Quarterly report, third quarter 2019

RCRA Corrective Action Program
Boeing Renton Facility
Project # 0088880100.2019 The Boeing Company

Prepared for:

The Boeing Company
Seattle, Washington

November 15, 2019

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Prepared by:

Wood Environment & Infrastructure Solutions, Inc.
600 University Street, Suite 600
Seattle, Washington 98101
USA
T: 206-342-1760

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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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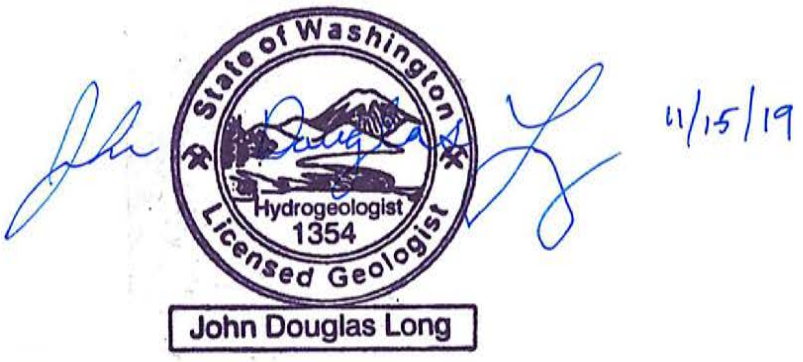

John Long, L.G., L. Hg.
Licensed Geologist/Hydrogeologist #1354
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Table of contents

List of figures

List of tables

List of appendices

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 2019. This work is required under the Resource Conservation and Recovery Act (RCRA) Corrective Action Program being performed at the 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Plan (Wood, 2019) which contains changes to the revised Compliance Monitoring Plan (Amec Foster Wheeler, 2016a) that superseded the original plan presented in Appendix D of the EDR (AMEC, 2014).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-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 and reported in the Apron A Investigation Results report (Amec Foster Wheeler, 2016b).

The goals for cleanup of groundwater at the Facility, as described in the CAP, include protection of groundwater for drinking water beneficial use at all areas of the site, and demonstration of protection of surface water beneficial uses at the conditional points of compliance (CPOCs) for each SWMU and AOC. Cleanup goals are discussed for each SWMU and AOC below. Discussions include comparisons to

protection of groundwater for drinking water beneficial uses by comparing concentrations to the Model Toxics Control Act (MTCA) or United States Environmental Protection Agency maximum contaminant level (MCL), as well as to site-specific cleanup levels (CULs) which are based on protection of surface water beneficial uses.

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 CULs at the CPOCs.

This report presents this information for the third quarter of 2019—the period from July through September 2019.

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 2019

The following work was completed during the third quarter of 2019, the period from July through September 2019:

- On behalf of Boeing, Wood Environment & Infrastructure Solutions, Inc. (Wood) submitted the second quarter 2018 report to Ecology on August 15, 2019.
- Groundwater monitoring for the third quarter of 2019 was completed during August 2019.
- On July 31, 2019, Boeing notified Ecology that a contractor working for King County on a sewer line project spilled fuel into an open excavation on Boeing property near the north guard gate, which is near the entrance to the site. Affected soil was removed from the excavation area. Total petroleum hydrocarbon (TPH) concentrations in soil samples collected from the site were below MTCA Method A Cleanup Levels. The soil confirmation soil data are included on the data CD.

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 2019:

- Reporting will be completed in accordance with the Order, CAP, EDR, Addendum to the Compliance Monitoring Plan (Wood, 2019), and any changes approved by Ecology.
- Groundwater sampling and analysis for the fourth quarter of 2019 will be completed.
- Monitoring wells will be decommissioned as construction on Apron R begins, per the Technical Memorandum from Wood that was submitted in December 2017 (Amec Foster Wheeler, 2017).

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 revised Compliance Monitoring Plan (Wood, 2019). 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 (Wood, 2019) for all Facility corrective action areas. 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. Tables A-1 and A-2 also include Building 4-70, Lot 20/Former Building 10-71, and Apron A, which were not included 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 2019. Operation of the SVE system at SWMU-172/174 continued during the third quarter, as discussed in Sections 3.2.1.2 and 3.3.1.2. Quarterly compliance monitoring was conducted in accordance with the Addendum to the Compliance Monitoring Plan (Wood, 2019).

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 2019 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 area 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 below the CUL in the groundwater collected from all CPOC area wells GW229S and GW231S. The VC concentration in CPOC area well GW230I exceeded the CUL. VC concentrations are below the applicable MCLs/MTCA criteria for potable water supply, except for GW230I.

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.

3.2.1.2 Soil vapor extraction and bioremediation operations

The SVE system at SWMU-172 and SWMU-174 operated normally during the third quarter. 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 2019 are summarized in Table 4 and shown on Figure 2. The contoured data for August 2019 show that groundwater is generally flowing east from SWMU-172 and SWMU-174, toward the Cedar River Waterway, with an approximate horizontal gradient of 0.009.

3.2.4 Groundwater monitoring results

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

3.2.4.1 Monitored attenuation/geochemical indicators

The geochemical indicator results are presented in Table 5. Total organic carbon (TOC) concentrations ranged from 1.23 milligrams per liter (mg/L) to 10.96 mg/L for all SWMU-172 and SWMU-174 monitoring wells. The other natural attenuation parameter results indicate that geochemical conditions were generally uniform and appropriate for reductive dechlorination of chlorinated volatile organic compounds (VOCs); the DO and ORP levels indicate that reducing conditions were present.

3.2.4.2 COC results for source and downgradient plume areas

Table 6 lists third quarter 2019 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 were stable during the third quarter of 2019, within the range of concentrations observed during 2019 monitoring events. As shown in Figure 4, COC concentrations also were generally stable in the groundwater from downgradient plume area wells GW172S and GW173S during the third quarter.

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 slightly during the third quarter sampling event, except for in source area well GW153S, which remained stable. Copper and lead were detected above the CUL in the groundwater from source area well GW152S and downgradient plume area well GW172S. Concentrations of both copper and lead were below the CUL in the groundwater from all other source area and downgradient plume area wells. The concentrations of arsenic and copper peaked during the third quarter sampling events conducted in August, indicating seasonal effects on the metal concentrations in groundwater.

While concentrations of select COCs in groundwater from source area and downgradient plume area wells exceed the CULs, COC concentrations are below the applicable MCLs/MTCA criteria for potable water supply.

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 0.0468 to 0.378 micrograms per liter (µg/L), in the groundwater collected from all CPOC area wells. The only other COC detected at a concentration above the CUL was VC in the groundwater from CPOC area well GW232S. TCE and PCE concentrations were below detection in all CPOC area wells. As shown on Figure 6, concentrations of *cis*-1,2-DCE have exceeded the CUL in the CPOC area 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 area 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. Lead was detected above the CUL in the groundwater sample from CPOC area well GW236S; copper was not detected above the CUL in the groundwater from the CPOC area wells (Table 6). Figure 7 shows arsenic, copper, and lead trends since the beginning of compliance monitoring in groundwater samples from the CPOC area 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 area wells.

While select COC concentrations exceed the CUL in the groundwater from select CPOC area wells, as detailed above, COC concentrations are below the applicable MCLs/MTCA criteria for potable water supply in all CPOC area wells, except for GW232S.

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 2019. 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.

3.3.1.2 Soil vapor extraction and bioremediation operations

As previously reported during 2018 monitoring events, the SVE system at Building 4-78/79 SWMU/AOC Group was shut down during the first quarter of 2018, during which rebound testing was implemented. Soil samples were collected during the second quarter 2018 to assess the attainment of soil CULs, and results were reported in the second quarter monitoring report (Wood, 2018). The CULs were attained with one exception: the sample from 4.5 feet below ground surface at well PP13 had a concentration of total petroleum hydrocarbons as gasoline (TPH-G) of 147 milligrams per kilogram (mg/kg), and the field duplicate was 131 mg/kg, above the CUL of 30 mg/kg. A revised work plan (CALIBRE, 2019) for excavating the soils near PP13 and GW013S was submitted to Ecology on May 8, 2019, in response to a request from Ecology. The investigation described in the work plan was conducted on June 13 and 14, 2019, and the results will be presented to Ecology in a separate report. Groundwater elevations were being monitored during the third quarter to determine the best time for soil removal activities. As of the end of the third quarter, the soil excavation work had not been completed because groundwater levels were not low enough before the start of the rainy season to schedule the work. TPH-G concentrations in groundwater continue to be closely monitored.

No new nitrate/sulfate injections have been completed since March 2019. Trend charts for *cis*-1,2-DCE and benzene in the injection wells are presented in Figure 9, and charts for TCE and VC in the injection wells are presented in Figure 10.

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 2019 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, but the gradient is too flat to include accurate groundwater elevation contours.

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 2019 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 area 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 was detected in groundwater samples from three source area wells at concentrations above the CUL. Benzene was below detection in the remaining source area wells. *Cis*-1,2-DCE was detected at a concentration above the CUL in the groundwater from source area well GW033S and VC was detected at concentrations above the CUL in the groundwater from four source area wells. TCE was below detection in the groundwater from all source area wells. TPH-G was detected in the groundwater from source area well GW031S, at a concentration of 1,390 µg/L (the field duplicate concentration was 1,200 µg/L). TPH-G was also detected in the groundwater from source area well GW033S at a concentration below the CUL. No COCs were detected in the groundwater collected from the downgradient plume area wells.

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, with benzene decreasing in concentration during the third quarter monitoring event, similar to the third quarters in 2017 and 2018. The concentration of benzene in the groundwater collected from source area well GW033S is generally consistent with historical results. The concentrations of *cis*-1,2-DCE and VC in both source area wells shown in Figure 11 have decreased since mid-2018, and TCE has been below detection in the groundwater from the same two source area wells for all 2019 monitoring events. 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 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.

Concentrations of COCs in the groundwater from select source area wells remain above the MCLs/MTCA standard for potable water supply (specifically VC, benzene and TPH-G). Active treatment is ongoing. Concentrations of COCs in downgradient monitoring wells are below the applicable MCLs/MTCA criteria for potable water supply.

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 area wells GW143S, GW237S and GW240D are shown in Figures 13 through 15. Benzene was detected only in the groundwater sample collected from CPOC area well GW237S, at a concentration below the CUL. As shown in Figure 13, benzene has been sporadically detected in the groundwater from CPOC area well GW237S but has not been detected in the groundwater samples from any other CPOC area wells at concentrations above the CUL. VC was detected in the groundwater from CPOC area wells GW237S and GW240D at concentrations above the CUL. As shown in Figure 13, the concentrations of VC in the groundwater from these CPOC area wells is within the range of concentrations detected since monitoring began. *Cis*-1,2-DCE and TCE were detected in the groundwater collected from CPOC area well GW143S at concentrations above their respective CULs, consistent with past monitoring events, as shown

in Figures 13 and 14. The only other COC detected in the groundwater samples from the CPOC area during the third quarter was TPH-G at a concentration of 329 µg/L, below the CUL, in the sample from CPOC area well GW237S. As shown in Figure 15, TPH-G concentrations in the groundwater from CPOC GW237S appear to fluctuate seasonally.

While TCE, *cis*-1,2-DCE, and VC exceed the CUL in the groundwater from select CPOC area wells, as detailed above, the concentrations of TCE, *cis*-1,2-DCE, and VC are below the applicable MCLs/MTCA criteria for potable water supply, except for the VC concentration in GW237S.

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 2019.

3.5 AOC-001 and AOC-002

This section describes corrective action activities conducted at these AOCs during third quarter of 2019. 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 installation/construction activities were conducted for this cleanup action area 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 2019 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 2019 data indicate that groundwater in the vicinity of these AOCs was flowing west, towards Lake Washington; however, it is not possible to determine an accurate hydraulic gradient.

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 area 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 area wells in the third quarter. *Cis*-1,2-DCE and VC were detected at concentrations above the CUL in the groundwater collected from all source area and downgradient plume area wells. TCE was detected at concentrations above the CUL in the groundwater collected from source area well GW193S and downgradient plume area well GW192S. Trend plots for TCE, VC, and *cis*-1,2-DCE in source area well GW193S and for *cis*-1,2-DCE and VC in downgradient plume area well GW190S are shown in Figure 17. Trend plots for *cis*-1,2-DCE and VC in downgradient plume area wells GW192S and GW246S are shown in Figure 18. These figures show that concentrations of the COCs in the groundwater from source area well and the downgradient plume area wells remain stable.

While select COCs exceed the CULs in the groundwater from the source area and downgradient plume area wells, COC concentrations are below the applicable MCLs/MTCA criteria for potable water supply in the groundwater from the source area. VC concentrations in select downgradient plume area wells exceed the applicable MCLs/MTCA criteria for potable water supply.

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 area wells were all either below detection or below the CUL. Concentrations of *cis*-1,2-DCE exceeded the CUL in the groundwater samples from all CPOC area wells except for GW194S. *cis*-1,2-DCE detections ranged from 0.0333 to 0.240 µg/L. VC was detected above the CUL of 0.05 µg/L in groundwater samples from CPOC area wells GW185S and GW195S. As shown in Figure 19, concentrations of *cis*-1,2-DCE and VC in the CPOC area monitoring wells have been generally stable since compliance monitoring began, aside from the increase in concentrations of *cis*-1,2-DCE and VC observed in the groundwater samples collected from GW185S in the second and third quarters of 2016. 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.

COC concentrations in groundwater from all CPOC area wells are below the applicable MCLs/MTCA criteria for potable water supply.

3.6 AOC-003

This section describes corrective action activities conducted at AOC-003 for the third quarter of 2019. 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 2019 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. Historic groundwater levels suggest 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 2019 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 generally have been 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 plume area well, GW188S. Concentrations of all other COCs were below the CUL.

With the exception of VC, COC concentrations in groundwater from all source area and downgradient plume area wells are below the applicable MTCA/MCL criteria for potable water.

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 area wells, as shown in Table 15.

While VC concentrations exceed the CUL in the groundwater from CPOC area wells, as detailed above, COC concentrations are below the applicable MCLs/MTCA criteria for potable water supply in both CPOC area wells, except for VC.

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 installation/construction activities were conducted for this cleanup action area 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 2019 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 2019 analytical results for lead, the sole AOC-004 COC. Lead was detected in the groundwater sample from the source area well at a concentration of 0.000714 mg/L, below the CUL of 0.001 mg/L. 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. The lead concentration is also below the applicable MCLs/MTCA criteria for potable water supply in the source area well.

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 0.000549 mg/L in the groundwater from CPOC area well GW174S. Lead concentrations are also below the applicable MCLs/MTCA criteria for potable water supply.

3.8 AOC-060

This section describes corrective action activities conducted at AOC-060 during the third quarter of 2019. 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.

3.8.1 Cleanup action activities

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

3.8.2 Compliance monitoring plan deviations

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

3.8.3 Water levels

Table 19 presents the groundwater elevations measured during the third quarter 2019 groundwater monitoring event at AOC-060. Figure 22 shows the groundwater elevations measured during this event.

The groundwater flow direction is west toward the Cedar River, and the hydraulic gradient was unable to be accurately determined.

3.8.4 Groundwater monitoring results

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

3.8.4.1 Monitored attenuation/geochemical indicators

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

3.8.4.2 COC results for source and downgradient plume areas

Table 21 presents third quarter 2019 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 cis-1,2-DCE exceeded the CUL in groundwater from the source area and downgradient plume area wells; concentrations of TCE exceeded the CUL in downgradient plume area wells GW012S and GW147S; and concentrations of VC exceeded the CUL in the groundwater from the source area well and all downgradient plume area wells except for GW147S. The concentrations of COCs in the groundwater from source area well GW009S and downgradient plume area wells GW012S and GW014S are generally stable (Figures 23 and 24), while the concentrations of COCs in the groundwater from downgradient plume area well GW147S appear to vary seasonally (Figure 24).

While select COCs exceed the CULs in source area and downgradient plume area wells, as described above, with the exception of VC, concentrations of COCs in the groundwater in the source and downgradient plume areas are below the applicable MCL/MTCA criteria for potable water supply.

3.8.4.3 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 area wells GW150S, GW253I, and GW254S, and at concentrations below the CUL in the groundwater CPOC area wells GW149S and GW252S. TCE was detected in the groundwater from CPOC area well GW150S at a concentration above the CUL; TCE concentrations in the remaining CPOC area wells were below the CUL. VC was detected in the groundwater from all of the CPOC area wells except GW150S and GW252S, but the concentrations were below the CUL. Figures 25 and 26 present trends for the COCs in the CPOC area wells. As shown in Figures 25 and 26, the COC concentrations in the groundwater from the CPOC area 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 area at concentrations above the CUL since February 2016.

While *cis*-1,2-DCE and TCE concentrations exceed the CUL in the groundwater from select CPOC area wells, as detailed above, COC concentrations are below the applicable MCLs/MTCA criteria for potable water supply in all CPOC area wells.

3.9 AOC-090

This section describes corrective action activities conducted at AOC-090 during the third quarter of 2019. 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.

3.9.1 Cleanup action activities

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

3.9.2 Compliance monitoring plan deviations

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

3.9.3 Water levels

Table 22 presents the groundwater elevations measured during the third quarter 2019 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 the water levels is not known.

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 23; results for COCs are presented in Table 24.

3.9.4.1 Monitored attenuation/geochemical indicators

The geochemical indicator results are presented in Table 23. The pH was near neutral in all 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.

3.9.4.2 COC Results for source and downgradient plume areas

Table 24 presents third quarter 2019 analytical results for the AOC-090 groundwater COCs. As shown in Table 24, most COC exceedances occur in the source area with cis-1,2-DCE, TCE, VC, TPH-G, and heavy oil range TPH being detected at concentrations above their respective CULs in the groundwater sample collected from GW189S. VC was also detected in the groundwater collected from downgradient plume area well GW176S at a concentration of 0.301 µg/L, above the CUL. No other COCs were 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 slightly during the third quarter sampling event. 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.

While select COCs exceed the CULs in groundwater from source area and downgradient area wells, concentrations of COCs are below the applicable MCLs/MTCA criteria for potable water supply, with the exception of VC.

3.9.4.3 COC Results for conditional point of compliance area

VC was detected at concentrations above the CUL in the shallow zone CPOC area wells GW178S and GW208S. No other COCs in were detected above the CULs in groundwater from either the shallow or intermediate zone CPOC area wells. This is the twelfth 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.

As described above, VC concentrations exceed the CUL in the groundwater from two CPOC area wells. The VC concentration in one of these wells (GW178S) also exceeds the applicable MTCA criteria for potable water supply. The concentrations of remaining COCs in the groundwater from CPOC area wells are below applicable MCLs/MTCA criteria for potable water supply.

3.10 Building 4-70 area

This section describes corrective action activities conducted at this area during third quarter 2019. 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.

3.10.1 Cleanup action activities

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

3.10.2 Compliance monitoring plan deviations

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

3.10.3 Water levels

Table 25 presents the groundwater elevations measured during the third quarter 2019 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: generally to the west, toward the Cedar River Waterway.

3.10.4 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.

3.10.4.1 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.

3.10.4.2 COC Results for conditional point of compliance area

Both 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 0.71 µg/L, above the CUL of 0.54 µg/L. No other COCs were detected in the groundwater at concentrations above the CUL. Concentrations of all COCs were also below the applicable MCLs/MTCA criteria for potable water supply in all wells.

3.11 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 2019.

3.12 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 2019.

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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CALIBRE, 2019, Plan for Evaluation of Soils around Probe PP13 at Building 4-78/79 SWMU/AOC Group; Boeing Renton Site. April 29.

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

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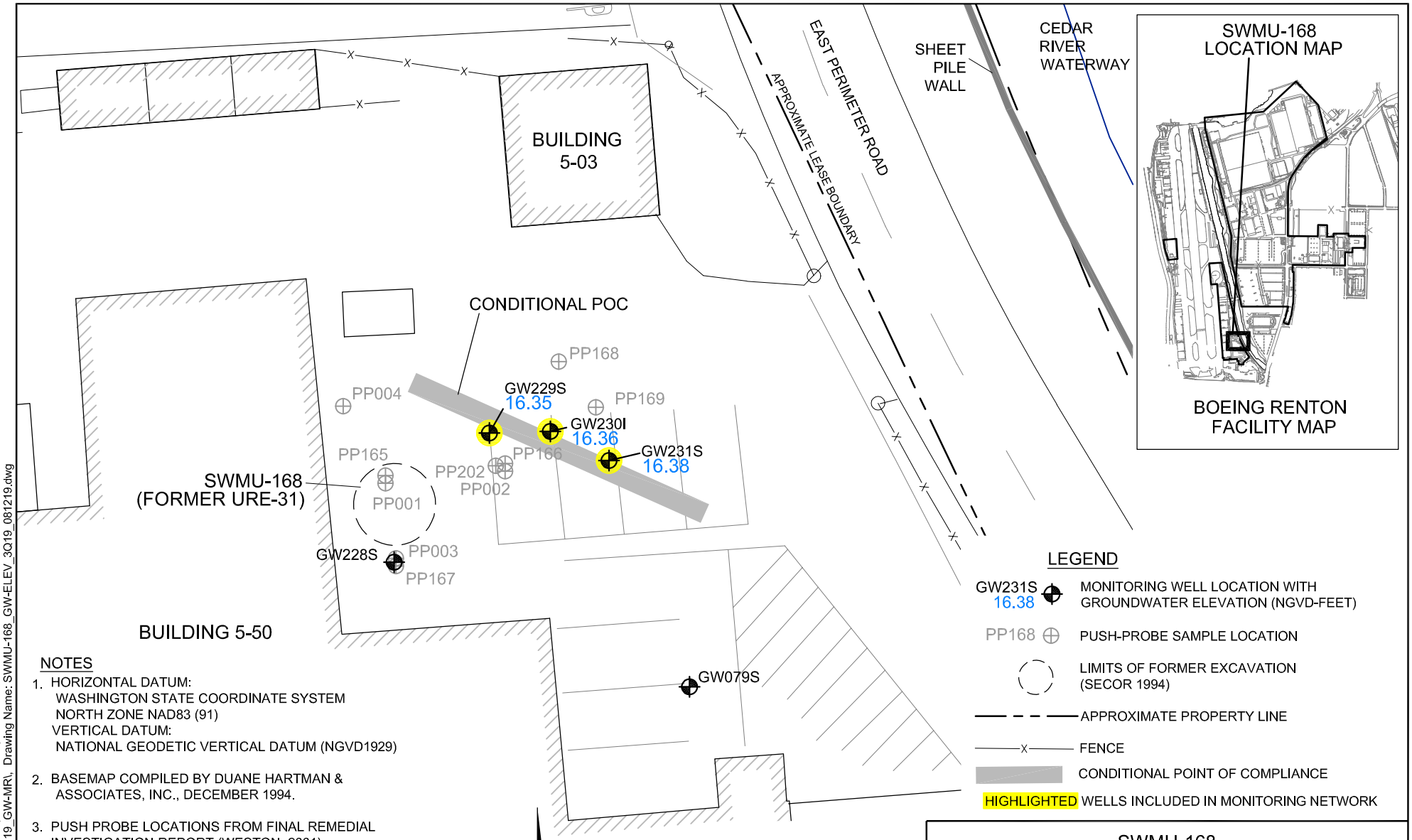
Figures



NOTES

1. HORIZONTAL DATUM:
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   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 12, 2019
Boeing Renton Facility
Renton, Washington

By: MDS	Date: 10/21/19	Project No. 8888
Wood Environment & Infrastructure Solutions, Inc.	Figure	1

Plot Date: 10/21/19 - 9:38am, Plotted by: mike.stenberg
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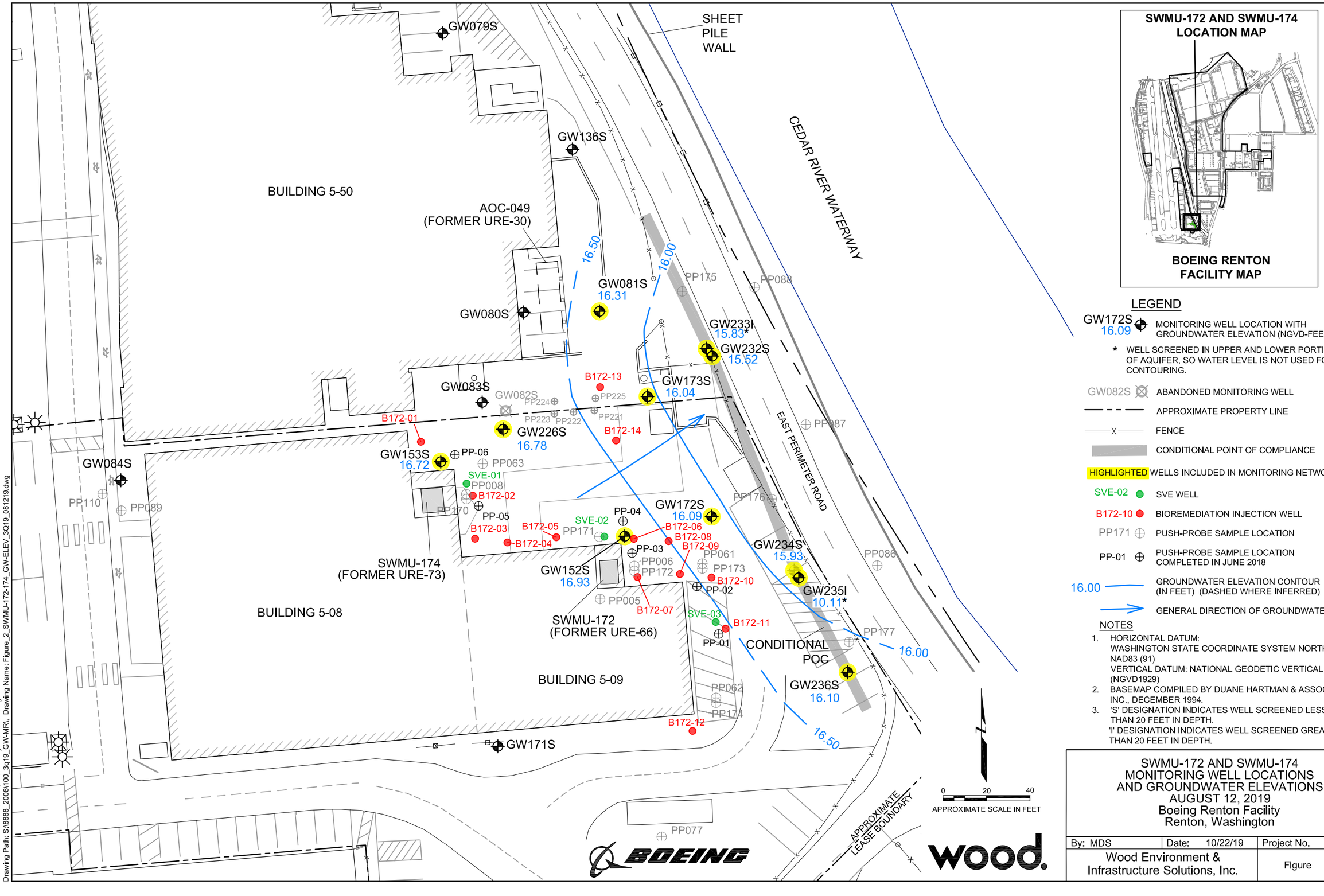

SWMU-172 AND SWMU-174
LOCATION MAP

BOEING RENTON
FACILITY MAP

LEGEND

GW172S 16.09 — 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

16.00 — 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 12, 2019 Boeing Renton Facility Renton, Washington

By: MDS	Date: 10/22/19	Project No. 8888
Wood Environment & Infrastructure Solutions, Inc.	Figure	2

Plot Date: 10/22/19 - 7:39am, Plotted by: mike.stenberg
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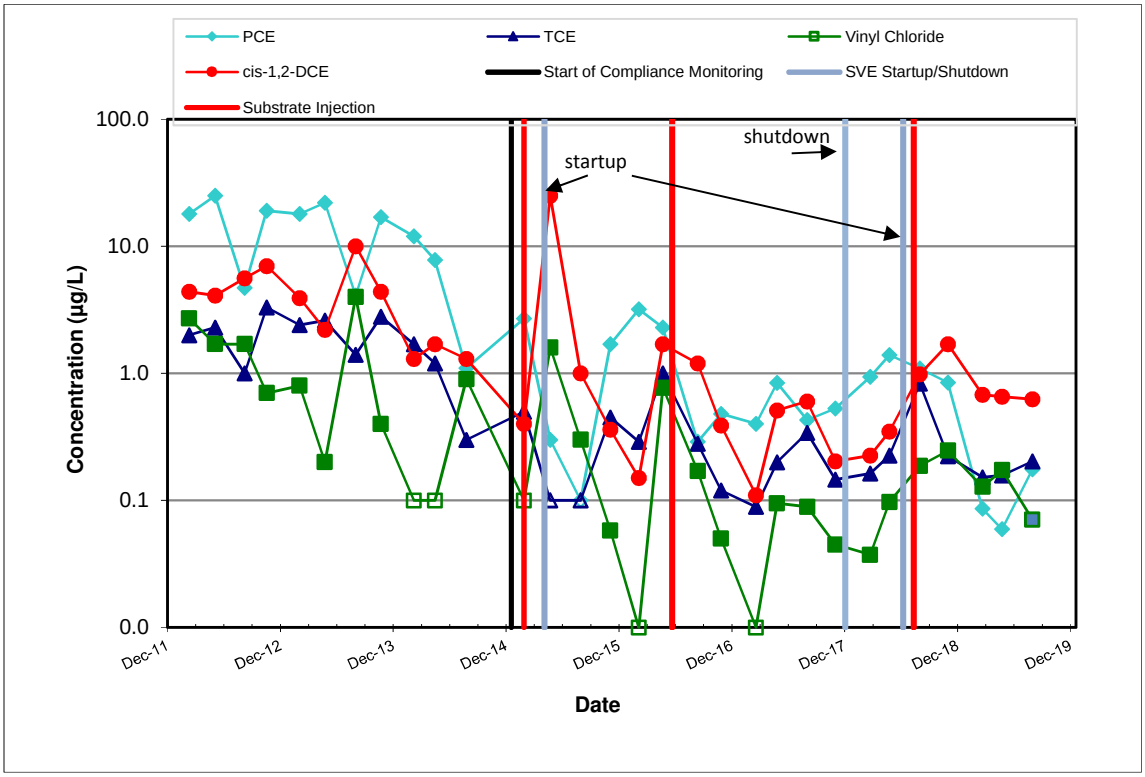
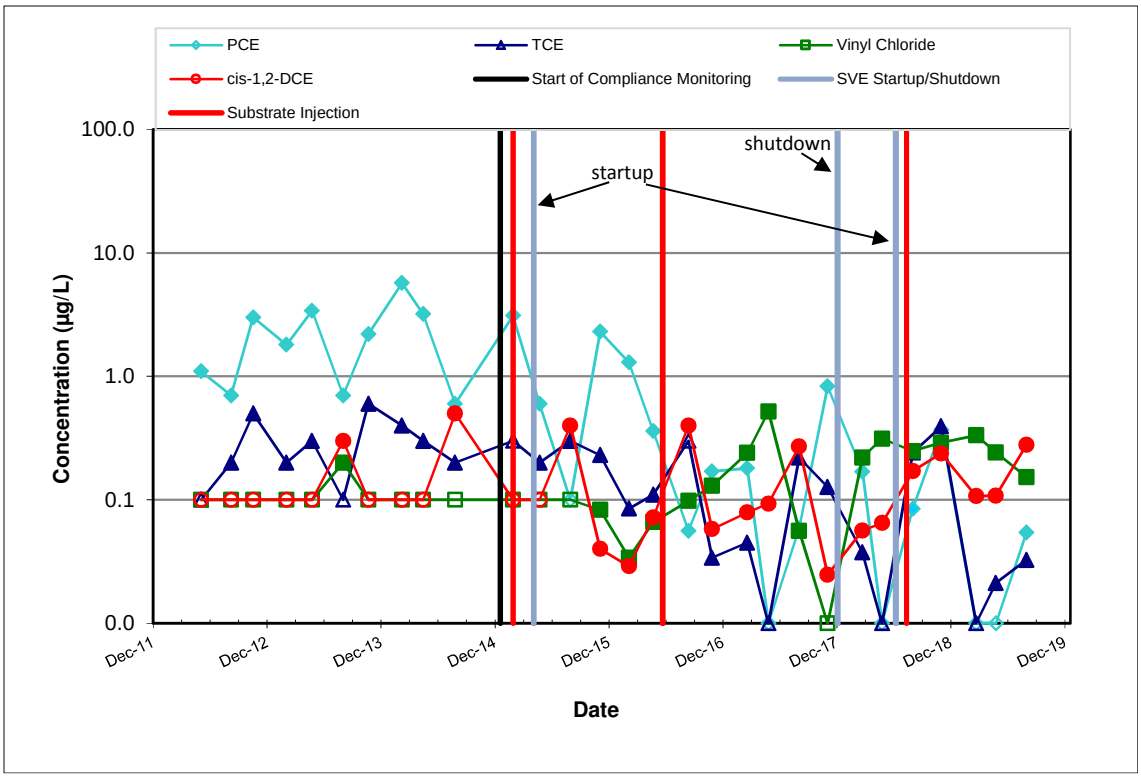


SOURCE AREA WELL GW152S

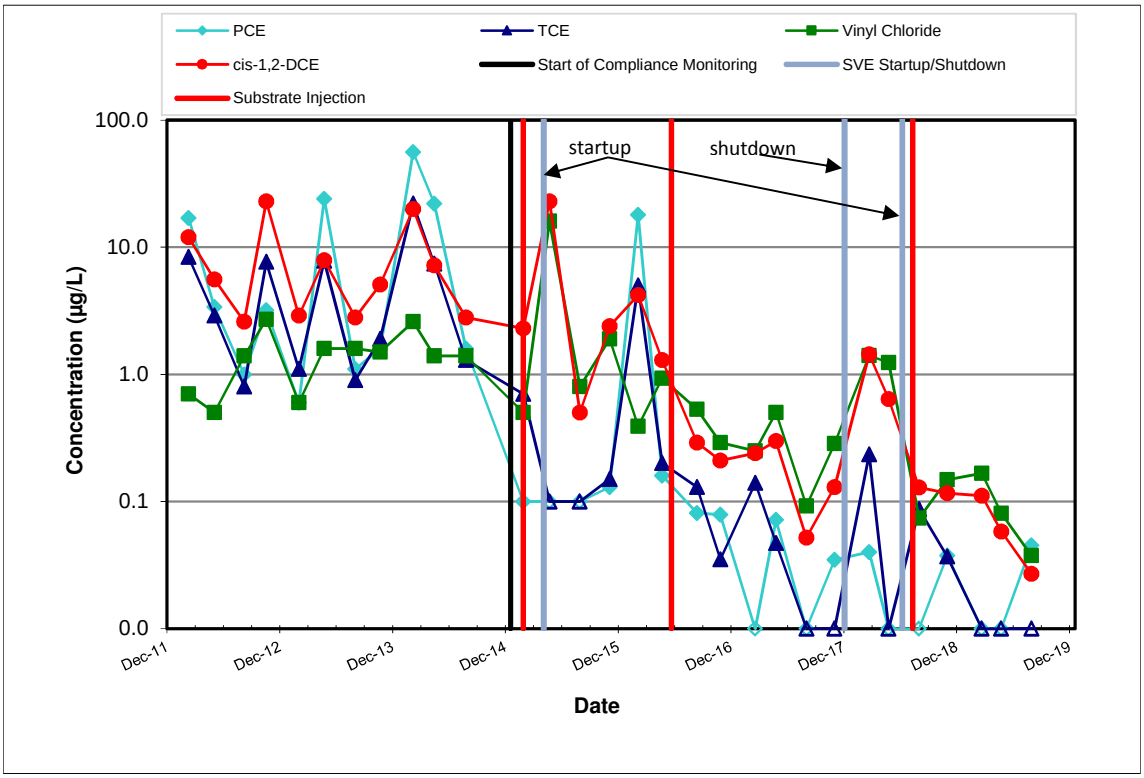


SOURCE AREA WELL GW153S

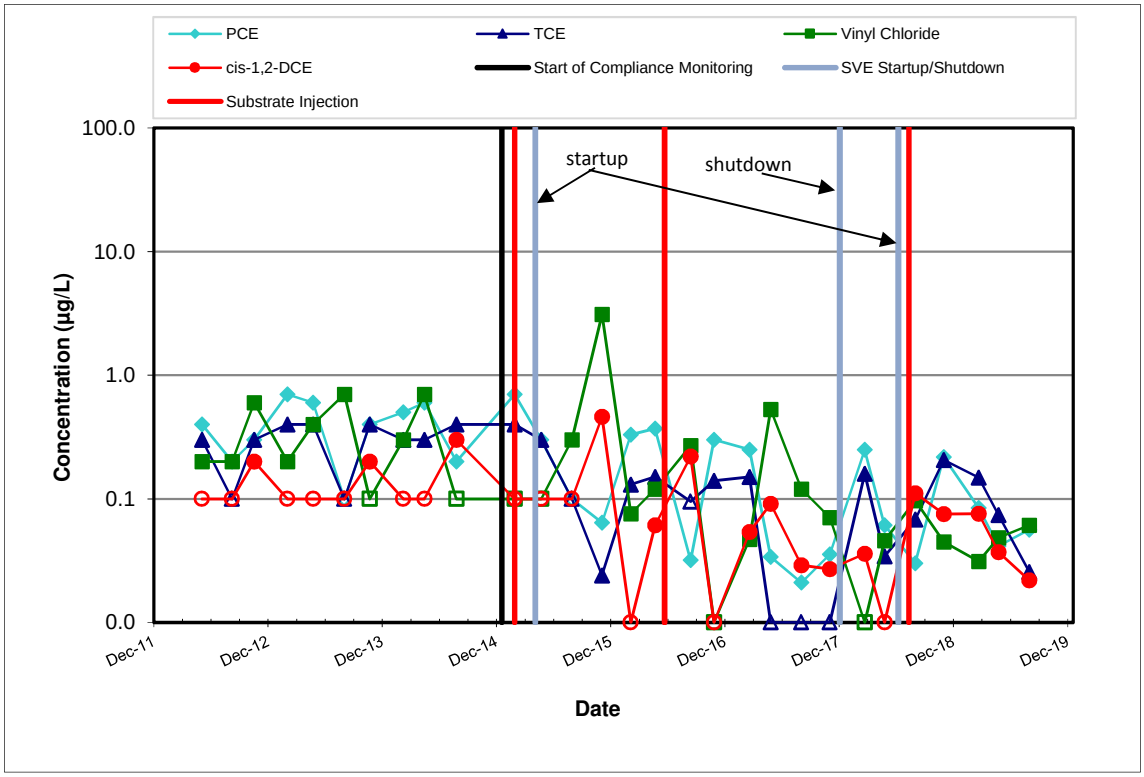
Note: non-detected values shown at one-half the reporting limit and graphed with an open symbol.

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

P:\8888 - Boeing Renton\02 Data Management\Grapher and Excel Figure Files\excel\Figures 3 to 7_ SWMU_172-174 Trend Plots.xlsx



DOWNGRADIENT PLUME AREA WELL GW172S

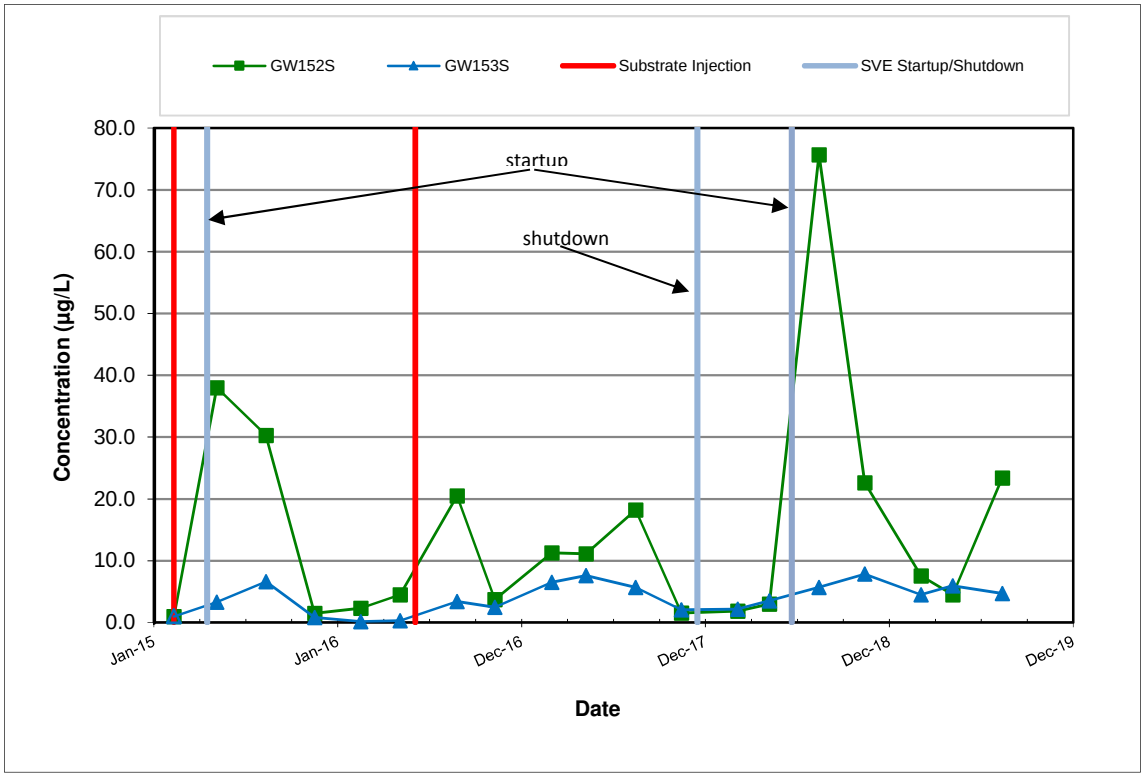


DOWNGRADIENT PLUME AREA WELL GW173S

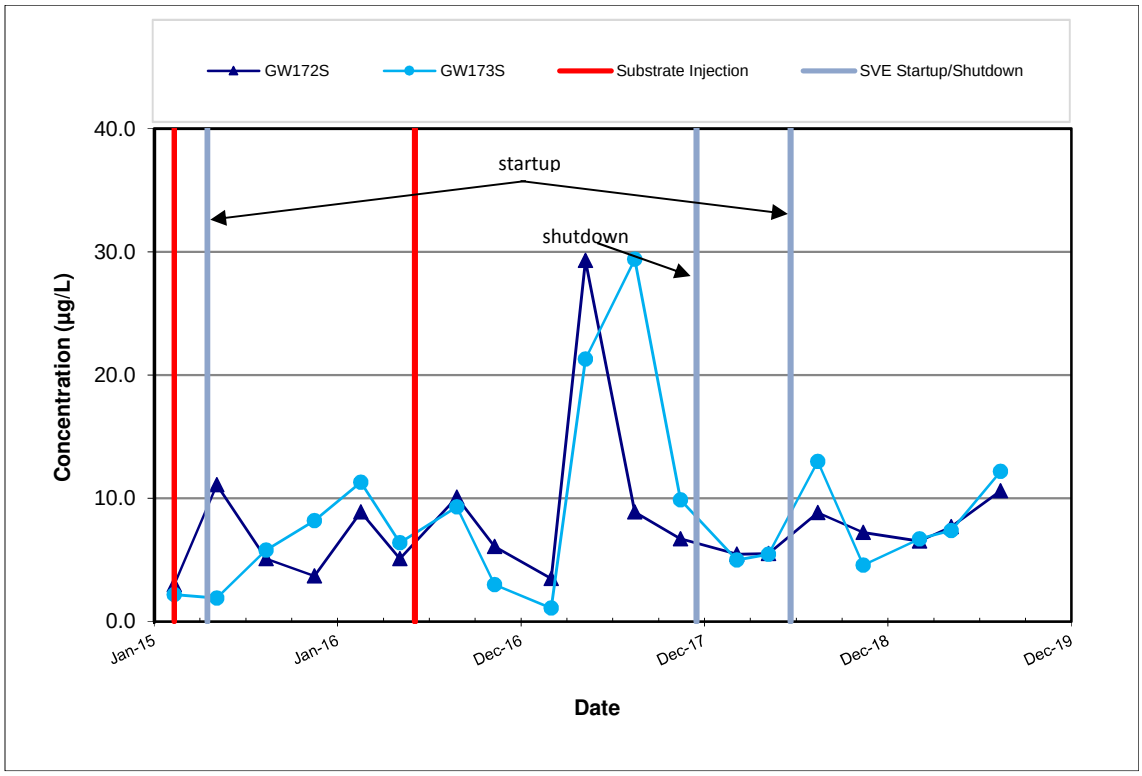
Note: non-detected values shown at one-half the reporting limit and graphed with an open symbol.

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

P:\8888 - Boeing Renton\02 Data Management\Grapher and Excel Figure Files\excel\Figures 3 to 7_ SWMU_172-174 Trend Plots.xlsx



TOTAL ARSENIC IN SOURCE AREA WELLS

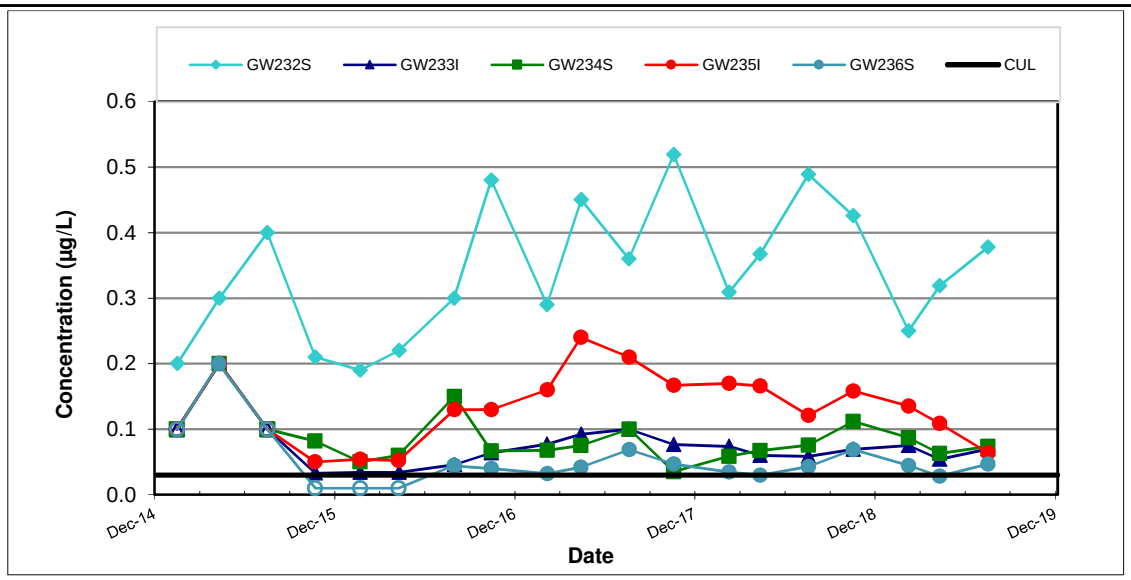


TOTAL ARSENIC IN DOWNGRADIENT PLUME AREA WELLS

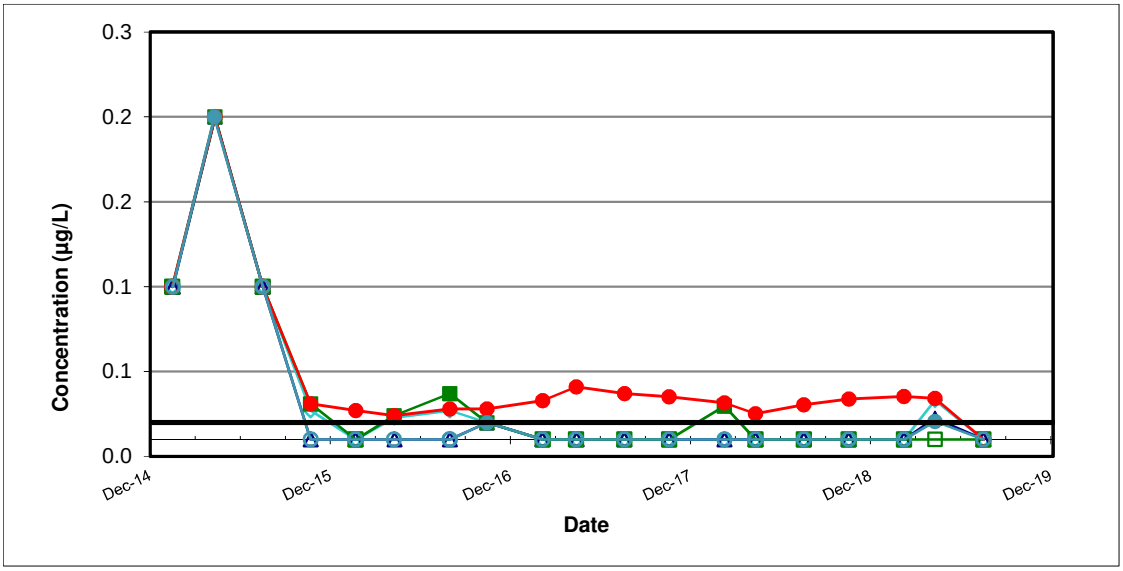
Note: non-detected values shown at one-half the reporting limit and graphed with an open symbol.

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

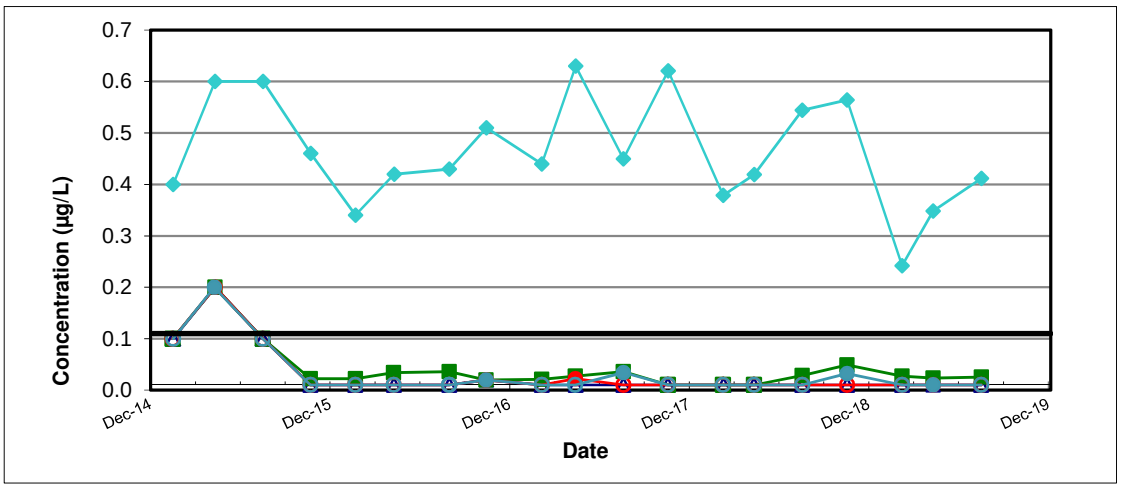
P:\8888 - Boeing Renton\02 Data Management\Grapher and Excel Figure Files\excel\Figures 3 to 7_ SWMU_172-174 Trend Plots.xlsx



cis-1,2-Dichloroethene



Trichloroethene

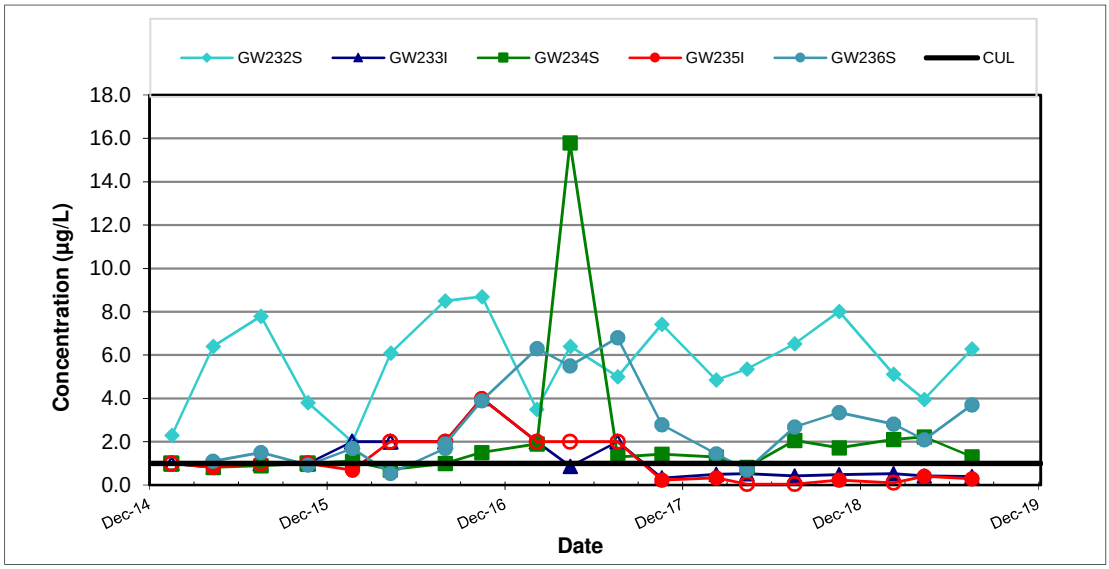


Vinyl Chloride

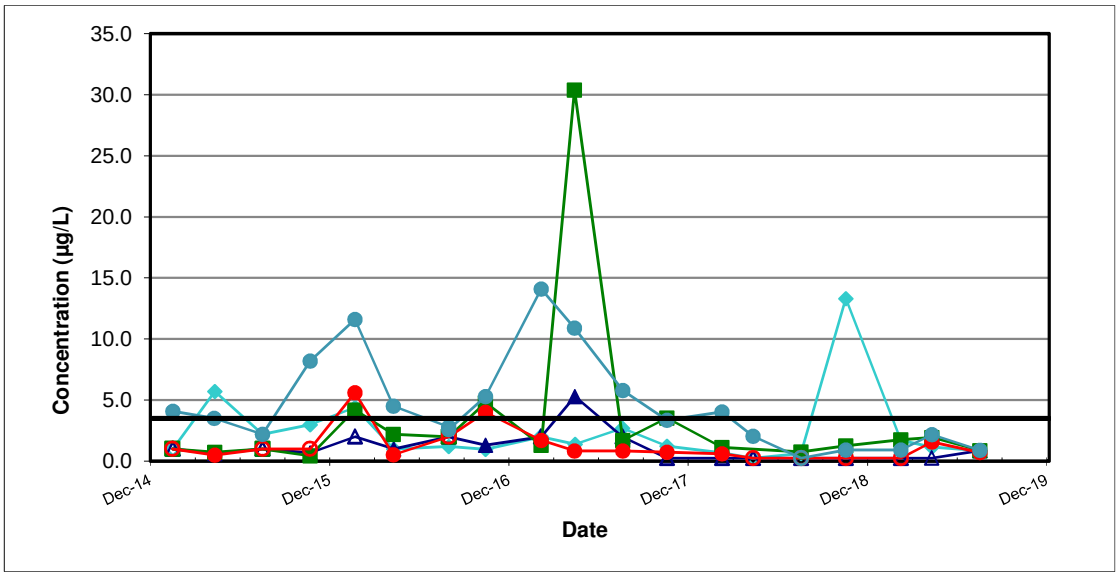
Note: non-detected values shown at one-half the reporting limit and graphed with an open symbol.

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

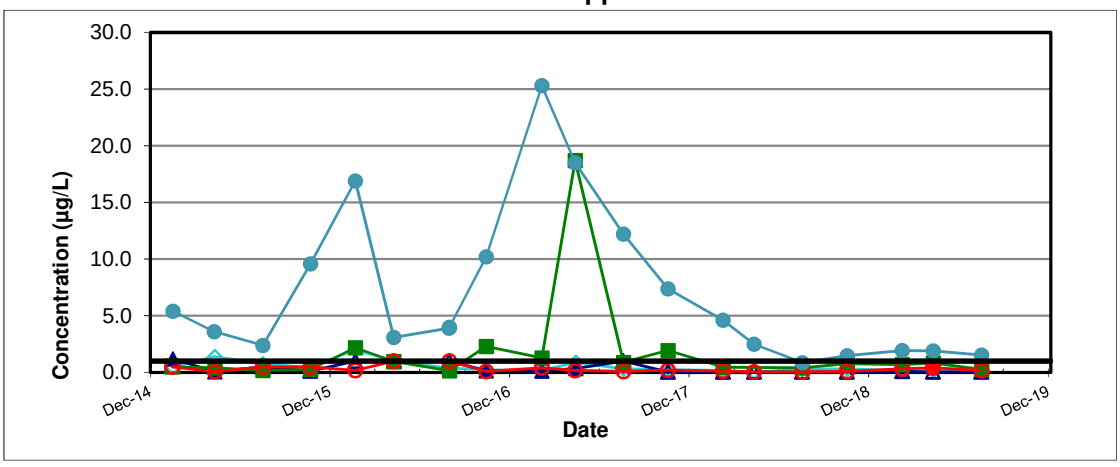
P:\8888 - Boeing Renton\02 Data Management\Grapher and Excel Figure Files\excel\Figures 3 to 7_ SWMU_172-174 Trend Plots.xlsx



Arsenic



Copper



Lead

Note: non-detected values shown at one-half the reporting limit and graphed with an open symbol.

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

P:\8888 - Boeing Renton\02 Data Management\Grapher and Excel Figure Files\excel\Figures 3 to 7_ SWMU_172-174 Trend Plots.xlsx

CEDAR RIVER TRAIL PARK

NISHIWAKI LANE

APPROXIMATE PROPERTY LINE

CONDITIONAL POC

CEDAR RIVER WATERWAY

BUILDING 4-45

BUILDING 4-79

BUILDING 4-78

BUILDING 4-77

SWMU-181

DISPENSER ISLAND (REMOVED)

GW132S

GW133S

GW237S 14.29

GW238I 14.34

GW209S 14.35

GW210S 14.44

GW022S

GW023S

GW024D

GW026I

GW027D

GW031S 14.43

GW042D

GW041S

GW243I 14.40

GW239I 14.35

GW240D 13.89*

GW143S 14.36

GW039S 14.30

GW040S

GW244S 14.41

GW151D

GW033S 14.39

GW030S

GW034S 14.42

GW038S 14.30

GW037S

GW035S

GW036S

GW242I 14.33

GW241S 14.31

AOC-013 (URE-17)

AOC-026 (URE-54)

AOC-015 (URE-24)

AOC-037 (URE-25)

AOC-054 (URE-23)

AOC-014 (URE-18)

B78-01 B78-02 B78-03 B78-04 B78-05 B78-06 B78-07 B78-08 B78-09 B78-10 B78-11 B78-12 B78-13 B78-14 B78-15 B78-16 B78-17 B78-18 B78-19 B78-20 B78-21

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

PP083 PP084 PP178 PP179 PP180 PP181 PP182 PP183 PP185 PP186 PP187 PP188 PP189 PP201

NOTES

1. HORIZONTAL DATUM:
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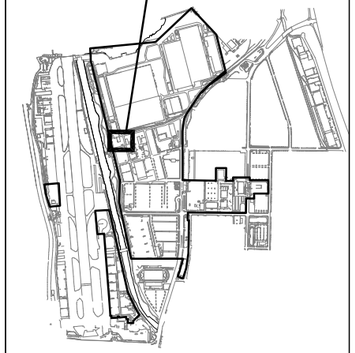
   NORTH ZONE NAD83 (91)
   VERTICAL DATUM:
   NATIONAL GEODETIC VERTICAL DATUM (NGVD1929)
2. BASEMAP COMPILED BY DUANE HARTMAN & ASSOCIATES, INC., DECEMBER 1994.
3. UST LOCATIONS AND PRODUCT PIPING LOCATIONS FROM FINAL REMEDIAL INVESTIGATION (WESTON, 2001).
4. 'S' DESIGNATION INDICATES WELL SCREENED LESS 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.

0 25 50

APPROXIMATE SCALE IN FEET

4-78/79 SWMU/AOC GROUP LOCATION MAP



BOEING RENTON FACILITY MAP

LEGEND

- GW031S 14.43 — MONITORING WELL LOCATION WITH GROUNDWATER ELEVATION (NGVD-FEET)
- * WELL SCREENED IN LOWER PORTION OF AQUIFER, SO WATER LEVEL IS NOT USED FOR CONTOURING.
- 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

BUILDING 4-78/79 SWMU/AOC GROUP MONITORING WELL LOCATIONS AND GROUNDWATER ELEVATIONS AUGUST 13, 2019 Boeing Renton Facility Renton, Washington

By: MDS	Date: 10/22/19	Project No. 8888
Wood Environment & Infrastructure Solutions, Inc.		Figure 8

BOEING

wood.

Plot Date: 10/22/19 - 7:55am, Plotted by: mike.stenberg
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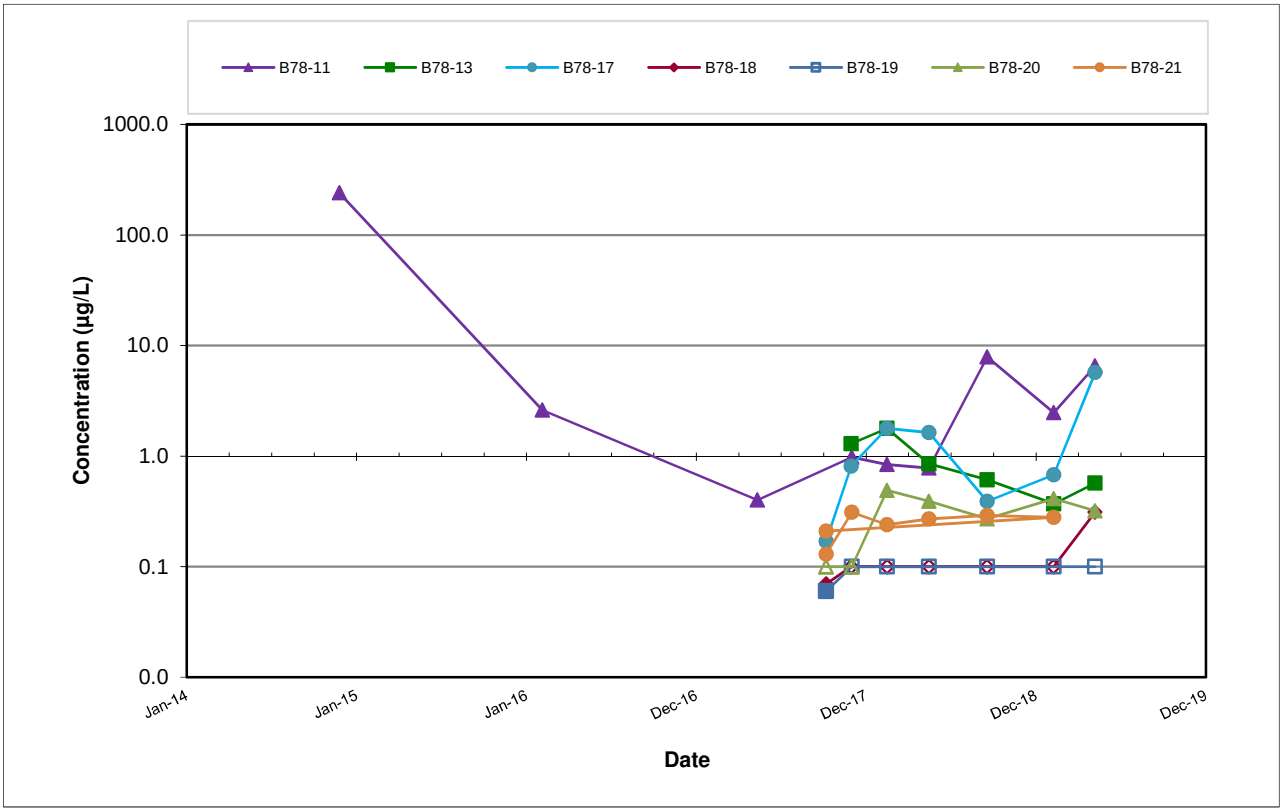
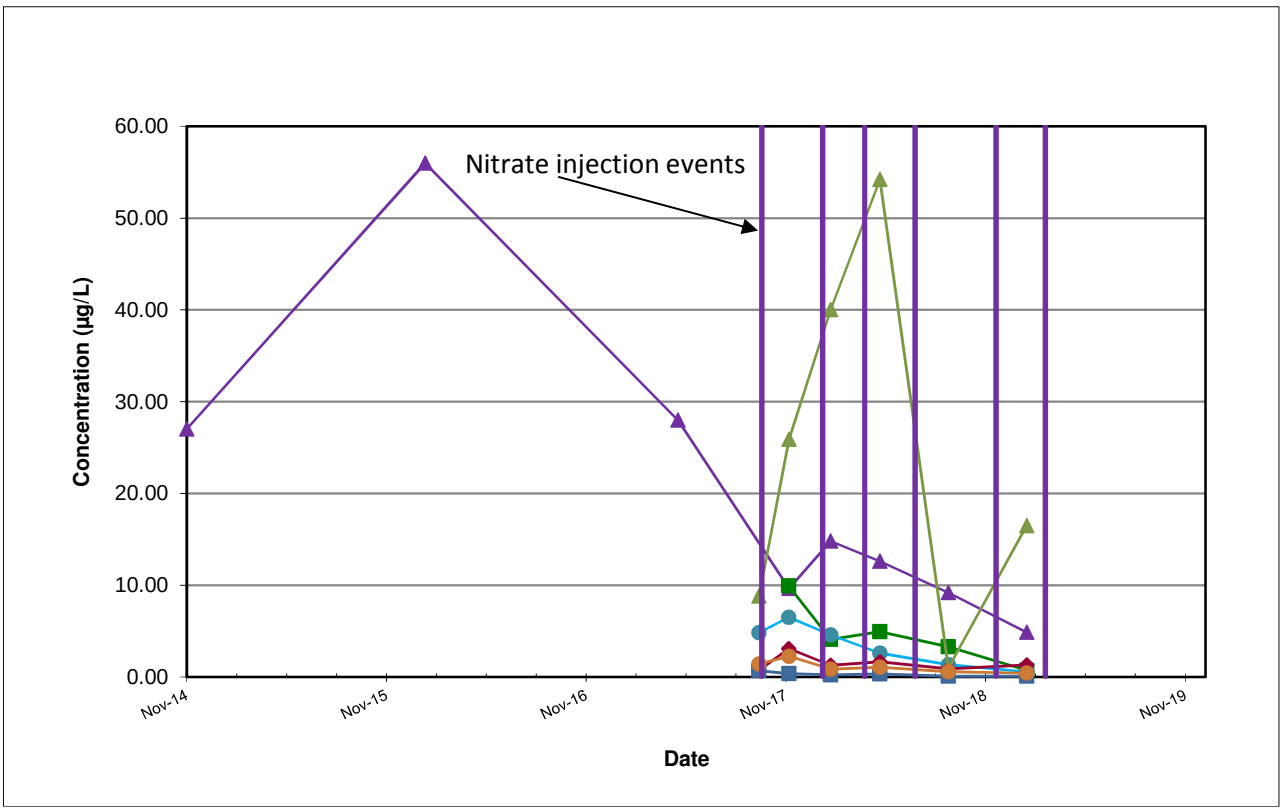


cis-1,2-Dichloroethene



Benzene

Note: non-detected values shown at one-half the reporting limit and graphed with an open symbol.

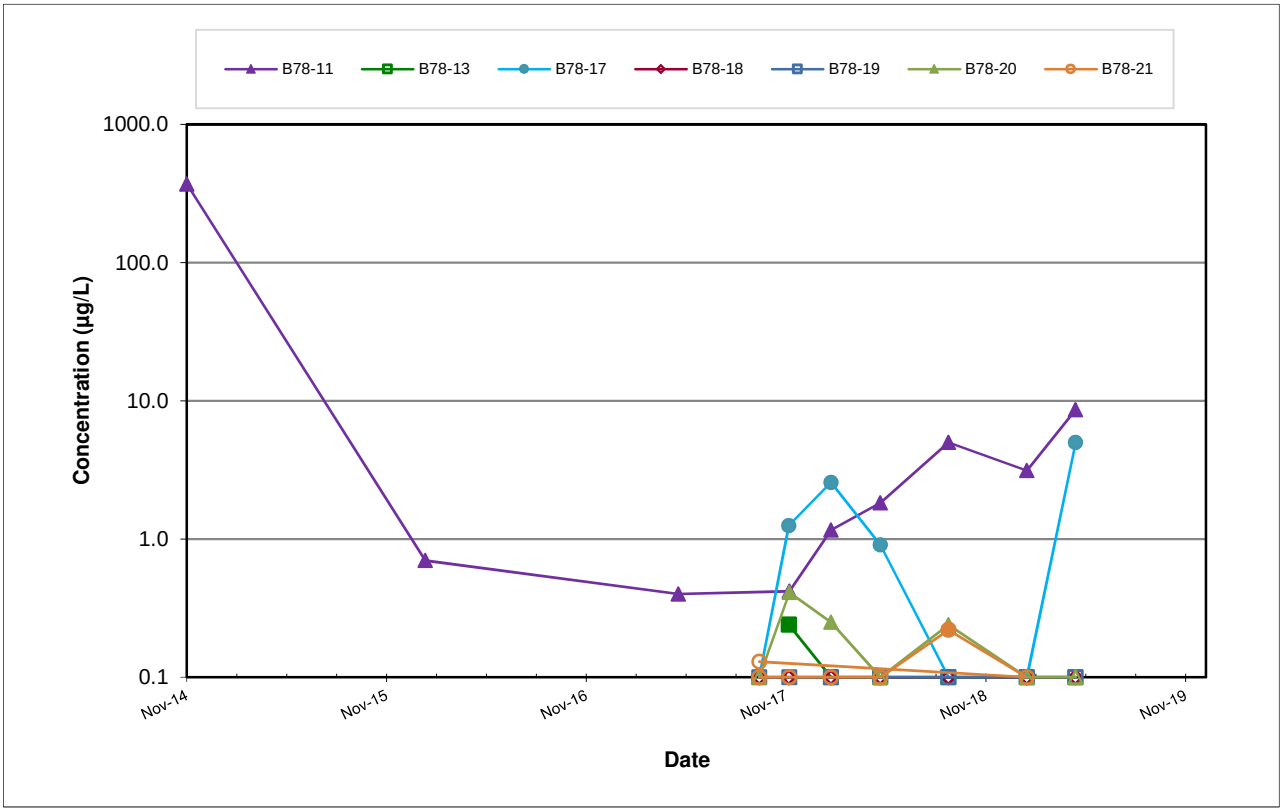
wood.

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

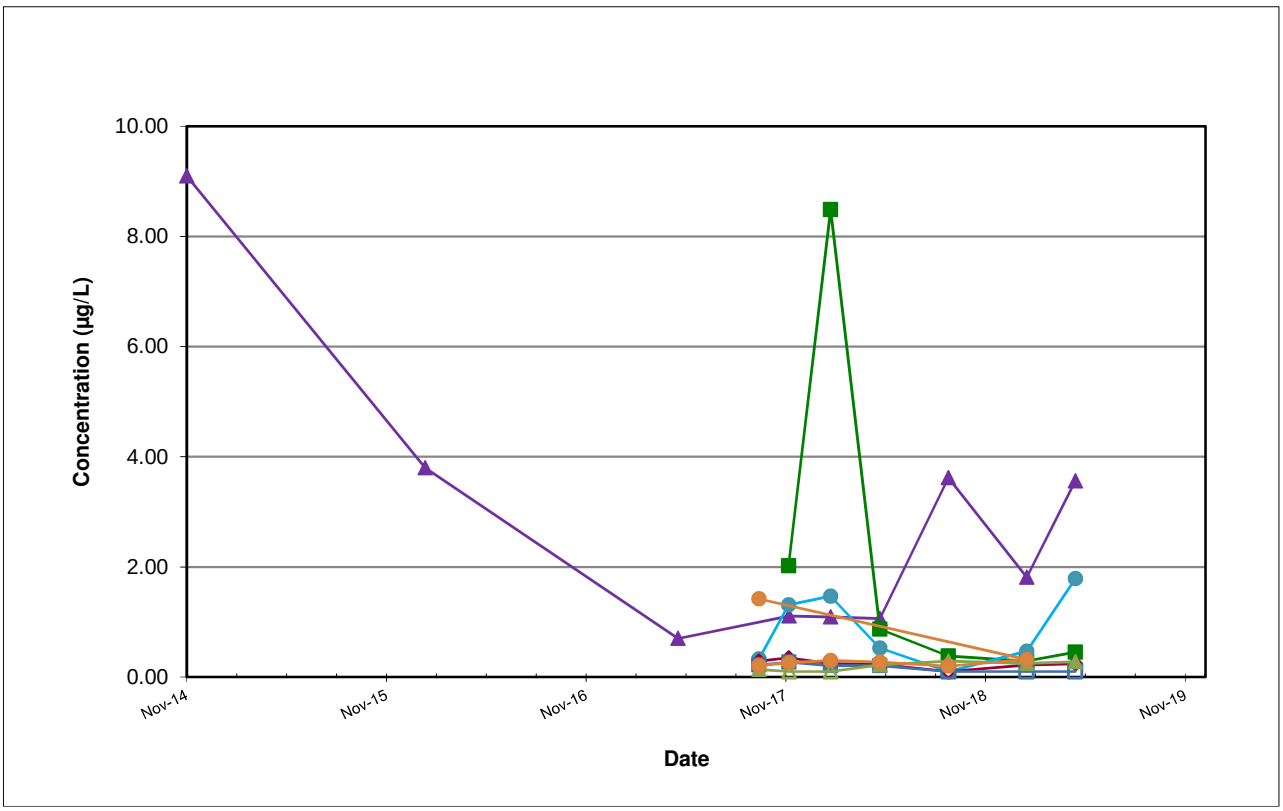
Project No. 8888

Figure 9

P:\8888 - Boeing Renton\02 Data Management\Grapher and Excel Figure Files\excel\Figures 9 to 15_ Bldg 4-78-79 Trend Plots.xlsx



Trichloroethene

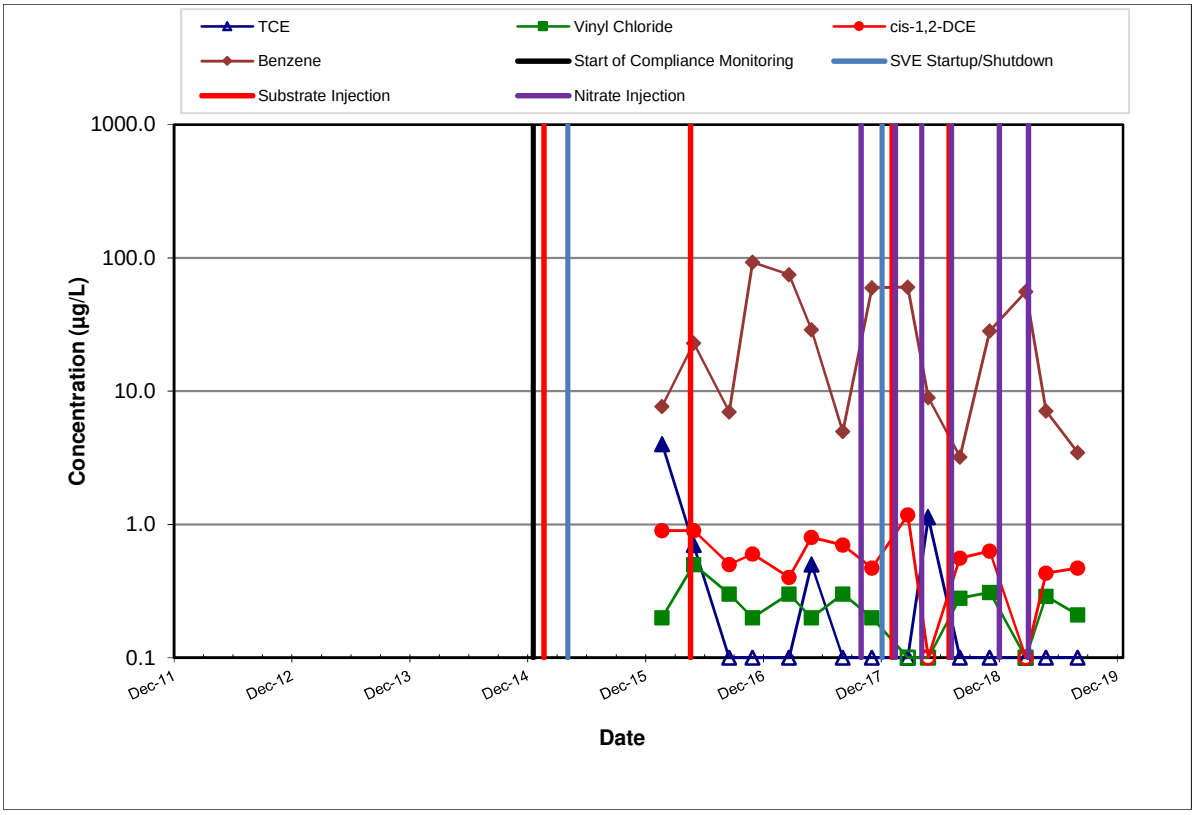


Vinyl Chloride

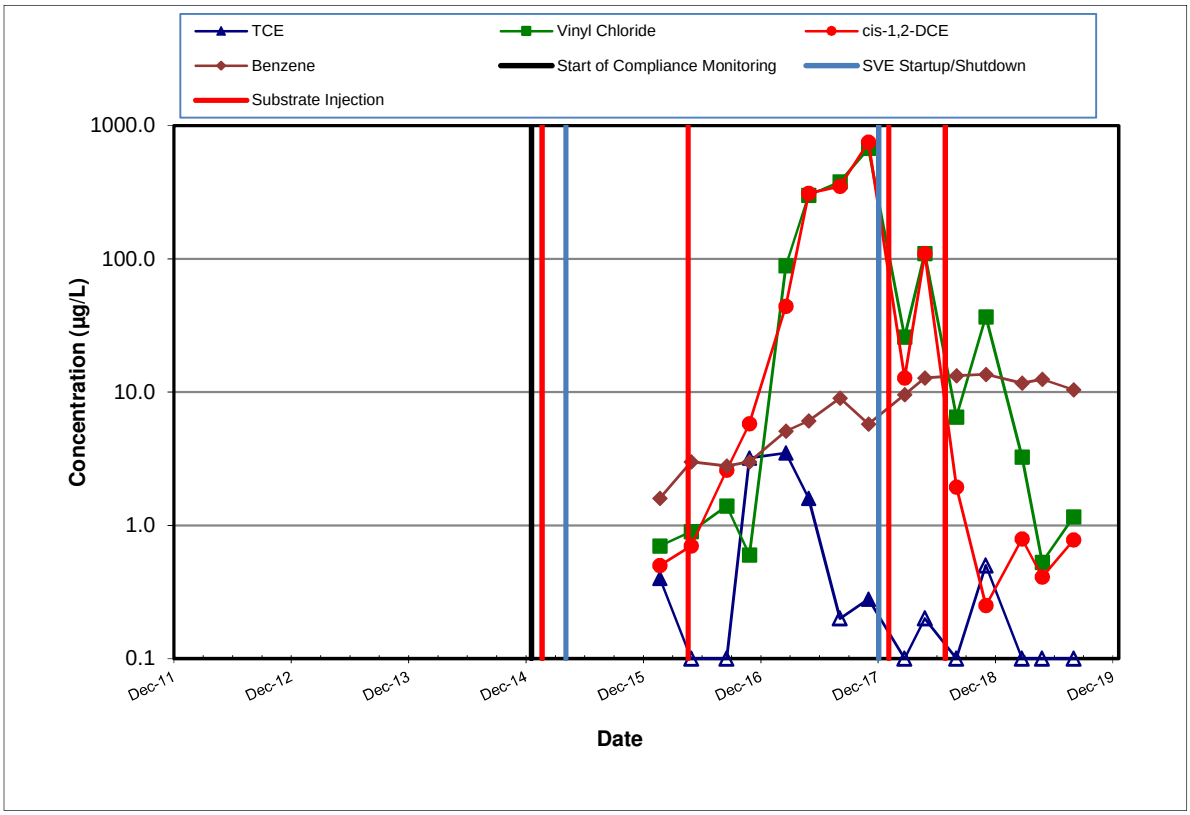
Note: non-detected values shown at one-half the reporting limit and graphed with an open symbol.

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

P:\8888 - Boeing Renton\02 Data Management\Grapher and Excel Figure Files\excel\Figures 9 to 15_ Bldg 4-78-79 Trend Plots.xlsx



SOURCE AREA WELL GW031S

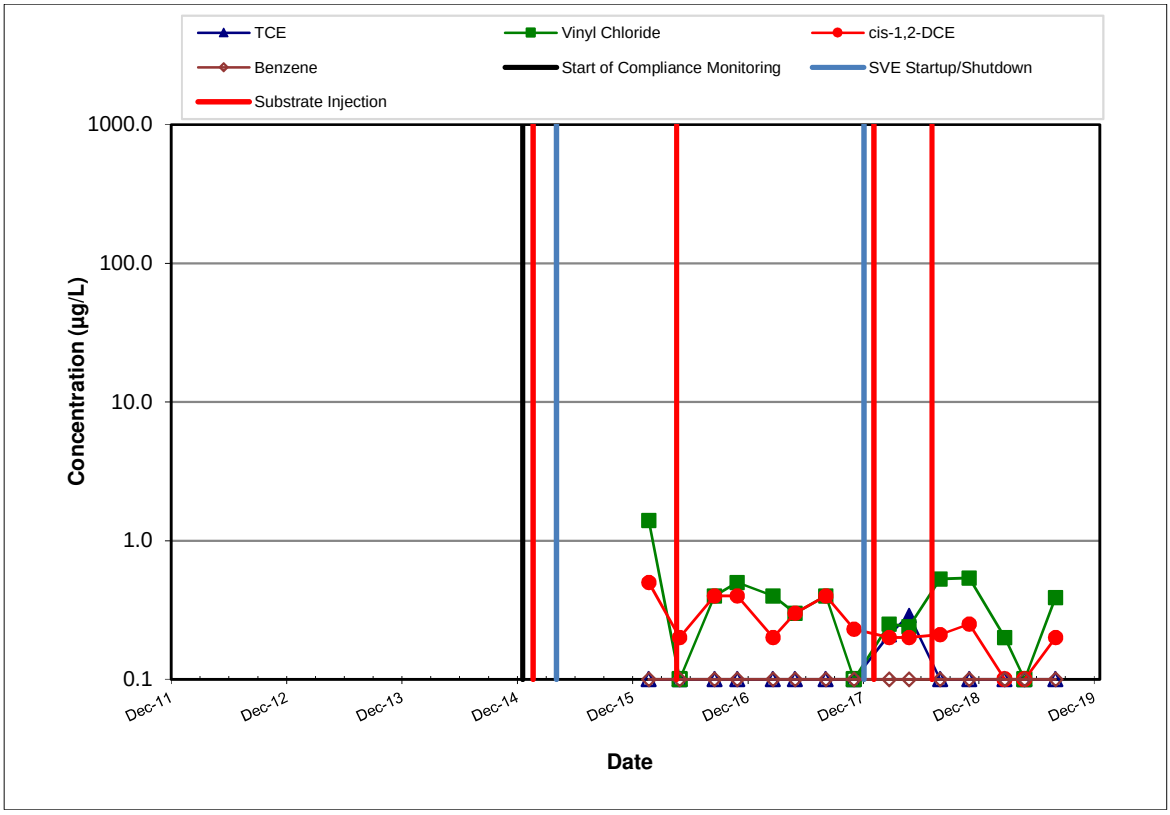


SOURCE AREA WELL GW033S

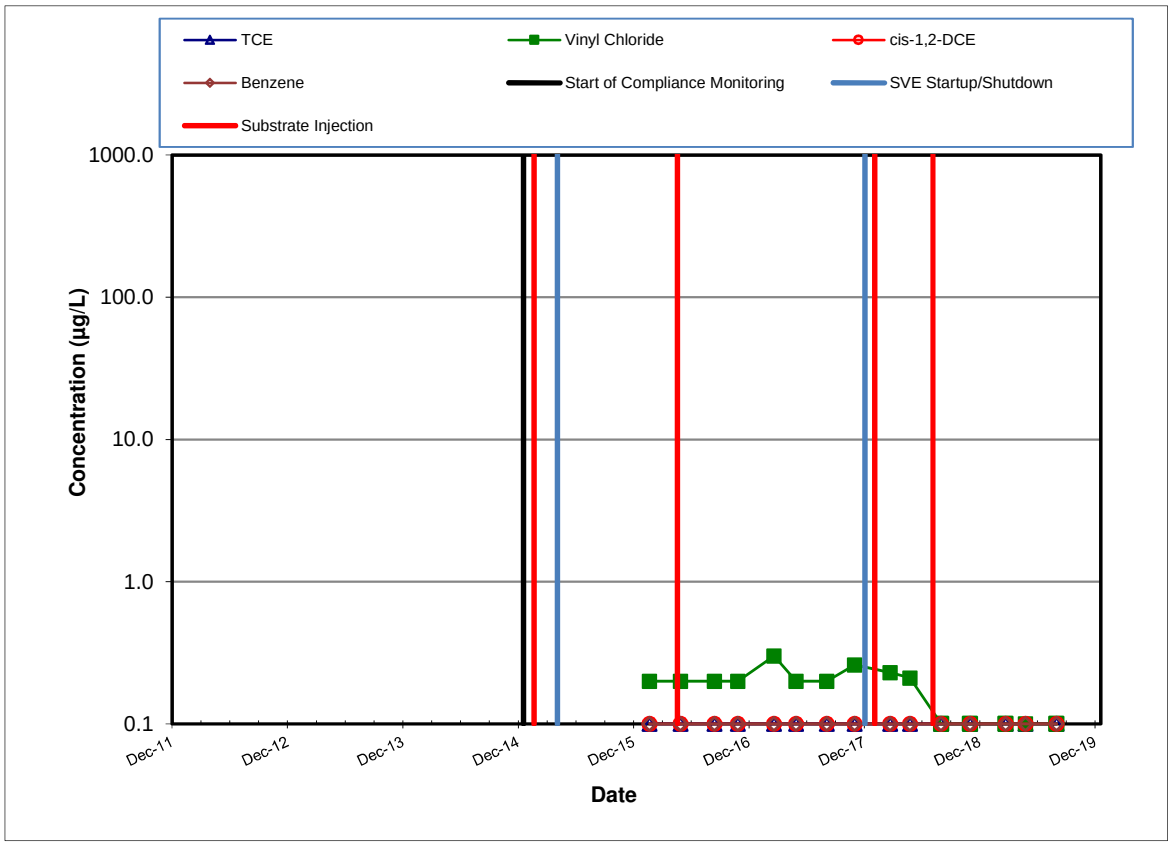
Note: non-detected values shown at one-half the reporting limit and graphed with an open symbol.

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 9 to 15_ Bldg 4-78-79 Trend Plots.xlsx



SOURCE AREA WELL GW034S

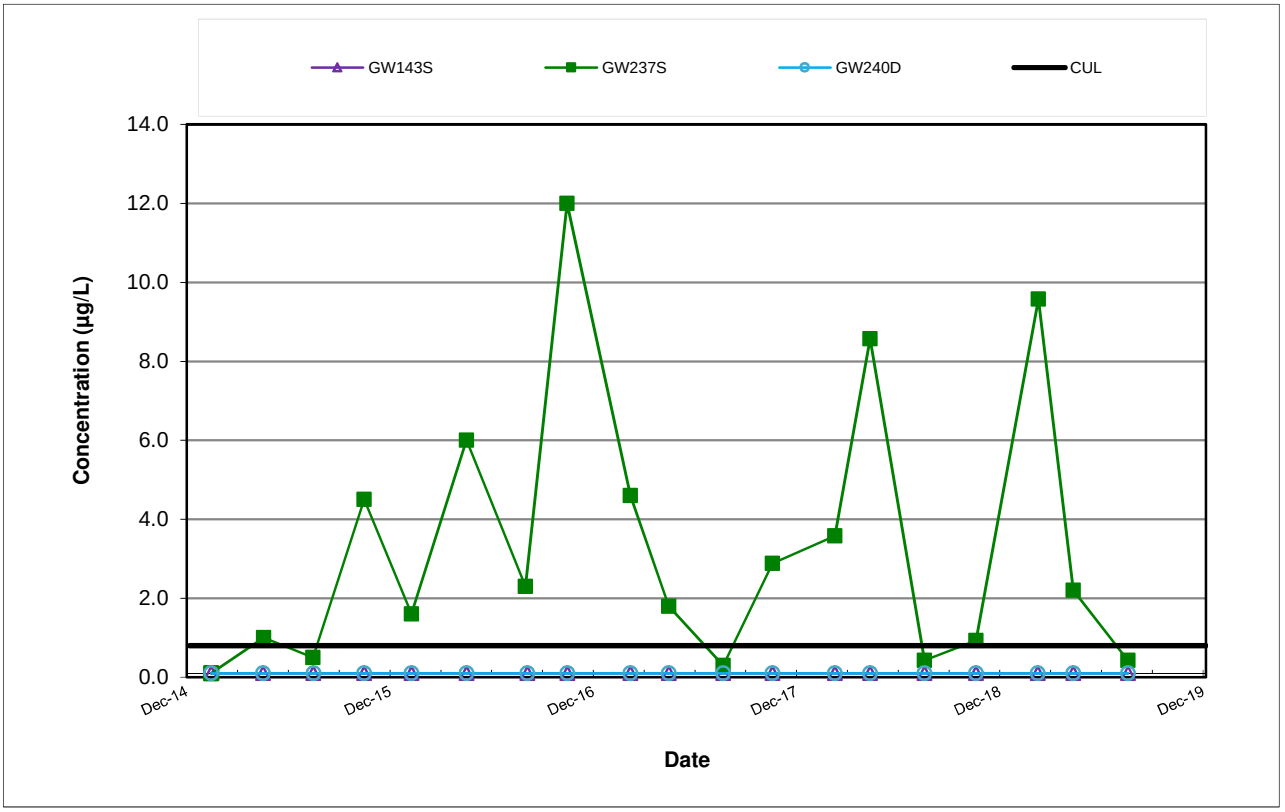


DOWNGRADIENT PLUME AREA WELL GW209S

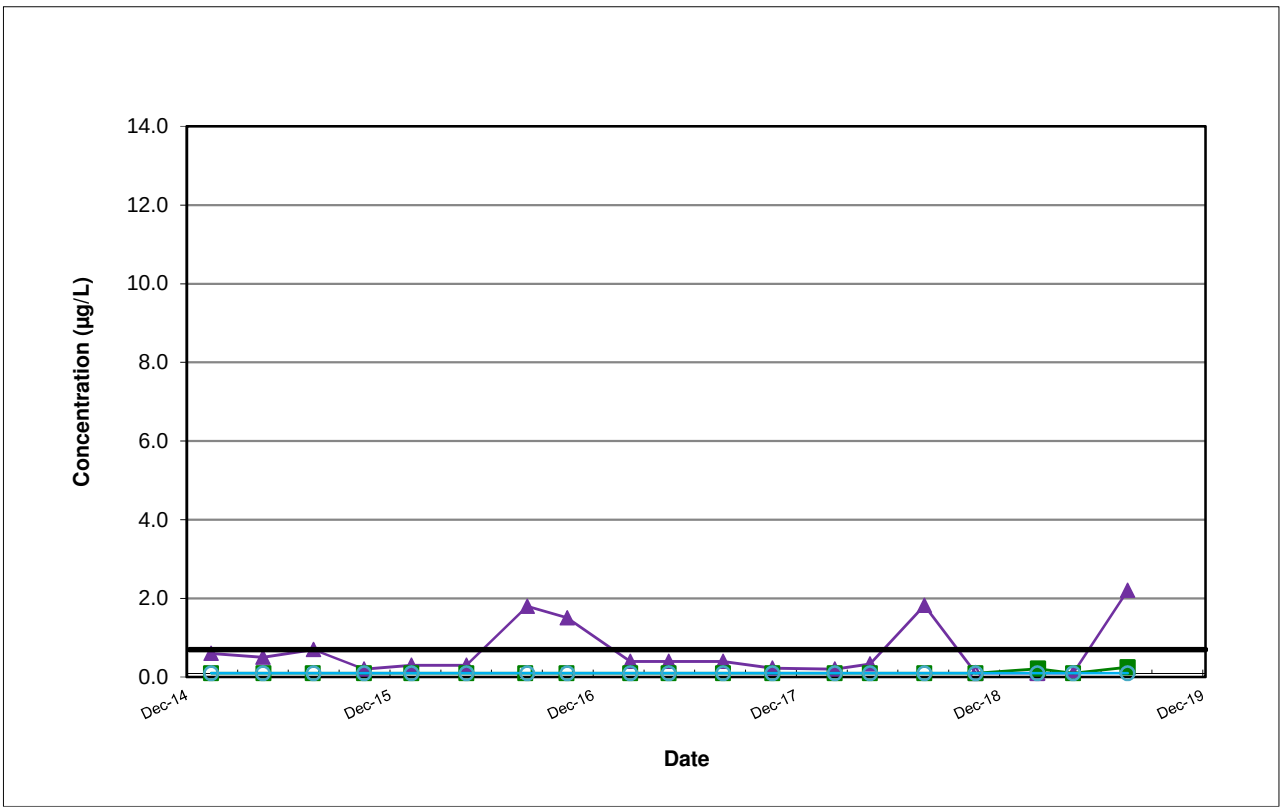
Note: non-detected values shown at one-half the reporting limit and graphed with an open symbol.

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 9 to 15_ Bldg 4-78-79 Trend Plots.xlsx



Benzene



cis-1,2-Dichloroethene

Note: non-detected values shown at one-half the reporting limit and graphed with an open symbol.

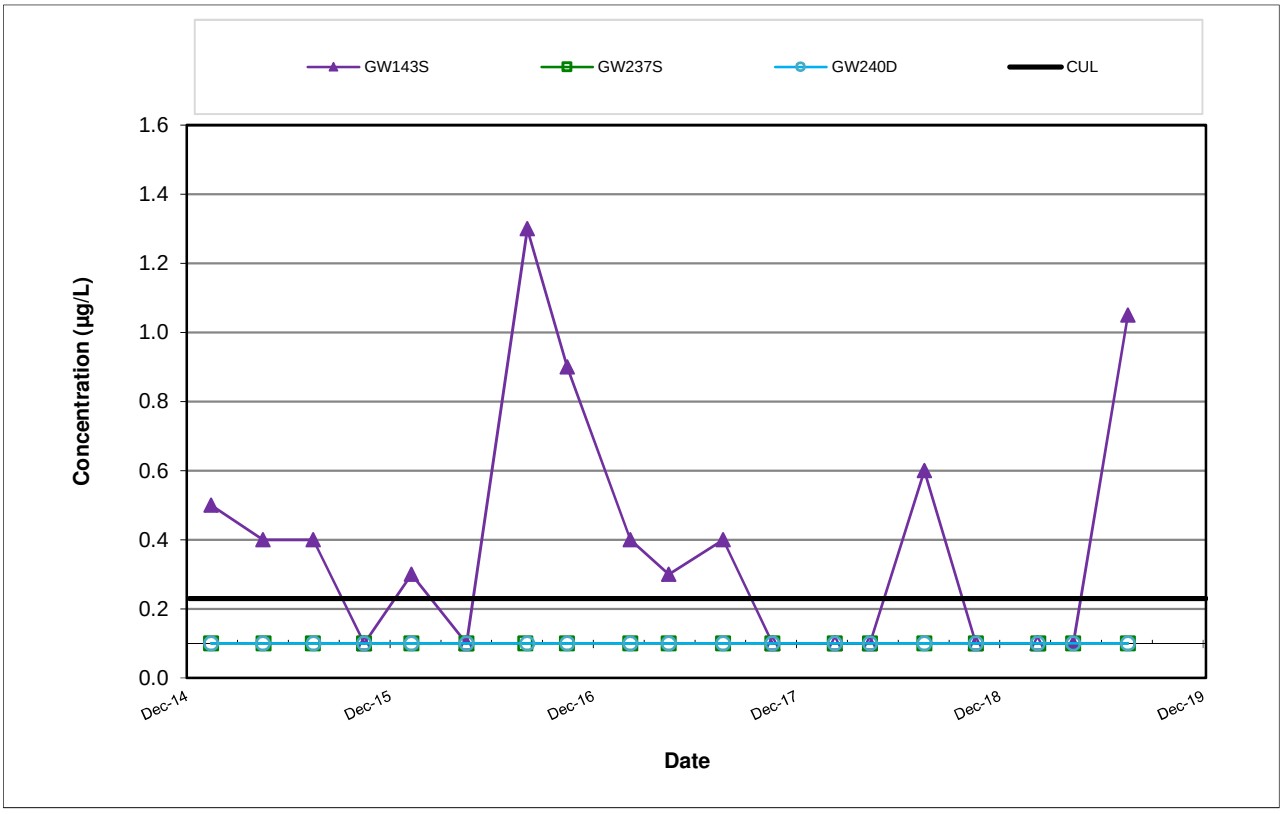
wood.

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

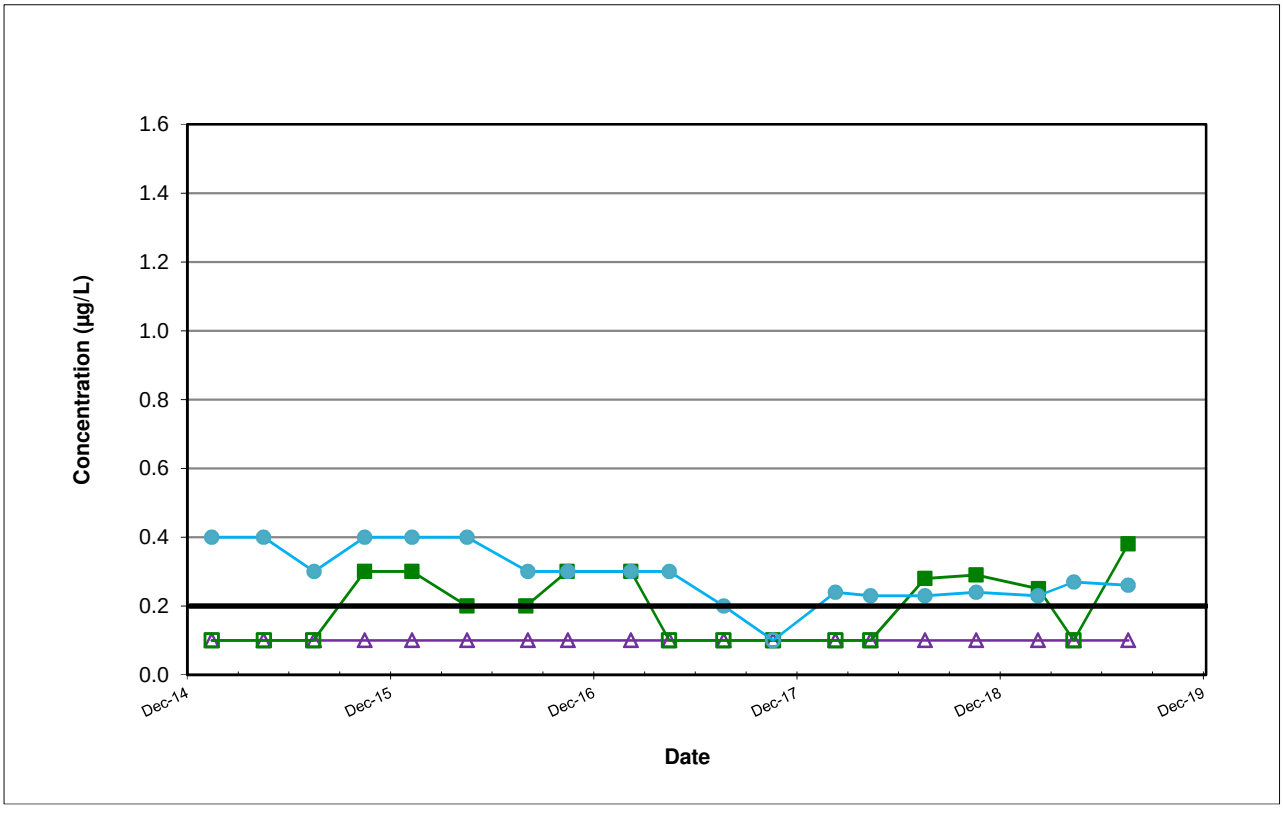
Project No. 8888

Figure 13

P:\8888 - Boeing Renton\02 Data Management\Grapher and Excel Figure Files\excel\Figures 9 to 15_ Bldg 4-78-79 Trend Plots.xlsx



Trichloroethene

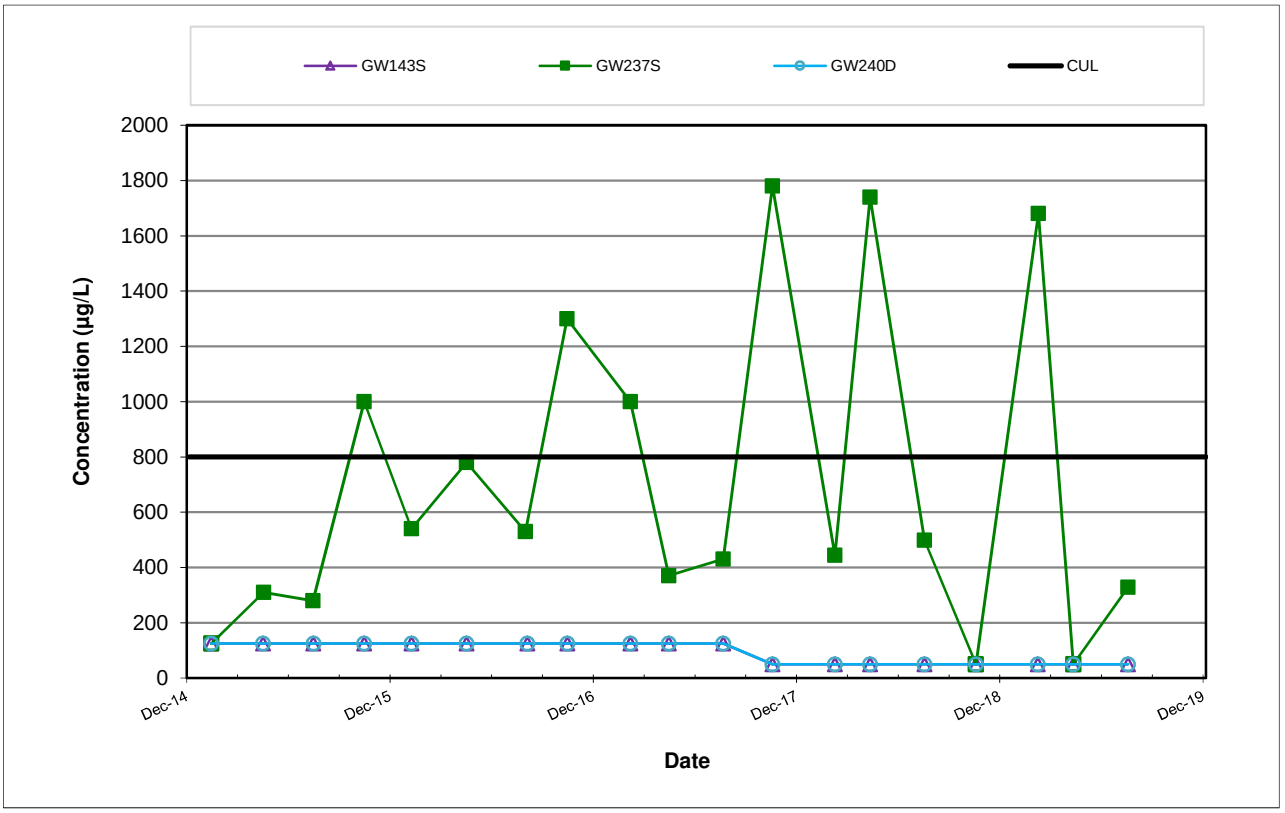


Vinyl Chloride

Note: non-detected values shown at one-half the reporting limit and graphed with an open symbol.

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

P:\8888 - Boeing Renton\02 Data Management\Grapher and Excel Figure Files\excel\Figures 9 to 15_ Bldg 4-78-79 Trend Plots.xlsx



TPH as Gasoline

Note: non-detected values shown at one-half the reporting limit and graphed with an open symbol.

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 9 to 15_ Bldg 4-78-79 Trend Plots.xlsx

LAKE WASHINGTON

GW187S

PP130

PP119

PP118

PP129

GW185S
14.38

14.50

GW049S

PP117

14.83
GW197S

PP098

PP099

PP192

PP081

GW245S
14.25

GW196D
14.36*

GW195S
14.32

PP097

PP132

PP131

14.30

GW186S

GW194S
14.31

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

PP133

GW246S
14.02

PP135

PP134

GW190S
14.34

PP115

GW191D
14.52*

PP113

PP114

14.30

PP136

PP112

PP145

GW192S
14.26

PP150

PP111

PP138

PP096

PP137

PP151

PP147

PP141

PP152

PP146

IPR1

IPR2

GW193S
14.18

PP153

PP140

PP143

PP091

PP144

PP094

PP139

PP095

PP090

PP116

PP066

STORM WATER
WET VAULT

GW050S

PP011

PP013

GW213S

GW215S

GW214S

PP012

AOC-001

AOC-002
(SECONDARY
SOURCE AREA)

STORM WATER
DIVERSION STRUCTURE

GW051S

PP065

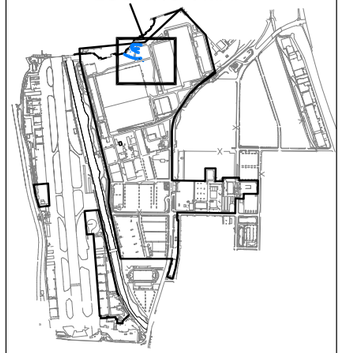
N

0 30 60
APPROXIMATE SCALE IN FEET

BOEING

wood.

AOC-001 AND AOC-002
LOCATION MAP



BOEING RENTON
FACILITY MAP

LEGEND

- GW195S 14.32 — MONITORING WELL LOCATION WITH GROUNDWATER ELEVATION (NGVD-FEET)
- NM — NOT MEASURED
- * — WELL SCREENED IN LOWER PORTION OF AQUIFER, SO WATER LEVEL IS NOT USED FOR CONTOURING.
- GW227S — ABANDONED MONITORING WELL
- GW215S — EXISTING ELECTRON DONOR INJECTION WELL
- IPR1 — EXISTING INJECTION PIPE RISER
- PP011 — PUSH PROBE SAMPLING LOCATION
- APPROXIMATE PROPERTY LINE
- GROUNDWATER ELEVATION CONTOUR (IN FEET) (DASHED WHERE INFERRED)
- GENERAL DIRECTION OF GROUNDWATER FLOW
- 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 14, 2019
Boeing Renton Facility
Renton, Washington

By: MDS	Date: 10/22/19	Project No. 8888
Wood Environment & Infrastructure Solutions, Inc.	Figure	16

Plot Date: 10/22/19 - 8:33am, Plotted by: mike.stenberg
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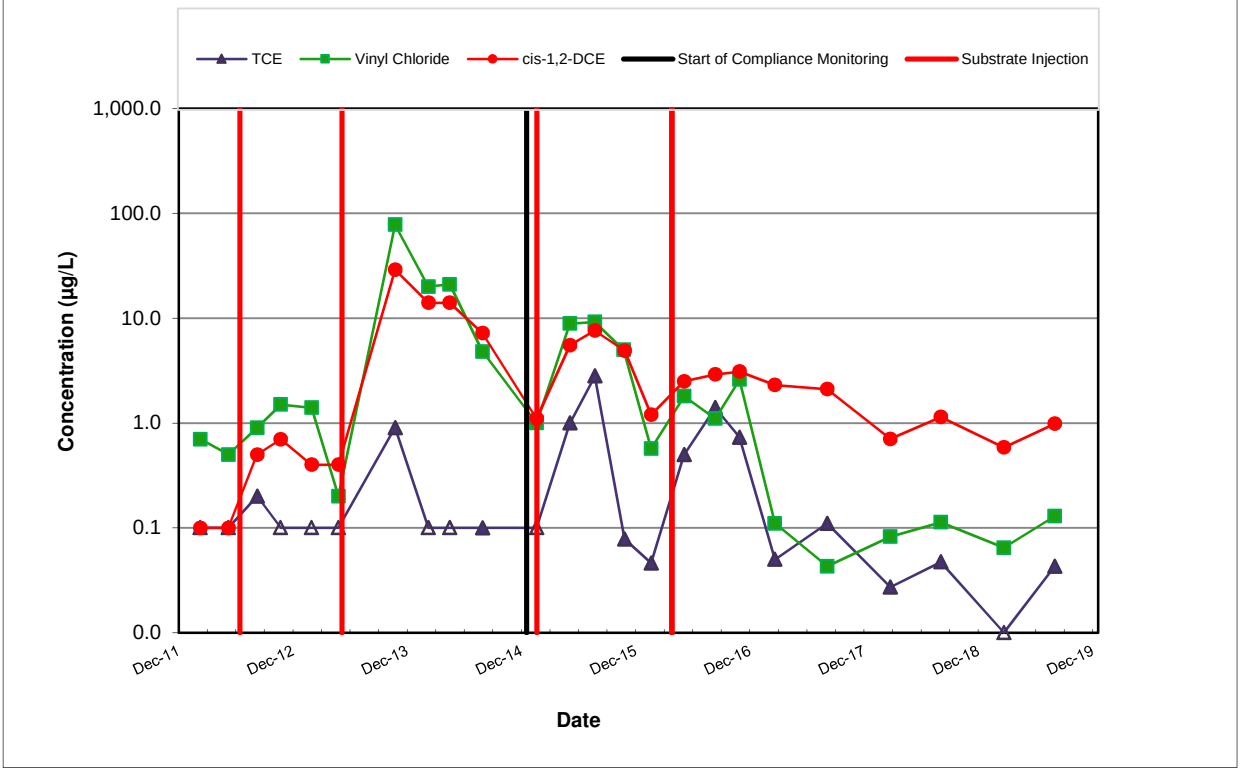
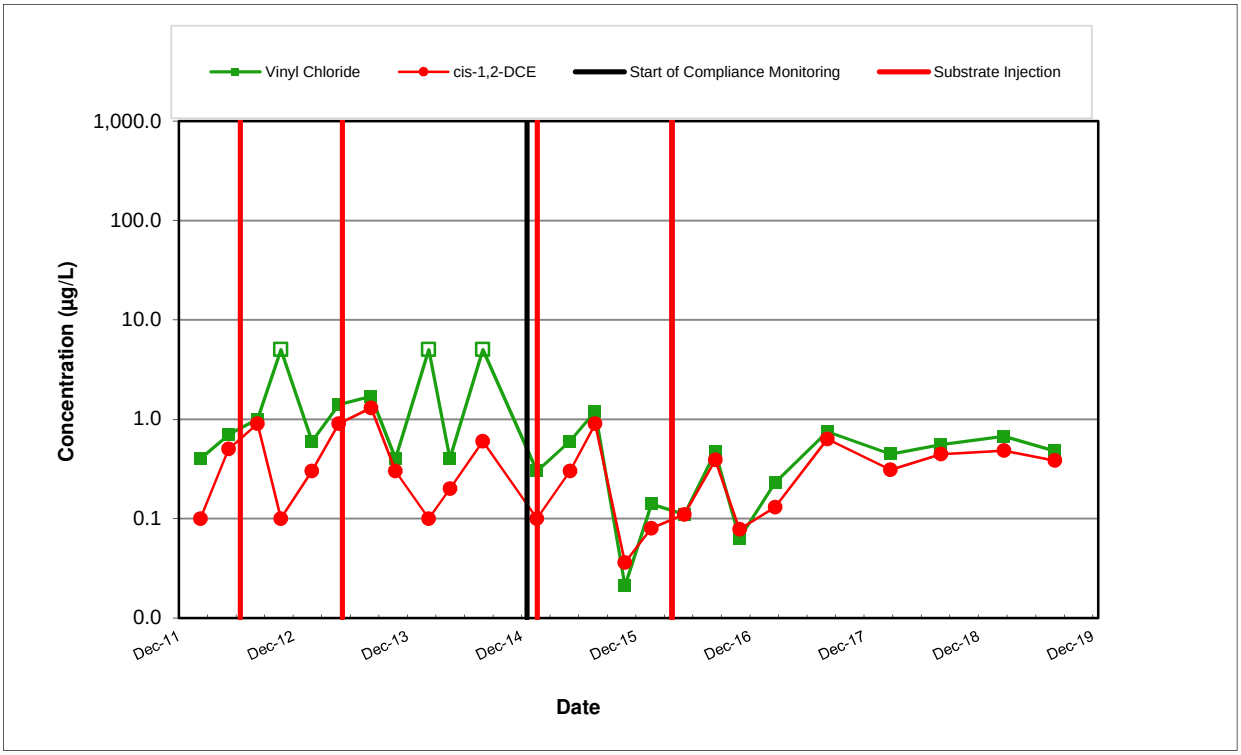


SOURCE AREA WELL GW193S

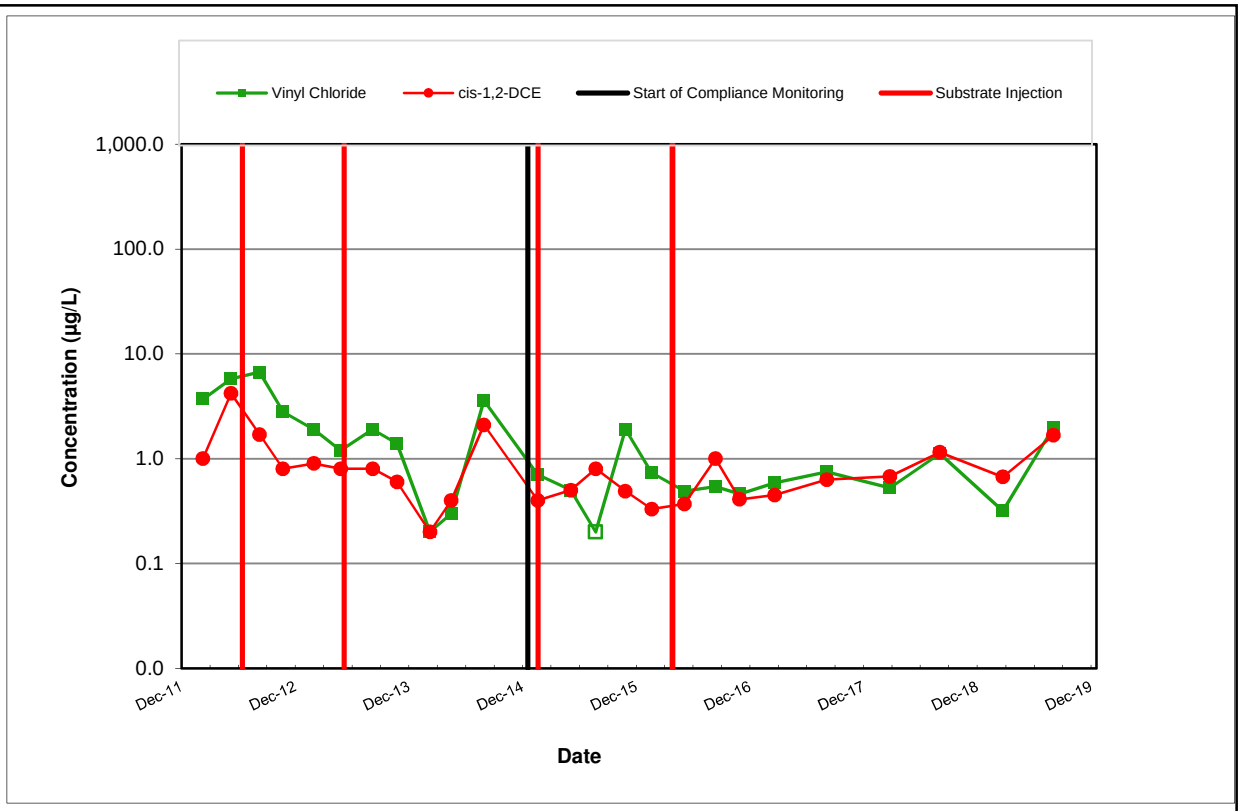


DOWNGRADIENT PLUME AREA WELL GW190S

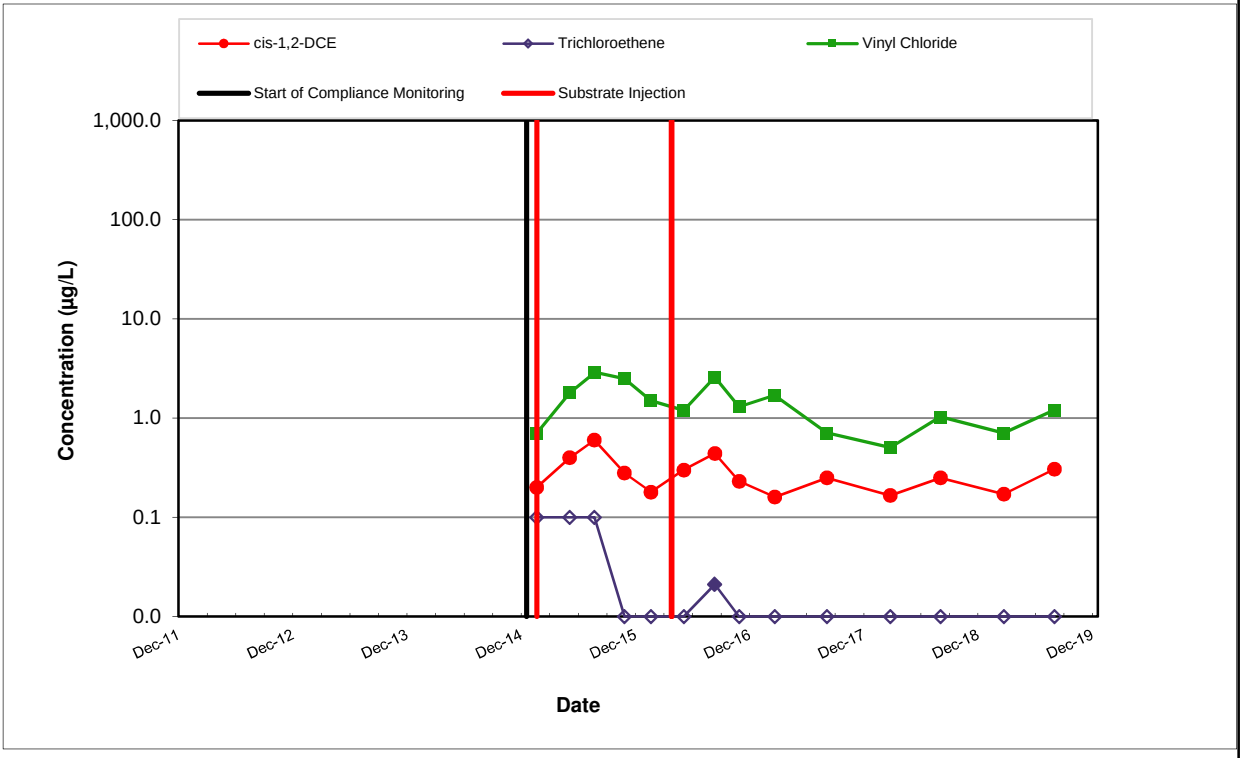
Note: non-detected values shown at one-half the reporting limit and are graphed with an open symbol.

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

\\sea2-fs1\projects\8888 - Boeing Renton\02 Data Management\Grapher and Excel Figure Files\excel\Figures 17 to 19_AOC 1-2 Trend Plots.xls.xlsx



DOWNGRADIENT PLUME AREA WELL GW192S

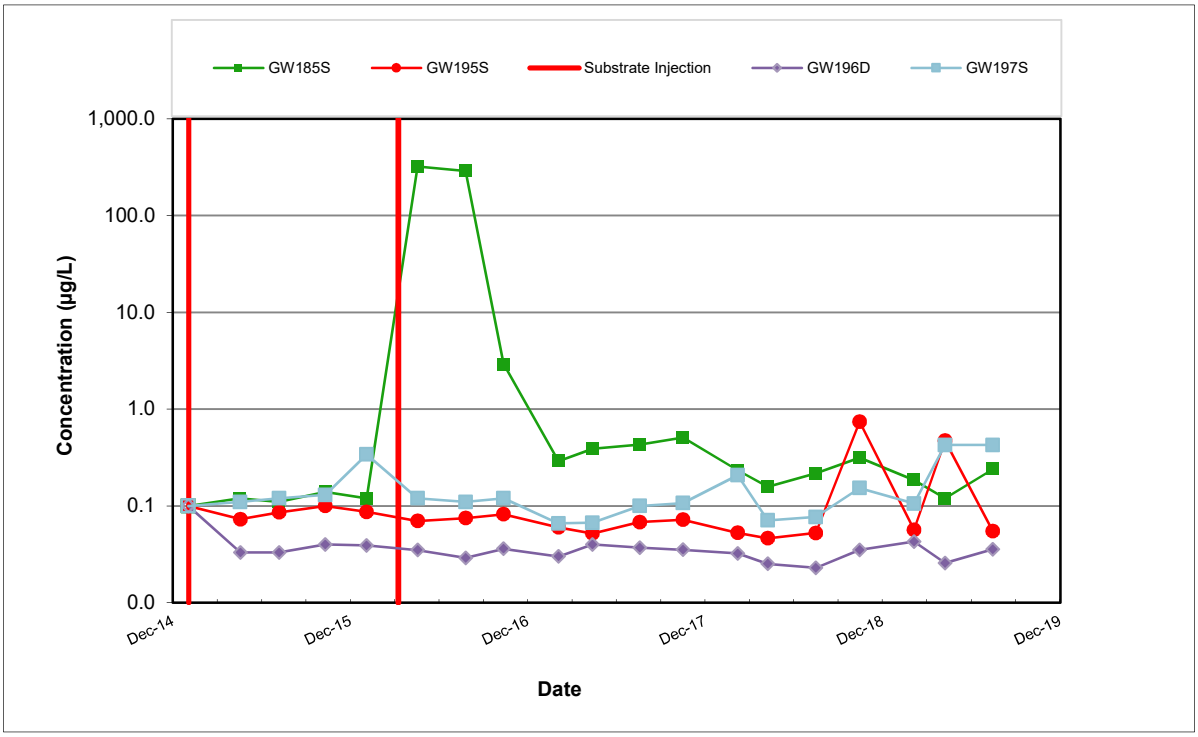


DOWNGRADIENT PLUME AREA WELL GW246S

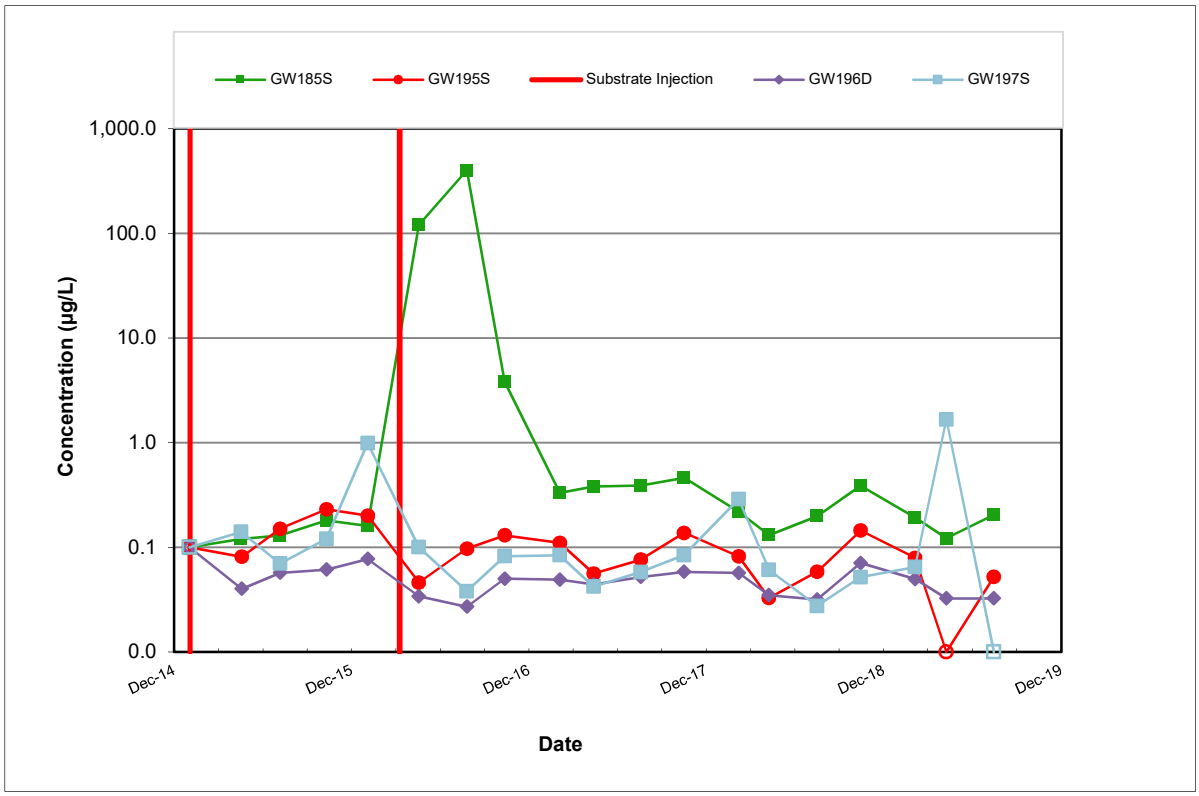
Note: non-detected values shown at one-half the reporting limit and graphed with an open symbol.

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

\\sea2-fs1\projects\8888 - Boeing Renton\02 Data Management\Grapher and Excel Figure Files\excel\Figures 17 to 19_AOC 1-2 Trend Plots.xls.xlsx



cis-1,2-Dichloroethene

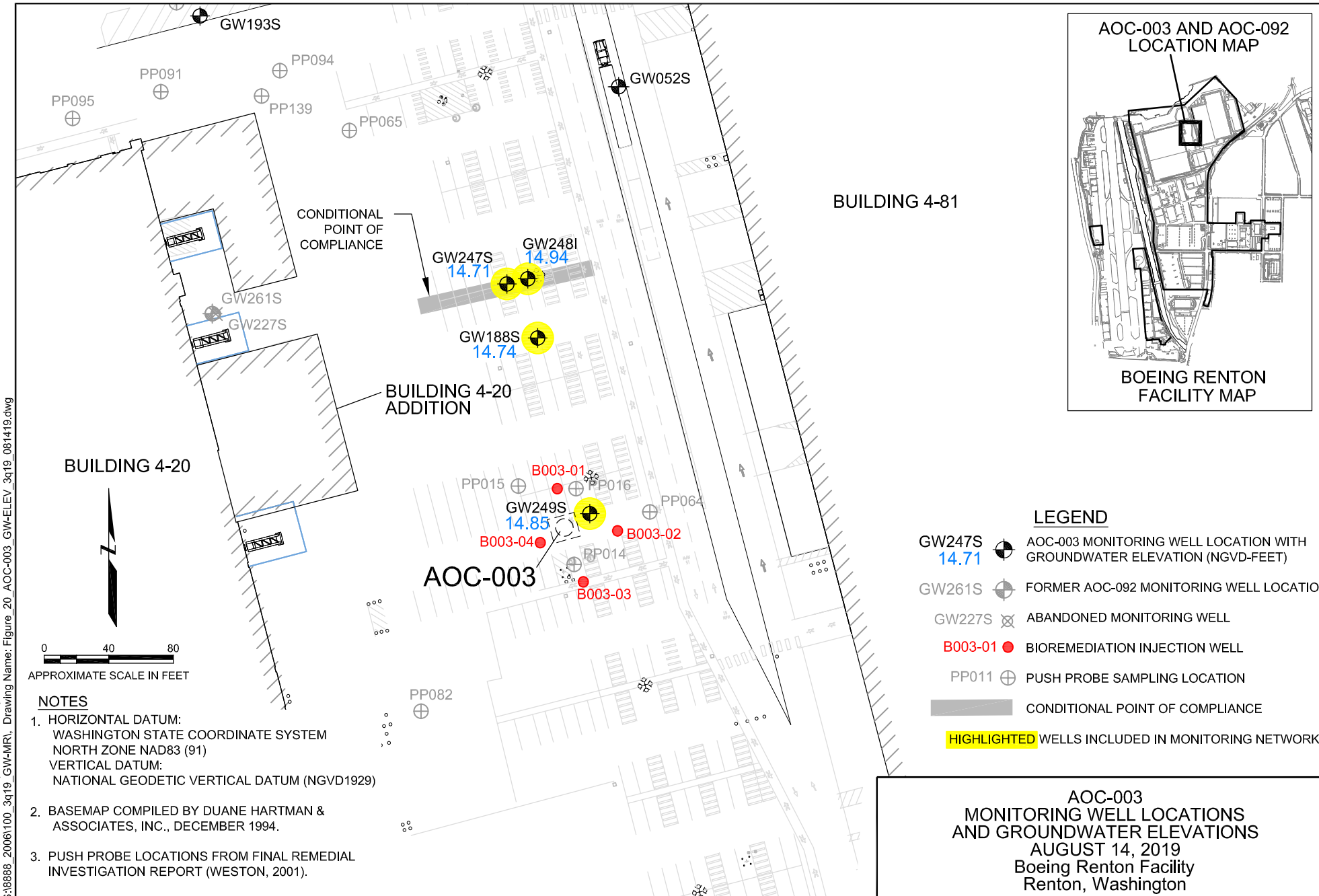


Vinyl Chloride

Note: non-detected values shown at one-half the reporting limit and graphed with an open symbol.

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 17 to 19_AOC 1-2 Trend Plots.xls.xlsx



AOC-003 AND AOC-092 LOCATION MAP

BOEING RENTON FACILITY MAP

LEGEND

- GW247S 14.71 — 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 14, 2019 Boeing Renton Facility Renton, Washington

By: MDS	Date: 10/21/19	Project No. 8888
Wood Environment & Infrastructure Solutions, Inc.		Figure 20

Plot Date: 10/21/19 - 3:44pm, Plotted by: mike.stenberg
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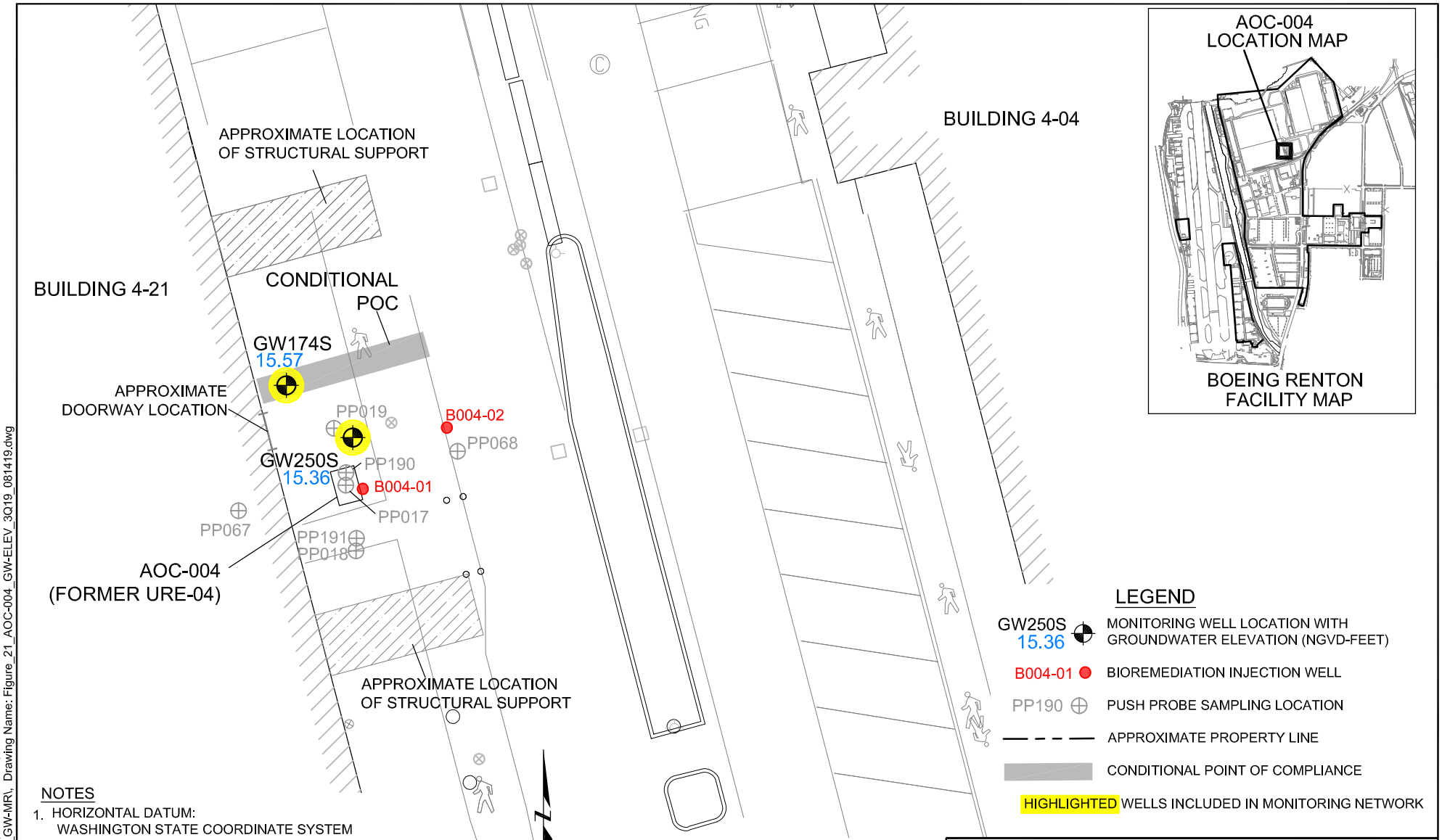


LEGEND

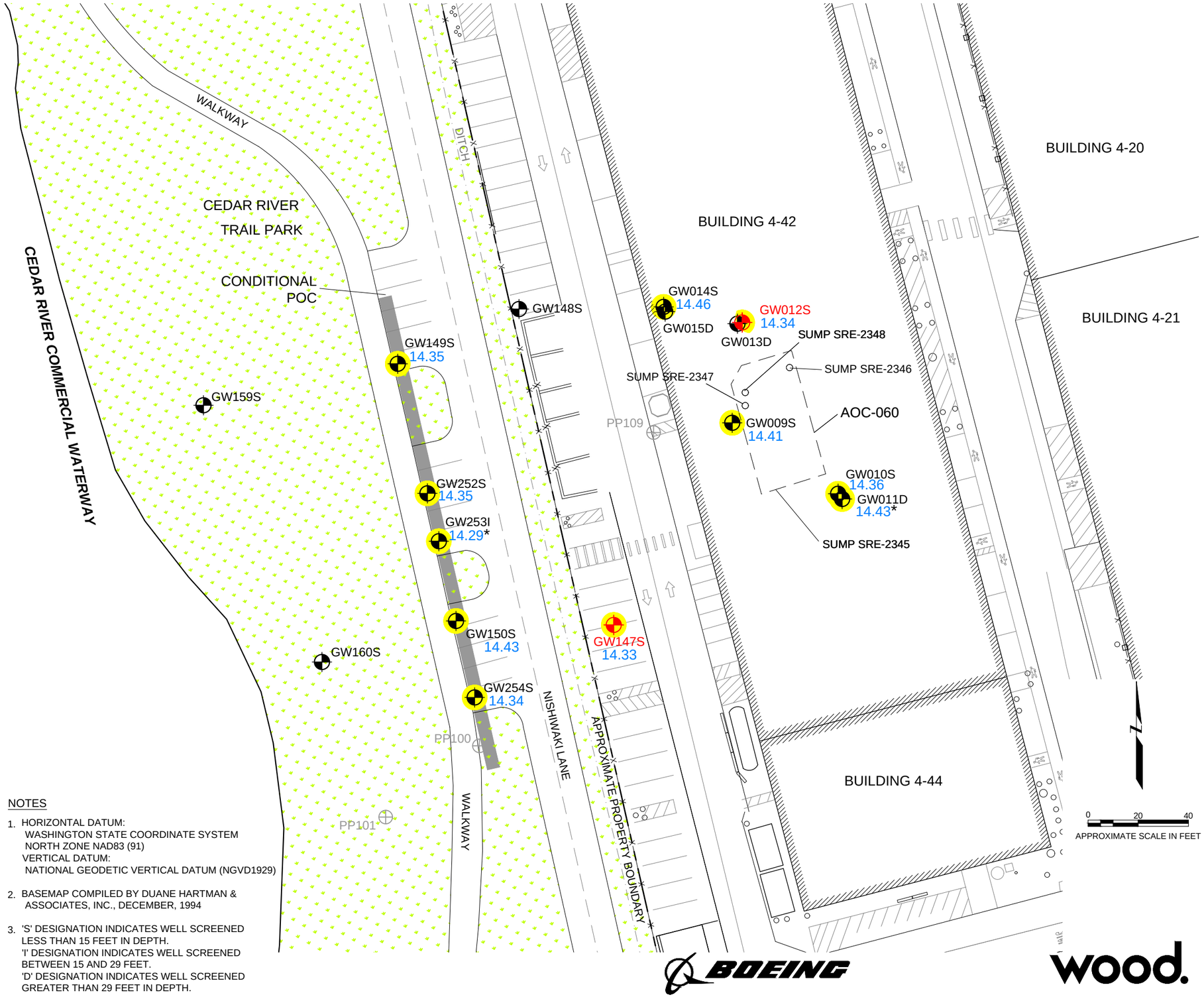
- GW250S 15.36 — MONITORING WELL LOCATION WITH GROUNDWATER ELEVATION (NGVD-FEET)
- B004-01 — BIOREMEDIATION INJECTION WELL
- PP190 — PUSH PROBE SAMPLING LOCATION
- APPROXIMATE PROPERTY LINE
- CONDITIONAL POINT OF COMPLIANCE
- HIGHLIGHTED WELLS INCLUDED IN MONITORING NETWORK

NOTES

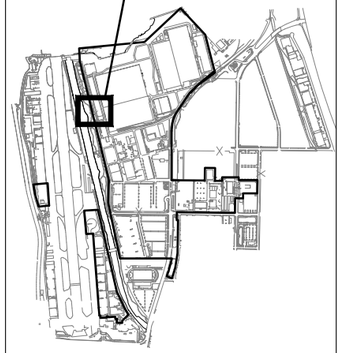
1. HORIZONTAL DATUM:
   WASHINGTON STATE COORDINATE SYSTEM
   NORTH ZONE NAD83 (91)
   VERTICAL DATUM:
   NATIONAL GEODETIC VERTICAL DATUM (NGVD1929)
2. BASEMAP COMPILED BY DUANE HARTMAN & ASSOCIATES, INC., DECEMBER 1994.
3. PUSH PROBE LOCATIONS FROM FINAL REMEDIAL INVESTIGATION REPORT (WESTON, 2001).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

AOC-004
MONITORING WELL LOCATIONS AND GROUNDWATER ELEVATIONS
AUGUST 14, 2019
Boeing Renton Facility
Renton, Washington

By: MDS	Date: 10/21/19	Project No. 8888
Wood Environment & Infrastructure Solutions, Inc.		Figure 21



AOC-060
LOCATION MAP



BOEING RENTON
FACILITY MAP

LEGEND

- GW252S 14.35 — 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

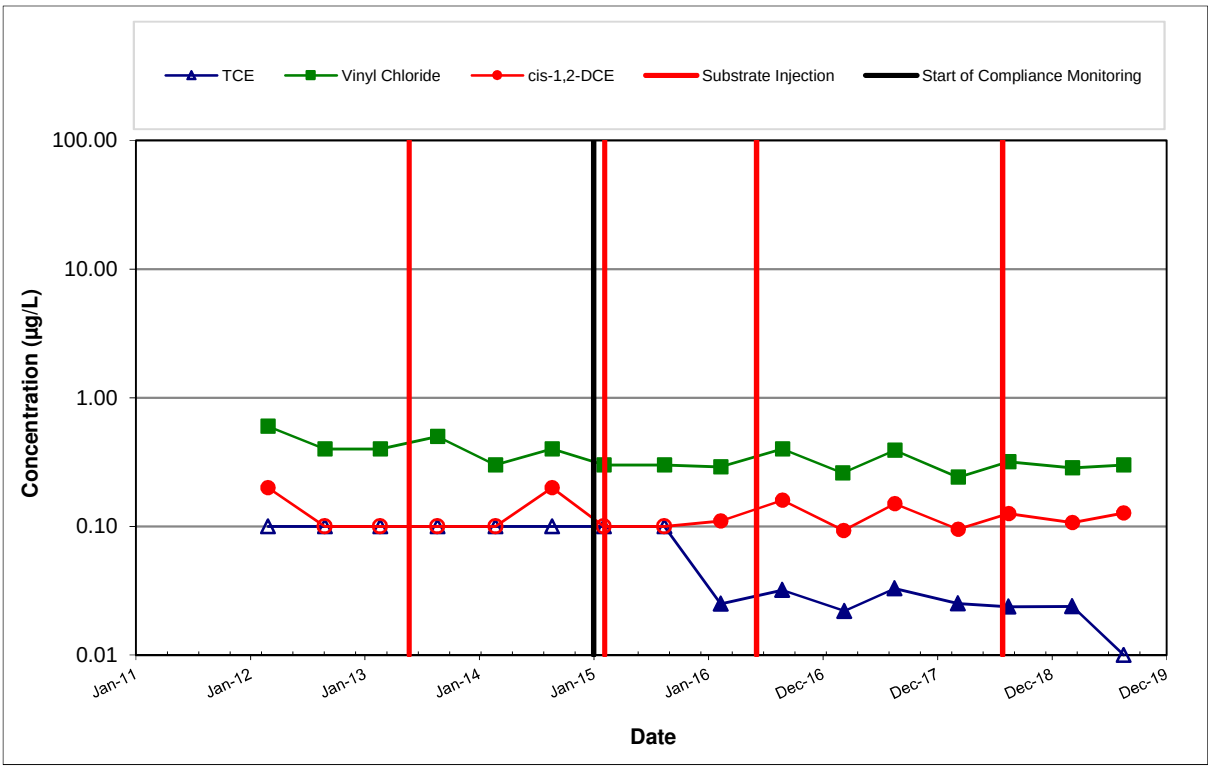
NOTES

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

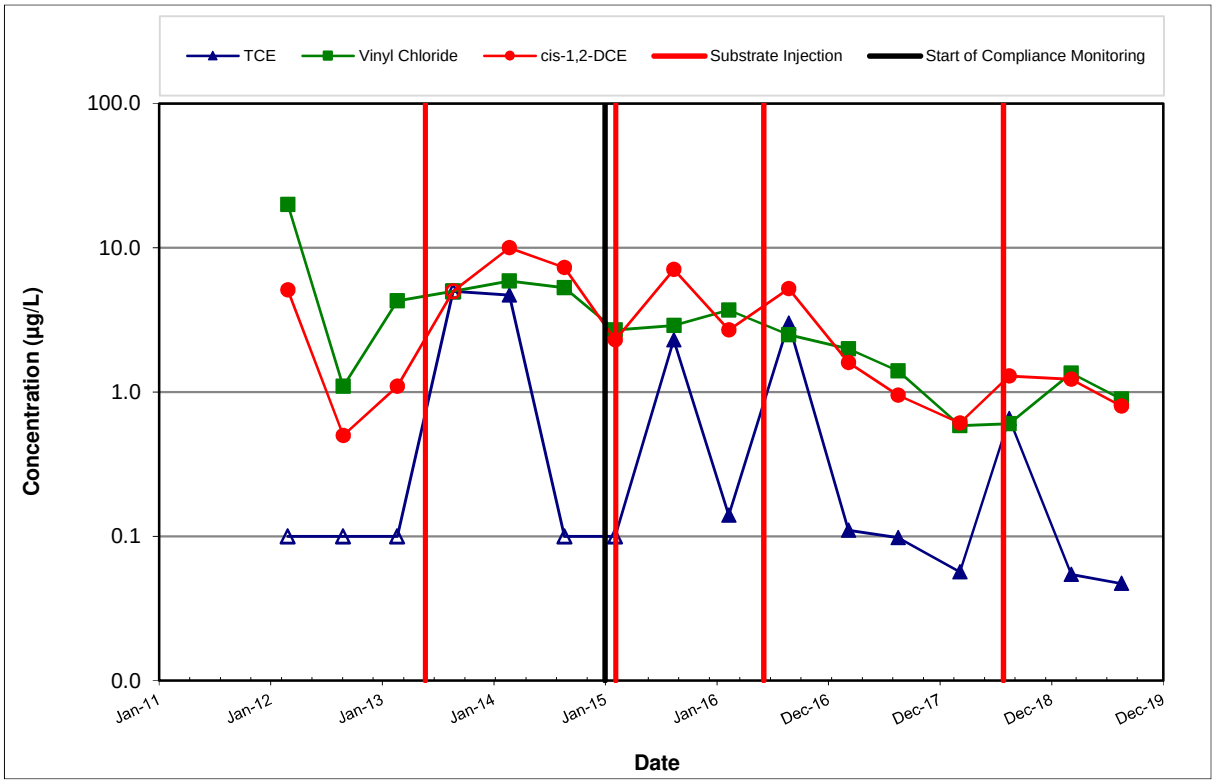
AOC-060
MONITORING WELL LOCATIONS AND GROUNDWATER ELEVATIONS
AUGUST 13 AND 14, 2019
Boeing Renton Facility
Renton, Washington

By: MDS	Date: 11/05/19	Project No. 8888
Wood Environment & Infrastructure Solutions, Inc.		Figure 22

Plot Date: 11/05/19 - 4:26pm Plotted by: mike stenberg
Drawing Path: \\sea2-fs1\S-3000s\8888_2006100_3q19_GW-MR\ Drawing Name: Figure_22_AOC-060_GW-ELEV_3Q19_081419.dwg



SOURCE AREA WELL GW009S

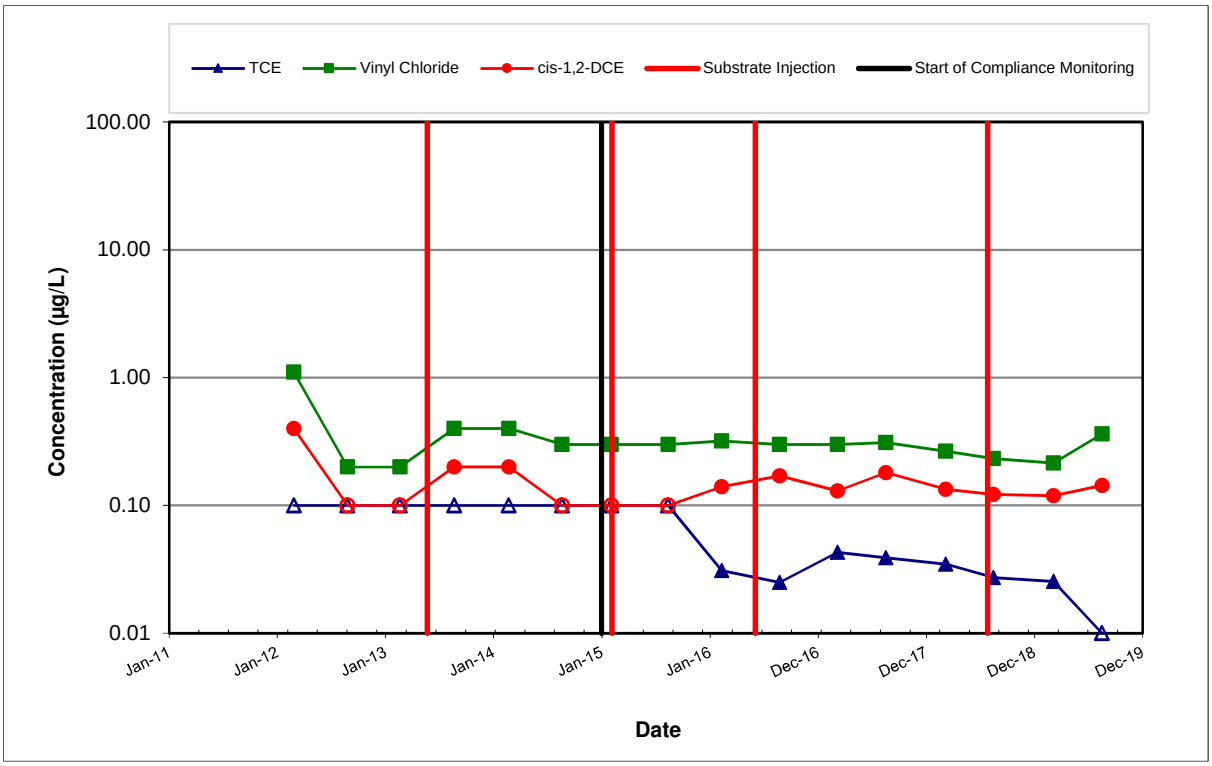


DOWNGRADIENT PLUME AREA WELL GW012S

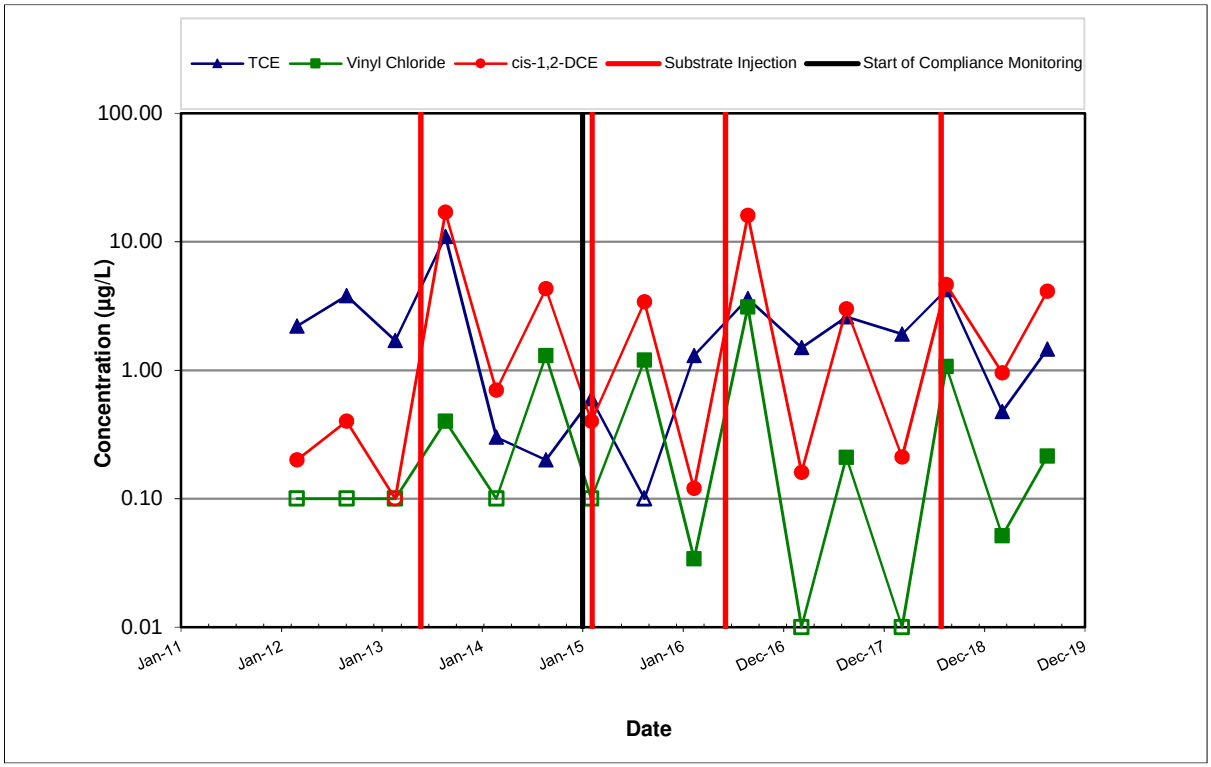
Note: non-detected values shown at one-half the reporting limit and graphed with an open symbol. August 2013 reporting limits elevated.

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 23 to 26 AOC 60.xlsx



DOWNGRADIENT PLUME AREA WELL GW014S

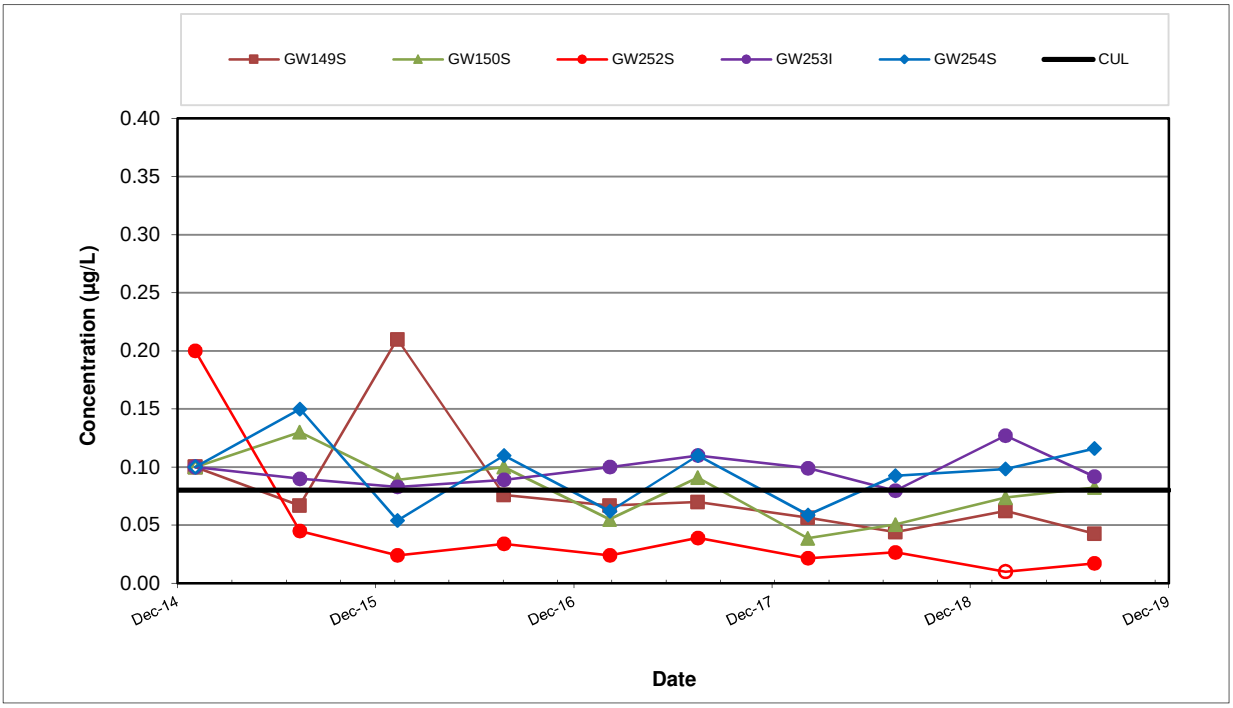


DOWNGRADIENT PLUME AREA WELL GW147S

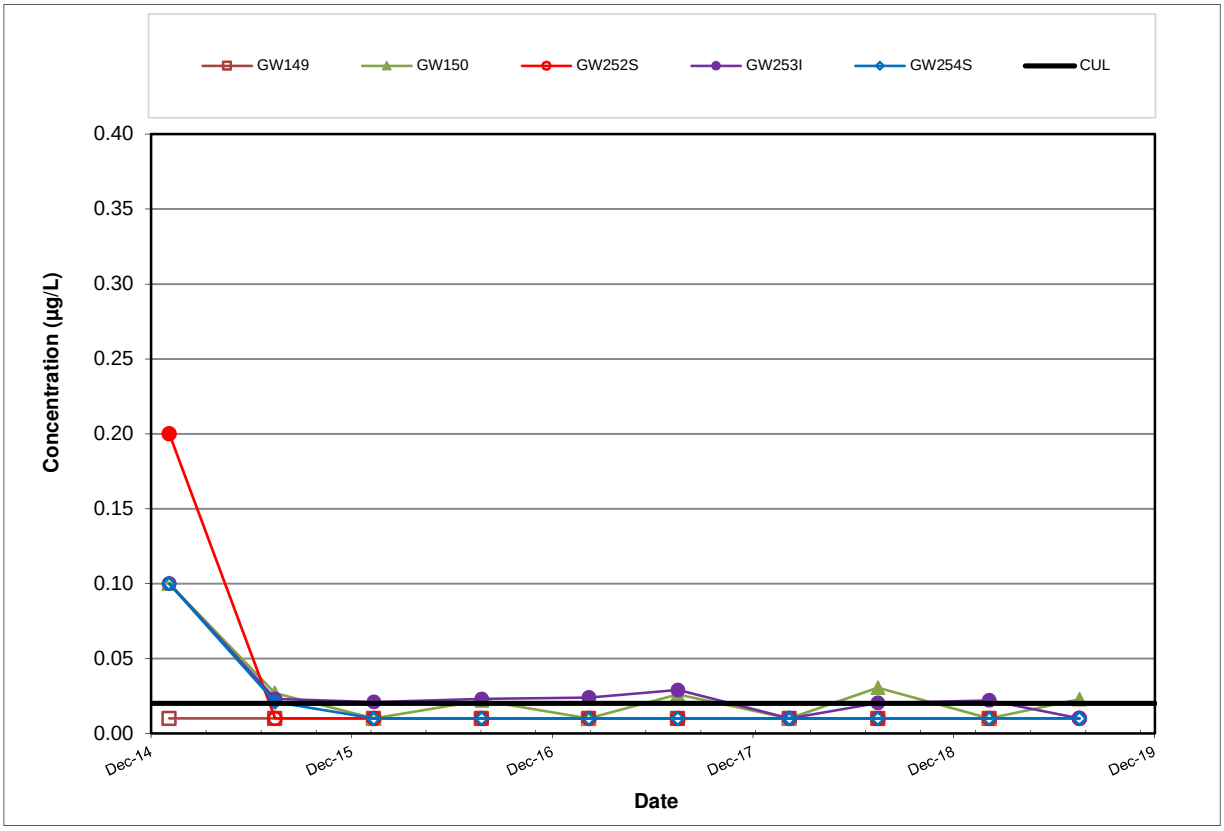
Note: non-detected values shown at one-half the reporting limit and graphed with an open symbol.

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 23 to 26 AOC 60.xlsx



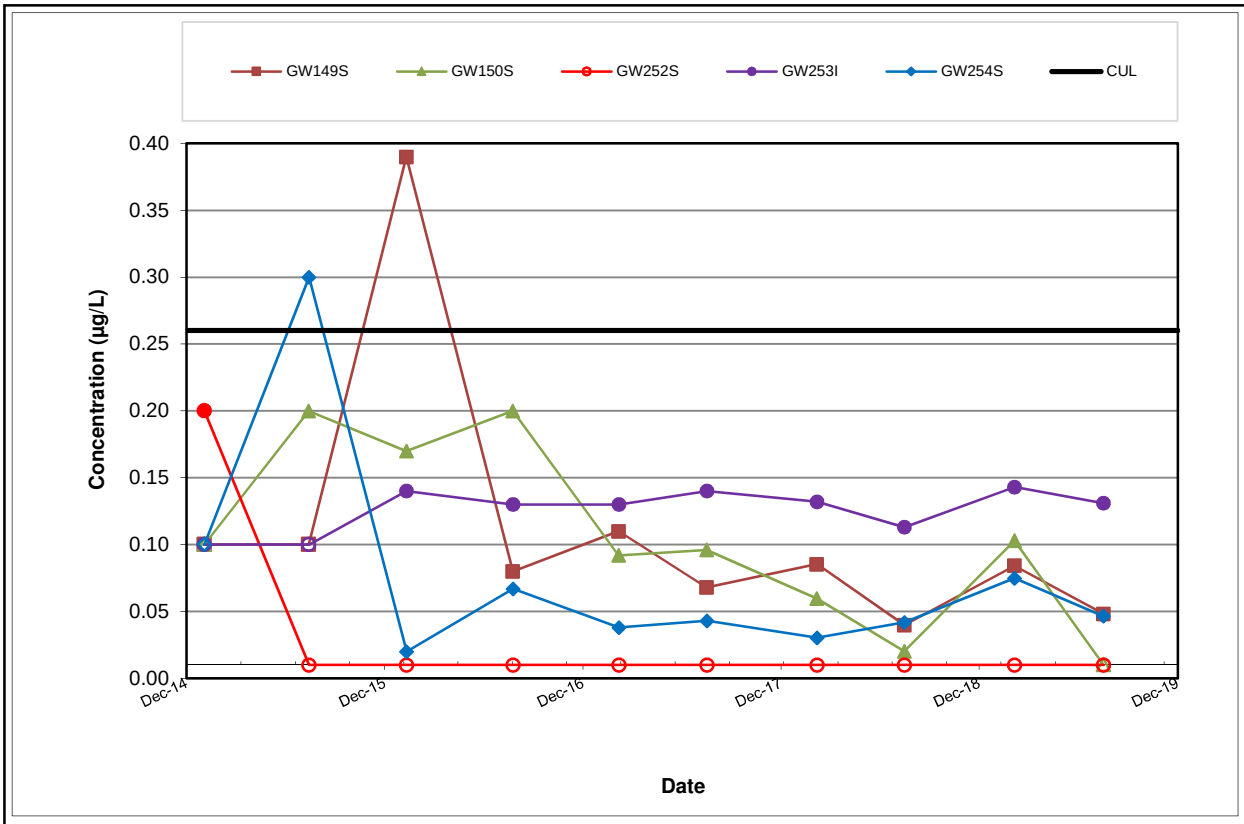
cis-1,2-Dichloroethene



Trichloroethene

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

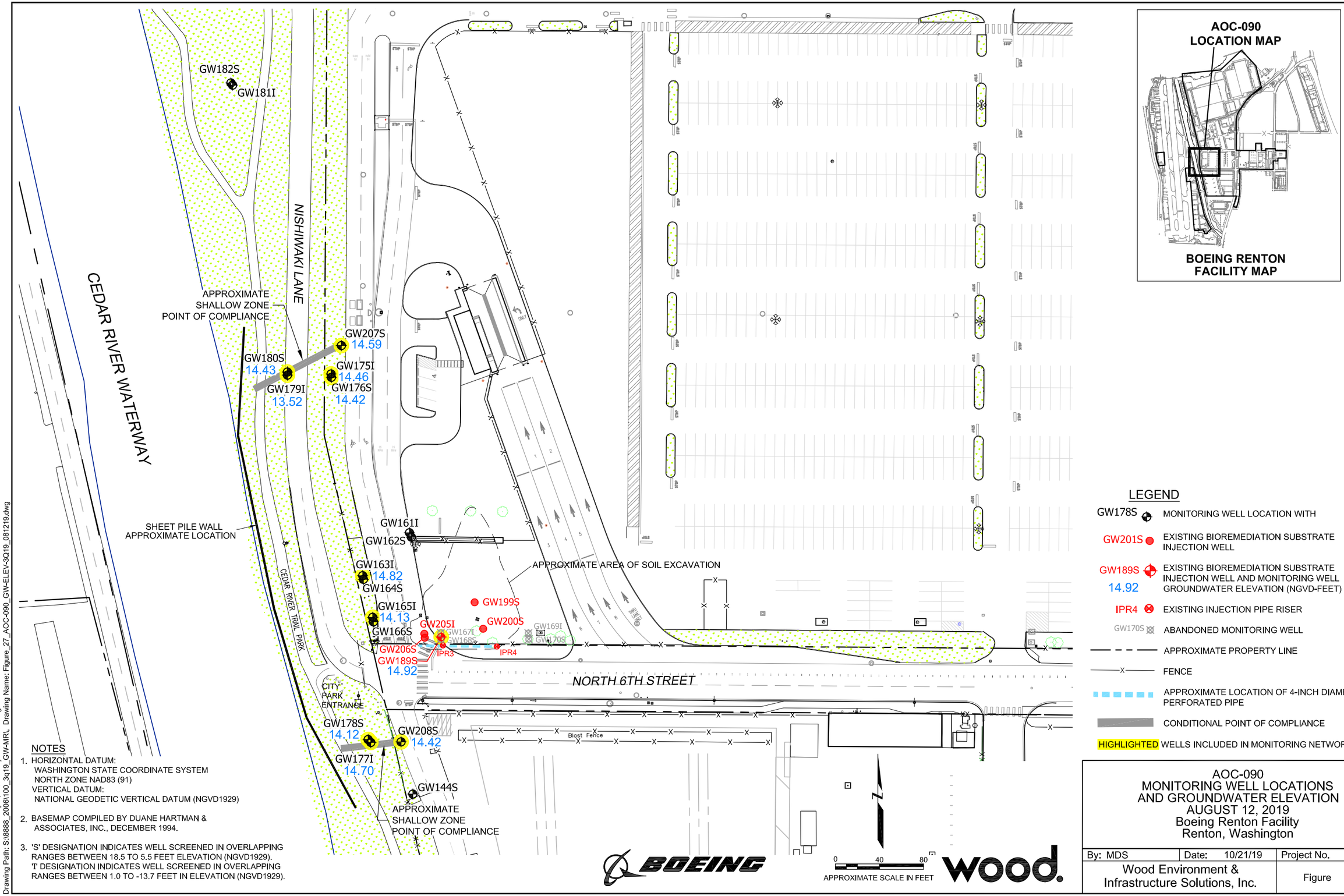
\\sea2-fs1\projects\8888 - Boeing Renton\02 Data Management\Grapher and Excel Figure Files\excel\Figures 23 to 26 AOC 60.xlsx



Vinyl Chloride

\\sea2-fs1\projects\8888 - Boeing Renton\02 Data Management\Grapher and Excel Figure Files\excel\Figures 23 to 26 AOC 60.xlsx

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 GROUNDWATER ELEVATION (NGVD-FEET) 14.92
- 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).

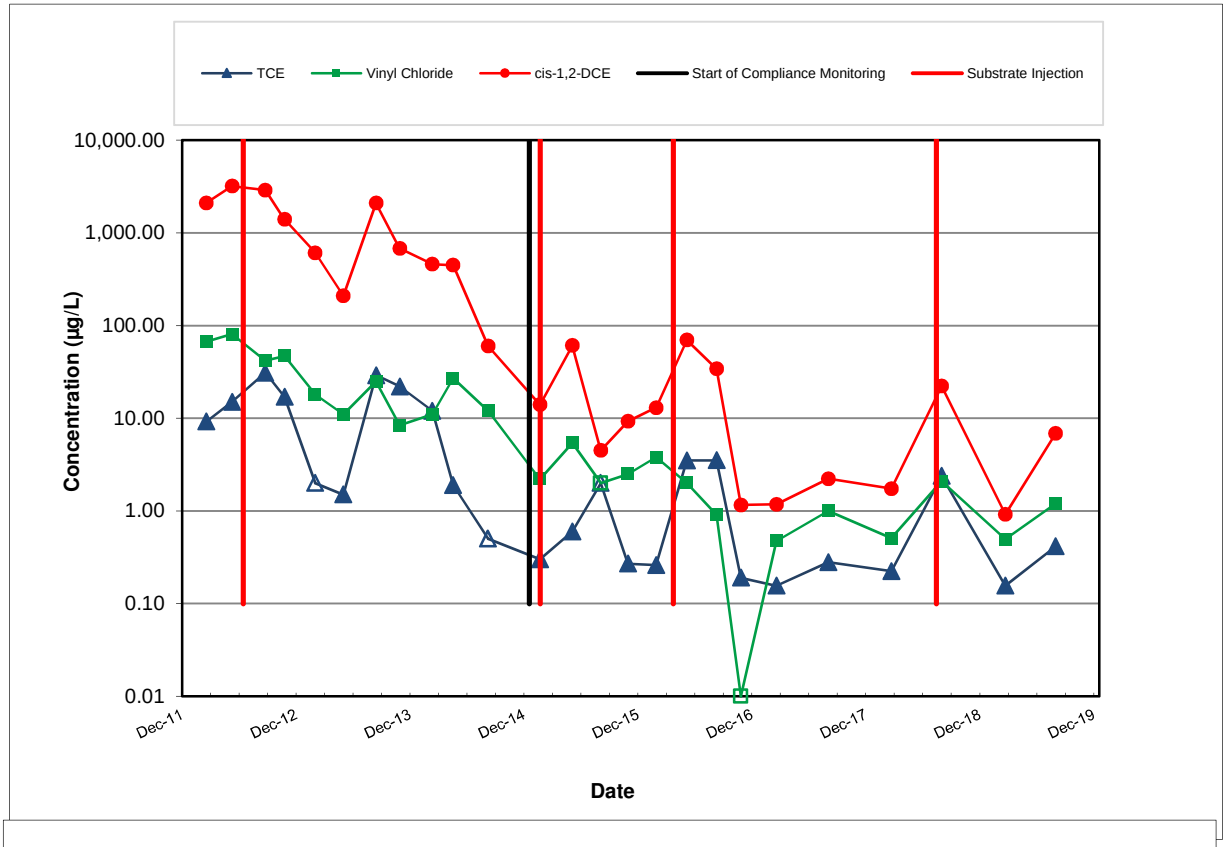
BOEING

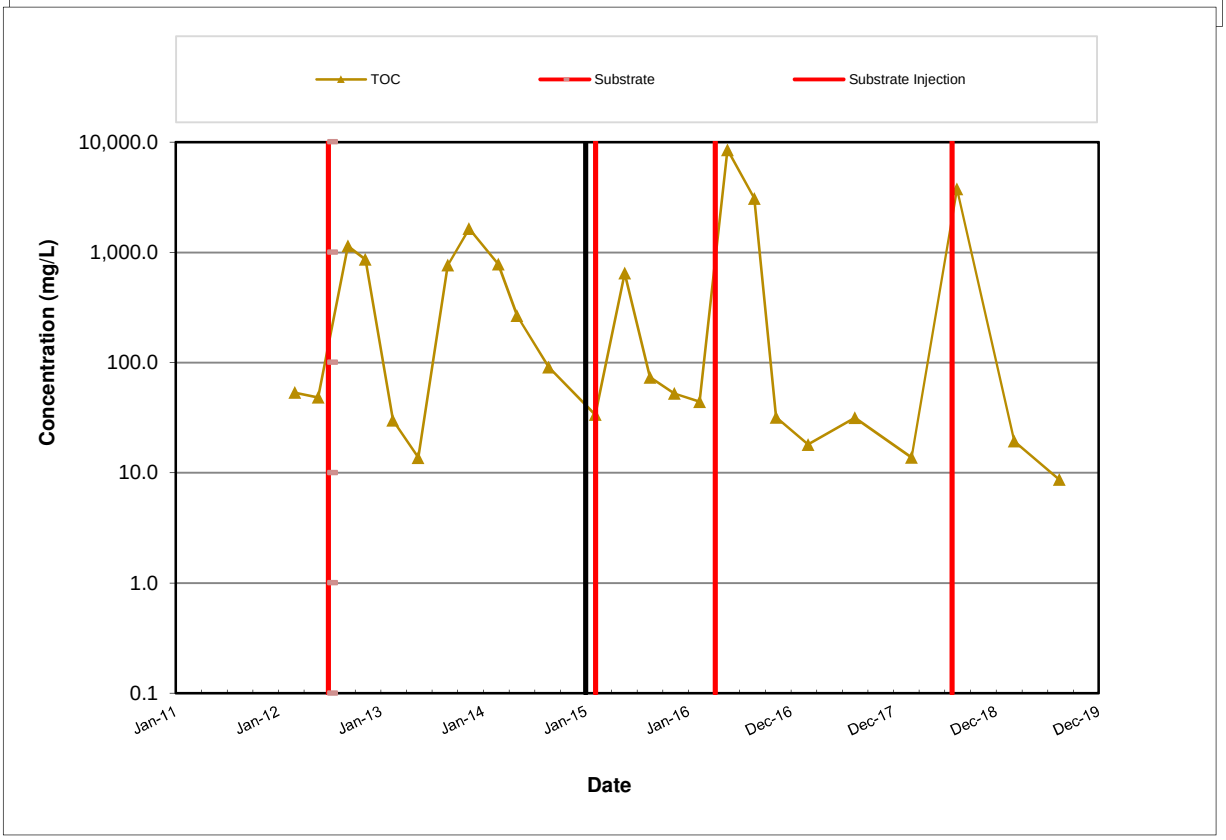
wood.

AOC-090
MONITORING WELL LOCATIONS AND GROUNDWATER ELEVATION
AUGUST 12, 2019
Boeing Renton Facility
Renton, Washington

By: MDS	Date: 10/21/19	Project No. 8888
Wood Environment & Infrastructure Solutions, Inc.		Figure 27

Plot Date: 10/21/19 - 4:41pm, Plotted by: mike.stenberg
Drawing Path: S:\8888_2006\100_3q19_GW-MR\, Drawing Name: Figure_27_AOC-090_GW-ELEV-3Q19_081219.dwg





Note: non-detected values shown at one-half the reporting limit and graphed with an open symbol.

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

\\sea2-fs1\projects\8888 - Boeing Renton\02 Data Management\Grapher and Excel Figure Files\excel\Figure 28 AOC-90 Trend Plots.xls

GW038S

GW035S

GW036S

GW259S
14.44

GW260S
14.32

B70-1

B70-2

B70-3

B70-4

B70-5

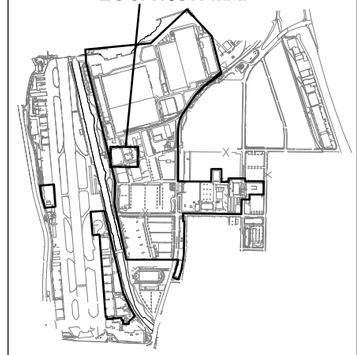
BUILDING 4-70

BUILDING 4-68

STOP

15 MPH

BUILDING 4-70 LOCATION MAP



BOEING RENTON FACILITY MAP

LEGEND

GW259S 14.44 — 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).

N

0 20 40
APPROXIMATE SCALE IN FEET

BOEING

wood.

BUILDING 4-70 MONITORING WELL LOCATIONS AND GROUNDWATER ELEVATIONS AUGUST 13, 2019 Boeing Renton Facility Renton, Washington

By: MDS	Date: 10/21/19	Project No. 8888
Wood Environment & Infrastructure Solutions, Inc.		Figure 29

Plot Date: 10/21/19 - 4:52pm, Plotted by: mike.stenberg
Drawing Path: S:\8888_2006\100_3q19_GW-MR\, Drawing Name: Figure_29_Building 4-70_GW-ELEV_3Q19_081319.dwg

Tables

TABLE 1: SWMU-168 GROUNDWATER ELEVATION DATA
August 12, 2019
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	9.07	16.35
GW230I	4 to 14	24.86	8.50	16.36
GW231S	5 to 10	24.65	8.27	16.38

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 12, 2019
Boeing Renton Facility, Renton, Washington

	Well ID [2]		
	CPOC Area		
	GW229S	GW230I	GW231S
Temperature (degrees C)	27.2	24.2	26.1
Specific Conductivity (µS/cm)	243.3	357.1	291.0
Dissolved Oxygen (mg/L)	4.76	3.89	1.36
pH (standard units)	5.96	6.26	6.41
Oxidation/Reduction Potential (mV)	78.7	-82.9	3.2

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]
August 12, 2019
Boeing Renton Facility, Renton, Washington

		Cleanup Level [3]	Well ID [2]		
			CPOC Area		
			GW229S	GW230I	GW231S
Volatile Organic Compounds (µg/L)					
Vinyl Chloride		0.11	0.020 U	**0.336**	0.0260

Notes:
1. **Bolded** values exceed the cleanup levels.
2. S = shallow well; I = intermediate well.
3. 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 12, 2019
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	9.60	16.31
GW152S	5 to 20[2]	26.98	10.05	16.93
GW153S	5 to 20[2]	27.47	10.75	16.72
GW172S	8 to 18[2]	26.44	10.35	16.09
GW173S	8 to 18[2]	26.51	10.47	16.04
GW226S	5 to 20[2]	26.86	10.08	16.78
GW232S	4 to 14	24.45	8.93	15.52
GW233I	15 to 25	24.35	8.52	15.83
GW234S	3 to 13	24.95	9.02	15.93
GW235I	15 to 25	24.9	14.79	10.11
GW236S	5 to 15	24.36	8.26	16.1

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 12, 2019
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)	25.3	25.3	22.2	21.7	25.5	22.1	27.0	19.8	20.4	23.3	22.6	21.2
Specific Conductivity (µS/cm)	181.2	181.2	258.9	262.5	257.3	432.8	341.0	553.0	209.6	273.6	167.1	395.2
Dissolved Oxygen (mg/L)	3.50	3.50	2.12	1.09	2.98	0.61	0.63	11.11	4.81	5.6	1.49	4.62
pH (standard units)	6.06	6.06	6.62	6.58	6.49	6.65	6.72	6.33	6.40	6.26	6.47	6.54
Oxidation/Reduction Potential (mV)	20.8	20.8	-29.2	-19.6	-40.5	-46.1	-52.8	-94.4	-12.2	24.7	-72.2	-41.8
Total Organic Carbon (mg/L)	10.96	10.37	6.27	7.48	6.59	5.92	7.77	7.48	4.10	1.60	1.23	2.19

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 12, 2019
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	**0.627**	**0.563**	**0.278**	0.0282	0.0270	0.0220	0.0259	**0.378**	**0.0697**	**0.0738**	**0.0638**	**0.0468**
Tetrachloroethene	0.02	**0.176**	**0.177**	**0.0544**	0.020 U	**0.0451**	**0.0561**	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Trichloroethene	0.02	**0.203**	**0.147**	**0.0326**	0.020 U	0.020 U	**0.0256**	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Vinyl Chloride	0.11	0.0705	0.0470	**0.153**	0.020 U	0.0376	0.0613	0.0290	**0.412**	0.020 U	0.0252	0.020 U	0.020 U
Total Metals (µg/L)													
Arsenic	1.0	**23.4**	**19.2**	**4.72**	**2.49**	**10.6**	**12.2**	**2.85**	**6.29**	0.397	**1.31**	0.292	**3.70**
Copper	3.5	**21.8**	**19.2**	1.58	1.38	**3.86**	1.39	0.626	0.878	0.500 U	0.869	0.714	0.893
Lead	1.0	**14.8**	**11.7**	0.351	0.116	**1.02**	0.290	0.100 U	0.102	0.100 U	0.280	0.182	**1.53**

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
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, 2019
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	5.01	14.43
GW033S	5 to 25	19.49	5.1	14.39
GW034S	5 to 25	19.65	5.23	14.42
GW038S	5 to 25	19.68	5.38	14.30
GW039S	3.5 to 13.5	19.3	5	14.30
GW143S	10 to 15	19.81	5.45	14.36
GW209S	3.5 to 13.3	19.37	5.02	14.35
GW210S	3.5 to 13.3	19.19	4.75	14.44
GW237S	5 to 15	18.85	4.56	14.29
GW238I	5 to 20	18.94	4.6	14.34
GW239I	15 to 20	19.69	5.34	14.35
GW240D	22 to 27	19.81	5.92	13.89
GW241S	4 to 14	20.28	5.97	14.31
GW242I	15 to 20	20.44	6.11	14.33
GW243I	5 to 20	19.49	5.09	14.40
GW244S	5 to 15	19.53	5.12	14.41

Notes:
1. S = shallow well; I = intermediate 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
SWMU = solid waste management unit
TOC = top of casing

TALBE 8: BUILDING 4-78/79 SWMU/AOC GROUP CONCENTRATIONS
OF PRIMARY GEOCHEMICAL INDICATORS [1]
August 13, 2019
Boeing Renton Facility, Renton, Washington

	Well ID [2]						
	Source Area						
	GW031S	GW031S (field dup.)	GW033S	GW034S	GW039S	GW243I	GW244S
Temperature (degrees C)	24.4	24.4	27.9	28.9	29.8	21.8	27.3
Specific Conductivity (µS/cm)	452.3	452.3	475.5	336.4	249.9	342.9	603.0
Dissolved Oxygen (mg/L)	0.33	0.33	0.27	0.15	0.65	2.91	0.39
pH (standard units)	6.44	6.44	6.43	6.61	6.10	6.39	6.48
Oxidation/Reduction Potential (mV)	-50.9	-50.9	-79.1	-85.4	29.3	-133.8	-81.1
Total Organic Carbon (mg/L)	15.31	15.02	22.79	8.31	5.84	9.79	15.53

	Well ID [2]		
	Downgradient Plume Area		
	GW038S	GW209S	GW210S
Temperature (degrees C)	22.7	27.3	26.5
Specific Conductivity (µS/cm)	332.8	429.1	369.0
Dissolved Oxygen (mg/L)	1.26	1.79	1.06
pH (standard units)	6.44	6.38	6.71
Oxidation/Reduction Potential (mV)	-61.7	-71.9	-5.6
Total Organic Carbon (mg/L)	9.65	9.83	79.1

	Well ID [2]						
	CPOC Area						
	GW143S	GW237S	GW238I	GW239I	GW240D	GW241S	GW242I
Temperature (degrees C)	26.5	25.4	28.2	25.7	26.4	21.8	24.1
Specific Conductivity (µS/cm)	300.5	326.6	512.0	416.0	471.4	342.9	405.4
Dissolved Oxygen (mg/L)	2.65	1.65	2.01	1.89	1.79	2.91	3.02
pH (standard units)	6.35	6.35	6.46	6.38	6.52	6.39	6.41
Oxidation/Reduction Potential (mV)	-19.1	-29.6	-103.9	-96.0	-109.2	-133.8	-109.7
Total Organic Carbon (mg/L)	4.10	8.11	10.04	9.24	5.15	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
NA = not analyzed
field dup. = field duplicate
mg/L = milligrams per liter
mV = millivolts
SWMU = solid waste management unit

TABLE 9: BUILDING 4-78/79 SWMU/AOC GROUP CONCENTRATIONS OF CONSTITUENTS OF CONCERN [1, 2]
August 13, 2019
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	**3.47**	**4.37**	**10.4**	0.20 U	0.20 U	0.20 U	**1.77**
cis -1,2-Dichloroethene	0.70	0.47	0.48	**0.78**	0.20 U	0.20 U	0.20 U	0.37
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	**0.21**	**0.22**	**1.16**	**0.39**	0.20 U	0.20 U	**0.71**
Total Petroleum Hydrocarbons (µg/L)								
NWTPH-Gx (C7-C12)	800	**1,390**	**1,200**	277	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	0.20 U
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	**2.20**	0.25	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Trichloroethene	0.23	**1.05**	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	**0.38**	0.20 U	0.20 U	**0.26**	0.20 U	0.20 U
Total Petroleum Hydrocarbons (µg/L)								
NWTPH-Gx (C7-C12)	800	100 U	329	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.
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 AOC-002 GROUNDWATER ELEVATION DATA
August 14, 2019
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	1.89	14.38
GW190S	3.0 to 13.0	17.3	2.96	14.34
GW191D	26.5 to 36.0	17.53	3.01	14.52
GW192S	5.0 to 9.5	17.54	3.28	14.26
GW193S	3.0 to 12.8	18.67	4.49	14.18
GW194S	7.3 to 12.0	16.79	2.48	14.31
GW195S	7.3 to 12.0	16.34	2.02	14.32
GW196D	26.8 to 36.8	16.46	2.1	14.36
GW197S	7.8 to 12.5	16.52	1.69	14.83
GW245S	3.0 to 13.0	16.08	1.83	14.25
GW246S	4.0 to 14.0	16.53	2.51	14.02

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 AND AOC-002 CONCENTRATIONS OF PRIMARY GEOCHEMICAL INDICATORS [1]

August 14, 2019

Boeing Renton Facility, Renton, Washington

	Well ID [2, 3]											
	Source Area	Downgradient Plume Area				CPOC Area						
	GW193S	GW190S	GW191D[4]	GW192S	GW246S	GW185S	GW185S (field dup.)	GW194S	GW195S	GW196D[5]	GW197S	GW245S
Temperature (degrees C)	23.3	24.7	24.4	23.1	25.3	25.1	25.1	27.8	29.5	29.5	26.7	27.3
Specific Conductivity (µS/cm)	1260	791	397.4	438.4	369.2	829	829	1011	999	525	1128	715
Dissolved Oxygen (mg/L)	0.91	0.79	0.83	0.73	0.54	0.34	0.34	0.37	0.25	0.20	0.13	0.20
pH (standard units)	6.39	6.21	6.57	6.09	6.25	6.56	6.56	6.23	6.40	6.39	7.04	6.98
Oxidation/Reduction Potential (mV)	-79.2	-55.5	-105.8	-44.8	-74.5	-120.7	-120.7	-83.1	-118.0	-89.4	-139.3	-91.4
Total Organic Carbon (mg/L)	39.75	8.21	5.57	7.86	4.16	12.55	12.72	19.52	21.11	7.82	13.07	12.26

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 GW246S and GW185S through GW197S 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 14, 2019

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	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Benzene	0.8	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.22	0.20 U
cis -1,2-Dichloroethene	0.02	**0.985**	**0.383**	**0.0341**	**1.670**	**0.305**	**0.222**	**0.240**	0.020 U	**0.0549**	**0.0356**	**0.0767**	**0.0333**
Trichloroethene	0.02	**0.0430**	0.020 U	0.020 U	**0.0665**	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	**0.129**	**0.480**	**0.128**	**1.980**	**1.210**	**0.193**	**0.203**	0.020 U	**0.0519**	0.0412	0.020 U	0.020 U

Notes:

1. Data qualifiers are as follows:
   U = The analyte was not detected at the reporting limit indicated.
2. **Bolded** values exceed the cleanup levels.
3. S = shallow well; 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 14, 2019
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	4.04	14.74
GW247S	4 to 14	18.91	4.2	14.71
GW248I	10 to 20	18.78	3.84	14.94
GW249S	4 to 14	18.85	3.89	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 14, 2019
Boeing Renton Facility, Renton, Washington

	Well ID [2]			
	Source Area	Downgradient Plume Area	CPOC Area	
	GW249S	GW188S	GW247S	GW248I
Temperature (degrees C)	26.4	23.3	25.6	28.1
Specific Conductivity (µS/cm)	566	541	523	575
Dissolved Oxygen (mg/L)	0.33	0.50	0.33	0.20
pH (standard units)	6.41	6.35	6.42	6.36
Oxidation/Reduction Potential (mV)	-101.1	-69.1	-50.1	-45.9
Total Organic Carbon (mg/L)	18.84	10.1	10.40	12.29

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 14, 2019
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	0.0526	0.0361	0.0650	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	0.020 U	0.020 U
Vinyl Chloride	0.24	**0.367**	**0.545**	**0.613**	**0.541**

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 14, 2019
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	3.99	15.57
GW250S	4 to 14	19.31	3.95	15.36

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 14, 2019
Boeing Renton Facility, Renton, Washington

	Well ID [2]	
	Source Area	CPOC Area
	GW250S	GW174S
Temperature (degrees C)	21.1	21.8
Specific Conductivity (µS/cm)	142.2	160.8
Dissolved Oxygen (mg/L)	0.39	0.35
pH (standard units)	7.00	6.64
Oxidation/Reduction Potential (mV)	-100.6	-61.4

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 14, 2019
Boeing Renton Facility, Renton, Washington

	Cleanup Level [3]	Well ID [2]	
		Source Area	CPOC Area
		GW250S	GW174S
Metals (mg/L)			
Lead	0.001	0.000714	0.000549

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 13 and 14, 2019
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	4.95	14.41
GW010S	4.5 to 14.5	19.47	5.11	14.36
GW011D	29 to 39	19.49	5.06	14.43
GW012S	4.5 to 14.5	19.11	4.77	14.34
GW014S	4.5 to 14.5	19.24	4.78	14.46
GW147S	5 to 15	18.73	4.4	14.33
GW149S	5 to 15	19.19	4.84	14.35
GW150S	5 to 15	19.1	4.67	14.43
GW252S	4 to 14	19.01	4.66	14.35
GW253I	10 to 20	19.02	4.73	14.29
GW254S	4 to 14	19.16	4.82	14.34

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 13 and 14, 2019

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)	21.0	22.0	21.4	21.4	20.4	19.6	23.5	23.8	20.8	21.7
Specific Conductivity (µS/cm)	406	735	391	391	93	272	398	661	388	608
Dissolved Oxygen (mg/L)	0.21	11.3 [3]	6.77	6.77	4.92	2.93	4.93	3.04	3.50	2.67
pH (standard units)	6.35	6.16	6.38	6.38	5.93	6.51	6.45	6.70	6.57	6.69
Oxidation/Reduction Potential (mV)	-37.7	-117.6	-67.8	-67.8	5.9	-69.5	-61.9	-118.2	-96.3	-124.6
Total Organic Carbon (mg/L)	6.88	10.84	4.12	4.08	3.23	4.41	8.07	5.81	4.66	9.49

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. Likely an erroneous field reading, as oxygen saturation is approximately 8 mg/L.

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 13 and 14, 2019
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	**0.127**	**0.798**	**0.143**	**0.145**	**4.11**	0.0427	**0.0824**	0.0342	**0.0917**	**0.116**
Trichloroethene	0.02	0.020 U	**0.0471**	0.020 U	0.020 U	**1.46**	0.020 U	**0.0228**	0.020 U	0.020 U	0.020 U
Vinyl Chloride	0.26	**0.300**	**0.893**	**0.365**	**0.362**	0.215	0.0482	0.020 U	0.020 U	0.131	0.0465

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 22: AOC-090 GROUNDWATER ELEVATION DATA
August 12, 2019
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	6.45	14.82
GW165I	25 to 35	21.14	7.01	14.13
GW175I	21.2 to 26.1	20.57	6.11	14.46
GW176S	10 to 14.3	20.15	5.73	14.42
GW177I	21.7 to 26	22.51	7.81	14.7
GW178S	11.2 to 15.5	22.73	8.61	14.12
GW179I	21.5 to 26	20.47	6.95	13.52
GW180S	10.5 to 15	20.56	6.13	14.43
GW189S	4 to 14	22.01	7.09	14.92
GW207S	7.3 to 12	21.12	6.53	14.59
GW208S	6.3 to 11	22.45	8.03	14.42

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 12, 2019

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)	23.6	21.6	19.3	17.4	19.0	19.0	18.6	19.7	19.7	20.8	18.7	18.1
Specific Conductivity (µS/cm)	428.3	533.0	628.0	391.5	305.9	305.9	465.6	472.6	405.7	369.7	556.0	475.4
Dissolved Oxygen (mg/L)	0.28	7.49	7.31	6.57	5.08	5.08	1.19	7.98	3.13	3.42	8.00	7.69
pH (standard units)	6.17	6.33	6.30	6.33	6.37	6.37	6.84	6.31	6.40	6.39	6.31	6.35
Oxidation/Reduction Potential (mV)	-29.1	-92.5	-98.4	-76.6	-54.0	-54.0	-98.9	-100.0	-92.7	-91.2	-98.3	-89.6
Total Organic Carbon (mg/L)	8.66	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, 2019

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)													
1,1,2,2-Tetrachloroethane	0.17	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
1,1,2-Trichloroethane	0.2	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
1,1-Dichloroethene	0.057	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Acetone	300	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Benzene	0.8	0.49	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Carbon Tetrachloride	0.23	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Chloroform	2	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
cis-1,2-Dichloroethene	2.4	**6.87**	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	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Tetrachloroethene	0.05	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Toluene	75	3.11	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	0.39	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Trichloroethene	0.08	**0.414**	0.020 U	0.020 U	0.020 U	0.0239	0.0211	0.0305	0.0293	0.020 U	0.020 U	0.020 U	0.020 U
Vinyl Chloride	0.13	**1.20**	0.020 U	**0.301**	**0.384**	0.0485	0.0553	0.020 U	**0.245**	0.020 U	0.020 U	0.0339	0.0368
Total Petroleum Hydrocarbons (µg/L)													
NWTPH-Gx (C7-C12)	800	**943**	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	432	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	**853**	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.
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 13, 2019
Boeing Renton Facility, Renton, Washington

Well ID[1]	Screen Interval Depth (feet bgs)	TOC Elevation (feet)[2]	Depth to Groundwater (feet below TOC)	Groundwater Elevation (feet)[2]
GW259S	5 to 15	19.72	5.28	14.44
GW260S	5 to 15	19.83	5.51	14.32

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 13, 2019

Boeing Renton Facility, Renton, Washington

	Well ID [2]	
	CPOC Area	
	GW259S	GW260S
Temperature (degrees C)	24.3	22.4
Specific Conductivity (µS/cm)	315.2	344.2
Dissolved Oxygen (mg/L)	1.50	2.96
pH (standard units)	6.57	6.42
Oxidation/Reduction Potential (mV)	2.2	-91.8
Total Organic Carbon (mg/L)	5.12	10.97

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 13, 2019
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	0.61	0.20 U
Trichloroethene	0.54	**0.71**	0.20 U
Vinyl Chloride	0.2	0.20 U	0.20 U

Notes:
1. Data qualifiers are as follows:
   U = The analyte was not detected at the reporting limit indicated.
2. **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, GW224S, and GW258S		TPH-jet fuel, TPH-diesel	NWTPH-Dx
AOC-001/AOC-002	X (CPOC wells)	X (1,3) (all other wells)	NA	GW193S	GW190S, GW191D, GW192S, and GW246S	GW185S, GW194S, GW195S, GW196D, GW197S, and GW245S		Benzene	SW8260C[6]
								TCE, *cis* -1,2-DCE, 1,1-dichloroethene, VC	SW8260C SIM[6]
AOC-003	X (CPOC wells)	X (1,3) (all other wells)	NA	GW249S	GW188S	GW247S and GW248I		PCE, TCE	SW8260C SIM[6]
								cis -1,2-DCE, VC	
AOC-004		X (1,3)	NA	GW250S	NA	GW174S		Lead	EPA 6020A
AOC-060		X (1,3)	GW012S and GW014S	GW009S	GW147S	GW149S, GW150S, GW252S, GW253I, and GW254S	GW010S and GW011D	VC	SW8260C SIM[6]
								TCE, *cis* -1,2-DCE	
AOC-090		X (1,3)	NA	GW189S	GW175I and GW176S	GW163I, GW165I, GW177I, GW178S, GW179I, GW180S, GW207S, and GW208S		1,1,2-Trichloroethane, acetone, benzene, toluene, carbon tetrachloride, chloroform, *cis* -1,2-DCE, *trans* -1,2-DCE, methylene chloride	SW8260C[6]
								1,1-Dichloroethene, 1,1,2,2-tetrachloroethane, VC, PCE, TCE	SW8260C SIM[6]
								TPH-gasoline	NWPTH-Gx
								TPH-diesel, TPH-motor oil	NWTPH-Dx
Building 4-70 Area		X (1,3)	NA	NA	NA	GW259S and GW260S		TCE, *cis* -1,2-DCE, VC	SW8260C[6]
Lot 20/Former Building 10-71		X (2,4)	NA	10-71-MW1, 10-71-MW2, and 10-71-MW4	NA	NA		Toluene, cis-1,2-DCE, TCE, VC	SW8260C[6]
Apron A		X (2,4)	NA	GW262S and GW264S	NA	NA		*cis* -1,2-DCE and VC	SW8260C[6]

Notes:

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

Abbreviations:

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

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

Boeing Renton Facility, Renton, Washington

Cleanup Action Area	Groundwater Monitoring Wells				Primary Geochemical Parameters[2]		
					Indicators	Monitoring Frequency[3]	
	Cross-Gradient Wells	Source Area Wells	Downgradient Plume Wells	CPOC Wells		Quarterly	Semiannual
SWMU-168	NA	GW228S[4]	NA	GW229S, GW230I, and GW231S	Dissolved oxygen, pH, ORP, temperature, specific conductance		X (1,3)
SWMU-172/SWMU-174	NA	GW152S and GW153S	GW081S, GW172S, GW173S, and GW226S	GW232S, GW233I, GW234S, GW235I, and GW236S	Dissolved oxygen, pH, ORP, temperature, specific conductance, TOC	X	
Building 4-78/79 SWMU/AOC Group	NA	GW031S, GW033S, GW034S, GW039S, GW243I, and GW244S	GW038S, GW209S, and GW210S	GW143S, GW237S, GW238I, GW239I, GW240D, GW241S, and GW242I	Dissolved oxygen, pH, ORP, temperature, specific conductance in all wells, TOC in all wells except GW241S and GW242I	X	
Former Fuel Farm SWMU/AOC Group	NA	GW255S, GW256S, and GW257S	NA	GW183S, GW184S, GW211S, GW212S, GW221S, GW224S, and GW258S	Dissolved oxygen, pH, ORP, temperature, specific conductance		X (2,4)
AOC-001/AOC-002	NA	GW193S	GW190S, GW191D, GW192S, and GW246S	GW185S, GW194S, GW195S, GW196D, GW197S, and GW245S	Dissolved oxygen, pH, ORP, temperature, specific conductance, TOC	X (CPOC wells)	X (1,3) (all other wells)
AOC-003	NA	GW249S	GW188S	GW247S and GW248I	Dissolved oxygen, pH, ORP, temperature, specific conductance, TOC	X (CPOC wells)	X (1,3) (all other wells)
AOC-004	NA	GW250S	NA	GW174S	Dissolved oxygen, pH, ORP, temperature, specific conductance		X (1,3)
AOC-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)
Lot 20/Former Building 10-71	NA	10-71-MW1, 10-71-MW2, and 10-71-MW4	NA	NA	Dissolved oxygen, pH, ORP, temperature, specific conductance		X (2,4)
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 2019 | Date/Time: 8/ 14 /2019@ 920

Sample Number: RGW185S- 190814 | Weather: SUNNY, WARM

Landau Representative: BXM

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 1.89 Time: 844 Flow through cell vol. GW Meter No.(s HERON-1

Begin Purge: Date/Time: 8/ 14 /2019 @ 856 End Purge: Date/Time: 8/ 14 /2019 @ 814 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		
859	21.9	827	0.71	6.73	-114.6		1.87		
902	23.3	835	0.47	6.63	-119.4		1.86		
905	24.4	831	0.36	6.59	-120.9		1.86		
908	24.9	831	0.35	6.58	-121.0				
911	25.1	829	0.34	6.56	-120.7				

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

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

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	830	0.33	6.56	-120.4				
2	25.3	830	0.33	6.56	-120.4				
3	25.3	829	0.33	6.56	-120.4				
4	25.3	830	0.32	6.56	-120.4				
Average:	25.3	830	0.33	6.56	-120.4	#DIV/0!			

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

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

Comments:

Signature: BXM Date: 8/14/2019

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly August 2019 | Date/Time: 8/ 14 /2019 @ 830

Sample Number: RGWDUP3 190814 | Weather: WARM, SUNNY

Landau Representative: BXM

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 1.89 Time: 844 Flow through cell vol. GW Meter No.(s HERON-1

Begin Purge: Date/Time: 8/ 14 /2019 856 End Purge: Date/Time: 8/ 14 /2019 @ 814 Gallons Purged: <0.5

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

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

DUPLICATE TO RGW185S

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, NO/NS, SLIGHT EFFERVESCENT

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	830	0.33	6.56	-120.4				
2	25.3	830	0.33	6.56	-120.4				
3	25.3	829	0.32	6.56	-120.4				
4	25.3	829	0.32	6.56	-120.4				
Average:	25.3	830	0.33	6.56	-120.4	#DIV/0!			

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

Duplicate Sample No(s): Duplicate to RGW194S

Comments:

Signature: BXM Date: 8/14/2019

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly August 2019 | Date/Time: 8/ 14 /2019@ 1331

Sample Number: RGW188S- 190814 | Weather: CLEAR

Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 4.04 Time: 1310 Flow through cell vol. GW Meter No.(s SLOPE 10

Begin Purge: Date/Time: 8/ 14 /2019 1300 End Purge: Date/Time: 8/ 14 /2019 @ 1317 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		
1303	21.9	523	0.41	6.33	-43.7	LOW	4.04		
1306	22.4	530	0.42	6.33	-48.8		4.04		
1309	23.0	535	0.46	6.35	-60.4		4.04		
1312	23.0	537	0.47	6.35	-62.8				
1315	23.3	541	0.50	6.35	-69.1				

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	23.3	541	0.51	6.35	-70.3				
2	23.3	542	0.52	6.35	-71.3				
3	23.3	542	0.52	6.35	-72.5				
4	23.3	543	0.53	6.35	-73.4				
Average:	23.3	542	0.52	6.35	-71.9	#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) (Silic		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s): MSMSD Location

Comments:

Signature: SRB Date: 8/14/2019

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly August 2019 | Date/Time: 8/ 14 /2019@ 1201

Sample Number: RGW190S- 190814 | Weather: CLEAR

Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 2.96 Time: 1120 Flow through cell vol. GW Meter No.(s SLOPE 10

Begin Purge: Date/Time: 8/ 14 /2019 1130 End Purge: Date/Time: 8/ 14 /2019 @ 1145 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		
1133	23.9	739	0.70	6.21	-45.7	LOW	2.96		
1136	24.3	770	0.76	6.21	-50.8		2.96		
1139	24.5	779	0.77	6.21	-52.7		2.96		
1142	24.7	791	0.79	6.21	-55.5				

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): 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	24.7	793	0.87	6.21	-55.9				
2	24.7	793	0.82	6.21	-56.1				
3	24.7	794	0.81	6.21	-56.3				
4	24.7	796	0.75	6.21	-56.4				
Average:	24.7	794	0.81	6.21	-56.2	#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) (Silic	
	VOC (Boeing short list)	
	Methane Ethane Ethene Acetylene	
	others	

Duplicate Sample No(s):

Comments:

Signature: SRB Date: 8/14/2019

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly August 2019 | Date/Time: 8/ 14 /2019@ 1101

Sample Number: RGW191D-190814 | Weather: CLEAR

Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 3.01 Time: 1020 Flow through cell vol. GW Meter No.(s SLOPE 10

Begin Purge: Date/Time: 8/ 14 /2019 1030 End Purge: Date/Time: 8/ 14 /2019 @ 1048 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		
1033	23.1	380.5	0.59	6.58	-96.0	LOW	3.01		
1036	23.4	384.8	0.87	6.58	-98.7		3.01		
1039	24.4	396.2	0.81	6.57	-105.2		3.01		
1042	24.4	396.4	0.82	6.57	-105.7				
1045	24.4	397.4	0.83	6.57	-105.8				

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 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	24.4	397.5	0.84	6.57	-106.0				
2	24.4	397.7	0.84	6.57	-106.1				
3	24.4	398.0	0.84	6.57	-106.3				
4	24.4	398.0	0.85	6.57	-106.5				
Average:	24.4	397.8	0.84	6.57	-106.2	#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) (Silic	
	VOC (Boeing short list)	
	Methane Ethane Ethene Acetylene	
	others	

Duplicate Sample No(s):

Comments:

Signature: SRB Date: 8/14/2019

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly August 2019 | Date/Time: 8/ 14 /2019@ 1131

Sample Number: RGW192S- 190814 | Weather: CLEAR

Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 3.28 Time: 1052 Flow through cell vol. GW Meter No.(s SLOPE 10

Begin Purge: Date/Time: 8/ 14 /2019 1100 End Purge: Date/Time: 8/ 14 /2019 @ 1120 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		
1103	22.6	464.5	0.59	6.10	-37.2		3.28		
1106	22.6	459.9	0.62	6.10	-39.1		3.28		
1109	22.8	452.2	0.66	6.10	-41.2		3.28		
1112	23.0	445.2	0.70	6.10	-43.5				
1115	23.1	442.4	0.74	6.09	-44.0				
1118	23.1	438.4	0.73	6.09	-44.8				

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	23.1	438.5	0.74	6.09	-44.9				
2	23.2	437.5	0.74	6.09	-44.9				
3	23.1	437.3	0.73	6.09	-45.0				
4	23.1	437.4	0.73	6.09	-45.1				
Average:	23.1	437.7	0.74	6.09	-45.0	#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) (Silic
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):

Comments:

Signature: SRB Date: 8/14/2019

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly August 2019 | Date/Time: 8/ 14 /2019@ 1031

Sample Number: RGW193S- 190814 | Weather: CLEAR

Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 4.49 Time: 955 Flow through cell vol. GW Meter No.(s SLOPE 10

Begin Purge: Date/Time: 8/ 14 /2019 1000 End Purge: Date/Time: 8/ 14 /2019 @ 1020 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		
1003	22.7	1219	0.55	6.39	-65.5	LOW	4.45		
1006	22.9	1228	0.60	6.39	-67.6		4.45		
1009	23.1	1239	0.76	6.39	-70.9		4.45		
1012	23.2	1251	0.93	6.39	-75.0				
1015	23.3	1261	0.93	6.39	-78.7				
1018	23.3	1260	0.91	6.39	-79.2				

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	23.3	1261	0.90	6.39	-79.5				
2	23.3	1261	0.90	6.39	-79.8				
3	23.3	1261	0.90	6.39	-80.0				
4	23.3	1262	0.89	6.39	-80.3				
Average:	23.3	1261	0.90	6.39	-79.9	#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) (Silic	
	VOC (Boeing short list)	
	Methane Ethane Ethene Acetylene	
	others	

Duplicate Sample No(s):

Comments:

Signature: SRB Date: 8/14/2019

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly August 2019 | Date/Time: 8/ 14 /2019@ 1335

Sample Number: RGW194S- 190814 | Weather: SUNNY, HOT

Landau Representative: BXM

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 2.48 Time: 1306 Flow through cell vol. GW Meter No.(s HERON-1

Begin Purge: Date/Time: 8/ 14/2019 (1309 End Purge: Date/Time: 8/ 14 /2019 @ 1333 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		
1312	23.9	856	0.17	6.22	-40.1		2.43		
1315	25.1	886	0.27	6.21	-56.8		2.43		
1318	26.0	930	0.35	6.21	-64.6		2.43		
1321	26.7	964	0.36	6.22	-72.2				
1324	27.2	990	0.37	6.22	-78.2				
1327	27.6	1002	0.37	6.23	-80.8				
1330	27.8	1011	0.37	6.23	-83.1				

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): CLEAR, COLORLESS, NO/NS, SOME DARK FINES, SLIGHT EFFERVESCENT

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	27.8	1012	0.38	6.23	-83.4				
2	27.9	1013	0.38	6.23	-83.7				
3	28.0	1014	0.38	6.23	-84.1				
4	28.0	1015	0.39	6.23	-84.4				
Average:	27.9	1014	0.38	6.23	-83.9	#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) (Silic	
	VOC (Boeing short list)	
	Methane Ethane Ethene Acetylene	
	others	

Duplicate Sample No(s):

Comments: PRESSURE RELEASE WHEN OPENED WELL. INITIAL DTW KEPT DROPPING RAPIDLY.

Signature: BXM Date: 8/14/2019

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly August 2019 | Date/Time: 8/ 14 /2019@ 1200

Sample Number: RGW195S- 190814 | Weather: SUNNY, MUGGY, HOT

Landau Representative: BXM

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 2.02 Time: 1125 Flow through cell vol. GW Meter No.(s HERON-1

Begin Purge: Date/Time: 8/ 14 /2019 @ 1133 End Purge: Date/Time: 8/ 14 /2019 @ 1157 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		
1136	26.4	834	0.14	6.48	-107.6		2.02		
1139	27.2	878	0.12	6.42	-111.6		2.02		
1142	28.0	915	0.14	6.42	-113.5		2.03		
1145	28.6	956	0.20	6.41	-116.3				
1148	28.9	968	0.23	6.41	-116.9				
1151	29.2	990	0.24	6.41	-117.5				
1154	29.5	999	0.25	6.40	-118.0				

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, 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	29.5	1000	0.25	6.4	-118.0				
2	29.6	1002	0.38	6.4	-117.7				
3	29.7	1004	0.27	6.4	-117.7				
4	29.7	1005	0.25	6.4	-117.7				
Average:	29.6	1003	0.29	6.4	-117.8	#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 ☐
	(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) (Silic	
	VOC (Boeing short list)	
	Methane Ethane Ethene Acetylene	
	others	

Duplicate Sample No(s):

Comments:

Signature: BXM Date: 8/14/2019

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly August 2019 | Date/Time: 8/ 14 /2019@ 1250

Sample Number: RGW196D-190814 | Weather: SUNNY, HOT, HUMID

Landau Representative: BXM

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 2.10 Time: 1208 Flow through cell vol. GW Meter No.(s HERON-1

Begin Purge: Date/Time: 8/ 14 /2019 @ 1222 End Purge: Date/Time: 8/ 14 /2019 @ 1245 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		
1225	29.0	559	0.13	6.45	-84.9		2.09		
1228	29.3	558	0.12	6.45	-85.5		2.10		
1231	30.3	554	0.15	6.42	-87.0		2.10		
1234	31.0	553	0.16	6.41	-88.4				
1237	30.8	550	0.17	6.41	-90.2				
1240	30.3	538	0.20	6.40	-89.8				
1243	29.5	525	0.20	6.39	-89.4				

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): CLEAR, COLORLESS, 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	29.6	527	0.20	6.39	-89.4				
2	29.7	523	0.21	6.40	-89.7				
3	29.2	520	0.20	6.39	-89.7				
4	29.3	521	0.20	6.39	-89.7				
Average:	29.5	523	0.20	6.39	-89.6	#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) (Silic	
	VOC (Boeing short list)	
	Methane Ethane Ethene Acetylene	
	others	

Duplicate Sample No(s):

Comments:

Signature: BXM Date: 8/14/2019

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly August 2019 | Date/Time: 8/ 14 /2019@ 1025

Sample Number: RGW197S- 190814 | Weather: SUNNY, WARM

Landau Representative: BXM

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 1.69 Time: 946 Flow through cell vol. GW Meter No.(s HERON-1

Begin Purge: Date/Time: 8/ 14 /2019 @ 957 End Purge: Date/Time: 8/14 /2019 @ 1020 Gallons Purged: <0.5

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

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
	Purge Goals: Stablization of Parameters for three consecutive readings within the following limits							>/= 1 flow through cell	
	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft		
1000	24.1	1043	0.18	6.91	-106.1		1.69		
1003	24.5	1056	0.17	6.91	-114.4		1.69		
1006	25.0	1071	0.19	6.94	-122.3		1.69		
1009	25.9	1099	0.14	7.00	-130.3				
1012	26.1	1109	0.14	7.01	-133.7				
1015	26.6	1123	0.12	7.03	-137.2				
1018	26.7	1128	0.13	7.04	-139.3				

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, NO/NS, SLIGHT EFFERV.

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	26.8	1128	0.13	7.05	-139.6				
2	26.8	1128	0.13	7.05	-139.7				
3	26.8	1129	0.13	7.05	-140.0				
4	26.8	1129	0.13	7.05	-140.3				
Average:	26.8	1129	0.13	7.05	-139.9	#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) (Silic	
	VOC (Boeing short list)	
	Methane Ethane Ethene Acetylene	
	others	

Duplicate Sample No(s):

Comments:

Signature: BXM Date: 8/14/2019

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly August 2019 | Date/Time: 8/ 14 /2019@ 1110

Sample Number: RGW245S- 190814 | Weather: SUNNY, MUGGY, WARM

Landau Representative: BXM

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 1.83 Time: 1038 Flow through cell vol. GW Meter No.(s HERON-1

Begin Purge: Date/Time: 8/ 14 /2019 @ 1044 End Purge: Date/Time: 8/ 14 /2019 @ 1108 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		
1047	23.8	711	0.27	7.07	-86.0		1.84		
1050	24.4	717	0.26	7.03	-86.6		1.84		
1053	25.2	712	0.48	7.01	-87.4		1.84		
1056	26.1	709	0.40	6.99	-89.6				
1059	26.7	712	0.24	6.99	-90.6				
1102	26.8	713	0.25	6.98	-91.2				
1105	27.3	715	0.20	6.98	-91.4				

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): CLEAR-SLIGHTLY CLOUDY, COLORLESS, ORANGE FINES, 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	27.4	716	0.20	6.98	-91.5				
2	27.4	716	0.20	6.98	-91.6				
3	27.4	716	0.19	6.98	-91.9				
4	27.6	717	0.25	6.98	-91.9				
Average:	27.5	716	0.21	6.98	-91.7	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: BXM Date: 8/14/2019

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly August 2019 | Date/Time: 8/ 14 /2019@ 1231

Sample Number: RGW246S- 190814 | Weather: CLEAR

Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 2.51 Time: 1150 Flow through cell vol. GW Meter No.(s SLOPE 10

Begin Purge: Date/Time: 8/ 14 /2019 1200 End Purge: Date/Time: 8/ 14 /2019 @ 1224 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		
1203	22.1	287.2	0.40	6.17	-1.1	LOW	2.23		
1206	24.9	492.3	0.46	6.26	-67.9		2.23		
1209	25.1	455.4	0.49	6.26	-72.4		2.23		
1212	25.1	456.1	0.50	6.26	-73.2				
1215	25.1	414.5	0.53	6.25	-74.6				
1218	25.2	383.8	0.54	6.25	-74.8				
1221	25.3	369.2	0.54	6.25	-74.5				

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	25.3	358.9	0.55	6.25	-74.5				
2	25.3	361.0	0.56	6.25	-74.6				
3	25.3	361.3	0.54	6.25	-74.6				
4	25.3	351.6	0.53	6.25	-74.6				
Average:	25.3	358.2	0.55	6.25	-74.6	#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) (Silic
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):

Comments:

Signature: SRB Date: 8/14/2019

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly August 2019 | Date/Time: 8/ 14 /2019@ 1401

Sample Number: RGW247S- 190814 | Weather: CLEAR

Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 4.2 Time: 1320 Flow through cell vol. GW Meter No.(s SLOPE 10

Begin Purge: Date/Time: 8/ 14 /2019 1330 End Purge: Date/Time: 8/ 14 /2019 @ 1342 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**		
1333	24.9	515	0.31	6.40	-29.5	LOW	4.39		
1336	25.2	519	0.32	6.41	-37.2		4.36		
1339	25.6	523	0.33	6.42	-50.1		4.32		

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	25.8	525	0.33	6.42	-51.9				
2	25.8	528	0.34	6.42	-53.7				
3	25.8	528	0.34	6.42	-55.6				
4	25.8	529	0.34	6.43	-57.1				
Average:	25.8	528	0.34	6.42	-54.6	#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) (Silic	
	VOC (Boeing short list)	
	Methane Ethane Ethene Acetylene	
	others	

Duplicate Sample No(s):

Comments:

Signature: SRB Date: 8/14/2019

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly August 2019 | Date/Time: 8/ 14 /2019@ 1435

Sample Number: RGW248I- 190814 | Weather: SUNNY, HOT

Landau Representative: BXM

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 3.84 Time: 1401 Flow through cell vol. GW Meter No.(s HERON-1

Begin Purge: Date/Time: 8/ 14 /2019 @ 1407 End Purge: Date/Time: 8/ 14 /2019 @ 1430 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		
1410	23.0	481.8	0.17	6.44	14.2		3.90		
1413	24.4	507	0.16	6.37	-0.3		3.90		
1416	25.9	514	0.14	6.32	-9.4		3.87		
1419	26.7	536	0.12	6.33	-21.2				
1422	27.4	554	0.12	6.34	-30.9				
1425	28.1	565	0.12	6.35	-38.6				
1428	28.1	575	0.20	6.36	-45.9				

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): CLEAR, COLORLESS, NO/NSDARK FINES, SLIGHT EFFERVESCENT

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	28.2	577	0.12	6.36	-46.7				
2	28.3	578	0.12	6.36	-47.6				
3	28.2	578	0.12	6.36	-48.3				
4	28.4	581	0.12	6.36	-49.0				
Average:	28.3	579	0.12	6.36	-47.9	#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) (Silic		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):

Comments:

Signature: BXM Date: 8/14/2019

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly August 2019 | Date/Time: 8/ 14 /2019@ 1301

Sample Number: RGW249S- 190814 | Weather: CLEAR

Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 3.89 Time: 1225 Flow through cell vol. GW Meter No.(s SLOPE 10

Begin Purge: Date/Time: 8/ 14 /2019 1230 End Purge: Date/Time: 8/ 14 /2019 @ 1254 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		
1233	23.4	581	0.12	6.34	-35.0	LOW	3.89		
1236	22.6	578	0.12	6.38	-58.4		3.89		
1239	23.2	575	0.11	6.41	-82.0		3.89		
1242	24.4	577	0.23	6.42	-94.7				
1245	24.9	574	0.26	6.42	-97.0				
1248	25.7	572	0.28	6.41	-99.2				
1251	26.4	566	0.33	6.41	-101.1				

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 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	26.3	562	0.33	6.41	-101.2				
2	26.6	562	0.33	6.40	-101.3				
3	26.5	561	0.35	6.40	-101.4				
4	26.4	560	0.36	6.40	-101.5				
Average:	26.5	561	0.34	6.40	-101.4	#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) (Silic
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):

Comments:

Signature: SRB Date: 8/14/2019

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly August 2019 | Date/Time: 8/ 14 /2019@ 1010

Sample Number: RGW174S- 190814 | Weather: CLEAR

Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 3.99 Time: 930 Flow through cell vol. GW Meter No.(s SLOPE 10

Begin Purge: Date/Time: 8/ 14 /2019 940 End Purge: Date/Time: 8/ 14 /2019 @ 1003 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		
943	19.2	142.2	0.76	6.48	-30.0	LOW	4.3		
946	19.5	143.1	0.63	6.46	-29.2		4.33		
949	21.0	150.9	0.55	6.51	-35.1		4.25		
952	21.3	153.3	0.44	6.53	-36.9		4.25		
955	21.6	157.0	0.41	6.59	-48.5				
958	21.7	158.6	0.35	6.62	-54.0				
1001	21.8	160.8	0.35	6.64	-61.4				

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

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

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	21.8	160.9	0.34	6.64	-62.4				
2	21.8	162.0	0.34	6.64	-64.2				
3	21.8	162.0	0.35	6.65	-65.1				
4	21.8	162.0	0.32	6.65	-66.2				
Average:	21.8	161.7	0.34	6.65	-64.5	#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) (Silic
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):

Comments:

Signature: SRB Date: 8/14/2019

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly August 2019 | Date/Time: 8/ 14 /2019@ 940

Sample Number: RGW250S- 190814 | Weather: CLEAR

Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 3.95 Time: 905 Flow through cell vol. GW Meter No.(s SLOPE 10

Begin Purge: Date/Time: 8/ 14 /2019 910 End Purge: Date/Time: 8/ 14 /2019 @ 932 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		
913	17.5	133.9	0.21	6.90	-55.5	LOW	4.41		
916	17.9	134.8	0.26	6.90	-65.8		4.45		
919	19.3	138.2	0.40	6.96	-86.5		4.2		
922	19.8	138.0	0.34	6.97	-88.3		4.2		
925	20.4	140.1	0.34	7.00	-94.8				
928	21.0	141.3	0.30	7.01	-98.7				
931	21.1	142.2	0.39	7.00	-100.6				

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	21.2	142.3	0.32	7.00	-101.1				
2	21.2	142.3	0.31	7.01	-101.7				
3	21.2	142.4	0.28	7.01	-102.0				
4	21.2	142.7	0.37	7.00	-102.4				
Average:	21.2	142.4	0.32	7.01	-101.8	#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) (Silic
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):

Comments:

Signature: SRB Date: 8/14/2019

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly August 2019 | Date/Time: 8/ 13 /2019@

Sample Number: RGW010S- 190813 | Weather: CLEAR SUNNY

Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 5.11 Time: 915 Flow through cell vol. GW Meter No.(s SLOPE 4

Begin Purge: Date/Time: 8/ 13 /2019 @ End Purge: Date/Time: 8/ 13 /2019 @ 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							>/= 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) (Si	
	VOC (Boeing short list)	
	Methane Ethane Ethene Acetylene	
	others	

Duplicate Sample No(s):

Comments:

Signature: SRB Date: 8/13/2019

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly August 2019 | Date/Time: 8/ 13 /2019@

Sample Number: RGW011D-190813 | Weather: CLEAR SUNNY

Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 5.06 Time: 910 Flow through cell vol. GW Meter No.(s SLOPE 4

Begin Purge: Date/Time: 8/ 13 /2019 @ End Purge: Date/Time: 8/ 13 /2019 @ 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							>/= 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) (Si	
	VOC (Boeing short list)	
	Methane Ethane Ethene Acetylene	
	others	

Duplicate Sample No(s):

Comments:

Signature: SRB Date: 8/13/2019

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly August 2019 | Date/Time: 8/ 14 /2019@ 910

Sample Number: RGW009S- 190814 | Weather: CLEAR

Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 4.95 | Time: 835 | Flow through cell vol. | GW Meter No.(s SLOPE 10

Begin Purge: Date/Time: 8/ 14 /2019 840 | End Purge: Date/Time: 8/ 14 /2019 @ 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	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft	>/= 1 flow through cell	
843	21.1	407.0	0.19	6.32	1.2	LOW	4.95		
846	21.0	407.2	0.17	6.34	-8.3		4.95		
849	21.0	406.6	0.17	6.34	-16.2		4.95		
852	21.0	406.0	0.21	6.35	-27.7				
855	21.0	405.8	0.21	6.35	-32.8				
858	21.0	405.6	0.21	6.35	-37.7				

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	405.5	0.22	6.36	-40.1				
2	21	405.6	0.24	6.36	-42.1				
3	21	405.3	0.24	6.36	-43.1				
4	21	405.2	0.24	6.36	-45.7				
Average:	21.0	405.4	0.24	6.36	-42.8	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: SRB | Date: 8/14/2019

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly August 2019 | Date/Time: 8/ 13 /2019@ 930

Sample Number: RGW012S- 190813 | Weather: CLEAR SUNNY

Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 4.77 | Time: 845 | Flow through cell vol. | GW Meter No.(s SLOPE 4

Begin Purge: Date/Time: 8/ 13 /2019 900 | End Purge: Date/Time: 8/ 13 /2019 @ 920 | Gallons Purged: 0.5

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

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft	>/= 1 flow through cell	
903	22.0	990	9.74	6.30	-137.6	LOW	4.77		
906	21.9	922	10.17	6.27	-133.9		4.77		
909	22.0	757	11.19	6.17	-119.5		4.77		
912	22.0	743	11.26	6.17	-118.1				
915	22.0	735	11.29	6.16	-117.7				
918	22.0	735	11.30	6.16	-117.6				

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	22.0	733	11.30	6.16	-117.6				
2	22.0	731	11.31	6.16	-117.5				
3	22.0	731	11.31	6.16	-117.6				
4	22.0	730	11.31	6.16	-117.4				
Average:	22.0	731	11.31	6.16	-117.5	#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) (Si
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):

Comments: ELEVATED DO READINGS VERY ODD. CHECKED METER CALIBRATION (WITHIN RANGE FOR CALIBRATION STANDARD).

Signature: SRB | Date: 8/13/2019

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly August 2019 | Date/Time: 8/ 13 /2019@ 900

Sample Number: RGW014S- 190813 | Weather: CLEAR SUNNY

Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 4.78 | Time: 825 | Flow through cell vol. | GW Meter No.(s SLOPE 4

Begin Purge: Date/Time: 8/ 13 /2019 830 | End Purge: Date/Time: 8/ 13 /2019 @ 842 | 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	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft	>/= 1 flow through cell	
833	21.4	397.2	6.52	6.36	-63.4	LOW	4.8		
836	21.4	395.1	6.71	6.37	-65.0		4.8		
839	21.4	391.4	6.77	6.38	-67.8		4.8		

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	21.4	390.5	6.77	6.38	-68.1				
2	21.4	389.8	6.77	6.38	-68.7				
3	21.4	389.4	6.76	6.38	-69.1				
4	21.4	388.9	6.79	6.38	-69.6				
Average:	21.4	389.7	6.77	6.38	-68.9	#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) (Si
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

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

Comments:

Signature: SRB | Date: 8/13/2019

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly August 2019 | Date/Time: 8/ 13 /2019@ 800

Sample Number: RGWDUP4 190813 | Weather: CLEAR SUNNY

Landau Representative: SRB

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 4

Begin Purge: Date/Time: 8/ 13 /2019 @ | End Purge: Date/Time: 8/ 13 /2019 @ | 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								**>/= 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	21.4	390.2	6.76	6.38	-68.5				
2	21.4	389.6	6.78	6.38	-68.9				
3	21.4	388.9	6.79	6.38	-68.8				
4	21.4	388.7	6.79	6.38	-69.8				
Average:	21.4	389.4	6.78	6.38	-69.0	#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) (Si	
	VOC (Boeing short list)	
	Methane Ethane Ethene Acetylene	
	others	

Duplicate Sample No(s): Duplicate to RGW014S

Comments:

Signature: SRB | Date: 8/13/2019

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly August 2019 | Date/Time: 8/ 13 /2019@ 1000

Sample Number: RGW147S- 190813 | Weather: CLEAR SUNNY

Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 4.4 | Time: 925 | Flow through cell vol. | GW Meter No.(s SLOPE 4

Begin Purge: Date/Time: 8/ 13 /2019 930 | End Purge: Date/Time: 8/ 13 /2019 @ 950 | 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	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft	>/= 1 flow through cell	
933	20.4	115.3	4.67	5.94	12.5	LOW	4.4		
936	20.4	102.9	4.82	5.93	9.5		4.4		
939	20.4	99.2	4.84	5.94	8.7		4.4		
942	20.3	94.1	4.89	5.93	7.0				
945	20.4	94.0	4.90	5.93	6.7				
948	20.4	93.1	4.92	5.93	5.9				

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	20.4	92.4	4.92	5.93	5.7				
2	20.4	92.5	4.92	5.93	5.6				
3	20.4	92.5	4.93	5.93	5.4				
4	20.4	92.2	4.92	5.93	5.4				
Average:	20.4	92.4	4.92	5.93	5.5	#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) (Si
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):

Comments:

Signature: SRB | Date: 8/13/2019

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly August 2019 | Date/Time: 8/ 13 /2019@ 1220

Sample Number: RGW149S- 190813 | Weather: CLEAR SUNNY

Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 4.84 | Time: 1140 | Flow through cell vol. | GW Meter No.(s SLOPE 4

Begin Purge: Date/Time: 8/ 13 /2019 1150 | End Purge: Date/Time: 8/ 13 /2019 @ 1210 | 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	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft	>/= 1 flow through cell	
1153	19.9	277.0	1.91	6.50	-53.7	LOW	4.84		
1156	19.8	277.1	2.34	6.50	-60.3		4.84		
1159	19.8	276.8	2.49	6.48	-61.9		4.84		
1202	19.6	274.1	2.81	6.50	-67.4				
1205	19.6	273.6	2.84	6.51	-68.0				
1208	19.6	271.7	2.93	6.51	-69.5				

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	19.5	271.4	2.93	6.51	-69.8				
2	19.5	271.0	2.95	6.51	-70.0				
3	19.5	270.2	2.96	6.51	-70.4				
4	19.5	270.0	2.97	6.51	-70.6				
Average:	19.5	270.7	2.95	6.51	-70.2	#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) (Si	
	VOC (Boeing short list)	
	Methane Ethane Ethene Acetylene	
	others	

Duplicate Sample No(s):

Comments:

Signature: SRB | Date: 8/13/2019

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly August 2019 | Date/Time: 8/ 13 /2019@ 1100

Sample Number: RGW150S- 190813 | Weather: CLEAR SUNNY

Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 4.67 | Time: 1020 | Flow through cell vol. | GW Meter No.(s SLOPE 4

Begin Purge: Date/Time: 8/ 13 /2019 1030 | End Purge: Date/Time: 8/ 13 /2019 @ 1050 | 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	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft	>/= 1 flow through cell	
1033	23.5	388.8	3.09	6.43	-44.0	LOW	4.81		
1036	23.5	393.6	4.20	6.44	-54.8		4.85		
1039	23.5	395.3	4.50	6.44	-57.2		4.85		
1042	23.3	397.8	4.87	6.45	-60.5				
1045	23.4	398.0	4.95	6.45	-61.3				
1048	23.5	398.0	4.93	6.45	-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.): 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	23.4	398.7	4.97	6.45	-62.1				
2	23.4	398.5	4.96	6.45	-62.4				
3	23.4	398.6	4.98	6.45	-62.5				
4	23.4	399.4	4.98	6.46	-62.7				
Average:	23.4	398.8	4.97	6.45	-62.4	#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) (Si
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):

Comments:

Signature: SRB | Date: 8/13/2019

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly August 2019 | Date/Time: 8/ 13 /2019@ 1150

Sample Number: RGW252S- 190813 | Weather: CLEAR SUNNY

Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 4.66 | Time: 1115 | Flow through cell vol. | GW Meter No.(s SLOPE 4

Begin Purge: Date/Time: 8/ 13 /2019 1120 | End Purge: Date/Time: 8/ 13 /2019 @ 1135 | 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	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft	>/= 1 flow through cell	
1123	23.3	629	2.74	6.67	-100.8	LOW	4.66		
1126	23.7	656	2.96	6.70	-114.9		4.66		
1129	23.7	657	2.99	6.70	-115.6		4.66		
1132	23.8	661	3.04	6.70	-118.2				

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 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	23.9	663	3.08	6.71	-199.8				
2	23.9	664	3.09	6.71	-120.1				
3	23.9	665	3.11	6.71	-120.4				
4	23.9	665	3.12	6.71	-120.8				
Average:	23.9	664	3.10	6.71	-140.3	#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) (Si
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s): MSMSD Location

Comments:

Signature: SRB | Date: 8/13/2019

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly August 2019 | Date/Time: 8/ 13 /2019@ 1130

Sample Number: RGW253I- 190813 | Weather: CLEAR SUNNY

Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 4.73 | Time: 1045 | Flow through cell vol. | GW Meter No.(s SLOPE 4

Begin Purge: Date/Time: 8/ 13 /2019 1100 | End Purge: Date/Time: 8/ 13 /2019 @ 1117 | 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	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft	>/= 1 flow through cell	
1103	21.5	348.1	2.96	6.47	76.0	LOW	4.73		
1106	21.3	366.1	3.23	6.50	-82.0		4.73		
1109	21.1	380.4	3.32	6.54	-88.5		4.73		
1112	21.0	386.1	3.41	6.56	-92.8				
1115	20.8	387.5	3.50	6.57	-96.3				

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	20.8	387.4	3.52	6.57	-96.6				
2	20.8	387.4	3.52	6.57	-96.8				
3	20.8	387.3	3.53	6.57	-96.9				
4	20.7	387.2	3.55	6.57	-97.0				
Average:	20.8	387.3	3.53	6.57	-96.8	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: SRB | Date: 8/13/2019

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly August 2019 | Date/Time: 8/ 13 /2019@ 1040

Sample Number: RGW254S- 190813 | Weather: CLEAR SUNNY

Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 4.82 | Time: 1005 | Flow through cell vol. | GW Meter No.(s SLOPE 4

Begin Purge: Date/Time: 8/ 13 /2019 1010 | End Purge: Date/Time: 8/ 13 /2019 @ 1033 | 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	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft	>/= 1 flow through cell	
1013	20.0	478	0.18	6.55	-86.9	LOW	4.85		
1016	21.3	554	0.78	6.63	-108.7		4.85		
1019	21.6	579	1.30	6.66	-114.6		4.85		
1022	21.6	582	1.46	6.66	-115.9				
1025	21.7	601	2.32	6.68	-121.9				
1028	21.6	604	2.45	6.69	-123.0				
1031	21.7	608	2.67	6.69	-124.6				

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	21.7	608	2.72	6.69	-124.8				
2	21.8	611	2.78	6.69	-125.3				
3	21.8	611	2.82	6.70	-125.6				
4	21.8	611	2.86	6.70	-126.0				
Average:	21.8	610	2.80	6.70	-125.4	#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) (Si
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):

Comments:

Signature: SRB | Date: 8/13/2019

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly August 2019 | Date/Time: 8/ 12/2019@ 1457

Sample Number: RGW163I- 190812 | Weather: PARTLY CLOUDY

Landau Representative: JAN

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 6.45 Time: 1423 Flow through cell vol. GW Meter No.(s 3

Begin Purge: Date/Time: 8/ 12/2019 @ 1427 End Purge: Date/Time: 8/12 /2019 @ 1448 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		
1430	17.0	403.6	0.27	6.41	-106.6		6.47		
1433	17.6	407.8	0.38	6.41	-108.9		6.46		
1436	17.9	409.0	0.55	6.41	-103.9		6.46		
1439	18.4	409.4	1.34	6.42	-99.0				
1442	18.9	406.9	2.07	6.41	-95.7				
1445	19.4	404.6	2.80	6.40	-94.0				
1447	19.7	405.7	3.13	6.40	-92.7				

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): NO COLOR, LOW TURB, 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	19.7	405.8	3.22	6.40	-91.9				
2	19.8	405.6	3.26	6.40	-91.2				
3	19.8	405.5	3.30	6.40	-91.0				
4	19.8	405.2	3.39	6.40	-90.9				
Average:	19.8	405.5	3.29	6.40	-91.3	#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) (Silic
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):

Comments:

Signature: JAN Date: 8/12/2019

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly August 2019 | Date/Time: 8/ 12 /2019@ 1410

Sample Number: RGW175I- 190812 | Weather: CLEAR SUNNY

Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 6.11 Time: 1315 Flow through cell vol. GW Meter No.(s SLOPE 10

Begin Purge: Date/Time: 8/ 12 /2019 1340 End Purge: Date/Time: 8/ 12 /2019 @ 1403 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		
1343	21.5	523	3.61	6.35	-82.8	LOW	6.13		
1346	21.7	525	4.81	6.35	-86.3		6.13		
1349	21.5	530	6.26	6.35	-88.8		6.13		
1352	21.6	530	6.57	6.34	-89.7				
1355	21.6	531	6.87	6.34	-90.5				
1358	21.6	533	7.47	6.33	-92.4				
1401	21.6	533	7.49	6.33	-92.5				

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	21.4	533	7.55	6.33	-92.6				
2	21.5	533	7.56	6.33	-92.7				
3	21.5	533	7.57	6.33	-92.6				
4	21.4	533	7.61	6.33	-92.7				
Average:	21.5	533	7.57	6.33	-92.7	#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) (Silic	
	VOC (Boeing short list)	
	Methane Ethane Ethene Acetylene	
	others	

Duplicate Sample No(s):

Comments: ELEVATED DO READINGS ARE ABNORMAL- CEHCKED DO CALIBRATION AND CHECKED OUT.

Signature: SRB Date: 8.12.19

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly August 2019 | Date/Time: 8/ 12 /2019@ 1501

Sample Number: RGW176S- 190812 | Weather: CLEAR SUNNY

Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 5.73 Time: 1355 Flow through cell vol. GW Meter No.(s SLOPE 10

Begin Purge: Date/Time: 8/ 12 /2019 1430 End Purge: Date/Time: 8/ 12 /2019 @ 1447 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**		
1433	20.4	645	5.96	6.30	-92.0	LOW	5.73		
1436	19.9	643	6.30	6.30	-93.8		5.73		
1439	19.7	638	6.71	6.30	-95.9		5.73		
1442	19.4	632	7.08	6.30	-97.3				
1445	19.3	628	7.31	6.30	-98.4				

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, 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	19.3	626	7.32	6.31	-98.6				
2	19.3	626	7.35	6.31	-98.7				
3	19.3	625	7.36	6.31	-98.9				
4	19.3	625	7.37	6.31	-99.1				
Average:	19.3	626	7.35	6.31	-98.8	#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) (Silic
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):

Comments: ELEVATED DO READINGS ARE ABNORMAL- CEHCKED DO CALIBRATION AND CHECKED OUT.

Signature: SRB Date: 8.12.19

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly August 2019 | Date/Time: 8/ 12 /2019@ 1250

Sample Number: RGW177I- 190812 | Weather: CLEAR SUNNY

Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 7.81 Time: 1210 Flow through cell vol. GW Meter No.(s SLOPE 10

Begin Purge: Date/Time: 8/ 12 /2019 1220 End Purge: Date/Time: 8/ 12 /2019 @ 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							**>/= 1 flow**	
	+/- 3%	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**through cell**	
1223	18.9	519	5.70	6.28	-83.6	LOW	7.82		
1226	18.8	537	6.91	6.30	-92.0		7.82		
1229	18.8	545	7.27	6.30	-94.6		7.82		
1232	18.7	549	7.59	6.30	-96.1				
1235	18.7	553	7.91	6.31	-97.9				
1238	18.7	556	8.00	6.31	-98.3				

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	18.7	556	8.03	6.31	-98.4				
2	18.7	557	8.05	6.31	-98.6				
3	18.7	557	8.04	6.31	-98.8				
4	18.8	557	8.09	6.31	-98.8				
Average:	18.7	557	8.05	6.31	-98.7	#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) (Silic
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):

Comments: ELEVATED DO READINGS ARE ABNORMAL- CEHCKED DO CALIBRATION AND CHECKED OUT.

Signature: SRB Date: 8.12.19

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly August 2019 | Date/Time: 8/ 12 /2019@ 1220

Sample Number: RGW178S- 190812 | Weather: CLEAR SUNNY

Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 8.61 Time: 1130 Flow through cell vol. GW Meter No.(s SLOPE 10

Begin Purge: Date/Time: 8/ 12 /2019 1150 End Purge: Date/Time: 8/ 12 /2019 @ 1207 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		
1153	16.2	380.2	5.03	6.27	-59.0	LOW	8.63		
1156	16.8	386.3	5.42	6.30	-65.1		8.63		
1159	17.2	390.4	6.01	6.32	-72.1		8.63		
1202	17.3	391.5	6.20	6.33	-73.9				
1205	17.4	391.5	6.57	6.33	-76.6				

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): CLEAR 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	17.4	391.2	6.61	6.33	-76.9				
2	17.4	391.3	6.65	6.33	-77.1				
3	17.4	390.9	6.68	6.33	-77.4				
4	17.4	390.9	6.67	6.33	-77.5				
Average:	17.4	391.1	6.65	6.33	-77.2	#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) (Silic
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):

Comments: ELEVATED DO READINGS ARE ABNORMAL- CEHCKED DO CALIBRATION AND CHECKED OUT.

Signature: SRB Date: 8.12.19

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly August 2019 | Date/Time: 8/ 12 /2019@ 1050

Sample Number: RGW179I- 190812 | Weather: CLEAR SUNNY

Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 6.95 Time: 1000 Flow through cell vol. GW Meter No.(s SLOPE 10

Begin Purge: Date/Time: 8/ 12 /2019 1020 End Purge: Date/Time: 8/ 12 /2019 @ 1042 Gallons Purged: 0.25

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

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
	Purge Goals: Stablization of Parameters for three consecutive readings within the following limits							>/= 1 flow through cell	
	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft		
1023	16.4	325.0	0.29	6.24	-48.3	LOW	6.95		
1026	17.7	367.9	4.51	6.26	-64.9		6.95		
1029	19.4	404.3	5.05	6.29	-70.1		6.95		
1032	19.9	432.5	5.88	6.31	-79.3				
1035	18.9	458.8	6.84	6.33	-83.6				
1038	18.5	467.5	7.33	6.34	-87.3				
1041	18.1	475.4	7.69	6.35	-89.6				

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 SLIGHT EFFERVENSENCE 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	18.2	475.9	7.76	6.35	-90.0				
2	18.1	476.0	7.77	6.35	-90.2				
3	18.0	478.2	7.92	6.35	-90.5				
4	18.0	478.0	7.91	6.35	-90.7				
Average:	18.1	477.0	7.84	6.35	-90.4	#DIV/0!			

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

Duplicate Sample No(s):

Comments: ELEVATED DO READINGS ARE ABNORMAL- CEHCKED DO CALIBRATION AND CHECKED OUT.

Signature: SRB Date: 8.12.19

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly August 2019 | Date/Time: 8/ 12 /2019@ 1010

Sample Number: RGW180S- 190812 | Weather: CLEAR SUNNY

Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 6.13 Time: 935 Flow through cell vol. GW Meter No.(s SLOPE 10

Begin Purge: Date/Time: 8/ 12 /2019 940 End Purge: Date/Time: 8/ 12 /2019 @ 1003 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		
943	18.5	283.6	0.15	6.28	-30.5	LOW	6.13		
946	18.8	303.9	0.72	6.36	-45.0		6.13		
949	18.9	305.1	2.35	6.36	-49.3		6.13		
952	18.9	305.4	2.61	6.36	-49.9				
955	18.9	305.0	3.72	6.37	-51.5				
958	19.0	305.4	4.30	6.37	-52.5				
1001	19.0	305.9	5.08	6.37	-54.0				

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): SLIGHTLY TURBID AND GRAY NO/ SLIGHT PETROLEUM LIKE SHEEN DETECTED

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	19.0	306.0	5.19	6.37	-54.4				
2	19.1	306.0	5.32	6.37	-54.7				
3	19.2	306.6	5.40	6.38	-55.1				
4	19.2	307.0	5.49	6.38	-55.4				
Average:	19.1	306.4	5.35	6.38	-54.9	#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) (Silic
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

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

Comments: ELEVATED DO READINGS ARE ABNORMAL- CEHCKED DO CALIBRATION AND CHECKED OUT.

Signature: SRB Date: 8.12.19

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly August 2019 | Date/Time: 8/ 12 /2019@ 900

Sample Number: RGW180S- 190812 | Weather: CLEAR SUNNY

Landau Representative: SRB

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 10

Begin Purge: Date/Time: 8/ 12 /2019 @ End Purge: Date/Time: 8/ 12 /2019 @ 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 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.): SLIGHTLY TURBID AND GRAY NO/ SLIGHT PETROLEUM LIKE SHEEN DETECTED

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	19.0	306.1	5.25	6.37	-54.5				
2	19.2	306.5	5.34	6.37	-54.9				
3	19.2	307.0	5.44	6.37	-55.2				
4	19.2	307.0	5.49	6.38	-55.6				
Average:	19.2	306.7	5.38	6.37	-55.1	#DIV/0!			

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

Duplicate Sample No(s): Duplicate to RGW180S

Comments: ELEVATED DO READINGS ARE ABNORMAL- CEHCKED DO CALIBRATION AND CHECKED OUT.

Signature: SRB Date: 8.12.19

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly August 2019 | Date/Time: 8/ 12/2019@ 1535

Sample Number: RGW165I- 190812 | Weather: PARTLY SUNNY

Landau Representative: JAN

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 7.01 Time: 1441 Flow through cell vol. GW Meter No.(s 3

Begin Purge: Date/Time: 8/ 12/2019 @ 1506 End Purge: Date/Time: 8/12 /2019 @ 1528 Gallons Purged: <0.25

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

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
	Purge Goals: Stablization of Parameters for three consecutive readings within the following limits							>/= 1 flow through cell	
	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft		
1509	16.6	338.1	0.07	6.38	-78.4		7.00		
1512	17.6	344.2	0.81	6.37	-84.2		6.91		
1515	18.2	349.1	1.40	6.38	-86.5		6.87		
1518	18.9	354.6	2.21	6.38	-88.2		6.81		
1521	19.5	359.6	2.73	6.38	-89.6		6.76		
1524	20.4	365.8	3.15	6.39	-90.9		6.72		
1526	20.8	369.7	3.42	6.39	-91.2		6.70		

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.): NO COLOR, LOW TURB, 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	371.0	3.54	6.39	-91.5				
2	21.1	371.8	3.50	6.39	-91.4				
3	21.2	372.3	3.49	6.39	-92.0				
4	21.2	372.9	3.55	6.39	91.6				
Average:	21.1	372.0	3.52	6.39	-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) (Silic		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):

Comments:

Signature: JAN Date: 8/12/2019

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly August 2019 | Date/Time: 8/ 12 /2019@ 1520

Sample Number: RGW189S- 190812 | Weather: SUNNY, MUGGY, HOT

Landau Representative: BXM

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 7.09 Time: 1431 Flow through cell vol. GW Meter No.(s HERON-1

Begin Purge: Date/Time: 8/ 12 /2019 @ 1437 End Purge: Date/Time: 8/ 12 /2019 @ 1500 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**	
1440	20.1	360.1	0.42	5.98	-2.0		7.29		HAVE PUMP ON LOWEST SETTING
1443	21.7	379.5	0.30	5.97	-5.4		7.31		
1446	22.8	406.8	0.38	6.07	-16.4		7.31		
1449	22.9	411.5	0.37	6.10	-18.9				
1452	22.9	412.8	0.26	6.11	-21.0				
1455	23.1	416.8	0.31	6.13	-24.6				
1458	23.6	428.3	0.28	6.17	-29.1				

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

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

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	429.9	0.29	6.17	-29.3				
2	23.8	431.8	0.30	6.17	-29.4				
3	24.0	435.2	0.39	6.18	-30.0				
4	24.1	437.1	0.35	6.18	-30.6				
Average:	23.9	433.5	0.33	6.18	-29.8	#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)	
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) (Silic	
	VOC (Boeing short list)	
	Methane Ethane Ethene Acetylene	
	others	

Duplicate Sample No(s): MSMSD Location

Comments: REPLACED SOAK SOCK

Signature: BXM Date: 8/12/2019

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly August 2019 | Date/Time: 8/ 12 /2019@ 1330

Sample Number: RGW207S- 190812 | Weather: CLEAR SUNNY

Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 6.53 Time: 1259 Flow through cell vol. GW Meter No.(s SLOPE 10

Begin Purge: Date/Time: 8/ 12 /2019 1300 End Purge: Date/Time: 8/ 12 /2019 @ 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							>/= 1 flow through cell	
	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft		
1303	18.8	326.7	0.22	6.42	-44.0	LOW	6.53		
1306	19.0	339.1	0.26	6.57	-79.2		6.53		
1309	19.1	356.4	0.37	6.72	-88.3		6.53		
1312	18.9	362.6	0.52	6.77	-91.7				
1315	18.9	366.2	0.73	6.81	-95.8				
1318	18.8	366.3	0.93	6.82	-97.3				
1321	18.6	365.6	1.19	6.84	-98.9				

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	18.6	365.6	1.25	6.84	99.1				
2	18.6	365.6	1.30	6.84	99.4				
3	18.6	365.4	1.32	6.84	99.7				
4	18.6	365.4	1.39	6.85	99.8				
Average:	18.6	365.5	1.32	6.84	99.5	#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) (Silic	
	VOC (Boeing short list)	
	Methane Ethane Ethene Acetylene	
	others	

Duplicate Sample No(s):

Comments:

Signature: SRB Date: 8.12.19

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly August 2019 | Date/Time: 8/ 12 /2019@ 1140

Sample Number: RGW208S- 190812 | Weather: CLEAR SUNNY

Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 8.03 Time: 1109 Flow through cell vol. GW Meter No.(s SLOPE 10

Begin Purge: Date/Time: 8/ 12 /2019 1110 End Purge: Date/Time: 8/ 12 /2019 @ 1127 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		
1113	19.7	494.0	3.77	6.28	-83.0	LOW	8.03		
1116	19.4	497.2	6.24	6.29	-94.6		8.03		
1119	19.5	485.7	7.52	6.30	-99.0		8.03		
1122	19.5	483.3	7.65	6.30	-99.0				
1125	19.7	472.6	7.98	6.31	-100.0				

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): SLIGHTLY YELLOW 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	19.6	470.5	7.97	6.31	-100.2				
2	19.6	470.5	7.98	6.31	-100.4				
3	19.7	469.9	8.05	6.31	-100.5				
4	19.5	469.2	8.05	6.31	-100.6				
Average:	19.6	470.0	8.01	6.31	-100.4	#DIV/0!			

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

Duplicate Sample No(s):

Comments: ELEVATED DO READINGS ARE ABNORMAL- CEHCKED DO CALIBRATION AND CHECKED OUT.

Signature: SRB Date: 8.12.19

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly August 2019 | Date/Time: 8/ 13 /2019@ 1400

Sample Number: RGW259S- 190813 | Weather: CLEAR SUNNY

Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 5.28 Time: 1325 Flow through cell vol. GW Meter No.(s SLOPE 4

Begin Purge: Date/Time: 8/ 13 /2019 1330 End Purge: Date/Time: 8/ 13 /2019 @ 1353 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		
1333	22.4	379.5	1.05	6.43	18.1	HIGH	5.7		
1336	24.4	316.9	0.96	6.56	5.7		5.7		
1339	24.4	316.1	1.03	6.57	5.3		5.7		
1342	24.3	314.7	1.28	6.57	4.4				
1345	24.3	314.8	1.36	6.57	3.8				
1348	24.3	315.1	1.44	6.57	2.9				
1351	24.3	315.2	1.50	6.57	2.2				

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.): ORANGE 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	24.3	314.8	1.53	6.57	1.9				
2	24.3	315.1	1.55	6.57	1.6				
3	24.4	315.5	1.57	6.57	1.5				
4	24.4	315.4	1.57	6.57	1.2				
Average:	24.4	315.2	1.56	6.57	1.6	#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) (Silic
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):

Comments:

Signature: SRB Date: 8/13/2019

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly August 2019 | Date/Time: 8/ 13 /2019@ 1320

Sample Number: RGW260S- 190813 | Weather: CLEAR SUNNY

Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 5.51 Time: 1245 Flow through cell vol. GW Meter No.(s SLOPE 4

Begin Purge: Date/Time: 8/ 13 /2019 1250 End Purge: Date/Time: 8/ 13 /2019 @ 1313 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		
1253	22.7	343.8	1.23	6.41	-83.4	LOW	5.41		
1256	22.6	344.4	1.94	6.41	-86.5		5.41		
1259	22.6	344.5	2.27	6.42	-88.2		5.41		
1302	22.5	344.4	2.50	6.42	-89.2				
1305	22.6	344.6	2.68	6.42	-90.3				
1308	22.6	344.7	2.80	6.42	-90.8				
1311	22.4	344.2	2.96	6.42	-91.8				

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 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	22.4	344.0	2.99	6.42	-92.0				
2	22.4	343.9	3.00	6.42	-92.0				
3	22.4	343.9	3.01	6.42	-92.2				
4	22.4	343.7	3.03	6.42	-92.3				
Average:	22.4	343.9	3.01	6.42	-92.1	#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) (Silic
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):

Comments:

Signature: SRB Date: 8/13/2019

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly August 2019 | Date/Time: 8/ 13 /2019@ 1019

Sample Number: RGW031S- 190813 | Weather: SUNNY, WARM

Landau Representative: BXM

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 5.01 Time: 939 Flow through cell vol. GW Meter No.(s HERON-1

Begin Purge: Date/Time: 8/ 13 /2019 @ 950 End Purge: Date/Time: 8/ 13 /2019 @ 1012 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		
953	23.9	440.9	0.51	6.4	-33.5		5.00		
956	23.8	443.7	0.45	6.39	-43.2		5.01		
959	24.0	446.2	0.37	6.41	-45.8		5.01		
1002	24.3	449.1	0.33	6.42	-48.2				
1005	24.3	450.8	0.32	6.43	-50.0				
1008	24.4	452.3	0.33	6.44	-50.9				

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

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

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	452.9	0.31	6.44	-51.5				
2	24.3	453.2	0.30	6.44	-51.9				
3	24.3	453.4	0.30	6.44	-52.4				
4	24.3	453.4	0.33	6.44	-52.7				
Average:	24.3	453.2	0.31	6.44	-52.1	#DIV/0!			

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

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

Comments:

Signature: BXM Date: 8/13/2019

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly August 2019 | Date/Time: 8/ 13 /2019@ 830

Sample Number: RGWDUP2 190813 | Weather: SUNNY, WARM

Landau Representative: BXM

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 5.01 Time: 939 Flow through cell vol. GW Meter No.(s HERON-1

Begin Purge: Date/Time: 8/ 13 /2019 @ 950 End Purge: Date/Time: 8/ 13 /2019 @ 1012 Gallons Purged: <0.5

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

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

DUPLICATE TO RGW031S

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, NO/NS, DARK FINES

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	453.1	0.30	6.44	-51.6				
2	24.3	453.3	0.32	6.44	-52.3				
3	24.3	453.6	0.31	6.44	-52.7				
4	24.3	453.6	0.32	6.44	-52.7				
Average:	24.3	453.4	0.31	6.44	-52.3	#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 ☐
	(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) (Silic	
	VOC (Boeing short list)	
	Methane Ethane Ethene Acetylene	
	others	

Duplicate Sample No(s): Duplicate to RGW031S

Comments:

Signature: BXM Date: 8/13/2019

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly August 2019 | Date/Time: 8/ 13 /2019@ 1223

Sample Number: RGW033S- 190813 | Weather: SUNNY, HOT

Landau Representative: BXM

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 5.10 Time: 1150 Flow through cell vol. GW Meter No.(s HERON-

Begin Purge: Date/Time: 8/ 13/2019 @ 1157 End Purge: Date/Time: 8/ 13 /2019 @ 1220 Gallons Purged: <0.5

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

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
	Purge Goals: Stablization of Parameters for three consecutive readings within the following limits							>/= 1 flow through cell	
	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft		
1200	24.2	466.4	0.17	6.43	-72.4		5.13		
203	25.3	465.9	0.21	6.41	-70.5		5.12		
1206	25.9	464.8	0.29	6.41	-72.4		5.12		
1209	26.7	468.5	0.31	6.42	-75.0				
1212	27.3	472.2	0.25	6.43	-77.5				
1215	27.8	474.7	0.27	6.43	-78.6				
1218	27.9	475.5	0.27	6.43	-79.1				

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

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

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	27.9	475.8	0.31	6.44	-79.1				
2	28.0	475.8	0.31	6.43	-79.1				
3	28.0	476.1	0.30	6.43	-79.3				
4	28.1	476.2	0.32	6.43	-79.3				
Average:	28.0	476.0	0.31	6.43	-79.2	#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) (Silic	
	VOC (Boeing short list)	
	Methane Ethane Ethene Acetylene	
	others	

Duplicate Sample No(s):

Comments: WATER TUBING IS GETTING A LITTLE SHORT. MIGHT WANT TO REPLACE NEXT TIME

Signature: BXM Date: 8/13/2019

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly August 2019 | Date/Time: 8/ 13 /2019@ 1328

Sample Number: RGW034S- 190813 | Weather: SUNNY, HOT

Landau Representative: BXM

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 5.23 Time: 1248 Flow through cell vol. GW Meter No.(s HERON-1

Begin Purge: Date/Time: 8/ 13 /2019 @ 1259 End Purge: Date/Time: 8/ 13 /2019 @ 1322 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		
1302	27.7	337.8	0.16	6.58	-74.9		5.23		
1305	28.2	337.2	0.18	6.58	-77.2		5.24		
1308	28.5	337.0	0.17	6.59	-81.0		5.24		
1311	28.7	337.4	0.14	6.60	-82.3				
1314	28.6	337.0	0.16	6.60	-83.1				
1317	28.8	336.7	0.16	6.60	-84.0				
1320	28.9	336.4	0.15	6.61	-85.4				

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): CLEAR, COLORLESS, 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	28.9	336.5	0.15	6.61	-85.5				
2	28.9	336.5	0.15	6.61	-85.4				
3	28.9	336.5	0.15	6.61	-85.3				
4	28.9	336.5	0.18	6.62	-85.6				
Average:	28.9	336.5	0.16	6.61	-85.5	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: BXM Date: 8/13/2019

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly August 2019 | Date/Time: 8/ 13 /2019@ 1431

Sample Number: RGW038S- 190813 | Weather: CLEAR SUNNY

Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 5.38 Time: 1355 Flow through cell vol. GW Meter No.(s SLOPE 4

Begin Purge: Date/Time: 8/ 13 /2019 1400 End Purge: Date/Time: 8/ 13 /2019 @ 1423 Gallons Purged: 0.5

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

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
	Purge Goals: Stablization of Parameters for three consecutive readings within the following limits							>/= 1 flow through cell	
	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft		
1403	20.9	299.9	0.46	6.47	-10.0	HIGH	5.44		
1406	21.2	303.0	0.43	6.46	-24.3	LOW	5.46		
1409	22.2	316.5	0.42	6.43	-35.9		5.46		
1412	21.3	319.3	0.46	6.43	-42.7		5.46		
1415	21.5	323.0	0.70	6.44	-51.2				
1418	22.7	326.9	1.05	6.44	-58.4				
1421	22.7	332.8	1.26	6.44	-61.7				

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 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	23.5	334.5	1.41	6.44	-63.2				
2	23.2	336.5	1.52	6.44	-64.1				
3	23.6	338.0	1.58	6.45	-65.1				
4	23.8	339.3	1.67	6.44	-66.0				
Average:	23.5	337.1	1.55	6.44	-64.6	#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) (Silic	
	VOC (Boeing short list)	
	Methane Ethane Ethene Acetylene	
	others	

Duplicate Sample No(s):

Comments:

Signature: SRB Date: 8/13/2019

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly August 2019 | Date/Time: 8/ 13 /2019@ 1422

Sample Number: RGW039S- 190813 | Weather: SUNNY, HOT

Landau Representative: BXM

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 5 Time: 1352 Flow through cell vol. GW Meter No.(s HERON-1

Begin Purge: Date/Time: 8/ 13/2019 @ 1357 End Purge: Date/Time: 8/ 13 /2019 @ 1420 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		
1400	26.7	235.8	0.60	6.09	41.8		5.00		
1403	27.5	240.0	0.88	6.07	33.2		5.00		
1406	28.4	243.3	0.61	6.07	29.8		5.00		
1409	29.2	246.4	0.67	6.08	29.2				
1412	29.8	249.9	0.65	6.10	29.3				

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, NO/NS, ORANGE FINES

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	30.1	251.0	0.68	6.1	29.4				
2	30.2	251.6	0.60	6.1	29.3				
3	30.4	252.0	0.70	6.1	29.6				
4	30.4	252.5	0.66	6.1	29.6				
Average:	30.3	251.8	0.66	6.1	29.5	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: BXM Date: 8/13/2019

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly August 2019 | Date/Time: 8/ 13/2019@ 1015

Sample Number: RGW143S- 190813 | Weather: SUNNY

Landau Representative: JAN

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 5.45 Time: 928 Flow through cell vol. GW Meter No.(s 3

Begin Purge: Date/Time: 8/ 13/2019 @ 942 End Purge: Date/Time: 8/ 13/2019 @ 1003 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		
945	23.3	264.1	2.95	6.31	-28.6		5.45		
948	24.1	269.7	2.81	6.33	-90.6		5.45		
951	24.7	274.8	2.67	6.33	-100.3		5.45		
954	25.3	284.6	2.76	6.34	-52.4				
957	25.8	288.4	2.49	6.35	-35.5				
1000	26.3	295.8	2.75	6.34	-25.2				
1002	26.5	300.5	2.65	6.35	-19.1				

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): NO COLOR, LOW TURB, NO/NS, PARTICULATES.

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	301.4	2.58	6.35	-18.6				
2	26.6	302.1	2.52	6.35	-19.1				
3	26.7	302.4	2.48	6.35	-22.3				
4	26.7	302.7	2.47	6.35	-21.2				
Average:	26.7	302.2	2.51	6.35	-20.3	#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 ☐
	(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) (Silic	
	VOC (Boeing short list)	
	Methane Ethane Ethene Acetylene	
	others	

Duplicate Sample No(s):

Comments:

Signature: JAN Date: 8/13/2019

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly August 2019 | Date/Time: 8/ 13/2019@ 1220

Sample Number: RGW209S- 190813 | Weather: SUNNY

Landau Representative: JAN

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 5.02 Time: 1151 Flow through cell vol. GW Meter No.(s 3

Begin Purge: Date/Time: 8/ 13/2019 @ 1154 End Purge: Date/Time: 8/ 13/2019 @ 1216 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		
1157	23.5	381.7	0.26	6.30	-46.9		5.03		
1200	24.4	394.0	0.51	6.34	-56.5		5.03		
1203	25.2	405.7	0.75	6.36	-61.3		5.03		
1206	26.3	416.8	1.26	6.37	-65.6				
1209	26.5	420.7	1.42	6.37	-67.5				
1212	27.0	426.7	1.71	6.38	-71.1				
1214	27.3	429.1	1.79	6.38	-71.9				

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): NO COLOR, LOW TURB, 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	27.4	429.7	1.82	6.38	-80.6				
2	27.4	430.1	1.85	6.39	-76.8				
3	27.6	430.6	1.85	6.39	-96.3				
4	27.5	430.9	1.89	6.39	-100.2				
Average:	27.5	430.3	1.85	6.39	-88.5	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: JAN Date: 8/13/2019

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly August 2019 | Date/Time: 8/ 13 /2019@ 910

Sample Number: RGW210S- 190813 | Weather: SUNNY, WARM

Landau Representative: BXM

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 4.75 Time: 841 Flow through cell vol. GW Meter No.(s HERON-1

Begin Purge: Date/Time: 8/13 /2019 @ 845 End Purge: Date/Time: 8/ 13 /2019 @ 909 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**	
848	22.3	367.2	2.27	6.78	-34.3		4.80		
851	22.6	364.9	2.15	6.75	-30.1		4.80		
854	24.2	353.9	2.08	6.70	-24.1		4.78		
857	24.8	356.7	1.79	6.70	-13.7		4.79		
900	25.3	364.9	1.52	6.71	-11.6				
903	25.7	368.7	1.31	6.71	-8.1				
906	26.5	369.0	1.06	6.71	-5.6				

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.): CLOUDY, BROWN, NO/NS, VERY TURBID

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	26.5	368.9	1.06	6.7	-5.2				
2	26.4	368.5	1.08	6.7	-5.0				
3	27.5	367.9	1.00	6.7	-4.4				
4	27.3	368.1	1.03	6.7	-4.0				
Average:	26.9	368.4	1.04	6.7	-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) (Silic
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):

Comments:

Signature: BXM Date: 8/13/2019

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly August 2019 | Date/Time: 8/ 13/2019@ 1400

Sample Number: RGW237S- 190813 | Weather: SUNNY

Landau Representative: JAN

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 4.56 Time: 1332 Flow through cell vol. GW Meter No.(s 3

Begin Purge: Date/Time: 8/ 13/2019 @ 1334 End Purge: Date/Time: 8/ 13/2019 @ 1355 Gallons Purged: 2

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		
1337	22.8	306.6	2.80	6.38	-12.0		4.53		
1340	23.4	310.2	3.06	6.35	-6.9		4.53		
1343	24.1	312.2	3.07	6.32	-2.1		4.54		
1346	24.6	314.0	2.87	6.33	-7.0				
1349	24.9	316.0	1.87	6.33	-14.0				
1352	25.2	320.7	1.80	6.34	-23.9				
1354	25.4	326.6	1.65	6.35	-29.6				

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): LIGHT ORANGE, LOW-MED TURB, NO/NS, PARTICULATES.

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	25.5	328.8	1.71	6.35	-30.0				
2	25.5	329.5	1.60	6.35	-30.0				
3	25.5	329.8	1.55	6.36	-30.1				
4	25.6	331.3	1.61	6.36	-30.5				
Average:	25.5	329.9	1.62	6.36	-30.2	#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) (Silic	
	VOC (Boeing short list)	
	Methane Ethane Ethene Acetylene	
	others	

Duplicate Sample No(s):

Comments:

Signature: JAN Date: 8/13/2019

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly August 2019 | Date/Time: 8/ 13/2019@ 1310

Sample Number: RGW238I- 190813 | Weather: SUNNY

Landau Representative: JAN

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 4.60 Time: 1229 Flow through cell vol. GW Meter No.(s 3

Begin Purge: Date/Time: 8/ 13/2019 @ 1234 End Purge: Date/Time: 8/ 13/2019 @ 1255 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		
1237	23.4	444	0.57	6.43	-104.5		4.60		
1240	24.4	447	1.19	6.43	-106.6		4.60		
1243	25.2	465	1.42	6.43	-102.5		4.60		
1246	25.9	474	1.68	6.44	-101.9				
1249	27.1	493	1.94	6.44	-100.8				
1252	27.7	503	1.91	6.45	-101.9				
1254	28.2	512	2.01	6.46	-103.9				

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): NO COLOR, LOW TURB, NO/NS, SLIGHT PARTICULATES

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	28.3	514	1.99	6.46	-104.0				
2	28.3	515	1.96	6.46	-103.9				
3	28.4	515	1.98	6.46	-103.8				
4	28.4	517	2.03	6.46	103.7				
Average:	28.4	515	1.99	6.46	-52.0	#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) (Silic
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s): MSMSD Location

Comments:

Signature: JAN Date: 8/13/2019

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly August 2019 | Date/Time: 8/ 13/2019@ 1125

Sample Number: RGW239I- 190813 | Weather: SUNNY

Landau Representative: JAN

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 5.34 Time: 1051 Flow through cell vol. GW Meter No.(s 3

Begin Purge: Date/Time: 8/13 /2019 @ 1054 End Purge: Date/Time: 8/ 13/2019 @ 1115 Gallons Purged: 1.5

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		
1057	22.3	403.7	0.14	6.44	-107.6		5.35		
1100	23.1	412.0	0.49	6.41	-108.9		5.35		
1103	23.7	414.4	0.97	6.39	-104.2		5.35		
1106	24.3	413.5	1.30	6.38	-101.1				
1109	24.8	412.7	1.60	6.38	-99.2				
1112	25.3	413.8	1.74	6.38	-99.7				
1114	25.7	416.0	1.89	6.38	-96.0				

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.): NO COLOR, LOW TURB, 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	25.8	416.2	1.91	6.38	-96.5				
2	25.8	416.4	1.93	6.38	-96.0				
3	22.9	416.7	1.91	6.38	-96.1				
4	25.9	417.2	1.92	6.38	-100.9				
Average:	25.1	416.6	1.92	6.38	-97.4	#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) (Silic	
	VOC (Boeing short list)	
	Methane Ethane Ethene Acetylene	
	others	

Duplicate Sample No(s):

Comments:

Signature: JAN Date: 8/13/2019

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly August 2019 | Date/Time: 8/13 /2019@ 1050

Sample Number: RGW240D- 190813 | Weather: SUNNY

Landau Representative: JAN

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 5.92 Time: 958 Flow through cell vol. GW Meter No.(s 3

Begin Purge: Date/Time: 8/13 /2019 @ 1016 End Purge: Date/Time: 8/ 13/2019 @ 1039 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		
1019	22.5	436.9	0.23	6.55	-119.2		5.75		
1022	23.4	442.6	0.40	6.53	-115.4		5.67		
1025	24.1	447.9	0.79	6.53	-112.9		5.61		
1028	24.7	454.3	1.14	6.52	-112.5		5.56		
1031	25.4	462.8	1.46	6.52	-111.2		5.53		
1034	26.0	468.4	1.65	6.52	-110.2		5.52		
1036	26.4	471.4	1.79	6.52	-109.2		5.49		

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.): LIGHT BROWN, LOW-MED TURB, 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	26.5	472.3	1.82	6.52	-109.1				
2	26.5	472.8	1.86	6.52	-111.8				
3	26.6	473.4	1.87	6.52	-109.4				
4	26.6	473.7	1.87	6.52	-109.8				
Average:	26.6	473.1	1.86	6.52	-110.0	#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) (Silic	
	VOC (Boeing short list)	
	Methane Ethane Ethene Acetylene	
	others	

Duplicate Sample No(s):

Comments:

Signature: JAN Date: 8/13/2019

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly August 2019 | Date/Time: 8/ 13/2019@ 850

Sample Number: RGW-241S 190813 | Weather: SUNNY

Landau Representative: JAN

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 5.97 Time: 820 Flow through cell vol. GW Meter No.(s 3

Begin Purge: Date/Time: 8/ 13/2019 @ 823 End Purge: Date/Time: 8/13 /2019 @ 844 Gallons Purged: 1

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

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
	Purge Goals: Stablization of Parameters for three consecutive readings within the following limits							>/= 1 flow through cell	
	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft		
826	19.5	329.7	0.22	6.35	-132.2		5.97		
829	19.7	331.1	0.54	6.36	-116.5		5.97		
832	20.2	332.6	2.19	6.37	-139.5		5.97		
835	20.7	335.6	2.94	6.38	-131.9				
838	21.1	337.7	3.07	6.38	-119.7				
841	21.6	341.3	2.97	6.39	-142.3				
843	21.8	342.9	2.91	6.39	-133.8				

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): NO COLOR, LOW TURB, 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	21.8	343.3	2.91	6.39	-133.8				
2	21.9	343.6	2.91	6.39	-133.7				
3	21.9	344.0	2.91	6.39	-128.9				
4	22.0	344.4	2.91	6.39	-126.4				
Average:	21.9	343.8	2.91	6.39	-130.7	#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)	
	(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) (Silic	
	VOC (Boeing short list)	
	Methane Ethane Ethene Acetylene	
	others	

Duplicate Sample No(s):

Comments:

Signature: JAN Date: 8/13/2019

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly August 2019 | Date/Time: 8/ 13/2019@ 920

Sample Number: RGW-242I- 190813 | Weather: SUNNY

Landau Representative: JAN

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 6.11 Time: 834 Flow through cell vol. GW Meter No.(s 3

Begin Purge: Date/Time: 8/13 /2019 @ 854 End Purge: Date/Time: 8/13 /2019 @ 915 Gallons Purged: 1

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

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
	Purge Goals: Stablization of Parameters for three consecutive readings within the following limits							>/= 1 flow through cell	
	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft		
857	21.2	370.7	1.39	6.40	-120.4		6.11		
900	21.8	369.5	2.00	6.41	-120.2		6.11		
903	22.3	372.4	2.45	6.41	-124.0		6.11		
906	22.8	363.7	2.69	6.40	-115.2				
909	23.2	393.9	2.82	6.41	-112.0				
912	23.8	403.2	2.99	6.41	-115.8				
914	24.1	405.4	3.02	6.41	-109.7				

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): NO COLOR, LOW TURB, 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	24.1	405.8	3.01	6.41	-110.1				
2	24.1	406.3	3.03	6.41	-107.1				
3	24.2	406.9	3.03	6.41	-107.5				
4	24.2	407.2	3.01	6.41	-107.8				
Average:	24.2	406.6	3.02	6.41	-108.1	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
5	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX) WA ☐ OR ☐
	(8270) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) WA ☐ OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)
	(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) (Silic
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):

Comments:

Signature: JAN Date: 8/13/2019

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly August 2019 | Date/Time: 8/ 13/2019@ 1440

Sample Number: RGW-243I- 190813 | Weather: SUNNY

Landau Representative: JAN

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 5.09 Time: 1411 Flow through cell vol. GW Meter No.(s 3

Begin Purge: Date/Time: 8/ 13/2019 @ 1414 End Purge: Date/Time: 8/ 13/2019 @ 1435 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		
1417	23.5	452.3	0.09	6.29	-72.9		5.09		
1420	24.5	459.0	0.73	6.29	-81.3		5.09		
1423	25.2	465.1	1.16	6.30	-84.5		5.09		
1426	25.7	469.6	1.57	6.30	-85.9				
1429	26.2	474.5	1.93	6.30	-86.4				
1432	26.7	480.0	2.16	6.30	-86.7				
1434	26.9	482.8	2.26	6.30	-87.0				

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.): NO COLOR, LOW TURB, 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	27.0	483.4	2.35	6.30	-86.8				
2	27.0	484.0	2.35	6.30	-86.7				
3	27.1	484.3	2.34	6.30	-86.6				
4	27.1	484.6	2.44	6.30	-86.5				
Average:	27.1	484.1	2.37	6.30	-86.7	#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) (Silic	
	VOC (Boeing short list)	
	Methane Ethane Ethene Acetylene	
	others	

Duplicate Sample No(s):

Comments:

Signature: JAN Date: 8/13/2019

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly August 2019 | Date/Time: 8/ 13 /2019@ 1121

Sample Number: RGW-244S 190813 | Weather: SUNNY, HOT

Landau Representative: BXM

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 5.12 Time: 1050 Flow through cell vol. GW Meter No.(s HERON-1

Begin Purge: Date/Time: 8/ 13/2019 @ 1054 End Purge: Date/Time: 8/ 13 /2019 @ 1118 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		
1057	24.2	563	0.32	6.50	-78.4		5.11		
1100	24.8	568	0.28	6.50	-70.1		5.12		
1103	25.5	575	0.27	6.48	-78.0		5.12		
1106	26.3	586	0.31	6.48	-79.3				
1109	26.5	593	0.31	6.48	-79.6				
1112	27.0	599	0.35	6.48	-80.8				
1115	27.3	603	0.39	6.48	-81.1				

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): CLEAR, COLORLESS, 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	27.4	604	0.39	6.48	-81.3				
2	27.4	604	0.39	6.48	-81.4				
3	27.4	604	0.40	6.48	-81.4				
4	27.4	606	0.36	6.48	-81.3				
Average:	27.4	605	0.39	6.48	-81.4	#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) (Silic	
	VOC (Boeing short list)	
	Methane Ethane Ethene Acetylene	
	others	

Duplicate Sample No(s):

Comments:

Signature: BXM Date: 8/13/2019

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly August 2019 | Date/Time: 8/12 /2019@ 1315

Sample Number: RGW229S- 190812 | Weather: SUNNY

Landau Representative: JAN

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 9.07 Time: 1241 Flow through cell vol. GW Meter No.(s 3

Begin Purge: Date/Time: 8/ 12/2019 (1245 End Purge: Date/Time: 8/12 /2019 @ 1307 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	26.1	233.8	1.70	5.94	69.8				
1251	26.3	235.1	2.23	5.94	76.1				
1254	26.5	236.7	3.33	5.95	70.4				
1257	26.7	237.2	4.09	5.95	81.4				SHALLOW WATER
1300	26.8	238.1	4.35	5.95	68.3				AIR BUBBLES
1303	26.9	238.7	5.06	5.96	77.7				
1305	27.2	243.3	4.76	5.96	78.7				

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): LIGHT BROWN, HIGH TURB, 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	27.3	245.0	4.62	5.96	77.0				
2	27.3	243.6	4.80	5.96	75.4				
3	27.5	249.7	4.47	5.96	69.7				
4	27.4	251.7	4.46	5.96	65.6				
Average:	27.4	247.5	4.59	5.96	71.9	#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) (Silic	
	VOC (Boeing short list)	
	Methane Ethane Ethene Acetylene	
	others	

Duplicate Sample No(s):

Comments: PULLED PUMP OUT TO GET WATER LEVEL

Signature: JAN Date: 8/12/2019

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly August 2019 | Date/Time: 8/12 /2019@ 1347

Sample Number: RGW230I- 190812 | Weather: SUNNY

Landau Representative: JAN

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 8.5 Time: 1317 Flow through cell vol. GW Meter No.(s 3

Begin Purge: Date/Time: 8/12 /2019 @ 1319 End Purge: Date/Time: 8/13 /2019 @ 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							>/= 1 flow through cell	
	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft		
1322	22.2	267.9	2.39	6.12	-42.2		8.51		
1325	22.8	287.8	2.89	6.20	-66.5		8.51		
1328	23.0	287.3	3.26	6.22	-81.4		8.51		
1331	23.6	344.6	3.70	6.22	-80.1				
1334	23.8	342.4	3.87	6.27	-85.0				
1337	24.2	357.1	3.89	6.26	-82.9				

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): LIGHT TAN, LOW TURB, 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	359.9	3.93	6.26	-83.3				
2	24.3	361.8	3.91	6.26	-81.9				
3	24.4	362.6	4.01	6.26	-81.9				
4	24.4	363.8	4.05	6.26	-81.7				
Average:	24.4	362.0	3.98	6.26	-82.2	#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) (Silic		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):

Comments:

Signature: JAN Date: 8/12/2019

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly August 2019 | Date/Time: 8/ 12/2019@ 1320

Sample Number: RGW231S- 190812 | Weather: SUNNY, HOT

Landau Representative: BXM

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 8.27 Time: 1253 Flow through cell vol. GW Meter No.(s HERON-1

Begin Purge: Date/Time: 8/ 12 /2019 @ 1258 End Purge: Date/Time: 8/ 12 /2019 @ 1316 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		
1301	24.1	280.9	1.92	6.31	26.2				COULD NOT
1304	24.5	284.1	1.66	6.32	13.1				GET DTW
1307	25.2	287.3	1.49	6.37	7.60				
1310	25.6	289.5	1.36	6.40	5.20				
1313	26.1	291.0	1.36	6.41	3.20				

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, NO/NS, DARK FINES

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	26.3	291.4	1.21	6.41	3.2				
2	26.3	291.6	1.21	6.42	2.6				
3	26.4	291.8	1.18	6.42	2.3				
4	26.4	291.9	1.12	6.42	1.8				
Average:	26.4	291.7	1.18	6.42	2.5	#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) (Silic		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):

Comments: HAD TO REMOVE BLADDER PUMP TO GET A DEPTH TO WATER. WATER DEPTH WAS BELOW TOP OF PUMP

Signature: BXM Date: 8/12/2019

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly August 2019 | Date/Time: 8/ 12 /2019@ 920

Sample Number: RGW081S- 190812 | Weather: SSUNNY, WARM

Landau Representative: BXM

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 9.6 Time: 845 Flow through cell vol. GW Meter No.(s HERON-1

Begin Purge: Date/Time: 8/ 12 /2019 @ 851 End Purge: Date/Time: 8/ 12 /2019 @ 914 Gallons Purged: <0.5

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

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
	Purge Goals: Stablization of Parameters for three consecutive readings within the following limits							>/= 1 flow through cell	
	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft		
854	21.1	230.0	2.05	7.27	-16.8		9.58		
857	21.3	250.2	1.65	6.92	-9.4		9.60		
900	21.3	251.5	1.64	6.79	-6.1		9.61		
903	21.3	253.5	1.56	6.66	0.7				
906	21.3	253.1	1.54	6.58	4.7				
909	21.6	260.9	1.19	6.58	-14.0				
912	21.7	262.5	1.09	6.58	-19.6				

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

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

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	21.7	260.8	1.11	6.58	-21.7				
2	21.7	261.3	1.08	6.58	-22.9				
3	21.7	260.3	1.04	6.58	-24.3				
4	21.8	258.3	1.05	6.59	-26.0				
Average:	21.7	260.2	1.07	6.6	-23.7	#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) (Silic	
	VOC (Boeing short list)	
	Methane Ethane Ethene Acetylene	
	others	

Duplicate Sample No(s):

Comments:

Signature: BXM Date: 8/12/2019

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly August 2019 | Date/Time: 8/12 /2019@ 1145

Sample Number: RGW152S- 190812 | Weather: PARTLY SUNNY

Landau Representative: JAN

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 10.05 Time: 1114 Flow through cell vol. GW Meter No.(s 3

Begin Purge: Date/Time: 8/12 /2019 @ 1117 End Purge: Date/Time: 8/12 /2019 @ 1139 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**	
1120	21.6	177.1	2.72	6.27	0.1		10.28		
1123	22.0	177.8	2.10	6.24	-6.9		10.28		
1126	22.4	178.6	1.82	6.21	9.4		10.28		
1129	22.7	179.1	1.92	6.13	16.9				
1132	22.9	179.6	2.46	6.08	15.5				
1135	23.1	180.4	3.09	6.06	20.8				
1137	23.3	181.2	3.50	6.06	20.8				

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): TANISH, MED-HIGH TURB, 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	23.3	181.4	3.51	6.06	10.9				
2	23.3	181.6	3.60	6.06	18.9				
3	23.3	181.8	3.64	6.06	19.9				
4	23.3	181.8	3.65	6.06	20.4				
Average:	23.3	181.7	3.60	6.06	17.5	#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) (Silic
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

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

Comments:

Signature: JAN Date: 8/12/2019

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly August 2019 | Date/Time: 8/ 12/2019@ 830

Sample Number: RGWDUP1 190812 | Weather: PARTLY SUNNY

Landau Representative:

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 3

Begin Purge: Date/Time: 8/ 12/2019 @ End Purge: Date/Time: 8/ 12/2019 @ 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 RGW152S

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.): TANISH, MED-HIGH TURB, 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	23.4	182.2	3.65	6.06	13.4				
2	23.4	182.1	3.70	6.06	15.1				
3	23.4	182.2	3.72	6.06	17.5				
4	23.4	182.3	3.76	6.06	18.4				
Average:	23.4	182.2	3.71	6.06	16.1	#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) (Silic
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s): Duplicate to RGW152S

Comments:

Signature: JAN Date: 8/12/2019

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly August 2019 | Date/Time: 8/ 12 /2019@ 1130

Sample Number: RGW153S- 190812 | Weather: SUNNY, WARM

Landau Representative: BXM

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 10.75 Time: 1102 Flow through cell vol. GW Meter No.(s HERON-1

Begin Purge: Date/Time: 8/ 12 /2019 @ 1107 End Purge: Date/Time: 8/ 12 /2019 @ 1120 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**	
1110	21.1	256.4	2.84	6.71	-30.2		10.81		
1113	21.9	261.0	1.85	6.63	-31.3		10.77		
1116	22.2	258.9	2.12	6.62	-29.2		10.77		

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): CLEAR, COLORLESS, YELLOW FINES, 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	255.6	2.05	6.59	-23.0				
2	22.7	255.2	1.99	6.59	-22.3				
3	22.7	254.8	2.12	6.59	-21.0				
4	22.8	254.3	2.10	6.59	-20.1				
Average:	22.7	255.0	2.07	6.59	-21.6	#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) (Silic		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):

Comments:

Signature: BXM Date: 8/12/2019

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly August 2019 | Date/Time: 8/ 12 /2019@ 1059

Sample Number: RGW172S- 190812 | Weather: MOSTLY CLOUDY

Landau Representative:

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 10.35 Time: 1015 Flow through cell vol. GW Meter No.(s 3

Begin Purge: Date/Time: 8/ 12 /2019 1033 End Purge: Date/Time: 8/ 12 /2019 @ 1054 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		
1036	24.2	245.2	2.11	6.52	-43.4		10.51		
1039	24.4	246.8	2.00	6.51	-41.9		10.48		
1042	24.7	248.1	2.12	6.51	-42.2		10.44		
1045	24.9	249.7	2.44	6.51	-39.5				
1048	25.1	252.1	2.68	6.51	-41.1				
1051	25.4	257.1	2.93	6.50	-38.6				
1053	25.5	257.3	2.98	6.49	-40.5				

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): YELLOW/LIGHT ORANGE, LOW-MED TURB, NO/NS, SLIGHT PARTICULATES

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	25.5	257.4	2.99	6.49	-41.0				
2	25.5	257.3	3.03	6.49	-41.0				
3	25.5	257.2	3.05	6.49	-39.4				
4	25.5	257.3	3.06	6.49	-39.1				
Average:	25.5	257.3	3.03	6.49	-40.1	#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) (Silic
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):

Comments:

Signature: JAN Date: 8/12/2019

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly August 2019 | Date/Time: 8/ 12 /2019@ 1010

Sample Number: RGW173S- 190812 | Weather: SUNNY, WARM

Landau Representative: BXM

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 10.47 Time: 935 Flow through cell vol. GW Meter No.(s HERON-1

Begin Purge: Date/Time: 8/ 12/2019 @ 939 End Purge: Date/Time: 8/ 12 /2019 @ 1002 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		
942	20.7	371.3	1.39	6.56	-43.4		10.48		
945	21.2	383.6	1.20	6.57	-43.3		10.46		
948	21.4	396.1	1.08	6.58	-42.5		10.46		
951	21.7	407.5	1.05	6.60	-42.5				
954	22.0	428.5	0.65	6.66	-44.9				
957	22.1	431.7	0.65	6.66	-45.9				
1000	22.1	432.8	0.61	6.65	-46.1				

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): TAN, CLOUDY, 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	433.2	0.61	6.65	-46.9				
2	22.1	433.6	0.59	6.65	-47.5				
3	22.2	433.9	0.60	6.65	-47.9				
4	22.2	434.2	0.60	6.65	-48.4				
Average:	22.2	433.7	0.60	6.65	-47.7	#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) (Silic
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s): MSMSD Location

Comments:

Signature: BXM Date: 8/12/2019

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly August 2019 | Date/Time: 8/ 12 /2019@ 1230

Sample Number: RGW226S- 190812 | Weather: SUNNY, WARM

Landau Representative: BXM

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 10.08 Time: 1148 Flow through cell vol. GW Meter No.(s HERON-1

Begin Purge: Date/Time: 8/ 12 /2019 @ 1156 End Purge: Date/Time: 8/ 12 /2019 @ 1220 Gallons Purged: <0.5

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

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft	>/= 1 flow through cell	
1159	26.2	298.5	1.89	6.65	-30.3		10.09		
1202	26.3	319.8	1.32	6.62	-34.7		10.08		
1205	26.7	332.4	1.04	6.65	-35.5		10.08		
1208	27.1	338.8	1.22	6.70	-37.2				
1211	27.2	342.8	0.84	6.72	-45.2				
1214	27.2	343.6	0.69	6.73	-51.5				
1217	27.0	341.0	0.63	6.72	-52.8				

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): CLEAR, COLORLESS, 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	27.0	340.4	0.62	6.72	-52.8				
2	27.0	340.0	0.62	6.72	-52.7				
3	27.0	339.5	0.61	6.72	-52.7				
4	26.9	338.8	0.61	6.72	-52.6				
Average:	27.0	339.7	0.62	6.72	-52.7	#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) (Silic
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):

Comments:

Signature: BXM Date: 8/12/2019

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly August 2019 | Date/Time: 8/ 12 /2019@ 851

Sample Number: RGW232S- 190812 | Weather: CLEAR SUNNY

Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 8.93 Time: 820 Flow through cell vol. GW Meter No.(s SLOPE 10

Begin Purge: Date/Time: 8/ 12 /2019 820 End Purge: Date/Time: 8/ 12 /2019 @ 833 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		
823	18.3	523	5.69	6.23	-77.1	LOW	9.45		
826	18.5	537	10.72	6.28	-87.4		9.5		
829	19.6	552	10.99	6.32	-91.7		9.6		
832	19.8	553	11.11	6.33	-94.4				

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

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

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	19.8	552	11.03	6.33	-95.2	LOW			
2	19.9	552	11.04	6.33	-95.6				
3	19.9	552	11.03	6.33	-95.8				
4	19.8	552	11.05	6.33	-96.0				
Average:	19.9	552	11.04	6.33	-95.7	#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) (Silic
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):

Comments: ELEVATED DO READINGS, NO AIR BUBBLE. METER CHECKS OUT. SIGNIFICANT DRAWDOWN

Signature: SRB Date: 8.12.19

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly August 2019 | Date/Time: 8/ 12 /2019@ 931

Sample Number: RGW233I- 190812 | Weather: CLEAR SUNNY

Landau Representative: SRB

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 8.52 Time: 855 Flow through cell vol. GW Meter No.(s SLOPE 10

Begin Purge: Date/Time: 8/ 12 /2019 900 End Purge: Date/Time: 8/ 12 /2019 @ 920 Gallons Purged: 0.25

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

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
	Purge Goals: Stablization of Parameters for three consecutive readings within the following limits							>/= 1 flow through cell	
	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft		
903	18.6	200.6	3.57	6.35	6.8	LOW	8.53		
906	18.8	201.0	4.22	6.33	5.6		8.53		
909	19.7	204.3	4.92	6.32	2.4		8.53		
912	20.1	206.7	4.95	6.35	-2.8				
915	20.2	208.1	4.91	6.37	-5.6				
918	20.4	209.6	4.81	6.40	-12.2				

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

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

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	20.5	210.0	4.82	6.41	-13.1				
2	20.5	210.2	4.76	6.42	-13.3				
3	20.5	210.3	4.73	6.42	-14.9				
4	20.6	210.8	4.72	6.42	-15.3				
Average:	20.5	210.3	4.76	6.42	-14.2	#DIV/0!			

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

Duplicate Sample No(s):

Comments: ELEVATED DO READINGS. CHECKED CALIBRATION - CHECKED OUT FINE.

Signature: SRB Date: 8.12.19

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly August 2019 | Date/Time: 8/ 12/2019@ 1027

Sample Number: RGW234S- 190812 | Weather: MOSTLY CLOUDY

Landau Representative: JAN

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 9.02 Time: 940 Flow through cell vol. GW Meter No.(s 3

Begin Purge: Date/Time: 8/ 12/2019 @ 1000 End Purge: Date/Time: 8/ 12/2019 @ 1020 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		
1003	20.6	236.7	2.59	6.00	2.6		9.02		
1006	21.6	238.7	3.72	6.05	0.1		9.02		
1009	22.1	246.6	4.75	6.14	-17.6		9.02		
1012	22.6	260.9	5.13	6.18	-25.9				
1015	22.9	269.9	5.54	6.23	-26.0				
1018	23.3	273.6	5.60	6.26	24.7				

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): NO COLOR, LOW TURB, 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	23.4	273.9	5.62	6.26	-23.7				
2	23.5	274.2	5.63	6.27	-24.4				
3	23.5	274.5	5.66	6.27	-25.3				
4	23.6	274.6	5.64	6.26	-24.5				
Average:	23.5	274.3	5.64	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) (Silic
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):

Comments:

Signature: JAN Date: 8/12/2019

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly August 2019 | Date/Time: 8/12/19 @ 954

Sample Number: RGW235I- 190812 | Weather: MOSTLY CLOUDY

Landau Representative: JAN

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 14.79 Time: 925 Flow through cell vol. GW Meter No.(s 3

Begin Purge: Date/Time: 8/ 12/2019 @ 927 End Purge: Date/Time: 8/ 12/2019 @ 948 Gallons Purged: 1

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

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
	Purge Goals: Stablization of Parameters for three consecutive readings within the following limits							>/= 1 flow through cell	
	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft		
930	20.8	162.9	0.22	6.63	-89.6		14.79		
933	21.2	165.5	0.19	6.63	-94.4		14.79		
936	21.5	166.4	0.24	6.64	-93.4		14.79		
939	21.9	166.8	0.26	6.60	-90.3				
942	22.1	166.9	0.67	6.53	-79.9				
945	22.4	166.6	1.06	6.49	-73.6				
947	22.6	167.1	1.49	6.47	-72.2				

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): SLIGHT TAN, LOW TURB, 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	22.7	167.2	1.58	6.47	-71.8				
2	22.7	167.2	1.64	6.47	-73.9				
3	22.7	167.3	1.69	6.47	-73.8				
4	22.8	167.4	1.76	6.47	-73.7				
Average:	22.7	167.3	1.67	6.47	-73.3	#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) (Silic
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):

Comments:

Signature: JAN Date: 8/12/2019

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly August 2019 | Date/Time: 8/ 12/2019@ 914

Sample Number: RGW236S- 190812 | Weather: MOSTLY CLOUDY

Landau Representative: JAN

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 8.26 Time: 844 Flow through cell vol. GW Meter No.(s 3

Begin Purge: Date/Time: 8/ 12/2019 @ 847 End Purge: Date/Time: 8/12/2019 @ 908 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**	
850	19.9	377.1	2.82	6.52	-28.9		8.35		
853	20.2	380.9	2.63	6.52	-36.4		8.31		
856	20.4	383.0	2.22	6.52	-34.7		8.29		
859	20.7	384.8	2.44	6.53	-34.8				
902	20.8	387.2	3.55	6.53	-35.4				AIR BUBBLE?
905	21.0	391.5	4.38	6.54	-40.0				
907	21.2	395.2	4.62	6.54	-41.8				

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): YELLOW/LIGHT ORANGE, LOW-MED TURB, 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	21.2	395.2	4.65	6.54	-42.0				
2	21.2	395.1	4.68	6.54	-42.2				
3	21.2	395.0	4.71	6.54	-42.6				
4	21.2	394.9	4.73	6.54	-43.0				
Average:	21.2	395.1	4.69	6.54	-42.5	#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) (Silic		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):

Comments:

Signature: JAN Date: 8/12/2019

Appendix C

Memo

To:	John Long, Project Manager	Project:	0088880100.2019
From:	Crystal Thimsen	c:	Project File
Tel:	(206) 342-1760		
Fax:	(206) 342-1761		
Date:	October 7, 2019		

Subject: Summary Data Quality Review
August 2019 Boeing Renton Groundwater Sampling
SWMU-168
ARI Work Order Number: 19H0184

This memo presents the summary data quality review of three primary groundwater samples and one trip blank sample collected on August 12, 2019. 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 (vinyl chloride) by U.S. Environmental Protection Agency (EPA) Method 8260C with selected ion monitoring.

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

Sample ID	Laboratory Sample ID	Requested Analyses
RGW229S-190812	19H0184-01	vinyl chloride
RGW230I-190812	19H0184-02	vinyl chloride
RGW231S-190812	19H0184-03	vinyl chloride
Trip Blank	18H0184-04	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 13, 2019. 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

Overall assessment of data

The table below summarizes the data assessment. The completeness of ARI work order number 19H0184 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
RGW229S-190812	none
RGW230I-190812	none
RGW231S-190812	none
Trip Blank	none

References

Amec Foster Wheeler Environment & Infrastructure, Inc. (Amec Foster Wheeler), 2016, Quality Assurance Project Plan, Boeing Renton Facility, Renton, Washington: Prepared for the Boeing Company, February.

U.S. Environmental Protection Agency (EPA), 2014, U.S. EPA National Functional Guidelines for Superfund Organic Methods Data Review: EPA 540-R-014-002, August.

Memo

To: John Long, Project Manager
From: Crystal Thimsen
Tel: (206) 342-1760
Fax: (206) 342-1761

Date: September 30, 2019

Project: 0088880100.2019
cc: Project File

Subject: Summary Data Quality Review
August 2019 Boeing Renton Groundwater Sampling
SWMU-172/174
ARI Work Order Number: 19H0180

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 12, 2019. 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 U.S. Environmental Protection Agency (EPA) Method 8260C with selected ion monitoring;
- 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
RGW232S-190812	19H0180-01	all
RGW081S-190812	19H0180-02	all
RGW236S-190812	19H0180-03	all
RGW233I-190812	19H0180-04	all
RGW173S-190812	19H0180-05	all
RGW235I-190812	19H0180-06	all
RGW234S-190812	19H0180-07	all
RGW172S-190812	19H0180-08	all
RGW153S-190812	19H0180-09	all
RGW152S-190812	19H0180-10	all
RGW226S-190812	19H0180-11	all
RGWDUP1-190812	19H0180-12	all
Trip Blank	19H0180-13	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 13, 2019. The temperatures of the coolers were recorded upon receipt and were below the maximum acceptable temperature of 6 degrees Celsius (ºC).

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 RPD is not calculated for results that are less than five times the reporting limit, as indicated on the table below by "NC." In these cases, the absolute value of the difference between the primary and duplicate result should not exceed the value of the reporting limit. The field duplicate RPDs were within the control limits.

Sample ID/ Field Duplicate ID	Analyte	Primary Result (µg/L)	Duplicate Result (µg/L)	Reporting Limit (µg/L)	RPD (%)
RGW152-190812/ RGWDUP1-190812	vinyl chloride	0.0705	0.0470	0.020	40
	cis-1,2-dichloroethene	0.627	0.563	0.020	11
	trichloroethene	0.203	0.147	0.020	32
	tetrachloroethene	0.176	0.177	0.020	<1

Notes
µg/L = micrograms per liter
RPD= relative percent difference

7. Reporting Limits and Laboratory Flags – Acceptable

Inorganic analyses

Samples were analyzed for total metals and TOC. Laboratory data were evaluated for the following parameters:

1. Preservation and Holding Times – Acceptable
2. Blanks – Acceptable
3. LCS – Acceptable
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 field duplicate RPDs were within the control limits.

Sample ID/ Field Duplicate ID	Analyte	Primary Result	Duplicate Result	Reporting Limit	Units	RPD (%)
RGW152-190812/ RGWDUP1-190812	TOC	10.96	10.37	0.5	mg/L	6
	total arsenic	23.4	19.2	1.0	µg/L	20
	total copper	21.8	19.2	2.5	µg/L	13
	total lead	14.8	11.7	0.5	µg/L	23

Notes
µg/L = micrograms per liter
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 19H0180 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
RGW232S-190812	none	NA	NA	NA
RGW081S-190812	none	NA	NA	NA
RGW236S-190812	none	NA	NA	NA

Sample ID	Qualified Analyte	Qualified Result	Units	Qualifier Reason
RGW233I-190812	none	NA	NA	NA
RGW173S-190812	none	NA	NA	NA
RGW235I-190812	none	NA	NA	NA
RGW234S-190812	none	NA	NA	NA
RGW172S-190812	none	NA	NA	NA
RGW153S-190812	none	NA	NA	NA
RGW152S-190812	vinyl chloride trichloroethene	70.5 J 203 J	ng/L	field duplicate RPD
RGW226S-190812	none	NA	NA	NA
RGWDUP1-190812	vinyl chloride trichloroethene	47.0 J 147 J	ng/L	field duplicate RPD
Trip Blank	none	NA	NA	NA

Notes
NA = not applicable
ng/L = nanograms per liter
RPD= relative percent difference

References

Amec Foster Wheeler Environment & Infrastructure, Inc. (Amec Foster Wheeler), 2016, Quality Assurance Project Plan, Boeing Renton Facility, Renton, Washington: Prepared for the Boeing Company, February.

U.S. Environmental Protection Agency (EPA), 2014a, U.S. EPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review: EPA 540-R-014-002, August.

EPA, 2014b, U.S. EPA National Functional Guidelines for Inorganic Superfund Data Review: EPA 540-R-013-001, August.

Memo

To:	John Long, Project Manager	Project:	0088880100.2019
From:	Crystal Thimsen	c:	Project File
Tel:	(206) 342-1760		
Fax:	(206) 342-1761		
Date:	October 7, 2019		

Subject: Summary Data Quality Review
August 2019 Boeing Renton Groundwater Sampling
Building 4-78/79 SWMU/AOC Group
ARI Work Order Number: 19H0223

This memo presents the summary data quality review of 16 primary groundwater samples, one field duplicate groundwater sample, and two trip blank samples collected on August 13, 2019. 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
RGW210S-190813	19H0223-01	all
RGW241S-190813	19H0223-02	VOCs and TPH-G
RGW242I-190813	19H0223-03	VOCs and TPH-G
RGW031S-190813	19H0223-04	all
RGW143S-190813	19H0223-05	all
RGW240D-190813	19H0223-06	all
RGW244S-190813	19H0223-07	all
RGW239I-190813	19H0223-08	all
RGW033S-190813	19H0223-09	all
RGW034S-190813	19H0223-10	all
RGW039S-190813	19H0223-11	all
RGW038S-190813	19H0223-12	all
RGW243I-190813	19H0223-13	all

Sample ID	Laboratory Sample ID	Requested Analyses
RGW238I-190813	19H0223-14	all
RGW237S-190813	19H0223-15	all
RGW209S-190813	19H0223-16	all
Trip Blank	19H0223-17	VOCs and TPH-G
RGWDUP2-190813	19H0223-18	all

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

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

ARI received the samples on August 14, 2019. The temperatures of the coolers were recorded upon receipt and were below the maximum acceptable temperature of 6 degrees Celsius (ºC).

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
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 (%)
RGW031S-190813/ RGWDUP2-190813	vinyl chloride	0.21	0.22	0.20	NC
	cis-1,2-dichloroethene	0.47	0.48	0.20	NC
	benzene	3.47	4.37	0.20	23
	TPH-G	1,390	1,200	100	15

Abbreviations
µg/L = micrograms per liter
RPD = relative percent difference
TPH-G = total petroleum hydrocarbons as gasoline

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 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-190813/ RGWDUP2-190813	TOC	15.31	15.02	5.00	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 19H0223 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
RGW210S-190813	none
RGW241S-190813	none
RGW242I-190813	none
RGW031S-190813	none
RGW143S-190813	none
RGW240D-190813	none
RGW244S-190813	none
RGW239I-190813	none
RGW033S-190813	none
RGW034S-190813	none
RGW039S-190813	none
RGW038S-190813	none
RGW243I-190813	none
RGW238I-190813	none
RGW237S-190813	none
RGW209S-190813	none
Trip Blank	none
RGWDUP2-190813	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:	0088880100.2019
From:	Crystal Thimsen	c:	Project File
Tel:	(206) 342-1760		
Fax:	(206) 342-1761		
Date:	October 11, 2019		

Subject: Summary Data Quality Review
August 2019 Boeing Renton Groundwater Sampling
AOC-001 and -002 and AOC-003
ARI Work Order Number: 19H0232

This memo presents the summary data quality review of 15 primary groundwater samples, one field duplicate, and one trip blank sample collected on August 14, 2019. 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 5310 B-00.

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

Sample ID	Laboratory Sample ID	Requested Analyses
RGW185S-190814	19H0232-01	all AOC-001 and -002 analyses
RGW197S-190814	19H0232-02	all AOC-001 and -002 analyses
RGW193S-190814	19H0232-03	all AOC-001 and -002 analyses
RGW191D-190814	19H0232-04	all AOC-001 and -002 analyses
RGW245S-190814	19H0232-05	all AOC-001 and -002 analyses
RGW192S-190814	19H0232-06	all AOC-001 and -002 analyses
RGW195S-190814	19H0232-07	all AOC-001 and -002 analyses

Sample ID	Laboratory Sample ID	Requested Analyses
RGW196D-190814	19H0232-08	all AOC-001 and -002 analyses
RGW190S-190814	19H0232-09	all AOC-001 and -002 analyses
RGW246S-190814	19H0232-10	all AOC-001 and -002 analyses
RGW194S-190814	19H0232-11	all AOC-001 and -002 analyses
RGW249S-190814	19H0232-12	all AOC-001 and -002 analyses
RGW188S-190814	19H0232-13	all AOC-003 analyses
RGW247S-190814	19H0232-14	all AOC-003 analyses
RGW248I-190814	19H0232-15	all AOC-003 analyses
Trip Blank	19H0232-16	VOCs
RGWDUP3-190814	19H0232-17	all AOC-003 analyses

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, 2019. The temperatures of the coolers were recorded upon receipt and were below the maximum acceptable temperature of 6 degrees Celsius (ºC). The laboratory noted an air bubble in one vial received for the following samples: RGW245S-190814, RGW195S-190814, RGW196D-190814, RGW188S-190814, and RGW248I-190814. The laboratory proceeded with analyses using unaffected vials. Sample results were 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 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 (%)
RGW185S-190814/ RGWDUP3-190814	vinyl chloride	193	203	20.0	5
	cis-1,2-dichloroethene	222	240	20.0	8

Abbreviations
ng/L = nanograms per liter
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-190814/ RGWDUP3-190814	TOC	12.55	12.72	0.50	1

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 19H0232 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
RGW185S-190814	none
RGW197S-190814	none
RGW193S-190814	none
RGW191D-190814	none
RGW245S-190814	none
RGW192S-190814	none
RGW195S-190814	none
RGW196D-190814	none
RGW190S-190814	none
RGW246S-190814	none
RGW194S-190814	none
RGW249S-190814	none
RGW188S-190814	none
RGW247S-190814	none
RGW248I-190814	none
Trip Blank	none
RGWDUP3-190814	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:	0088880100.2019
From:	Crystal Thimsen	c:	Project File
Tel:	(206) 342-1760		
Fax:	(206) 342-1761		
Date:	November 1, 2019		

Subject: Summary Data Quality Review
August 2019 Boeing Renton Groundwater Sampling
AOC-004
ARI Work Order Number: 19H0231

This memo presents the summary data quality review of two primary groundwater samples collected on August 14, 2019. 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
RGW250S-190814	19H0231-01	total lead
RGW174S-190814	19H0231-02	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 15, 2019. 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 19H0231 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
RGW250S-190814	none
RGW174S-190814	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:	0088880100.2019
From:	Crystal Thimsen	c:	Project File
Tel:	(206) 342-1760		
Fax:	(206) 342-1761		
Date:	October 7, 2019		

Subject: Summary Data Quality Review
August 2019 Boeing Renton Groundwater Sampling
AOC-060
ARI Work Order Numbers: 19H0206 and 19H0230

This memo presents the summary data quality review of nine primary groundwater samples, one field duplicate, and two trip blank samples collected on August 13 and 14, 2019. 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) 5310B-00.

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

Sample ID	Laboratory Sample ID	Requested Analyses
RGWDUP4-190813	19H0206-01	all
RGW014S-190813	19H0206-02	all
RGW012S-190813	19H0206-03	all
RGW147S-190813	19H0206-04	all
RGW254S-190813	19H0206-05	all
RGW150S-190813	19H0206-06	all
RGW253I-190813	19H0206-07	all
RGW252S-190813	19H0206-08	all
RGW149S-190813	19H0206-09	all
Trip Blank	19H0206-10	VOCs
RGW009S-190814	19H0230-01	all
Trip Blank	19H0230-02	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 14 and 15, 2019. The temperatures of the coolers were recorded upon receipt and were below the maximum acceptable temperature of 6º 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
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 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-190813/ RGWDUP4-190813	vinyl chloride	365	362	20.0	<1
	cis-1,2-dichloroethene	143	145	20.0	1

Abbreviations
ng/L = nanograms 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 RPDs were within the control limits

Sample ID/ Field Duplicate ID	Analyte	Primary Result (mg/L)	Duplicate Result (mg/L)	Reporting Limit (mg/L)	RPD (%)
RGW014S-190813/ RGWDUP4-190813	TOC	4.12	4.08	0.50	1

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 numbers 19H0206 and 19H0230 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
RGWDUP4-190813	none
RGW014S-190813	none
RGW012S-190813	none
RGW147S-190813	none
RGW254S-190813	none
RGW150S-190813	none
RGW253I-190813	none
RGW252S-190813	none
RGW149S-190813	none
Trip Blank	none
RGW009S-190814	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.

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Memo

To:	John Long, Project Manager	Project:	0088880100.2019
From:	Crystal Thimsen	c:	Project File
Tel:	(206) 342-1760		
Fax:	(206) 342-1761		
Date:	October 11, 2019		

Subject: Summary Data Quality Review
August 2019 Boeing Renton Groundwater Sampling
AOC-090
ARI Work Order Number: 19H0197

This memo summarizes the data quality review of 11 primary groundwater samples, one duplicate sample, and a trip blank sample collected on August 12, 2019. 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
RGWDUP5-190812	19H0197-01	VOCs and TPH
RGW180S-190812	19H0197-02	VOCs and TPH
RGW179I-190812	19H0197-03	VOCs and TPH
RGW208S-190812	19H0197-04	VOCs and TPH
RGW178S-190812	19H0197-05	VOCs and TPH
RGW177I-190812	19H0197-06	VOCs and TPH
RGW207S-190812	19H0197-07	VOCs and TPH
RGW175I-190812	19H0197-08	VOCs and TPH
RGW176S-190812	19H0197-09	VOCs and TPH

Sample ID	Laboratory Sample ID	Requested Analyses
RGW163I-190812	19H0197-10	VOCs and TPH
RGW189S-190812	19H0197-11	All
RGW165I-190812	19H0197-12	VOCs and TPH
Trip Blank	19H0197-13	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 13, 2019. The temperatures of the coolers were recorded upon receipt and were less than the maximum acceptable temperature of 6 degrees Celsius (ºC). The laboratory noted the following upon sample receipt:

- For sample RGW165I-190812, a bubble was noted in one of seven vials submitted for VOC analysis. The laboratory proceeded with analysis using unaffected vials and sample results were not affected.
- The laboratory noted that three unlabeled vials were submitted. The laboratory was unable to resolve which sample was missing vials. Sample results are not affected and are not qualified.

Organic analyses

Samples were analyzed for VOCs and TPH. Laboratory data were evaluated for the following parameters:

1. Preservation and Holding Times – Acceptable
2. Blanks – Acceptable
3. Surrogates – Acceptable
4. LCS/LCSD – Acceptable
5. MS/MSD – Acceptable except as noted:

   VOCs by EPA 8260C: The recovery for 1,1,2-trichloroethane was above the control limits in the MS performed with sample RGW189S-190812. The recovery in the MSD was acceptable. Due to the acceptable MSD recovery, the result for 1,1,2-trichloroethane in sample RGW189S-190812 was not affected and not qualified.

The recovery for cis-1,2-dichloroethene was above the control limits in the MSD. The recovery in the MS was acceptable. The cis-1,2-dichloroethene result for sample RGW189S-190812 is not qualified based on the acceptable MS result.

VOCs by EPA 8260C SIM: The recovery for 1,1,2,2-tetrachloroethane was above the control limits in the MS/MSD performed with sample RGW189S-190812. The high recovery equates to a potential high bias in the sample; and the 1,1,2,2-tetrachloroethane result in sample RGW189S-190812 was below detection. Therefore, the result for 1,1,2,2-tetrachloroethane in sample RGW189S-190812 was not affected and not qualified.

6. Field Duplicates – Acceptable

   One field duplicate was submitted for each analysis during this sampling event, meeting the project frequency requirement of five percent, or one for every 20 samples. Primary and duplicate results are summarized in the table below. The project-specific control limit for field duplicate relative percent differences (RPDs) is 30 percent for concentrations greater than five times the reporting limit. The RPD is not calculated for results that are less than five times the reporting limit, as indicated on the table below by "NC." In these cases, the absolute value of the difference between the primary and duplicate result should not exceed the value of the reporting limit. The field duplicate RPDs were within the control limits.

Sample ID/ Field Duplicate ID	Analyte	Primary Result (ng/L)	Duplicate Result (ng/L)	Reporting Limit (µg/L)	RPD (%)
RGW180S-190812/ RGWDup5-190812	vinyl chloride	48.5	55.3	20.0	NC
	trichloroethene	23.9	21.1	20.0	NC

Abbreviations
ng/L = nanograms 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

   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 numbers 19H0197 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
RGWDUP5-190812	none
RGW180S-190812	none
RGW179I-190812	none
RGW208S-190812	none
RGW178S-190812	none
RGW177I-190812	none
RGW207S-190812	none
RGW175I-190812	none
RGW176S-190812	none
RGW163I-190812	none
RGW189S-190812	none
RGW165I-190812	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:	0088880100.2019
From:	Crystal Thimsen	c:	Project File
Tel:	(206) 342-1760		
Fax:	(206) 342-1761		
Date:	October 7, 2019		

Subject: Summary Data Quality Review
August 2018 Boeing Renton Groundwater Sampling
Bldg. 4-70
ARI Work Order Number: 19H0210

This memo summarizes the data quality review of two primary groundwater samples and one trip blank sample collected on August 13, 2019. 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-190813	19H0210-01	all
RGW260S-190813	19H0210-02	all
Trip Blank	19H0210-03	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 14, 2019. The temperature of the cooler was recorded upon receipt and was less than the maximum acceptable temperature of 6 degrees Celsius (ºC).

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 19H0210 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-190813	none
RGW260S-190813	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 2019

Boeing Renton Site
Renton, Washington

Prepared for:
The Boeing Company
EHS Remediation

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

November 12, 2019

Table of Contents

List of Tables

List of Figures

Acronyms

AOC	Area of Concern
^{o}Bx	degrees brix
bgs	below ground surface
Building 4-78/79	Building 4-78/4-79 SWMU/AOC Group
CALIBRE	CALIBRE Systems, Inc.
cfm	cubic feet per minute
DAP	Diammonium Phosphate
DCA	Dichloroethane
DCE	Dichloroethene
EDR	Engineering Design Report
ERD	Enhanced Reductive Dechlorination
ft	feet
lbs	pounds
mg/L	milligrams per liter
MgSO4	Magnesium Sulfate
NA	not analyzed
NaNO3	Sodium Nitrate
ND	non-detect
PCE	Tetrachloroethene
PID	Photoionization detector
ppbv	parts per billion by volume
SVE	Soil Vapor Extraction
SWMU	Solid Waste Management Unit
TCA	Trichloroethane
TCE	Trichloroethene
Tech Memo	Technical Memorandum
Total Chlorinated	Sum of PCE, TCE, cis-1,2-DCE, trans-1,2-DCE, 1,1,1-TCA, and 1,1-DCA
TPH-G	Total Petroleum Hydrocarbons-Gasoline
ug/L	micorgrams per liter
VC	Vinyl Chloride
VOCs	Volatile Organic Compounds
VPC	Vapor Phase Carbon

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 2019 (between July 1 and September 30, 2019). The ongoing remedial actions include:

1. Operation of one soil vapor extraction (SVE) system located at Solid Waste Management Unit (SWMU) designated as SWMU-172/174;
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. 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 2019. This includes operation and monitoring activities for the SVE system located at SWMU-172/174 and a summary of the ongoing biological treatment and monitoring 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

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. Rebound stabilization tests were conducted in early 2018 followed by collection of soil confirmation samples from both areas in June 2018. Ecology approved the recommended shutdown of the Building 4-78/79 SVE system on November 1, 2018 after review and evaluation of the soil confirmation results for that area (CALIBRE 2018a). Operational modifications have continued at the SWMU-172/174 SVE system to optimize VOC removal for that area. The following sections summarize the operating conditions, operational changes, and performance monitoring/evaluation for the SWMU-172/174 SVE system performed in July to September 2019.

2.1 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 2-1. 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 historically included two smaller vessels each containing 200 pounds of zeolite impregnated with permanganate for vinyl chloride treatment. As described below, the lag permanganate drum became plugged during the beginning of the fourth quarter 2019 and was taken offline. The lead permanganate drum is still operating within the treatment system.

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 summarizes the TO-15 detections for the SWMU-172/174 SVE system for 15 TO-15 sampling events[1] that have been implemented since system startup.

2.1.2 Summary of Operations and Operational Changes

[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.

The soil confirmation samples collected in the second quarter of 2018 identified a location between SVE-2 and SVE-3 which still showed elevated PCE levels in soil. During the third quarter of 2018, the SVE system was adjusted to alter the flushing pattern through this area by using SVE-3 as an inlet vent well with continued extraction through SVE-2 and SVE-1. Vapor concentrations, measured with a PID, showed some increase for approximately two weeks during that reporting period. Subsequent measurements during the fourth quarter 2018 reporting period showed vapor concentrations reducing to previous low level detections. Therefore, on December 5, 2018 the SVE system was adjusted to alter the flushing pattern around SVE-2 and SVE-3 by using SVE-1 as an inlet vent well with continued extraction from SVE-2 and re-opening SVE-3 to extraction.

At the end of the previous quarter (June 20, 2019, second quarter 2019) PID readings showed reduced VOC levels at SVE-2 while SVE-1 remained near 0 ppbv. Systems operation modifications were completed that day (following the collection of samples for TO-15 analysis) to adjust SVE-1 as an inlet vent well with extraction at SVE-2 and SVE-3. The system has continued to operate in this manner during the third quarter 2019. Table 2-2 shows the PID readings for the wells in the SWMU 172/174 SVE system. Table 2-3 shows an operational summary for the system.

A brief summary of key changes/events associated with operation of the SWMU 172/174 SVE system is presented below; specific details are only included for weeks when system changes and modifications were implemented. More details on weekly operations are summarized in Table 2-2 and the operational logs included in Appendix A.

- The SVE system was turned off on August 17, 2019 to reposition the SVE trailer and associated carbon vessels, permanganate drums and hoses to provide access to electrical outlets positioned behind the SVE trailer. The system was restarted August 21, 2019 and at that time, equipment near the SVE trailer was being spray painted. Area background PID measurements ranged from 1.6 ppm to 3.3 ppm near the trailer at this time. The subsequent PID monitoring of the SVE wells and carbon vessels showed unusually high detections (influent at 10.4 ppm), and the elevated detections are believed to be associated with the painting activities at the facility. The PID results for this week were not used in calculating VOC mass removal as they are not representative of PCE mass removal at the site.
- The system was turned off on August 30, 2019 due to an observed airline leak at the connection to the influent of the second carbon vessel. The hose was taken in for replacement and re-installed. Subsequent PID monitoring showed some rebound in monitoring results compared to the previous visit.
- On October 2, 2019 (fourth quarter 2019) the hose between the 2nd carbon vessel and 2nd permanganate drum had a crack near the camlock fitting entering the zeolite/permanganate drum. The system was turned off to repair the hose.
- On October 3, 2019 the repaired hose was installed and limited effluent flow was observed from the zeolite/permanganate drum indicating this drum had become plugged. The drum was removed from the treatment system. The first zeolite/permanganate drum remains in place operating

between the two carbon vessels. The zeolite/permanganate drums were originally installed to treat concentrations of vinyl chloride that would not be captured in the GAC vessels. As shown in Table 2-1, no vinyl chloride is present in the inlet to the SVE systems, and therefore permanganate treatment is not needed.

2.1.3 Mass Removal Estimate

Between April 17, 2015 and September 26, 2019 the SWMU-172/174 SVE system has recovered an estimated 18.4 pounds of VOCs (primarily PCE), as shown in Table 2-3. Approximately 1.1 pounds of VOCs were removed during the current reporting period (third quarter 2019) based on PID measurements collected. The cumulative VOC mass removal for the SWMU-172/174 SVE system is shown in Figure 2-2.

2.2 Recommended Next Steps for the SVE Systems and Monitoring

In December 2018, Boeing submitted to Ecology a Tech Memo describing the planned approach for further evaluation of soils around probe point PP13 at the Building 4-78/79 area (CALIBRE 2018b). The single sample (PP13) which exceed cleanup standards for TPH-G was collected from a low permeable silty/clay layer. The objective of the soil evaluation is to identify the location and depth of utilities in the immediate area, determine the feasibility of excavating soil by delineating the extent of soil contamination around PP13 and to determine the extent of soil that can be removed.

Additional probe points were sampled in June 2019 and those results showed concentrations of TPH-G exceeding the cleanup level of 30 mg/L to a depth 11.5 ft bgs in certain areas, with the highest detections between 5 to 9 ft bgs. The water table elevation in this area was monitored during July, August, and September 2019 to determine if soil excavation would be feasible; however water table elevations remained near 5 ft bgs during this period therefore any attempt at soil excavation will be postponed until summer/fall 2020.

Modifying the SVE system flow at the SWMU-172/174 area at the end of the second quarter 2019 showed increases in VOC mass removal from the system influent. Subsequent monitoring during third quarter 2019 showed variable vapor concentrations at the SVE-2 and SVE-3 monitoring points. During a number of visits in this operating period paint odors or painting activities were occurring in the area of the SVE system and the observed PID monitoring fluctuations may be associated with those activities. If, during the 4th quarter 2019, concentrations reduce to asymptotic levels the system will be modified to alternate flows between wells as has been done in the past (i.e. SVE-3 is extracting and will be changed to an inlet vent and vice versa for SVE-1). Summa canister samples for TO-15 analysis will be planned for the 4th Quarter 2019 to monitor if appreciable changes in vapor concentrations have occurred.

Additional modifications to the operation of this system should be considered to continue increased mass removal in the area between SVE-2 and SVE-3. These modifications may include opening SVE-1 and SVE-3

as an inlet vent or SVE-1 and SVE-2 as an inlet vent, to focus vapor removal in that area. 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 solvents between December 2014 and March 2019.

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. As a result of any soil excavations being postponed until drier months, additional nitrate/sulfate samples in groundwater may be recommended for the benzene treatment area in the fourth quarter of 2019. Additional nitrate/sulfate injections would be completed following evaluation of those monitoring results.

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 3-1 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

SVE operations were modified at the SWMU-172/174 area at the end of the 2nd quarter 2019 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 2nd quarter of 2018. It is recommended that SVE operations be continued for this area, with additional modifications to include opening of SVE-1 and SVE-2 as inlet vents or SVE-1 and SVE-3 as inlet vents to allow focused vapor removal at SVE-2 and SVE-3. In addition, it may be beneficial to operate 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. Performance monitoring data related to benzene treatment at the Building 4-78/79 area was temporarily delayed in anticipation of possible soil excavations for this area. However, since water table elevations did not drop below the 5 ft to 9 ft bgs impacted zone identified in June 2019, the soil excavation has been postponed until fall of 2020. Therefore, additional nitrate/sulfate and benzene samples are recommended for this area to monitor benzene treatment performance. To date a majority of the wells in this treatment area are at benzene concentrations below baseline results, with many wells at 90% reduction from baseline (Wood 2019). Additional nitrate/sulfate injections will be considered

following evaluation of the data. Substrate injections for ERD treatment will be recommended following the review of the 4th quarter 2019 monitoring results.

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.

CALIBRE 2018a. Recommendation to shut down SVE system at Building 4-78/4-79 SWMU/AOC Group; Boeing Renton Site. Prepared by CALIBRE Systems, Inc. for The Boeing Company, EHS Remediation. October 2018.

CALIBRE 2018b. Plan for Evaluation of Soils around Probe PP13 at Building 4-78/4-79 SWMU/AOC Group; Boeing Renton Site. Prepared by CALIBRE Systems, Inc. for The Boeing Company, EHS Remediation. November 2018.

Ecology 2015. Washington State Water Quality Standards: Human Health Criteria and Implementation Tools. Prepared by the Washington Department of Ecology. Publication no. 14-10-058. January 2015.

USACE 2002. Engineering and Design - Soil Vapor Extraction and Bioventing. Prepared by US Army Corps of Engineers. EM 1110-1-4001. June 2002.

Wood 2019. Quarterly report, second quarter 2019. RCRA Corrective Action Program Boeing Renton Facility. Prepared by Wood and CALIBRE Systems, Inc. for the Boeing Company, EHS Remediation. August 2019.

TABLES

Table 2-1 TO-15 Analytical Results - SWMU-172/174 SVE System Project History

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
2/13/2019	32	2.2	1.6	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	36	36
6/20/2019	74	6.2	3.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	84	84

SVE-1

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
6/20/2019	10	1.4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	11	11

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
2/13/2019	48	3.3	2.8	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	54	54
6/20/2019	100	9.6	5.1	ND	ND	1.4	ND	ND	1.4	ND	ND	ND	ND	ND	116	118

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

Table 2-1 TO-15 Analytical Results - SWMU-172/174 SVE System Project History

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
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.

Shaded cells are results from 1st Quarter 2019.

Table 2-2 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
7/2/2019	1,374	Vent	0	440	844		0	Changed blower oil
7/19/2019	1,391	Vent	56	350	148		0	
7/24/2019	1,396	Vent	0	570	385		0	Paint locker door open, PID at door = 13.4 ppm.
8/2/2019	1,405	Vent	373	780	797		0	Paint locker door open, PID at door = 2.0 ppm.
8/6/2019	1,409	Vent	632	918	703		0	
8/16/2019	1,419							System power was turned off; restarted system.
8/21/2019	1,424	Vent	1,802	5,288	10,350		800	System was turned off on 8/17/19 to reposistion SVE trailer, carbon vessels, and KMNO4 drums for Boeing access to electrical outlets behind SVE trailer. System turned on 8/21/19. Equipment being spray painted next to SVE trailer. Background PID ranges from 1,600 ppb to 3,300 ppb. Do not intend to use this data as it is not representative of PCE mass removal.
8/27/2019	1,430	Vent	170	804	572		0	
9/13/2019	1,447	Vent	261	1,320	1,083		0	System was turned off on 8/30 due to air line leak. Hose taken in for replacement; replacement installed on 9/13/19. Restart system. Readings after 1 hour of operating.
9/26/2019	1,460	Vent	0	322	163		0	

Notes:

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

Operational change was made on 6/20/19. Due to reduced concentrations observed at SVE-1 and the influent, SVE-01 was opened as a vent well to promote focused flow towards SVE-02 and SVE-03.

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

Table 2-3 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)[2]	Cumulative VOC Mass Removed Since Start of SVE Operations in April, 2015 (lbs)
7/2/2019	844	486	98	26,690	0.136	17.43
7/19/2019	148	85	100	27,093	0.083	17.52
7/24/2019	385	222	98	27,205	0.059	17.58
8/2/2019	797	459	100	27,418	0.237	17.81
8/6/2019	703	405	98	27,511	0.090	17.90
8/16/2019[3]	703	405	103	27,663	0.154	18.06
8/21/2019	Not used - spray painting occuring near trailer.	0	98	27,708	0.000	18.06
8/27/2019	572	329	91	27,849	0.103	18.16
9/13/2019	1,083	623	85	27,946	0.126	18.29
9/26/2019	163	94	85	28,248	0.058	18.35

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 6/20/19. This number is much higher than the TO-15 results.

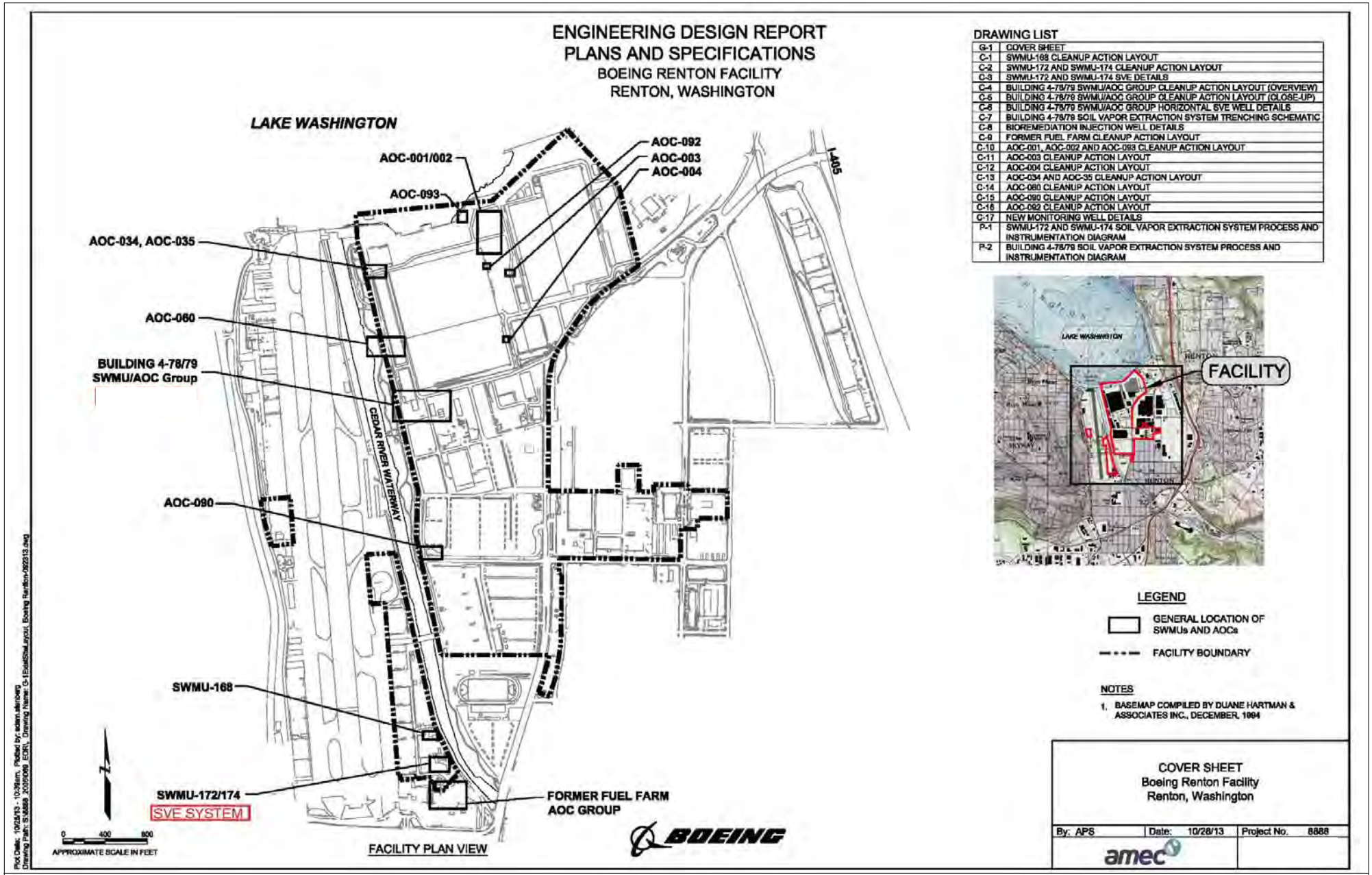
[2] These are based soley on the PID measurements collected this quarter; the TO-15 analysis indicates much lower mass.
TO-15 analysis results showed Tetrachloroethene made up 88% of the total VOCs removed at the influent on 6/20/19.

[3] Previous weeks influent PID reading used to calculate mass removal if that reading was not collected during the site visit.

Table 3-1 Groundwater Monitoring Results Summary August 2019 and Recommended ERD Treatment

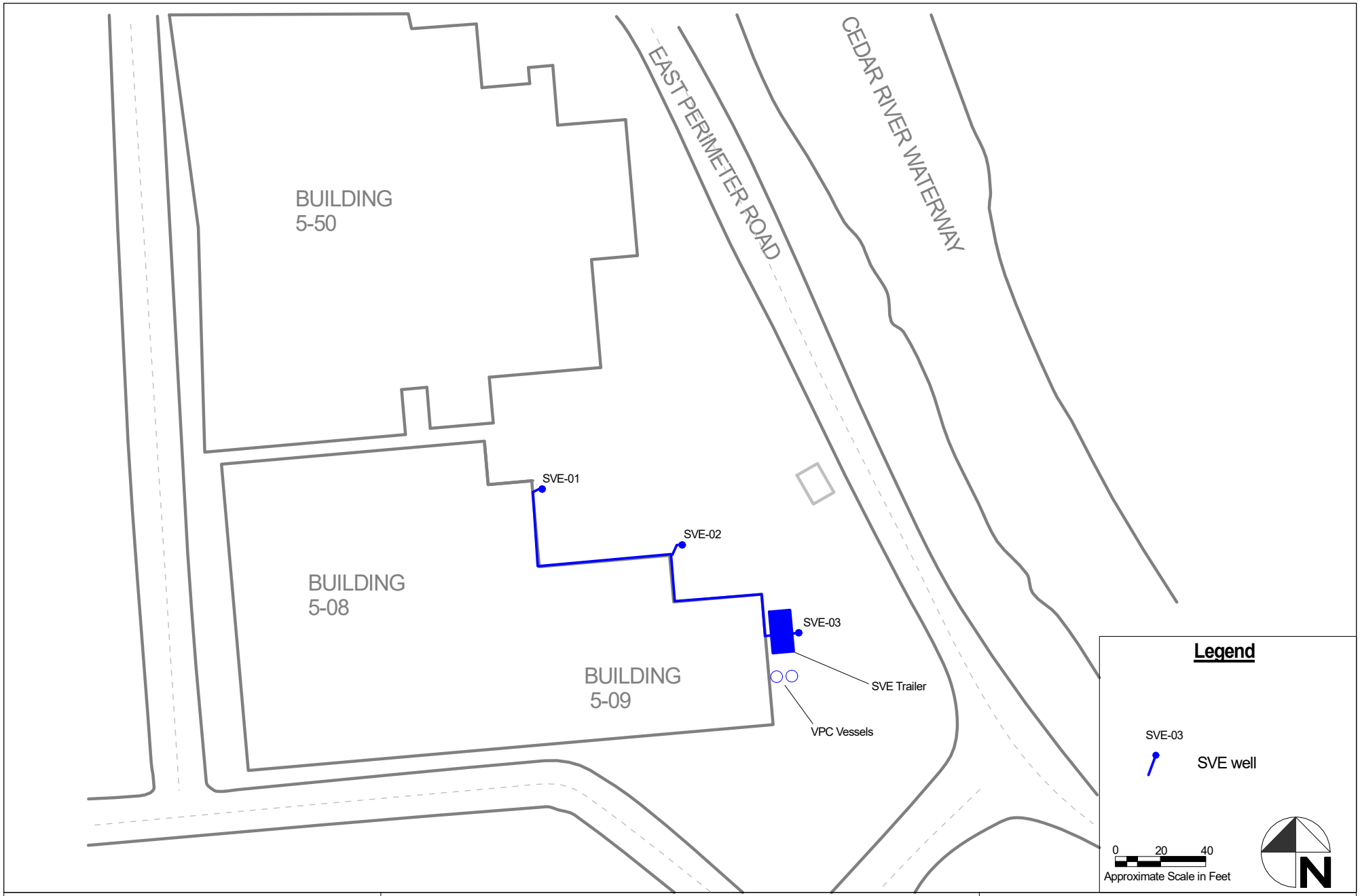
GW Treatment Area	Source and down gradient MWs	CPOC wells	Treatment IWs	ERD Treatment Recommendation
SWMU-172/174	PCE and TCE at or less than 0.2 ug/L; cisDCE less than 0.70 ug/L and VC less than 0.15 ug/L.	All detections are at 0.42 ug/L or less.	*Prior data Mar 2018, North and South IWS showed total CVOCs range from 0.03 ug/L to 6.90 ug/L. TOC near background.*	**Detections are very low and less than 1 ug/L throughout the site. Will consider additional injections if beneficial.**
Building 4-78/4-79 SWMU/AOC Group	TCE is ND; cisDCE and VC are less than 1.0 ug/L at all but GW033S with VC at 1.16. One central well (GW033S) continues to show total CVOCs remain reduced from Nov 2017 results of 1,430 ug/L. Recent data show 46 ug/L in Nov 2018, 4.1 ug/L in Mar 2019, 0.94 ug/L in May 2019, and 1.94 ug/L in Aug 2019. Substrate was applied to this area after Mar 2019 sampling. Benzene decreased at source well GW031S (59 ug/L in Mar 2019 to 7.1 ug/L in May 2019 to 4.37 ug/L in Aug 2019). Nitrate/sulfate injected following Mar 2019 sampling.	Most detections are ND; one central well with TCE and cisDCE detections at 1.05 ug/L and 2.20 ug/L, respectively (GW143S). VC detections are less than 0.40 ug/L. Northern well GW237S showed decrease in Benzene from 9.58 ug/L to 2.20 ug/L in May 2019 to 0.43 ug/L in Aug 2019.	*Prior data May 2017, 4 of 5 wells with low detections where sum of CVOCs are less than 3 ug/L*	**Detections are very low throughout the site. Will consider additional injections if beneficial. Additional benzene, nitrate, sulfate samples recommened for benzene treatment area. Nitrate/sulfate injections to be determined following data evaluation.**
AOC-001/002	Source MW: TCE is 0.04 ug/L, cisDCE is 0.99 ug/L and VC is 0.12 ug/L. Down gradient wells less than 3.71 ug/L total CVOCs.	All detections below 0.30 ug/L.	*Prior data Mar 2018, detections at or below 0.30 ug/L.*	**Consider injection at infiltration galleries at source (IPRA and IPRB) when area is accessible.**
AOC-003	All detections are less than 0.40 ug/L.	All detections are less than 0.55 ug/L.	VC detections less than 0.61 ug/L.	**Substrate injection to be considered in conjunction with AOC-001/002.**
Lot 20 / former 10-71	*Prior Data May 2019: All wells are ND.*	-	-	**No action at this time.**
AOC-60	MW's with detections less than 0.37 ug/L; treatment MWs with total CVOCs less than 5.8 ug/L.	Detections less than 0.15 ug/L.	-	**Detections are very low throughout the site. Will consider additional injections if beneficial.**
AOC – 90	Treatment MW at source with total CVOCs at 8.9 ug/L total CVOCs (primarily cisDCE) and down from 27 ug/L in Aug 2018; down gradient wells less than 0.57 ug/L total CVOCs.	Detections less than 0.40 ug/L.	-	**Detections are very low throughout the site. Will consider additional injections if beneficial.**
Apron A	*Prior data: Two of three wells ND; other well shows VC at 1.39 ug/L.*	-	-	**Detections are very low throughout the site. Will consider additional injections if beneficial.**
Building 4-70	-	VC is non-detect; TCE and cisDCE detections less than 0.71 ug/L.	-	**No action at this time.**

FIGURES



CALIBRE Systems, Inc.

Figure 1-1 Site Location/ AOC Outlines



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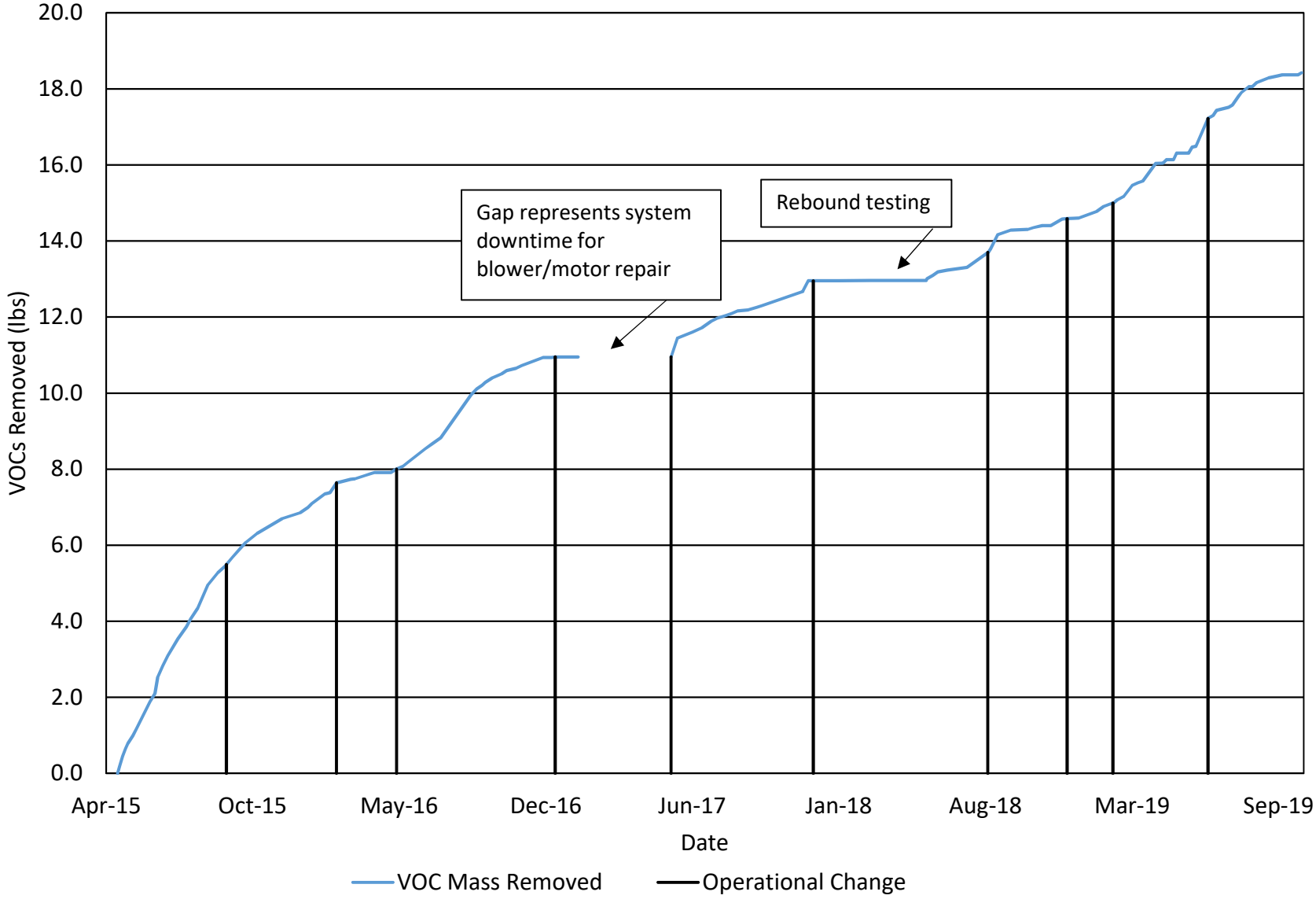
Boeing Renton
Spring 2017 SVE Quarterly Summary Report

Figure 2-1 SWMU-172/174 Area
SVE System Layout

Figure 2-2 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: 7/2/19 Date of last inspection: 6/27/19

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: 11,880.6
Blower	**Current Value**	**Other Notes**
Vacuum gauge	38" H20	Changed oil in blower.
Pressure gauge	22" H20	
System flow rate	98 SCFM	
Blower Temperature	113°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:	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		VENT					
SVE-02	0924	0 ppb	0 ppb				
SVE-03	0932	440 ppb	420 ppb				
VPC Inlet	0920	840 ppb	844 ppb				
VPC Midpoint							
VPC Outlet	0916	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) 7/2/19 (Date)

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

Inspection Date: 7/19/19 Date of last inspection: 7/2/19

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: 1421		Motor Hours: 12,283.8
Blower	**Current Value**	**Other Notes**
Vacuum gauge	39" H_2O	
Pressure gauge	22" H_2O	
System flow rate	100 SCFM	
Blower Temperature	119°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 / 9,999 ppb
Calibration time/ date: 7/19/19 1421	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		Vent					
SVE-02		45 ppb	56 ppb				
SVE-03		350 ppb	236 ppb				
VPC Inlet		146 ppb	148 ppb				
VPC Midpoint							
VPC Outlet		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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Signature _____ Printed Name _____ Signature _____ Date

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

Inspection Date: 7/24/19 Date of last inspection: 7/19/19

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: 12,395.7
Blower	**Current Value**	**Other Notes**
Vacuum gauge	40" H2O	Paint room door open near SVE-1 PID Reads 13.9 ppm reading in @ door.
Pressure gauge	22" H2O	
System flow rate	98 SCFM	
Blower Temperature	113°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 / 10.03 ppm	
Calibration time/ date: 7/24/19 0830		PID check after monitoring:	

Sampling Point	Time	PID Reading (1)	PID Reading (2)	Vacuum	Flow Rate (gauge)	Differential Pressure	Flow Rate Calculated[1]
SVE-01		Vent					
SVE-02		0 ppb	0 ppb				
SVE-03		522 ppb	570 ppb				
VPC Inlet		375 ppb	385 ppb				
VPC Midpoint							
VPC Outlet		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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Signature Justin Neste (Printed Name) _____ (Signature) 7/24/19 (Date)

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

Inspection Date: 8/2/19 Date of last inspection: 7/24/19

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: 12608.5
Blower	**Current Value**	**Other Notes**
Vacuum gauge	39" H_2O	Paint Locker open - 1,945 ppb
Pressure gauge	22" H_2O	
System flow rate	100 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: 0ppb / 9,999 ppb					
Calibration time/ date: 8/2/19 0915		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		Vent					
SVE-02		333 ppb	373 ppb				
SVE-03		780 ppb	631 ppb				
VPC Inlet		522 ppb	797 ppb				
VPC Midpoint							
VPC Outlet		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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Signature _____ Printed Name _____ Signature _____ Date

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

Inspection Date: 8/6/19 Date of last inspection: 8/2/19

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: 0820 Motor Hours: 12,701.7

Blower	Current Value	Other Notes
Vacuum gauge	40" H2O	
Pressure gauge	20" H2O	
System flow rate	98 SCFM	
Blower Temperature	113°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: 8/6/19 0820 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		Vent					
SVE-02	0905	598 ppb	632 ppb				
SVE-03	0910	941 ppb	918 ppb				
VPC Inlet	0900	681 ppb	703 ppb				
VPC Midpoint							
VPC Outlet	0855	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) 8/6/19 (Date)

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

Inspection Date: 9/16/19 Date of last inspection: 8/6/19

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: 12854.2

Blower	Current Value
Vacuum gauge	38" H20
Pressure gauge	19" H20
System flow rate	103 scfm
Blower Temperature	115°F
Temp.at lag VPC discharge	

Other Notes

System Power was turned off

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

PID Model:

Details:

Calibration time/ date:

PID check after monitoring:

Sampling Point	Time	PID Reading (1)	PID Reading (2)	Vacuum	Flow Rate (gauge)	Differential Pressure	Flow Rate Calculated[1]
SVE-01							
SVE-02							
SVE-03							
VPC Inlet							
VPC Midpoint							
VPC Outlet							
Other vapor point _____							

1. Flow rate calculated from the equation $Flow\ Rate\ (cfm) = 12.24 \times \sqrt{differential\ pressure}$.

Questions? Call Justin Neste @ (360) 981-5606

At the Completion of a monitoring event scan monitoring forms and email to Justin Neste: Justin.Neste@calibresys.com

Signature _____ Printed Name _____ Signature _____ Date

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

Inspection Date: 8/21/19 Date of last inspection: 8/16/19

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: 12898.5
Blower	**Current Value**	**Other Notes**
Vacuum gauge	40" H20	Equipment being spray painted near trailer, Strong paint odor in area of trailer. Ambient/Background = 600 – 3,300 ppb
Pressure gauge	17" H20	
System flow rate	100 scfm	
Blower Temperature		
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: 8/21/19 0915 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		Vent					
SVE-02		1,802 ppb	1,662 ppb				
SVE-03		5,090 ppb	5,288 ppb				
VPC Inlet		10,350 ppb	8,750 ppb				
VPC Midpoint							
VPC Outlet		800 ppb	290 ppb				
Other vapor point _____							

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) 8/21/19 (Date)

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

Inspection Date: 8/27/19 Date of last inspection: 8/21/19

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: 13039.4
Blower	**Current Value**	**Other Notes**
Vacuum gauge	38" H2O	
Pressure gauge	72" H2O	
System flow rate	915cfm	
Blower Temperature	119°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: 8/27/19 0830	PID check after monitoring:

Sampling Point	Time	PID Reading (1)	PID Reading (2)	Vacuum	Flow Rate (gauge)	Differential Pressure	Flow Rate Calculated[1]
SVE-01		Vent					
SVE-02	0910	170 ppb	123 ppb				
SVE-03	0920	789 ppb	804 ppb				
VPC Inlet	0855	535 ppb	572 ppb				
VPC Midpoint							
VPC Outlet	0850	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) 8/27/19 (Date)

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

Inspection Date: 9/13/19 Date of last inspection: 8/27/19

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: 1020		Motor Hours: 13,137.3
Blower	**Current Value**	**Other Notes**
Vacuum gauge	28" H_2O	Onsite to install repaired hose.
Pressure gauge	52" H_2O	10 min Running Out - 0/0 PPB IN - 2,159/1,841 ppb SVE1 - Vent SVE2 - 0/0 PPB SVE3 - 2,843/3,067 PPB
System flow rate	85 SCFM	60 min Running IN = 1,083/993 ppb SVE2: 261/105 PPB SVE3 = 1,317/1,320 PPB
Blower Temperature	130°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: 2ppb / 10.00 PPB
Calibration time/ date: 9/13/19 1020	PID check after monitoring:

Sampling Point	Time	PID Reading (1)	PID Reading (2)	Vacuum	Flow Rate (gauge)	Differential Pressure	Flow Rate Calculated[1]
SVE-01							
SVE-02							
SVE-03							
VPC Inlet							
VPC Midpoint							
VPC Outlet							
Other vapor point _____							

1. Flow rate calculated from the equation $Flow\ Rate\ (cfm) = 12.24 \times \sqrt{differential\ pressure}$.

Questions? Call Justin Neste @ (360) 981-5606

At the Completion of a monitoring event scan monitoring forms and email to Justin Neste: Justin.Neste@calibresys.com

Signature _____ Printed Name _____ Signature _____ Date

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

Inspection Date: 9/26/19 Date of last inspection: 9/13/19

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: 1030		Motor Hours: 13,438.5
Blower	**Current Value**	**Other Notes**
Vacuum gauge	30" H_2O	
Pressure gauge	60" H_2O	
System flow rate	35 SCFM	
Blower Temperature	133°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: 9/26/19 1030 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		Vent					
SVE-02		0 ppb	0 ppb				
SVE-03		322 ppb	299 ppb				
VPC Inlet		163 ppb	159 ppb				
VPC Midpoint							
VPC Outlet	1103	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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Signature Justin Neste (Printed Name) _____ (Signature) 9/26/19 (Date)