUL in all source area and downgradient plume area wells. As shown in Figure 5, the arsenic concentrations in the groundwater from both source area and downgradient wells increased during the third quarter sampling event. The field notes for the sample from GW152S describe the sample as "gray and turbid strong odor". This same sample also indicated an order-of-mangnitude increase in copper and lead concentrations relative to the last quarter of sampling. The observed variations for concentrations of inorganics may be influenced by the naturally occurring reducing conditions or other factors such as turbidity in the sample. Samples from this well should be further evaluated in the next round of sampling including both total and dissolved analysis for these metals..

3.2.4.3 COC results for conditional point of compliance area

Results from the CPOC area wells are presented in Table 6 and trend charts for *cis*-1,2-DCE, TCE, and VC for all CPOC area wells are presented in Figure 6. As shown in Table 6, *cis*-1,2-DCE was detected at concentrations above the CUL, ranging from 0.0427 to 0.489 µg/L, in the groundwater collected from all CPOC area wells; TCE was detected above the CUL in the groundwater from CPOC well GW235I; and VC was detected above the CUL in the groundwater from CPOC well GW232S. PCE was not detected in the groundwater collected from the CPOC wells and is not shown on Figure 6. As shown on Figure 6, concentrations of *cis*-1,2-DCE have exceeded the CUL in the CPOC wells since compliance monitoring began, but are generally stable and are of low concern due to the low toxicity of *cis*-1,2-DCE and associated lack of surface water quality standard for this constituent. The concentrations of TCE and VC in the CPOC wells also generally appear to be stable.

Arsenic was detected above the CUL in the groundwater samples from CPOC area wells GW232S, GW234S, and GW236S. Copper and lead were not detected above their respective CULs in the groundwater from the CPOC wells (Table 6). Figure 7 shows arsenic, copper, and lead trends since the beginning of compliance monitoring in groundwater samples from the CPOC wells. As shown in Figure 7, though arsenic, copper and lead concentrations appear to vary over time, there are no increasing trends in the groundwater collected from CPOC wells.

3.3 Building 4-78/79 SWMU/AOC group

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

3.3.1 Cleanup action activities

3.3.1.1 Installation/construction activities

No installation/construction activities were conducted for this cleanup action area during the third quarter. Substrate injections were perfomed between July 16 and 18, 2018 at Bldg. 4-78/79.

3.3.1.2 Soil vapor extraction and bioremediation operations

The SVE system at Building 4-78/79 SWMU/AOC Group was shut down during the first quarter, during which rebound testing was implemented. Soil samples were collected during the second quarter to assess the attainment of soil CULs, and results were reported in the second quarter monitoring report (Wood, 2018). On October 18, 2018, Boeing submitted a formal request for approval of the shutdown of the SVE system at Building 4-78/79 SWMU/AOC Group. Further details are included in the SVE operations and monitoring report prepared by Calibre and included as Appendix D.

A fourth round of nitrate/sulfate injections was performed in July 2018, and groundwater samples were collected from the injection wells and monitoring wells in September 2018. The results of the performance monitoring are shown in Table 3-1 of Appendix D. Concentrations of benzene and *cis*-1,2-DCE in the groundwater from all injection wells related to ongoing benzene treatment in this area are shown in Figure 9. As shown in Table 3-1 of Appendix D, benzene concentrations in groundwater samples collected from injection and monitoring wells ranged from below the reporting limit of 0.20 µg/L to 9.20 µg/L. The benzene concentrations detected in September 2018 were below the baseline concentrations in four of the five injection wells, with current concentration reductions at approximately 70-89 percent of the baseline results at these wells, indicating biodegradation of benzene is occurring. Concentrations of nitrate were below detection limits in each of the wells during the September sampling event, while sulfate concentrations began reducing in most wells, with detections ranging from 0.113 mg/L to 23.4 mg/L. Trend charts for TCE and VC during injection events are presented in Figure 10.

The three benzene treatment injection events completed prior to July 2018 were implemented utilizing low target concentrations of nitrate and sulfate applied to each of the injection wells with concentrations of 100, 200, and 400 mg/L in October 2017, January 2018, and April 2018, respectively. The reagent concentration for the July treatment injection event was 800 mg/L for nitrate and 400 mg/L for sulfate to provide additional nitrate and sulfate to the affected area due to the rapid reaction time observed during previous injection events. More detail is provided in Appendix D.

3.3.2 Compliance monitoring plan deviations

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

3.3.3 Water levels

Groundwater elevations measured during the third quarter 2018 groundwater monitoring event at the Building 4-78/79 SWMU/AOC group are summarized in Table 7 and shown on Figure 8. The approximate direction of groundwater flow from the source area is generally to the west, with a hydraulic gradient of 0.0004.

3.3.4 Groundwater monitoring results

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

3.3.4.1 Natural attenuation/geochemical indicators

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

3.3.4.2 COC results for source and downgradient plume areas

Table 9 lists third quarter 2018 analytical results for the Building 4-78/79 SWMU/AOC Group COCs. The CULs established in the CAP are also presented on Table 9. Figures 11 and 12 are trend charts showing historical trends for COCs for in source and downgradient plume area groundwater monitoring wells that have a history of frequent detections. Trend charts have not been prepared for groundwater monitoring wells or COCs that do not have a history of frequent detections.

As shown in Table 9, benzene, *cis*-1,2-DCE, and VC were detected in groundwater samples from several source area wells at concentrations above their respective CULs, except for groundwater from source area well GW039S, which had concentrations below detection for all COCs. TCE was below detection in the groundwater from all source area wells. Total petroleum hydrocarbons in the gasoline range (TPH-G) was detected in the groundwater from source area well GW031S, at a concentration of 1,640 µg/L (the field duplicate concentration was 1,740 µg/L). TPH-G was also detected in the groundwater from source area well GW033S at a concentration below the CUL.

Benzene was detected at a concentration of 0.28 µg/L in the groundwater collected from downgradient plume area well GW210S. No other COCs were detected in the groundwater collected from the downgradient plume area wells. Benzene has been sporadically detected in the groundwater samples from GW210S and the concentration observed during the third quarter is consistent with historical concentrations of benzene in the groundwater from this well.

Figure 11 shows trends for selected COCs for source area wells GW031S and GW033S and Figure 12 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, except benzene, which has decreased in concentration during 2018. The concentration of benzene in the groundwater collected from source area well GW033S is generally consistent with historical results, and may be slightly increasing (from 12.8 µg/L to 13.3 µg/L). The concentrations of *cis*-1,2-DCE, TCE, and VC in this well decreased during the third quarter 2018 sampling event. COC concentrations in groundwater samples collected from source area well GW034S (Figure 12) 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 12 shows a trend chart for downgradient plume area well GW209S, which was installed in 2008 and is located west of Building 4-79. Monitoring results for all COCs are stable in the groundwater collected from GW209S, with concentrations either not detected or detected at concentrations just above the reporting limit of 0.2 µg/L.

3.3.4.3 COC results for conditional point of compliance area

Groundwater monitoring results from the third quarter for the CPOC area are summarized in Table 9. Trends for CPOC wells GW143S, GW237S and GW240D are shown in Figures 13 through 15. Benzene was not detected in any of the groundwater samples collected from CPOC wells for the first time since August 2017. As shown in Figure 13, benzene has been sporadically detected in the groundwater from CPOC well GW237S but has not been detected in the groundwater samples from any other CPOC wells at concentrations above the CUL. *Cis*-1,2-DCE and TCE were detected in the groundwater collected from CPOC well GW143S. As shown in Figures 13 and 14, the concentration of *cis*-1,2-DCE does not exceed the CUL but the TCE concentration does, as it has sporacially in the groundwater from CPOC well GW143S. VC was detected the groundwater samples collected from CPOC wells GW237S and GW240D above the CUL at concentrations of 0.28 and 0.23 µg/L, respectively. As shown in Figure 14, the VC concentrations in CPOC area wells GW237S and GW240D are consistent with historical results. The only other COC detected in the groundwater samples from the CPOC area during the third quarter was TPH-G at a concentration of 499 µg/L in the sample from CPOC well GW237S. As shown in Figure 15, TPH-G concentrations in the groundwater from CPOC GW237S appear to flucuate seasonally.

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3.4 Former fuel farm AOC group

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

3.5 AOC-001 and AOC-002

This section describes corrective action activities conducted at these AOCs during third quarter of 2018. The cleanup remedy for this corrective action area is bioremediation and MA. Bioremediation commenced for this area in late 2004, following source area excavation. Figure 16 shows the location of groundwater monitoring wells and the bioremediation injection system for AOC-001 and AOC 002, as well as the groundwater elevations measured during this monitoring event.

3.5.1 Cleanup action activities

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

3.5.2 Compliance monitoring plan deviations

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

3.5.3 Water levels

Table 10 presents the groundwater elevations measured during the third quarter 2018 monitoring event at AOC-001 and AOC-002. Figure 16 shows the groundwater elevations from this event. The average elevation of Lake Washington was not available from the U.S. Army Corps of Engineers Northwestern Division website. Third quarter 2018 data indicate that groundwater in the vicinity of these AOCs was flowing west, toward Lake Washington, with an approximate horizontal hydraulic gradient of 0.008.

3.5.4 Groundwater monitoring results

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

3.5.4.1 Monitored attenuation/geochemical indicators

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

3.5.4.2 COC results for source and downgradient plume areas

The analytical results for the AOC-001 and -002 COCs are summarized in Table 12. Concentrations of 1,1-dichloroethene and benzene were below CULs in all AOC-001/002 source area and downgradient plume wells in the third quarter. *Cis*-1,2-DCE was detected at concentrations above the CUL in the groundwater collected from all source and downgradient wells, except for from downgradient plume well GW191D. VC was detected at concentrations above the CUL in the groundwater collected from all source and downgradient wells at concentrations ranging from 0.113 to 1.120 µg/L. TCE was detected in the groundwater collected from source area well GW193S at a concentration of 0.0472 µg/L, above the CUL, and was also detected above the CUL in the groundwate from downgradient plume area well GW192S.Trend plots for TCE, VC, and *cis*-1,2-DCE in source area well GW193S, and *cis*-1,2-DCE and VC in downgradient plume well GW190S are shown in Figure 17. The concentrations of the COCs in the groundwater from these wells have been relatively stable during the 2018 monitoring events. Figure 18 presents the trends for VC and *cis*-1,2-DCE in downgradient plume wells GW192S, and TCE, VC, and *cis*-1,2-DCE in downgradient plume well GW246S. In general, concentrations of COCs in groundwater samples from GW192S and GW246S have also remained stable.

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 were above the CUL in the groundwater samples from all CPOC area wells except for GW194S. Concentrations of *cis*-1,2-DCE in groundwater from the CPOC wells ranged from 0.0229 µg/L to 0.217 µg/L, all above the CUL of 0.02 µg/L. VC was detected above the CUL of 0.05 µg/L in groundwater samples from CPOC wells GW185S and GW195S. As shown in Figure 19, 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 19 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 19.

3.6 AOC-003

This section describes corrective action activities conducted at AOC-003 for the third quarter of 2018. The cleanup remedy for this AOC is bioremediation and MA. Figure 20 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 third quarter.

3.6.2 Compliance monitoring plan deviations

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

3.6.3 Water levels

Table 13 presents the groundwater elevations measured during the third quarter 2018 monitoring event at AOC-003. Figure 20 shows the groundwater elevations from this event. Groundwater elevation contours are not shown due to the limited number of shallow groundwater monitoring wells. The third quarter 2018 groundwater elevation data indicate that the groundwater table is fairly flat and that groundwater generally flows north-northwest toward Lake Washington.

3.6.4 Groundwater monitoring results

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

3.6.4.1 Monitored attenuation/geochemical indicators

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

3.6.4.2 COC results for source and downgradient plume areas

Table 15 lists third quarter 2018 analytical results for the AOC-003 COCs. Trend plots have not been prepared for the AOC-003 source area well, since groundwater analyses for source area well GW249S have been generally below reporting limits. During the third quarter sampling event, VC was detected above the CUL in the groundwater samples from the source area well, GW249S, and the downgradient well, GW188S. All other COCs were either not detected or were detected at concentrations below the CUL.

3.6.4.3 COC results for conditional point of compliance area

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

3.7 AOC-004

This section describes corrective action activities conducted at AOC-004. The cleanup remedy for this AOC is bioremediation and MA. Figure 21 shows the layout of the groundwater monitoring and bioremediation injection wells for this AOC.

3.7.1 Cleanup action activities

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

3.7.2 Compliance monitoring plan deviations

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

3.7.3 Water levels

Table 16 presents the groundwater elevations measured during the third quarter 2018 monitoring event at AOC-004. Figure 21 shows the groundwater elevations. Because there are only two groundwater elevation monitoring locations for AOC-004, groundwater contours are not shown on Figure 21.

3.7.4 Groundwater monitoring results

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

3.7.4.1 Monitored attenuation/geochemical indicators

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

3.7.4.2 COC results for the source area

Table 18 lists third quarter 2018 analytical results for lead, the sole AOC-004 COC. Lead was detected at a concentration of 0.00107 mg/L, above the CUL of 0.001 mg/L but below the EPA SDWA MCL of 0.015 mg/L, in the groundwater sample from the source area well. Trend plots have not been created for the AOC-004 source area well, since COCs have not been detected consistently at concentrations above the CUL since monitoring began in 2015.

3.7.4.3 COC results for the conditional point of compliance area

As shown in Table 18, lead was detected below the CUL at a concentration of 0.000762 mg/L in the groundwater from CPOC well GW174S.

3.8 AOC-034 and AOC-035

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

3.9 AOC-060

This section describes corrective action activities conducted at AOC-060 during the third quarter of 2018. The cleanup remedy for this AOC is bioremediation and MA. Figure 22 shows the locations of the groundwater monitoring and bioremediation injection wells at AOC-060, as well as the groundwater elevations measured during the third quarter sampling event.

3.9.1 Cleanup action activities

Substrate injections were performed on July 26, 2018 at AOC-060.

3.9.2 Compliance monitoring plan deviations

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

3.9.3 Water levels

Table 19 presents the groundwater elevations measured during the third quarter 2018 groundwater monitoring event at AOC-060. Figure 22 shows the groundwater elevations measured during this event. The groundwater flow direction was approximately towards the Cedar River but the hydraulic gradient could not be determined.

3.9.4 Groundwater monitoring results

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

3.9.4.1 Monitored attenuation/geochemical indicators

The geochemical indicator results are presented in Table 20. The primary geochemical indicators show general uniform conditions in source and downgradient plume areas, except for the higher TOC concentrations detected in the groundwater from downgradient plume area wells GW012S and GW147S, reflecting the recent substrate injections. These data indicate that conditions are generally conducive to biodegradation of the COCs for this AOC.

3.9.4.2 COC results for source and downgradient plume areas

Table 21 presents third quarter 2018 analytical results for the AOC-060 groundwater COCs. Figures 23 and 24 present trend plots for the COCs in selected source area and downgradient plume area wells. Trend charts are not shown for groundwater monitoring wells for which COCs are not commonly detected.

As shown in Table 21 and Figures 23 and 24, concentrations of all COCs exceeded the CUL in the groundwater collected from source area well GW009S as well as all of the downgradient plume area wells, except for VC, which was detected at a concentration below the CUL in the groundwater from downgradient plume well GW014S. The concentrations of COCs in the groundwater from source area well GW009S and downgradient plume wells GW012S and GW014S are generally stable (Figures 23 and 24), while the concentrations of COCs in the groundwater from downgradient plume well GW147S appear to vary seasonally (Figure 24).

3.9.4.3 COC results for the conditional point of compliance area

As shown in Table 21, *cis*-1,2-DCE was detected at a concentration above the CUL in the groundwater collected from CPOC well GW254S, and at concentrations below the CUL in the groundwater from the remaining CPOC wells. TCE was detected in the groundwater from CPOC wells GW150S and GW253I at concentrations above the CUL; TCE concentrations in the remaining CPOC wells were below the CUL. VC was detected in the groundwater from all of the CPOC wells except GW252S, but the concentrations were below the CUL. Figures 25 and 26 present trends for the COCs in the CPOC wells. As shown in Figures 25 and 26, the COC concentrations in the groundwater from the CPOC wells are generally stable, with *cis*-1,2-DCE and TCE the most consistently detected at concentrations above the CUL. VC has not been detected in the groundwater from the CPOC at cocnetrations above the CUL since February 2016.

3.10 AOC-090

This section describes corrective action activities conducted at AOC-090 during the third quarter of 2018. The cleanup remedy for this AOC is bioremediation and MA. Figure 27 shows the locations of the groundwater monitoring wells and the bioremediation injection system at AOC-090, as well as the groundwater elevations measured during the third quarter.

3.10.1 Cleanup action activities

Substrate injections were perfoirmed on July 27, 2018 at AOC-090.

3.10.2 Compliance monitoring plan deviations

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

3.10.3 Water levels

Table 22 presents the groundwater elevations measured during the third quarter 2018 groundwater monitoring event at AOC-090. Figure 27 shows the groundwater elevations measured during this event. Based on these measurements, groundwater flow directions in the vicinity of AOC-090 could not be accurately determined. The cause of variations in water levels is not known.

3.10.4 Groundwater monitoring results

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

3.10.4.1 Monitored attenuation/geochemical indicators

The geochemical indicator results are presented in Table 23. TOC concentrations in the groundwater from source area well GW189S were elevated during the thrid quarter, reflecting the recent substrate injection in this area (Figure 28). The pH was depressed in source area well GW189S but was neutral in all downgradient plume area wells. The other geochemical indicators show that conditions are generally uniform in AOC-090 groundwater and in general, primary geochemical indicators show that conditions support biological degradation of chlorinated VOCs.

3.10.4.2 COC Results for source and downgradient plume areas

Table 24 presents third quarter 2018 analytical results for the AOC-090 groundwater COCs. As shown in Table 24, benzene, chloroform, *cis*-1,2-DCE, methylene chloride, TCE, VC, and TPH in the gasoline and diesel ranges were detected at concentrations above their respective CULs in the groundwater sample collected from GW189S. In addition, due to necessary dilutions performed to overcome sample matrix interference, reporting limits for 1,1,2,2-tetrachloroethane, 1,1,2-trichloroethane, 1,1-dichloroethene, carbon tetrachloride, PCE, and TPH in the lube oil range were elevated above their respective CULs. VC was also detected in the groundwater collected from downgradient plume area well GW176S at a concentration of 0.230 µg/L, above the CUL. There were no other COCs detected at concentrations above the CUL in the groundwater samples collected from downgradient plume area wells.

Figure 28 presents trends for selected COCs in source area well GW189S. As shown in Figure 28; concentrations of *cis*-1,2-DCE, TCE, and VC increased during the third quarter sampling event. Samples were collected a few weeks after the substrate injection. COC concentrations in the groundwater sample from this source area well have been declining over the past several years and concentrations during the third quarter are within the ranges observed historically.

3.10.4.3 COC Results for conditional point of compliance area

VC was detected at concentrations above the CUL in the shallow zone CPOC wells except for well GW180S, but not in the intermediate zone CPOC wells. No other COCs in were detected above the CULs in groundwater from either the shallow or intermediate zone CPOC wells. This is the ninth consecutive sampling event that neither 1,1,2-trichloroethane, acetone, benzene, carbon tetrachloride, chloroform,

cis-1,2-DCE, methylene chloride, toluene, trans-1,2-dichloroethene, nor any of the TPH fractions were detected above CULs in any of the CPOC area wells.

3.11 Building 4-70 area

This section describes corrective action activities conducted at this area during third quarter 2018. The cleanup remedy for the Building 4-70 Area is bioremediation and MA. Figure 29 shows the locations of the groundwater monitoring and bioremediation injection wells for this area.

3.11.1 Cleanup action activities

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

3.11.2 Compliance monitoring plan deviations

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

3.11.3 Water levels

Table 25 presents the groundwater elevations measured during the third quarter 2018 monitoring event at Building 4-70. Figure 29 shows the groundwater elevations in the two monitoring wells for this area. These groundwater elevation data (only two wells) do not support development of elevation contours. However, the flow direction is expected to be similar to the flow observed at the Building 4 78/79 Area, which is generally to the west, toward the Cedar River Waterway.

3.11.4 Groundwater monitoring results

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

3.11.4.1 Monitored attenuation/geochemical indicators

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

3.11.4.2 COC Results for conditional point of compliance area

All of the groundwater monitoring wells for the Building 4-70 Area are located along the CPOC (Figure 29). Groundwater monitoring results for the CPOC area wells are shown in Table 27. TCE was detected in the groundwater from monitoring well GW259S at a concentration of 0.70 µg/L, above the CUL of 0.54 µg/L, and VC was detected in the groundwater from monitoring well GW260S at a concentration of 0.22 µg/L, just above the CUL of 0.2 µg/L. No other COCs were detected in the groundwater at concentrations above the CUL.

3.12 Lot 20/former building 10-71 parcel

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

3.13 Apron A area

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

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.

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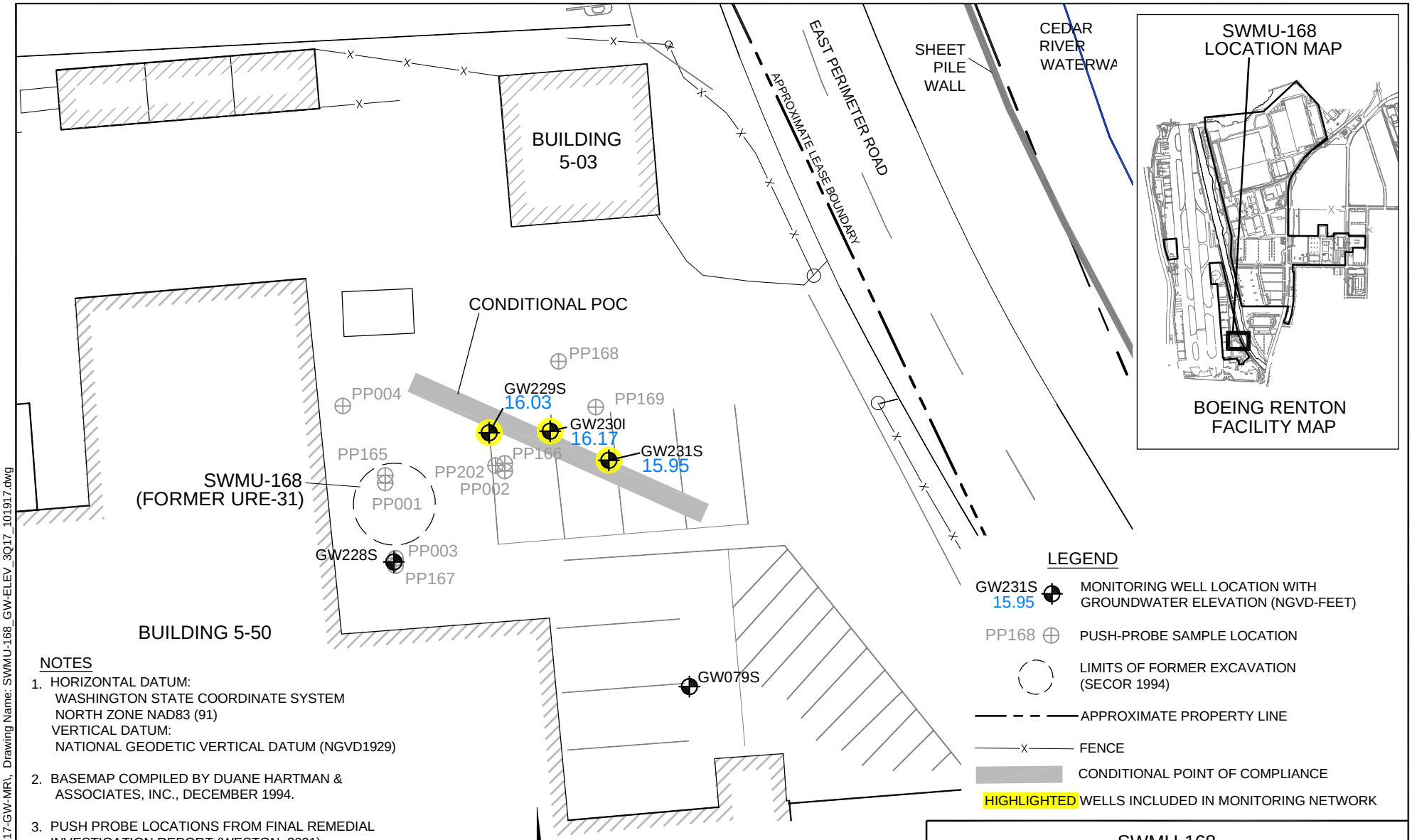
Amec Foster Wheeler, 2016c, Quality Assurance Project Plan, Boeing Renton Facility, Renton, Washington: Prepared for The Boeing Company, February.

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

Wood Environment & Infrastructure Solutions, Inc. (Wood), 2018, Quarterly report, second quarter 2018, RCRA Corrective Action Program, Boeing Renton Facility. August.

Figures



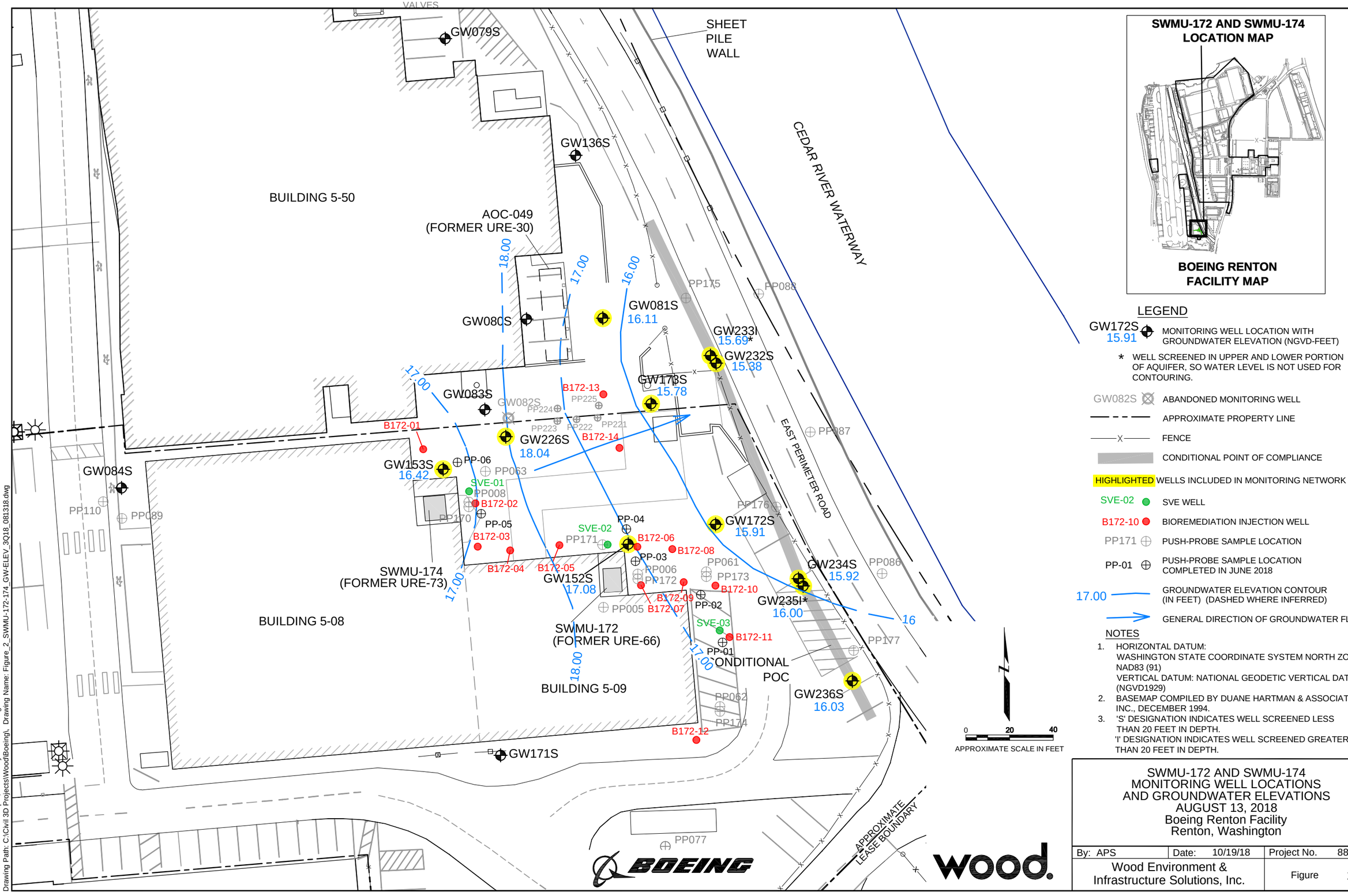
NOTES

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

0 10 20
APPROXIMATE SCALE IN FEET

SWMU-168 MONITORING WELL LOCATIONS AND GROUNDWATER ELEVATIONS AUGUST 13, 2018 Boeing Renton Facility Renton, Washington

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



SWMU-172 AND SWMU-174 LOCATION MAP

BOEING RENTON FACILITY MAP

LEGEND

- GW172S 15.91 — MONITORING WELL LOCATION WITH GROUNDWATER ELEVATION (NGVD-FEET)
- * — WELL SCREENED IN UPPER AND LOWER PORTION OF AQUIFER, SO WATER LEVEL IS NOT USED FOR CONTOURING.
- GW082S — ABANDONED MONITORING WELL
- APPROXIMATE PROPERTY LINE
- FENCE
- CONDITIONAL POINT OF COMPLIANCE
- HIGHLIGHTED WELLS INCLUDED IN MONITORING NETWORK
- SVE-02 — SVE WELL
- B172-10 — BIOREMEDIATION INJECTION WELL
- PP171 — PUSH-PROBE SAMPLE LOCATION
- PP-01 — PUSH-PROBE SAMPLE LOCATION COMPLETED IN JUNE 2018
- 17.00 — GROUNDWATER ELEVATION CONTOUR (IN FEET) (DASHED WHERE INFERRED)
- GENERAL DIRECTION OF GROUNDWATER FLOW

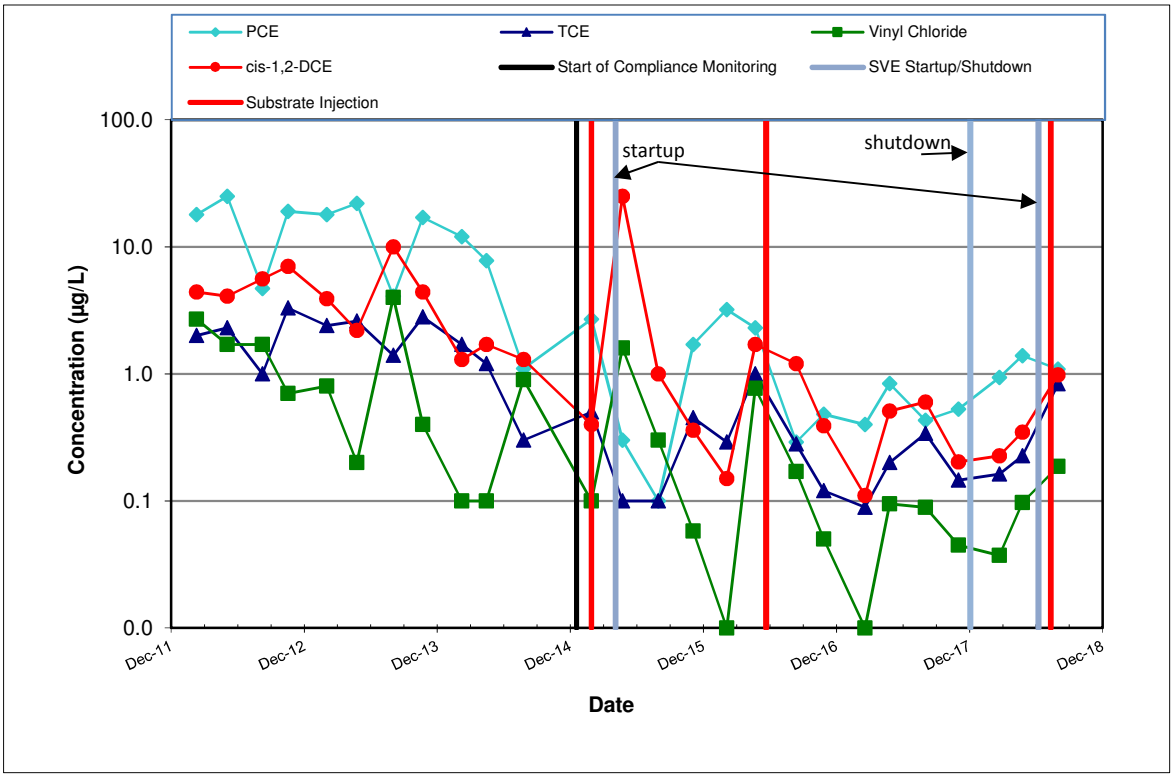
NOTES

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

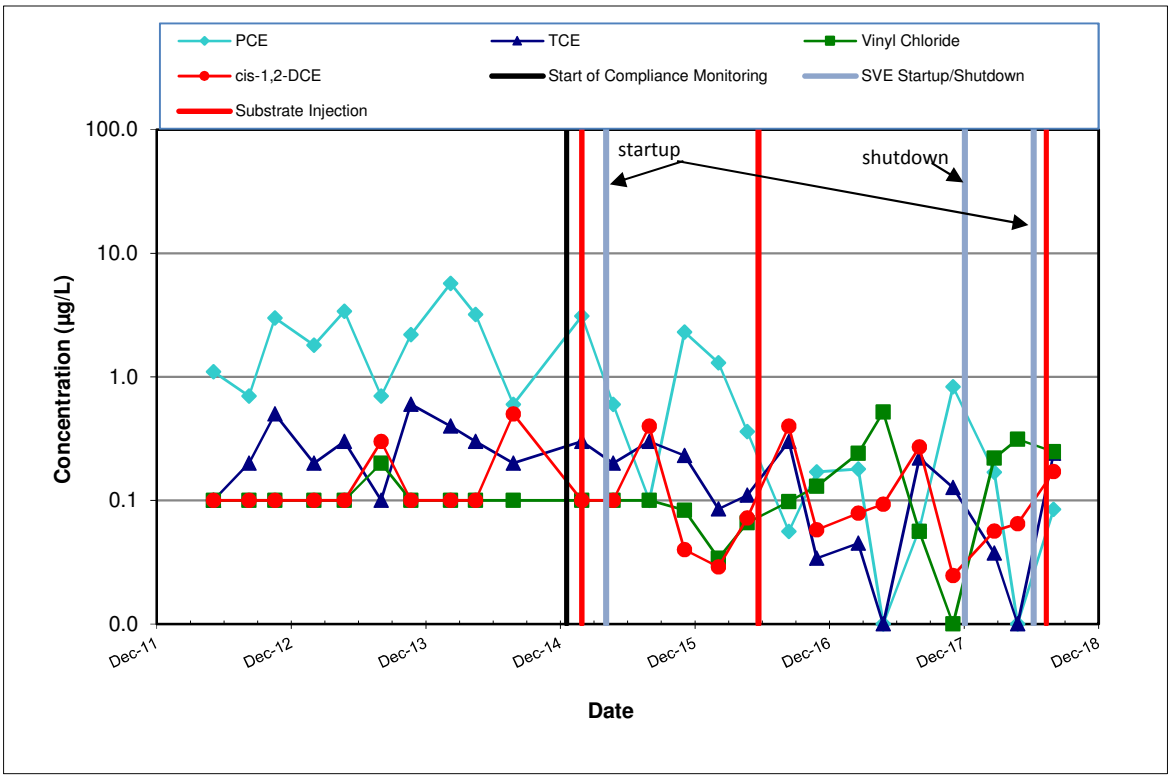
SWMU-172 AND SWMU-174 MONITORING WELL LOCATIONS AND GROUNDWATER ELEVATIONS AUGUST 13, 2018 Boeing Renton Facility Renton, Washington

By: APS	Date: 10/19/18	Project No. 8888
Wood Environment & Infrastructure Solutions, Inc.	Figure	2

Plot Date: 10/19/18 - 1:45pm, Plotted by: mike.stenberg
Drawing Path: C:\Civil 3D Projects\WoodBoeing\, Drawing Name: Figure_2_SWMU-172-174_GW-ELEV_3Q18_081318.dwg



SOURCE AREA WELL GW152S

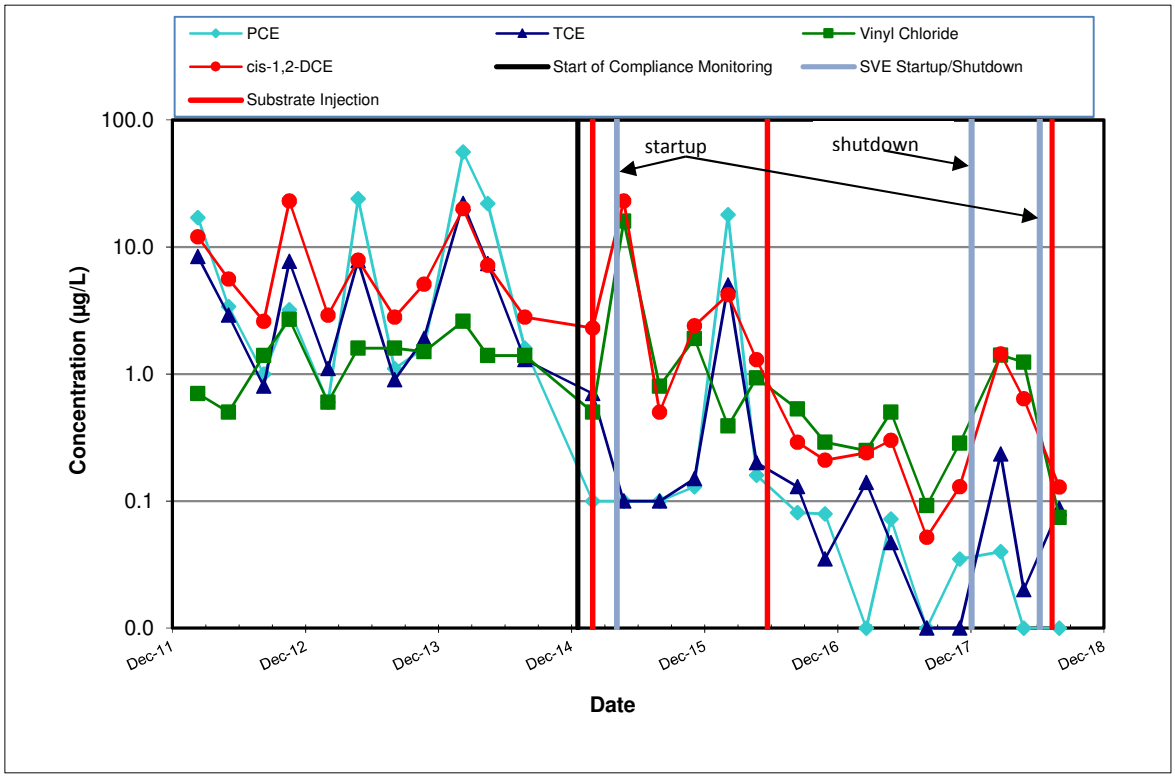


Note: non-detected values shown at one-half the reporting limit

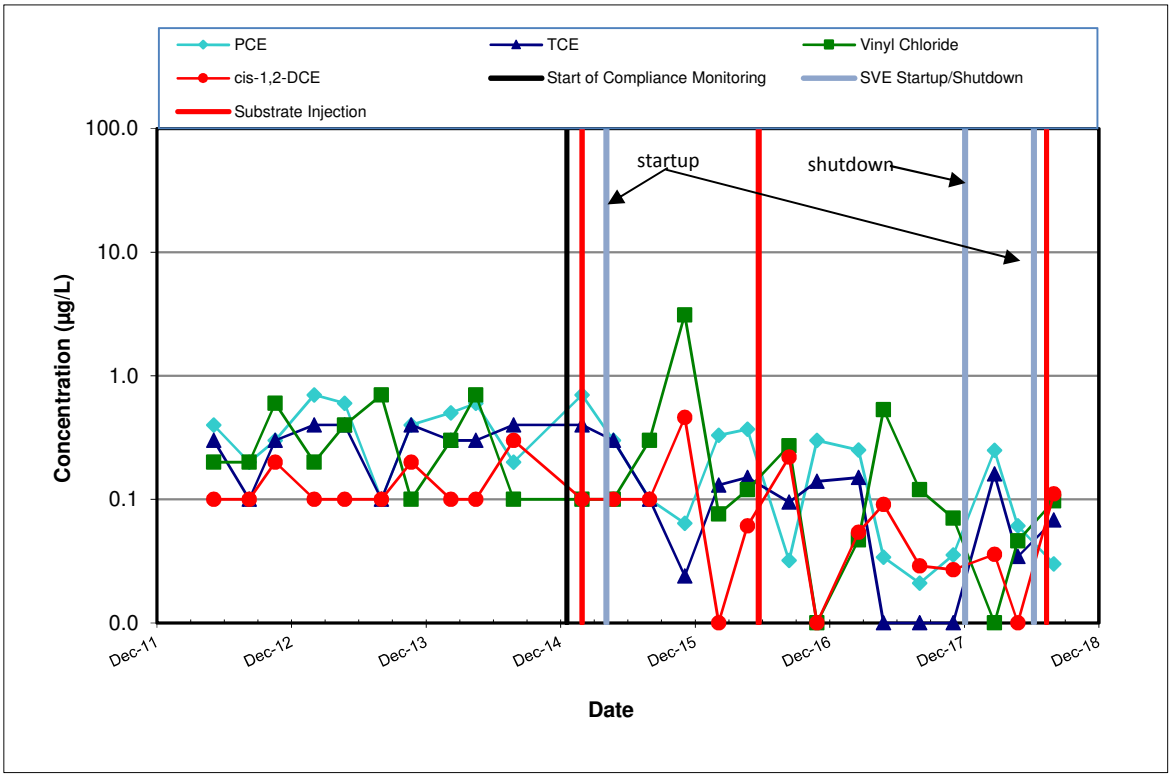
SOURCE AREA WELL GW153S

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

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



DOWNGRADIENT PLUME AREA WELL GW172S

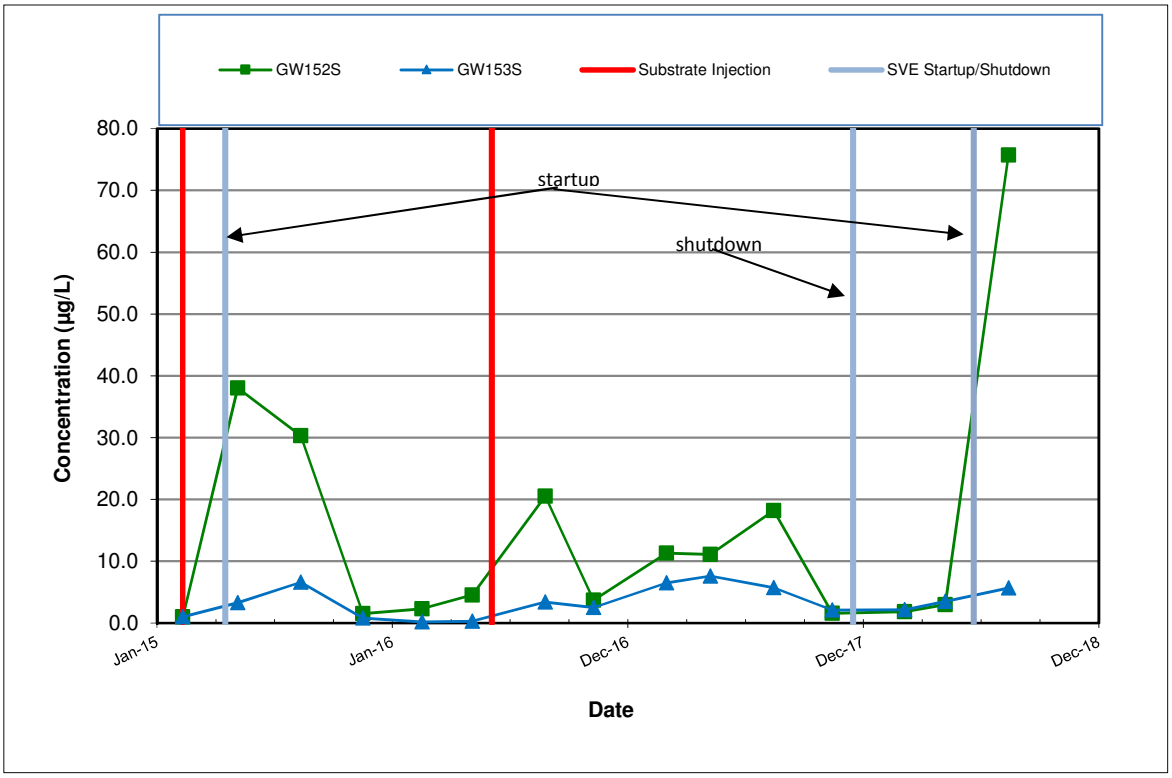


Note: non-detected values shown at one-half the reporting limit

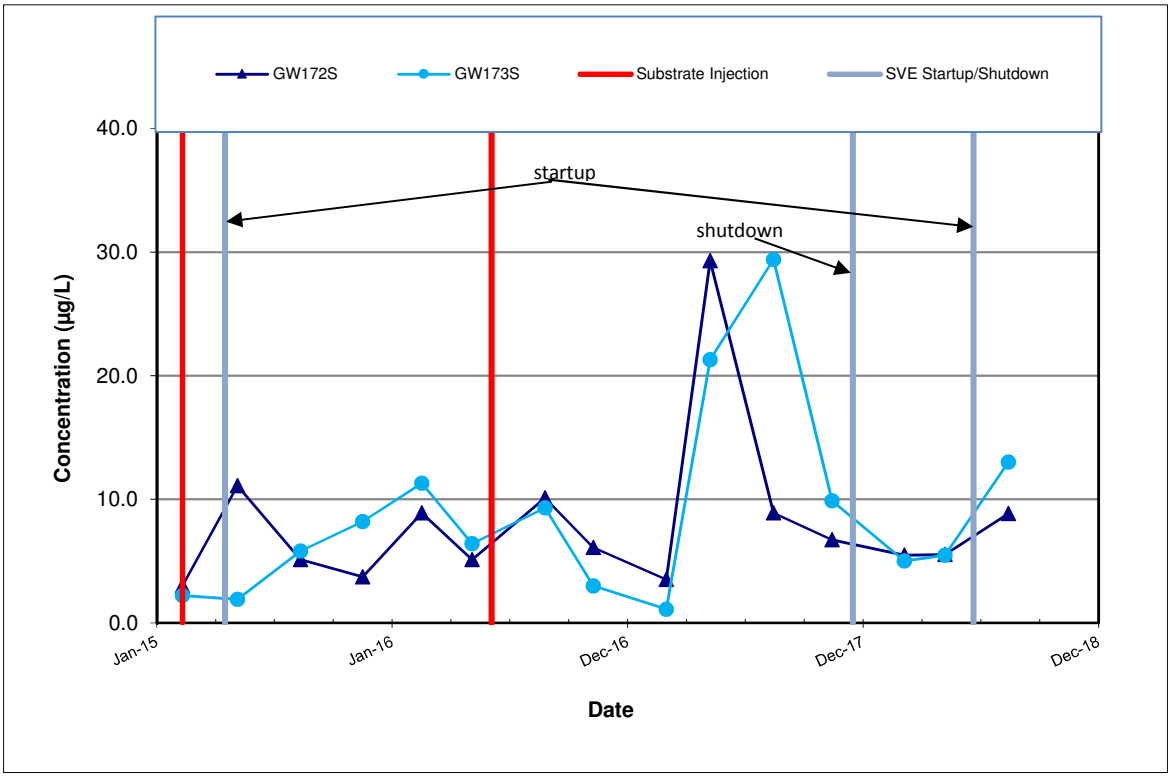
DOWNGRADIENT PLUME AREA WELL GW173S

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

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



TOTAL ARSENIC IN SOURCE AREA WELLS

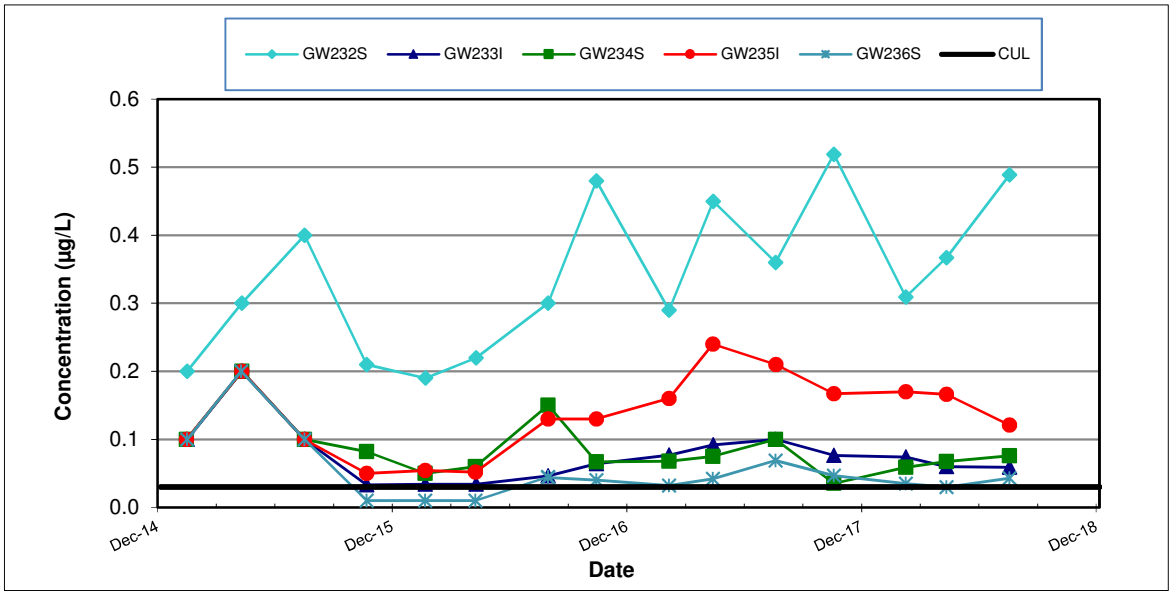


TOTAL ARSENIC IN DOWNGRADIENT PLUME AREA WELLS

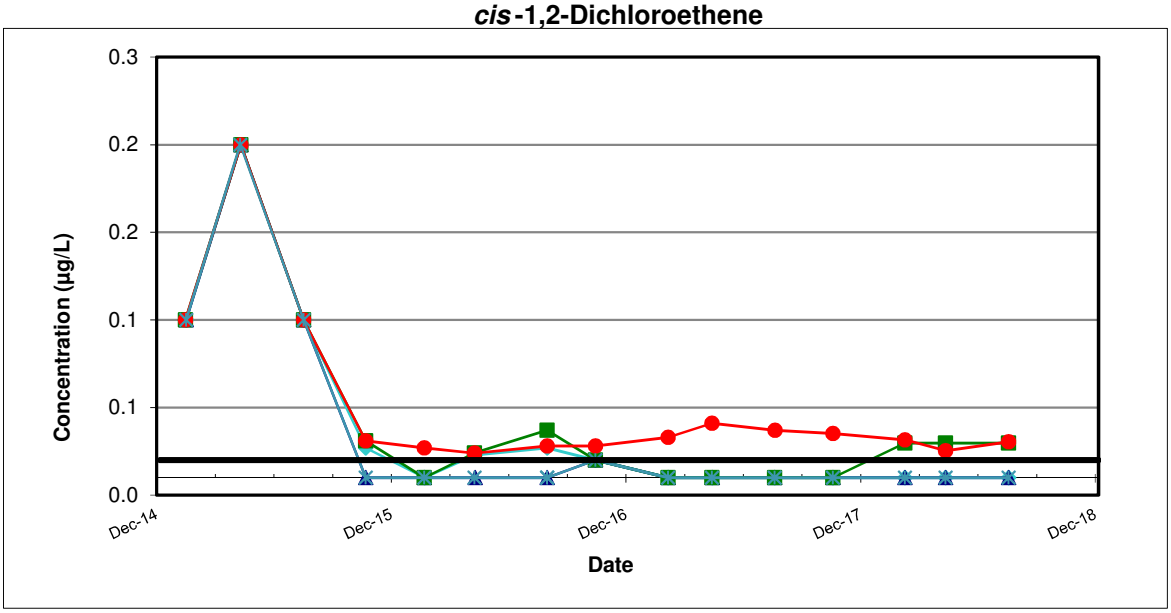
Note: non-detected values shown at one-half the reporting limit

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

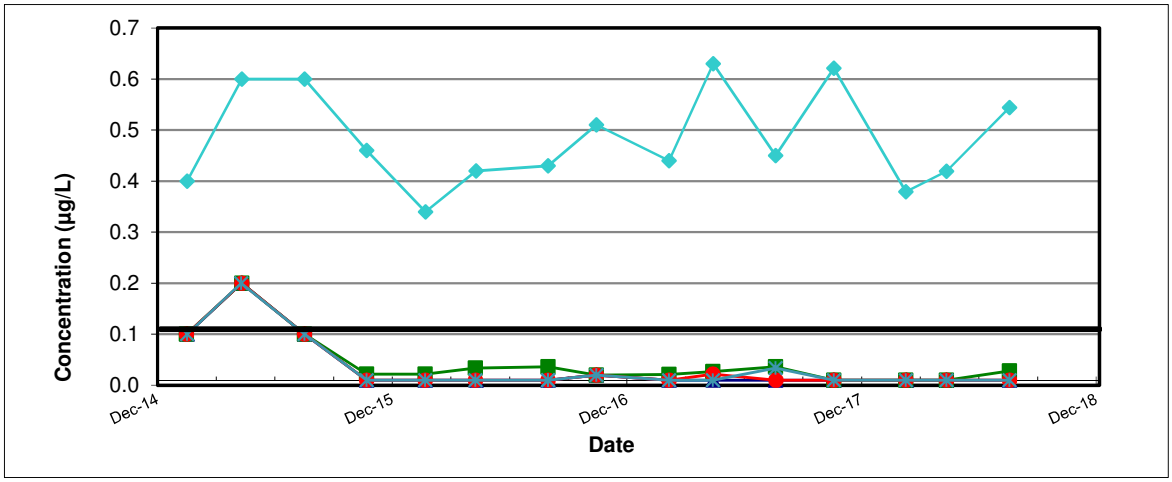
P:\8888 - Boeing Renton\02 Data Management\Grapher and Excel Figure Files\excel\Figures 3 & 4_ SWMU_172-174 Trend Plots.xls



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



Trichloroethene



Vinyl Chloride

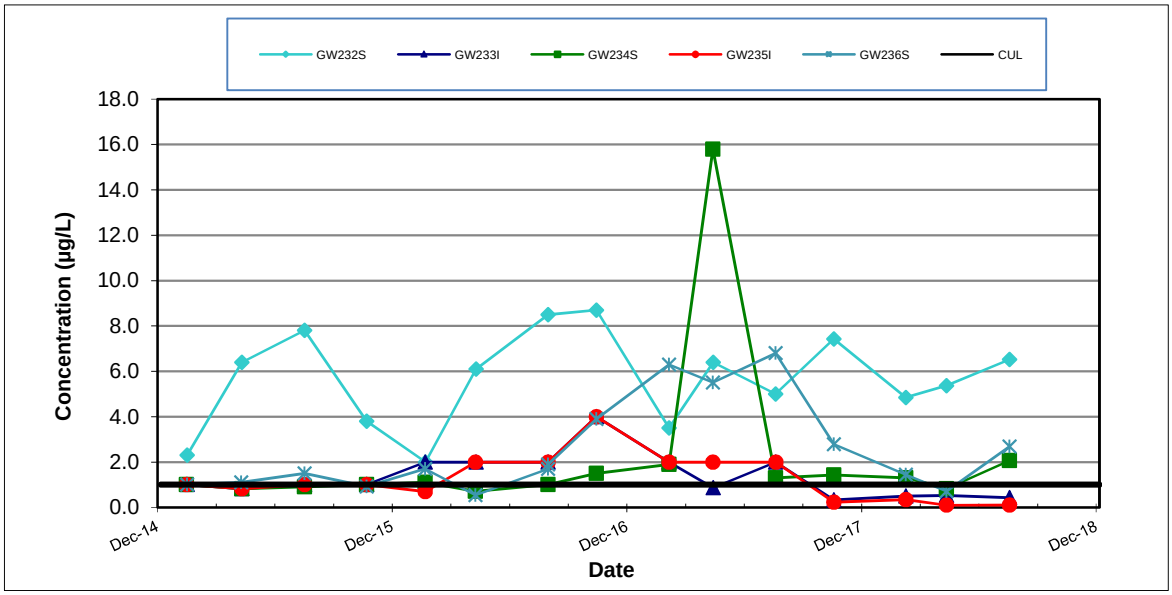
wood.

SWMU-172 AND SWMU-174 TREND PLOTS FOR CIS-1,2-DICHLROETHENE, TRICHLOROETHENE, AND VINYL CHLORIDE IN CPOC AREA WELLS
Boeing Renton Facility
Renton, Washington

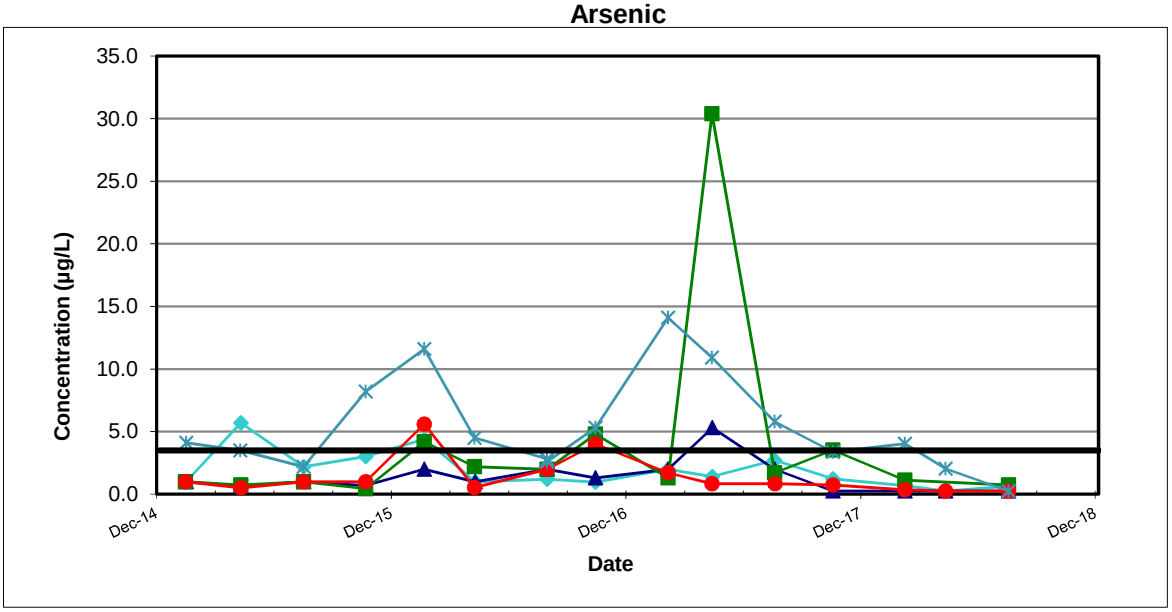
Project No. 8888

Figure 6

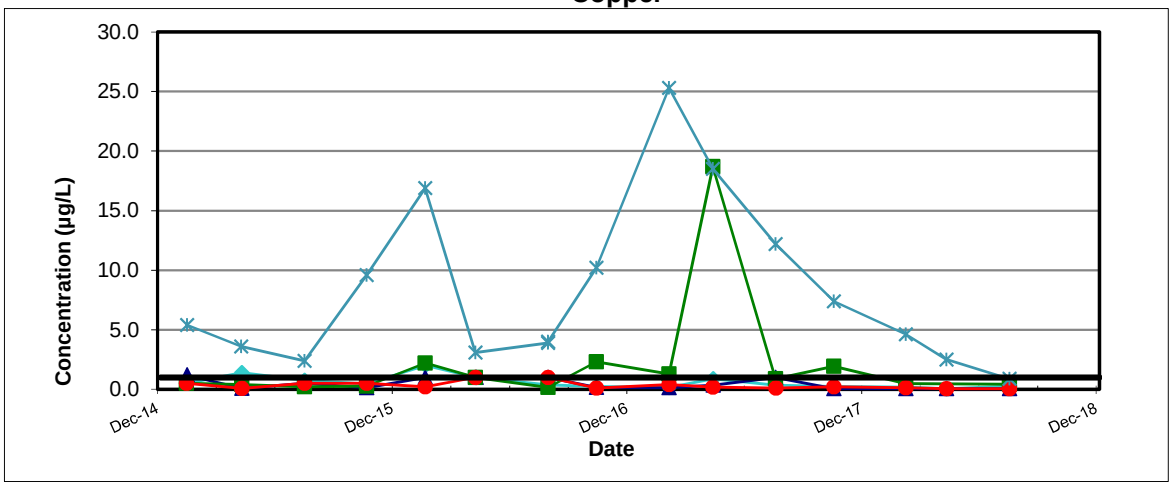
P:\8888 - Boeing Renton\02 Data Management\Grapher and Excel Figure Files\excel\Figures 3 & 4_ SWMU_172-174 Trend Plots.xls



Arsenic



Copper



Lead

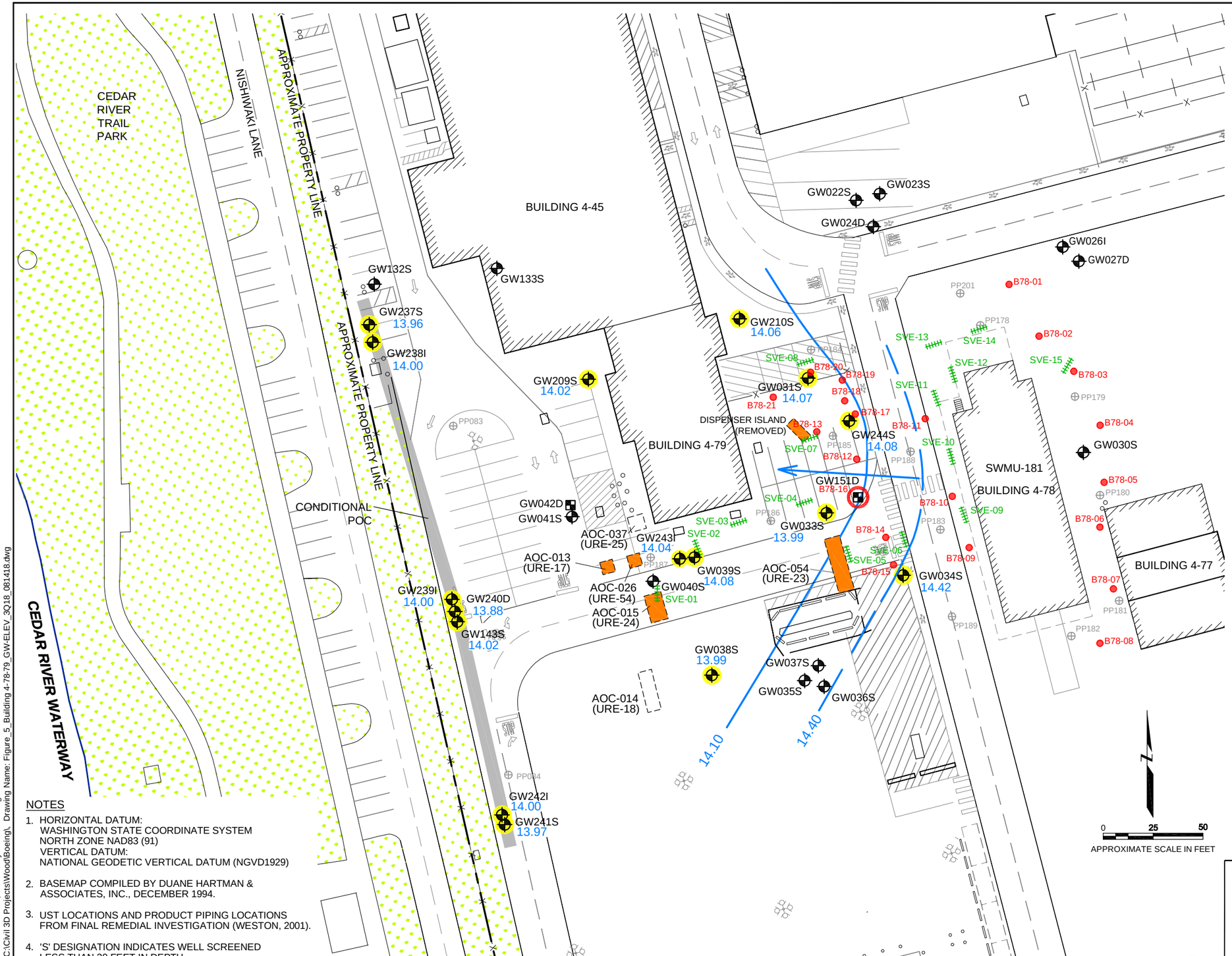
P:\8888 - Boeing Renton\02 Data Management\Grapher and Excel Figure Files\excel\Figures 3 & 4_ SWMU_172-174 Trend Plots.xls

wood.

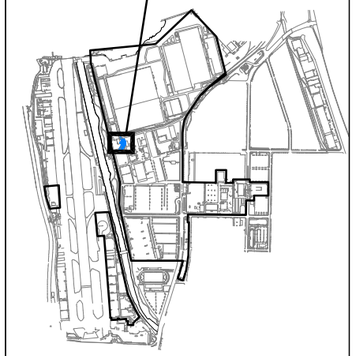
SWMU-172 AND SWMU-174 TREND PLOTS FOR ARSENIC, COPPER AND LEAD IN CPOC AREA WELLS
Boeing Renton Facility
Renton, Washington

Project No. 8888

Figure 7



4-78/79 SWMU/AOC GROUP LOCATION MAP



BOEING RENTON FACILITY MAP

LEGEND

GW031S 14.07 — 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.

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

GENERAL DIRECTION OF GROUNDWATER FLOW

GW042D — EXTRACTION WELL

ABANDONED MONITORING WELL

SVE-15 — HORIZONTAL SVE WELL

B78-12 — BIOREMEDIATION INJECTION WELL

EXTRACTION WELL CONVERTED TO INJECTION WELL

PP083 — PUSH-PROBE SAMPLE LOCATION

PUSH-PROBE SAMPLE LOCATION COMPLETED IN JUNE 2018

FENCE

APPROXIMATE FUEL AND NON-CHLORINATED VOC SOURCE AREAS

REMOVED UST (WESTON, 2001)

CONDITIONAL POINT OF COMPLIANCE

HIGHLIGHTED WELLS INCLUDED IN MONITORING NETWORK

APPROXIMATE SCALE IN FEET

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.

BUILDING 4-78/79 SWMU/AOC GROUP MONITORING WELL LOCATIONS AND GROUNDWATER ELEVATIONS AUGUST 14, 2018 Boeing Renton Facility Renton, Washington

By: APS	Date: 10/31/18	Project No. 8888
Wood Environment & Infrastructure Solutions, Inc.		Figure 8

Plot Date: 10/31/18 - 11:33am, Plotted by: mike.stenberg
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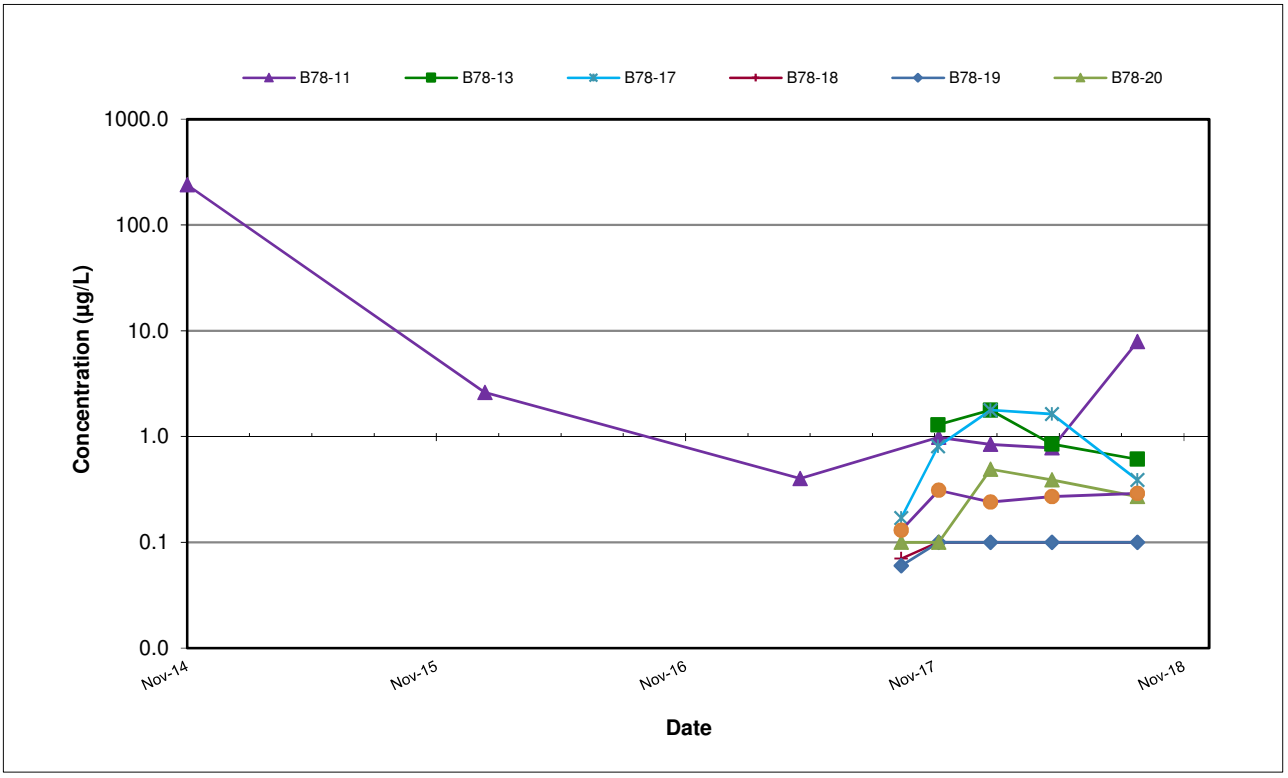
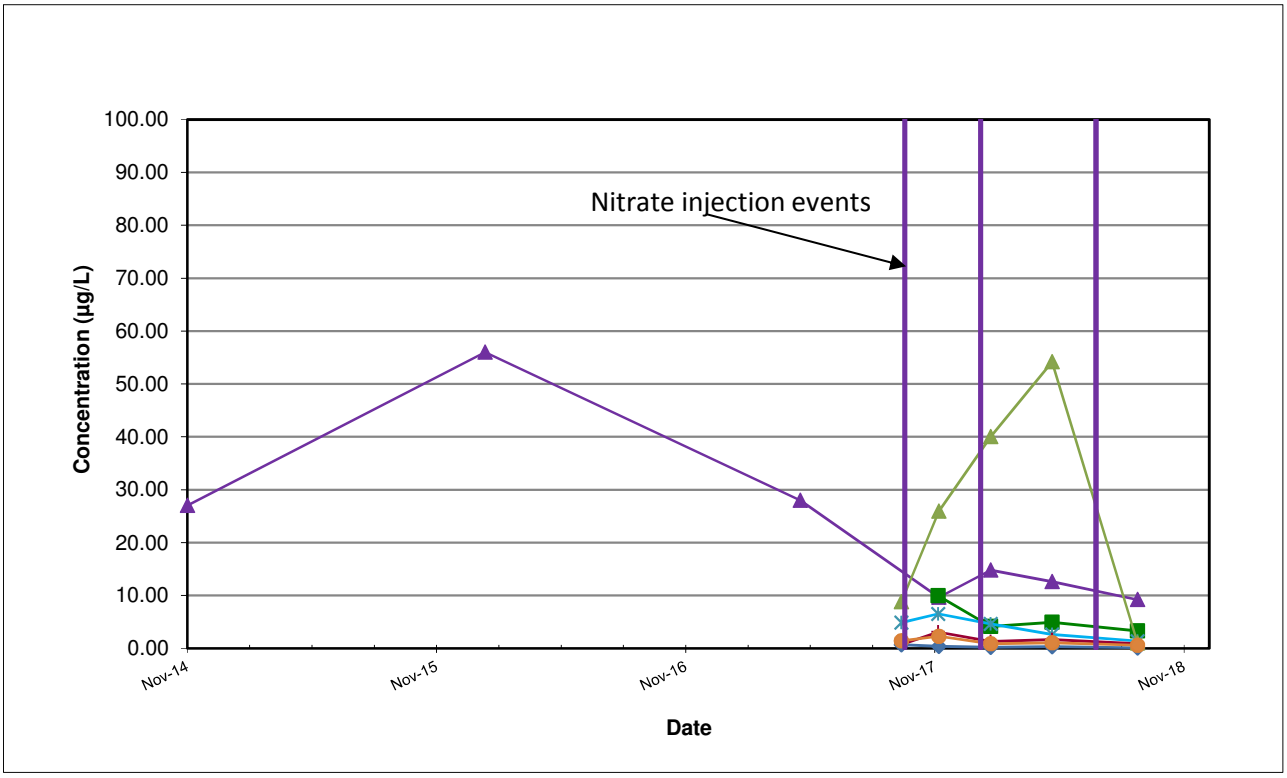


cis-1,2-Dichloroethene

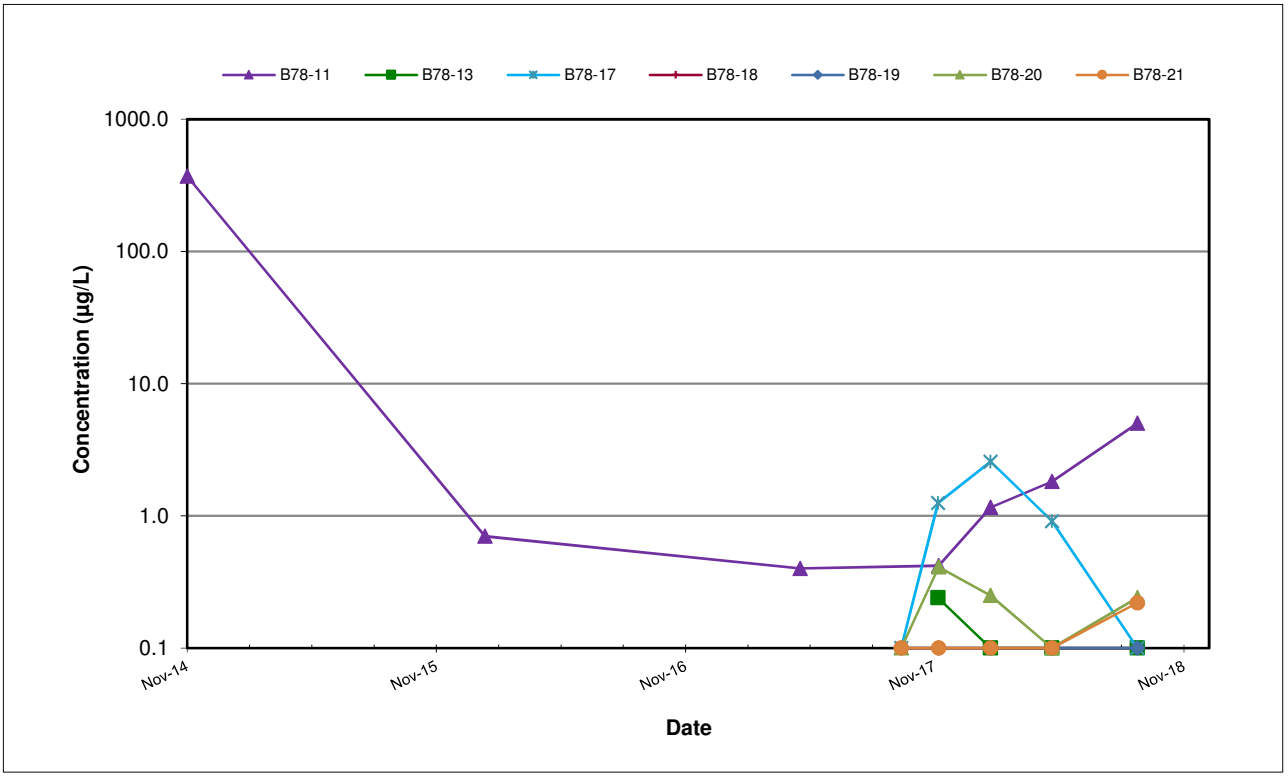


Note: non-detected values shown at one-half the reporting limit

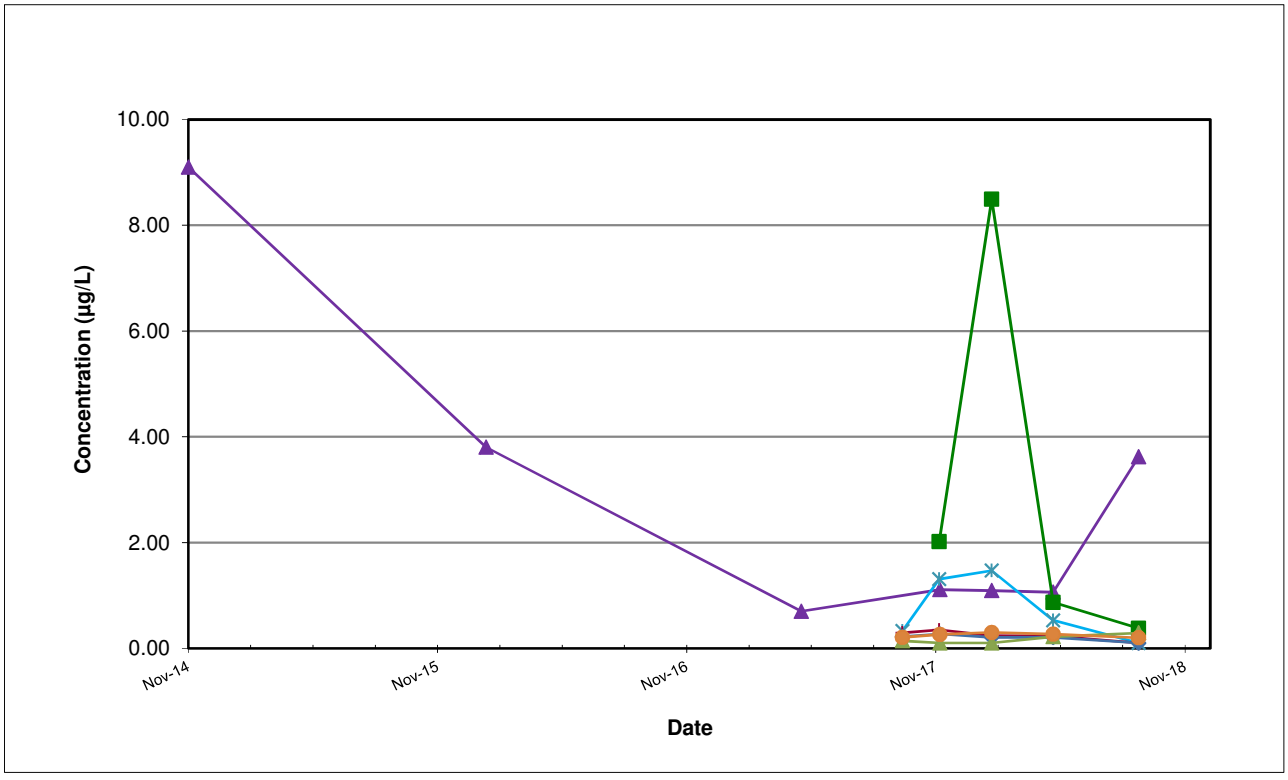
Benzene

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

wood.	BUILDING 4-78/79 SWMU/AOC GROUP TREND PLOTS FOR CIS-1,2-DICHLOROETHENE AND BENZENE IN INJECTION WELLS Boeing Renton Facility Renton, Washington	Project No. 8888 Figure 9



Trichloroethene



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

Vinyl Chloride

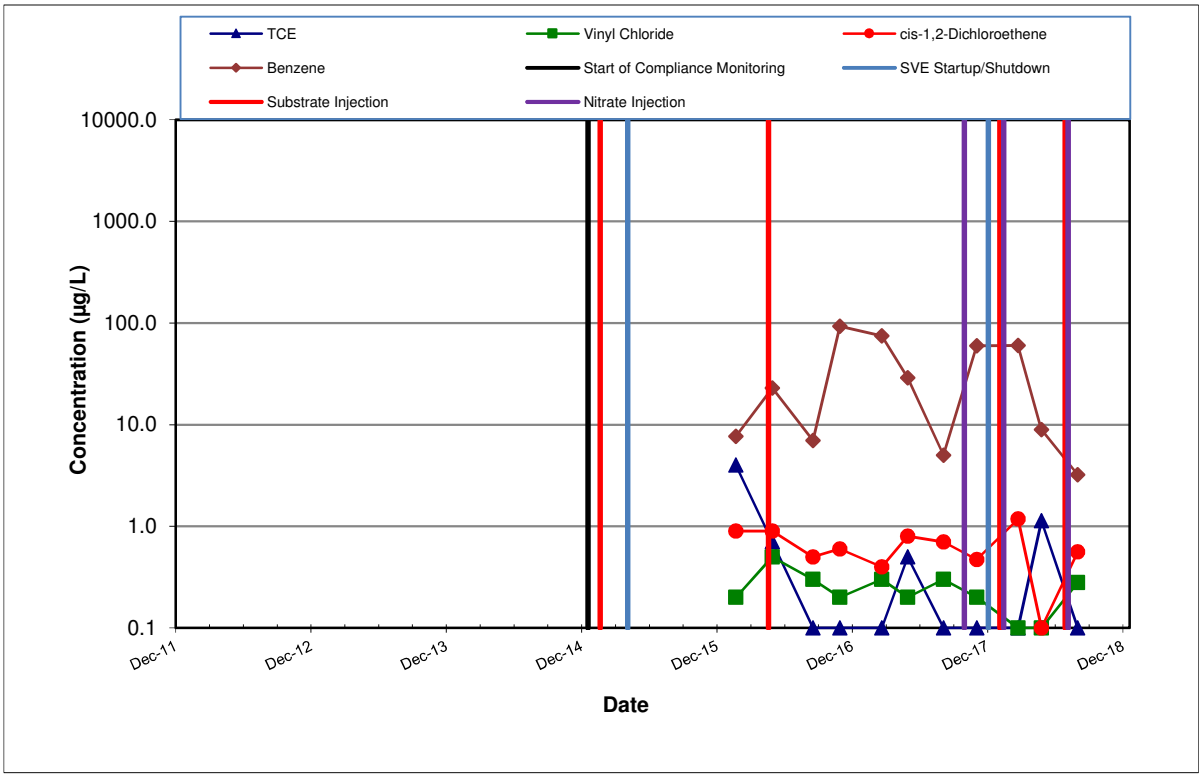
P:\8888 - Boeing Renton\02 Data Management\Grapher and Excel Figure Files\excel\Figures 7 & 8_ Bldg 4-78-79 Trend Plots (Autosaved).xls

wood.

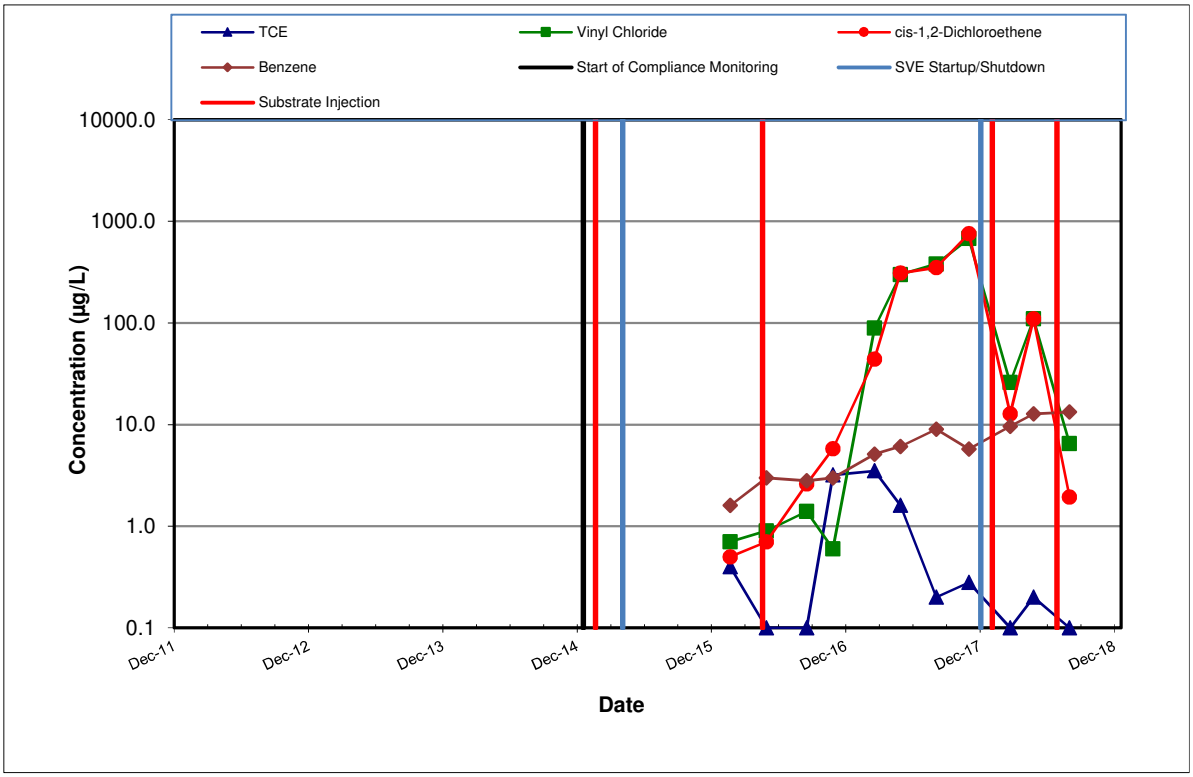
BUILDING 4-78/79 SWMU/AOC GROUP TREND PLOTS FOR
TRICHLOROETHENE AND VINYL CHLORIDE IN INJECTION WELLS
Boeing Renton Facility
Renton, Washington

Project No. 8888

Figure 10



SOURCE AREA WELL GW031S

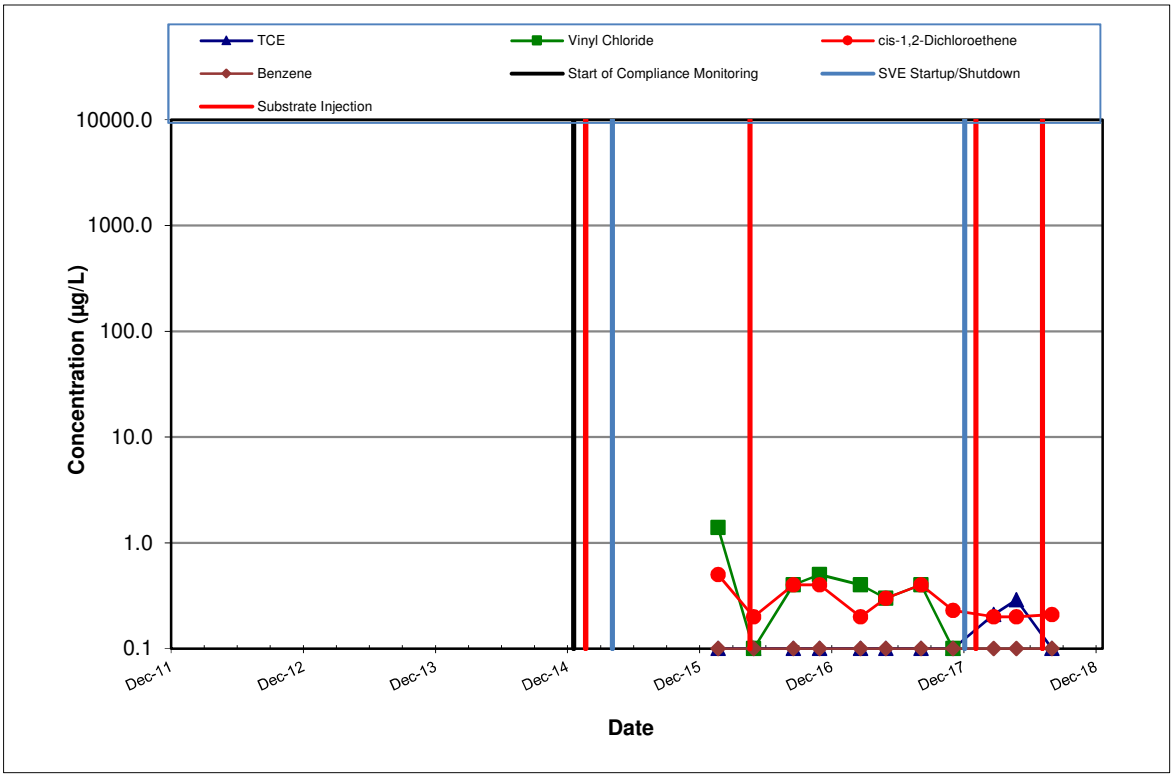


Note: non-detected values shown at one-half the reporting limit

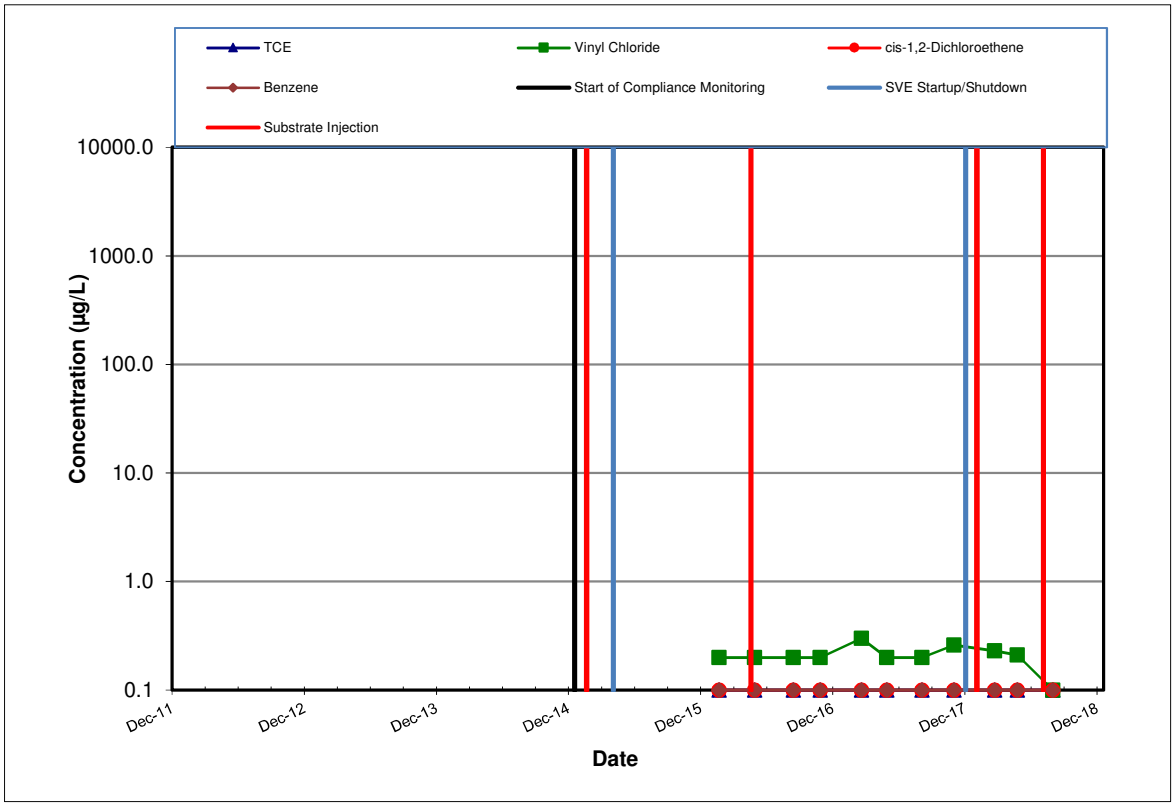
SOURCE AREA WELL GW033S

wood.	BUILDING 4-78/79 SWMU/AOC GROUP TREND PLOTS FOR SOURCE AREA WELLS GW031S AND GW033S Boeing Renton Facility Renton, Washington	Project No. 8888 Figure 11

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



SOURCE AREA WELL GW034S

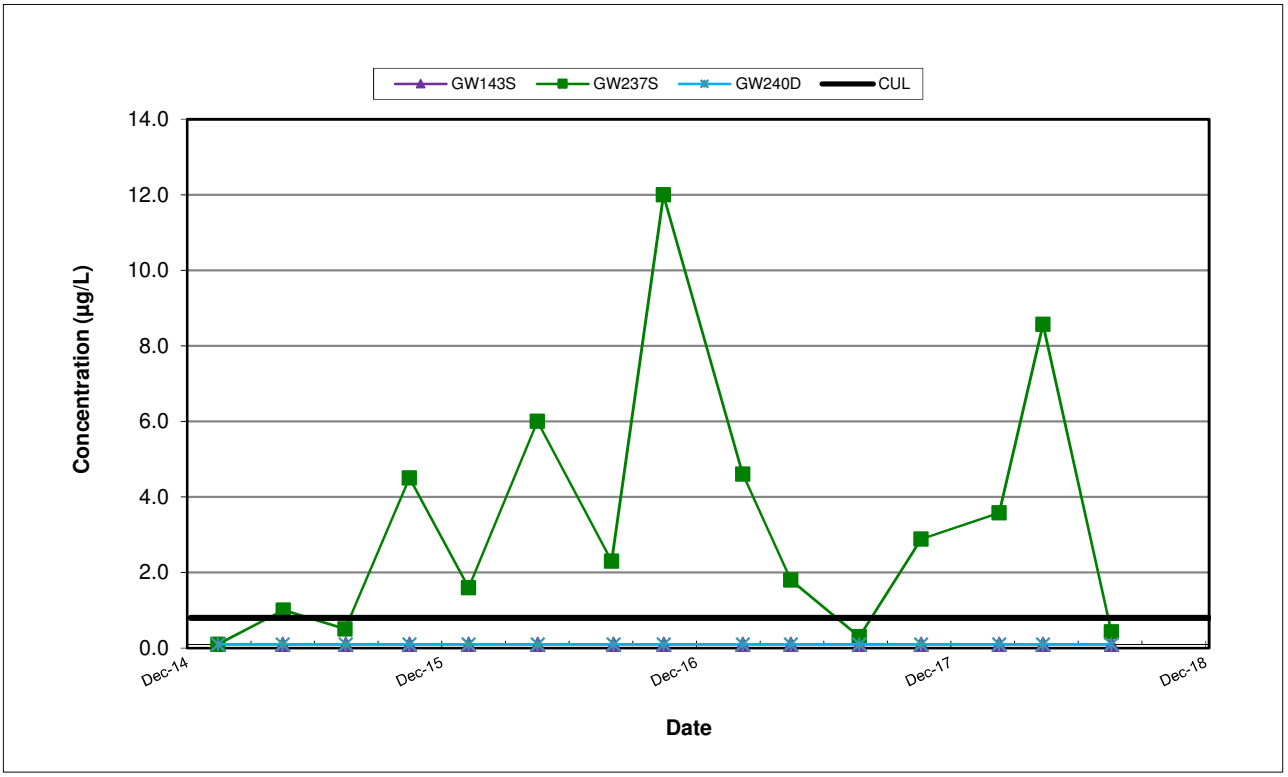


Note: non-detected values shown at one-half the reporting limit

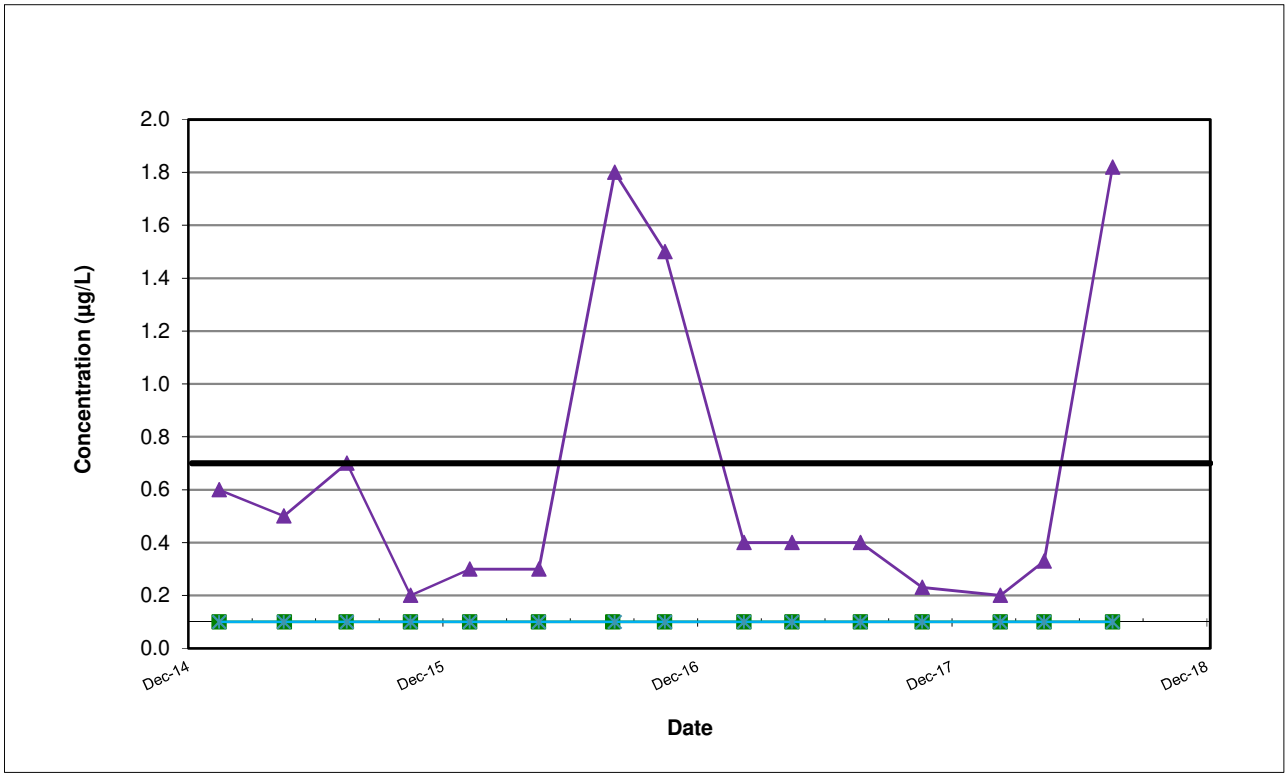
DOWNGRADIENT PLUME AREA WELL GW209S

wood.	BLDG 4-78/79 SWMU/AOC GROUP TREND PLOTS FOR SOURCE AREA WELL GW034S AND DOWNGRADIENT PLUME AREA WELL GW209S Boeing Renton Facility Renton, Washington	Project No. 8888 Figure 12

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



Benzene



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

cis-1,2-Dichloroethene

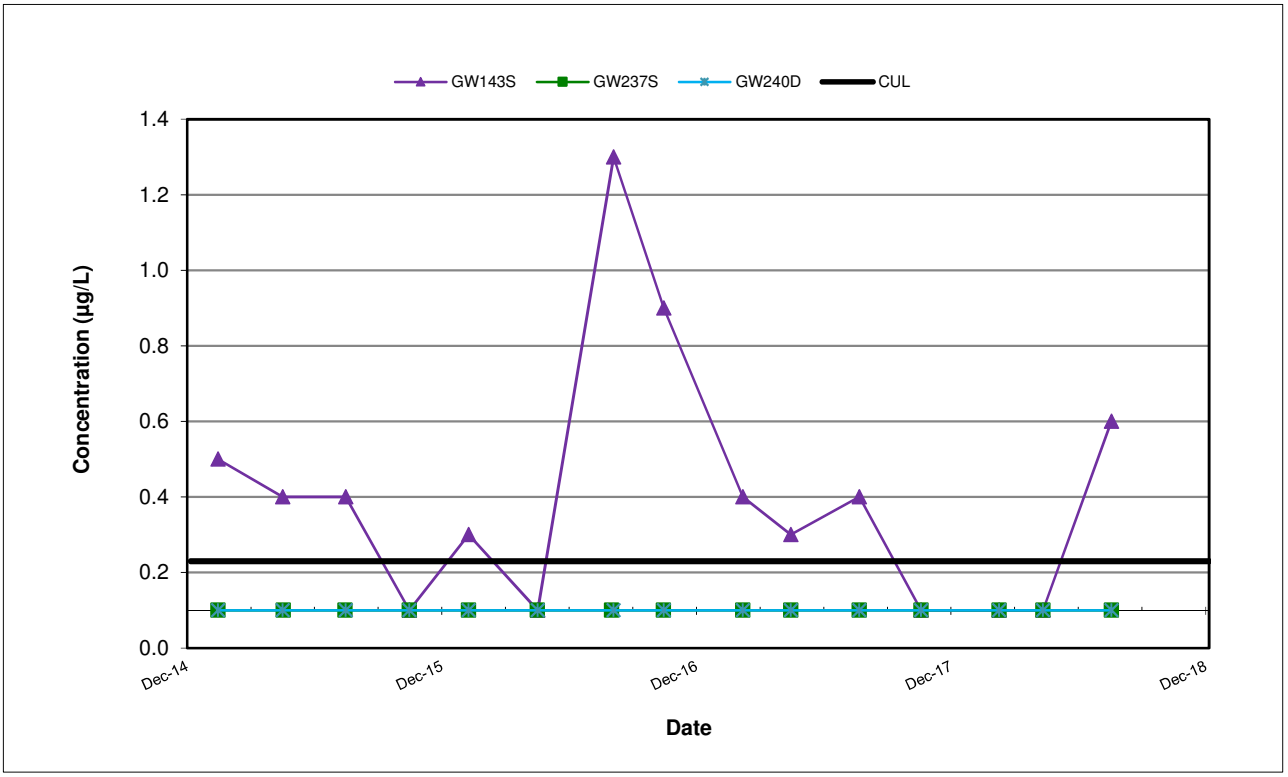
P:\8888 - Boeing Renton\02 Data Management\Grapher and Excel Figure Files\excel\Figures 7 & 8_ Bldg 4-78-79 Trend Plots (Autosaved).xls

wood.

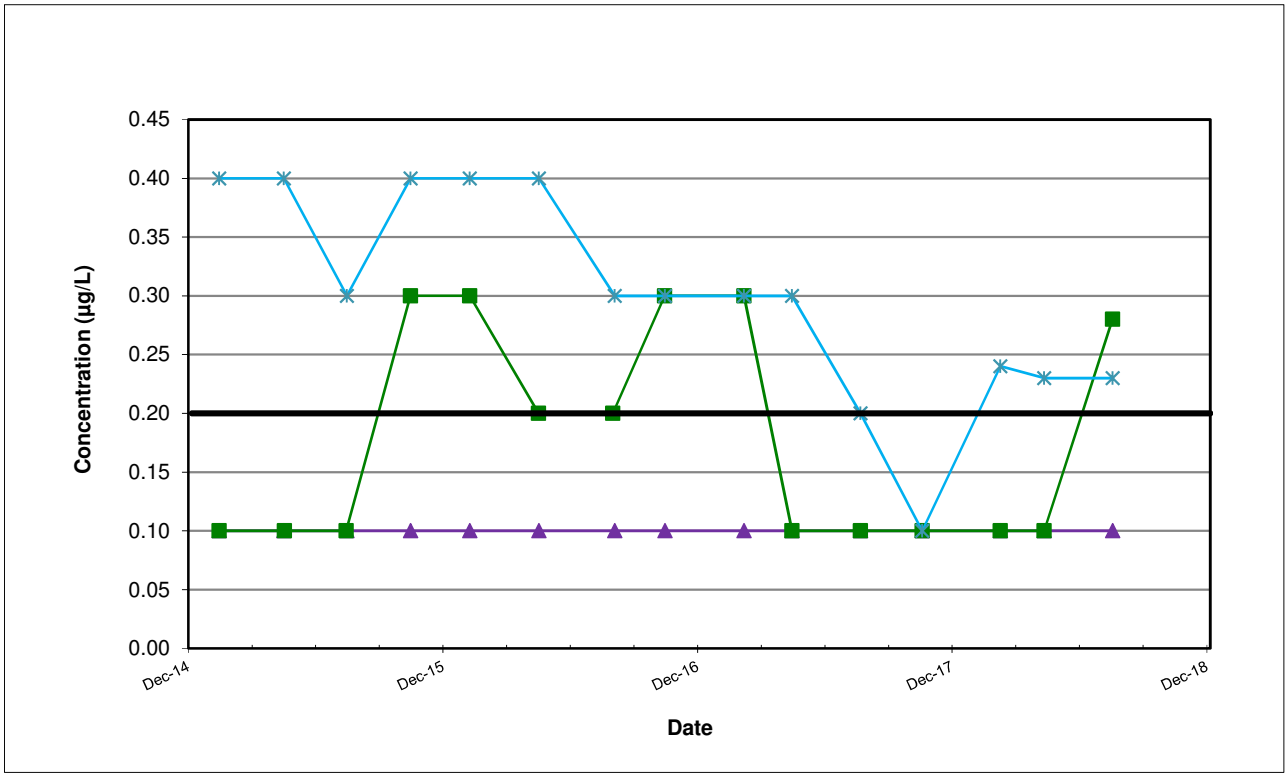
BUILDING 4-78/79 SWMU/AOC GROUP TREND PLOTS FOR BENZENE AND CIS-1,2-DICHLOROETHENE IN CPOC AREA WELLS
Boeing Renton Facility
Renton, Washington

Project No. 8888

Figure 13



Trichloroethene



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

Vinyl Chloride

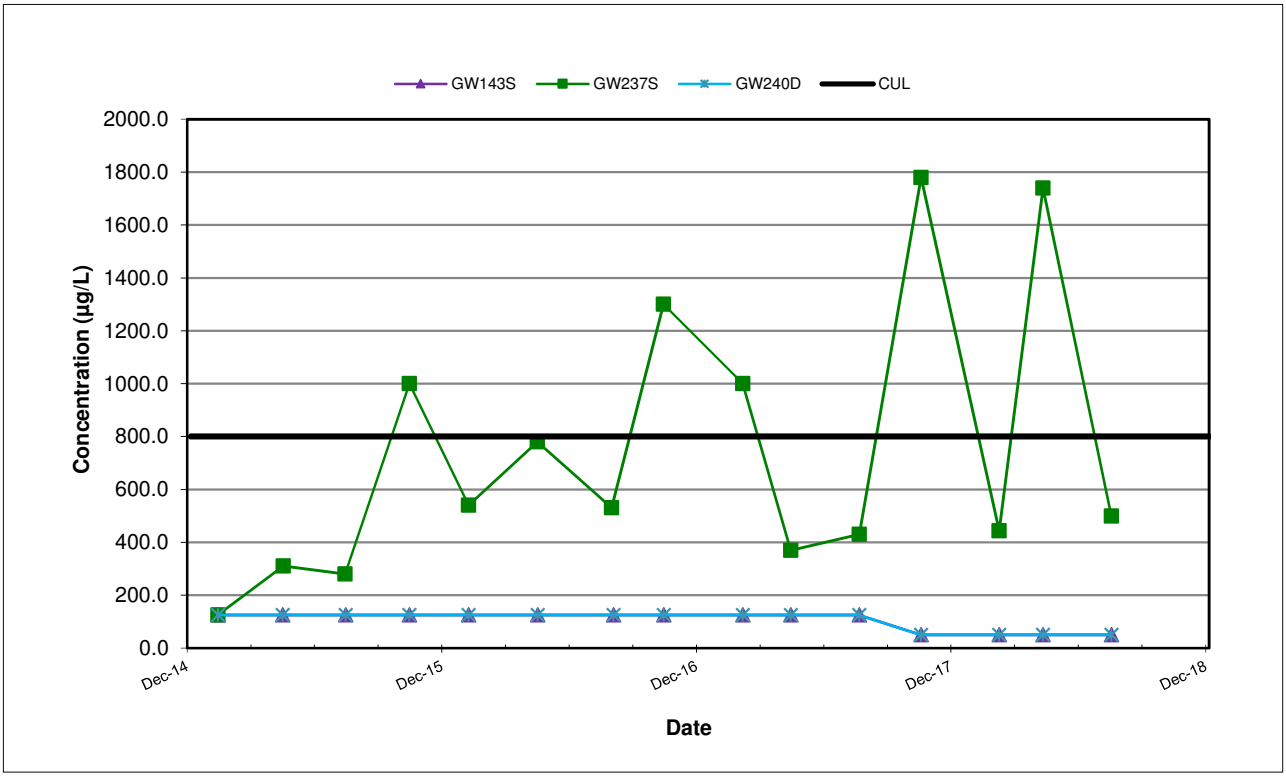
P:\8888 - Boeing Renton\02 Data Management\Grapher and Excel Figure Files\excel\Figures 7 & 8_ Bldg 4-78-79 Trend Plots (Autosaved).xls

wood.

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

Project No. 8888

Figure 14

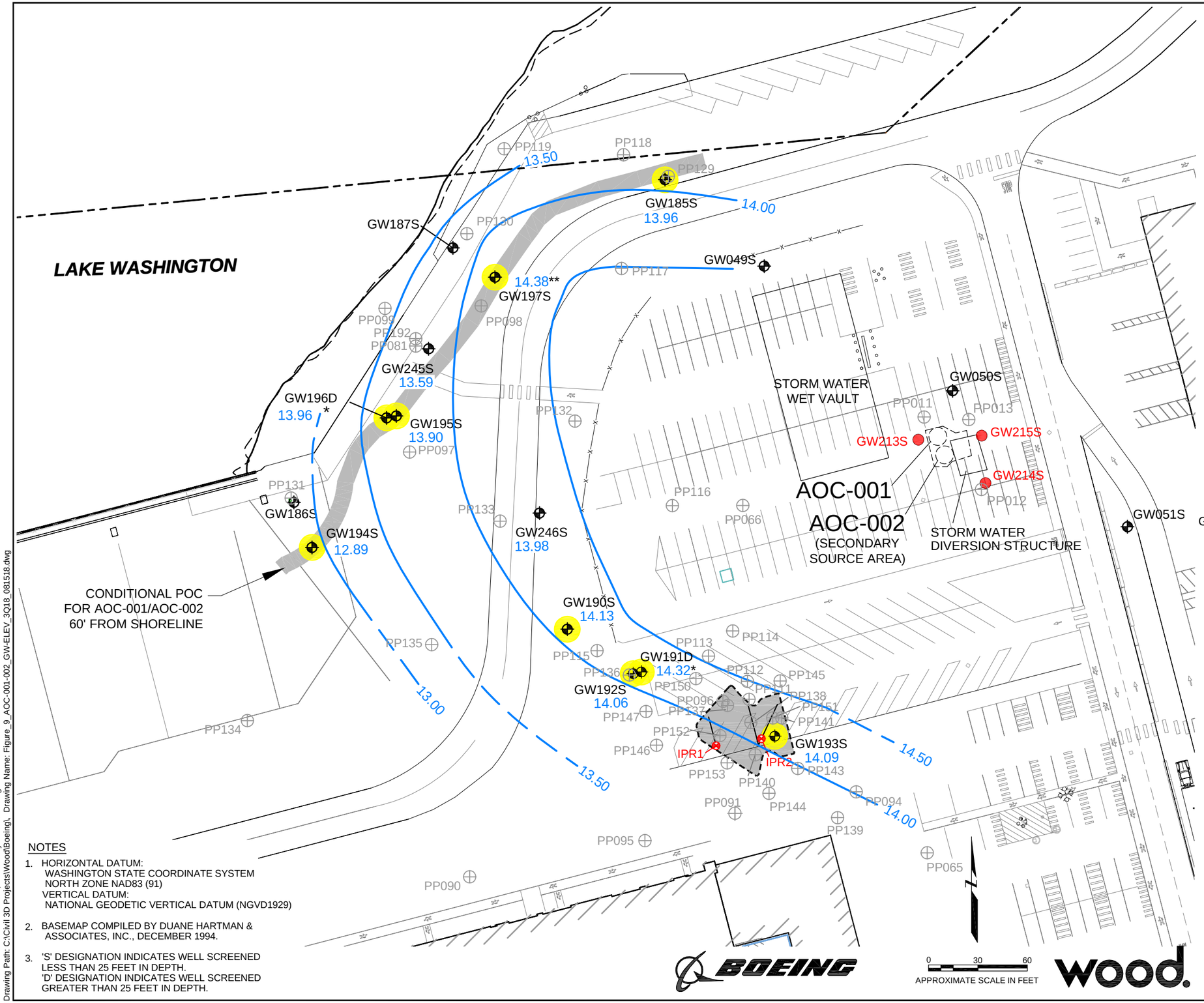


TPH as Gasoline

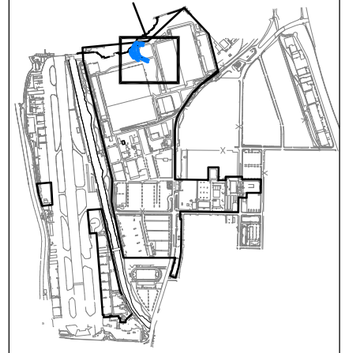
non-detected values shown at one-half the reporting limit

wood.	BUILDING 4-78/79 SWMU/AOC GROUP TREND PLOTS FOR TPH AS GASOLINE IN CPOC AREA WELLS Boeing Renton Facility Renton, Washington	Project No. 8888 Figure 15

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



AOC-001 AND AOC-002
LOCATION MAP



BOEING RENTON
FACILITY MAP

LEGEND

GW195S 13.90	MONITORING WELL LOCATION WITH GROUNDWATER ELEVATION (NGVD-FEET)
NM	NOT MEASURED
*	WELL SCREENED IN LOWER PORTION OF AQUIFER, SO WATER LEVEL IS NOT USED FOR CONTOURING.
**	WATER LEVEL IS ANOMALOUS, NOT USED FOR CONTOURING.
GW227S	ABANDONED MONITORING WELL
GW215S	EXISTING ELECTRON DONOR INJECTION WELL
IPR1	EXISTING INJECTION PIPE RISER
PP011	PUSH PROBE SAMPLING LOCATION
	APPROXIMATE PROPERTY LINE
	FENCE LINE
	APPROXIMATE LIMIT OF NOVEMBER 2005 SOURCE AREA EXCAVATION
	AOC-001, AOC-002 CONDITIONAL POINT OF COMPLIANCE
HIGHLIGHTED	WELLS INCLUDED IN MONITORING NETWORK

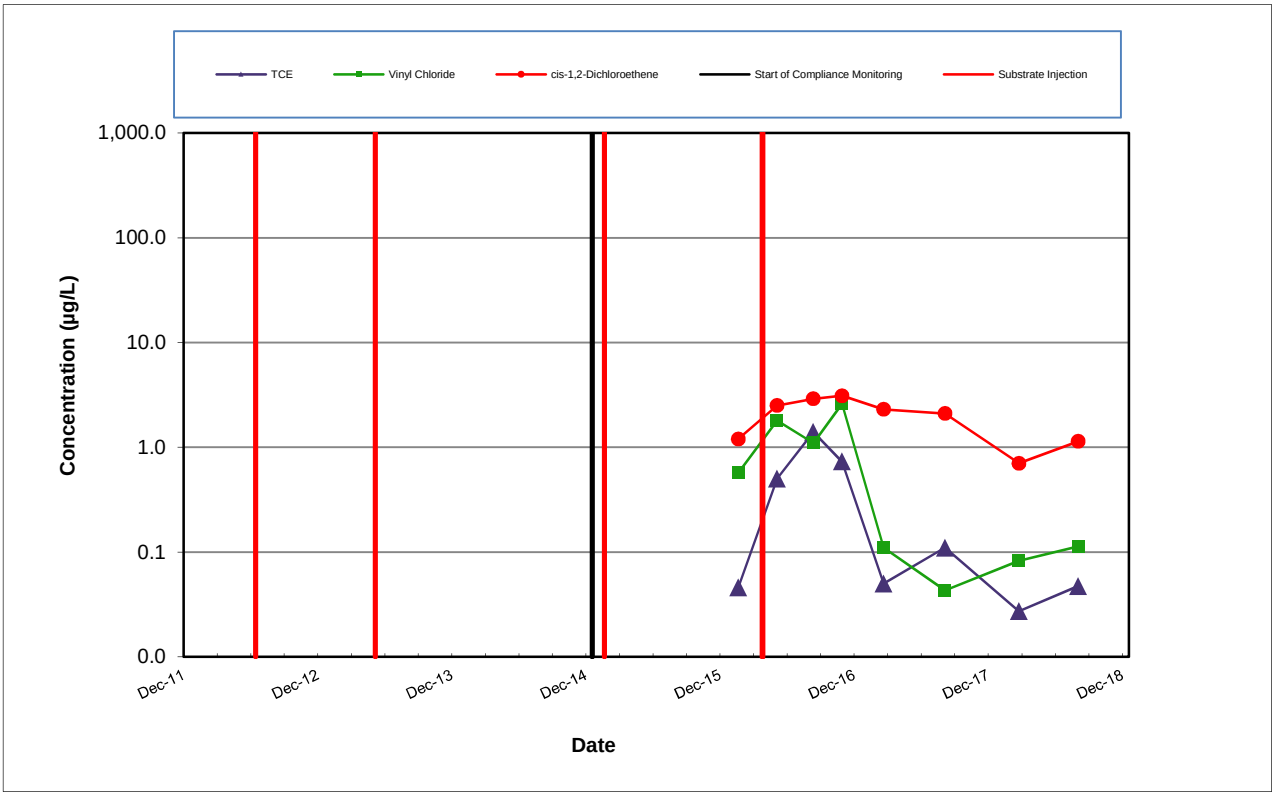
NOTES

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

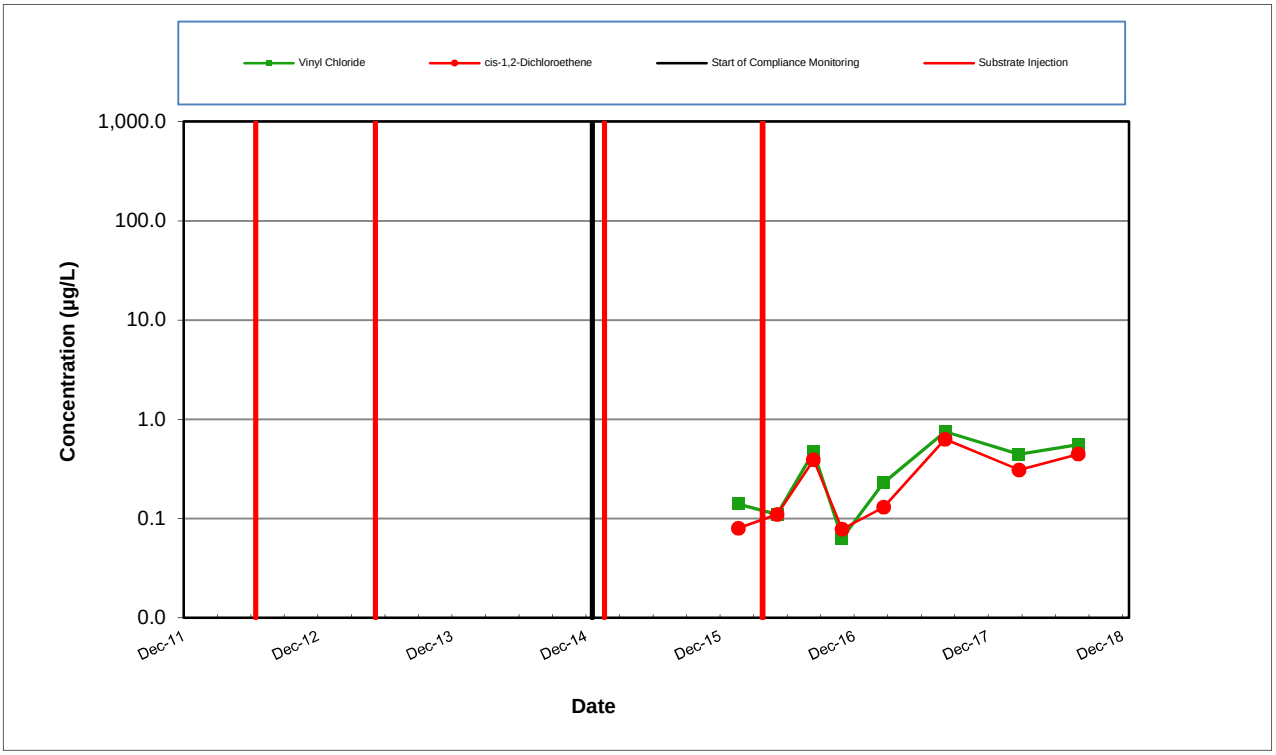
AOC-001 AND AOC-002
MONITORING WELL LOCATIONS AND GROUNDWATER ELEVATIONS
AUGUST 15, 2018
Boeing Renton Facility
Renton, Washington

By: APS	Date: 10/31/18	Project No. 8888
Wood Environment & Infrastructure Solutions, Inc.		Figure 16

Plot Date: 10/31/18 - 11:41am, Plotted by: mike.stenberg
Drawing Path: C:\Civil 3D Projects\Wood\Boeing\, Drawing Name: Figure_9_AOC-001-002_GW-ELEV_3Q18_081518.dwg



SOURCE AREA WELL GW193S

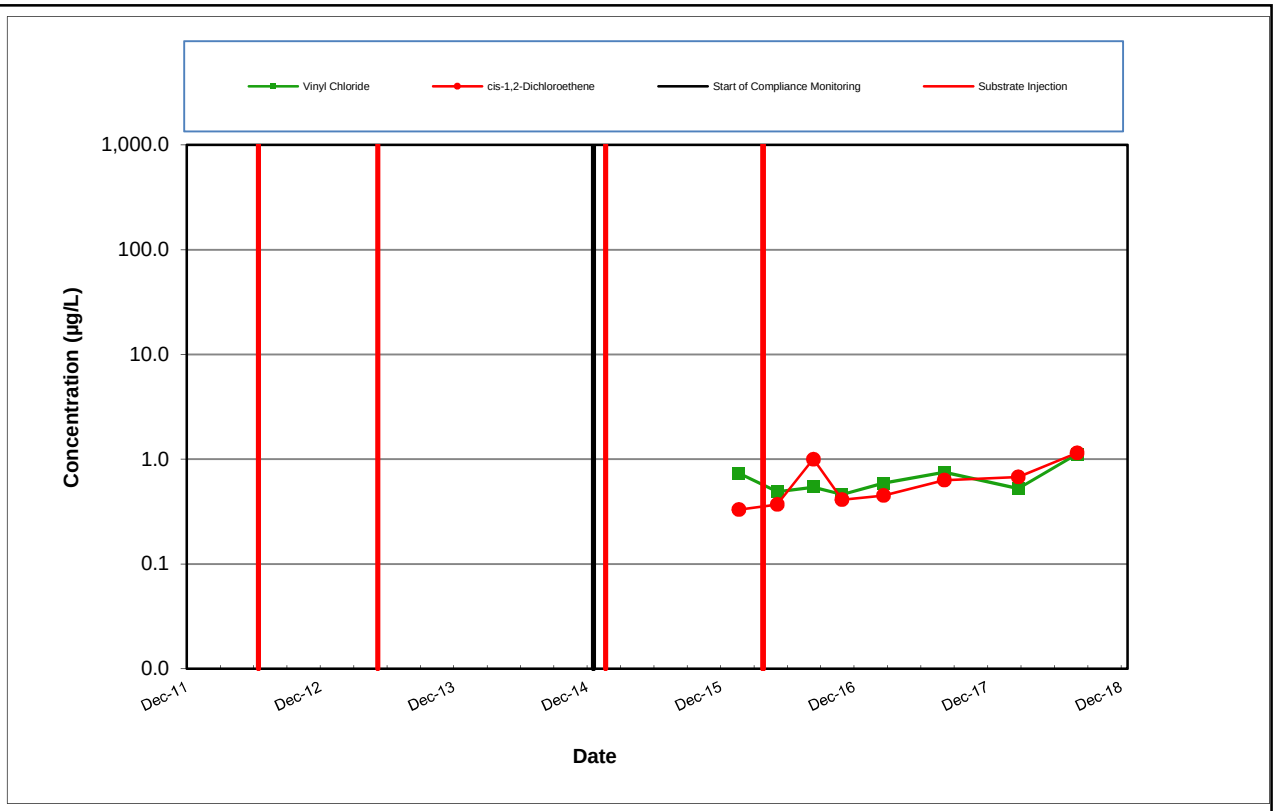


DOWNGRADIENT PLUME AREA WELL GW190S

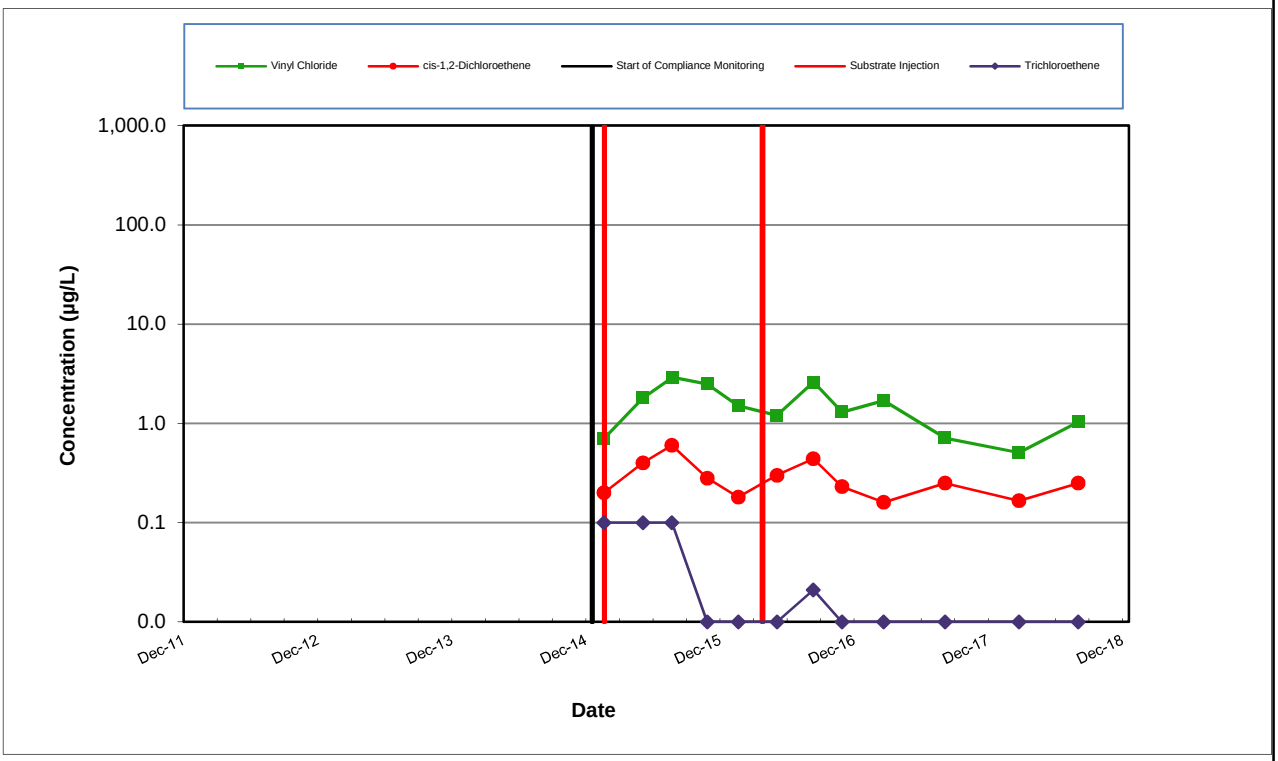
Note: non-detected values shown at one-half the reporting limit

wood.	AOC-001 AND 002 TREND PLOTS FOR SOURCE AREA WELL GW193S AND DOWNGRADIENT PLUME AREA WELL GW190S Boeing Renton Facility Renton, Washington	Project No. 8888 Figure 17

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



DOWNGRADIENT PLUME AREA WELL GW192S

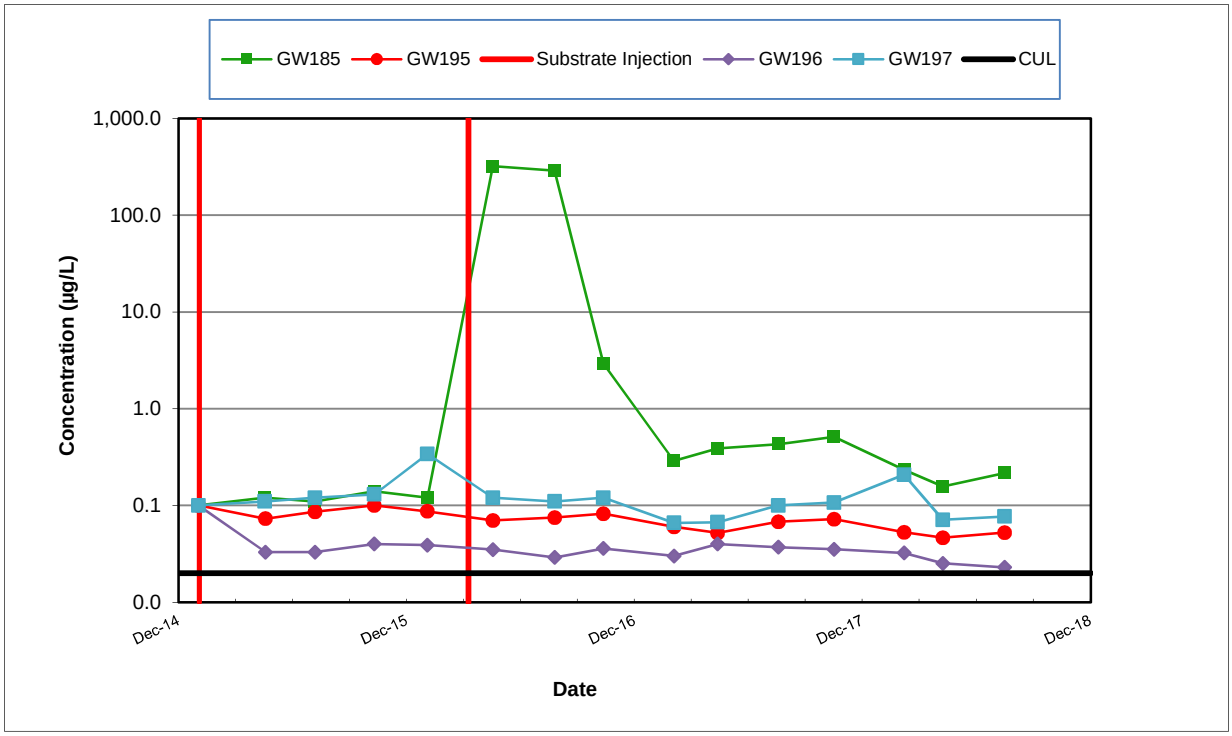


DOWNGRADIENT PLUME AREA WELL GW246S

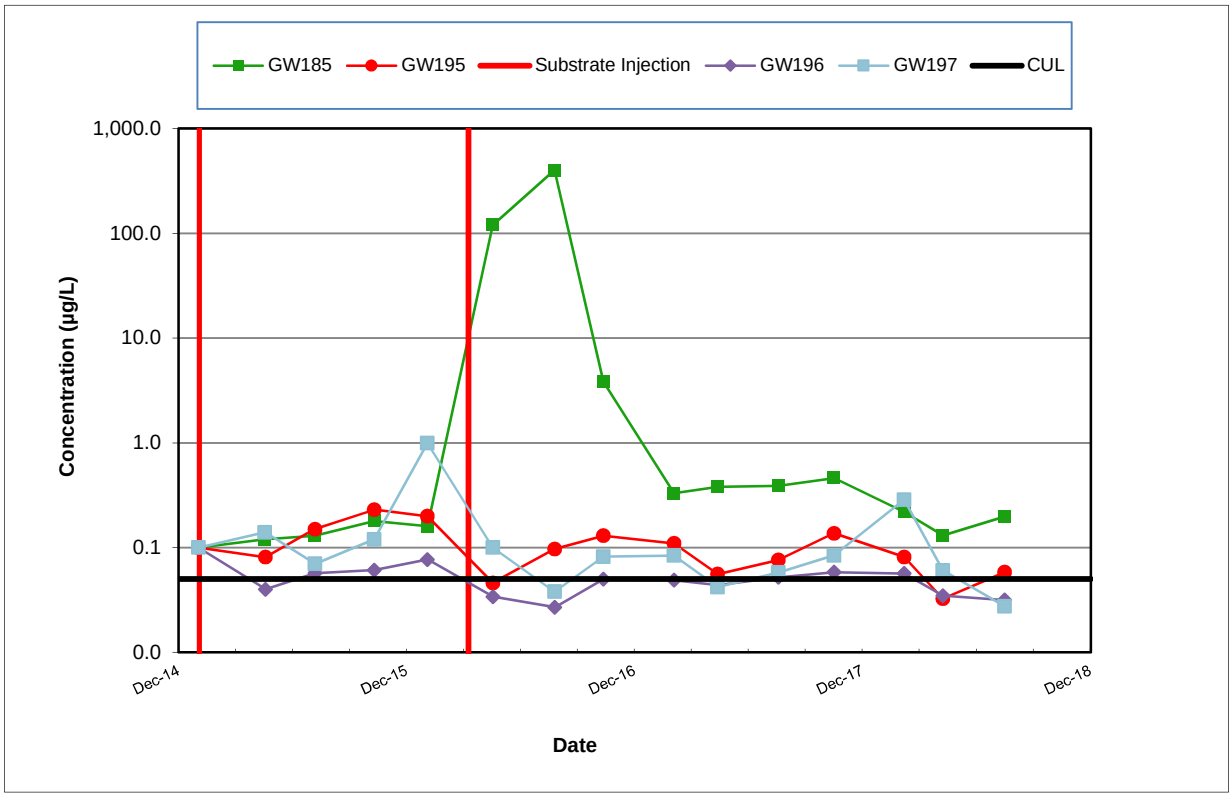
Note: non-detected values shown at one-half the reporting limit

wood.	AOC-001 AND 002 TREND PLOTS FOR DOWNGRADIENT PLUME AREA WELLS GW192S AND GW246S Boeing Renton Facility Renton, Washington	Project No. 8888 Figure 18

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



cis-1,2-Dichloroethene

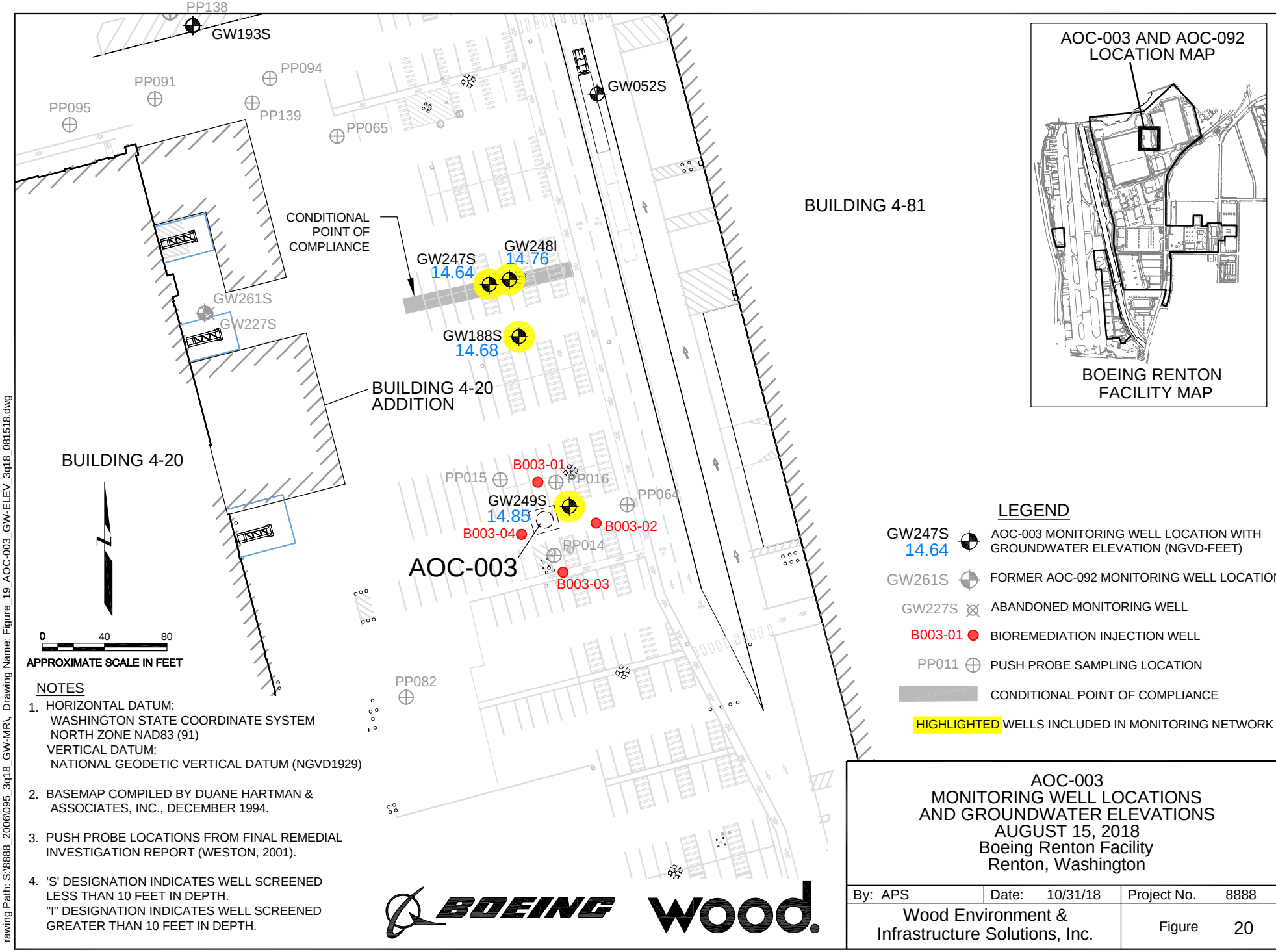


Vinyl Chloride

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

wood.	AOC-001 AND 002 TREND PLOTS FOR CIS-1,2-DICHLOROETHENE AND VINYL CHLORIDE IN CPOC AREA WELLS Boeing Renton Facility Renton, Washington	Project No. 8888 Figure 19

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



AOC-003 AND AOC-092 LOCATION MAP

BOEING RENTON FACILITY MAP

LEGEND

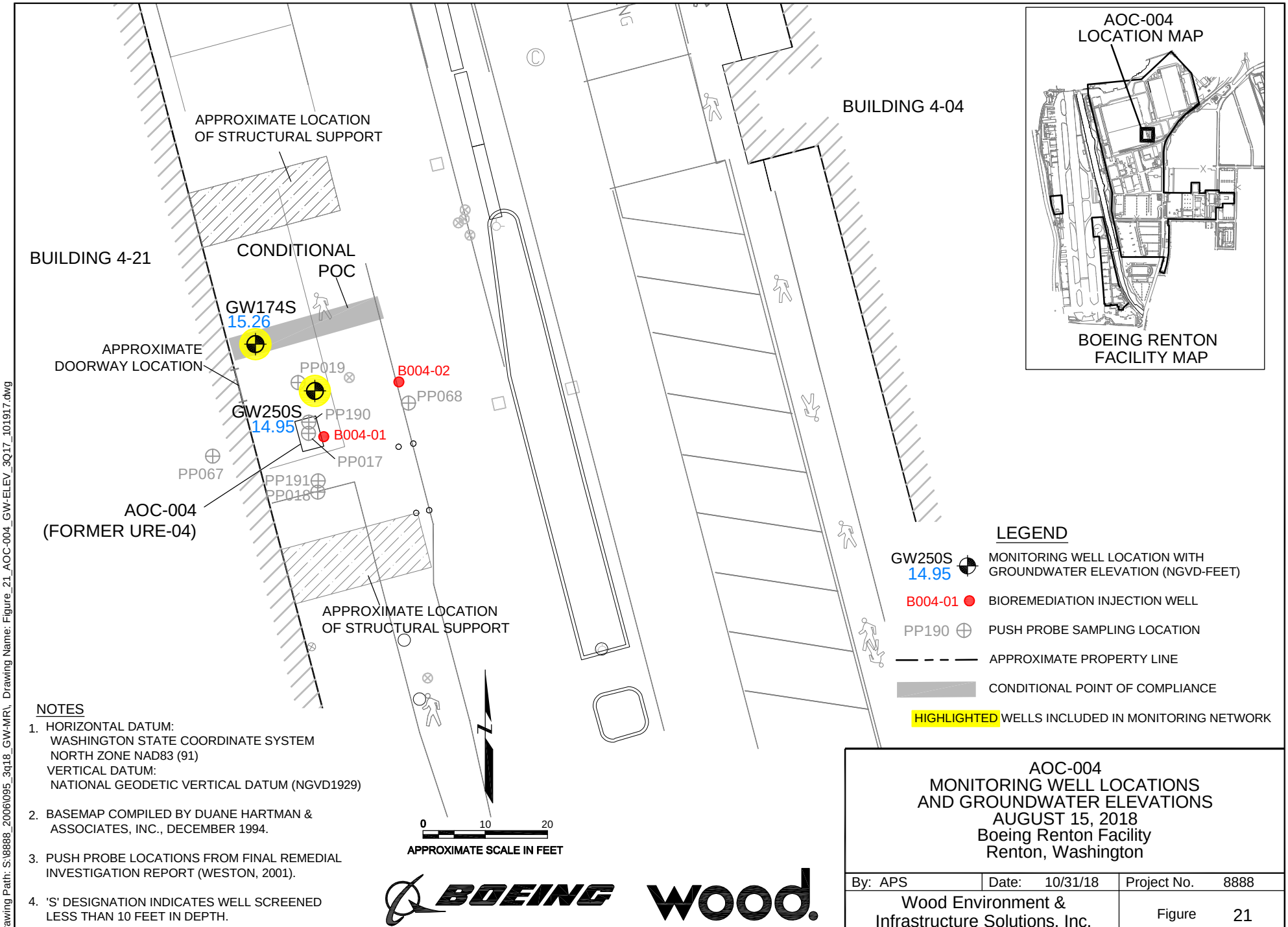
- GW247S 14.64 — AOC-003 MONITORING WELL LOCATION WITH GROUNDWATER ELEVATION (NGVD-FEET)
- GW261S — FORMER AOC-092 MONITORING WELL LOCATION
- GW227S — ABANDONED MONITORING WELL
- B003-01 — BIOREMEDIATION INJECTION WELL
- PP011 — PUSH PROBE SAMPLING LOCATION
- CONDITIONAL POINT OF COMPLIANCE
- HIGHLIGHTED 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.

AOC-003 MONITORING WELL LOCATIONS AND GROUNDWATER ELEVATIONS AUGUST 15, 2018 Boeing Renton Facility Renton, Washington

By: APS	Date: 10/31/18	Project No. 8888
Wood Environment & Infrastructure Solutions, Inc.		Figure 20

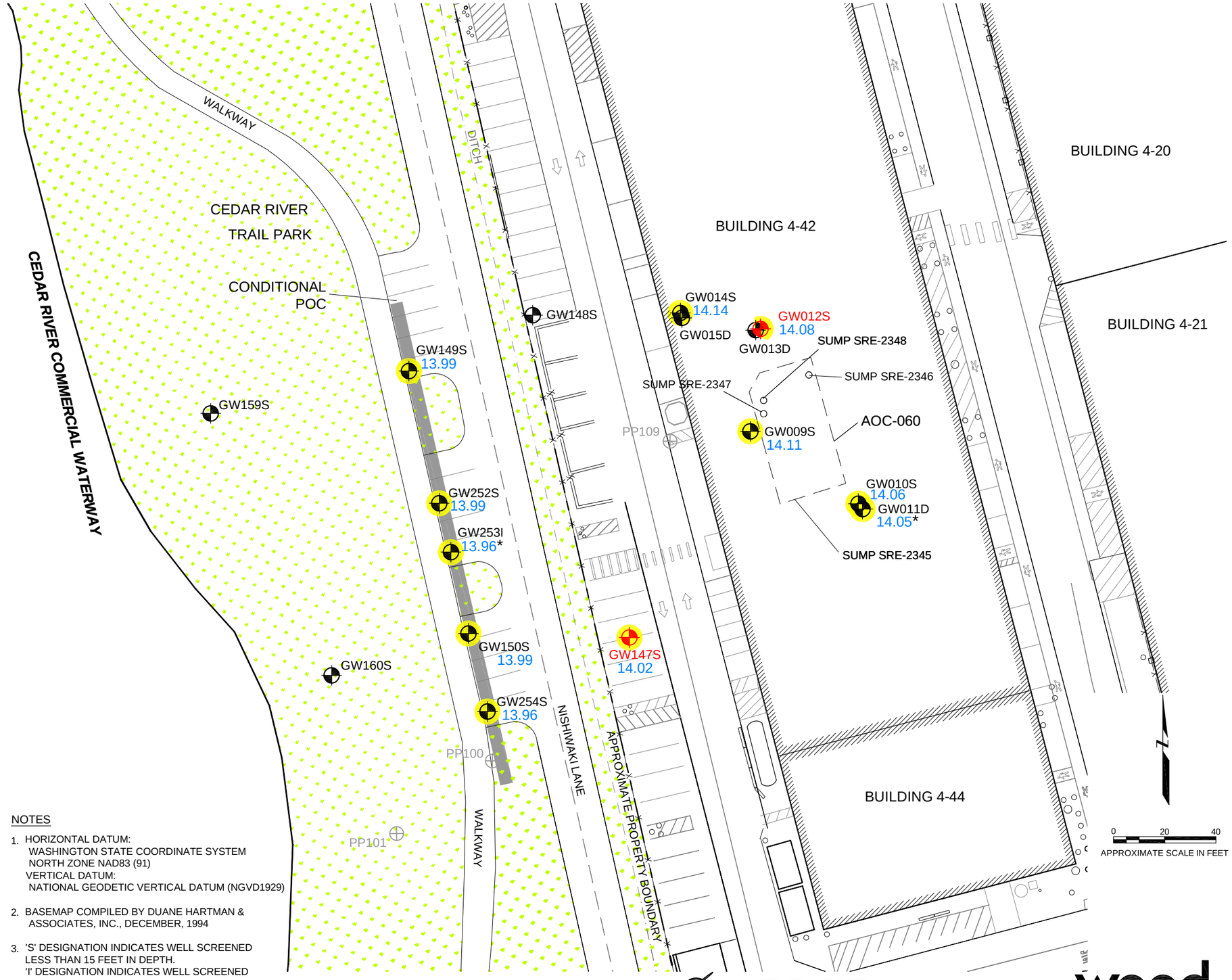


NOTES

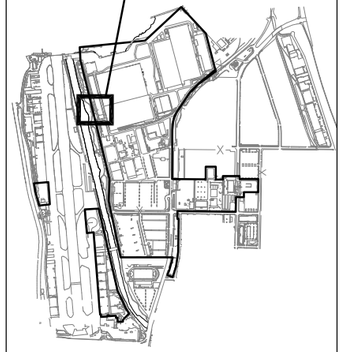
1. HORIZONTAL DATUM:
   WASHINGTON STATE COORDINATE SYSTEM
   NORTH ZONE NAD83 (91)
   VERTICAL DATUM:
   NATIONAL GEODETIC VERTICAL DATUM (NGVD1929)
2. BASEMAP COMPILED BY DUANE HARTMAN & ASSOCIATES, INC., DECEMBER 1994.
3. PUSH PROBE LOCATIONS FROM FINAL REMEDIAL INVESTIGATION REPORT (WESTON, 2001).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

AOC-004
MONITORING WELL LOCATIONS AND GROUNDWATER ELEVATIONS AUGUST 15, 2018
Boeing Renton Facility
Renton, Washington

By: APS	Date: 10/31/18	Project No. 8888
Wood Environment & Infrastructure Solutions, Inc.		Figure 21



AOC-060
LOCATION MAP



BOEING RENTON
FACILITY MAP

NOTES

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

LEGEND

- GW252S 13.99 — MONITORING WELL LOCATION WITH GROUNDWATER ELEVATION (NGVD-FEET)
- * — WELL SCREENED IN LOWER PORTION OF AQUIFER, SO WATER LEVEL IS NOT USED FOR CONTOURING.
- GW147S — ELECTRON DONOR INJECTION WELL AND MONITORING WELL
- PP109 — PUSH PROBE SAMPLING LOCATION
- APPROXIMATE PROPERTY LINE
- FENCE LINE
- CONDITIONAL POINT OF COMPLIANCE
- HIGHLIGHTED WELLS INCLUDED IN MONITORING NETWORK

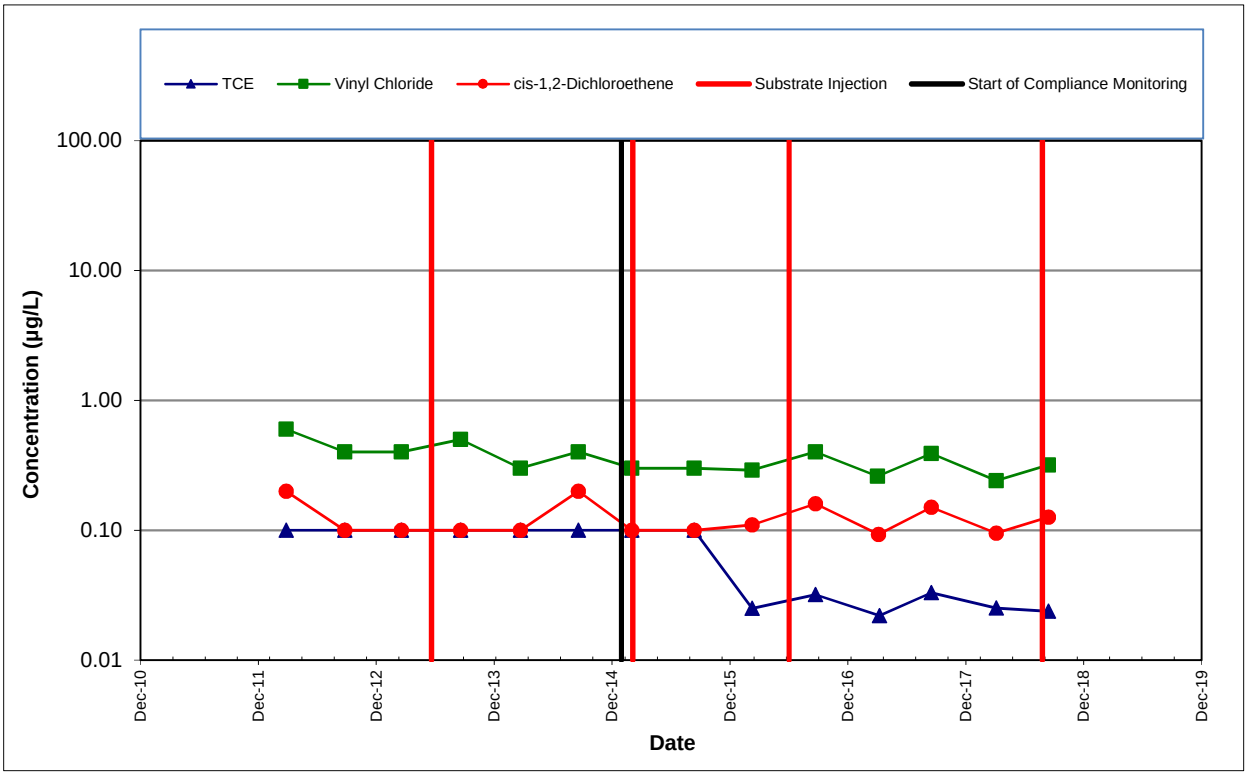
BOEING

wood.

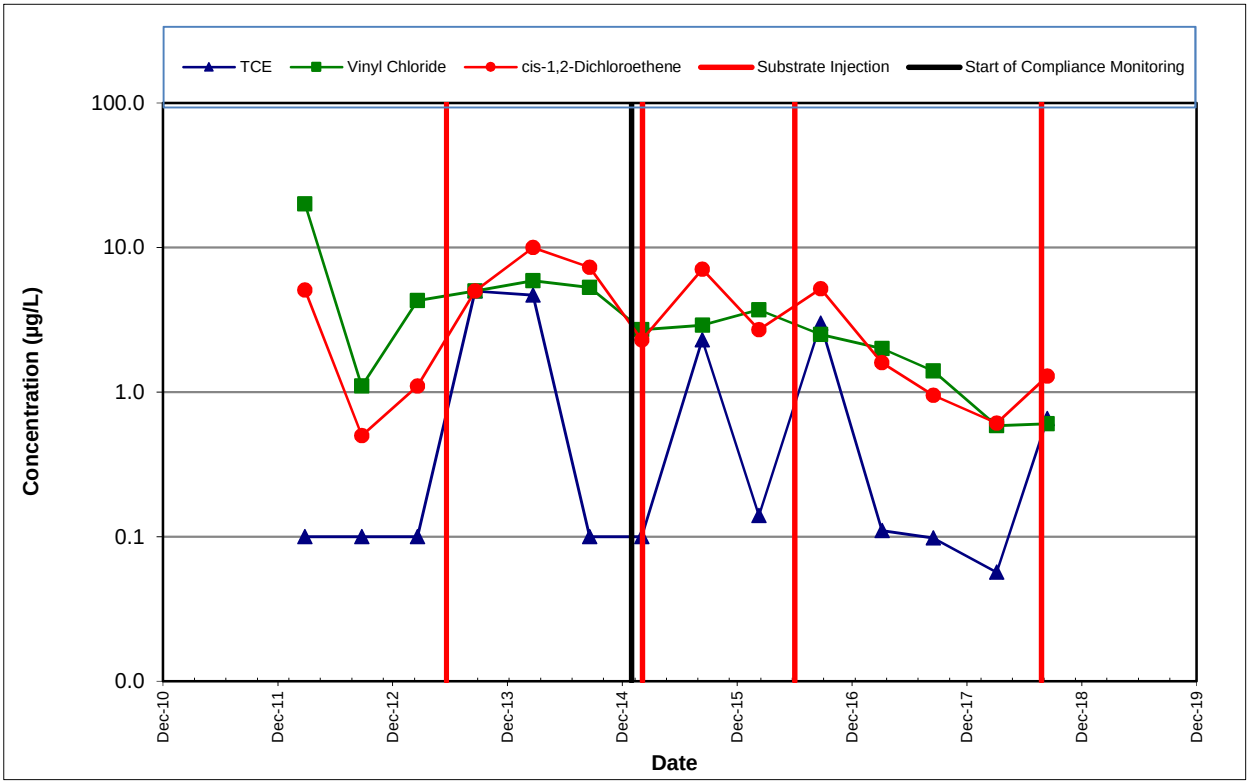
AOC-060
MONITORING WELL LOCATIONS AND GROUNDWATER ELEVATIONS
AUGUST 14, 2018
Boeing Renton Facility
Renton, Washington

By: APS	Date: 10/31/18	Project No. 8888
Wood Environment & Infrastructure Solutions, Inc.	Figure 22	

Plot Date: 10/31/18 - 1:57pm, Plotted by: mike.stenberg
Drawing Path: C:\Civil 3D Projects\Wood\Boeing\, Drawing Name: AOC-060_GW-ELEV_3Q18_081418.dwg



SOURCE AREA WELL GW009S

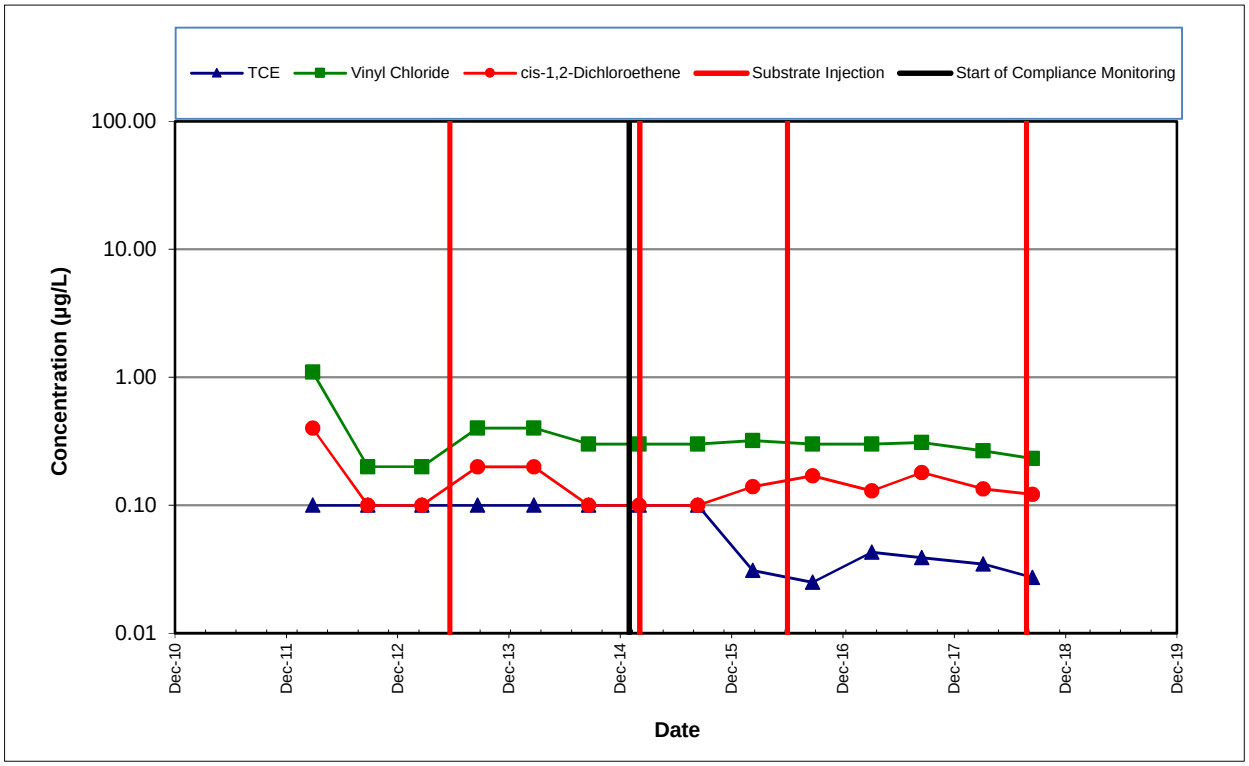


Note: non-detected values shown at one-half the reporting limit. TCE reporting limit raised in August 2013 due to sample dilution.

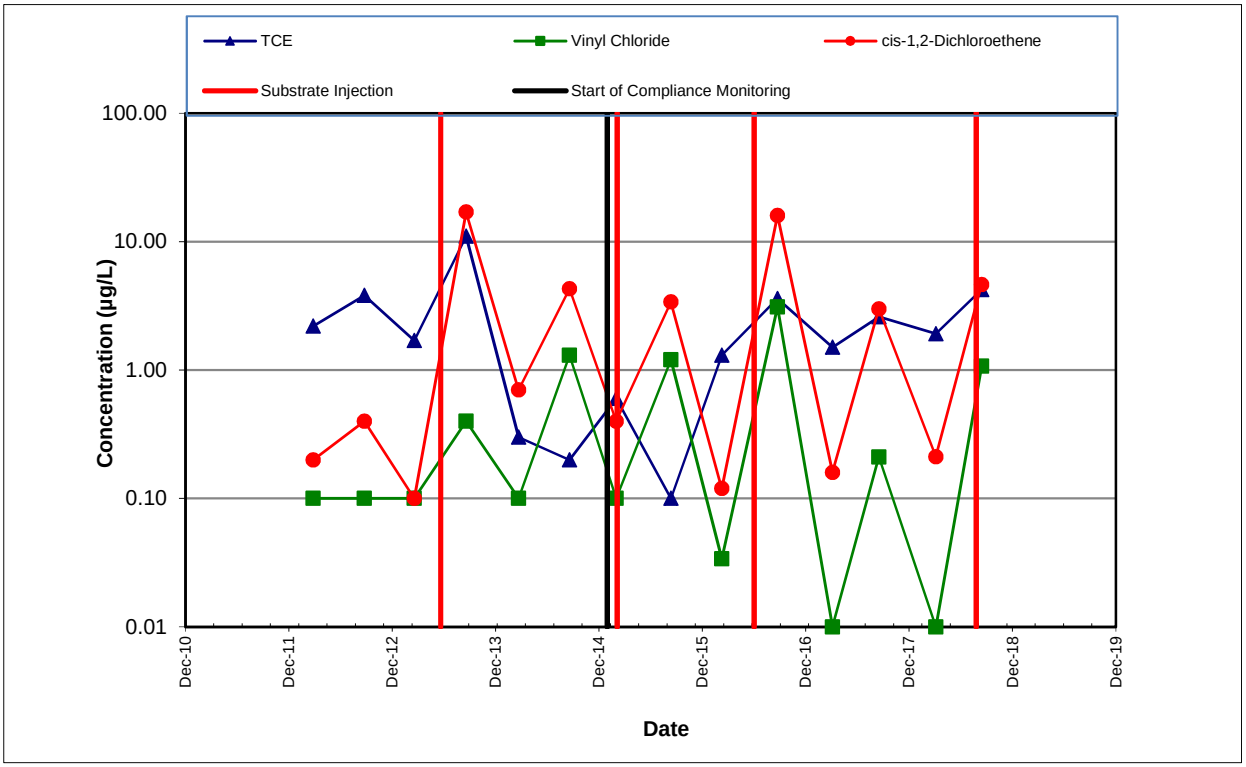
DOWNGRADIENT PLUME AREA WELL GW012S

wood.	AOC-060 TREND PLOTS FOR SOURCE AREA WELL GW009S AND DOWNGRADIENT PLUME AREA WELL GW012S Boeing Renton Facility Renton, Washington	Project No. 8888 Figure 23

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



DOWNGRADIENT PLUME AREA WELL GW014S

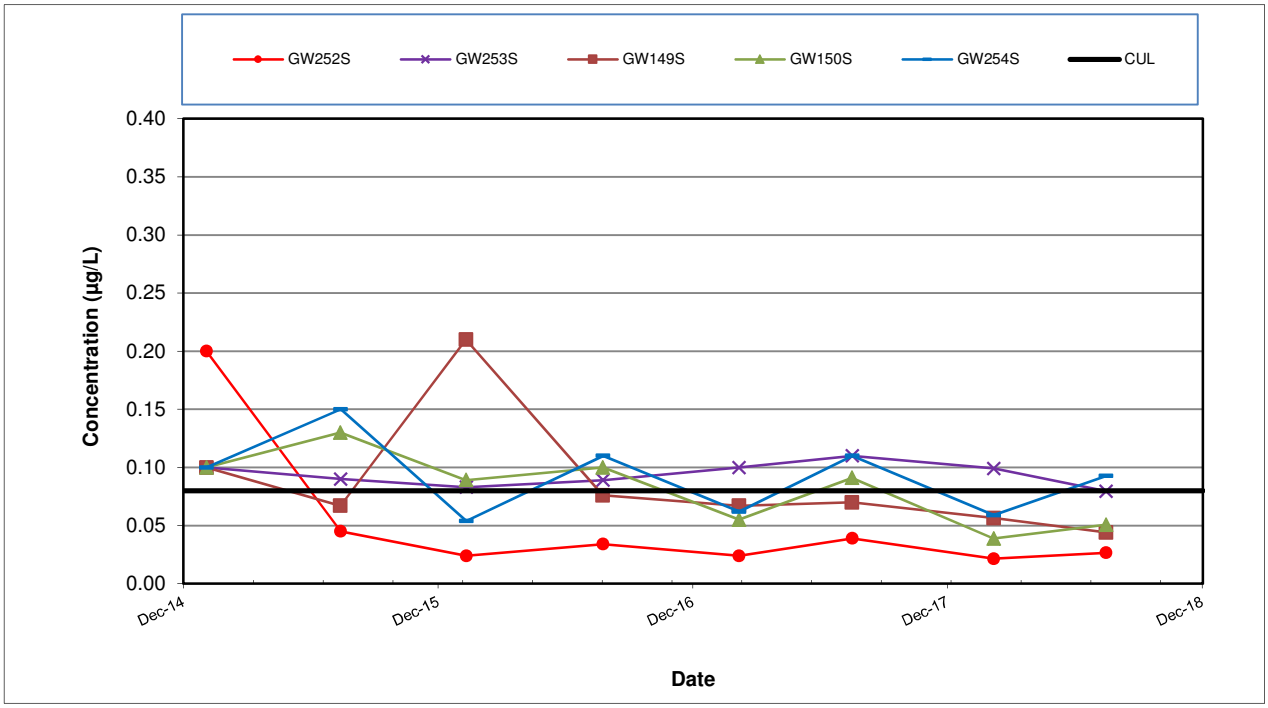


Note: non-detected values shown at one-half the reporting limit

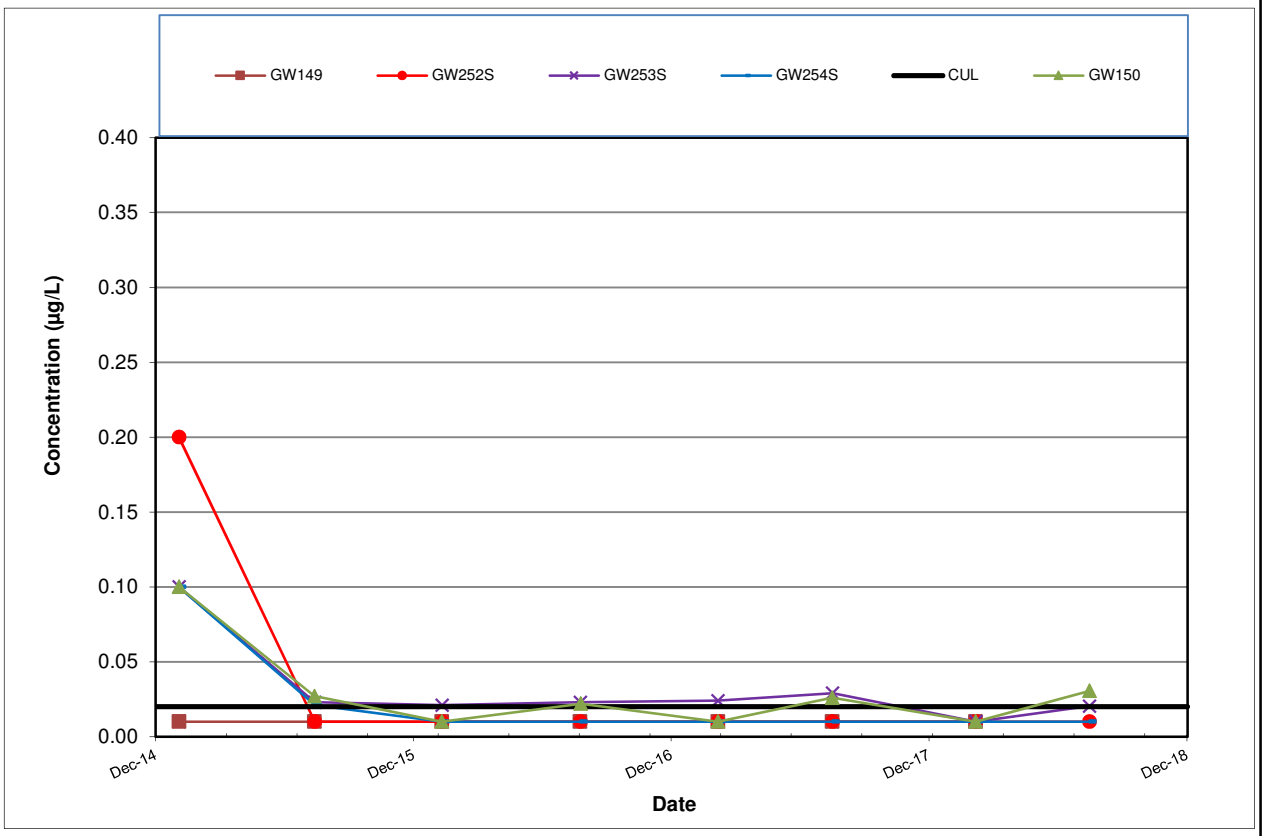
DOWNGRADIENT PLUME AREA WELL GW147S

wood.	AOC-060 TREND PLOTS FOR DOWNGRADIENT PLUME AREA WELLS GW014S AND GW147S Boeing Renton Facility Renton, Washington	Project No. 8888 Figure 24

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



cis-1,2-Dichloroethene



Trichloroethene

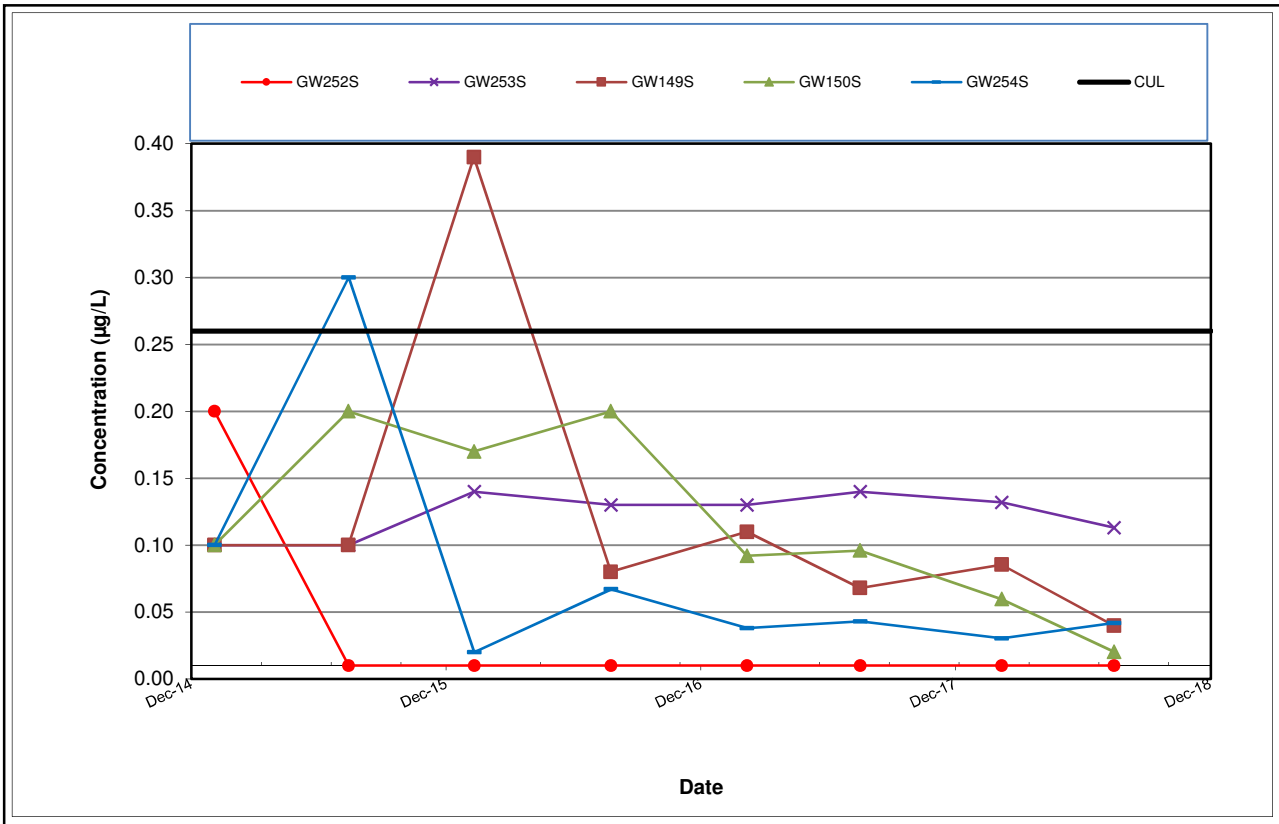
P:\8888 - Boeing Renton\02 Data Management\Grapher and Excel Figure Files\excel\Figures 15 to 17 AOC 60.xls

wood.

AOC-060 TREND PLOTS FOR CIS-1,2-DICHLOROETHENE AND TRICHLOROETHENE IN CPOC AREA WELLS
Boeing Renton Facility
Renton, Washington

Project No. 8888

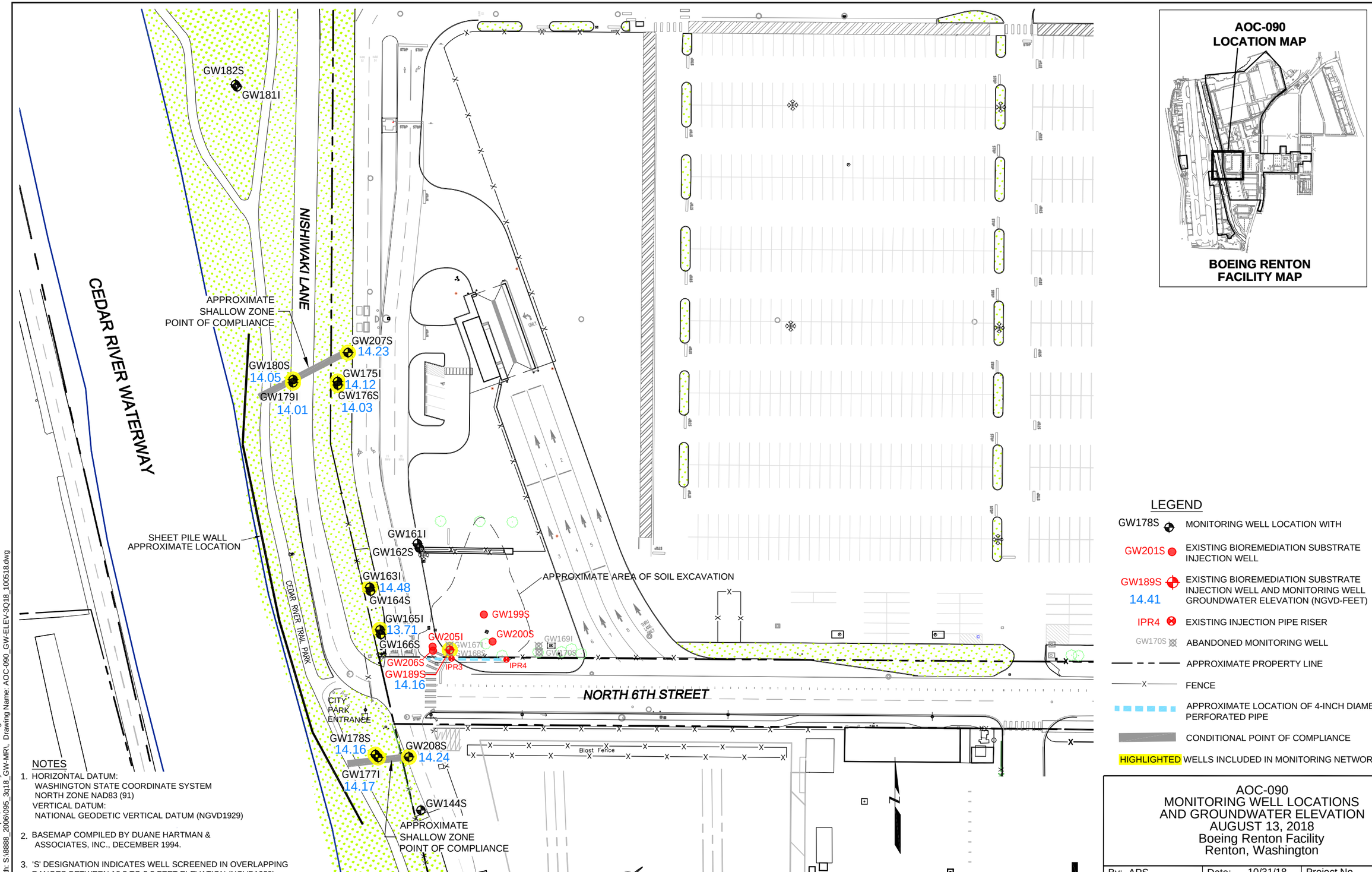
Figure 25



Vinyl Chloride

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

wood.	AOC-060 TREND PLOTS FOR VINYL CHLORIDE IN CPOC AREA WELLS Boeing Renton Facility Renton, Washington	Project No. 8888 Figure 26



AOC-090
LOCATION MAP

BOEING RENTON
FACILITY MAP

LEGEND

- GW178S — MONITORING WELL LOCATION WITH 14.41 GROUNDWATER ELEVATION (NGVD-FEET)
- GW201S — EXISTING BIOREMEDIATION SUBSTRATE INJECTION WELL
- GW189S — EXISTING BIOREMEDIATION SUBSTRATE INJECTION WELL AND MONITORING WELL
- IPR4 — EXISTING INJECTION PIPE RISER
- GW170S — ABANDONED MONITORING WELL
- APPROXIMATE PROPERTY LINE
- FENCE
- APPROXIMATE LOCATION OF 4-INCH DIAMETER PERFORATED PIPE
- CONDITIONAL POINT OF COMPLIANCE
- HIGHLIGHTED WELLS INCLUDED IN MONITORING NETWORK

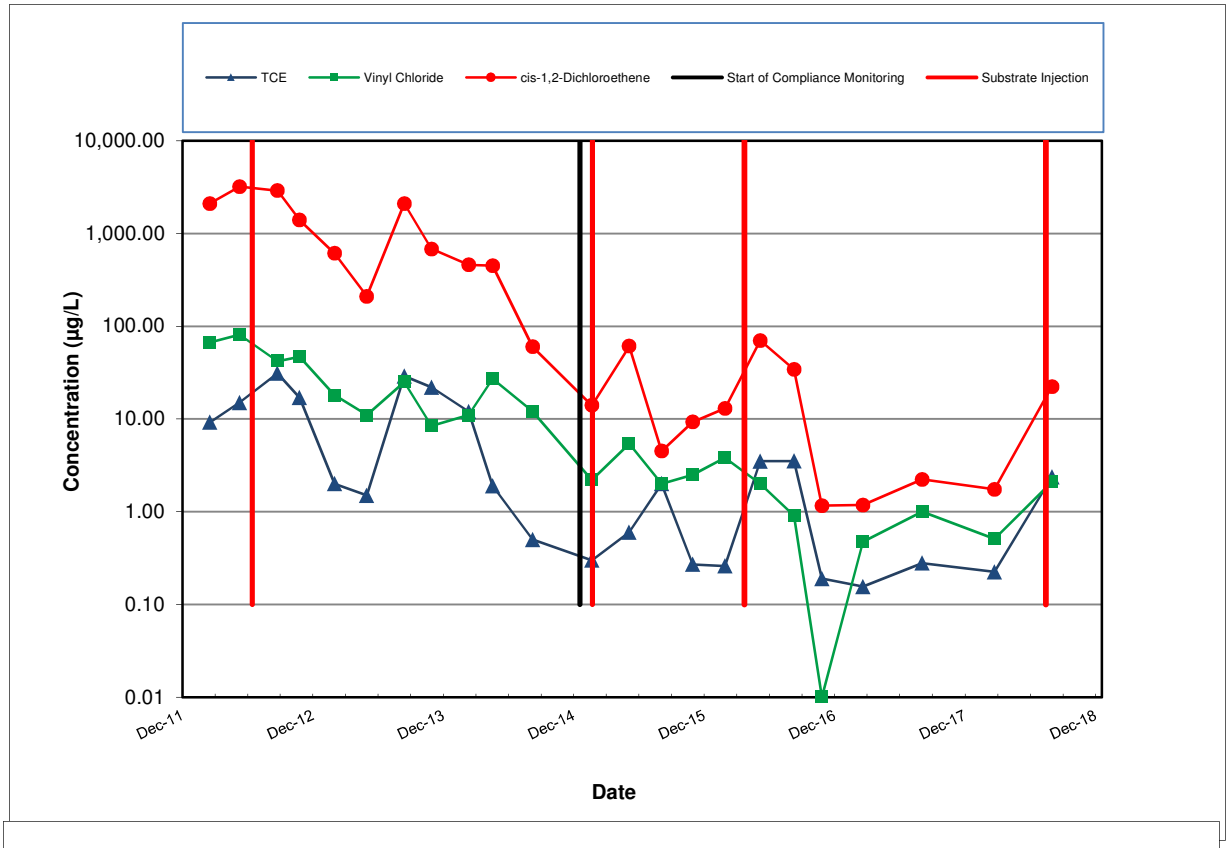
NOTES

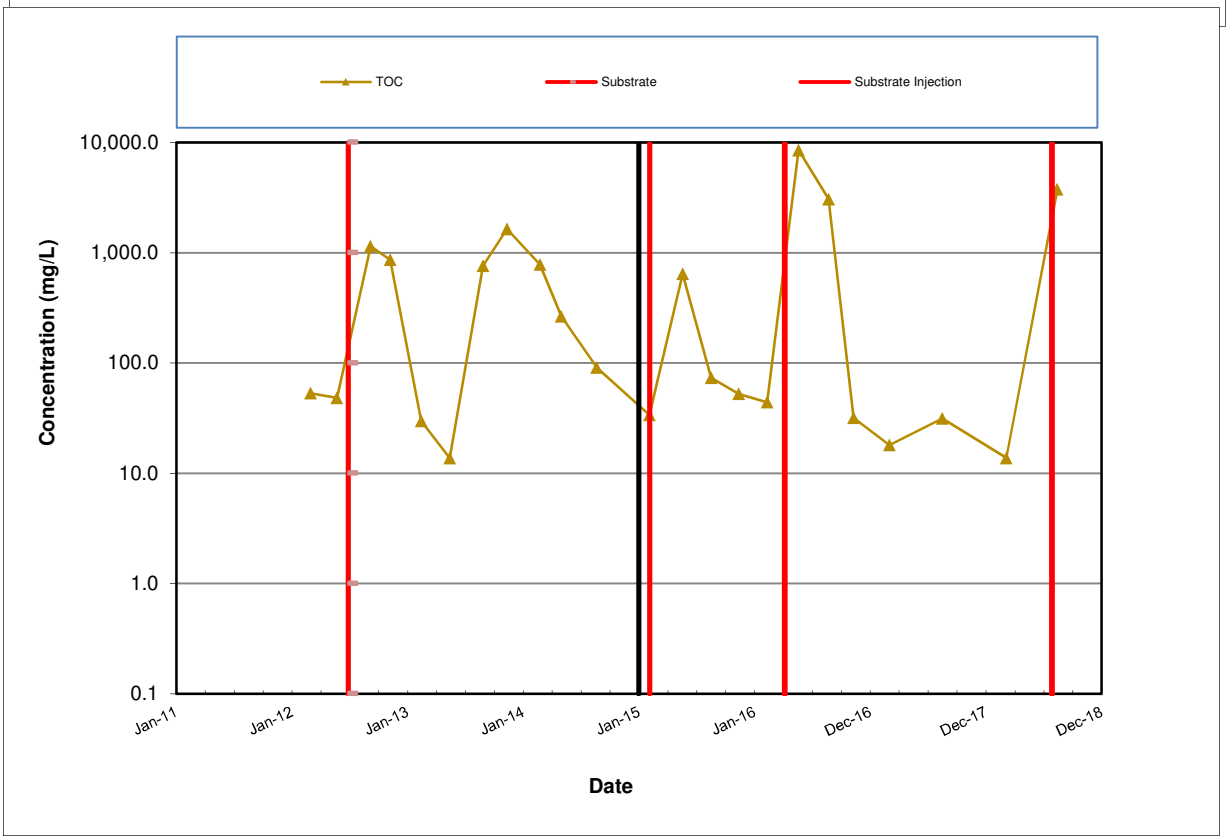
1. HORIZONTAL DATUM:
   WASHINGTON STATE COORDINATE SYSTEM
   NORTH ZONE NAD83 (91)
   VERTICAL DATUM:
   NATIONAL GEODETIC VERTICAL DATUM (NGVD1929)
2. BASEMAP COMPILED BY DUANE HARTMAN & ASSOCIATES, INC., DECEMBER 1994.
3. 'S' DESIGNATION INDICATES WELL SCREENED IN OVERLAPPING RANGES BETWEEN 18.5 TO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

AOC-090
MONITORING WELL LOCATIONS AND GROUNDWATER ELEVATION
AUGUST 13, 2018
Boeing Renton Facility
Renton, Washington

By: APS	Date: 10/31/18	Project No. 8888
Wood Environment & Infrastructure Solutions, Inc.		Figure 27

Plot Date: 10/31/18 - 1:05pm, Plotted by: mike.stenberg
Drawing Path: S:\8888_2006\095_3q18_GW-MR\, Drawing Name: AOC-090_GW-ELEV-3Q18_100518.dwg

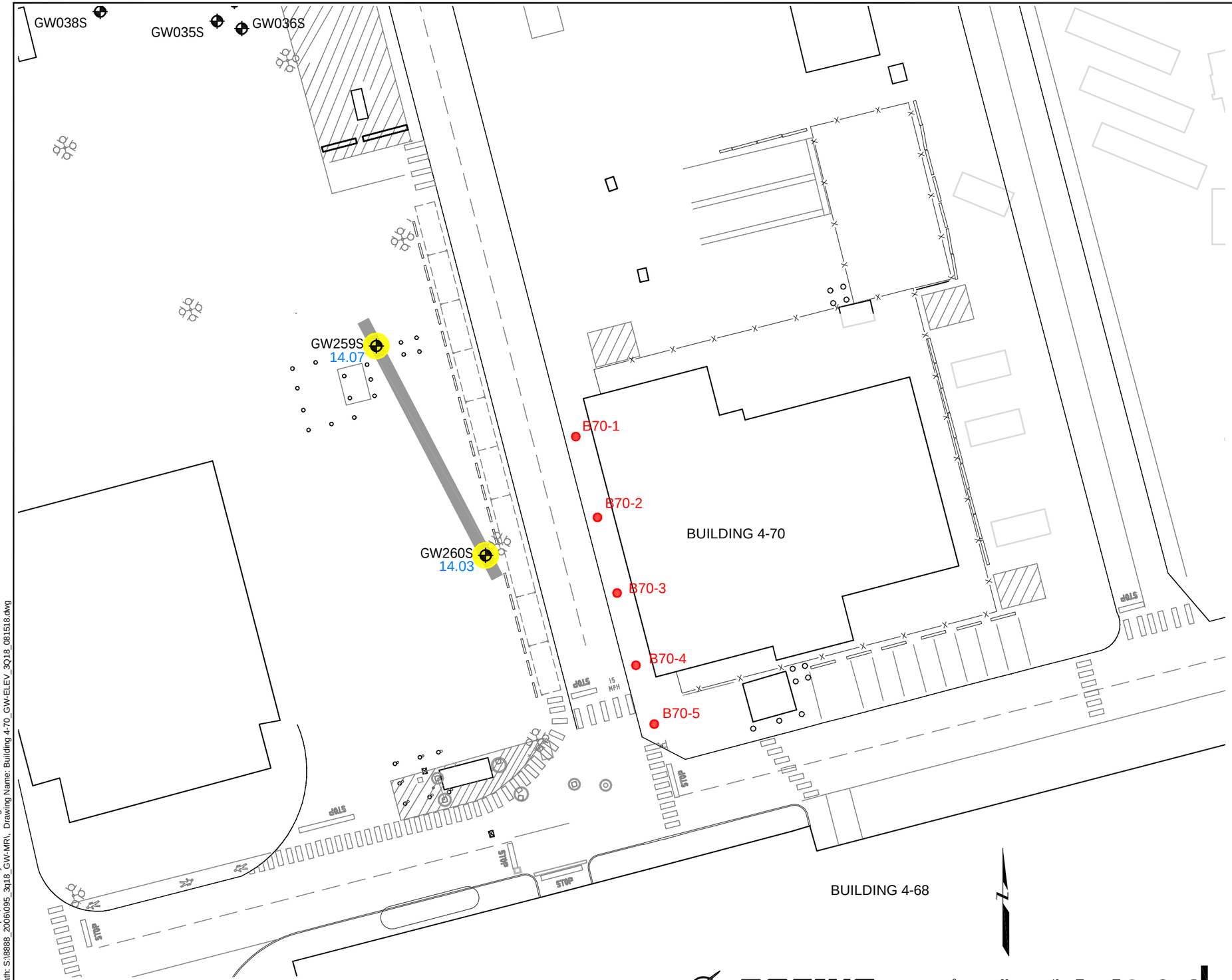




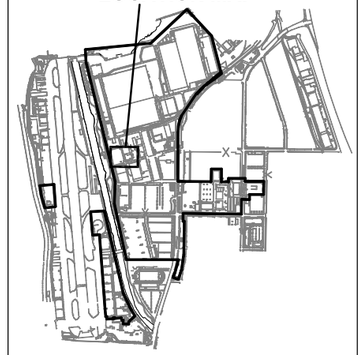
Note: non-detected values shown at one-half the reporting limit

wood.	AOC-090 TREND PLOTS FOR SOURCE AREA WELL GW189S Boeing Renton Facility Renton, Washington	Project No. 8888 Figure 28

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



BUILDING 4-70 LOCATION MAP



BOEING RENTON FACILITY MAP

LEGEND

- GW259S 14.33 — MONITORING WELL LOCATION WITH GROUNDWATER ELEVATION (NGVD-FEET)
- B70-2 — ELECTRON DONOR INJECTION WELL
- APPROXIMATE PROPERTY LINE
- FENCE
- CONDITIONAL POINT OF COMPLIANCE

HIGHLIGHTED WELLS INCLUDED IN MONITORING NETWORK

NOTES

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

0 20 40
APPROXIMATE SCALE IN FEET

BOEING

wood.

BUILDING 4-70 MONITORING WELL LOCATIONS AND GROUNDWATER ELEVATIONS AUGUST 15, 2018

Boeing Renton Facility
Renton, Washington

By: APS	Date: 10/31/18	Project No. 8888
Wood Environment & Infrastructure Solutions, Inc.		Figure 29

Plot Date: 10/31/18 - 1:14pm Plotted by: mike.stenberg
Drawing Path: S:\8888_2006\095_3q18_GW-MR\ Drawing Name: Building 4-70_GW-ELEV_3Q18_081518.dwg

Tables

TABLE 1: SWMU-168 GROUNDWATER ELEVATION DATA

August 13, 2018

Boeing Renton Facility, Renton, Washington

Well ID[1]	Screen Interval Depth (feet bgs)	TOC Elevation (feet)[2]	Depth to Groundwater (feet below TOC)	Groundwater Elevation (feet)[2]
GW229S	5 to 10	25.42	9.39	16.03
GW230I	4 to 14	24.86	8.69	16.17
GW231S	5 to 10	24.65	8.70	15.95

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
SWMU = solid waste management unit
TOC = top of casing

TABLE 2: SWMU-168 CONCENTRATIONS OF PRIMARY GEOCHEMICAL INDICATORS [1]

August 13, 2018

Boeing Renton Facility, Renton, Washington

	Well ID [2]		
	CPOC Area		
	GW229S	GW230I	GW231S
Temperature (degrees C)	22.45	20.28	19.63
Specific Conductivity (µS/cm)	314	836	845
Dissolved Oxygen (mg/L)	0.84	0.22	0.84
pH (standard units)	6.08	6.03	6.19
Oxidation/Reduction Potential (mV)	49.4	-42.8	-37.3

Notes

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

Abbreviations

µS/cm = microsiemens per centimeter
CPOC = conditional point of compliance
degrees C = degrees Celsius
mg/L = milligrams per liter
mV = millivolts
SWMU = solid waste management unit

TABLE 3: SWMU-168 CONCENTRATIONS OF CONSTITUENTS OF CONCERN 1[1, 2]
AUGUST 13, 2018
Boeing Renton Facility, Renton, Washington

		Cleanup Level [4]	Well ID [3]		
			CPOC Area		
			GW229S	GW230I	GW231S
Volatile Organic Compounds (µg/L)					
Vinyl Chloride		0.11	0.020 U	**0.140 J**	0.0326

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

Abbreviations
µg/L = micrograms per liter
CPOC = conditional point of compliance
SWMU = solid waste management unit

TABLE 4: SWMU-172 AND SWMU-174 GROUP
GROUNDWATER ELEVATION DATA
August 13, 2018
Boeing Renton Facility, Renton, Washington

Well ID[1]	Screen Interval Depth (feet bgs)[2]	TOC Elevation (feet)[3]	Depth to Groundwater (feet below TOC)	Groundwater Elevation (feet)[3]
GW081S	5 to 20[2]	25.91	9.80	16.11
GW152S	5 to 20[2]	26.98	9.90	17.08
GW153S	5 to 20[2]	27.47	11.05	16.42
GW172S	8 to 18[2]	26.44	10.53	15.91
GW173S	8 to 18[2]	26.51	10.73	15.78
GW226S	5 to 20[2]	26.86	8.82	18.04
GW232S	4 to 14	24.45	9.07	15.38
GW233I	15 to 25	24.35	8.66	15.69
GW234S	3 to 13	24.95	9.03	15.92
GW235I	15 to 25	24.90	8.90	16.00
GW236S	5 to 15	24.36	8.33	16.03

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

Abbreviations
bgs = below ground surface
SWMU = solid waste management unit
TOC = top of casing

TABLE 5: SWMU-172 AND SWMU-174 GROUP CONCENTRATIONS OF PRIMARY GEOCHEMICAL INDICATORS [1]
August 13, 2018
Boeing Renton Facility, Renton, Washington

	Well ID [2]											
	Source Area			Downgradient Plume Area				CPOC Area				
	GW152S	GW152S (field dup.)	GW153S	GW081S	GW172S	GW173S	GW226S	GW232S	GW233I	GW234S	GW235I	GW236S
Temperature (degrees C)	19.60	19.60	19.60	19.20	18.60	19.40	21.30	19.10	18.30	17.80	17.90	16.80
Specific Conductivity (µS/cm)	3,149	3,149	2,079	133.1	326.4	846	323.7	515	235	247.8	153	406.6
Dissolved Oxygen (mg/L)	0.36	0.36	0.44	0.58	0.40	0.34	1.32	1.30	0.3	0.49	2.18	1.08
pH (standard units)	4.45	4.45	4.77	6.41	6.34	6.25	6.27	6.10	6.20	6.06	6.34	6.28
Oxidation/Reduction Potential (mV)	31.6	31.6	-1.3	52.9	52.1	42.7	-23.7	-23.2	-26.9	14.3	-12.1	77.0
Total Organic Carbon (mg/L)	10,860	10,870	1,281	7.12	1,697	351.7	6.36	8.44	3.95	1.70	0.76	1.43

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

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

TABLE 6: SWMU-172 AND SWMU-174 GROUP CONCENTRATIONS OF CONSTITUENTS OF CONCERN [1,2]
AUGUST 13, 2018
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	**0.981**	**0.991**	**0.171**	0.0243	**0.129**	**0.111**	0.0262	**0.489**	**0.0587**	**0.0758**	**0.121**	**0.0427**
Tetrachloroethene	0.02	**1.090**	**1.060**	**0.0845**	0.020 U	0.020 U	**0.0301**	**0.0733**	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Trichloroethene	0.02	**0.833**	**0.827**	**0.241**	0.020 U	**0.0872**	**0.0681**	0.020 U	0.020 U	0.020 U	0.020 U	**0.0305**	0.020 U
Vinyl Chloride	0.11	**0.187 J**	**0.178**	**0.248 J**	0.020 U	0.0742	0.0969 J	0.0409 J	**0.544 J**	0.020 U	0.0282 J	0.020 U	0.020 U
Total Metals (µg/L)													
Arsenic	1.0	**75.7**	**66.5**	**5.67**	**2.30**	**8.84**	**13.0**	**2.78**	**6.52**	0.421	**2.07**	0.200 U	**2.69**
Copper	3.5	**24.1**	**21.2**	2.55	0.811	2.50 U	**6.95**	1.19	0.628	0.500 U	0.748	0.500 U	0.500 U
Lead	1.0	**12.7**	**11.0**	**3.06**	0.100 U	**1.02**	**2.88**	0.141	0.275	0.100 U	0.425	0.100 U	0.874

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

Abbreviations
µg/L = micrograms per liter
CPOC = conditional point of compliance
field dup. = field duplicate
SWMU = solid waste management unit

TABLE 7: BUILDING 4-78/79 SWMU/AOC GROUP
GROUNDWATER ELEVATION DATA
August 13 and 14, 2018
Boeing Renton Facility, Renton, Washington

Well ID[1]	Screen Interval Depth (feet bgs)	TOC Elevation (feet)[2]	Depth to Groundwater (feet below TOC)	Groundwater Elevation (feet)[2]
GW031S	5 to 25	19.44	5.37	14.07
GW033S	5 to 25	19.49	5.50	13.99
GW034S[3]	5 to 25	19.65	5.58	14.42
GW038S	5 to 25	19.68	5.69	13.99
GW039S	3.5 to 13.5	19.30	5.22	14.08
GW143S	10 to 15	19.81	5.79	14.02
GW209S	3.5 to 13.3	19.37	5.35	14.02
GW210S	3.5 to 13.3	19.19	5.13	14.06
GW237S	5 to 15	18.85	4.89	13.96
GW238I	5 to 20	18.94	4.94	14.00
GW239I	15 to 20	19.69	5.69	14.00
GW240D	22 to 27	19.81	5.93	13.88
GW241S	4 to 14	20.28	6.31	13.97
GW242I	15 to 20	20.44	6.44	14.00
GW243I	5 to 20	19.49	5.45	14.04
GW244S	5 to 15	19.53	5.45	14.08

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

Abbreviations
AOC = area of concern
bgs = below ground surface
TOC = top of casing

TALBE 8: BUILDING 4-78/79 SWMU/AOC GROUP CONCENTRATIONS
OF PRIMARY GEOCHEMICAL INDICATORS [1]
August 13 and 14, 2018
Boeing Renton Facility, Renton, Washington

	Well ID [2]						
	Source Area						
	GW031S	GW031S (field dup.)	GW033S	GW034S	GW039S	GW243I	GW244S
Temperature (degrees C)	23.70	23.7	23.60	25.60	24.40	28.40	25.60
Specific Conductivity (µS/cm)	367.3	367.3	412.8	337.4	194.2	482.7	530
Dissolved Oxygen (mg/L)	0.21	0.21	0.32	0.21	0.15	0.31	0.32
pH (standard units)	6.17	6.17	6.14	6.30	6.20	6.28	6.21
Oxidation/Reduction Potential (mV)	70.9	70.9	41.1	37.7	16.4	29.2	44.9
Total Organic Carbon (mg/L)	13.41	14.11	43.57	8.60	13.49	9.65	12.70

	Well ID [2]		
	Downgradient Plume Area		
	GW038S	GW209S	GW210S
Temperature (degrees C)	24.50	25.00	25.30
Specific Conductivity (µS/cm)	341.7	401.6	362.9
Dissolved Oxygen (mg/L)	0.08	0.20	0.19
pH (standard units)	6.35	6.31	6.39
Oxidation/Reduction Potential (mV)	5.5	11.4	64.5
Total Organic Carbon (mg/L)	10.02	9.96	11.63

	Well ID [2]						
	CPOC Area						
	GW143S	GW237S	GW238I	GW239I	GW240D	GW241S	GW242I
Temperature (degrees C)	24.2	23.20	25.3	26.20	27.20	21.62	24.04
Specific Conductivity (µS/cm)	326.7	343.9	478.5	364.4	484.4	349	370
Dissolved Oxygen (mg/L)	0.27	0.26	0.13	0.22	0.14	0.12	0.30
pH (standard units)	6.32	6.40	6.45	6.31	6.44	6.34	6.54
Oxidation/Reduction Potential (mV)	-1.7	22.0	-7.4	18.9	-8.9	-77.6	-72.1
Total Organic Carbon (mg/L)	7.62	7.16	8.68	9.42	5.77	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
AOC = area of concern
CPOC = conditional point of compliance
degrees C = degrees Celsius
field dup. = field duplicate
mg/L = milligrams per liter
mV = millivolts

TABLE 9: BUILDING 4-78/79 SWMU/AOC GROUP CONCENTRATIONS OF CONSTITUENTS OF CONCERN [1,2]
AUGUST 13 and 14, 2018
Boeing Renton Facility, Renton, Washington

	Cleanup Level [4]	Well ID [3]						
		Source Area						
		GW031S	GW031S (field dup.)	GW033S	GW034S	GW039S	GW243I	GW244S
Volatile Organic Compounds (µg/L)								
Benzene	0.80	**3.21**	**3.11**	**13.30**	0.20 U	0.20 U	0.34	**4.64**
cis -1,2-Dichloroethene	0.70	0.56 J	0.48 J	**1.94**	0.21	0.20 U	0.20 U	0.44
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	**0.28**	**0.28**	**6.5**	**0.53**	0.20 U	0.20 U	**0.62**
Total Petroleum Hydrocarbons (µg/L)								
NWTPH-Gx (C7-C12)	800	**1,640**	**1,740**	258	100 U	100 U	100 U	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	0.28
cis -1,2-Dichloroethene	0.70	0.20 U	0.20 U	0.20 U
Trichloroethene	0.23	0.20 U	0.20 U	0.20 U
Vinyl Chloride	0.20	0.20 U	0.20 U	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	0.43	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
cis -1,2-Dichloroethene	0.70	**1.82**	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Trichloroethene	0.23	**0.60**	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	**0.28**	0.20 U	0.20 U	**0.23**	0.20 U	0.20 U
Total Petroleum Hydrocarbons (µg/L)								
NWTPH-Gx (C7-C12)	800	100 U	499	100 U	100 U	100 U	100 U	100 U

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

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

TABLE 10: AOC-001 AND -002 GROUNDWATER ELEVATION DATA
August 15, 2018
Boeing Renton Facility, Renton, Washington

Well ID[1]	Screen Interval Depth (feet bgs)	TOC Elevation (feet)[2]	Depth to Groundwater (feet below TOC)	Groundwater Elevation (feet)[2]
GW185S	4.5 to 14.5	16.27	2.31	13.96
GW190S	3.0 to 13.0	17.30	3.17	14.13
GW191D	26.5 to 36.0	17.53	3.21	14.32
GW192S	5.0 to 9.5	17.54	3.48	14.06
GW193S	3.0 to 12.8	18.67	4.58	14.09
GW194S	7.3 to 12.0	16.79	3.90	12.89
GW195S	7.3 to 12.0	16.34	2.44	13.90
GW196D	26.8 to 36.8	16.46	2.50	13.96
GW197S	7.8 to 12.5	16.52	2.14	14.38
GW245S	3.0 to 13.0	16.08	2.49	13.59
GW246S	4.0 to 14.0	16.53	2.55	13.98

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

Abbreviations
AOC = area of concern
bgs = below ground surface
TOC = top of casing

TABLE 11: AOC-001, AOC-002, AND AOC-093 CONCENTRATIONS OF PRIMARY GEOCHEMICAL INDICATORS [1]

August 15, 2018

Boeing Renton Facility, Renton, Washington

	Well ID [2]											
	Source Area	Downgradient Plume Area				CPOC Area [3]						
	GW193S	GW190S	GW191D[4]	GW192S	GW246S	GW185S	GW185S (field dup.)	GW194S	GW195S	GW196D[5]	GW197S	GW245S
Temperature (degrees C)	23.20	23.90	25.20	23.70	24.30	22.50	22.50	21.30	21.00	22.10	23.00	22.90
Specific Conductivity (µS/cm)	1,300	725	431.3	548	364	759	759	820	795	454.4	1040	885
Dissolved Oxygen (mg/L)	0.19	0.16	0.16	0.40	0.13	0.39	0.39	0.28	0.17	0.28	0.16	0.13
pH (standard units)	6.40	6.23	6.49	6.04	6.27	6.47	6.47	6.20	6.28	6.38	7.03	7.01
Oxidation/Reduction Potential (mV)	20.0	19.8	-8.6	39.3	31.5	47.0	47.0	61.9	19.2	24.1	1.0	-8.8
Total Organic Carbon (mg/L)	36.47	13.29	5.09	9.30	4.1	11.93	11.75	20.46	17.45	7.77	12.39	12.47

Notes

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

Abbreviations

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

TABLE 12: AOC-001 AND AOC-002 CONCENTRATIONS OF CONSTITUENTS OF CONCERN [1,2]
AUGUST 15, 2018
Boeing Renton Facility, Renton, Washington

	Cleanup Level [4]	Well ID [3]											
		Source Area	Downgradient Plume Area				CPOC Area						
		GW193S	GW190S	GW191D [5]	GW192S	GW246S	GW185S	GW185S (field dup.)	GW194S	GW195S	GW196D [6]	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	0.20 U	0.02	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Benzene	0.8	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.32	0.33	0.20 U	0.20 U	0.20 U	0.28	0.20 U
cis -1,2-Dichloroethene	0.02	**1.14**	**0.446**	0.020 U	**1.15**	**0.25**	**0.217**	**0.224**	0.020 U	**0.0525**	**0.0229**	**0.0769**	**0.052**
Trichloroethene	0.02	**0.0472**	0.020 U	0.020 U	**0.0707**	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Vinyl Chloride	0.05	**0.113**	**0.556**	**0.117**	**1.120**	**1.03**	**0.198**	**0.201**	0.020 U	**0.0583**	0.0316	0.0275	0.0204

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

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

TABLE 13: AOC-003 GROUNDWATER ELEVATION DATA

August 15, 2018

Boeing Renton Facility, Renton, Washington

Well ID[1]	Screen Interval Depth (feet bgs)	TOC Elevation (feet)[2]	Depth to Groundwater (feet below TOC)	Groundwater Elevation (feet)[2]
GW188S	3.5 to 13.5	18.78	4.10	14.68
GW247S	4 to 14	18.91	4.27	14.64
GW248I	10 to 20	18.78	4.02	14.76
GW249S	4 to 14	18.85	3.99	14.85

Notes

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

Abbreviations

AOC = area of concern
bgs = below ground surface
TOC = top of casing

TABLE 14: AOC-003 CONCENTRATIONS OF PRIMARY GEOCHEMICAL INDICATORS [1]

August 15, 2018

Boeing Renton Facility, Renton, Washington

	Well ID [2]			
	Source Area	Downgradient Plume Area	CPOC Area	
	GW249S	GW188S	GW247S	GW248I
Temperature (degrees C)	25.30	21.40	25.00	25.20
Specific Conductivity (µS/cm)	644	519	502	576
Dissolved Oxygen (mg/L)	0.12	0.11	0.20	0.20
pH (standard units)	6.32	6.25	6.40	6.29
Oxidation/Reduction Potential (mV)	16.3	17.7	30.1	38.8
Total Organic Carbon (mg/L)	16.94	11.56	9.52	11.72

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
AOC = area of concern
CPOC = conditional point of compliance
degrees C = degrees Celsius
mg/L = milligrams per liter
mV = millivolts

TABLE 15: AOC-003 CONCENTRATIONS OF CONSTITUENTS OF CONCERN [1,2]
AUGUST 15, 2018
Boeing Renton Facility, Renton, Washington

	Cleanup Level [4]	Well ID [3]			
		Source Area	Downgradient Plume Area	CPOC Area	
		GW249S	GW188S	GW247S	GW248I
Volatile Organic Compounds (µg/L)					
cis -1,2-Dichloroethene	0.78	0.0524	0.0386	0.081	0.020 U
Tetrachloroethene	0.02	0.020 U	0.020 U	0.020 U	0.020 U
Trichloroethene	0.16	0.020 U	0.020 U	0.0291	0.020 U
Vinyl Chloride	0.24	**0.413**	**0.404**	**0.453**	**0.526**

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
µg/L = micrograms per liter
AOC = area of concern
CPOC = conditional point of compliance

TABLE 16: AOC-004 GROUNDWATER ELEVATION DATA
August 15, 2018
Boeing Renton Facility, Renton, Washington

Well ID[1]	Screen Interval Depth (feet bgs)	TOC Elevation (feet)[2]	Depth to Groundwater (feet below TOC)	Groundwater Elevation (feet)[2]
GW174S	4 to 14	19.56	4.30	15.26
GW250S	4 to 14	19.31	4.36	14.95

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

Abbreviations
AOC = area of concern
bgs = below ground surface
TOC = top of casing

TABLE 17: AOC-004 CONCENTRATIONS OF PRIMARY GEOCHEMICAL INDICATORS [1]

August 15, 2018

Boeing Renton Facility, Renton, Washington

	Well ID [2]	
	Source Area	CPOC Area
	GW250S	GW174S
Temperature (degrees C)	23.50	19.50
Specific Conductivity (µS/cm)	149.6	167.4
Dissolved Oxygen (mg/L)	0.25	0.08
pH (standard units)	6.64	6.46
Oxidation/Reduction Potential (mV)	44.1	52.0

Notes

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

Abbreviations

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

TABLE 18: AOC-004 CONCENTRATIONS OF CONSTITUENTS OF CONCERN[1]
AUGUST 15, 2018
Boeing Renton Facility, Renton, Washington

	Cleanup Level [3]	Well ID [2]	
		Source Area	CPOC Area
		GW250S	GW174S
Metals (mg/L)			
Lead	0.001	**0.00107**	0.000762

Notes
1. **Bolded** values exceed the cleanup levels.
2. S = shallow well.
3. Cleanup levels obtained from Table 2 of the Cleanup Action Plan.

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

TABLE 19: AOC-060 GROUNDWATER ELEVATION DATA

August 14, 2018

Boeing Renton Facility, Renton, Washington

Well ID[1]	Screen Interval Depth (feet bgs)	TOC Elevation (feet)[2]	Depth to Groundwater (feet below TOC)	Groundwater Elevation (feet)[2]
GW009S	4.5 to 14.5	19.36	5.25	14.11
GW010S	4.5 to 14.5	19.47	5.41	14.06
GW011D	29 to 39	19.49	5.44	14.05
GW012S	4.5 to 14.5	19.11	5.03	14.08
GW014S	4.5 to 14.5	19.24	5.10	14.14
GW147S	5 to 15	18.73	4.71	14.02
GW149S	5 to 15	19.19	5.20	13.99
GW150S	5 to 15	19.10	5.11	13.99
GW252S	4 to 14	19.01	5.02	13.99
GW253I	10 to 20	19.02	5.06	13.96
GW254S	4 to 14	19.16	5.20	13.96

Notes

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

Abbreviations

AOC = area of concern
bgs = below ground surface
TOC = top of casing

TABLE 20: AOC-060 CONCENTRATIONS OF PRIMARY GEOCHEMICAL INDICATORS [1]
August 14, 2018
Boeing Renton Facility, Renton, Washington

	Well ID [2]									
	Source Area	Downgradient Plume Area				CPOC Area				
	GW009S	GW012S	GW014S	GW014S (field dup.)	GW147S	GW149S	GW150S	GW252S	GW253I	GW254S
Temperature (degrees C)	21.10	22.80	21.50	21.50	20.40	17.90	21.30	21.80	20.60	20.40
Specific Conductivity (µS/cm)	412.5	2404	416.3	416.3	2613	225.7	390.6	639.0	372.1	557
Dissolved Oxygen (mg/L)	0.23	0.27	0.55	0.55	0.51	0.28	0.20	0.40	0.21	0.26
pH (standard units)	6.32	4.64	6.28	6.28	4.60	6.25	6.32	6.66	6.47	6.55
Oxidation/Reduction Potential (mV)	15.0	100.4	115.5	115.5	34.6	104.6	-3.7	61.1	59.8	-7.8
Total Organic Carbon (mg/L)	7.95	3,397	5.76	3.09	4,288	4.49	8.20	7.38	5.42	10.91

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
AOC = area of concern
CPOC = conditional point of compliance
degrees C = degrees Celsius
field dup. = field duplicate
mg/L = milligrams per liter
mV = millivolts

TABLE 21: AOC-060 CONCENTRATIONS OF CONSTITUENTS OF CONCERN [1,2]
AUGUST 14, 2018
Boeing Renton Facility, Renton, Washington

	Cleanup Levels [4]	Well ID [3]									
		Source Area	Downgradient Plume Area				CPOC Area				
		GW009S	GW012S	GW014S	GW014S (field dup.)	GW147S	GW149S	GW150S	GW252S	GW253I	GW254S
Volatile Organic Compounds (µg/L)											
cis -1,2-Dichloroethene	0.08	**0.126**	**1.29**	**0.122**	**0.122**	**4.63**	0.0441	0.0506	0.0266	0.0796	**0.0926**
Trichloroethene	0.02	**0.0238**	**0.656**	**0.0273**	**0.0244**	**4.23**	0.020 U	**0.0305**	0.020 U	**0.0204**	0.020 U
Vinyl Chloride	0.26	**0.318**	**0.605 J**	0.232 J	0.228 J	**1.070 J**	0.0399 J	0.0203 J	0.020 U	0.113	0.0418 J

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

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

TABLE 22: AOC-090 GROUNDWATER ELEVATION DATA

August 13, 2018

Boeing Renton Facility, Renton, Washington

Well ID[1]	Screen Interval Depth (feet bgs)	TOC Elevation (feet)[2]	Depth to Groundwater (feet below TOC)	Groundwater Elevation (feet)[2]
GW163I	25 to 35	21.27	6.79	14.48
GW165I	25 to 35	21.14	7.43	13.71
GW175I	21.2 to 26.1	20.57	6.45	14.12
GW176S	10 to 14.3	20.15	6.12	14.03
GW177I	21.7 to 26	22.51	8.34	14.17
GW178S	11.2 to 15.5	22.73	8.57	14.16
GW179I	21.5 to 26	20.47	6.46	14.01
GW180S	10.5 to 15	20.56	6.51	14.05
GW189S	4 to 14	22.01	7.85	14.16
GW207S	7.3 to 12	21.12	6.89	14.23
GW208S	6.3 to 11	22.45	8.21	14.24

Notes

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

Abbreviations

AOC = area of concern
bgs = below ground surface
TOC = top of casing

TABLE 23: AOC-090 CONCENTRATIONS OF PRIMARY GEOCHEMICAL INDICATORS [1]
August 13, 2018
Boeing Renton Facility, Renton, Washington

	Well ID [2]											
	Source Area	Downgradient Plume Area		Shallow Zone CPOC Area					Intermediate Zone CPOC Area			
	GW189S [3]	GW175I	GW176S	GW178S	GW180S	GW180s (field dup.)	GW207S	GW208S	GW163I	GW165I	GW177I	GW179I
Temperature (degrees C)	24.60	22.00	22.60	16.28	21.13	21.13	19.70	20.16	20.00	23.00	16.13	19.98
Specific Conductivity (µS/cm)	2496	540	729	438	329	329	480.1	574	369.9	397.5	649	530
Dissolved Oxygen (mg/L)	0.86	0.40	0.20	0.11	0.22	0.22	0.19	0.11	0.29	0.26	0.16	0.25
pH (standard units)	4.54	6.31	6.28	6.18	6.19	6.19	6.21	6.99	6.11	6.12	6.34	6.12
Oxidation/Reduction Potential (mV)	61.9	-16.6	-20.8	-74.5	-39.1	-39.1	3.7	-98.1	7.3	47.3	-91.6	-85.6
Total Organic Carbon (mg/L)	3,752	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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

Abbreviations
µS/cm = microsiemens per centimeter
AOC = area of concern
CPOC = conditional point of compliance
degrees C = degrees Celsius
field dup. = field duplicate
mg/L = milligrams per liter
mV = millivolts
NA = not analyzed

TABLE 24: AOC-090 CONCENTRATIONS OF CONSTITUENTS OF CONCERN [1,2]
August 13, 2018
Boeing Renton Facility, Renton, Washington

	Cleanup Levels [4]	Well ID [3]											
		Source Area	Downgradient Plume Area		Shallow Zone CPOC Area					Intermediate Zone CPOC Area			
		GW189S [5]	GW175I	GW176S	GW178S	GW180S	GW180S (field dup.)	GW207S	GW208S	GW163I	GW165I	GW177I	GW179I
Volatile Organic Compounds (µg/L)							0.02 U						
1,1,2,2-Tetrachloroethane	0.17	**0.20 U**	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
1,1,2-Trichloroethane	0.2	**2.00 U**	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
1,1-Dichloroethene	0.057	**0.20 U**	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.023	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Acetone	300	70.4	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U
Benzene	0.8	**2.42**	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Carbon Tetrachloride	0.23	**2.00 U**	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Chloroform	2	**2.23**	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
cis-1,2-Dichloroethene	2.4	**22.3**	0.20 U	0.27	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Methylene Chloride	2	**10.9 UJ**	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
Tetrachloroethene	0.05	**0.20 U**	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Toluene	75	21.7	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
trans-1,2-Dichloroethene	53.9	2.00 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Trichloroethene	0.08	**2.38**	0.02 U	0.02 U	0.0213	0.02 U	0.02 U	0.0388	0.0234	0.02 U	0.02 U	0.02 U	0.02 U
Vinyl Chloride	0.13	**2.09 J**	0.02 U	**0.230**	**0.378**	0.02 U	0.0243	**0.311 J**	0.0973	0.02 U	0.02 U	0.0303	0.02 U
Total Petroleum Hydrocarbons (µg/L)													
NWTPH-Gx (C7-C12)	800	**9,440**	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U
DRO (C12-C24)	500	**4,120**	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U
HRO (C24-C40)	500	**2,000 U**	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U

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

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

TABLE 25: BUILDING 4-70 GROUNDWATER ELEVATION DATA
August 15, 2018
Boeing Renton Facility, Renton, Washington

Well ID[1]	Screen Interval Depth (feet bgs)	TOC Elevation (feet)[2]	Depth to Groundwater (feet below TOC)	Groundwater Elevation (feet)[2]
GW259S	5 to 15	19.72	5.65	14.07
GW260S	5 to 15	19.83	5.80	14.03

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

Abbreviations
bgs = below ground surface
TOC = top of casing

TABLE 26: BUILDING 4-70 CONCENTRATIONS OF PRIMARY GEOCHEMICAL INDICATORS [1]

August 15, 2018

Boeing Renton Facility, Renton, Washington

	Well ID [2]	
	CPOC Area	
	GW259S	GW260S
Temperature (degrees C)	18.30	18.90
Specific Conductivity (µS/cm)	191.7	293.6
Dissolved Oxygen (mg/L)	1.48	0.38
pH (standard units)	6.32	6.16
Oxidation/Reduction Potential (mV)	105.2	73.9
Total Organic Carbon (mg/L)	3.91	9.78

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
AOC = area of concern
CPOC = conditional point of compliance
degrees C = degrees Celsius
mg/L = milligrams per liter
mV = millivolts

TABLE 27: BUILDING 4-70 CONCENTRATIONS OF CONSTITUENTS OF CONCERN [1, 2]
AUGUST 15, 2018
Boeing Renton Facility, Renton, Washington

	Cleanup Level [4]	Well ID [3]	
		CPOC Area	
		GW259S	GW260S
Volatile Organic Compounds (µg/L)			
cis-1,2-Dichloroethene	16	0.49	0.20 U
Trichloroethene	0.54	**0.70**	0.20 U
Vinyl Chloride	0.2	0.20 U	**0.22**

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

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

Appendix A

TABLE A-1: GROUNDWATER COMPLIANCE MONITORING SCHEDULE

Boeing Renton Facility, Renton, Washington

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

Notes:

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

Abbreviations:

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

TABLE A-2: MONITORED NATURAL ATTENUATION/MONITORED ATTENUATION SCHEDULE

Boeing Renton Facility, Renton, Washington

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

Notes:

1. In addition to COCs listed in Table A-1, primary geochemical indicators will be monitored during each regular monitoring event.
2. All primary geochemical indicators except TOC are monitored in the field during sampling. TOC is analyzed in the laboratory following methods specified in the Quality Assurance Project Plan, which is Appendix E to the Cleanup Action Plan (AMEC, 2012).
   The primary geochemical indicators differ slightly depending on whether the site is a fuel-related site or a solvent-related site.
   At a fuel related site, TOC is not necessary; at a solvent-related site, TOC is a measure of how much electron donor remains present.
3. The EDR presents the groundwater monitoring frequency for each SWMU/AOC. For sites with semiannual monitoring frequency, specific quarters when monitoring will be conducted is indicated by 1 for quarter 1, 2 for quarter 2, etc.
4. Primary geochemical parameters will not be collected at GW228S - only at CPOC wells that are sampled semiannually.
5. TOC will only be analyzed in the groundwater from the source area well (GW189S).

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

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly August 2018 | Date/Time: 8/ 13 /2018@ 946
Sample Number: RGW229S- 180813 | Weather: 60'S, PARTLY SUINNY
Landau Representative: JHA

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) | Damaged (NO) | Describe:
DTW Before Purging (ft) 9.39 | Time: | Flow through cell vol. | GW Meter No.(s SLOPE 2
Begin Purge: Date/Time: 8/ 13 /2018 @ 921 | End Purge: Date/Time: 8/ 13 /2018 @ 942 | 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**	
924	21.63	317	0.86	5.76	58.8	HIGH		<0.25	AT LOWEST SETTING
927	21.68	317	0.82	5.88	54.1				
930	21.93	317	0.80	5.92	53.7				
933	22.17	315	0.81	6.06	50.3				
936	22.28	314	0.77	6.07	49.6				
939	22.45	314	0.84	6.08	49.4				

SAMPLE COLLECTION DATA

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

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	22.52	314	0.85	6.09	49.5				
2	22.53	314	0.85	6.09	49.6				
3	22.54	315	0.84	6.09	49.6				
4	22.58	314	0.85	6.09	49.6				
Average:	22.54	314	0.85	6.09	49.6	#DIV/0!			

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

Duplicate Sample No(s): LOWERED PUMP FROM REGULAR SAMPLING DEPTH DUE TO LOW WATER LEVEL
Comments: HAD TO PULL PUMP OUT OF WELL TO GET WATER LEVEL

Signature: JHA | Date: 8/13/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name:	Boeing Renton	Project Number:	0025217.099.099
Event:	Quarterly August 2018	Date/Time:	8/ 13 /2018@ 916
Sample Number:	RGW230I- 180813	Weather:	60'S, PARTLY SUINNY
Landau Representative:	JHA		

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 8.69 Time: 835 Flow through cell vol. GW Meter No.(s SLOPE 2

Begin Purge: Date/Time: 8/ 13 /2018 @ 852 End Purge: Date/Time: 8/ 13 /2018 @ 911 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**	
855	18.47	814	0.27	5.91	-11.0	MED		<0.25	
858	19.35	829	0.25	5.93	-23.8		8.71		
901	19.95	836	0.22	6.05	-40.1			0.25	
904	19.94	836	0.21	6.05	-41.9				
907	20.20	834	0.21	6.03	-42.1		8.71		
910	20.28	836	0.22	6.03	-42.8				

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): TURBID, BROWNISH/GRAY COLOR, STRONG 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	20.29	836	0.22	6.03	-42.8				
2	20.29	836	0.22	6.03	-42.9				
3	20.29	836	0.22	6.03	-42.9				
4	20.29	836	0.22	6.03	-42.9				
Average:	20.29	836	0.22	6.03	-42.9	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: JHA Date: 8/13/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly August 2018 | Date/Time: 8/ 13 /2018@ 846
Sample Number: RGW231S- 180813 | Weather: 60'S, PARTLY SUINNY
Landau Representative: JHA

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:
DTW Before Purging (ft) 8.7 Time: 812 Flow through cell vol. GW Meter No.(s SLOPE 2
Begin Purge: Date/Time: 8/ 13 /2018 @ 824 End Purge: Date/Time: 8/ 13 /2018 @ 845 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**	
827	19.88	579	2.77	6.09	51.2	LOW		<0.25	
830	19.60	725	2.22	6.09	16.0				
833	19.58	775	1.80	6.10	3.1				
836	19.57	811	1.29	6.12	-16.7				
839	19.57	827	1.12	6.14	-24.9				
842	19.57	837	1.03	6.16	-30.3			0.25	
844	19.63	845	0.84	6.19	-37.3				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): CLOUDY, 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	19.63	845	0.82	6.19	-37.6				
2	19.63	845	0.82	6.19	-37.9				
3	19.63	845	0.82	6.19	-38.1				
4	19.63	845	0.81	6.19	-38.4				
Average:	19.63	845	0.82	6.19	-38.0	#DIV/0!			

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

Duplicate Sample No(s):
Comments: HAD TO TAKE PUMP OUT TO GET WATER LEVEL.
Signature: JHA Date: 8/13/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly August 2018 | Date/Time: 8/13 /2018@ 913
Sample Number: RGW081S- 180813 | Weather: CLEAR
Landau Representative: CEB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:
DTW Before Purging (ft) 9.8 Time: 839 Flow through cell vol. GW Meter No.(s 1
Begin Purge: Date/Time: 8/ 13 /2018 841 End Purge: Date/Time: 8/ 13 /2018 @ 903 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**	
844	19.1	127.4	2.05	6.37	59.3	LOW	9.83		
847	18.9	131.0	1.49	6.33	61.2		9.81		
850	19.1	125.5	1.13	6.35	61.3		9.80		
853	19.0	138.1	0.81	6.38	57.9				
856	19.2	132.4	0.66	6.39	55.9				
859	19.2	138.9	0.59	6.41	53.1				
901	19.2	133.1	0.58	6.41	52.9				

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.): SLIGHT YELLOW COLOR, CLEAR, 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	19.2	132.9	0.59	6.41	52.7				
2	19.2	133.8	0.60	6.41	52.4				
3	19.2	137.8	0.60	6.41	52.1				
4	19.2	135.8	0.61	6.41	51.8				
Average:	19.2	135.1	0.60	6.41	52.3	#DIV/0!			

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

Duplicate Sample No(s):
Comments:
Signature: CEB Date: 8/13/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly August 2018 | Date/Time: 8/ 13 /2018@ 855
Sample Number: RGW152S- 180813 | Weather: 70s clear
Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:
DTW Before Purging (ft) 9.9 Time: 815 Flow through cell vol. GW Meter No.(s heron2
Begin Purge: Date/Time: 8/ 13 /2018 825 End Purge: Date/Time: 8/ 13 /2018 @ 848 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**	
828	19.5	2610.0	1.06	4.46	55.5	MED	10.59		
831	19.3	3054.0	0.64	4.44	43.1		10.80		
834	19.3	3066.0	0.59	4.44	42.3		10.85		
837	19.3	3080.0	0.51	4.44	39.8		10.90		
840	19.4	3105.0	0.44	4.44	36.3		10.90		
843	19.5	3117.0	0.42	4.44	35.5		10.90		
846	19.6	3149.0	0.36	4.45	31.6				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type ded bladder
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☐ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): GRAY AND TURBID STRONG ODOR NO 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	19.6	3149.0	0.36	4.45	31.4				
2	19.6	3148.0	0.35	4.45	30.8				
3	19.6	3148.0	0.35	4.45	30.4				
4	19.6	3148.0	0.35	4.45	30.0				
Average:	19.6	3148.3	0.35	4.45	30.7	#DIV/0!			

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

Duplicate Sample No(s): Duplicate Location (DUP1)
Comments: VERY LOW PH AND HIGH COND
Signature: SRB Date: 8/13/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly August 2018 | Date/Time: 8/ 13 /2018@
Sample Number: RGWDUP1 180813 | Weather: 70s clear
Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:
DTW Before Purging (ft) Time: 700 Flow through cell vol. GW Meter No.(s heron2
Begin Purge: Date/Time: 8/ 13 /2018 @ End Purge: Date/Time: 8/ 13 /2018 @ 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**		
		DUPLICATE TO RGW152S							

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ☐ Pump/Pump Type ded bladder
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ☐ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☐ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): GRAY AND TURBID STRONG ODOR NO 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	19.6	3149.0	0.35	4.45	31.0				
2	19.6	3148.0	0.35	4.45	30.6				
3	19.6	3148.0	0.35	4.45	30.2				
4	19.6	3148.0	0.35	4.45	29.7				
Average:	19.6	3148.3	0.35	4.45	30.4	#DIV/0!			

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

Duplicate Sample No(s): Duplicate to RGW152S
Comments:
Signature: SRB Date: 8/13/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly August 2018 | Date/Time: 8/13/18 @ 1033
Sample Number: RGW153S- 180813 | Weather: CLEAR
Landau Representative: CEB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:
DTW Before Purging (ft) 11.05 Time: 1004 Flow through cell vol. GW Meter No.(s 1
Begin Purge: Date/Time: 8/ 13 /2018 1005 End Purge: Date/Time: 8/13 /2018 @ 1027 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		
1008	18.9	1854	1.31	4.82	32	LOW	11.39		
1011	19.3	2145	0.54	4.74	21.5		11.33		
1014	19.5	2214	0.46	4.73	17		11.33		
1017	19.6	2232	0.39	4.74	9.5				
1020	19.5	2213	0.4	4.75	5.2				
1023	19.5	2135	0.44	4.77	0.8				
1025	19.6	2079	0.44	4.77	-1.3				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ☒ Pump/Pump Type BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ☒ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☒ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): CLEAR COLORLESS STRONG 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	19.6	2065	0.46	4.78	-1.7				
2	19.6	2051	0.47	4.78	-2.2				
3	19.7	2037	0.48	4.78	-2.8				
4	19.7	2022	0.48	4.79	-3.2				
Average:	19.7	2044	0.47	4.78	-2.5	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
3	(8260-SIM) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
1	(COD) (TOC5310C) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
1	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(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: CEB Date: 8/13/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly August 2018 | Date/Time: 8/13 /2018@ 833

Sample Number: RGW172S- 180813 | Weather: HAZY

Landau Representative: CEB

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 10.53 | Time: 756 | Flow through cell vol. | GW Meter No.(s 1

Begin Purge: Date/Time: 8/ 13 /2018 757 | End Purge: Date/Time: 8/13 /2018 @ 819 | 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**	
800	18.4	264.1	0.93	6.57	67.7		10.88		
803	18.5	267.4	0.43	6.53	66.7		10.91		
806	18.6	266.6	0.42	6.53	63.5		10.92		
809	18.6	266.1	0.36	6.51	60.7				
812	18.6	288.7	0.39	6.43	55.9				
815	18.6	326.4	0.40	6.34	52.1				

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): COLORLESS, SOME BLACK PARTICULATES, 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	18.7	343.2	0.37	6.30	50.7				
2	18.7	350.8	0.36	6.28	50.3				
3	18.7	358.8	0.37	6.27	49.6				
4	18.8	364.5	0.37	6.25	48.6				
Average:	18.7	354.3	0.37	6.28	49.8	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: CEB | Date: 8/13/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly August 2018 | Date/Time: 8/ 13 /2018@ 951
Sample Number: RGW173S- 180813 | Weather: HAZY
Landau Representative: CEB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:
DTW Before Purging (ft) 10.73 Time: 920 Flow through cell vol. GW Meter No.(s 1
Begin Purge: Date/Time: 8/13 /2018 921 End Purge: Date/Time: 8/13 /2018 @ 944 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**	
924	18.8	427.2	0.30	6.35	74.4	LOW	10.82		
927	19.1	509.0	0.29	6.39	64.6		10.82		
930	19.4	591.0	0.30	6.40	54.4		10.81		
933	19.3	658.0	0.35	6.36	50.3				
936	19.2	749.0	0.34	6.31	46.3				
939	19.4	833.0	0.33	6.25	43.2				
942	19.4	846.0	0.34	6.25	42.7				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ☒ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ☒ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☒ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): CLEAR, SLIGHT YELLOW COLOR, 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	19.4	859.0	0.35	6.24	42.2				
2	19.4	869.0	0.35	6.23	41.8				
3	19.4	876.0	0.36	6.22	41.6				
4	19.4	884.0	0.35	6.22	41.3				
Average:	19.4	872.0	0.35	6.23	41.7	#DIV/0!			

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

Duplicate Sample No(s):
Comments:
Signature: CEB Date: 8/13/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly August 2018 | Date/Time: 8/ 13 /2018@ 1000
Sample Number: RGW226S- 180813 | Weather: 70s clear
Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:
DTW Before Purging (ft) 8.82 Time: 850 Flow through cell vol. GW Meter No.(s heron2
Begin Purge: Date/Time: 8/ 13 /2018 930 End Purge: Date/Time: 8/ 13 /2018 @ 955 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	
933	20.5	318.4	2.21	5.93	11.1	MED	10.34		
936	20.8	330.2	1.74	6.11	-4.7		10.35		
939	20.9	331.7	1.59	6.18	-11.5		10.35		
942	20.9	332.4	1.43	6.22	-16.3		10.35		
945	21.1	330.0	1.36	6.24	-19.9				
948	21.2	324.5	1.32	6.26	-23.2				
951	21.3	323.7	1.32	6.27	-23.7				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type ded bladder
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☐ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): GRAY SLIGHTLY TURBID SLIGHT ODOR NO 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	21.3	322.4	1.29	6.27	-23.8				
2	21.3	321.7	1.28	6.27	-24.2				
3	21.3	321.1	1.26	6.27	-24.7				
4	21.3	318.9	1.23	6.27	-25.1				
Average:	21.3	321.0	1.27	6.27	-24.5	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
3	(8260-SIM) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX) WA ☐ OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) WA ☐ OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)
1	(COD) (TOC5310C) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)
1	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	(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: LARGE INITIAL DRAWDOWN
Signature: SRB Date: 8/13/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly August 2018 | Date/Time: 8/ 13 /2018@ 716
Sample Number: RGW232S- 180813 | Weather: 60'S, PARLTY SUNNY
Landau Representative: JHA

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:
DTW Before Purging (ft) 9.07 Time: 653 Flow through cell vol. GW Meter No.(s SLOPE 2
Begin Purge: Date/Time: 8/ 13 /2018 @ 655 End Purge: Date/Time: 8/ 13 /2018 @ 705 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**	
658	19.4	512	1.4	6.1	-15.2	LOW	9.33	<0.25	AT LOWEST SETTING
701	19.2	515	1.4	6.1	-19.4		9.38		
704	19.1	515	1.3	6.1	-23.2				

SAMPLE COLLECTION DATA

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

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	19.1	516	1.3	6.1	-23.4				
2	19.1	516	1.3	6.1	-23.9				
3	19.1	517	1.3	6.1	-23.9				
4	19.1	517	1.3	6.1	-24.1				
Average:	19.1	517	1.3	6.1	-23.8	#DIV/0!	9.82		

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

Duplicate Sample No(s): LETTING RECAHRGE A FEW MINUTES BEFORE SAMPLING.
Comments: DRAWDOWN INEVITABLE. VERY BAD RECHARGE.

Signature: JHA Date: 8/13/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly August 2018 | Date/Time: 8/ 13 /2018@ 741
Sample Number: RGW233I- 180813 | Weather: 60'S, PARLTY SUNNY
Landau Representative: JHA

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) | Damaged (NO) | Describe:
DTW Before Purging (ft) 8.66 | Time: 714 | Flow through cell vol. | GW Meter No.(s SLOPE 2
Begin Purge: Date/Time: 8/ 13 /2018 @ 718 | End Purge: Date/Time: 8/ 13 /2018 @ 739 | 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**	
721	18.8	235	0.6	6.5	-3.2	LOW	8.66	<0.25	
724	18.1	233	0.5	6.2	-3.7				
727	18.3	232	0.4	6.1	-3.4		8.68	0.25	
730	18.3	233	0.3	6.1	-12.7		8.68		
733	18.3	237	0.3	6.1	-16.7				
736	18.3	237	0.3	6.2	-21.0			0.5	
738	18.3	235	0.3	6.2	-26.9				

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	18.3	239	0.3	6.2	-27.9				
2	18.3	237	0.3	6.2	-28.5				
3	18.3	237	0.3	6.2	-29.6				
4	18.3	236	0.3	6.2	-30.3				
Average:	18.3	237	0.3	6.2	-29.1	#DIV/0!			

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

Duplicate Sample No(s): MSMSD Location
Comments:

Signature: JHA | Date: 8/13/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly August 2018 | Date/Time: 8/ 13 /2018@ 740
Sample Number: RGW234S- 180813 | Weather: 70s clear
Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:
DTW Before Purging (ft) 9.03 Time: 700 Flow through cell vol. GW Meter No.(s heron2
Begin Purge: Date/Time: 8/ 13 /2018 710 End Purge: Date/Time: 8/ 13 /2018 @ 725 Gallons Purged: 0.25
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits								>/= 1 flow through cell	
	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft		
713	17.7	265.1	0.76	6.06	29.8	LOW	9.05		
716	17.7	248.5	0.54	6.04	18.5		9.05		
719	17.7	248.1	0.54	6.05	17.3		9.05		
722	17.8	247.8	0.49	6.06	14.3				

SAMPLE COLLECTION DATA

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

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	17.8	247.2	0.51	6.06	13.6				
2	17.7	247.3	0.49	6.06	13.0				
3	17.8	247.3	0.49	6.07	12.4				
4	17.8	247.0	0.49	6.06	12.0				
Average:	17.8	247.2	0.50	6.06	12.8	#DIV/0!			

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

Duplicate Sample No(s):
Comments:
Signature: SRB Date: 8/13/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly August 2018 | Date/Time: 8/ 13 /2018@ 810
Sample Number: RGW235I- 180813 | Weather: 70s clear
Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:
DTW Before Purging (ft) 8.9 Time: 730 Flow through cell vol. GW Meter No.(s heron2
Begin Purge: Date/Time: 8/ 13 /2018 740 End Purge: Date/Time: 8/ 13 /2018 @ 805 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**	
743	18.3	151.4	0.57	6.54	-2.6	MED	8.93		
746	17.8	170.4	0.40	6.05	17.6	LOW	8.90		
749	17.8	172.0	0.36	5.94	20.5		8.90		
752	17.9	166.7	3.70	6.05	8.6		8.90		
755	17.9	155.4	2.44	6.31	-7.6				
758	17.9	154.3	2.29	6.32	-9.0				
801	17.9	153.0	2.18	6.34	-12.1				

SAMPLE COLLECTION DATA

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

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	17.9	152.3	2.13	6.34	-12.8				
2	17.9	152.1	2.16	6.35	-13.5				
3	17.9	152.0	2.16	6.35	-13.6				
4	17.9	151.6	2.03	6.36	-14.3				
Average:	17.9	152.0	2.12	6.35	-13.6	#DIV/0!			

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

Duplicate Sample No(s):
Comments:
Signature: SRB Date: 8/13/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name:	Boeing Renton	Project Number:	0025217.099.099
Event:	Quarterly August 2018	Date/Time:	8/13 /2018@ 743
Sample Number:	RGW236S- 180813	Weather:	HAZY
Landau Representative:	CEB		

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 8.33 Time: 702 Flow through cell vol. GW Meter No.(s 1

Begin Purge: Date/Time: 8/ 13 /2018 708 End Purge: Date/Time: 8/13 /2018 @ 725 Gallons Purged: 0.25

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

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
711	16.5	401.7	1.18	6.41	71.3		8.68		
714	16.6	412.4	0.91	6.28	73.0		8.58		
717	16.6	413.2	1.06	6.27	76.0		8.49		
720	16.7	410.2	1.11	6.27	76.6		8.45		
723	16.8	406.6	1.08	6.28	77.0				

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

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

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	16.9	403.4	1.04	6.28	76.1				
2	16.9	402.7	1.04	6.28	76.2				
3	17.0	402.2	1.05	6.28	76.0				
4	17.0	401.4	1.03	6.28	75.4				
Average:	17.0	402.4	1.04	6.28	75.9	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: CEB Date: 8/13/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name:	Boeing Renton	Project Number:	0025217.099.099
Event:	Quarterly August 2018	Date/Time:	8/ 14 /2018@ 1248
Sample Number:	RGW031S- 180814	Weather:	HAZY, 80S
Landau Representative:	CEB		

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 5.37 Time: 1216 Flow through cell vol. GW Meter No.(s 1

Begin Purge: Date/Time: 8/14/2018 1218 End Purge: Date/Time: 8/ 14 /2018 @ 1237 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**	
1221	21.2	316.4	0.16	6.10	93.3		5.37		
1224	23.5	355.1	0.20	6.08	83.6	LOW	5.35		
1227	23.6	358.2	0.19	6.13	79.0		5.35		
1230	23.7	367.3	0.21	6.17	70.9				
1233									
1236									
1238									

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, SOME BROWN PARTICULATES, 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	23.8	372.2	0.23	6.18	68.4				
2	23.8	375.2	0.24	6.18	66.8				
3	23.8	376.5	0.23	6.19	65.60				
4	23.8	378.7	0.22	6.19	63.9				
Average:	23.8	375.7	0.23	6.19	66.2	#DIV/0!			

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

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

Comments:

Signature: CEB Date: 8/14/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly August 2018 | Date/Time: 8/ 14 /2018@ 1100
Sample Number: RGWDUP2 180814 | Weather: HAZY, 80S
Landau Representative: CEB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:
DTW Before Purging (ft) Time: Flow through cell vol. GW Meter No.(s)
Begin Purge: Date/Time: 8/ /2018 @ End Purge: Date/Time: 8/ /2018 @ Gallons Purged:
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ☐ Other SITE TREATMENT SYSTEM

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

DUPLICATE TO RGW031S

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ☐ Pump/Pump Type 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, SOME BROWN PARTICULATES, 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	23.8	273.6	0.23	6.18	67.4				
2	23.9	376.7	0.23	6.19	66.2				
3	23.8	377.5	0.23	6.19	65.00				
4	23.8	378.0	0.23	6.19	64.4				
Average:	23.8	351.5	0.23	6.19	65.8	#DIV/0!			

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

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

Signature: CEB Date: 8/14/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly August 2018 | Date/Time: 8/14 /2018@ 1428

Sample Number: RGW033S- 180814 | Weather: HAZY

Landau Representative: CEB

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 5.5 Time: 1356 Flow through cell vol. GW Meter No.(s 1

Begin Purge: Date/Time: 8/14 /2018 1357 End Purge: Date/Time: 8/ 14 /2018 @ 1420 Gallons Purged: 0.25

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

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
1400	22.1	403.4	0.21	6.11	63.0	LOW	5.50		
1403	22.7	396.1	0.19	6.13	59.1		5.50		
1406	23.4	395.3	0.20	6.16	51.9		5.50		
1409	23.6	399.3	0.23	6.17	49.3				
1412	23.6	404.1	0.25	6.16	45.8				
1415	23.6	407.2	0.26	6.14	43.4				
1417	23.6	412.8	0.32	6.14	41.1				

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): CLEAR COLORLESS, SOME 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	23.6	413.1	0.33	6.14	40.6				
2	23.6	413.6	0.33	6.14	40.4				
3	23.6	414.4	0.34	6.14	40.10				
4	23.6	414.8	0.34	6.14	39.8				
Average:	23.6	414.0	0.34	6.14	40.2	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: CEB Date: 8/14/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name:	Boeing Renton	Project Number:	0025217.099.099
Event:	Quarterly August 2018	Date/Time:	8/ 14 /2018@ 1513
Sample Number:	RGW034S- 180814	Weather:	HAZY 80S
Landau Representative:	CEB		

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 5.58 Time: 1439 Flow through cell vol. GW Meter No.(s 1

Begin Purge: Date/Time: 8/14 /2018 1440 End Purge: Date/Time: 8/14 /2018 @ 1457 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**	
1443	22.3	321.4	0.19	6.28	54.9	LOW	5.59		
1446	24.9	334.3	0.21	6.21	52.3		5.60		
1449	25.3	336.4	0.20	6.27	46.7		5.60		
1452	25.6	337.4	0.21	6.30	37.7				
1455									
1458									

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	25.9	338.8	0.22	6.31	36.7				
2	25.9	338.7	0.22	6.31	35.9				
3	25.9	338.7	0.22	6.32	35.50				
4	25.9	338.7	0.24	6.32	35.0				
Average:	25.9	338.7	0.23	6.32	35.8	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: CEB Date: 8/14/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly August 2018 | Date/Time: 8/ 14 /2018@ 1500
Sample Number: RGW038S- 180814 | Weather: 70S SMOKY
Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:
DTW Before Purging (ft) 5.69 Time: 1428 Flow through cell vol. GW Meter No.(s) HERON3
Begin Purge: Date/Time: 8/ 14 /2018 1430 End Purge: Date/Time: 8/ 14 /2018 @ 1450 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**	
1433	24.3	311.9	0.12	6.17	22.7	LOW	5.69		
1436	14.4	320.0	0.13	6.23	19.5		5.69		
1439	24.6	325.1	0.10	6.28	15.7		5.69		
1442	24.7	336.3	0.09	6.34	9.4				
1445	24.5	341.5	0.08	6.35	5.5				
1448	24.5	341.7	0.08	6.35	5.5				

SAMPLE COLLECTION DATA

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

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	24.5	342.2	0.08	6.35	5.0				
2	24.5	342.2	0.08	6.35	4.7				
3	24.5	342.4	0.08	6.35	4.8				
4	24.5	342.6	0.08	6.35	4.2				
Average:	24.5	342.4	0.08	6.35	4.7	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
5	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(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: 8/14/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly August 2018 | Date/Time: 8/ 14 /2018@ 1530
Sample Number: RGW039S- 180814 | Weather: 70S SMOKY
Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:
DTW Before Purging (ft) 5.22 Time: 1445 Flow through cell vol. GW Meter No.(s) HERON3
Begin Purge: Date/Time: 8/ 14 /2018 1500 End Purge: Date/Time: 8/ 14 /2018 @ 1324 Gallons Purged: 0.25
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
1503	24.7	177.0	0.19	6.21	21.1	LOW	5.22		
1306	24.6	178.4	0.20	6.21	21.1		5.22		
1309	24.7	180.0	0.17	6.18	21.6		5.22		
1312	24.6	184.5	0.14	6.19	20.0				
1315	24.4	187.9	0.16	6.19	19.2				
1318	24.5	191.3	0.13	6.19	17.8				
1321	24.4	194.2	0.15	6.20	16.4				

SAMPLE COLLECTION DATA

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

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	24.4	194.0	0.11	6.20	15.8				
2	24.5	195.9	0.14	6.22	15.0				
3	24.5	195.9	0.13	6.21	14.9				
4	24.5	195.8	0.13	6.21	15.2				
Average:	24.5	195.4	0.13	6.21	15.2	#DIV/0!			

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

Duplicate Sample No(s):
Comments:
Signature: SRB Date: 8/14/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly August 2018 | Date/Time: 8/ 14 /2018@ 1430
Sample Number: RGW143S- 180814 | Weather: 70S SMOKY
Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:
DTW Before Purging (ft) 5.79 Time: 1345 Flow through cell vol. GW Meter No.(s) HERON3
Begin Purge: Date/Time: 8/ 14 /2018 1400 End Purge: Date/Time: 8/ 14 /2018 @ 1424 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**	
1403	23.3	303.5	0.83	6.32	7.9	LOW	5.80		
1406	24.0	317.1	0.48	6.33	2.9		5.80		
1409	24.2	322.0	0.40	6.33	0.4		5.80		
1412	24.2	323.1	0.36	6.34	-1.1				
1415	24.2	323.9	0.32	6.34	-1.5				
1418	24.2	325.5	0.29	6.34	-1.4				
1421	24.2	326.7	0.27	6.32	-1.7				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☐ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): CLEAR WITH ORANGE PARTICULATES 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	24.2	327.0	0.28	6.33	-2.1				
2	24.2	327.2	0.27	6.33	-2.3				
3	24.2	327.0	0.30	6.32	-1.9				
4	24.1	327.4	0.27	6.32	-2.4				
Average:	24.2	327.2	0.28	6.33	-2.2	#DIV/0!			

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

Duplicate Sample No(s):
Comments:
Signature: SRB Date: 8/14/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly August 2018 | Date/Time: 8/ 14 /2018@ 1300
Sample Number: RGW209S- 180814 | Weather: 70S SMOKY
Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:
DTW Before Purging (ft) 5.35 Time: 1215 Flow through cell vol. GW Meter No.(s) HERON3
Begin Purge: Date/Time: 8/ 14 /2018 1230 End Purge: Date/Time: 8/ 14 /2018 @ 1240 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**	
1233	24.8	399.3	0.20	6.26	6.1	LOW	5.38		
1236	24.9	400.8	0.18	6.29	13.2		5.38		
1239	25.0	401.6	0.20	6.31	11.4		5.38		

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 CLEAR 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	25.1	401.9	0.18	6.31	10.9				
2	25.1	402.0	0.18	6.32	10.4				
3	25.3	403.3	0.18	6.32	9.9				
4	25.3	402.8	0.19	6.32	9.4				
Average:	25.2	402.5	0.18	6.32	10.2	#DIV/0!			

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

Duplicate Sample No(s):
Comments:
Signature: SRB Date: 8/14/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name:	Boeing Renton	Project Number:	0025217.099.099
Event:	Quarterly August 2018	Date/Time:	8/ 14 /2018@ 1158
Sample Number:	RGW210S- 180814	Weather:	HAZY, 80S
Landau Representative:	CEB		

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 5.13 Time: 1126 Flow through cell vol. GW Meter No.(s 1

Begin Purge: Date/Time: 8/14 /2018 1128 End Purge: Date/Time: 8/14 /2018 @ 1151 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**	
1131	21.3	304.2	0.92	6.34	90.8	HIGH	5.17		
1134	22.9	309.4	0.57	6.28	89.9		5.18		
1137	24.5	237.9	0.38	6.37	79.0		5.18		
1140	24.8	337.1	0.31	6.39	74.6				
1143	25.0	249.3	0.27	6.39	71.2				
1146	25.2	257.0	0.21	6.39	66.9				
1148	25.3	362.9	0.19	6.39	64.5				

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): YELLOWISH, HIGHLY TURBID WITH ORANGE PARTICULATES, 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	25.3	364.6	0.18	6.39	63.9				
2	25.3	365.7	0.17	6.39	63.4				
3	25.4	366.1	0.16	6.38	63.00				
4	25.4	366.8	0.17	6.38	62.6				
Average:	25.4	365.8	0.17	6.39	63.2	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: CEB Date: 8/14/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly August 2018 | Date/Time: 8/ 14 /2018@ 1155
Sample Number: RGW237S- 180814 | Weather: 70S SMOKY
Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:
DTW Before Purging (ft) 4.89 Time: 1122 Flow through cell vol. GW Meter No.(s) HERON3
Begin Purge: Date/Time: 8/ 14 /2018 1125 End Purge: Date/Time: 8/ 14 /2018 @ 1148 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**	
1128	20.5	318.2	1.14	6.61	41.8	LOW	4.89		
1131	21.8	312.2	0.29	6.35	36.0		4.89		
1134	21.7	319.9	0.30	6.35	35.6		4.90		
1137	22.0	323.9	0.25	6.35	32.3				
1140	23.0	340.6	0.28	6.40	23.5				
1143	23.0	341.6	0.30	6.39	23.6				
1146	23.2	343.9	0.26	6.40	22.0				

SAMPLE COLLECTION DATA

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

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	23.2	347.8	0.26	6.41	21.1				
2	23.3	348.0	0.25	6.41	20.7				
3	23.3	347.9	0.24	6.41	20.4				
4	23.3	351.2	0.25	6.40	20.2				
Average:	23.3	348.7	0.25	6.41	20.6	#DIV/0!			

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

Duplicate Sample No(s):
Comments:
Signature: SRB Date: 8/14/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly August 2018 | Date/Time: 8/ 14 /2018@ 1230
Sample Number: RGW238I- 180814 | Weather: 70S SMOKY
Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:
DTW Before Purging (ft) 4.94 Time: 1150 Flow through cell vol. GW Meter No.(s) HERON3
Begin Purge: Date/Time: 8/ 14 /2018 1200 End Purge: Date/Time: 8/ 14 /2018 @ 1211 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**	
1203	24.6	480.0	0.13	6.46	2.7	LOW	4.94		
1206	25.1	479.0	0.12	6.46	-5.1		4.94		
1209	25.3	478.5	0.13	6.45	-7.4		4.94		

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.): STARTED SLIGHTLY GRAY WITH PARTICULATES NO/NS ENDED 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	25.2	478.1	0.12	6.45	-8.0				
2	25.3	478.0	0.12	6.45	-8.7				
3	25.3	477.8	0.12	6.45	-9.3				
4	25.3	477.6	0.12	6.45	-9.8				
Average:	25.3	477.9	0.12	6.45	-9.0	#DIV/0!			

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

Duplicate Sample No(s): MSMSD Location
Comments:
Signature: SRB Date: 8/14/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly August 2018 | Date/Time: 8/ 14 /2018@ 1330
Sample Number: RGW239I- 180814 | Weather: 70S SMOKY
Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:
DTW Before Purging (ft) 5.69 Time: 1257 Flow through cell vol. GW Meter No.(s) HERON3
Begin Purge: Date/Time: 8/ 14 /2018 1300 End Purge: Date/Time: 8/ 14 /2018 @ 1320 Gallons Purged: 0.25
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft	>/= 1 flow through cell	
1303	21.6	345.4	0.54	6.56	31.1	LOW	5.69		
1306	22.1	347.7	0.30	6.37	33.2		5.69		
1309	23.5	348.4	0.24	6.28	30.5		5.69		
1312	24.8	352.0	0.23	6.30	25.7				
1315	25.8	361.5	0.20	6.31	20.5				
1318	26.2	364.4	0.22	6.31	18.9				

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.): SLIGHTY GRAY CLEAR 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	26.1	365.8	0.19	6.32	18.3				
2	26.3	366.8	0.17	6.32	17.6				
3	26.4	367.7	0.18	6.32	17.2				
4	26.4	368.5	0.18	6.32	16.5				
Average:	26.3	367.2	0.18	6.32	17.4	#DIV/0!			

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

Duplicate Sample No(s):
Comments:
Signature: SRB Date: 8/14/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly August 2018 | Date/Time: 8/ 14 /2018@ 1400
Sample Number: RGW240D- 180814 | Weather: 70S SMOKY
Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:
DTW Before Purging (ft) 5.93 Time: 1315 Flow through cell vol. GW Meter No.(s) HERON3
Begin Purge: Date/Time: 8/ 14 /2018 1330 End Purge: Date/Time: 8/ 14 /2018 @ 1350 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**	
1333	23.0	443.2	0.27	6.31	22.1	LOW	6.19		
1336	24.1	450.6	0.19	6.31	8.0		6.10		
1339	25.2	463.5	0.17	6.36	9.4		6.10		
1342	26.0	471.5	0.14	6.39	4.4				
1345	27.0	482.7	0.12	6.43	-6.2				
1348	27.2	484.4	0.14	6.44	-8.9				

SAMPLE COLLECTION DATA

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

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	27.2	485.0	0.14	6.44	-10.1				
2	27.3	487.5	0.12	6.45	-11.5				
3	27.3	487.9	0.12	6.45	-12.3				
4	27.3	488.2	0.12	6.43	-12.7				
Average:	27.3	487.2	0.13	6.44	-11.7	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
5	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(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: 8/14/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name:	Boeing Renton	Project Number:	0025217.099.099
Event:	Quarterly August 2018	Date/Time:	8/ 13 /2018@ 1436
Sample Number:	RGW-241S 180813	Weather:	70'S, PARTLY SUNNY
Landau Representative:	JHA		

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 6.31 Time: 1409 Flow through cell vol. GW Meter No.(s SLOPE 2

Begin Purge: Date/Time: 8/ 13 /2018 @ 1412 End Purge: Date/Time: 8/ 13 /2018 @ 1433 Gallons Purged: 0.05

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**	
1415	22.03	373	0.55	6.33	1.3	LOW	6.31	<0.25	
1418	21.71	352	0.44	6.06	-27.1		6.31		
1421	21.85	350	0.27	6.07	-43.9			0.25	
1424	21.84	349	0.17	6.24	-66.2		6.31		
1427	21.70	349	0.15	6.27	-71.5				
1430	21.67	349	0.13	6.32	-75.7			0.5	
1432	21.62	349	0.12	6.34	-77.6				

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

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

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	21.61	349	0.13	6.34	-77.9				
2	21.63	349	0.12	6.34	-78.1				
3	21.61	349	0.12	6.34	-78.1				
4	21.68	349	0.11	6.34	-78.5				
Average:	21.63	349	0.12	6.34	-78.2	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
5	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
	(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: 8/13/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly August 2018 | Date/Time: 8/ 13 /2018@ 1501
Sample Number: RGW-242I- 180813 | Weather: 70'S, PARTLY SUNNY
Landau Representative: JHA

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:
DTW Before Purging (ft) 6.44 Time: 1416 Flow through cell vol. GW Meter No.(s SLOPE 2
Begin Purge: Date/Time: 8/ 13 /2018 @ 1437 End Purge: Date/Time: 8/ 13 /2018 @ 1458 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							>/= 1 flow through cell	
	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft		
1440	23.01	371	0.44	6.27	-29.1	LOW	6.44	<0.25	
1443	23.43	371	0.43	6.31	-38.4				
1446	23.66	371	0.42	6.37	-41.4				
1449	23.81	371	0.39	6.50	-53.8				
1452	23.87	371	0.37	6.51	-62.9				
1455	23.95	371	0.35	6.52	-68.2				
1457	24.04	370	0.30	6.54	-72.1				

SAMPLE COLLECTION DATA

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

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	24.05	370	0.33	6.53	-72.4				
2	24.05	370	0.33	6.52	-72.9				
3	24.05	370	0.33	6.52	-73.2				
4	24.06	370	0.32	6.52	-73.6				
Average:	24.05	370	0.33	6.52	-73.0	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
5	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
	(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: 8/13/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly August 2018 | Date/Time: 8/14 /2018@ 1548

Sample Number: RGW-243I- 180814 | Weather: HAZY

Landau Representative: CEB

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 5.45 | Time: 1517 | Flow through cell vol. | GW Meter No.(s 1

Begin Purge: Date/Time: 8/ 14 /2018 @1519 | End Purge: Date/Time: 8/ 14 /2018 @ 1541 | 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**	
1522	25.5	449.3	0.20	6.23	56.1	LOW	5.45		
1525	26.4	459.1	0.19	6.21	53.2		5.47		
1528	26.9	463.7	0.21	6.22	49.3		5.47		
1531	27.9	477.0	0.23	6.29	39.3				
1534	28.2	480.8	0.24	6.29	35.1				
1537	28.4	482.1	0.29	6.28	30.9				
1539	28.4	482.7	0.31	6.28	29.2				

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): SLIGHTLY GRAY CLEAR 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	28.4	483.1	0.33	6.28	28.7				
2	28.4	483.8	0.33	6.29	28.1				
3	28.4	484.7	0.33	6.29	27.70				
4	28.4	485.5	0.33	6.29	27.2				
Average:	28.4	484.3	0.33	6.29	27.9	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: CEB | Date: 8/14/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly August 2018 | Date/Time: 8/ 14 /2018@ 1348
Sample Number: RGW-244S 1808 | Weather: HAZY 80S
Landau Representative: CEB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:
DTW Before Purging (ft) 5.45 Time: 1316 Flow through cell vol. GW Meter No.(s 1
Begin Purge: Date/Time: 8/ 14 /2018 1320 End Purge: Date/Time: 8/14 /2018 @ 1341 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		
1323	19.7	469.9	0.14	6.12	72.8	LOW	5.45		
1326	21.6	478.5	0.17	6.12	71.9		5.46		
1329	24.4	511.0	0.19	6.17	59.5		5.48		
1332	24.8	517.0	0.20	6.18	55.6				
1335	25.2	522.0	0.23	6.20	51.5				
1338	25.4	524.0	0.29	6.21	47.3				
1340	25.6	530.0	0.32	6.21	44.9				

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, SLIGHT YELLOW COLOR, NO/NS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	25.7	530.0	0.31	6.21	44.4				
2	25.7	531.0	0.32	6.21	44.1				
3	25.7	531.0	0.34	6.21	43.50				
4	25.7	531.0	0.35	6.21	42.9				
Average:	25.7	530.8	0.33	6.21	43.7	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)	
5	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐ OR ☐
	(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: CEB Date: 8/14/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly August 2018 | Date/Time: 8/ 15 /2018@ 848
Sample Number: RGW185S- 180815 | Weather: HAZY
Landau Representative: CEB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:
DTW Before Purging (ft) 2.31 Time: 817 Flow through cell vol. GW Meter No.(s 1
Begin Purge: Date/Time: 8/15 /2018 818 End Purge: Date/Time: 8/ 15 /2018 @ 842 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**	
821	21.3	795.0	0.33	6.45	85.1	LOW	2.31		
824	21.7	782.0	0.27	6.46	75.7		7.31		
827	21.8	778.0	0.27	6.47	70.6		7.31		
830	22.2	766.0	0.31	6.47	60.5				
833	22.4	761.0	0.34	6.48	51.6				
836	22.4	760.0	0.39	6.47	50.6				
838	22.5	759.0	0.39	6.47	47.0				

SAMPLE COLLECTION DATA

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

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	22.4	758.0	0.40	6.47	46.2				
2	22.5	758.0	0.42	6.47	44.6				
3	22.5	757.0	0.42	6.47	43.3				
4	22.5	756.0	0.44	6.47	41.7				
Average:	22.5	757.3	0.42	6.47	44.0	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
5	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(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)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

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

Signature: CEB Date: 8/15/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly August 2018 | Date/Time: 8/15/2018 800

Sample Number: RGWDUP3 180815 | Weather: HAZY

Landau Representative: CEB

WATER LEVEL/WELL/PURGE DATA

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

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

Begin Purge: Date/Time: 8/ /2018 @ End Purge: Date/Time: 8/ 15 /2018 @ Gallons Purged:

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

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

DUPLICATE TO RGW185S

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	22.5	758.0	0.41	6.47	45.3				
2	22.5	758.0	0.42	6.47	43.9				
3	22.6	757.0	0.43	6.47	42.3				
4	22.6	756.0	0.44	6.47	41.1				
Average:	22.6	757.3	0.43	6.47	43.2	#DIV/0!			

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

Duplicate Sample No(s): Duplicate to RGW185S

Comments:

Signature: CEB Date: 8/15/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly August 2018 | Date/Time: 8/ 15 /2018@ 1045
Sample Number: RGW190S- 180815 | Weather: 70s smoky
Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:
DTW Before Purging (ft) 3.17 Time: 1012 Flow through cell vol. GW Meter No.(s heron 3
Begin Purge: Date/Time: 8/ 15 /2018 1015 End Purge: Date/Time: 8/ 15 /2018 @ 1030 Gallons Purged: 0.25
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
1018	21.0	584.0	0.19	6.15	37.0	LOW	3.17		
1021	23.3	694.0	0.16	6.22	24.5		3.17		
1024	23.5	702.0	0.17	6.22	23.8		3.17		
1027	23.9	725.0	0.16	6.23	19.8				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☐ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): SLIGHTLY YELLOW WITH ORANGE PARTICULATES 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	23.9	728.0	0.16	6.24	19.1				
2	23.9	729.0	0.15	6.24	18.9				
3	24.0	734.0	0.16	6.24	18.4				
4	24.0	735.0	0.16	6.24	18.0				
Average:	24.0	731.5	0.16	6.24	18.6	#DIV/0!			

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

Duplicate Sample No(s):
Comments:
Signature: SRB Date: 8/15/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly August 2018 | Date/Time: 8/ 15 /2018@ 1145
Sample Number: RGW191D- 180815 | Weather: 70s smoky
Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:
DTW Before Purging (ft) 3.21 Time: 1110 Flow through cell vol. GW Meter No.(s heron 3
Begin Purge: Date/Time: 8/ 15 /2018 1115 End Purge: Date/Time: 8/ 15 /2018 @ 1138 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**	
1118	24.5	533.0	0.33	6.50	10.3	LOW	3.21		
1121	24.7	510.0	0.27	6.46	10.0		3.21		
1124	25.0	480.3	0.23	6.50	4.8		3.21		
1127	25.3	452.5	0.18	6.48	-2.7				
1130	25.4	451.9	0.18	6.49	-2.8				
1133	25.3	442.1	0.16	6.49	-6.2				
1136	25.2	431.3	0.16	6.49	-8.6				

SAMPLE COLLECTION DATA

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

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	25.2	428.3	0.15	6.48	-9.0				
2	25.3	427.9	0.15	6.48	-9.0				
3	25.2	424.8	0.15	6.51	-10.7				
4	25.2	422.6	0.15	6.50	-11.1				
Average:	25.2	425.9	0.15	6.49	-10.0	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)	
5	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐ OR ☐
	(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: 8/15/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name:	Boeing Renton	Project Number:	0025217.099.099
Event:	Quarterly August 2018	Date/Time:	8/15 /2018@ 1157
Sample Number:	RGW192S- 180815	Weather:	HAZY 80S
Landau Representative:	CEB		

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 3.48 Time: 1117 Flow through cell vol. GW Meter No.(s 1

Begin Purge: Date/Time: 8/ 15 /2018 1127 End Purge: Date/Time: 8/ 15 /2018 @ 1147 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**	
1130	23.6	571.0	0.18	6.03	50.6	LOW	3.49		
1133	23.6	567.0	0.21	6.04	48.2		3.47		
1136	23.6	560.0	0.26	6.04	45.6		3.48		
1139	23.7	556.0	0.30	6.04	43.8				
1142	23.7	551.0	0.35	6.04	41.7				
1145	23.7	549.0	0.39	6.04	40.1				
1147	23.7	548.0	0.40	6.04	39.3				

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

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

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	23.7	548.0	0.42	6.04	39.0				
2	23.7	548.0	0.42	6.04	38.6				
3	23.7	548.0	0.43	6.04	38.5				
4	23.7	547.0	0.43	6.04	38.2				
Average:	23.7	547.8	0.43	6.04	38.6	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: CEB Date: 8/15/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly August 2018 | Date/Time: 8/ 15 /2018@ 1120
Sample Number: RGW193S- 180815 | Weather: 70s smoky
Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:
DTW Before Purging (ft) 4.58 Time: 1030 Flow through cell vol. GW Meter No.(s heron 3
Begin Purge: Date/Time: 8/ 15 /2018 1050 End Purge: Date/Time: 8/ 15 /2018 @ 1102 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	22.1	1279.0	0.21	6.45	24.9	LOW	4.60		
1056	22.8	1294.0	0.19	6.40	23.6		4.60		
1059	23.2	1300.0	0.19	6.40	20.0		4.60		

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	23.2	1301.0	0.19	6.40	19.6				
2	23.2	1301.0	0.19	6.40	19.4				
3	23.2	1301.0	0.19	6.40	19.1				
4	13.2	1301.0	0.19	6.40	19.0				
Average:	20.7	1301.0	0.19	6.40	19.3	#DIV/0!			

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

Duplicate Sample No(s):
Comments:
Signature: SRB Date: 8/15/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly August 2018 | Date/Time: 8/ 15 /2018@ 910
Sample Number: RGW194S- 180815 | Weather: 70s smoky
Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:
DTW Before Purging (ft) 3.9 Time: 837 Flow through cell vol. GW Meter No.(s heron 3
Begin Purge: Date/Time: 8/ 15 /2018 840 End Purge: Date/Time: 8/ 15 /2018 @ 900 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**	
843	20.4	829.0	0.26	6.14	100.0	LOW	2.80		
846	20.5	840.0	0.35	6.16	97.0		2.80		
849	20.8	858.0	0.36	6.19	85.2		2.80		
852	21.0	846.0	0.31	6.20	74.0				
855	21.0	844.0	0.28	6.20	73.0				
858	21.3	820.0	0.28	6.20	61.9				

SAMPLE COLLECTION DATA

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

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	21.3	818.0	0.26	6.20	60.8				
2	21.3	818.0	0.26	6.20	60.4				
3	21.3	816.0	0.29	6.20	60.0				
4	21.3	816.0	0.27	6.20	59.4				
Average:	21.3	817.0	0.27	6.20	60.2	#DIV/0!			

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

Duplicate Sample No(s):
Comments:
Signature: SRB Date: 8/15/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly August 2018 | Date/Time: 8/ 15 /2018@ 1010
Sample Number: RGW195S- 180815 | Weather: 70s smoky
Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:
DTW Before Purging (ft) 2.44 Time: 930 Flow through cell vol. GW Meter No.(s heron 3
Begin Purge: Date/Time: 8/ 15 /2018 940 End Purge: Date/Time: 8/ 15 /2018 @ 955 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**	
943	20.3	807.0	0.15	6.26	25.0	LOW	2.44		
946	20.4	800.0	0.16	6.27	23.5		2.44		
949	20.6	796.0	0.17	6.28	20.1		2.44		
952	21.0	795.0	0.17	6.28	19.2				

SAMPLE COLLECTION DATA

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

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	21.0	794.0	0.17	6.29	18.4				
2	21.0	795.0	0.18	6.28	18.0				
3	21.2	796.0	0.17	6.29	17.5				
4	21.2	796.0	0.17	6.29	16.6				
Average:	21.1	795.3	0.17	6.29	17.6	#DIV/0!			

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

Duplicate Sample No(s):
Comments:
Signature: SRB Date: 8/15/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly August 2018 | Date/Time: 8/ 15 /2018@ 945
Sample Number: RGW196D- 180815 | Weather: 70s smoky
Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:
DTW Before Purging (ft) 2.5 Time: 900 Flow through cell vol. GW Meter No.(s heron 3
Begin Purge: Date/Time: 8/ 15 /2018 915 End Purge: Date/Time: 8/ 15 /2018 @ 934 Gallons Purged: 0.25
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
918	20.4	453.2	0.37	6.38	46.1	LOW	2.50		
921	20.5	454.5	0.35	6.37	44.5		2.50		
924	21.1	454.5	0.30	6.35	41.1		2.50		
927	21.7	454.9	0.26	6.38	30.8				
930	22.1	454.4	0.28	6.38	24.1				

SAMPLE COLLECTION DATA

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

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	22.2	454.3	0.25	6.39	23.7				
2	22.1	454.3	0.24	6.39	23.0				
3	22.2	454.4	0.25	6.39	22.6				
4	22.2	454.4	0.24	6.39	22.2				
Average:	22.2	454.4	0.25	6.39	22.9	#DIV/0!			

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

Duplicate Sample No(s):
Comments:
Signature: SRB Date: 8/15/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly August 2018 | Date/Time: 8/15 /2018@
Sample Number: RGW197S- 180815 | Weather: CEB 933
Landau Representative: CEB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:
DTW Before Purging (ft) 2.14 Time: 901 Flow through cell vol. GW Meter No.(s 1
Begin Purge: Date/Time: 8/ 15 /2018 904 End Purge: Date/Time: 8/ 15 /2018 @ 927 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**	
907	22.2	1042.0	0.15	6.72	49.3	LOW	2.13		
910	22.6	1044.0	0.15	6.85	34.5		2.15		
913	23.0	1045.0	0.15	6.96	15.9		2.18		
916	23.0	1041.0	0.16	7.02	2.1				
919	23.0	1040.0	0.16	7.03	1.0				

SAMPLE COLLECTION DATA

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

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	23	1040.0	0.16	7.07	-10.2				
2	23.1	1040.0	0.16	7.07	-11.6				
3	23	1039.0	0.16	7.07	-12.4				
4	23	1040.0	0.16	7.07	-13.2				
Average:	23.0	1039.8	0.16	7.07	-11.9	#DIV/0!			

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

Duplicate Sample No(s):
Comments:

Signature: CEB Date: 8/15/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name:	Boeing Renton	Project Number:	0025217.099.099
Event:	Quarterly August 2018	Date/Time:	8/15 /2018@ 1023
Sample Number:	RGW245S- 180815	Weather:	HAZY 80s
Landau Representative:	CEB		

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 2.49 Time: 948 Flow through cell vol. GW Meter No.(s 1

Begin Purge: Date/Time: 8/ 15 /2018 951 End Purge: Date/Time: 8/ 15 /2018 @ 1012 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**	
954	20.9	812.0	0.16	6.90	19.0	LOW	2.26		
957	21.1	824.0	0.16	6.95	14.9		2.27		
1000	22.1	854.0	0.14	7.01	7.0		2.28		
1003	22.4	867.0	0.14	7.02	2.1				
1006	22.9	883.0	0.13	7.01	-7.7				
1009	22.9	885.0	0.13	7.01	-8.8				

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): CLEAR COLORLESS 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	23	885.0	0.13	7.00	-9.3				
2	22.9	887.0	0.13	7.01	-9.9				
3	22.9	887.0	0.12	7.01	-10.5				
4	22.8	890.0	0.12	7.01	-11.1				
Average:	22.9	887.3	0.13	7.01	-10.2	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: CEB Date: 8/15/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly August 2018 | Date/Time: 8/ 15 /2018@ 1107
Sample Number: RGW246S- 180815 | Weather: HAZY 80S
Landau Representative: CEB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:
DTW Before Purging (ft) 2.55 Time: 1036 Flow through cell vol. GW Meter No.(s 1
Begin Purge: Date/Time: 8/ 15 /2018 1037 End Purge: Date/Time: 8/ 15 /2018 @ 1055 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		
1040	21.2	211.6	0.17	6.56	31.0	LOW	2.55		
1043	23.0	447.8	0.18	6.37	38.0		2.56		
1046	24.0	426.8	0.14	6.31	35.5		2.57		
1049	24.2	392.8	0.13	6.28	33.2				
1052	24.3	364.0	0.13	6.27	31.5				

SAMPLE COLLECTION DATA

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

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	24.3	358.4	0.12	6.25	30.9				
2	24.3	356.1	0.12	6.25	30.6				
3	24.3	352.6	0.13	6.25	30.6				
4	24.3	349.0	0.13	6.25	30.3				
Average:	24.3	354.0	0.13	6.25	30.6	#DIV/0!			

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

Duplicate Sample No(s):
Comments:
Signature: CEB Date: 8/15/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly August 2018 | Date/Time: 8/ 15 /2018@ 1315
Sample Number: RGW188S- 180815 | Weather: 70s smoky
Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:
DTW Before Purging (ft) 4.1 Time: 1240 Flow through cell vol. GW Meter No.(s heron 3
Begin Purge: Date/Time: 8/ 15 /2018 1245 End Purge: Date/Time: 8/ 15 /2018 @ 1256 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		
1248	21.1	510.0	0.11	6.19	22.9	LOW	4.10		
1251	21.0	513.0	0.12	6.22	21.0		4.10		
1254	21.4	519.0	0.11	6.25	17.7		4.10		

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 SMALL PARTICULATES 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	21.4	520.0	0.12	6.26	17.0				
2	21.4	522.0	0.11	6.26	16.6				
3	21.8	523.0	0.12	6.27	16.0				
4	21.9	524.0	0.12	6.27	15.5				
Average:	21.6	522.3	0.12	6.27	16.3	#DIV/0!			

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

Duplicate Sample No(s): MSMSD Location
Comments:
Signature: SRB Date: 8/15/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly August 2018 | Date/Time: 8/15 /2018@ 1313
Sample Number: RGW247S- 180815 | Weather: HAZY 80S
Landau Representative: CEB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:
DTW Before Purging (ft) 4.27 Time: 1241 Flow through cell vol. GW Meter No.(s 1
Begin Purge: Date/Time: 8/15 /2018 1243 End Purge: Date/Time: 8/ 15 /2018 @ 1302 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**	
1246	21.2	456.8	0.14	6.17	56.0		4.60		
1249	22.0	249.8	0.17	6.31	43.9		4.35		
1252	23.3	482.7	0.22	6.37	37.2		4.35		
1255	23.8	491.7	0.21	6.38	34.3		4.38		
1258	25.0	502.0	0.20	6.40	30.1				
1301									
1304									

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	26.6	510.0	0.23	6.40	28.4				
2	26.3	514.0	0.23	6.41	27.7				
3	26.4	515.0	0.22	6.41	27.1				
4	26.5	515.0	0.23	6.42	26.6				
Average:	26.5	513.5	0.23	6.41	27.5	#DIV/0!			

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

Duplicate Sample No(s):
Comments:
Signature: CEB Date: 8/15/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly August 2018 | Date/Time: 8/15 /2018@ 1243
Sample Number: RGW248I- 180815 | Weather: HAZY
Landau Representative: CEB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:
DTW Before Purging (ft) 4.02 Time: 1213 Flow through cell vol. GW Meter No.(s 1
Begin Purge: Date/Time: 8/15 /2018 1214 End Purge: Date/Time: 8/ 15 /2018 @ 1230 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**	
1217	21.7	500.0	0.27	6.22	60.4		4.06		
1220	23.2	535.0	0.22	6.13	61.9		4.08		
1223	24.6	566.0	0.20	6.26	47.1		4.08		
1226	25.2	575.0	0.20	6.29	39.9				
1229	25.2	576.0	0.20	6.29	38.8				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ☒ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ☒ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☒ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): CLEAR COLORLESS 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	25.2	576.0	0.19	6.30	38.1				
2	25.3	576.0	0.20	6.30	37.5				
3	25.3	577.0	0.20	6.30	36.9				
4	25.3	577.0	0.21	6.30	36.2				
Average:	25.3	576.5	0.20	6.30	37.2	#DIV/0!			

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

Duplicate Sample No(s):
Comments:

Signature: CEB Date: 8/15/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly August 2018 | Date/Time: 8/ 15 /2018@ 1250
Sample Number: RGW249S- 180815 | Weather: 70s smoky
Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:
DTW Before Purging (ft) 3.99 Time: 1215 Flow through cell vol. GW Meter No.(s heron 3
Begin Purge: Date/Time: 8/ 15 /2018 1220 End Purge: Date/Time: 8/ 15 /2018 @ 1245 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**	
1223	21.6	611.0	0.20	6.22	39.2	LOW	3.99		
1226	21.7	572.0	0.19	6.13	42.0		3.99		
1229	21.7	575.0	0.17	6.09	41.3		3.99		
1232	22.2	582.0	0.14	6.12	38.9				
1235	24.3	630.0	0.12	6.27	23.4				
1238	24.9	638.0	0.12	6.29	20.5				
1241	25.3	644.0	0.12	6.32	16.3				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☐ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): SLIGHTLY GRAY WITH ORANGE PARTICULATES 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	25.4	645.0	0.12	6.32	15.6				
2	25.4	645.0	0.12	6.32	15.1				
3	25.6	646.0	0.12	6.32	14.6				
4	25.7	646.0	0.12	6.32	14.6				
Average:	25.5	645.5	0.12	6.32	15.0	#DIV/0!			

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

Duplicate Sample No(s):
Comments:
Signature: SRB Date: 8/15/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly August 2018 | Date/Time: 8/ 15 /2018@ 1433
Sample Number: RGW174S- 180815 | Weather: HAZY
Landau Representative: CEB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:
DTW Before Purging (ft) 4.3 Time: 1403 Flow through cell vol. GW Meter No.(s 1
Begin Purge: Date/Time: 8/15 /2018 1404 End Purge: Date/Time: 8/ 15 /2018 @ 1421 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**	
1407	19.0	152.2	0.10	6.31	66.0		4.44		
1410	19.5	162.5	0.10	6.23	69.2		4.44		
1413	19.5	165.1	0.08	6.36	60.7		4.45		
1416	19.5	167.2	0.08	6.45	53.8				
1419	19.5	167.4	0.08	6.46	52.0				
1422									

SAMPLE COLLECTION DATA

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

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	19.3	167.5	0.08	6.46	51.6				
2	19.3	167.5	0.08	6.46	51.4				
3	19.3	167.3	0.08	6.46	51.2				
4	19.3	167.5	0.07	6.46	50.9				
Average:	19.3	167.5	0.08	6.46	51.3	#DIV/0!			

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

Duplicate Sample No(s):
Comments:
Signature: CEB Date: 8/15/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name:	Boeing Renton	Project Number:	0025217.099.099
Event:	Quarterly August 2018	Date/Time:	8/ 15 /2018@ 1403
Sample Number:	RGW250S- 180815	Weather:	HAZY
Landau Representative:	CEB		

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 4.36 Time: 1333 Flow through cell vol. GW Meter No.(s 1

Begin Purge: Date/Time: 8/ /2018 @ 1335 End Purge: Date/Time: 8/ 15 /2018 @ 1354 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**	
1338	21.3	141.9	0.82	6.46	60.1		4.25		
1341	22.0	142.6	0.57	6.32	67.0		4.23		
1344	22.5	145.6	0.45	6.39	61.6		4.24		
1347	23.1	148.4	0.32	6.57	50.8				
1350	23.4	149.3	0.26	6.62	46.3				
1353	23.5	149.6	0.25	6.64	44.1				

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): CLEAR COLORLESS SLIGHT 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	23.5	149.5	0.24	6.64	43.7				
2	23.6	149.5	0.23	6.64	43.3				
3	23.5	149.5	0.22	6.65	43.0				
4	23.6	149.6	0.22	6.65	42.8				
Average:	23.6	149.5	0.23	6.65	43.2	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: CEB Date: 8/15/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly August 2018 | Date/Time: 8/ 14 /2018@ 1030
Sample Number: RGW009S- 180814 | Weather: 70S SMOKY
Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:
DTW Before Purging (ft) 5.25 Time: 958 Flow through cell vol. GW Meter No.(s) HERON3
Begin Purge: Date/Time: 8/ 14 /2018 1000 End Purge: Date/Time: 8/ 14 /2018 @ 1024 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**	
1003	20.9	405.3	0.35	6.26	28.5	LOW	5.30		
1006	21.0	408.0	0.30	6.27	27.0		5.30		
1009	21.0	410.0	0.28	6.27	26.4		5.30		
1012	21.1	413.0	0.23	6.29	22.3				
1015	21.1	412.4	0.26	6.30	19.3				
1018	21.1	412.5	0.22	6.31	16.9				
1021	21.1	412.5	0.23	6.32	15.0				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☐ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): CLEAR COLORLESS SLIGHT ROTTEN ODOR NO 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	21.1	412.2	0.21	6.32	14.5				
2	21.1	411.9	0.20	6.31	14.5				
3	21.1	411.9	0.20	6.31	13.8				
4	21.1	411.6	0.19	6.31	13.4				
Average:	21.1	411.9	0.20	6.31	14.1	#DIV/0!			

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

Duplicate Sample No(s):
Comments:
Signature: SRB Date: 8/14/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly August 2018 | Date/Time: 8/14 /2018@ 816

Sample Number: RGW010S- 1808 | Weather: HAZY

Landau Representative: CEB

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 5.41 Time: 816 Flow through cell vol. GW Meter No.(s)

Begin Purge: Date/Time: 8/ 14 /2018 @ End Purge: Date/Time: 8/ 14 /2018 @ Gallons Purged:

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

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

WATER LEVEL ONLY

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ☐ Pump/Pump Type

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

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

(By Numerical Order) ☐ Other

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

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

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

Duplicate Sample No(s):

Comments:

Signature: Date:

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly August 2018 | Date/Time: 8/ 14 /2018@ 823

Sample Number: RGW011D- 1808 | Weather: HAZY

Landau Representative: CEB

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 5.44 Time: Flow through cell vol. GW Meter No.(s)

Begin Purge: Date/Time: 8/14 /2018 @ End Purge: Date/Time: 8/14 /2018 @ Gallons Purged:

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

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

WATER LEVEL ONLY

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ☐ Pump/Pump Type

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

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

(By Numerical Order) ☐ Other

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

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

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

Duplicate Sample No(s):

Comments:

Signature: Date:

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly August 2018 | Date/Time: 8/ 14 /2018@ 820
Sample Number: RGW012S- 180814 | Weather: 70S SMOKY
Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:
DTW Before Purging (ft) 5.03 Time: 747 Flow through cell vol. GW Meter No.(s) HERON3
Begin Purge: Date/Time: 8/ 14 /2018 750 End Purge: Date/Time: 8/ 14 /2018 @ 805 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**	
753	22.7	2346.0	0.29	4.63	100.0	MED	5.03		
756	22.7	2380.0	0.28	4.64	100.4		5.03		
759	22.8	2384.0	0.29	4.64	100.4				
802	22.8	2404.0	0.27	4.64	100.4		5.03		

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☐ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): GRAY SLIGHTLY TURBID ROTTEN ODOR NO 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	22.8	2406.0	0.27	4.64	100.3				
2	22.8	2406.0	0.27	4.64	100.3				
3	22.8	2407.0	0.27	4.64	100.3				
4	22.8	2408.0	0.27	4.64	100.3				
Average:	22.8	2406.8	0.27	4.64	100.3	#DIV/0!			

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

Duplicate Sample No(s):
Comments:
Signature: SRB Date: 8/14/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly August 2018 | Date/Time: 8/14 /2018@ 747
Sample Number: RGW014S- 180814 | Weather: CLEAR
Landau Representative: CEB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:
DTW Before Purging (ft) 5.1 Time: 716 Flow through cell vol. GW Meter No.(s 1
Begin Purge: Date/Time: 8/ 14 /2018 717 End Purge: Date/Time: 8/14 /2018 @ 734 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**	
720	21.4	416.4	0.35	6.33	106.5	LOW	5.18		
723	21.3	417.3	0.54	6.29	112.9		5.19		
726	21.4	416.7	0.59	6.28	114.6		5.20		
729	21.5	416.3	0.55	6.28	115.5				

SAMPLE COLLECTION DATA

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

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	21.5	416.7	0.52	6.28	115.1				
2	21.5	416.8	0.52	6.28	114.7				
3	21.5	417.0	0.52	6.28	114.10				
4	21.5	417.0	0.52	6.28	113.9				
Average:	21.5	416.9	0.52	6.28	114.5	#DIV/0!			

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

Duplicate Sample No(s): Duplicate location (DUP4)
Comments:

Signature: CEB Date: 8/14/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name:	Boeing Renton	Project Number:	0025217.099.099
Event:	Quarterly August 2018	Date/Time:	8/ 14 /2018@ 700
Sample Number:	RGWDUP4 180814	Weather:	CLEAR
Landau Representative:	CEB		

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 5.1 Time: 716 Flow through cell vol. GW Meter No.(s 1

Begin Purge: Date/Time: 8/ 14 /2018 717 End Purge: Date/Time: 8/ 14 /2018 @ 7.34 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**		

DUPLICATE TO RGW014S

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): 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	21.5	416.8	0.51	6.28	114.9				
2	21.5	416.9	0.51	6.28	114.4				
3	21.5	417.0	0.52	6.28	114.00				
4	21.5	417.0	0.51	6.28	113.3				
Average:	21.5	416.9	0.51	6.28	114.2	#DIV/0!			

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

Duplicate Sample No(s): Duplicate to RGW014S

Comments:

Signature: CEB Date: 8/14/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly August 2018 | Date/Time: 8/ 14 /2018@ 745
Sample Number: RGW147S- 180814 | Weather: 70S SMOKY
Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:
DTW Before Purging (ft) 4.71 Time: 714 Flow through cell vol. GW Meter No.(s) HERON3
Begin Purge: Date/Time: 8/ 14 /2018 715 End Purge: Date/Time: 8/ 14 /2018 @ 735 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**	
718	19.6	1832.0	1.02	4.42	79.8	LOW	4.71		
721	20.2	2476.0	0.65	4.44	54.5		4.71		
724	20.3	2538.0	0.61	4.57	50.0		4.71		
727	20.4	2607.0	0.53	4.60	38.2				
730	20.4	2615.0	0.52	4.60	35.9				
733	20.4	2613.0	0.51	4.60	34.6				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☐ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): CLEAR COLORLESS ROTTEN ODOR NO 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	20.4	2615.0	0.51	4.60	34.0				
2	20.4	2619.0	0.52	4.60	33.9				
3	20.4	2617.0	0.53	4.60	33.4				
4	20.5	2619.0	0.51	4.60	33.1				
Average:	20.4	2617.5	0.52	4.60	33.6	#DIV/0!			

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

Duplicate Sample No(s):
Comments: VERY HIGH COND AND LOW PH
Signature: SRB Date: 8/14/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly August 2018 | Date/Time: 8/ 14 /2018@ 923

Sample Number: RGW149S- 180814 | Weather: SUNNY

Landau Representative: CEB

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 5.2 Time: 846 Flow through cell vol. GW Meter No.(s 1

Begin Purge: Date/Time: 8/ 14 /2018 849 End Purge: Date/Time: 8/ 14 /2018 @ 911 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**	
852	17.8	237.9	0.29	6.05	131.8	LOW	5.20		
855	18.1	237.6	0.27	6.17	119.8		5.20		
858	18.1	236.5	0.24	6.19	117.0		5.22		
901	18.0	233.6	0.27	6.23	112.9				
904	18.0	231.7	0.26	6.24	109.4				
907	17.9	225.7	0.28	6.25	104.6				

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

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

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	18.0	223.7	0.26	6.25	103.3				
2	18.0	223.2	0.26	6.25	102.9				
3	18.0	222.9	0.26	6.25	102.50				
4	18.0	222.6	0.27	6.25	102.2				
Average:	18.0	223.1	0.26	6.25	102.7	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
3	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
5	(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: CEB Date: 8/14/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly August 2018 | Date/Time: 8/ 14 /2018@ 945
Sample Number: RGW150S- 180814 | Weather: 70S SMOKY
Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:
DTW Before Purging (ft) 5.11 Time: 900 Flow through cell vol. GW Meter No.(s) HERON3
Begin Purge: Date/Time: 8/ 14 /2018 915 End Purge: Date/Time: 8/ 14 /2018 @ 930 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**	
918	19.5	366.0	0.29	6.46	1.0	LOW	5.13		
921	21.4	390.3	0.20	6.31	-0.4		5.13		
924	21.4	391.0	0.20	6.31	-1.2		5.13		
927	21.3	390.6	0.20	6.32	-3.7				

SAMPLE COLLECTION DATA

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

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	21.3	390.6	0.19	6.32	-3.8				
2	21.3	390.0	0.21	6.31	-3.9				
3	21.3	389.7	0.19	6.32	-4.3				
4	21.3	389.7	0.19	6.32	-4.4				
Average:	21.3	390.0	0.20	6.32	-4.1	#DIV/0!			

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

Duplicate Sample No(s):
Comments:
Signature: SRB Date: 8/14/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly August 2018 | Date/Time: 8/ 14 /2018@ 1002
Sample Number: RGW252S- 180814 | Weather: CLEAR
Landau Representative: CEB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:
DTW Before Purging (ft) 5.02 Time: 931 Flow through cell vol. GW Meter No.(s 1
Begin Purge: Date/Time: 8/ 14 /2018 932 End Purge: Date/Time: 8/14 /2018 @ 951 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**	
935	21.5	615.0	0.24	6.63	89.6	LOW	5.03		
938	21.4	620.0	0.29	6.64	85.6		5.03		
941	21.4	632.0	0.39	6.65	71.1		5.03		
944	21.7	638.0	0.38	6.66	62.9				
947	21.8	639.0	0.40	6.66	61.1				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ☒ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ☒ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☒ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): COLORLESS SOME REDDISH PARTICULATES 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	22.0	641.0	0.43	6.66	57.5				
2	22.0	653.0	0.44	6.67	56.3				
3	22.0	653.0	0.42	6.67	55.30				
4	22.1	653.0	0.40	6.67	54.3				
Average:	22.0	650.0	0.42	6.67	55.9	#DIV/0!			

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

Duplicate Sample No(s): MSMSD Location
Comments:

Signature: CEB Date: 8/14/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name:	Boeing Renton	Project Number:	0025217.099.099
Event:	Quarterly August 2018	Date/Time:	8/ 14 /2018@ 1043
Sample Number:	RGW253I- 180814	Weather:	HAZY 80S
Landau Representative:	CEB		

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 5.06 Time: 1016 Flow through cell vol. GW Meter No.(s 1

Begin Purge: Date/Time: 8/ 14 /2018 1018 End Purge: Date/Time: 8/ 14 /2018 @ 1040 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**	
1021	19.3	347.1	0.24	6.55	80.9	LOW	5.06		
1024	20.0	354.0	0.24	6.37	86.2		5.06		
1027	20.4	363.7	0.22	6.36	80.9		5.07		
1030	20.5	367.9	0.25	6.44	71.7				
1033	20.5	370.8	0.22	6.47	65.5				
1036	20.5	372.0	0.21	6.47	62.1				
1038	20.6	372.1	0.21	6.47	59.8				

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

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

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	20.6	371.9	0.20	6.47	59.2				
2	20.6	371.8	0.20	6.46	58.9				
3	20.6	371.8	0.20	6.47	58.40				
4	20.6	371.9	0.20	6.47	57.8				
Average:	20.6	371.9	0.20	6.47	58.6	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: CEB Date: 8/14/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly August 2018 | Date/Time: 8/ 14 /2018@ 915
Sample Number: RGW254S- 180814 | Weather: 70S SMOKY
Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:
DTW Before Purging (ft) 5.2 Time: 844 Flow through cell vol. GW Meter No.(s) HERON3
Begin Purge: Date/Time: 8/ 14 /2018 845 End Purge: Date/Time: 8/ 14 /2018 @ 910 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	19.0	529.0	0.34	6.09	36.6	LOW	5.21		
851	19.2	535.0	0.33	6.15	31.7		5.21		
854	19.9	542.0	0.35	6.35	16.9		5.21		
857	20.1	548.0	0.32	6.44	9.0				
900	20.2	550.0	0.30	6.49	2.6				
903	20.4	556.0	0.26	6.54	-6.1				
906	20.4	557.0	0.26	6.55	-7.8				

SAMPLE COLLECTION DATA

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

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	20.4	558.0	0.27	6.55	-8.5				
2	20.4	558.0	0.27	6.56	-9.2				
3	20.4	558.0	0.27	6.56	-9.8				
4	20.4	558.0	0.26	6.56	-10.4				
Average:	20.4	558.0	0.27	6.56	-9.5	#DIV/0!			

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

Duplicate Sample No(s):
Comments:
Signature: SRB Date: 8/14/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly August 2018 | Date/Time: 8/ 13 /2018@ 1345
Sample Number: RGW163I- 180813 | Weather: 70s clear
Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:
DTW Before Purging (ft) 6.79 Time: 1310 Flow through cell vol. GW Meter No.(s heron2
Begin Purge: Date/Time: 8/ 13 /2018 1315 End Purge: Date/Time: 8/ 13 /2018 @ 1338 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**	
1318	20.4	370.2	0.74	6.25	8.5	LOW	6.79		
1321	20.7	378.7	0.66	6.25	7.2		6.79		
1324	20.6	380.0	0.51	6.19	8.6		6.79		
1327	20.4	378.6	0.46	6.17	8.7				
1330	20.2	375.2	0.42	6.14	8.2				
1333	20.2	372.7	0.37	6.14	7.8				
1336	20.0	369.9	0.29	6.11	7.3				

SAMPLE COLLECTION DATA

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

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	20.0	369.1	0.25	6.11	6.9				
2	19.9	368.7	0.24	6.10	6.9				
3	19.9	368.4	0.24	6.10	6.6				
4	19.9	368.1	0.23	6.10	6.6				
Average:	19.9	368.6	0.24	6.10	6.8	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
7	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX) WA ☐ OR ☐
2	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) WA ☐ OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)
	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):
Comments:
Signature: SRB Date: 8/13/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly August 2018 | Date/Time: 8/13 /2018@ 1413

Sample Number: RGW165I- 180813 | Weather: HAZY

Landau Representative: CEB

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 7.43 Time: 1334 Flow through cell vol. GW Meter No.(s 1

Begin Purge: Date/Time: 8/13 /2018 1342 End Purge: Date/Time: 8/13 /2018 @ 1400 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**	
1345	19.9	395.5	0.19	6.00	67.4	LOW	7.59		
1348	22.0	394.3	0.19	6.00	62.3		7.61		
1351	22.5	396.2	0.25	6.06	56.3		7.60		
1354	22.8	397.8	0.26	6.10	51.1				
1357	23.0	397.5	0.26	6.12	47.3				

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

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

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	23.0	397.3	0.28	6.13	46.2				
2	23.0	397.2	0.28	6.13	46.0				
3	23.0	397.0	0.29	6.13	45.7				
4	23.0	397.0	0.29	6.13	45.3				
Average:	23.0	397.1	0.29	6.13	45.8	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
7	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
2	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):

Comments:

Signature: CEB Date: 8/13/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly August 2018 | Date/Time: 8/ 13 /2018@ 1230
Sample Number: RGW175I- 180813 | Weather: 70s clear
Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:
DTW Before Purging (ft) 6.45 Time: 1145 Flow through cell vol. GW Meter No.(s heron2
Begin Purge: Date/Time: 8/ 13 /2018 1200 End Purge: Date/Time: 8/ 13 /2018 @ 1225 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**	
1203	20.8	521.0	0.20	6.24	2.6	LOW	6.85		
1206	20.8	522.0	0.19	6.25	1.0		6.86		
1209	20.9	524.0	0.27	6.26	-2.4		6.86		
1212	21.3	532.0	0.33	6.28	-6.9				
1215	21.5	535.0	0.39	6.29	-10.1				
1218	21.8	538.0	0.39	6.30	-14.0				
1221	22.0	540.0	0.40	6.31	-16.6				

SAMPLE COLLECTION DATA

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

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	22.1	541.0	0.40	6.31	-17.4				
2	22.1	542.0	0.38	6.31	-18.3				
3	22.2	543.0	0.33	6.31	-19.0				
4	22.3	543.0	0.35	6.31	-19.5				
Average:	22.2	542.3	0.37	6.31	-18.6	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
7	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX) WA ☐ OR ☐
2	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) WA ☐ OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)
	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):
Comments:
Signature: SRB Date: 8/13/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly August 2018 | Date/Time: 8/ 13 /2018@ 1300
Sample Number: RGW176S- 180813 | Weather: 70s clear
Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:
DTW Before Purging (ft) 6.12 Time: 1215 Flow through cell vol. GW Meter No.(s heron2
Begin Purge: Date/Time: 8/ 13 /2018 1235 End Purge: Date/Time: 8/ 13 /2018 @ 1245 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**	
1238	22.3	723.0	0.19	6.28	-15.5	LOW	6.12		
1241	22.4	726.0	0.20	6.28	-17.1		6.12		
1244	22.6	729.0	0.20	6.28	-20.8		6.12		

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 CLEAR 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	22.6	729.0	0.19	6.28	-21.8				
2	22.6	729.0	0.20	6.28	-22.5				
3	22.6	730.0	0.19	6.28	-23.2				
4	22.7	730.0	0.19	6.28	-23.7				
Average:	22.6	729.5	0.19	6.28	-22.8	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
7	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX) WA ☐ OR ☐
2	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) WA ☐ OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)
	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):
Comments:
Signature: SRB Date: 8/13/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly August 2018 | Date/Time: 8/ 13 /2018@ 1226
Sample Number: RGW177I- 180813 | Weather: 60'S, PARTLY SUNNY
Landau Representative: JHA

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:
DTW Before Purging (ft) 8.34 Time: 1200 Flow through cell vol. GW Meter No.(s SLOPE 2
Begin Purge: Date/Time: 8/ 13 /2018 @ 1204 End Purge: Date/Time: 8/ 13 /2018 @ 1225 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**	
1207	17.45	692	0.66	6.16	-64.5	LOW	8.29	<0.25	LEVEL RISING?
1210	17.28	677	0.43	6.18	-75.0		8.21		
1213	16.43	656	0.24	6.21	-82.2			0.25	
1216	16.29	654	0.21	6.23	-84.3				
1219	16.21	652	0.18	6.24	-86.9				
1222	16.13	650	0.17	6.32	-89.6		8.18	0.5	
1224	16.13	649	0.16	6.34	-91.6				

SAMPLE COLLECTION DATA

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

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	16.15	649	0.15	6.34	-92.0				
2	16.16	648	0.16	6.35	-92.2				
3	16.18	648	0.15	6.35	-92.4				
4	16.16	648	0.15	6.35	-92.6				
Average:	16.16	648	0.15	6.35	-92.3	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
7	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
2	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):
Comments:

Signature: JHA Date: 8/13/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly August 2018 | Date/Time: 8/ 13 /2018@ 1256
Sample Number: RGW178S- 180813 | Weather: 60'S, PARTLY SUNNY
Landau Representative: JHA

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:
DTW Before Purging (ft) 8.57 Time: 1217 Flow through cell vol. GW Meter No.(s SLOPE 2
Begin Purge: Date/Time: 8/ 13 /2018 @ 1231 End Purge: Date/Time: 8/ 13 /2018 @ 1252 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**	
1234	16.22	465	0.15	5.96	-18.0	LOW		<0.25	
1237	15.83	471	0.11	6.00	-41.2		8.61		
1240	15.87	458	0.10	6.03	-56.7			0.25	
1243	16.07	446	0.11	6.09	-67.0		8.61		
1246	16.23	439	0.10	6.17	-71.6				
1249	16.28	438	0.11	6.18	-74.5			0.5	

SAMPLE COLLECTION DATA

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

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	16.33	437	0.10	6.18	-75.2				
2	16.33	438	0.10	6.18	-75.5				
3	16.34	437	0.11	6.18	-75.9				
4	16.34	437	0.11	6.19	-76.2				
Average:	16.34	437	0.11	6.18	-75.7	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
7	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
2	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):
Comments:

Signature: JHA Date: 8/13/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name:	Boeing Renton	Project Number:	0025217.099.099
Event:	Quarterly August 2018	Date/Time:	8/ 13 /2018@ 1131
Sample Number:	RGW179I- 180813	Weather:	60'S, PARTLY SUNNY
Landau Representative:	JHA		

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 6.46 Time: 1104 Flow through cell vol. GW Meter No.(s SLOPE 2

Begin Purge: Date/Time: 8/ 13 /2018 @ 1109 End Purge: Date/Time: 8/ 13 /2018 @ 1130 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**	
1112	19.29	450	0.39	5.85	-32.1	LOW	6.46	<0.25	
1115	19.59	465	0.32	5.88	-45.4				
1118	19.81	489	0.27	6.00	-63.2		6.46	0.25	
1121	19.86	497	0.26	6.03	-67.5				
1124	20.00	514	0.25	6.10	-79.3				
1127	20.03	527	0.25	6.12	-83.9			0.5	
1129	19.98	530	0.25	6.12	-85.6				

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

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

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	19.93	532	0.25	6.12	-86.0				
2	19.91	532	0.24	6.12	-86.3				
3	19.91	532	0.24	6.12	-86.6				
4	19.91	533	0.24	6.12	-86.9				
Average:	19.92	532	0.24	6.12	-86.5	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
7	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
2	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):

Comments:

Signature: JHA Date: 8/13/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly August 2018 | Date/Time: 8/ 13 /2018@ 1041
Sample Number: RGW180S- 180813 | Weather: 60'S, PARTLY SUNNY
Landau Representative: JHA

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:
DTW Before Purging (ft) 6.51 Time: 1015 Flow through cell vol. GW Meter No.(s SLOPE 2
Begin Purge: Date/Time: 8/ 13 /2018 @ 1019 End Purge: Date/Time: 8/ 13 /2018 @ 1040 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		
1022	20.79	312	0.17	6.05	13.2	LOW	8.51	<0.25	
1025	20.36	318	0.20	5.91	6.3		8.51		
1028	20.65	325	0.31	5.94	-6.3				
1031	20.89	328	0.23	6.05	-20.7		8.51		
1034	20.94	328	0.21	6.09	-25.3			0.25	
1037	21.01	328	0.21	6.14	-31.4				
1039	21.13	329	0.22	6.19	-39.1				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): CLOUDY, LIGHT 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	21.14	329	0.22	6.19	-39.3				
2	21.16	329	0.21	6.19	-40.1				
3	21.16	329	0.21	6.19	-40.4				
4	21.18	330	0.21	6.19	-41.2				
Average:	21.16	329	0.21	6.19	-40.3	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
7	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
2	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s): Duplicate Location (DUP5)
Comments:

Signature: JHA Date: 8/13/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly August 2018 | Date/Time: 8/ 13 /2018@ 1000
Sample Number: RGW180S- 180813 | Weather: 60'S, PARTLY SUNNY
Landau Representative: JHA

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:
DTW Before Purging (ft) Time: Flow through cell vol. GW Meter No.(s SLOPE 2
Begin Purge: Date/Time: 8/ 13 /2018 @ End Purge: Date/Time: 8/ 13 /2018 @ Gallons Purged:
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

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

Duplicate to RGW180S

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ☐ Pump/Pump Type DED BLADDER
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ☐ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☐ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.): CLOUDY, LIGHT 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	21.14	329	0.21	6.19	-39.7				
2	21.17	329	0.21	6.19	-40.7				
3	21.17	330	0.21	6.19	-41.0				
4	21.17	330	0.22	6.19	-41.5				
Average:	21.16	330	0.21	6.19	-40.7	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
7	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
2	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s): Duplicate to RGW180S
Comments:

Signature: JHA Date: 8/13/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name:	Boeing Renton	Project Number:	0025217.099.099
Event:	Quarterly August 2018	Date/Time:	8/13 /2018@ 1141
Sample Number:	RGW189S- 180813	Weather:	HAZY 80S
Landau Representative:	CEB		

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 7.85 Time: 1109 Flow through cell vol. GW Meter No.(s 1

Begin Purge: Date/Time: 8/13 /2018 1111 End Purge: Date/Time: 8/ 13 /2018 @ 1130 Gallons Purged: 0.20

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

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
1114	20.0	1781.0	0.23	4.60	84.1	LOW	7.98		
1117	21.7	2064.0	0.41	4.54	75.6		7.95		
1120	22.4	2236.0	0.65	4.53	72.2		7.95		
1123	23.3	2312.0	0.77	4.53	69.1				
1126	23.6	2375.0	0.79	4.54	65.8		7.97		
1129	24.6	2496.0	0.86	4.54	61.9				

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.): COLORLESS, SOME BLACK PARTICULATES, 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	24.6	2506.0	0.86	4.54	61.6				
2	24.6	2514.0	0.85	4.54	61.3				
3	24.8	2527.0	0.82	4.54	61.2				
4	24.9	2535.0	0.84	4.54	60.9				
Average:	24.7	2520.5	0.84	4.54	61.3	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
7	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
2	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
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: CHANGED SOAK SOCK WENT DRY DURING SAMPLING WAITED 5 MIN FOR RECHARGE

Signature: CEB Date: 8/13/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly August 2018 | Date/Time: 8/ 13 /2018@ 1155
Sample Number: RGW207S- 180813 | Weather: 70s clear
Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:
DTW Before Purging (ft) 6.89 Time: 1118 Flow through cell vol. GW Meter No.(s heron2
Begin Purge: Date/Time: 8/ 13 /2018 1125 End Purge: Date/Time: 8/ 13 /2018 @ 1142 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	
1128	19.7	462.6	0.30	6.15	23.0	LOW	6.91		
1131	19.9	470.1	0.25	6.17	17.5		6.91		
1134	20.0	477.5	0.20	6.20	10.5		6.91		
1137	19.9	480.0	0.18	6.21	6.0				
1140	19.7	480.1	0.19	6.21	3.7				

SAMPLE COLLECTION DATA

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

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	19.8	480.0	0.18	6.20	3.5				
2	19.9	481.2	0.20	6.20	3.1				
3	19.7	481.3	0.19	6.20	2.5				
4	19.8	481.3	0.18	6.20	2.1				
Average:	19.8	481.0	0.19	6.20	2.8	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
7	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
2	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):
Comments:
Signature: SRB Date: 8/13/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly August 2018 | Date/Time: 8/ 13 /2018@ 1336
Sample Number: RGW208S- 180813 | Weather: 60'S, PARTLY SUNNY
Landau Representative: JHA

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:
DTW Before Purging (ft) 8.21 Time: 1310 Flow through cell vol. GW Meter No.(s SLOPE 2
Begin Purge: Date/Time: 8/ 13 /2018 @ 1313 End Purge: Date/Time: 8/ 13 /2018 @ 1334 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							>/= 1 flow through cell	
	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft		
1316	20.17	583	0.20	6.10	-48.0	LOW	8.26		
1319	20.12	585	0.14	6.13	-67.5				
1322	20.16	583	0.13	6.52	-77.9		8.26	0.25	
1325	20.21	580	0.12	6.68	-84.9				
1328	20.31	578	0.11	6.77	-90.7				
1331	20.19	576	0.11	6.86	-94.7				
1333	20.16	574	0.11	6.99	-98.1				

SAMPLE COLLECTION DATA

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

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	20.15	574	0.11	6.99	-98.4				
2	20.16	573	0.10	7.00	-98.7				
3	20.18	573	0.10	7.01	-99.1				
4	20.19	572	0.10	7.01	-99.4				
Average:	20.17	573	0.10	7.00	-98.9	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
7	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
2	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
	(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: 8/13/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Quarterly August 2018 | Date/Time: 8/ 15 /2018@ 750
Sample Number: RGW259S- 180815 | Weather: 70s smoky
Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:
DTW Before Purging (ft) 5.65 Time: 715 Flow through cell vol. GW Meter No.(s heron 3
Begin Purge: Date/Time: 8/ 15 /2018 720 End Purge: Date/Time: 8/ 15 /2018 @ 735 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**	
723	18.2	179.2	2.16	6.40	96.8	low	6.11		
726	18.5	188.8	1.59	6.30	104.5		6.01		
729	18.5	189.2	1.57	6.31	104.5		6.01		
732	18.3	191.7	1.48	6.32	105.2		6.01		

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 GRAY AND TURBID WITH PARTICULATES 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	18.3	192.1	1.39	6.32	105.5				
2	18.3	192.4	1.39	6.31	105.7				
3	18.3	192.6	1.35	6.31	105.9				
4	18.3	192.9	1.33	6.31	105.7				
Average:	18.3	192.5	1.37	6.31	105.7	#DIV/0!			

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

Duplicate Sample No(s):
Comments:
Signature: SRB Date: 8/15/2018

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly August 2018 | Date/Time: 8/ 15 /2018@ 753

Sample Number: RGW260S- 180815 | Weather: HAZY

Landau Representative: CEB

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft): 5.8 | Time: 721 | Flow through cell vol. | GW Meter No.(s: 1

Begin Purge: Date/Time: 8/15 /2018 723 | End Purge: Date/Time: 8/ 15 /2018 @ 738 | 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**	
726	18.2	287.1	0.42	5.95	82.6		5.85		
729	18.7	291.1	0.36	6.06	77.9		5.85		
732	18.8	292.2	0.37	6.09	76.7		5.86		
735	18.9	293.6	0.38	6.16	73.9				

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	18.9	293.7	0.40	6.17	73.4				
2	18.9	293.8	0.40	6.17	73.2				
3	18.9	293.7	0.38	6.18	73.0				
4	18.9	294.0	0.37	6.18	72.8				
Average:	18.9	293.8	0.39	6.18	73.1	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: CEB | Date: 8/15/2018

Appendix C

Memo

To:	John Long, Project Manager	Project:	0088880100.2018
From:	Crystal Thimsen	c:	Project File
Tel:	(206) 342-1760		
Fax:	(206) 342-1761		
Date:	September 26, 2018		

Subject: Summary Data Quality Review
August 2018 Boeing Renton Groundwater Sampling
SWMU-168
ARI Work Order Number: 18H0177

This memo presents the summary data quality review of three primary groundwater samples and one trip blank sample collected on August 13, 2018. The samples were submitted to Analytical Resources Inc. (ARI), located in Tukwila, Washington, a laboratory accredited by the Washington State Department of Ecology. The samples were analyzed for volatile organic compounds (VOCs) (vinyl chloride) by U.S. Environmental Protection Agency (EPA) Method 8260C with selected ion monitoring (SIM).

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

Sample ID	Laboratory Sample ID	Requested Analyses
RGW231S-180813	18H0177-01	vinyl chloride
RGW230I-180813	18H0177-02	vinyl chloride
RGW229S-180813	18H0177-03	vinyl chloride
Trip Blank	18H0177-04	vinyl chloride

Data were reviewed in accordance with the appropriate method procedures and criteria documented in the Quality Assurance Project Plan (QAPP) (Amec Foster Wheeler, 2016). The control limits provided in the QAPP are advisory limits; therefore, the most current control limits provided by the laboratory were used to evaluate the quality control data. In cases where the laboratory did not track limits for an analyte, the limits in the QAPP were used.

Holding times, method/trip blanks, surrogate recoveries, laboratory control samples (LCS) and laboratory control sample duplicates (LCSD), matrix spike/matrix spike duplicates (MS/MSD), field duplicates, and reporting limits were reviewed where available to assess compliance with applicable methods. If qualification was required, data were qualified based on the definitions and use of qualifying flags outlined in the EPA guidance documents (EPA, 2014).

ARI received the samples on August 14, 2018. The temperature of the cooler was recorded upon receipt and was below the maximum acceptable temperature of 6 degrees Celsius (ºC).

Organic analyses

Samples were analyzed for vinyl chloride. Laboratory data were evaluated for the following parameters:

1. Preservation and Holding Times – Acceptable
2. Blanks – Acceptable

3. Surrogates – Acceptable
4. LCS/LCSD – Acceptable
5. MS/MSD – Acceptable

   Extra volume was not submitted for analysis of MS/MSD samples. The project frequency requirement was achieved with MS/MSD analysis conducted at other sites included in this sampling event.

6. Field Duplicates – Acceptable

   Field duplicates were not collected at this site during this sampling event. The project frequency requirement of one field duplicate for every 20 samples was achieved with field duplicate samples collected at other sites included in this sampling event.

7. Reporting Limits and Laboratory Flags – Acceptable

   The vinyl chloride result for sample RGW230I-180813 was flagged with an "M" by the laboratory to indicate an estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters. The result is reported as estimated and flagged with a "J."

Overall assessment of data

The table below summarizes the data assessment. The completeness of ARI work order number 18H0177 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 (ng/L)	Qualifier Reason
RGW231S-180813	none		
RGW230I-180813	vinyl chloride	140 J	flagged "M" by laboratory
RGW229S-180813	none		
Trip Blank	none		

Abbreviations
J = the value is an estimate
M = the value is estimated but with low spectral match parameters
ng/L = nanograms per liter

References

Amec Foster Wheeler Environment & Infrastructure, Inc. (Amec Foster Wheeler), 2016, Quality Assurance Project Plan, Boeing Renton Facility, Renton, Washington: Prepared for the Boeing Company, February.

U.S. Environmental Protection Agency (EPA), 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
From: Crystal Thimsen
Tel: (206) 342-1760
Fax: (206) 342-1761

Date: October 3, 2018

Project: 0088880100.2018
cc: Project File

Subject: Summary Data Quality Review
August 2018 Boeing Renton Groundwater Sampling
SWMU-172/174
ARI Work Order Number: 18H0193

This memo presents the summary data quality review of 11 primary groundwater samples, one groundwater field duplicate, and one trip blank sample collected on August 13, 2018. The samples were submitted to Analytical Resources, Inc. (ARI), located in Tukwila, Washington, a laboratory accredited by the Washington State Department of Ecology. The samples were analyzed for the following:

- Volatile organic compounds (VOCs) (cis-1,2-dichloroethene, tetrachloroethene, trichloroethene, and vinyl chloride) by EPA Method 8260C with selected ion monitoring (SIM);
- Total organic carbon (TOC) by Standard Method (SM) 5310 B-00; 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
RGWDup1-180813	18H0193-01	all
RGW232S-180813	18H0193-02	all
RGW234S-180813	18H0193-03	all
RGW236S-180813	18H0193-04	all
RGW233I-180813	18H0193-05	all
RGW235I-180813	18H0193-06	all
RGW172S-180813	18H0193-07	all
RGW152S-180813	18H0193-08	all
RGW081S-180813	18H0193-09	all
RGW226S-180813	18H0193-10	all
RGW173S-180813	18H0193-11	all
RGW153S-180813	18H0193-12	all
Trip Blank	18H0193-13	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 August 15, 2018. The temperatures of the coolers were recorded upon receipt and were below the maximum acceptable temperature of 6 degrees Celsius (ºC). Bubbles were observed in:

- One of three vials submitted for sample RGWDup1-180813,
- One of three vials submitted for sample RGW232S-180813,
- Three of nine vials submitted for sample RGW233I-180813,
- Two out of three vials submitted for sample RGW172S-180813,
- One of three vials submitted for sample RGW152S-180813,
- Three of three vials submitted for sample RGW081S-180813,
- Three of three vials submitted for sample RGW226S-180813,
- One of three vials submitted for sample RGW153S-180813, and
- One of two vials submitted for the trip blank.

The laboratory proceeded with analysis using unaffected or the least affected vials, and sample results are not qualified.

Organic analyses

Samples were analyzed for VOCs. 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. The field duplicate RPDs were within the control limits.

Sample ID/ Field Duplicate ID	Analyte	Primary Result (µg/L)	Duplicate Result (µg/L)	Reporting Limit (µg/L)	RPD (%)
RGW152-180813/ RGWDup1-180813	vinyl chloride	0.187	0.178	0.020	5
	cis-1,2-dichloroethene	0.981	0.991	0.020	1
	trichloroethene	0.833	0.827	0.020	1
	tetrachloroethene	1.090	1.060	0.020	3

Notes
µg/L = micrograms per liter
RPD= relative percent difference

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

   The laboratory flagged the vinyl chloride results in samples RGWDup1-180813, RGW232S-180813, RGW234S-180813, RGW152S-180813, RGW226S-180813, RGW173S-180813, and RGW153S-180813 with an "M" to indicate an estimated value for the analyte was detected and confirmed by an analyst but with low spectral match parameters. The affected results are qualified as estimated and flagged with a "J."

Inorganic analyses

Samples were analyzed for total metals and TOC. Laboratory data were evaluated for the following parameters:

1. Preservation and Holding Times – Acceptable except as noted:

   Bottles submitted for metals analyses for samples RGWDup1-180813 and RGW152S-180813 were not preserved to a pH of <2. The laboratory added additional preservative and proceeded with analysis.

2. Blanks – Acceptable
3. LCS – Acceptable
4. MS/MSD – Acceptable
5. Laboratory Duplicates – Acceptable
6. Field Duplicates – Acceptable

   One field duplicate was submitted for each analysis during this sampling event, meeting the project frequency requirement of five percent, or one for every 20 samples. Primary and duplicate results are summarized in the table below. The project-specific control limit for field duplicate RPDs is 30 percent for concentrations greater than five times the reporting limit. The RPD is not calculated for results that are less than five times the reporting limit, as indicated on the table below by "NC." In these cases, the absolute value of the difference between the primary and duplicate result should not exceed the value of the reporting limit. The field duplicate RPDs were within the control limits.

Sample ID/ Field Duplicate ID	Analyte	Primary Result	Duplicate Result	Reporting Limit	Units	RPD (%)
RGW152-180813/ RGWDup1-180813	TOC	10,860	10,870	25.0	mg/L	<1
	total arsenic	75.7	66.5	4.0	µg/L	13
	total copper	24.1	21.2	10.0	µg/L	NC
	total lead	12.7	11.0	2.0	µg/L	14

Notes
mg/L = milligrams per liter
NC = not calculated
RPD= relative percent difference
TOC = total organic carbon

7. Reporting Limits and Laboratory Flags – Acceptable

Overall assessment of data

The table below summarizes the data assessment. The completeness of ARI work order number 18H0193 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
RGWDup1-180813	vinyl chloride	178 J	ng/L	flagged "M" by laboratory
RGW232S-180813	vinyl chloride	544 J	ng/L	flagged "M" by laboratory
RGW234S-180813	vinyl chloride	28.2 J	ng/L	flagged "M" by laboratory
RGW236S-180813	none			
RGW233I-180813	none			
RGW235I-180813	none			
RGW172S-180813	none			
RGW152S-180813	vinyl chloride	187 J	ng/L	flagged "M" by laboratory
RGW081S-180813	none			
RGW226S-180813	vinyl chloride	40.9 J	ng/L	flagged "M" by laboratory
RGW173S-180813	vinyl chloride	96.9 J	ng/L	flagged "M" by laboratory
RGW153S-180813	vinyl chloride	248 J	ng/L	flagged "M" by laboratory
Trip Blank	none			

Abbreviations
J = the value is estimated
M = the value is estimated but with low spectral match parameters
ng/L = nanograms per liter

References

Amec Foster Wheeler Environment & Infrastructure, Inc. (Amec Foster Wheeler), 2016, Quality Assurance Project Plan, Boeing Renton Facility, Renton, Washington: Prepared for the Boeing Company, February.

U.S. Environmental Protection Agency (EPA), 2014a, U.S. EPA 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.

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Memo

To: John Long, Project Manager
From: Crystal Thimsen
Tel: (206) 342-1760
Fax: (206) 342-1761

Date: October 9, 2018

Project: 0088880100.2018
c: Project File

Subject: Summary Data Quality Review
August 2018 Boeing Renton Groundwater Sampling
Building 4-78/79 SWMU/AOC Group
ARI Work Order Numbers: 18H0176 and 18H0227

This memo presents the summary data quality review of 16 primary groundwater samples, one field duplicate groundwater sample, and one trip blank sample collected on August 13 and 14, 2018. The samples were submitted to Analytical Resources, Inc. (ARI), located in Tukwila, Washington, a laboratory accredited by the Washington State Department of Ecology (Ecology). The samples were analyzed for the following:

- Volatile organic compounds (VOCs) (limited suite: benzene, vinyl chloride, cis-1,2-dichloroethene, and trichloroethene) by U.S. Environmental Protection Agency (EPA) Method 8260C;
- Total petroleum hydrocarbons as gasoline (TPH-G) by Ecology Method NWTPH Gx; and
- Total organic carbon (TOC) by Standard Method (SM) 5310B-00.

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

Sample ID	Laboratory Sample ID	Requested Analyses
RGW-241S-180813	18H0176-01	VOCs and TPH-G
RGW-242I-180813	18H0176-02	VOCs and TPH-G
Trip Blank	18H0176-03	VOCs
RGWDUP	18H0227-01	all
RGW237S-180814	18H0227-02	all
RGW210S-180814	18H0227-03	all
RGW238I-180814	18H0227-04	all
RGW031S-180814	18H0227-05	all
RGW209S-180814	18H0227-06	all
RGW239I-180814	18H0227-07	all
RGW244S-180814	18H0227-08	all
RGW240D-180814	18H0227-09	all

Sample ID	Laboratory Sample ID	Requested Analyses
RGW143S-180814	18H0227-10	all
RGW033S-180814	18H0227-11	all
RGW038S-180814	18H0227-12	all
RGW039S-180814	18H0227-13	all
RGW243I-180814	18H0227-14	all
RGW034S-180814	18H0227-15	all
Trip Blank	18H0227-16	VOCs and TPH-G

Data were reviewed in accordance with the appropriate method procedures and criteria documented in the Quality Assurance Project Plan (QAPP) (Amec Foster Wheeler, 2016). The control limits provided in the QAPP are advisory limits; therefore, the most current control limits provided by the laboratory were used to evaluate the quality control data. In cases where the laboratory did not track limits for an analyte, the limits in the QAPP were used.

Holding times, method/trip blanks, surrogate recoveries, laboratory control samples (LCS) and laboratory control sample duplicates (LCSD), matrix spike/matrix spike duplicates (MS/MSD), field duplicates, and reporting limits were reviewed where available to assess compliance with applicable methods. If qualification was required, data were qualified based on the definitions and use of qualifying flags outlined in EPA guidelines (EPA, 2014a and b).

ARI received the samples on August 14 and 15, 2018. The temperatures of the coolers were recorded upon receipt and were below the maximum acceptable temperature of 6 degrees Celsius (ºC). ARI noted the following upon sample receipt:

- Bubbles were observed in at least one vial for every sample that was submitted. The laboratory proceeded with analysis using unaffected vials if available or the least affected vials, and sample results are not qualified.

Organic analyses

Samples were analyzed for VOCs and TPH-G. Laboratory data were evaluated for the following parameters:

1. Preservation and Holding Times – Acceptable
2. Blanks – Acceptable
3. Surrogates – Acceptable except as noted:

   VOCs by EPA 8260C: The recoveries for one of three surrogates, 1,2-dichloroethane-d4, was 136 percent, for samples RGW DUP and RGW031S-180814, above the control limits of 80 to 129 percent. The laboratory did not reanalyze the samples. The high surrogate recovery equates to a potential high bias in the sample; therefore, detected analytes are qualified as estimated and flagged with a "J" and non-detected analytes are not qualified.
4. LCS/LCSD – Acceptable
5. MS/MSD – Acceptable

6. Field Duplicates – Acceptable

   One field duplicate was submitted for each analysis during this sampling event, meeting the project frequency requirement of five percent, or one for every 20 samples. Primary and duplicate results are summarized in the table below. The relative percent differences (RPDs) for the field duplicate are within the project-specific control limit of 30 percent.

Sample ID/ Field Duplicate ID	Analyte	Primary Result (µg/L)	Duplicate Result (µg/L)	Reporting Limit (µg/L)	RPD (%)
RGW031S-180814/ RGW DUP	benzene	3.21	3.11	0.20	3
	cis-1,2-dichloroethene	0.56	0.48	0.20	NC
	vinyl chloride	0.28	0.28	0.20	NC
	TPH-G	1640	1740	100	6

Abbreviations
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 cis-1,2-dichloroethene results in samples RGW DUP and RGW031S-180814 with an "M" to indicate an estimated value for the analyte was detected and confirmed by an analyst but with low spectral match parameters. The affected results are qualified as estimated and flagged with a "J."

Inorganic analyses

Samples were analyzed for TOC. Laboratory data were evaluated for the following parameters:

1. Preservation and Holding Times – Acceptable
2. Blanks – Acceptable
3. LCS – Acceptable
4. MS – Acceptable
5. Laboratory Duplicates – Acceptable
6. Field Duplicates – Acceptable

   One field duplicate was submitted for each analysis during this sampling event, meeting the project frequency requirement of five percent, or one for every 20 samples. Primary and duplicate results are summarized in the table below. The RPDs are acceptable.

Sample ID/ Field Duplicate ID	Analyte	Primary Result (mg/L)	Duplicate Result (mg /L)	Reporting Limit (mg /L)	RPD (%)
RGW031S-180814/ RGW DUP	TOC	13.41	14.11	0.50	5

Abbreviations
mg/L = milligrams per liter
RPD = relative percent difference
TOC = total organic carbon

7. Reporting Limits and Laboratory Flags – Acceptable

Overall assessment of data

The table below summarizes the data assessment. The completeness of ARI work order numbers 18H0176 and 18H0227 is 100 percent. Evaluation of the usefulness of these data is based on EPA guidance documents identified in the introduction to this report. Few problems were identified, and analytical performance was generally within specified limits. The data meet the project's data quality objectives.

Sample ID	Qualified Analyte	Qualified Result (µg/L)	Qualifier Reason
RGW-241S-180813	none		
RGW-242I-180813	none		
Trip Blank	none		
RGWDUP	vinyl chloride cis-1,2-dichloroethene benzene	0.28 J 0.48 J 3.11 J	surrogate recovery flagged "M" by lab/surrogate recovery surrogate recovery
RGW237S-180814	none		
RGW210S-180814	none		
RGW238I-180814	none		
RGW031S-180814	vinyl chloride cis-1,2-dichloroethene benzene	0.28 J 0.56 J 3.21 J	surrogate recovery flagged "M" by lab/surrogate recovery surrogate recovery
RGW209S-180814	none		
RGW239I-180814	none		
RGW244S-180814	none		
RGW240D-180814	none		
RGW143S-180814	none		
RGW033S-180814	none		

Sample ID	Qualified Analyte	Qualified Result (µg/L)	Qualifier Reason
RGW038S-180814	none		
RGW039S-180814	none		
RGW243I-180814	none		
RGW034S-180814	none		
Trip Blank	none		

Abbreviations
µg/L = micrograms per liter
J = the value is an estimate
M = the value is estimated but with low spectral match parameters

References

Amec Foster Wheeler Environment & Infrastructure, Inc. (Amec Foster Wheeler), 2016, Quality Assurance Project Plan, Boeing Renton Facility, Renton, Washington: Prepared for the Boeing Company, February.

U.S. Environmental Protection Agency (EPA), 2014a, U.S. EPA 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.

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Memo

To:	John Long, Project Manager	Project:	0088880100.2018
From:	Crystal Thimsen	c:	Project File
Tel:	(206) 342-1760		
Fax:	(206) 342-1761		
Date:	October 4, 2018		

Subject: Summary Data Quality Review
August 2018 Boeing Renton Groundwater Sampling
AOC-001 and -002 and AOC-003
ARI Work Order Number: 18H0233

This memo presents the summary data quality review of 15 primary groundwater samples, one field duplicate, and one trip blank sample collected on August 15, 2018. The samples were submitted to Analytical Resources, Inc. (ARI), located in Tukwila, Washington, a laboratory accredited by the Washington State Department of Ecology.

The samples from AOC-001 and -002 were analyzed for the following:

- Volatile organic compounds (VOCs) (benzene only reported) by U.S. Environmental Protection Agency (EPA) Method 8260C;
- VOCs (vinyl chloride, 1,1-dichloroethene, trichloroethene, and cis-1,2-dichloroethene) by EPA Method 8260C with selected ion monitoring (SIM); and
- Total organic carbon (TOC) by Standard Method (SM) 5310C.
- Samples from AOC-003 were analyzed for the following:
- VOCs (cis-1,2-dichloroethene, tetrachloroethene, trichloroethene, and vinyl chloride) by EPA Method 8260C SIM; and
- TOC by SM 5310C.

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

Sample ID	Laboratory Sample ID	Requested Analyses
RGWDUP3-180815	18H0233-01	all AOC-001 and -002 analyses
RGW185S-180815	18H0233-02	all AOC-001 and -002 analyses
RGW194S-180815	18H0233-03	all AOC-001 and -002 analyses
RGW197S-180815	18H0233-04	all AOC-001 and -002 analyses
RGW196D-180815	18H0233-05	all AOC-001 and -002 analyses
RGW195S-180815	18H0233-06	all AOC-001 and -002 analyses
RGW190S-180815	18H0233-07	all AOC-001 and -002 analyses
RGW245S-180815	18H0233-08	all AOC-001 and -002 analyses

Sample ID	Laboratory Sample ID	Requested Analyses
RGW246S-180815	18H0233-09	all AOC-001 and -002 analyses
RGW191D-180815	18H0233-10	all AOC-001 and -002 analyses
RGW193S-180815	18H0233-11	all AOC-001 and -002 analyses
RGW192S-180815	18H0233-12	all AOC-001 and -002 analyses
RGW188S-180815	18H0233-13	all AOC-003 analyses
RGW247S-180815	18H0233-14	all AOC-003 analyses
RGW248I-180815	18H0233-15	all AOC-003 analyses
RGW249S-180815	18H0233-16	all AOC-003 analyses
Trip Blank	18H0233-17	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 August 16, 2018. The temperatures of the coolers were recorded upon receipt and were below the maximum acceptable temperature of 6 degrees Celsius (ºC). The field team did not put the date on the chain of custody. The laboratory logged the samples according to the date in the sample IDs.

Organic analyses

Samples were analyzed for VOCs. Laboratory data were evaluated for the following parameters:

1. Preservation and Holding Times – Acceptable
2. Blanks – Acceptable
3. Surrogates – Acceptable
4. LCS/LCSD – Acceptable
5. MS/MSD – Acceptable
6. Field Duplicates – Acceptable

   One field duplicate was submitted for each analysis during this sampling event, meeting the project frequency requirement of five percent, or one for every 20 samples. Primary and duplicate results are summarized in the table below. The project-specific control limit for field duplicate

relative percent differences (RPDs) is 30 percent for concentrations greater than five times the reporting limit. The RPD is not calculated for results that are less than five times the reporting limit, as indicated on the table below by "NC." In these cases, the absolute value of the difference between the primary and duplicate result should not exceed the value of the reporting limit. The field duplicate RPDs were within the control limits.

Sample ID/ Field Duplicate ID	Analyte	Primary Result (µg/L)	Duplicate Result (µg/L)	Reporting Limit (µg/L)	RPD (%)
RGW185S-180307/ RGWDUP3-180307	benzene	0.32	0.33	0.20	NC
	vinyl chloride	0.198	0.201	0.020	2
	cis-1,2-dichloroethene	0.217	0.224	0.020	3

Abbreviations
µg/L = micrograms per liter
NC = not calculated
RPD = relative percent difference

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 – Acceptable
5. Laboratory Duplicates – Acceptable
6. Field Duplicates – Acceptable

   One field duplicate was submitted for TOC analysis during this sampling event, meeting the project frequency requirement of five percent, or one for every 20 samples. Primary and duplicate results are summarized in the table below. The project-specific control limit for field duplicate RPDs is 30 percent for concentrations greater than five times the reporting limit. The field duplicate RPD was within the control limits.

Sample ID/ Field Duplicate ID	Analyte	Primary Result (mg/L)	Duplicate Result (mg/L)	Reporting Limit (mg/L)	RPD (%)
RGW185S-180307/ RGWDUP3-180307	TOC	11.93	11.75	0.50	2

Abbreviations
mg/L = milligrams per liter
RPD= relative percent difference
TOC = total organic carbon

7. Reporting Limits and Laboratory Flags – Acceptable

Overall assessment of data

The table below summarizes the data assessment. The completeness of ARI work order number 18H0233is 100 percent. The usefulness of these data was evaluated based on EPA guidance documents listed in the introduction to this report. Few problems were identified, and analytical performance was generally within specified limits.

Sample ID	Qualified Analyte	Qualified Result	Units	Qualifier Reason
RGWDUP3-180815	none			
RGW185S-180815	none			
RGW194S-180815	none			
RGW197S-180815	none			
RGW196D-180815	none			
RGW195S-180815	none			
RGW190S-180815	none			
RGW245S-180815	none			
RGW246S-180815	none			
RGW191D-180815	none			
RGW193S-180815	none			
RGW192S-180815	none			
RGW188S-180815	none			
RGW247S-180815	none			
RGW248I-180815	none			
RGW249S-180815	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.

Memo

To:	John Long, Project Manager	Project:	0088880100.2018
From:	Crystal Thimsen	c:	Project File
Tel:	(206) 342-1760		
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Date:	October 4, 2018		

Subject: Summary Data Quality Review
August 2018 Boeing Renton Groundwater Sampling
AOC-004
ARI Work Order Number: 18H0234

This memo presents the summary data quality review of two primary groundwater samples collected on August 15, 2018. The samples were submitted to Analytical Resources, Inc. (ARI), located in Tukwila, Washington, a laboratory accredited by the Washington State Department of Ecology. The samples were analyzed for total lead by U.S. Environmental Protection Agency (EPA) Method 6020A.

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

Sample ID	Laboratory Sample ID	Requested Analyses
RGW174S-180815	18H0234-01	total lead
RGW250S-180815	18H0234-02	total lead

Data were reviewed in accordance with the appropriate method procedures and criteria documented in the Quality Assurance Project Plan (QAPP) (Amec Foster Wheeler, 2016). The control limits provided in the QAPP are advisory limits; therefore, the most current control limits provided by the laboratory were used to evaluate the quality control data. In cases where the laboratory did not track limits for an analyte, the limits in the QAPP were used.

Holding times, method/trip blanks, laboratory control samples (LCS) and laboratory control sample duplicates (LCSD), matrix spike/matrix spike duplicates (MS/MSD), field duplicates, and reporting limits were reviewed where available to assess compliance with applicable methods. If qualification was required, data were qualified based on the definitions and use of qualifying flags outlined in the EPA guidance documents (EPA, 2014).

ARI received the samples on August 16, 2018. The temperature of the cooler was recorded upon receipt and was below the maximum acceptable temperature of 6 degrees Celsius (°C).

Inorganic analyses

Samples were analyzed for total lead. Laboratory data were evaluated for the following parameters:

1. Preservation and Holding Times – Acceptable
2. Blanks – Acceptable
3. LCS – Acceptable
4. MS/MSD – Acceptable

Additional sample volume was not submitted for MS/MSD analyses with samples collected from this site. MS/MSD results were reported with samples not associated with project samples; therefore, sample results are evaluated based on LCS/LCSD results. Project-specific MS/MSD requirements were met with samples collected at other sites included in this sampling event. The laboratory reported MS/MSD results; but project samples are not evaluated using this data since the spiked sample was not a project sample.

5. Field Duplicates – Acceptable

   Field duplicates were not collected at this site during this sampling event. The project frequency requirement of one field duplicate for every 20 samples was achieved with field duplicate samples collected at other sites included in this sampling event.

6. Reporting Limits and Laboratory Flags – Acceptable

Overall assessment of data

The table below summarizes the data assessment. The completeness of work order number 18H0234 is 100 percent. The usefulness of these data was evaluated based on EPA guidance documents listed in the introduction to this report. Few problems were identified, and analytical performance was generally within specified limits.

Sample ID	Qualified Analyte
RGW174S-180815	none
RGW250S-180815	none

References

Amec Foster Wheeler Environment & Infrastructure, Inc. (Amec Foster Wheeler), 2016, Quality Assurance Project Plan, Boeing Renton Facility, Renton, Washington: Prepared for the Boeing Company, February.

U.S. Environmental Protection Agency (EPA), 2014, U.S. EPA National Functional Guidelines for Inorganic Superfund Data Review: EPA 540-R-013-001, August.

Memo

To:	John Long, Project Manager	Project:	0088880100.2018
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Date:	October 4, 2018		

Subject: Summary Data Quality Review
August 2018 Boeing Renton Groundwater Sampling
AOC-060
ARI Work Order Number: 18H0219

This memo presents the summary data quality review of nine primary groundwater samples, one field duplicate, and one trip blank sample collected on August 14, 2018. The samples were submitted to Analytical Resources, Inc. (ARI), located in Tukwila, Washington, a laboratory accredited by the Washington State Department of Ecology. The samples were selectively analyzed for the following:

- Volatile organic compounds (VOCs) (cis-1,2-dichloroethene, trichloroethene, and vinyl chloride) by U.S. Environmental Protection Agency (EPA) Method 8260C with selected ion monitoring (SIM); and
- Total organic carbon (TOC) by Standard Method (SM) 5310 – B-00.

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

Sample ID	Laboratory Sample ID	Requested Analyses
RGWDUP4-180814	18H0219-01	all
RGW147S-180814	18H0219-02	all
RGW014S-180814	18H0219-03	all
RGW012S-180814	18H0219-04	all
RGW254S-180814	18H0219-05	all
RGW149S-180814	18H0219-06	all
RGW150S-180814	18H0219-07	all
RGW252S-180814	18H0219-08	all
RGW009S-180814	18H0219-09	all
RGW253I-180814	18H0219-10	all
Trip Blank	18H0219-11	VOCs

Data were reviewed in accordance with the appropriate method procedures and criteria documented in the Quality Assurance Project Plan (QAPP) (Amec Foster Wheeler, 2016). The control limits provided in the QAPP are advisory limits; therefore, the most current control limits provided by the laboratory were used

to evaluate the quality control data. In cases where the laboratory did not track limits for an analyte, the limits in the QAPP were used.

Hold times, method/trip blanks, surrogate recoveries, laboratory control samples (LCS) and laboratory control sample duplicates (LCSD), matrix spike/matrix spike duplicates (MS/MSD), field duplicates, and reporting limits were reviewed where available to assess compliance with applicable methods. If qualification was required, data were qualified based on the definitions and use of qualifying flags outlined in EPA guidelines (EPA, 2014a and b).

Samples were received by ARI on August 15, 2018. The temperatures of the coolers were recorded upon receipt and were below the maximum acceptable temperature of 6° Celsius.

Organic analyses

Samples were analyzed for VOCs. Laboratory data were evaluated for the following parameters:

1. Preservation and Holding Times – Acceptable
2. Blanks – Acceptable
3. Surrogates – Acceptable
4. LCS/LCSD – Acceptable except as noted:
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 (%)
RGW014S-180814/ RGWDUP4-180814	vinyl chloride	232	228	20.0	2
	cis-1,2-dichloroethene	122	122	20.0	0
	trichloroethene	27.3	24.4	20.0	NC

Abbreviations
ng/L = nanograms per liter
NC = not calculated
RPD = relative percent difference

7. Reporting Limits and Laboratory Flags – Acceptable

   The laboratory flagged the vinyl chloride results in samples RGWDUP4-180814, RGW147S-180814, RGW014S-180814, RGW012S-180814, RGW254S-180814, RGW149S-180814, and RGW150S-180814 with an "M" to indicate an estimated value for the analyte was detected and

confirmed by an analyst but with low spectral match parameters. The affected results are qualified as estimated and flagged with a "J."

Inorganic analyses

Samples were analyzed for TOC. Laboratory data were evaluated for the following parameters:

1. Preservation and Holding Times – Acceptable
2. Blanks – Acceptable
3. LCS – Acceptable
4. MS – Acceptable
5. Laboratory Duplicates – Acceptable
6. Field Duplicates – Acceptable

   One field duplicate was submitted for TOC analysis during this sampling event, meeting the project frequency requirement of five percent, or one for every 20 samples. Primary and duplicate results are summarized in the table below. The TOC RPD exceeds the control limit of 30 percent; therefore, the TOC results for samples RGW014S-180814 and RGWDUP4-180814 are qualified as estimated and flagged with a "J".

Sample ID/ Field Duplicate ID	Analyte	Primary Result (mg/L)	Duplicate Result (mg/L)	Reporting Limit (mg/L)	RPD (%)
RGW014S-180814/ RGWDUP4-180814	TOC	5.76	3.09	0.50	60

Abbreviations
mg/L = milligrams per liter
RPD= relative percent difference
TOC = total organic carbon

7. Reporting Limits – Acceptable

Overall assessment of data

A summary of the data assessment is presented in the table below. The completeness of work order number 18H0219 is 100 percent. Evaluation of the usefulness of these data is based on the EPA guidance document listed in the introduction to this report. Few problems were identified, and analytical performance was generally within specified limits. The data meet the project's data quality objectives.

Sample ID	Qualified Analyte	Qualified Result	Units	Qualifier Reason
RGWDUP4-180814	vinyl chloride TOC	228 J 3.09 J	ng/L mg/L	flagged "M" by laboratory field duplicate RPD
RGW147S-180814	vinyl chloride	1,070 J	ng/L	flagged "M" by laboratory
RGW014S-180814	vinyl chloride TOC	232 J 5.76 J	ng/L mg/L	flagged "M" by laboratory field duplicate RPD
RGW012S-180814	vinyl chloride	605 J	ng/L	flagged "M" by laboratory
RGW254S-180814	vinyl chloride	41.8 J	ng/L	flagged "M" by laboratory

Sample ID	Qualified Analyte	Qualified Result	Units	Qualifier Reason
RGW149S-180814	vinyl chloride	39.9 J	ng/L	flagged "M" by laboratory
RGW150S-180814	vinyl chloride	20.3 J	ng/L	flagged "M" by laboratory
RGW252S-180814	none			
RGW009S-180814	none			
RGW253I-180814	none			
Trip Blank	none			

Abbreviations:
J = the value is estimated
M = the value is estimated but with low spectral match parameters
ng/L = nanograms per liter

References

Amec Foster Wheeler Environment & Infrastructure, Inc. (Amec Foster Wheeler), 2016, Quality Assurance Project Plan, Boeing Renton Facility, Renton, Washington: Prepared for the Boeing Company, February.

U.S. Environmental Protection Agency (EPA), 2014a, U.S. EPA 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

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Date:	October 2, 2018		

Subject: Summary Data Quality Review
August 2018 Boeing Renton Groundwater Sampling
AOC-090
ARI Work Order Number: 18H0191

This memo summarizes the data quality review of 11 primary groundwater samples, one duplicate sample, and one trip blank sample collected on August 13, 2018. The samples were submitted to Analytical Resources, Inc. (ARI), located in Tukwila, Washington, a laboratory accredited by the Washington State Department of Ecology (Ecology). The samples were selectively analyzed for the following:

- Volatile organic compounds (VOCs) (acetone, methylene chloride, trans-1,2-dichlorethene, cis-1,2-dichloroethene, chloroform, carbon tetrachloride, benzene, toluene, 1,1,2-trichloroethane) by U.S. Environmental Protection Agency (EPA) Method 8260C;
- VOCs (vinyl chloride, 1,1-dichloroethene, trichloroethene, tetrachloroethene, 1,1,2,2-tetrachloroethane) by EPA Method 8260C with selected ion monitoring (SIM);
- Total petroleum hydrocarbons in the gasoline range (TPH-G) by Ecology Method NWTPH Gx;
- Total petroleum hydrocarbons in the diesel and motor oil ranges (TPH-D and TPH O) by Ecology Method NWTPH-Dx (with silica gel cleanup); and
- Total organic carbon (TOC) by Standard Method (SM) 5310C.

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

Sample ID	Laboratory Sample ID	Requested Analyses
RGWDup5-180813	18H0191-01	VOCs and TPH
RGW180S-180813	18H0191-02	VOCs and TPH
RGW189S-180813	18H0191-03	all
RGW207S-180813	18H0191-04	VOCs and TPH
RGW175I-180813	18H0191-05	VOCs and TPH
RGW179I-180813	18H0191-06	VOCs and TPH
RGW177I-180813	18H0191-07	VOCs and TPH
RGW176S-180813	18H0191-08	VOCs and TPH
RGW178S-180813	18H0191-09	VOCs and TPH

Sample ID	Laboratory Sample ID	Requested Analyses
RGW208S-180813	18H0191-10	VOCs and TPH
RGW163I-180813	18H0191-11	VOCs and TPH
RGW165I-180813	18H0191-12	VOCs and TPH
Trip Blank	18H0191-13	VOCs and TPH-G

Data were reviewed in accordance with the appropriate method procedures and criteria documented in the Quality Assurance Project Plan Addendum (QAPP) (Amec Foster Wheeler, 2016). The control limits provided in the QAPP are advisory limits; therefore, the most current control limits provided by the laboratory were used to evaluate the quality control data. In cases where the laboratory did not track limits for an analyte, the limits in the QAPP were used.

Holding times, method/trip blanks, surrogate recoveries, laboratory control samples (LCS), laboratory duplicates (LCSD), matrix spike/matrix spike duplicates (MS/MSD), 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 August 14, 2018. The temperatures of the coolers were recorded upon receipt and were less than the maximum acceptable temperature of 6 degrees Celsius (ºC). Bubbles were observed in:

- One out of seven vials submitted for sample RGWDup5-180813,
- 13 out of 21 vials submitted for sample RGW189S-180813,
- Four out of seven vials submitted for sample RGW207S-180813,
- Seven out of seven vials submitted for sample RGW175I-180813,
- Five out of seven vials submitted for sample RGW179I-180813,
- One of seven vials submitted for sample RGW177I-180813,
- Six of seven vials submitted for sample RGW176S-180813,
- Five of seven vials submitted for sample RGW208S-180813,
- Five of seven vials submitted for sample RGW163I-180813,
- Six of seven vials submitted for sample RGW165I-180813, and
- Six of seven vials submitted for the trip blank.

The laboratory proceeded with analysis using unaffected or the least affected vials, and sample results are not qualified.

Organic analyses

Samples were analyzed for VOCs and TPH. Laboratory data were evaluated for the following parameters:

1. Preservation and Holding Times – Acceptable
2. Blanks – Acceptable

3. Surrogates – Acceptable
4. LCS/LCSD – Acceptable except as noted:
5. MS/MSD – Acceptable except as noted:

   VOCs by EPA 8260C: the recoveries for acetone, methylene chloride, trans-1,2-dichloroethene, cis-1,2-dichloroethene, chloroform, carbon tetrachloride, and toluene were below the control limits in MS/MSD performed with sample RGW189S-180813. The low recoveries equate to a low bias in the sample; therefore, the results for these compounds in sample RGW189S-180813 were qualified as estimated with detections flagged with a "J" and non-detects flagged with a "UJ." Benzene and 1,1,2-trichloroethene also had low recoveries in the MS, but the MSD recoveries were acceptable; therefore, sample results are not qualified.

   VOCs by EPA 8260C SIM: the recoveries for 1,1-dichloroethene, trichloroethene, and tetrachloroethene were below the control limits in MS/MSD performed with sample RGW189S-180813. The low recoveries equate to a low bias in the sample; therefore, the results for these compounds in sample RGW189S-180813 were qualified as estimated with detections flagged with a "J" and non-detects flagged with a "UJ." Vinyl chloride and 1,1,2,2-tetrachloroethane also had low recoveries in the MS, but the MSD recoveries were acceptable; therefore, sample results are not qualified.

   TPH-D by NWTPH-Dx: the TPH-D recoveries in the MS/MSD performed with sample RGW189S-180813 were 135 and 205 percent, respectively, greater than the control limits of 56 to 120 percent. The high recoveries equate to a potential high bias in the sample; therefore the TPH-D and TPH-O results in sample RGW189S-180813 are qualified as estimated and flagged with a "J."

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 (%)
RGW180S-180813/ RGWDup5-180813	vinyl chloride	20.0 U	24.3	20	NC

Abbreviations
µg/L = micrograms per liter
NC = not calculated
RPD = relative percent difference

7. Reporting Limits and Laboratory Flags – Acceptable

   TPH-G by NWTPH-Gx: The initial gasoline range organics result in sample RGW189S-180813 was flagged by the laboratory with an "E" to indicate the result was greater than the calibration range

of the instrument. The sample was diluted and reanalyzed. The gasoline range organics results is reported from the diluted analysis.

VOCs by EPA 8260C: The methylene chloride results were flagged with a "Q" by the laboratory due to a low response in the continuing calibration. The low response equates to a possible low bias in the samples; therefore, the methylene chloride results were qualified as estimated with detections flagged with a "J" and non-detects flagged with a "UJ." Sample results that were previously qualified were not qualified further.

VOCs by EPA 8260C SIM: The laboratory flagged the vinyl chloride results in samples RGW189S-180813 and RGW207S-180813 with an "M" to indicate an estimated value for the analyte was detected and confirmed by an analyst but with low spectral match parameters. The affected results are qualified as estimated and flagged with a "J."

Inorganic analyses

Samples were analyzed for TOC. Laboratory data were evaluated for the following parameters:

1. Preservation and Holding Times – Acceptable
2. Blanks – Acceptable
3. LCS – Acceptable
4. MS – Acceptable except as noted:

   The MS was performed with sample RGW189S-180813 and TOC was not recovered. The sample concentration was four times greater than the spike concentration; therefore, the control limits are not applicable and sample results are not affected.
5. Laboratory Duplicates – Acceptable
6. Field Duplicates

   A field duplicate was not collected for TOC analysis at this site during this sampling event. The project frequency requirement of one field duplicate for every 20 samples was achieved with field duplicate samples collected at other sites included in this sampling event.
7. Reporting Limits – Acceptable

Overall assessment of data

The completeness of ARI work order number 18H0191 is 100 percent. Evaluation of the usefulness of these data was evaluated based on EPA guidance documents listed in the introduction to this report. Few problems were identified, and analytical performance was generally within specified limits. The data, as qualified, meet the project's data quality objectives.

A summary of the data quality review is presented in the table below.

Sample ID	Qualified Analyte	Qualified Result	Units	Qualifier Reason
RGWDup5-180813	methylene chloride	1.00 UJ	µg/L	low calibration result
RGW180S-180813	methylene chloride	1.00 UJ	µg/L	low calibration result
RGW189S-180813	acetone	70.4 J	µg/L	MS/MSD recovery
	methylene chloride	10.9 J	µg/L	"
	trans-1,2-dichloroethene	2.00 UJ	µg/L	"
	cis-1,2-dichloroethene	22.3 J	µg/L	"
	chloroform	2.23 J	µg/L	"
	carbon tetrachloride	2.00 UJ	µg/L	"
	toluene	21.7 J	µg/L	"
	vinyl chloride	2,090 J	ng/L	flagged "M" by laboratory
	1,1-dichloroethene	200 UJ	ng/L	MS/MSD recovery
	trichloroethene	2,380 J	ng/L	"
	tetrachloroethene	200 UJ	ng/L	"
	diesel range organics	4.12 J	mg/L	MS/MSD recovery
RGW207S-180813	methylene chloride	1.00 UJ	µg/L	low calibration result
	vinyl chloride	311 J	ng/L	flagged "M" by laboratory
RGW175I-180813	methylene chloride	1.00 UJ	µg/L	low calibration result
RGW179I-180813	methylene chloride	1.00 UJ	µg/L	low calibration result
RGW177I-180813	methylene chloride	1.00 UJ	µg/L	low calibration result
	vinyl chloride	30.3 J	ng/L	flagged "M" by laboratory
RGW176S-180813	methylene chloride	1.00 UJ	µg/L	low calibration result
RGW178S-180813	methylene chloride	1.00 UJ	µg/L	low calibration result
RGW208S-180813	methylene chloride	1.00 UJ	µg/L	low calibration result
RGW163I-180813	methylene chloride	1.00 UJ	µg/L	low calibration result
RGW165I-180813	methylene chloride	1.00 UJ	µg/L	low calibration result
Trip Blank	methylene chloride	1.00 UJ	µg/L	low calibration result

Abbreviations:
J = the value is estimated
M = the value is estimated but with low spectral match parameters
MS/MSD = matrix spike/matrix spike duplicate
ng/L = nanograms per liter
µg/L = micrograms per liter
UJ = not detected at the given estimated reporting limit

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.

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Memo

To:	John Long, Project Manager	Project:	0088880100.2018
From:	Crystal Thimsen	c:	Project File
Tel:	(206) 342-1760		
Fax:	(206) 342-1761		
Date:	October 4, 2018		

Subject: Summary Data Quality Review
August 2018 Boeing Renton Groundwater Sampling
Bldg. 4-70
ARI Work Order Number: 18H0235

This memo summarizes the data quality review of two primary groundwater samples and one trip blank sample collected on August 15, 2018. The samples were submitted to Analytical Resources, Inc. (ARI), located in Tukwila, Washington, a laboratory accredited by the Washington State Department of Ecology. The samples were analyzed for the following:

- Volatile organic compounds (VOCs) (vinyl chloride, cis-1,2-dichloroethene, and trichloroethene) by U.S. Environmental Protection Agency (EPA) Method 8260C; and
- Total organic carbon (TOC) by Standard Method (SM) 5310C.

Sample ID	Laboratory Sample ID	Requested Analyses
RGW259S-180815	18H0235-01	all
RGW260S-180815	18H0235-02	all
Trip Blank	18H0235-03	VOCs

Data were reviewed in accordance with the appropriate method procedures and criteria documented in the Quality Assurance Project Plan Addendum (QAPP) (Amec Foster Wheeler, 2016). The control limits provided in the QAPP are advisory limits; therefore, the most current control limits provided by the laboratory were used to evaluate the quality control data. In cases where the laboratory did not track limits for an analyte, the limits in the QAPP were used.

Holding times, method/trip blanks, surrogate recoveries, laboratory control samples (LCS), laboratory duplicates (LCSD), matrix spike/matrix spike duplicates (MS/MSD), 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 August 16, 2018. The temperature of the cooler was recorded upon receipt and was less than the maximum acceptable temperature of 6 degrees Celsius (°C). The laboratory noted an air bubble in one of five vials submitted for VOCs analysis for sample RGW260S-180815. The laboratory proceeded with analysis using an unaffected vial and results are not impacted or 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 – Acceptable except as noted:
5. MS/MSD – Extra volume was not submitted with samples to perform MS/MSD analyses. MS/MSD analyses performed with project samples submitted separately met project frequency requirements.
6. Field Duplicates – Acceptable

   Field duplicates were not collected at this site during this sampling event. The project frequency requirement of one field duplicate for every 20 samples was achieved with field duplicate samples collected at other sites included in this sampling event.
7. Reporting Limits and Laboratory Flags – Acceptable

Overall assessment of data

The completeness of ARI work order number 18H0235 is 100 percent. Evaluation of the usefulness of these data is based on EPA guidance documents referenced in the introduction to this report. Few problems were identified, and analytical performance was generally within specified limits. The data, as qualified, meet the project's data quality objectives.

A summary of the data quality review is presented in the table below.

Sample ID	Qualified Result
RGW259S-180815	none
RGW260S-180815	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.

Appendix D

APPENDIX D

Summary of Remedial Actions at the Boeing Renton Facility July - September 2018

Boeing Renton Site
Renton, Washington

Prepared for:
The Boeing Company
EHS Remediation

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

November 15, 2018

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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 third quarter of 2018 (between July 1 and September 30, 2018). The ongoing remedial actions include:

1. Operation of two soil vapor extraction (SVE) systems located at Solid Waste Management Unit (SWMU) and Area of Concern (AOC) locations designated as SWMU-172/174 and Building 4-78/4-79 SWMU/AOC Group;
2. Biological treatment to promote Enhanced Reductive Dechlorination (ERD) of volatile organic compounds (VOCs) in groundwater underway at several AOCs located throughout the Renton Facility, and;
3. Anaerobic biodegradation of benzene by nitrate/sulfate injections at the 4-78/79 Building.

CALIBRE completed the work described in this Tech Memo to support remedial activities described in the Engineering Design Report (EDR), (AMEC, 2014) as supplemented by a document describing the remedial approach for *in situ* treatment for benzene in groundwater (CALIBRE 2017).

1.1 Facility Location and Background

The Boeing Renton Facility is used for assembly of 737 airplanes and is located at the southern end of Lake Washington in Renton, Washington. The location of the Renton Facility and the locations of SWMU-172/174 and Building 4-78/79 within the Facility are shown on Figure 1-1 (SWMU-172/174 and Building 4-78/79 are the locations where the two SVE systems 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 third quarter of 2018. 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 – Groundwater Treatment
Section 4 – Conclusions and Recommendations
Section 5 – References
Attachment A – Field Data Sheets
Attachment B – Laboratory Report

2.0 SVE Systems Operation and Monitoring

SVE systems were installed in the Building 4-78/79 and SWMU-172/174 areas and began operation in April 2015. During the last quarter of 2017 photoionization detector (PID) results from both systems had shown low-level VOC concentrations removed at asymptotically low levels. Given these data, a rebound test for both systems was started on December 15, 2017 and continued for 80 days to March 2018. In May 2018, after an additional 76 day shut-down period, a rebound stabilization test was run for 29 days to test how fast the VOC mass removal rate would decline back down to the prior asymptote levels. At the completion of the rebound stabilization test, soil confirmation samples were collected from both areas in June 2018. The following sections summarize the operating conditions, operational changes, and performance monitoring/evaluation for the SVE systems performed in July - September 2018, following evaluation of the soil confirmation sampling results.

2.1 Building 4-78/4-79 SWMU/AOC Group SVE System

The Building 4-78/79 SVE system consists of 15 vapor extraction wells and a SVE equipment trailer as shown in Figure 2-1. The SVE system is equipped with two vapor-phase granular-activated carbon (GAC) vessels each filled with 1,800 pounds of virgin carbon. The GAC vapor treatment system is configured to run in a lead-lag configuration with vapors from the outlet of the lead vessel passing through the lag vessel. The system also includes two smaller vessels each containing 200 pounds of zeolite impregnated with permanganate to remove and oxidize specific compounds, such as vinyl chloride, that are not efficiently adsorbed by GAC.

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).

2.1.1 TO-15 Laboratory Analysis of Vapor Samples

No samples for TO-15 analysis were collected during this operating period. Table 2-1 shows historical samples for TO-15 analysis at the Building 4-78/79 SVE system.

2.1.2 Summary of Operations and Operational Changes

Following the completion of the soil confirmation sampling in this area, the Building 4-78/79 SVE system was turned on to allow air flow from all 15 wells. On July 18, 2018 and August 16, 2018 the system was down at the time of observation. Following the system restart on August 16, some rebound in VOC concentrations was observed at the system influent. The influent was re-screened approximately three hours after re-starting and some drop was observed in the influent (reducing from 3,082 ppbv to 2,500 ppbv). The system was monitored the following day and influent concentrations had continued to decline (2,500 ppbv to 980 ppbv).

On August 20, 2018 an increase in influent concentrations was observed with the PID. There was a strong spray paint odor in the entire area at this time. The PID background readings were 1,500 ppb to 2,500 ppb and the increase in concentrations is believed to be associated with that odor (either from contamination of the sampling equipment with the ambient air or paint vapors passing through the SVE system). Subsequent monitoring events in September and October 2018 show the influent concentrations dropping back to the asymptotic levels observed prior to and during the rebound testing periods.

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. The SVE system for the 4-78/79 area has been shut down with Ecology concurrence.

2.1.3 Mass Removal Estimate

Between April 17, 2015 and September 30, 2018 the Building 4-78/79 SVE system has recovered an estimated 19.3 pounds of VOCs (a mixture of TCE, other CVOCs and fuel related compounds), as shown in Tables 2-1 and 2-3. Approximately 1.86 pounds of VOCs were removed during the current reporting period (third quarter 2018). The mass removal estimate for this quarter includes monitoring periods following system down time with some subsequent rebound in concentrations and after painting was occurring in the general area (where monitoring indicated high background concentrations); these two factors likely lead to an overestimation of mass removal. The cumulative VOC mass removal for the Building 4-78/79 SVE system is shown in Figure 2-2.

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 2-2. The SVE system is equipped with two vapor-phase GAC vessels, each filled with 1,800 pounds of virgin carbon. The GAC vapor treatment system is configured to run in a lead-lag configuration with vapor from the outlet of the lead vessel passing through the lag vessel. The system also includes two smaller vessels each containing 200 pounds of zeolite impregnated with permanganate.

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).

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 August 30, 2018. The results showed PCE represented approximately 90% of the total VOCs for the SWMU-172/174 SVE system influent and SVE-2 samples. Table 2-4 summarizes the TO-15 detections for the SWMU-172/174 SVE system for 13 TO-15 sampling events[1] 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 soil confirmation samples collected in the previous quarter identified a location between SVE-2 and SVE-3 which still showed elevated PCE levels in soil. On August 16, 2018 the SVE system was adjusted to alter the flushing pattern through this area by using SVE-3 as vent well with continued extraction through SVE-2 and SVE-1. The system was periodically monitored over a 4 hour time the day of the system modification and again the following day to identify any increase in vapor concentration from the operating wells or the system inlet. Vapor concentrations, measured with a PID, showed increases through August 30, 2018 and at that time two samples for TO-15 analysis were collected from the system influent and SVE-2. Table 2-5 shows the PID readings for the wells in the SWMU 172/174 SVE system. Table 2-6 shows an operational summary for the system.

2.2.3 Mass Removal Estimate

Between April 17, 2015 and September 30, 2018 the SMU-172/174 SVE system has recovered an estimated 14.3 pounds of VOCs (primarily tetrachloroethene, PCE), as shown in Table 2-6. Approximately 1.1 pounds of VOCs were removed during the current reporting period (third quarter 2018) with PCE representing approximately 90% of the total VOCs in the TO-15 analysis (Table 2-4). The cumulative VOC mass removal for the SWMU-172/174 SVE system is shown in Figure 2-4.

2.3 Recommended Next Steps for the SVE Systems

During the previous quarter, the rebound testing showed VOC concentrations were reduced to the baseline asymptotic levels within the 30-day rebound stabilization test period. Soil confirmation samples were collected, during the previous quarter, and those samples revealed that cleanup standards for COCs were met at all but one of the 24 samples at the 4-78/79 area. The single sample which exceed cleanup standards for TPH-G was collected from a low permeable silty/clay layer. Historical TO-15 samples from the nearest extraction well to this location showed TPH-G was non-detect in both samples, therefore it is

[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.

unlikely that continued SVE operation would impact this layer. The SVE system for the 4-78/79 area has been shut down with Ecology concurrence.

An evaluation of utilities present and potential access for soil excavation near the sample location exceeding cleanup standards was started during this quarter. Utility maps for this area indicate a number of utilities (both active and abandoned) present within a 20' radius of PP-13 (the soil sample location with TPH-G exceedances). These utilities include a 12" water line for fire hydrants, a fresh water line, airline, underground pipe, high pressure steam line, and an abandoned 6" utility line. Characterization work to bound the hydrocarbon impacted area near PP13 is planned and a separate Technical Memorandum will be prepared detailing utility locations and the depths and locations of proposed probe points.

Modifying the SVE system flow at the SWMU-172/174 area showed temporary increases in VOC mass removal from SVE-2 and the system influent (for a period of approximately 30 days). Continued monitoring in September and October 2018 show those increases are starting to drop towards asymptotic conditions. Additional modifications to the operation of this system should be considered to continue increased mass removal in the area of SVE-2. These modifications may include opening SVE-1 as a vent, similar to SVE-3, to focus vapor removal in the area of SVE-2. It may also be beneficial to operate the SVE system in a pulsed mode in order to allow vapor concentrations to rebound followed by running the system for a period of time.

3.0 Ongoing Groundwater Treatment

Groundwater treatment is being implemented at several AOCs/SWMUs at the Renton Facility. The primary remedy being implemented is enhanced reductive dechlorination (ERD) of chlorinated solvents in targeted areas. The ERD treatment involves substrate injection using sucrose as a carbon source to stimulate biological degradation of the chlorinated solvent.

Beginning in late 2017, anaerobic biodegradation of benzene using nitrate and sulfate injections was implemented for a small area at the 4-78/79 Building. A fourth round of nitrate/sulfate injections was performed in July 2018, and groundwater samples were collected from the injection wells and monitoring wells in September 2018. The results of the performance monitoring are presented in Table 3-1 and discussed in the main text of the quarterly report.

Selected wells at the SWMU-172/174, 4-78/79 Building Area, AOC-60, and AOC-90 were amended with sucrose substrate in July 2018, see Table 3-2. Site wide groundwater sampling was conducted as part of the quarterly monitoring program during this reporting period and the results are discussed in the main text of the quarterly report. Table 3-3 presents a summary of those groundwater monitoring results, by area, related to groundwater treatment/ERD implementation, with recommendations for additional substrate injections at selected areas.

4.0 Conclusions and Recommendations

The soil confirmation samples in the previous quarter revealed that cleanup standards for CVOCs were met at all but one of the 24 samples at the 4-78/79 area. The single sample which exceed cleanup standards for TPH-G was collected from a low permeable silty/clay layer. TO-15 samples from the nearest extraction well to this location showed TPH-G was non-detect in both samples, therefore it is unlikely that continued SVE operation will have any impact on this low permeable layer. A separate work plan will be provided to Ecology for review and approval outlining the proposed locations and depths of additional soil sampling (by Geoprobe) around PP13 for evaluation of soil excavation. The 4-78/79 SVE system will be shut down, likely in the following quarter of operation, following Ecology's approval.

SVE operations were modified at the SWMU-172/174 area to increase flushing between extraction wells SVE-2 and SVE-3, based on the elevated PCE detections observed during the soil confirmation sampling event in the previous quarter. Increased mass removal was observed at SVE-2 and the system influent for a period of approximately 30 days at which point concentrations began to drop to previous asymptote levels. It is recommended that SVE operations be continued for this area, with additional modifications to include opening of SVE-1 as a vent (similar to SVE-3) to allow focused vapor removal at SVE-2 or operating the SVE system in a pulsed mode to monitor for any VOC rebound in soil vapor.

Groundwater monitoring will continue according to the EDR, with supplemental VOC and TOC sampling at selected wells. Additional substrate injections were recently completed in July 2018 at selected areas of the SWMU-172/174, Building 4-78/79, AOC-60, and AOC-90 sites for continued ERD treatment and nitrate/sulfate injections for benzene treatment at the Building 4-78/79 area. Additional substrate injections are recommended for AOC-001/002 (once construction activities have been completed in this area), AOC-003, Apron A, and Building 4-70.

All wells monitored at the 4-78/79 building in September 2018 showed benzene concentrations had reduced from May 2018. These positive results indicate continued treatment with similar concentration of reagents used in July 2018 should be considered for this area. Injections would be performed at B78-11, B78-13, B78-17, B78-18, B78-19, B78-20, and B78-21. Performance monitoring data will be collected approximately 30 days after the injection event and will include the same list of wells sampled in the previous performance monitoring events.

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.

USACE 2002. Engineering and Design - Soil Vapor Extraction and Bioventing. Prepared by US Army Corps of Engineers. EM 1110-1-4001. June 2002.

TABLES

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

SVE System Inlet

Date	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	Vinyl Chloride	1,1,1-TCA	1,1-DCA	1,1-DCE	Acetone	Benzene	Freon 113	Hexane	Pentane	Toluene	TPHg	MEK	Carbon Disulfide	m,p-Xylene	o-Xylene	Ethyl Benzene	Chloroform	1,2,4-Trimethylbenzene	Cumene	Styrene	Total Chlorinated	Total VOCs
4/17/2015[1]	2.9	280	5.2	ND	ND	8.0	ND	ND	ND	ND	98	ND	ND	1.2	ND	21	ND	ND	ND	ND	ND	ND	ND	ND	296	416
5/18/2015	11	800	27	ND	ND	21.0	ND	ND	ND	ND	120	ND	ND	ND	ND	61	ND	ND	ND	ND	ND	ND	ND	ND	859	1,040
10/13/2015	2.7	160	11	ND	ND	2.7	ND	ND	12	ND	48	9.4	ND	ND	1,400	ND	ND	ND	ND	ND	ND	ND	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	ND	ND	ND	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	ND	ND	ND	ND	ND	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	ND	ND	ND	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	ND	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	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	ND	ND	103	118
12/8/2017 - Rebound Start	ND	42	2.5	ND	ND	1.3	ND	ND	ND	ND	1.7	1.7	5.2	1.9	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	45.8	56.3
1/19/2018 - 35-Day 60 Minute Sample	ND	68	2.6	ND	2.0	5.8	ND	ND	ND	ND	13	13	26	1.0	280	7.1	ND	ND	ND	ND	ND	ND	ND	ND	78.4	419
3/6/2018 - 80-Day 60 Min Sample	ND	67	3.2	ND	8.9	7.6	ND	ND	ND	ND	40	44	48	1.0	510	ND	ND	ND	ND	ND	ND	ND	ND	ND	86.7	730
5/22/2018	2.6	260	10	ND	4.6	19	ND	ND	22	ND	50	49	110	2.8	2,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	296	2,530
6/7/2018	ND	69	3.7	ND	ND	2.1	ND	ND	ND	ND	2.8	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	74.8	77.6
6/20/2018	1.3	87	3.7	ND	ND	2.6	ND	ND	ND	ND	3.4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	94.6	98.0

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	Cumene	Styrene	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	ND	ND	ND	ND	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	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	ND	ND	ND	ND	ND	ND	ND	2,037
12/8/2017 - Rebound Start	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	11	27	2.0	250	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	290
5/22/2018	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	26	83	ND	630	ND	16	ND	ND	ND	ND	ND	1.7	ND	ND	757
6/7/2018	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	11
6/20/2018	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0

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	Cumene	Styrene	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	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	Cumene	Styrene	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	ND	ND	ND	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	ND	ND	127	647
12/8/2017 - Rebound Start	5.4	37	ND	ND	ND	2.7	ND	ND	ND	ND	7.2	ND	ND	6.4	ND	ND	ND	ND	ND	ND	1.2	ND	ND	ND	45	60
1/19/2018 - 35-Day 60 Minute Sample	6.4	52	1.0	ND	ND	4.6	ND	ND	ND	ND	24	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.3	ND	ND	ND	64	89
3/6/2018 - 80-Day 60 Min Sample	9.8	67	ND	ND	ND	10	ND	ND	ND	ND	2,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	87	2,087
5/22/2018	36	220	ND	ND	29	28	ND	ND	ND	ND	1,900	350	690	ND	26,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	313	29,253
6/7/2018	20	120	3.3	ND	ND	5.9	1.4	ND	ND	ND	65	ND	ND	ND	ND	ND	ND	ND	ND	ND	2	ND	ND	ND	151	218
6/20/2018	24	120	2.7	ND	ND	4.2	1.5	ND	ND	1.5	57	ND	ND	ND	ND	ND	ND	ND	ND	ND	3.4	ND	ND	ND	152	214

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	Cumene	Styrene	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	ND	ND	ND	ND	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	ND	ND	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	Cumene	Styrene	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	ND	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	ND	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	ND	ND	ND	ND	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	ND	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	ND	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	ND	ND	360	670
12/8/2017 - Rebound Start	ND	180	11	ND	ND	6.3	ND	ND	ND	ND	8.9	ND	ND	1.2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	197	207
1/19/2018 - 35-Day 60 Minute Sample	1.7	330	13	ND	ND	28	1.2	ND	ND	ND	39	ND	ND	1.4	ND	17	ND	ND	ND	ND	ND	ND	ND	ND	374	431
1/19/2018 - 35-Day 180 Minute Sample	1.8	350	15	ND	ND	24	1.3	ND	ND	ND	31	ND	ND	ND	ND	37	ND	ND	ND	ND	ND	ND	ND	ND	392	460
3/6/2018 - 80-Day 60 Min Sample	1.7	330	12	ND	ND	41	1.7	ND	ND	ND	59	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	386	445
3/6/2018 - 80-Day 180 Min Sample	1.6	300	12	ND	ND	32	ND	ND	ND	ND	41	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	346	387
5/22/2018	5.4	720	23	ND	ND	70	ND	ND	ND	ND	77	ND	17	38	480	ND	ND	19	7.6	6.9	ND	ND	ND	11	818	1,475
6/7/2018	1.6	230	14	ND	ND	8.5	ND	ND	ND	ND	11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	254	265
6/20/2018	1.9	300	15	ND	ND	11	ND	ND	11	ND	11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	328	350

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	Cumene	Styrene	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	ND	ND	346	350

Notes:
(1) The TO-15 sample results from this day were considered anomalously low based on multiple PID measurements at the time and subsequent TO-15 samples from system operation
All results are in parts per billion by volume (ppbv).
ND = non-detect
DCA = Dichloroethane
DCE = Dichloroethene
MEK = methyl ethyl ketone or 2-butanone
PCE = Tetrachloroethene
TCA = Trichloroethane
TCE = Trichloroethene
Total Chlorinated = the sum of PCE, TCE, cis-1,2-DCE, trans-1,2-DCE, 1,1,1-TCA, 1,1-DCA, and 1,1-DCE.

Table 2-2 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]	Notes
7/18/2018	1,032																			Site check, system power was turned off; restart system.
8/16/2018	1,061																3,082		120	System power was turned off; restart system and rescreen 3 hrs after restart.
8/16/2018	1,061																2,500			Rescreen 3 hrs after restart.
8/17/2018	1,062																980			
8/20/2018	1,065	36				1,240	1,360		5,350		2,326		2,864				4,088		0	Spray paint odor in SVE area, background range from 1,500 ppb to 2,500 ppb.
8/30/2018	1,075																3,443			
9/17/2018	1,093	234				188	253		460		683		761				797		0	
10/11/2018	1,117																311		0	
10/19/2018	1,125																422		0	Background PID at 340 ppb.

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.

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)
6/20/2018	79	52	119	19,804	0.04	17.41
7/18/2018		0	119	19,811	0.00	17.41
8/16/2018	3,082	1,798	120	19,852	0.20	17.61
8/16/2018	2,500	1,458	120	19,855	0.01	17.62
8/17/2018	980	572	120	19,880	0.04	17.66
8/20/2018	Not Used - Strong paint odors in area	0	105	19,947	0.00	17.66
8/30/2018	3,443	2,008	105	20,189	1.13	18.79
9/17/2018	797	465	107	20,622	0.48	19.27
10/11/2018	311	181	105	21,190	0.24	19.51
10/19/2018	422	246	98	21,381	0.10	19.61

Notes:

PID = photoionization detector

ppbv = parts per billion by volume

cfm = cubic feet per minute

lbs = pounds

A correction factor of 0.58 has been applied to the PID vapor measurement for VOCs based on the mixture of analytes detected in the influent TO-15 analysis on 6/20/18.

TO-15 analysis results showed Trichloroethene made up of 89% of the total VOCs removed in the 6/20/18 results.

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

SVE System Inlet

Date	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	Vinyl Chloride	1,1,1-TCA	1,1-DCA	Acetone	Toluene	m,p-Xylene	Chloroform	o-Xylene	Pentane	Hexane	Total Chlorinated	Total VOCs
4/17/2015	1,500	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 - Rebound Start	99	7.6	3.4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	110	110
5/22/2018	430	43	13	ND	ND	12	ND	ND	ND	ND	ND	ND	ND	ND	498	498
6/7/2018	160	13	5.4	ND	ND	1.8	ND	ND	ND	ND	ND	ND	ND	ND	180	180
6/20/2018	170	14	5.7	ND	ND	1.8	ND	ND	ND	ND	ND	ND	ND	ND	192	192
8/30/2018	**110**	**8.6**	**3.7**	**NA**	**ND**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**122**	**122**

SVE-2

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
8/30/2018	**180**	**14**	**6.1**	**NA**	**ND**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**200**	**200**

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 - Rebound Start	170	13	5.8	ND	ND	1.7	ND	ND	ND	ND	ND	ND	ND	ND	191	191
1/19/2018 - 35-Day 60 Minute Sample	310	30	13	ND	ND	6.9	1.3	ND	ND	ND	1.1	ND	ND	ND	361	362
1/19/2018 - 35-Day 180 Minute Sample	310	28	12	ND	ND	7.9	1.1	ND	ND	ND	1.1	ND	ND	ND	359	360
3/6/2018 - 80-Day 60 Min Sample	440	41	15	ND	ND	14	2.2	ND	ND	ND	ND	ND	ND	ND	512	512
3/6/2018 - 80-Day 180 Min Sample	410	33	13	ND	ND	13	1.6	ND	ND	ND	ND	ND	ND	ND	471	471
5/22/2018	790	66	22	ND	ND	22	ND	ND	ND	ND	ND	ND	ND	ND	900	900
6/7/2018	280	23	9.6	ND	ND	3	ND	ND	ND	ND	ND	ND	ND	ND	316	316
6/20/2018	310	24	11	ND	ND	3.4	ND	ND	ND	ND	ND	ND	ND	ND	348	348

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

NA = not analyzed

DCE = Dichloroethene

PCE = tetrachloroethene

TCE = trichloroethene

Total Chlorinated = the sum of PCE, TCE, cis-1,2-DCE, trans-1,2-DCE, 1,1,1-TCA, and 1,1-DCA.

Table 2-5 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
7/18/2018	1,025							Site check, system power was turned off; restart system.
8/16/2018	1,054	50	520	800	470		0	Took initial readings then modified SVE-3 to operate as a vent.
8/16/2018	1,054	72	517	Vent				
8/16/2018	1,054	0	615	Vent				
8/16/2018	1,054	85	540	Vent	50			
8/16/2018	1,054	245	690	Vent	145			
8/17/2018	1,055	222	690	Vent	292		0	
8/20/2018	1,058	402	1,636	Vent	1,251		0	
8/30/2018	1,068	841	1,850	Vent	1,478		0	TO-15 samples from Influent and SVE-2.
9/17/2018	1,086	183	535	Vent	275		0	
10/11/2018	1,110			Vent	40	0	0	
10/19/2018	1,118			Vent	282		0	

Notes:

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

Operational change was made on 8/16/18. SVE-03 was opened as a vent well to promote focused flow towards SVE-02.

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)
6/20/2018	153	88	103	18,451	0.044	13.23
7/18/2018		0	105	18,770	0.071	13.30
8/16/2018	470	269	90	19,438	0.393	13.70
8/16/2018		0	70	19,438	0.000	13.70
8/16/2018		0	70	19,438	0.000	13.70
8/16/2018	50	29	70	19,438	0.000	13.70
8/16/2018	145	83	70	19,438	0.000	13.70
8/17/2018	292	167	77	19,464	0.008	13.70
8/20/2018	1,251	717	77	19,530	0.088	13.79
8/30/2018	1,478	847	77	19,763	0.370	14.16
9/17/2018	275	158	77	20,176	0.122	14.28
10/11/2018	40	23	77	20,713	0.023	14.31
10/19/2018	282	162	70	20,869	0.043	14.35

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 8/30/18.

TO-15 analysis results showed Tetrachloroethene made up 90% of the total VOCs removed at the influent on 8/30/18.

Table 3-1 - Baseline and Performance Monitoring Groundwater Data; 4-78/79 Benzene Treatment Area

Sample ID	Date	Sample Depth (ft bgs)	TCE (ug/L)		cis-1,2-DCE (ug/L)		VC (ug/L)		Benzene (ug/L)		Nitrate (mg-N/L)		Nitrite (mg-N/L)		Sulfate (mg/L)		Duplicate Well ID
B78-11-8-113017	11/30/2017	8	0.42		0.98		1.11		9.66		<0.100	U	<0.100	U	1.94		
B78-11-021418	2/14/2018	8	1.16		0.84		1.09		14.8		<0.100	U	<0.100	U	9.22	D	
B78-11-051518	5/15/2018	8	1.86		0.78		1.06		12.6		<0.100	U	<0.100	U	34.1	D	
B78-11-180917	9/17/2018	8	5.01		7.90		3.62		9.20		<0.100	U	<0.100	U	23.4	D	
B78-13-15-112917	11/29/2017	15	0.24		1.29		2.02		9.92		0.135		<0.100	U	0.652		
B78-13-021418	2/14/2018	15	<0.2	U	1.78		8.49		4.11		<0.100	U	<0.100	U	1.31		
B78-13-051518	5/15/2018	15	<0.2	U	0.85		0.87		4.94		0.182		<0.100	U	4.32	D	
B78-13-180917	9/17/2018	15	<0.2	U	0.61		0.38		3.29		<0.100	U	<0.100	U	0.812		
B78-17-9-100617	10/6/2017	9	<0.2	U	0.17	J	0.33		4.84		-		-		-		
B78-17-15-112917	11/29/2017	15	1.25		0.81		1.31		6.52		<0.100	U	<0.100	U	17.1	D	
B78-17-021418	2/14/2018	15	2.57		1.78		1.47		4.61		<0.100	U	<0.100	U	7.35	D	
B78-17-051518	5/15/2018	15	0.91		1.63		0.53		2.60		<0.100	U	<0.100	U	8.66	D	
B78-17-180917	9/17/2018	15	<0.2	U	0.39		<0.2	U	1.37		<0.100	U	<0.100	U	9.63	D	
B78-18-8-100617	10/6/2017	8	<0.2	U	0.07	J	0.29		0.72		-		-		-		
B78-18-15-112917	11/29/2017	15	<0.2	U	<0.2	U	0.35	M	3.10		<0.100	U	<0.100	U	0.343		
DUP-01-112917	11/29/2017	15	<0.2	U	<0.2	U	0.36		2.96		<0.100	U	<0.100	U	1.68		B78-18-15
B78-18-021418	2/14/2018	15	<0.2	U	<0.2	U	0.24		1.28		<0.100	U	<0.100	U	1.47		
B78-18-051518	5/15/2018	15	<0.2	U	<0.2	U	0.23		1.68		<0.100	U	<0.100	U	27.6	D	
B78-18-180917	9/17/2018	15	<0.2	U	<0.2	U	<0.2	U	0.89		<0.100	U	<0.100	U	7.28	D	
B78-19-9-100617	10/6/2017	9	<0.2	U	0.06	J	0.22		0.69		-		-		-		
B78-19-15-112917	11/29/2017	15	<0.2	U	<0.2	U	0.27	M	0.36		<0.100	U	<0.100	U	0.255		
B78-19-021418	2/14/2018	15	<0.2	U	<0.2	U	0.21		0.23		<0.100	U	<0.100	U	1.22		
B78-19-051518	5/15/2018	15	<0.2	U	<0.2	U	0.21		0.34		<0.100	U	<0.100	U	22.4	D	
B78-19-180917	9/17/2018	15	<0.2	U	<0.2	U	<0.2	U	<0.2	U	<0.100	U	<0.100	U	1.91		
B78-20-8-100617	10/6/2017	8	<0.2	U	<0.2	U	0.14	J	8.81		-		-		-		
B78-20-15-113017	11/30/2017	15	0.41		<0.2	U	<0.2	U	25.9		2.93	D	<0.100	U	53.9	D	
B78-20-021418	2/14/2018	15	0.25		0.49	M	<0.2	U	40.0		<0.100	U	<0.100	U	21.1	D	
B78-20-051518	5/15/2018	15	<0.2	U	0.39		0.22		54.2		<0.100	U	<0.100	U	15.5	D	
B78-20-180917	9/17/2018	15	0.24		0.27		0.29		0.98		<0.100	U	<0.100	U	2.39		
B78-21-8-100617	10/6/2017	8	<0.2	U	0.13	J	0.21		1.42		-		-		-		
Dup01-100617	10/6/2017	15	<0.2	U	0.15	J	0.20	J	2.01		-		-		-		B78-21-8
B78-21-15-112917	11/29/2017	15	<0.2	U	0.31	M	0.26		2.27		0.101		<0.100	U	4.43	D	
B78-21-021418	2/14/2018	15	<0.2	U	0.24		0.30		0.86		<0.100	U	<0.100	U	1.60		
B78-21-051518	5/15/2018	15	<0.2	U	0.27		0.27		1.08		<0.100	U	<0.100	U	4.59	D	
B78-21-180917	9/17/2018	15	0.22		0.29		<0.2	U	0.59		<0.100	U	<0.100	U	3.62	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-244S-021418	2/14/2018	13	1.01		1.25		1.22		5.34		<0.100	U	<0.100	U	1.25		
GW-244S	3/6/2018	13	1.26		2.00		1.56		6.86		-		-		-		
GW-244S-051518	5/15/2018	13	<0.2	U	0.30		0.41		3.89		<0.100	U	<0.100	U	<0.100	U	
GW-244S-180917	9/17/2018	13	<0.2	U	0.25		0.38		3.74		<0.100	U	<0.100	U	0.113		

Table 3-1 - Baseline and Performance Monitoring Groundwater Data; 4-78/79 Benzene Treatment Area

Sample ID	Date	Sample Depth (ft bgs)	TCE (ug/L)		cis-1,2-DCE (ug/L)		VC (ug/L)		Benzene (ug/L)		Nitrate (mg-N/L)		Nitrite (mg-N/L)		Sulfate (mg/L)		Duplicate Well ID
GW-031S-23-113017	11/30/2017	23	<0.2	U	<0.2	U	<0.2	U	17.6		<0.100	U	<0.100	U	2.54	D	
GW-031S-021418	2/14/2018	23	<0.2	U	0.45	M	0.49		21.9		<0.100	U	<0.100	U	3.67	D	
DUP-01-021418	2/14/2018	23	<0.2	U	0.46		0.42		21.4		-		-		-		GW-031S
GW-031S	3/6/2018	23	<0.2	U	1.18		<0.2	U	60.3		-		-		-		
GW-031S-051518	5/15/2018	23	0.36		0.40		0.21		2.68		<0.100	U	<0.100	U	2.95	D	
Dup-01-051518	5/15/2018	23	0.32		0.34		0.20		2.64		<0.100	U	<0.100	U	2.87	D	GW-031S
GW-031S-180917	9/17/2018	23	<0.2	U	<0.2	U	0.28		<0.2	U	<0.100	U	<0.100	U	0.499		
Dup-01-180917	9/17/2018	23	<0.2	U	0.21		0.30		<0.2	U	<0.100	U	<0.100	U	0.441		GW-031S

Notes:
U = non-detect
D = dilution
M = Estimated value for a GC/MS analyte detected and confirmed by an analyst but with low spectral match parameters.

Table 3-2 - July 2018 Injection Volumes at ERD Wells

Area	Injection Well	Volume of Solution (gallons)	Brix (°Bx)	Pounds Substrate in the Solution (lbs)
SWMU-172/174	B172-01	500	9.0	375
	B172-02	500	9.0	375
	B172-03	500	9.0	375
	B172-04	500	9.0	375
	B172-05	500	9.0	375
	B172-06	500	9.0	375
	B172-07	500	9.0	375
	B172-08	500	9.0	375
	B172-09	500	7.5	313
	B172-10	Well lid rusted to monument		NA
	B172-11	500	7.5	313
	B172-12	500	7.5	313
	B172-13	500	9.0	375
	B172-14	500	9.0	375
Building 4-78/79	B78-12	514	7.8	334
	B78-14	516	7.8	336
	B78-15	515	7.8	335
	B78-16	522	7.8	340
AOC-060	GW012S	748	7.5	468
	GW147S	752	7.5	470
AOC-090	IPR3	100	7.5	63
	GW 189S	500	7.5	313
	Total (gal)	10,667	Total (lbs)	7,349

Notes:

°Bx (degrees brix) is a measure of the sugar content in an aqueous solution. One degree Brix is 1 gram of sucrose in 100 grams of solution and represents the strength of the solution as

Table 3-3 Groundwater Monitoring Results Summary and Recommended ERD Treatment

GW Treatment Area	Source and downgradient	CPOC wells	Treatment IWs	ERD Treatment
SWMU-172/174	All detections are less than 1.1 ug/L.	All detections are at 0.5 ug/L or less.	*Prior data, North and South IWS showed total CVOCs range from 0.03 ug/L to 6.90 ug/L. TOC near background.*	**Substrate injection completed in July 2018. Elevated TOC at source area MWs. Continue monitoring.**
Building 4-78/4-79 SWMU/AOC Group	Most source area MWs are ND or less than 1.0 ug/L. One central well continues to shows significant decrease in total CVOCs from 1,430 ug/L in Nov 2017, 150 ug/L in May 2018, and 8.5 ug/L in August 2018 after substrate injections in January and August 2018. Benzene remains in selected wells/areas (<10 typically). Nitrate/sulfate injected in July 2018.	Six of seven CPOC wells with CVOCs below or just slightly above CULs. Max VC concentration at 0.28 ug/L (CUL is 0.20 ug/L).	*Prior data, 4 of 5 wells with low detections where sum of CVOCs are less than 3 ug/L. CVOCs at nearby downgradient MW (GW-033s) continue to decline (CVOCs at 8.5 ug/L).*	**Substrate injection completed in July 2018. Substrate injection in selected IWs/areas around GW-033S completed in July 2018.**
AOC-001/002	MW near source at 1.2 ug/L; downgradient all detections are less than 2.5 ug/L.	All detections 0.23 ug/L or less.	*Prior data, detections at or below 0.30 ug/L.*	**Inject infiltration galleries at source (IPRA and IPRB) when area is accessible.**
AOC-003	All detections are less than 0.50 ug/L.	Detections below 0.60 ug/L.	*Prior data, in May 2017 one of four IWs sampled – VC detection less than 0.30 ug/L*	**Substrate injection to be considered in conjunction with AOC-001/002.**
Lot 20 / former 10-71	*Prior data, one well with VC at 0.24 ug/L, all other MWs are ND.*	-	-	**No action**
AOC-60	Detections less than 5 ug/L.	All detections less than 0.10 ug/L	-	**Substrate injection completed in July 2018. Elevated TOC at treated wells. Continue monitoring.**
AOC – 90	MW near source at 27 ug/L CVOCs; downgradient wells less than 0.30 ug/L.	All detections are less than 0.40 ug/L.	-	**Substrate injection at GW-189S completed in July 2018. Elevated TOC at treated well. Continue monitoring**
Apron A	*Prior data, detections of VC range from 0.24 ug/L to 1.63 ug/L.*	-	-	**Substrate injection to be considered in conjunction with AOC-001/002.**
Building 4-70	-	*Prior data, CVOCs at 0.70 ug/L and 0.22 ug/L.*	-	**Substrate injection to be considered in conjunction with AOC-001/002.**

FIGURES

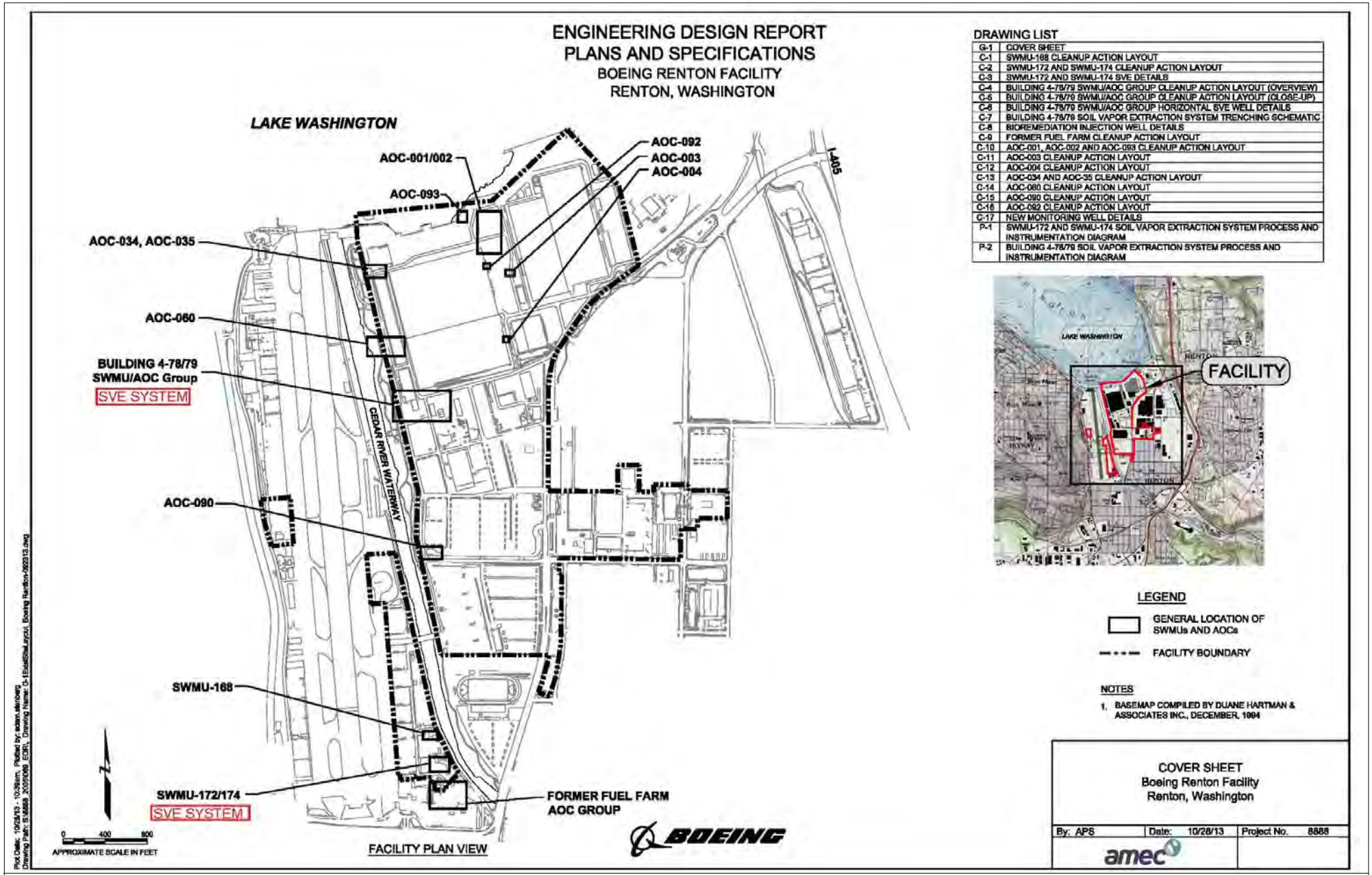

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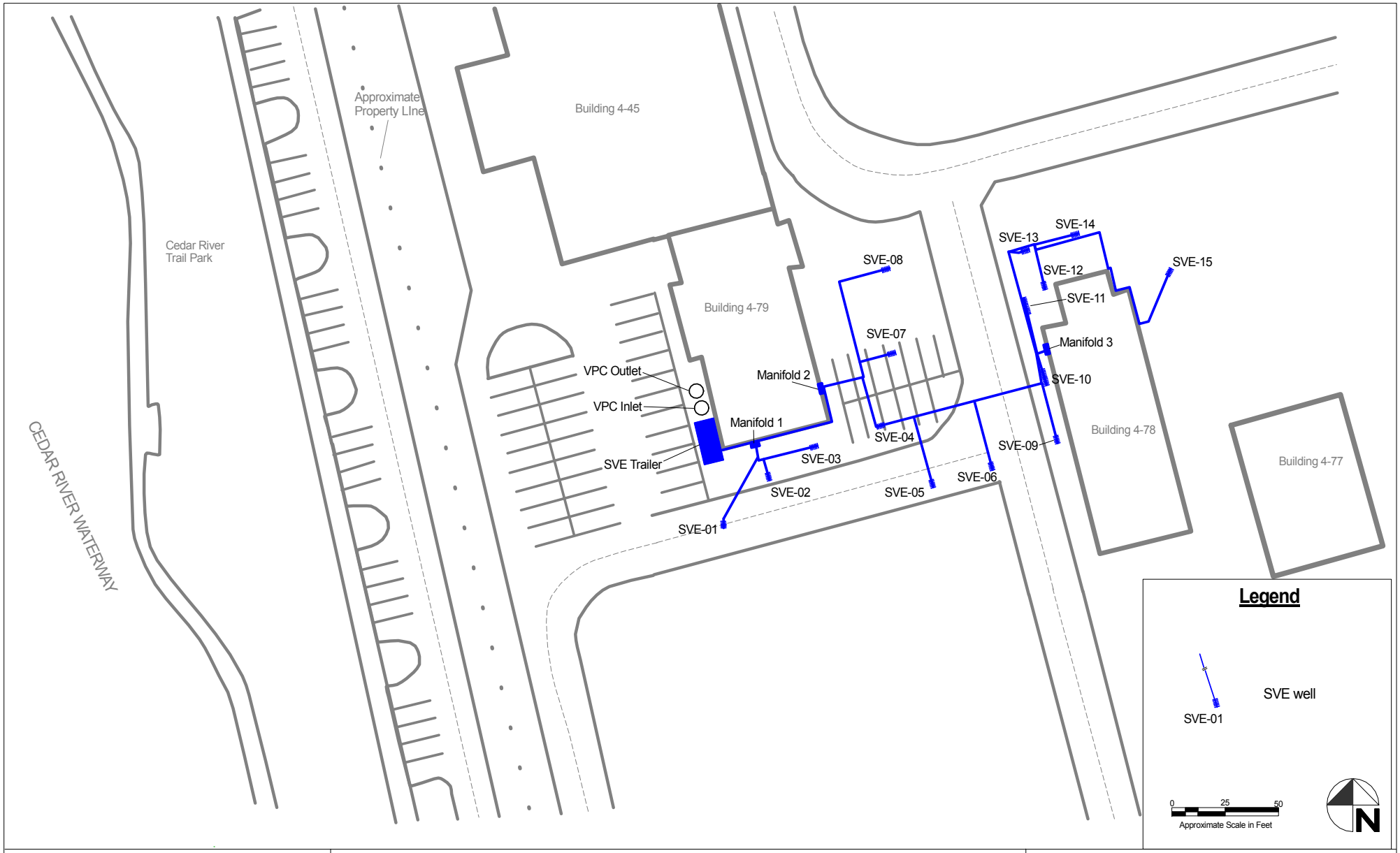
Figure 1-1 Site Location/ AOC Outlines



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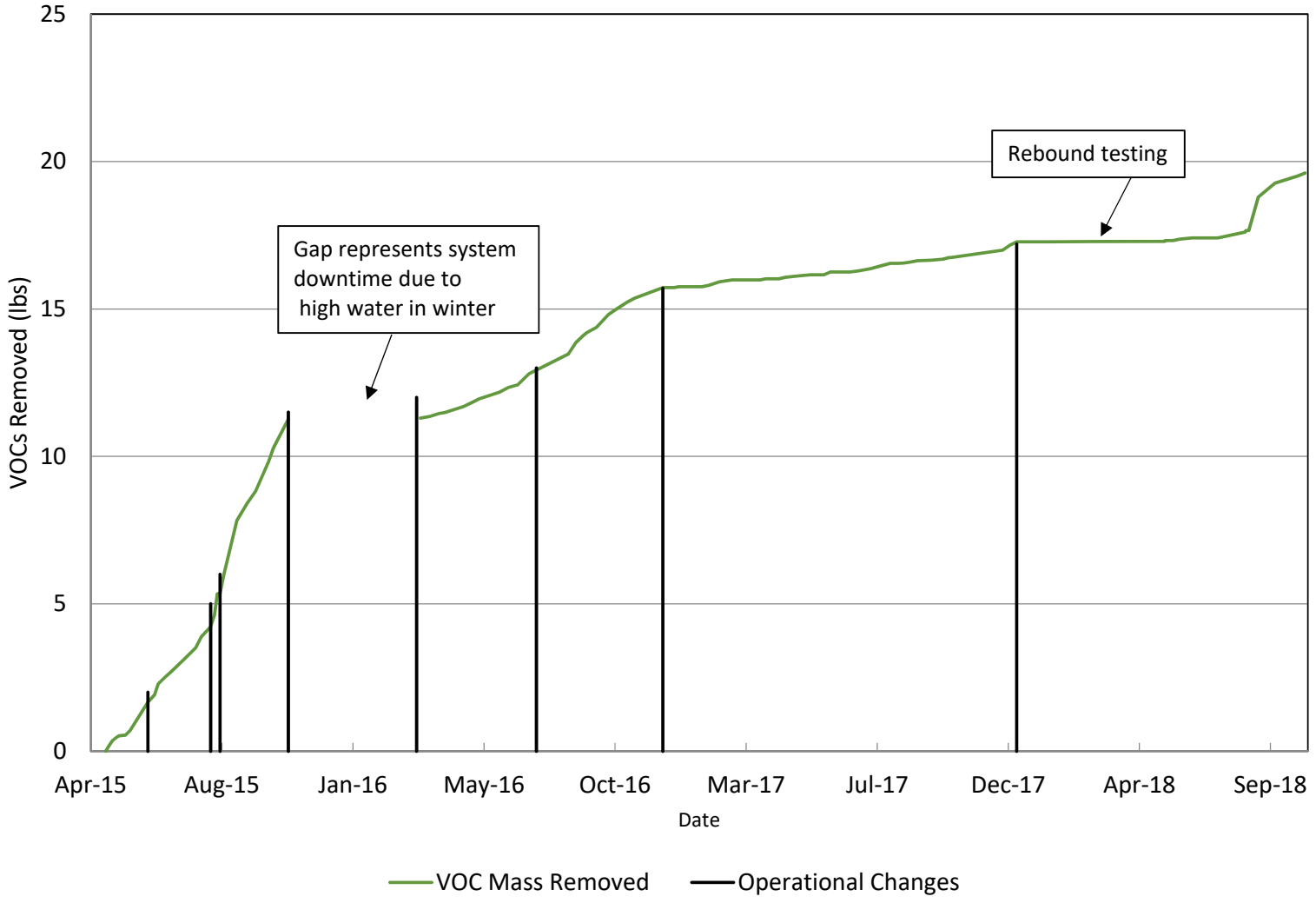
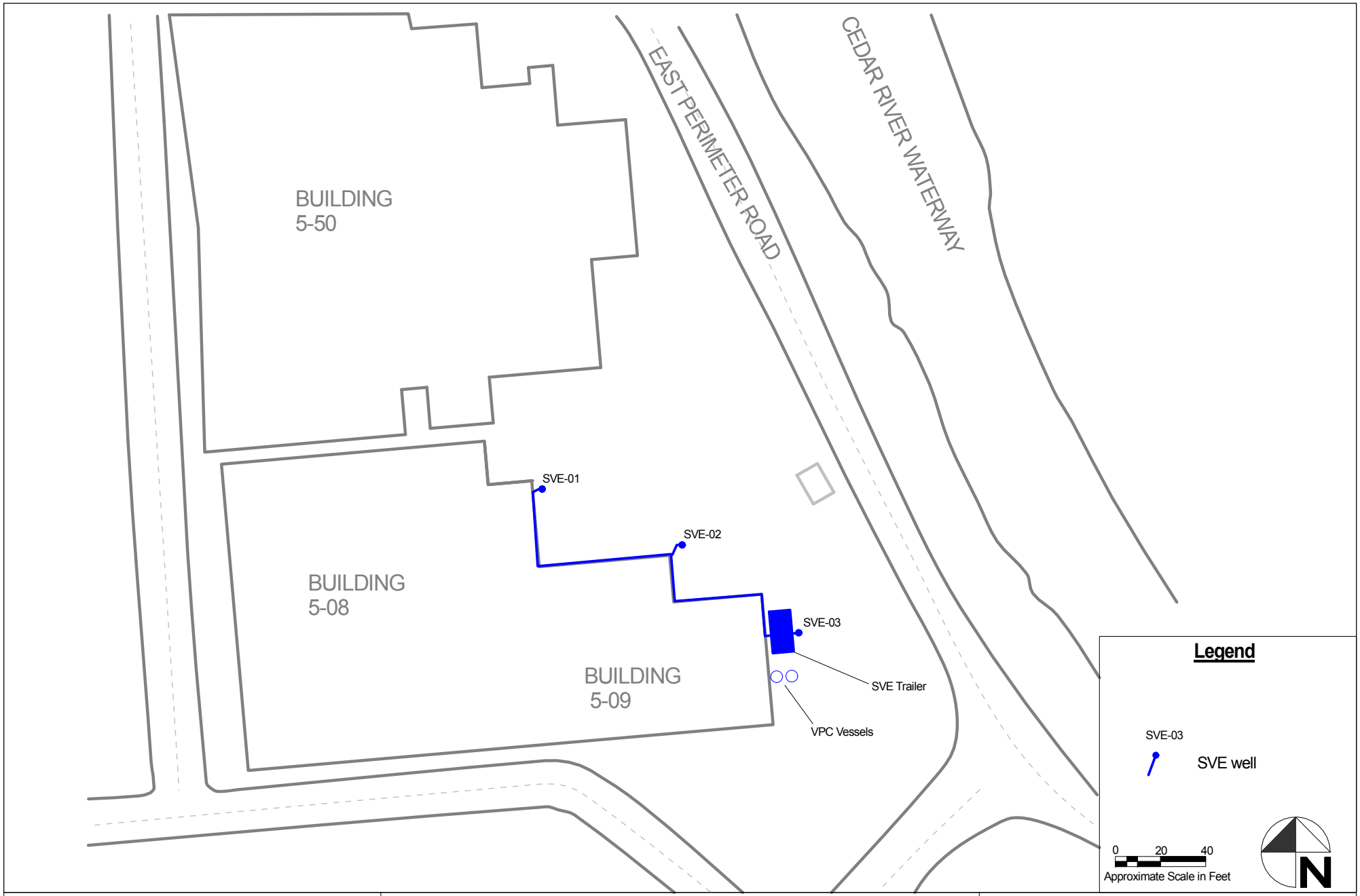
Boeing Renton
Spring 2017 SVE Quarterly Summary Report

Figure 2-1 Building 4-78/79

SVE System Layout

Figure 2-2 Cumulative VOC Mass Removed - 4-78/79 SVE System





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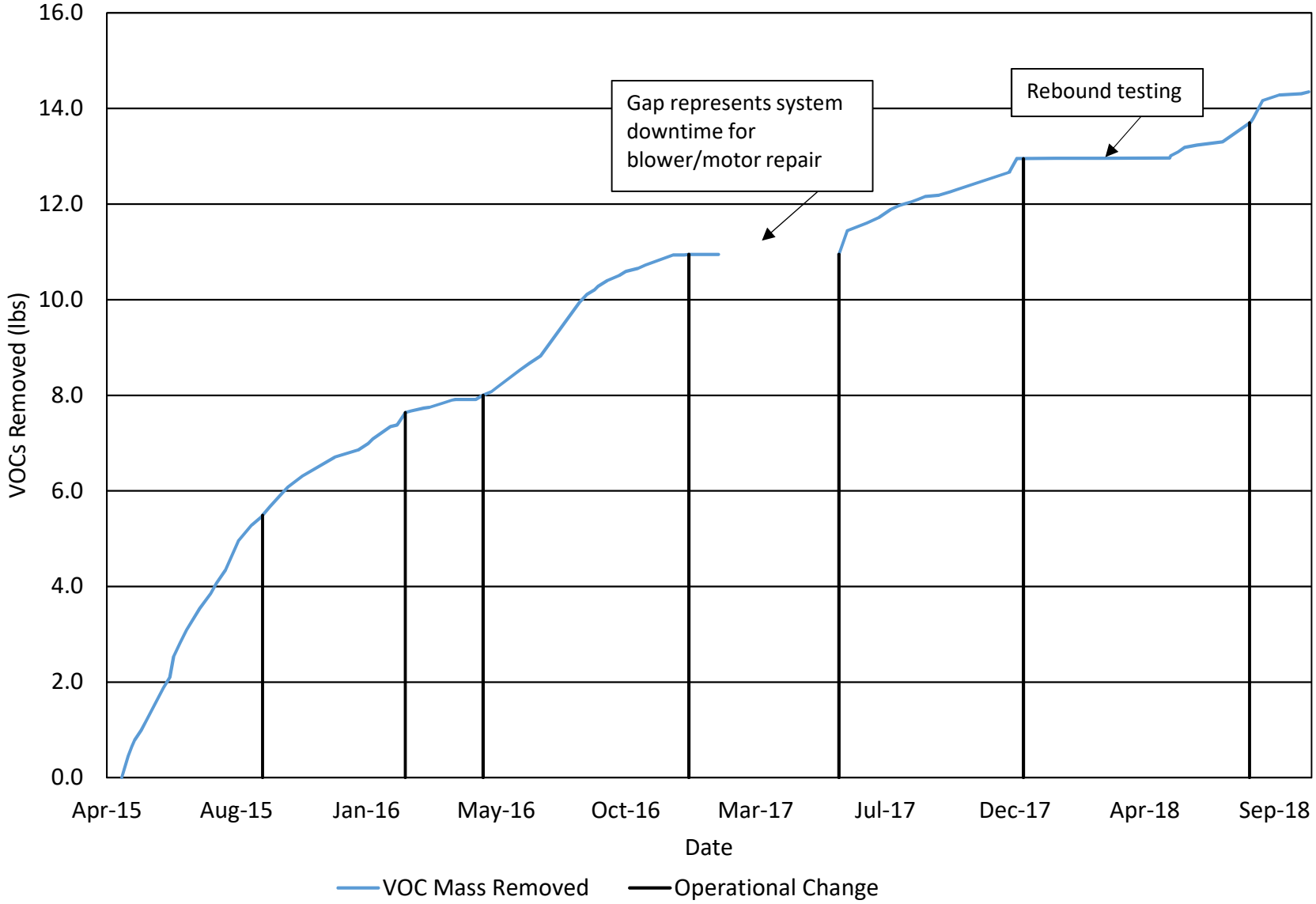
Spring 2017 SVE Quarterly Summary Report

Figure 2-3 SWMU-172/174 Area
SVE System Layout

Figure 2-4 Cumulative VOC Mass Removed - SWMU-172/174 SVE System



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

Attachment A: Field Log Forms

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

Inspection Date: 8/16/18 Date of last inspection: 6/20/18

Periodic systems check:
1) Check flowrate, vacuum, pressure, moisture separator, water storage drums
2) Check each SVE well, VPC inlet, and VPC outlet with PID.

Operational Parameters - Monitoring interval is variable.

Inspection Time: 1000 1030 Motor Hours: 4606.3

Blower	Current Value	
Vacuum gauge	30"H2O	50"H2O
Pressure gauge	20"H2O	16"H2O
System flow rate	90SCFM	70SCFM
Blower Temperature	114°F	123°F
Temp.at lag VPC discharge		

Other Notes

@1030 Took Initial Readings. Then closed SVE-3 valve & opened vent. Opened SVE-2 all the ways, Left SVE-1 as is.

	1130	1300
Vac	45"H2O	47"H2O
Pres	16"H2O	16"H2O
Flow	75 SCFM	75SCFM
Temp	125°F	128°F

1030	Vac	Flow	Diff Pres	calc Flow
SVE1	2"H2O	24SCFM	6.5"H2O	31 SCFM
SVE2	13"H2O	38SCFM	18"H2O	52 SCFM

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

PID Model: Details: 0 ppb / 10.01 ppm

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	1020	50 ppb	50 ppb	NR	12SCFM	1.5"H2O	15 SCFM
SVE-02	1017	424 ppb	520 ppb	4"H2O	16SCFM	4.5"H2O	26 SCFM
SVE-03	1015	557	800 ppb	3"H2O	>38SCFM	26"H2O	62 SCFM
VPC Inlet	1012	470 ppb	470 ppb				
VPC Midpoint							
VPC Outlet	1010	0 ppb	0 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 8/16/18 Date

PID	1030	1100	1130	1300
SVE1	72 ppb	0	85 ppb	235/245 ppb
SVE2	517 ppb	615 ppb	540 ppb	690/550 ppb
IN			50 ppb	145 ppb

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

Inspection Date: 8/17/18 Date of last inspection: 8/16/18

Periodic systems check:

1) Check flowrate, vacuum, pressure, moisture separator, water storage drums

2) Check each SVE well, VPC inlet, and VPC outlet with PID.

Operational Parameters - Monitoring interval is variable.		
Inspection Time: 1150		Motor Hours: 4631.8
Blower	**Current Value**	**Other Notes**
Vacuum gauge	48" H_2O	
Pressure gauge	17" H_2O	
System flow rate	775cfm	
Blower Temperature	128°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 / 10.01 ppm
Calibration time/ date: 8/17/18 1130	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	1215	185 ppb	222 ppb				
SVE-02	1207	580 ppb	690 ppb				
SVE-03	Vent	~~580~~ ppb	~~0~~				
VPC Inlet	1205	292 ppb	280 ppb				
VPC Midpoint							
VPC Outlet	1200	0 ppb	0 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 _____ Printed Name _____ Signature _____ Date

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

Inspection Date: 8/20/18 Date of last inspection: 8/17/18

Periodic systems check:
1) Check flowrate, vacuum, pressure, moisture separator, water storage drums
2) Check each SVE well, VPC inlet, and VPC outlet with PID.

Operational Parameters - Monitoring interval is variable.		
Inspection Time:		Motor Hours: 4697.5
Blower	**Current Value**	**Other Notes**
Vacuum gauge	50 "H_2O	
Pressure gauge	17 "H_2O	
System flow rate	77 SCFM	
Blower Temperature	123°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 / 9997 ppb
Calibration time/ date: 8/20/18 0740	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	0805	402 ppb	393 ppb				
SVE-02	0800	1,636 ppb	1,578 ppb				
SVE-03							
VPC Inlet	0755	1,236	1,251				
VPC Midpoint							
VPC Outlet	0750	0 ppb	0 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) 8/20/18 (Date)

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

Inspection Date: 8/30/18 Date of last inspection: 8/20/18

Periodic systems check:
1) Check flowrate, vacuum, pressure, moisture separator, water storage drums
2) Check each SVE well, VPC inlet, and VPC outlet with PID.

Operational Parameters - Monitoring interval is variable.		
Inspection Time: 1130		Motor Hours: 4931.3
Blower	**Current Value**	**Other Notes**
Vacuum gauge	40" H_2O	Collected Summa samples for TO-15 analysis from SVE-1N & SVE-2
Pressure gauge	16" H_2O	
System flow rate	778CFM	
Blower Temperature	126°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 / 10.02 ppm				
Calibration time/ date: 8/30/18 1110			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	1145	841 ppb	763 ppb				
SVE-02	1140	1,850 ppb	1,740 ppb				
SVE-03	Vent						
VPC Inlet	1135	1,478 ppb	1,478 ppb				
VPC Midpoint							
VPC Outlet	1137	0 ppb	0 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) 8/30/18 (Date)

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

Inspection Date: 9/17/18 Date of last inspection: 8/30/18

Periodic systems check:
1) Check flowrate, vacuum, pressure, moisture separator, water storage drums
2) Check each SVE well, VPC inlet, and VPC outlet with PID.

Operational Parameters - Monitoring interval is variable.		
Inspection Time: 1520		Motor Hours: 5343.09
Blower	**Current Value**	**Other Notes**
Vacuum gauge	49" H_2O	
Pressure gauge	14" H_2O	
System flow rate	77 SCFM	
Blower Temperature	120°F	
Temp.at lag VPC discharge		
Other notes: check oil level, drive belts, TEFC motor fan, any unusual noise/vibration		

PID Model: PPB RAE 3000			Details: 0 PPB / 10.00 ppm				
Calibration time/ date: 1430 9/17/18			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	1535	183 ppb	116 ppb				
SVE-02	1530	524 ppb	535 ppb				
SVE-03	Vent						
VPC Inlet	1522	275 ppb	271 ppb				
VPC Midpoint							
VPC Outlet	1525	0 ppb	0 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) 9/17/18 (Date)

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

Inspection Date: 10/11/18 Date of last inspection: 9/17/18

Periodic systems check:
1) Check flowrate, vacuum, pressure, moisture separator, water storage drums
2) Check each SVE well, VPC inlet, and VPC outlet with PID.

Operational Parameters - Monitoring interval is variable.		
Inspection Time: 0745		Motor Hours: 5881.2
Blower	**Current Value**	**Other Notes**
Vacuum gauge	49 "H2O	
Pressure gauge	14 "H2O	
System flow rate	77 scfm	
Blower Temperature	108 °F	
Temp.at lag VPC discharge		
Other notes: check oil level, drive belts, TEFC motor fan, any unusual noise/vibration		

PID Model: PPB RAE 3000	Details: 0 ppb / 10.00 ppm
Calibration time/ date: 10/11/18 0740	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	VENT						
VPC Inlet	0750	40 ppb	36 ppb				
VPC Midpoint	0752	0 ppb	0 ppb				
VPC Outlet	0755	0 ppb	0 ppb				
Other vapor point _____							

1. Flow rate calculated from the equation $Flow\ Rate\ (cfm) = 12.24 \times \sqrt{differential\ pressure}$.

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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) 10/11/18 (Date)

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

Inspection Date: 10/19/18 Date of last inspection: 10/11/18

Periodic systems check:

1) Check flowrate, vacuum, pressure, moisture separator, water storage drums

2) Check each SVE well, VPC inlet, and VPC outlet with PID.

Operational Parameters - Monitoring interval is variable.		
Inspection Time: 0715		Motor Hours: 6036.6
Blower	**Current Value**	**Other Notes**
Vacuum gauge	55 "H_2O	
Pressure gauge	10 "H_2O	
System flow rate	70 SCFM	
Blower Temperature	117°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 / 9,996 PPB
Calibration time/ date: 10/19/18 0715	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	0722	282 ppb	265 ppb				
VPC Midpoint							
VPC Outlet	0730	0 ppb	0 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) 10/19/18 (Date)

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

Inspection Date: 8/16/18 Date of last inspection: 6/20/18

Periodic systems check:

1) Check flowrate, vacuum, pressure, moisture separator, water storage drums

2) Check each SVE well, VPC inlet, and VPC outlet with PID.

Operational Parameters - Monitoring interval is variable.		
Inspection Time: 0915		Motor Hours: 3958.6
Blower	**Current Value**	**Other Notes**
Vacuum gauge	29 "H2O	System power was turned off outside. Restarted system. PID 0930 1200 Influent = 3,082 PPB 2,500 ppb Effluent = 120 PPB (background)
Pressure gauge	10 "H2O	
System flow rate	120 SCFM	
Blower Temperature	88°F	
Temp.at lag VPC discharge		
Other notes: check oil level, drive belts, TEFC motor fan, any unusual noise/vibration		

PID Model: RAE 3000				Details: 0 PPB / 10.0 PPM				
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]**	**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	0930	3,082 ppb.		2500 ppb	@ 1200			
VPC Midpoint								
VPC Outlet	0930	120 ppb (background)						

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

8/16/18
Date

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

Inspection Date: 8/17/18 Date of last inspection: 8/16/18

Periodic systems check:
1) Check flowrate, vacuum, pressure, moisture separator, water storage drums
2) Check each SVE well, VPC inlet, and VPC outlet with PID.

Operational Parameters - Monitoring interval is variable.		
Inspection Time: 1240		Motor Hours: 3985.8
Blower	**Current Value**	**Other Notes**
Vacuum gauge	28 "H2O	Influent Check
Pressure gauge	8 "H2O	
System flow rate	120 scfm	
Blower Temperature	128°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 / 10.0 / ppm				
Calibration time/ date: 8/17/18 1130				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	1245	980 ppb	980 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

Printed Name

Signature

8/17/18
Date

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

Inspection Date: 8/20/18 Date of last inspection: 8/17/18

Periodic systems check:

1) Check flowrate, vacuum, pressure, moisture separator, water storage drums

2) Check each SVE well, VPC inlet, and VPC outlet with PID.

Operational Parameters - Monitoring interval is variable.		
Inspection Time: 0830		Motor Hours: 4053.3
Blower	**Current Value**	**Other Notes**
Vacuum gauge	31" H2O	Spray paint odor around area. Background @ 1,500 - 2500 ppb
Pressure gauge	7" H2O	
System flow rate	105 scfm	
Blower Temperature	121°F	* Left sin for Tape pickup. Return @ 1230 to screen.
Temp.at lag VPC discharge		
Other notes: check oil level, drive belts, TEFC motor fan, any unusual noise/vibration		

PID Model: PPB RAE 3000				Details: 0 ppb / 10.00 ppm				
Calibration time/ date: 8/20/18 0830				PID check after monitoring:				
Sampling Point	**Time**	**PID Reading (1)**	**PID Reading (2)**	**Vacuum**	**Flow Rate (gauge)**	**Differential Pressure**	**Flow Rate Calculated[1]**	**Well Off**
SVE-01	1250	36 ppb	33 ppb					
SVE-02								
SVE-03								
SVE-04								
SVE-05	1255	1,240 ppb	1,199 ppb					
SVE-06	1258	1,360 ppb	1,324 ppb					
SVE-07								
SVE-08	1305	5,420 ppb	6,310 ppb					
SVE-09								
SVE-10	1310	2,326 ppb	2,281 ppb					
SVE-11								
SVE-12	1312	2,864 ppb	2,754 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	1243	3,943 ppb	4,088 ppb					
VPC Midpoint								
VPC Outlet	1246	0 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

8/20/18
Date

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

Inspection Date: 8/30/18 Date of last inspection: 5/20/18

Periodic systems check:

1) Check flowrate, vacuum, pressure, moisture separator, water storage drums

2) Check each SVE well, VPC inlet, and VPC outlet with PID.

Operational Parameters - Monitoring interval is variable.		
Inspection Time: 1115		Motor Hours: 4,295.0
Blower	**Current Value**	**Other Notes**
Vacuum gauge	31" H20	
Pressure gauge	7" H_2O	
System flow rate	105 scfm	
Blower Temperature	124°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 ppm / 10.02 ppm				
Calibration time/ date: 8/30/18 1110				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	1120	3,443 ppb	2,907 ppb					
VPC Midpoint								
VPC Outlet								

1. Flow rate calculated from the equation $Flow\ Rate\ (cfm) = 12.24 \times \sqrt{differential\ pressure}$.

Questions? Call Justin Neste @ (360) 981-5606

At the Completion of a monitoring event scan monitoring forms and e-mail to Justin Neste @ Justin.Neste@calibresys.com

Signature

Justin Neste
Printed Name

Signature

8/30/18
Date

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

Inspection Date: 9/17/18 Date of last inspection: 8/30/18

Periodic systems check:

1) Check flowrate, vacuum, pressure, moisture separator, water storage drums

2) Check each SVE well, VPC inlet, and VPC outlet with PID.

Operational Parameters - Monitoring interval is variable.		
Inspection Time: 1430		Motor Hours: 4728.2
Blower	**Current Value**	**Other Notes**
Vacuum gauge	31 "H2O	
Pressure gauge	8 "H2O	
System flow rate	107 SCFM	
Blower Temperature	129 °F	
Temp.at lag VPC discharge		
Other notes: check oil level, drive belts, TEFC motor fan, any unusual noise/vibration		

PID Model: RAE 3000				Details: 0 ppb / 10.00 ppm				
Calibration time/ date: 1430 9/17/18				PID check after monitoring:				
Sampling Point	**Time**	**PID Reading (1)**	**PID Reading (2)**	**Vacuum**	**Flow Rate (gauge)**	**Differential Pressure**	**Flow Rate Calculated[1]**	**Well Off**
SVE-01		234 ppb	230					
SVE-02								
SVE-03								
SVE-04								
SVE-05		188 ppb	154					
SVE-06		244 ppb	253					
SVE-07								
SVE-08		460 ppb	380					
SVE-09								
SVE-10		661 ppb	683					
SVE-11								
SVE-12		702 ppb	761					
SVE-13								
SVE-14								
SVE-15								
Other:_____								

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

Inspection Date: 10/11/18 Date of last inspection: 9/17/18

Periodic systems check:

1) Check flowrate, vacuum, pressure, moisture separator, water storage drums

2) Check each SVE well, VPC inlet, and VPC outlet with PID.

Operational Parameters - Monitoring interval is variable.		
Inspection Time: 0830		Motor Hours: 5296.3
Blower	**Current Value**	**Other Notes**
Vacuum gauge	35" H2O	
Pressure gauge	13" H2O	
System flow rate	105 SCFM	
Blower Temperature	126°F	
Temp.at lag VPC discharge		
Other notes: check oil level, drive belts, TEFC motor fan, any unusual noise/vibration		

PID Model: PPB RAE 3000				Details: 0 PPB / 10.00 ppm				
Calibration time/ date: 10/11/18 0740				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	0840	311 ppb	303 ppb					
VPC Midpoint								
VPC Outlet	0845	0 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 _____ Printed Name _____ Signature _____ Date

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

Inspection Date: 10/19/18 Date of last inspection: 10/11/18

Periodic systems check:
1) Check flowrate, vacuum, pressure, moisture separator, water storage drums
2) Check each SVE well, VPC inlet, and VPC outlet with PID.

Operational Parameters - Monitoring interval is variable.

Inspection Time: 0755 Motor Hours: 54869

Blower	Current Value	Other Notes
Vacuum gauge	31 "H20	Background PID = 340 ppb
Pressure gauge	14 "H20	
System flow rate	985 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: PPBRAE 3000 Details: 0 ppb / 9996 ppb

Calibration time/ date: 10/19/18 0745 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	0755	422 ppb						
VPC Midpoint								
VPC Outlet	0757	0 ppb						

1. Flow rate calculated from the equation $Flow\ Rate\ (cfm) = 12.24 \times \sqrt{differential\ pressure}$.

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Signature

Justin Neste
Printed Name

Signature

10/19/18
Date

Sampling Point	Time	PID Reading (1)	PID Reading (2)	Vacuum	Flow Rate (gauge)	Differential Pressure	Flow Rate Calculated[1]	Well Off
VPC Inlet	1437	795 ppb	797 ppb					
VPC Midpoint								
VPC Outlet	1439	0 ppb	0					

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

9/17/18
Date

Attachment B: Laboratory Data Package

eurofins | Air Toxics

9/17/2018

Mr. Justin Neste
CALIBRE, Environmental Technology Solutions
20926 Pugh Rd NE

Poulsbo WA 98370

Project Name:
Project #:
Workorder #: 1809012

Dear Mr. Justin Neste

The following report includes the data for the above referenced project for sample(s) received on 9/4/2018 at Air Toxics Ltd.

The data and associated QC analyzed by TO-15 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Eurofins Air Toxics Inc. for your air analysis needs. Eurofins Air Toxics Inc. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Kelly Buettner at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Kelly Buettner

Project Manager

eurofins | Air Toxics

WORK ORDER #: 1809012

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 #**	
DATE RECEIVED:	09/04/2018	**CONTACT:**	Kelly Buettner
DATE COMPLETED:	09/17/2018		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	5-09-SVE-IN-083018	TO-15	3.5 "Hg	15 psi
02A	5-09-SVE-2-083018	TO-15	6.0 "Hg	15 psi
03A	Lab Blank	TO-15	NA	NA
04A	CCV	TO-15	NA	NA
05A	LCS	TO-15	NA	NA
05AA	LCSD	TO-15	NA	NA

CERTIFIED BY: Heidi Hayes DATE: 09/17/18

Technical Director

Certification numbers: AZ Licensure AZ0775, NJ NELAP - CA016, NY NELAP - 11291,
TX NELAP - T104704434-15-9, UT NELAP CA0093332015-6, VA NELAP - 8113, WA NELAP - C935
Name of Accreditation Body: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
Accreditation number: CA300005, Effective date: 10/18/2015, Expiration date: 10/17/2016.
Eurofins Air Toxics Inc.. certifies that the test results contained in this report meet all requirements of the NELAC standards

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630
(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

LABORATORY NARRATIVE
EPA Method TO-15
CALIBRE, Environmental Technology Solutions
Workorder# 1809012

Two 1 Liter Summa Canister samples were received on September 04, 2018. The laboratory performed analysis via EPA Method TO-15 using GC/MS in the full scan mode.

This workorder was independently validated prior to submittal using 'USEPA National Functional Guidelines' as generally applied to the analysis of volatile organic compounds in air. A rules-based, logic driven, independent validation engine was employed to assess completeness, evaluate pass/fail of relevant project quality control requirements and verification of all quantified amounts.

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

There were no analytical discrepancies.

Definition of Data Qualifying Flags

Ten qualifiers may have been used on the data analysis sheets and indicates as follows:

B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).

J - Estimated value.

E - Exceeds instrument calibration range.

S - Saturated peak.

Q - Exceeds quality control limits.

U - Compound analyzed for but not detected above the reporting limit, LOD, or MDL value. See data page for project specific U-flag definition.

UJ- Non-detected compound associated with low bias in the CCV

N - The identification is based on presumptive evidence.

M - Reported value may be biased due to apparent matrix interferences.

CN - See Case Narrative.

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified

b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue

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Summary of Detected Compounds
EPA METHOD TO-15 GC/MS FULL SCAN

Client Sample ID: 5-09-SVE-IN-083018

Lab ID#: 1809012-01A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
cis-1,2-Dichloroethene	1.1	3.7	4.5	15
Trichloroethene	1.1	8.6	6.2	46
Tetrachloroethene	1.1	110	7.8	730

Client Sample ID: 5-09-SVE-2-083018

Lab ID#: 1809012-02A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
cis-1,2-Dichloroethene	1.3	6.1	5.0	24
Trichloroethene	1.3	14	6.8	75
Tetrachloroethene	1.3	180	8.5	1200

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Client Sample ID: 5-09-SVE-IN-083018

Lab ID#: 1809012-01A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**p091220**	**Date of Collection: 8/30/18 12:00:00 PM**	
Dil. Factor:	**2.29**	**Date of Analysis: 9/12/18 10:56 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Chloromethane	11	Not Detected	24	Not Detected
Vinyl Chloride	1.1	Not Detected	2.9	Not Detected
1,1-Dichloroethene	1.1	Not Detected	4.5	Not Detected
Methylene Chloride	11	Not Detected	40	Not Detected
cis-1,2-Dichloroethene	1.1	3.7	4.5	15
Benzene	1.1	Not Detected	3.6	Not Detected
Trichloroethene	1.1	8.6	6.2	46
Tetrachloroethene	1.1	110	7.8	730

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	99	70-130
1,2-Dichloroethane-d4	90	70-130
4-Bromofluorobenzene	103	70-130

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Client Sample ID: 5-09-SVE-2-083018

Lab ID#: 1809012-02A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**p091221**	**Date of Collection: 8/30/18 12:05:00 PM**	
Dil. Factor:	**2.52**	**Date of Analysis: 9/12/18 11:22 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Chloromethane	13	Not Detected	26	Not Detected
Vinyl Chloride	1.3	Not Detected	3.2	Not Detected
1,1-Dichloroethene	1.3	Not Detected	5.0	Not Detected
Methylene Chloride	13	Not Detected	44	Not Detected
cis-1,2-Dichloroethene	1.3	6.1	5.0	24
Benzene	1.3	Not Detected	4.0	Not Detected
Trichloroethene	1.3	14	6.8	75
Tetrachloroethene	1.3	180	8.5	1200

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	99	70-130
1,2-Dichloroethane-d4	87	70-130
4-Bromofluorobenzene	105	70-130

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Client Sample ID: Lab Blank

Lab ID#: 1809012-03A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**p091211**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 9/12/18 04:31 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
1,1-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Methylene Chloride	5.0	Not Detected	17	Not Detected
cis-1,2-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Benzene	0.50	Not Detected	1.6	Not Detected
Trichloroethene	0.50	Not Detected	2.7	Not Detected
Tetrachloroethene	0.50	Not Detected	3.4	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	98	70-130
1,2-Dichloroethane-d4	87	70-130
4-Bromofluorobenzene	102	70-130

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Client Sample ID: CCV

Lab ID#: 1809012-04A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**p091208**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 9/12/18 02:38 PM**	

Compound	%Recovery
Chloromethane	82
Vinyl Chloride	89
1,1-Dichloroethene	79
Methylene Chloride	81
cis-1,2-Dichloroethene	88
Benzene	88
Trichloroethene	97
Tetrachloroethene	108

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	100	70-130
1,2-Dichloroethane-d4	90	70-130
4-Bromofluorobenzene	107	70-130

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Client Sample ID: LCS

Lab ID#: 1809012-05A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**p091209**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 9/12/18 03:03 PM**	

Compound	%Recovery	Method Limits
Chloromethane	83	70-130
Vinyl Chloride	88	70-130
1,1-Dichloroethene	79	70-130
Methylene Chloride	81	70-130
cis-1,2-Dichloroethene	80	70-130
Benzene	90	70-130
Trichloroethene	102	70-130
Tetrachloroethene	108	70-130

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	101	70-130
1,2-Dichloroethane-d4	88	70-130
4-Bromofluorobenzene	108	70-130

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Client Sample ID: LCSD

Lab ID#: 1809012-05AA

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**p091210**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 9/12/18 03:28 PM**	

Compound	%Recovery	Method Limits
Chloromethane	87	70-130
Vinyl Chloride	85	70-130
1,1-Dichloroethene	79	70-130
Methylene Chloride	82	70-130
cis-1,2-Dichloroethene	80	70-130
Benzene	89	70-130
Trichloroethene	100	70-130
Tetrachloroethene	108	70-130

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	101	70-130
1,2-Dichloroethane-d4	90	70-130
4-Bromofluorobenzene	107	70-130