Quarterly Report, First Quarter 2020

RCRA Corrective Action Program
Boeing Renton Facility
Project # PS20203450.2020 The Boeing Company

Prepared for:

The Boeing Company
Seattle, Washington

May 15, 2020

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Prepared by:

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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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Wood Environment & Infrastructure Solutions, Inc.

05/15/2020

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1.0 Introduction

This report provides progress reporting in conformance with Section VII.B.1 of Agreed Order No. 8191 (Order) and summarizes cleanup actions and monitoring conducted at the Boeing Renton Facility (the Facility) during the first quarter 2020. 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Plan (Wood, 2019), which contains changes to the revised Compliance Monitoring Plan (Amec Foster Wheeler, 2016a) that superseded the original plan presented in Appendix D of the EDR (AMEC, 2014).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 for each SWMU and AOC are discussed in this report. Discussions of the protection of

groundwater for drinking water beneficial uses compare concentrations of constituents of concern (COCs) to both the current site specific cleanup levels (CULs) specified in the CAP (which were based primarily on drinking water and protection of surface water beneficial uses) and to proposed updated CULs from the CALIBRE Systems, Inc. (CALIBRE) December 17, 2019, technical memorandum (CALIBRE, 2019a), which proposed revised CULs based on Model Toxics Control Act (MTCA) criteria for potable water that are demonstrated to be protective of other exposure pathways and promulgated criteria. Ecology has made several clarifications and changes to MTCA since the draft CAP was prepared that are relevant to Facility CULs. These proposed revised CULs are referenced herein as *proposed* CULs, while the CULs specified in the CAP are referenced as *current* CULs.

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 first quarter of 2020—the period from January through March 2020.

1.1 Quarterly progress reporting

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

1.1.1 Work completed in the first quarter 2020

The following work was completed during the first quarter of 2020, the period from January through March 2020:

- On behalf of Boeing, Wood Environment & Infrastructure Solutions, Inc. (Wood) submitted the fourth quarter 2019 report to Ecology on February 17, 2020.
- Nitrate injections at the Building 4-78/79 area were completed during January 2020.
- Injection well sampling at Building 4-78/79 was completed during February 2020.
- Groundwater monitoring for the first quarter of 2020 was completed during March 2020.

1.1.2 Deviations from required tasks

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

1.1.3 Deviations from CAP

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

1.1.4 Schedule revisions

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

1.1.5 Work projected for the next quarter

The following work is projected for the second quarter of 2020:

- 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 second quarter of 2020 will be completed.
- Nitrate and sugar substrate injections will be performed as needed
- Boeing will submit a response to Ecology's comments regarding the December 17, 2019, technical memorandum discussing updated CULs, and will provide a recommendation for modifications to the groundwater monitoring program in accordance with the CAP to reduce monitoring where COCs have been below cleanup levels for eight consecutive monitoring events.

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 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 first quarter of 2020. Operation of the SVE system at SWMU-172/174 continued during the first quarter, as discussed in Section 3.2.1.2. 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 first quarter.

3.1.2 Compliance monitoring plan deviations

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

3.1.3 Water levels

Groundwater elevations measured during the first quarter 2020 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; and COC results for the last eight consecutive quarters are presented in Appendix D. 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 not detected in CPOC area wells GW229S and GW231S The concentration of VC in the groundwater from CPOC well GW230I was below both *current* and *proposed* CULs for VC. As shown in Table D-1 in Appendix D, VC

concentrations in the groundwater collected from CPOC wells GW229S and GW231S have been below *current* and *proposed* CULs for the last eight consecutive quarters.

3.2 SWMU-172 and SWMU-174

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

3.2.1 Cleanup action activities

3.2.1.1 Installation/construction activities

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

3.2.1.2 Soil vapor extraction and bioremediation operations

The SVE system at SWMU-172 and SWMU-174 operated normally during the first quarter until a shutdown in March 2020. The shutdown occurred due to the COVID-19 pandemic and the system is tentatively set to restart in May 2020, pending state work orders. Details for system operations are included in the SVE operations and monitoring report prepared by CALIBRE (Appendix E).

3.2.2 Compliance monitoring plan deviations

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

3.2.3 Water levels

Groundwater elevations for the SWMU-172 and SWMU-174 area measured during the first quarter 2020 are summarized in Table 4 and shown on Figure 2. The contoured data for March 2020 show that groundwater is generally flowing east from SWMU-172 and SWMU-174, toward the Cedar River Waterway, with an approximate horizontal gradient of 0.01.

3.2.4 Groundwater monitoring results

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

3.2.4.1 Monitored attenuation/geochemical indicators

The geochemical indicator results are presented in Table 5. Total organic carbon (TOC) concentrations ranged from 1.25 milligrams per liter (mg/L) to 45.66 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 first quarter 2020 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 *current* 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 within the range of historical concentrations in the first quarter of 2020. In source area well GW152S, COCs in groundwater increased in concentration compared to previous monitoring events in the past year, while COCs except for VC decreased in concentration in the groundwater collected from source area well GW153S. As shown in Figure 4, COC concentrations in groundwater from downgradient plume area wells were stable or increased during the first quarter. COCs were observed at higher concentrations in the first quarter 2020 than have been detected in the previous two years of monitoring events in the groundwater from downgradient well GW172S. However, all COCs at GW172S remain at concentrations below 1 microgram per liter (µg/L). COCs in the groundwater collected from downgradient well GW173S were generally stable, and lower than concentrations observed at GW172S.

Arsenic was detected above the *current* 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 decreased during the first quarter sampling event, except for in downgradient plume area well GW172S, which increased. The range of arsenic values detected continues to be highly variable, with average values in the range of 5–15 µg/L and occasional short-term excursions up to 30 to 40 µg/L (see Appendix D). This observed range is consistent with the naturally occurring background arsenic range reported by Ecology (Ecology, 2018) based on testing over 2,500 water supply wells in the Puget Sound Basin (all from water supply aquifers with no anthropogenic impacts). Copper and lead were detected above the *current* CUL in the groundwater from source area well GW152S and from downgradient plume area well GW172S. Concentrations of both copper and lead were below the *current* CUL in the groundwater from all other source area and downgradient plume area wells, except for an exceedance of copper in GW226S.

As discussed above, concentrations of select COCs in groundwater from source area and downgradient plume area wells exceed the *current* CULs; however, concentrations of all COCs, except arsenic and lead, in the groundwater from source area wells are below the *proposed* CULs.

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 *current* CUL, ranging from 0.0552 to 0.221 µg/L, in the groundwater from all CPOC wells except GW236S. TCE was also detected at concentrations above the *current* CUL in the groundwater from CPOC area wells GW234S and GW235I, and VC was detected above the *current* CUL in the groundwater from CPOC area well GW232S. 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 a surface water quality standard for this COC. The concentrations of PCE, TCE, VC in the CPOC area wells also generally appear to be stable.

Arsenic was detected above the *current* CUL in the groundwater samples from CPOC area wells GW232S, GW234S, and GW236S. Copper and lead were detected above the respective *current* CULs in the groundwater samples from CPOC area wells GW234S and GW236S (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, arsenic, copper, and lead concentrations appear to vary over time. Generally, groundwater collected from CPOC area wells have a stable trend with recent spikes in metals in GW234S and GW236S.

Select COC concentrations exceed the *current* CUL in the groundwater from select CPOC area wells, as detailed above; however, only arsenic and lead concentrations exceed the *proposed* CULs in the groundwater samples collected from CPOC wells.

3.3 Building 4-78/79 SWMU/AOC group

This section describes corrective action activities conducted at the Building 4-78/79 SWMU/AOC Group during the first quarter of 2020. The cleanup remedy for this SMWU/AOC group is bioremediation, SVE, MNA, and MA. Figure 8 shows the location of groundwater monitoring wells, bioremediation wells, and SVE wells for this area.

3.3.1 Cleanup action activities

3.3.1.1 Installation/construction activities

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

3.3.1.2 Soil vapor extraction and bioremediation operations

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 *current* CUL of 30 mg/kg.

A revised work plan (CALIBRE, 2019b) 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 were submitted to Ecology in November 2019 (CALIBRE, 2019c). Groundwater elevations were being monitored during the fourth quarter of 2019 to determine the best time for soil removal activities. As documented in an email to Ecology dated October 22, 2019, 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. As of the end of the first quarter of 2020, the soil excavation work has not been completed. TPH-G concentrations in groundwater continue to be closely monitored.

Nitrate/sulfate injections were completed in January 2020, with sampling taking place in February 2020. Trend charts for *cis*-1,2-DCE and benzene in the nitrate/sulfate 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 first quarter.

3.3.3 Water levels

Groundwater elevations measured during the first quarter 2020 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; and COC results for the last eight consecutive quarters are presented in Appendix D. Groundwater at this area is monitored following the schedule presented in Tables A-1 and A-2 in Appendix A.

3.3.4.1 Natural attenuation/geochemical indicators

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

3.3.4.2 COC results for source and downgradient plume areas

Table 9 lists first quarter 2020 analytical results for the Building 4-78/79 SWMU/AOC Group COCs. The *current* CULs established in the CAP are also presented on Table 9. Figures 11 and 12 are trend charts showing historical trends for COCs 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 two source area wells (GW031S and GW033S) at concentrations above the *current* CUL. Benzene was below detection in the remaining source area wells. Other detections above the *current* CUL in the groundwater from source area wells were *cis*-1,2-DCE in GW033S, TCE in GW244S, and VC in GW033S and GW244S. TPH-G was detected in the groundwater from source area well GW031S at a concentration of 2,980 µg/L (the field duplicate concentration was 3,060 µg/L), which is above both the *current* and *proposed* CUL. TPH-G was also detected in the groundwater from source area well GW033S, but at a concentration below the *current* and *proposed* CUL. Benzene, VC, and TPH-G were the only COCs with concentrations above the proposed CULs in the groundwater from source area wells. 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 increasing in concentration during the first quarter monitoring event, similar to the first 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 are within the range of concentrations previously detected and TCE has been below detection in the groundwater from the same two source area wells for the past two years of monitoring events. COC concentrations in groundwater samples collected from source area well GW034S (Figure 12) are stable. Nitrate and sulfate injections described in Appendix E are continuing to address elevated benzene present between source area well GW031S and downgradient plume area well GW210S.

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 not detected.

As shown in Table D-3 in Appendix D, all COCs have been either below detection or below *current* CULs in the groundwater collected from source area wells GW039S and GW243I (except for one exceedance of benzene in GW 243I in May 2018) and all downgradient plume area wells (except for one slight exceedance of VC in GW209S in May 2018) for the last eight consecutive quarters.

3.3.4.3 COC results for conditional point of compliance area

Groundwater monitoring results from the first quarter for the CPOC area are summarized in Table 9. Trends for CPOC 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 of 3.48 µg/L, above the *current* 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 *current* CUL. VC was not detected in any of the groundwater samples from CPOC area wells. As shown in Figure 14, the concentrations of VC in the groundwater from the CPOC area wells is within the range of concentrations detected since monitoring began. *Cis*-1,2-DCE was detected in the groundwater collected from CPOC area well GW143S at a concentration below the *current* CUL, consistent with past monitoring events, as shown in Figure 13. TCE was not detected above the reporting limit in any of the CPOC area wells during the first quarter monitoring events. The reporting limit for COCs in GW237S was elevated, but results still indicate VC, TCE, and *cis*-1,2-DCE were not detected. The only other COC detected in the groundwater samples from the CPOC area during the first quarter was TPH-G in CPOC area well GW237S at a concentration of 961 µg/L, above the *current* and *proposed* CUL. As shown in Figure 15, TPH-G concentrations in the groundwater from CPOC GW237S appear to fluctuate seasonally.

While select COCs exceed the *current* CULs in the groundwater from select CPOC area wells, as detailed above, the concentrations of these COCs are below the *proposed* CULs, except TPH-G in GW237S.

As shown in Table D-3 in Appendix D, all COCs have been below detection in the groundwater from CPOC wells GW239I, GW241S, and GW242I for the last eight consecutive quarters. Additionally, well GW238I has been below detection limits for all COCs with the exception of a single detection of vinyl chloride at 0.21 µg/L during November 2018.

3.4 Former fuel farm AOC group

The final remedy for the Former Fuel Farm is MNA. The Former Fuel Farm AOC group is monitored semiannually in May and November; therefore, no monitoring was conducted for this area during the first quarter of 2020. COC results for the last eight consecutive quarters are presented in Appendix D.

3.5 AOC-001 and AOC-002

This section describes corrective action activities conducted at these AOCs during the first quarter of 2020. 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 first quarter.

3.5.2 Compliance monitoring plan deviations

Due to construction at Apron R, monitoring wells in these areas were removed on November 25, 2019. The wells affected by this work are noted in Table A-1. Groundwater samples were collected from the remaining source area well, GW193S, during the first quarter 2020.

3.5.3 Water levels

Table 10 presents the groundwater elevation measured during the first quarter 2020 monitoring event at AOC-001 and AOC-002. Figure 16 shows the groundwater elevation from this event. Due to construction activities, only one monitoring well in this area was measured and consequently the hydraulic gradient cannot be determined.

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. Due to the number of wells that were decommissioned when Apron R construction began, this site is not included in in Appendix D.

3.5.4.1 Monitored attenuation/geochemical indicators

The geochemical indicator results are presented in Table 11. The pH was near neutral in CPOC area well GW193S and is conducive to microbial activity. TOC was elevated this quarter in the source area well, at 48.20 mg/L.

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. The only COCs detected in the groundwater collected from GW193S were *cis*-1,2-DCE, TCE, and VC, all of which were detected at concentrations above the *current* CULs. However, COC concentrations are below the *proposed* CULs. Trend plots for *cis*-1,2-DCE, TCE, and VC in source area well GW193S are shown in Figure 17. This figure shows that concentrations of the COCs in the groundwater from GW193S remain stable.

3.5.4.3 COC results for conditional point of compliance area

The CPOC area wells were not sampled during this event due to construction activities.

3.6 AOC-003

This section describes corrective action activities conducted at AOC-003 for the first quarter of 2020. The cleanup remedy for this AOC is bioremediation and MA. Figure 18 shows the location of groundwater monitoring and bioremediation wells at AOC-003, as well as the groundwater elevations measured during this monitoring event.

3.6.1 Cleanup action activities

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

3.6.2 Compliance monitoring plan deviations

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

3.6.3 Water levels

Table 13 presents the groundwater elevations measured during the first quarter 2020 monitoring event at AOC-003. Figure 18 shows the groundwater elevations from this event. Groundwater elevation contours are not shown due to the limited number of shallow groundwater monitoring wells. 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; and COC results for the last eight consecutive quarters are presented in Appendix D.

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 first quarter 2020 analytical results for the AOC-003 COCs. Trend plots have not been prepared for the AOC-003 source area well because groundwater analyses for this well generally have been below reporting limits. During the first quarter sampling event, VC was detected above the *current* CUL in the groundwater from the source area well, GW249S (at 0.33 µg/L), and PCE was detected above the *current* CUL in the groundwater from the downgradient area well, GW188S (at 0.024 µg/L). All other sample results for the source area and downgradient area wells were below the *current* and *proposed* CULs.

As shown in Table D-5 in Appendix D, except for VC, all COCs have been below the *current* and *proposed* CULs in the groundwater collected from the source and downgradient plume area wells for the last eight consecutive quarters.

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 the *current* and *proposed* CULs. VC was detected at concentrations above the *current* and *proposed* CULs in the groundwater samples collected from both CPOC area wells, as shown in Table 15 (however, both detections were below 0.5 µg/L).

As shown in Table D-5 in Appendix D, except for VC, all COCs have been below the *current* and *proposed* CULs in the groundwater collected from the CPOC area wells for the last eight consecutive quarters.

3.7 AOC-004

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

3.7.1 Cleanup action activities

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

3.7.2 Compliance monitoring plan deviations

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

3.7.3 Water levels

Table 16 presents the groundwater elevations measured during the first quarter 2020 monitoring event at AOC-004. Figure 19 shows the groundwater elevations. Because there are only two groundwater elevation monitoring locations for AOC-004, groundwater contours are not shown on Figure 19.

3.7.4 Groundwater monitoring results

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

3.7.4.1 Monitored attenuation/geochemical indicators

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

3.7.4.2 COC results for the source area

Table 18 lists first quarter 2020 analytical results for lead, the sole COC for AOC-004. Lead was detected in the groundwater sample from the source area well at a concentration of 0.00119 mg/L, slightly above the *current* CUL of 0.001 mg/L. This concentration is below the *proposed* CUL for lead. Trend plots have not been created for the AOC-004 source area well, since COCs have not been detected consistently at concentrations above the *current* CUL since monitoring began in 2015.

3.7.4.3 COC results for the conditional point of compliance area

As shown in Table 18, lead was detected below both the *current* and *proposed* CUL at a concentration of 0.000974 mg/L in the groundwater from CPOC area well GW174S.

As shown in Table D-6 in Appendix D, lead concentrations in the groundwater from CPOC well GW174S have been below the *current* CUL for that last six consecutive quarters and below the *proposed* CUL for the last eight consecutive quarters.

3.8 AOC-060

This section describes corrective action activities conducted at AOC-060 during the first quarter of 2020. The cleanup remedy for this AOC is bioremediation and MA. Figure 20 shows the locations of the groundwater monitoring and bioremediation injection wells at AOC-060, as well as the groundwater elevations measured during the first quarter sampling event.

3.8.1 Cleanup action activities

No installation/construction activities were conducted for this cleanup action area during the first 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 first quarter 2020 groundwater monitoring event at AOC-060. Figure 20 shows the groundwater elevations measured during this event. The groundwater flow direction is west toward the Cedar River, but 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; and COC results for the last eight consecutive quarters are presented in Appendix D.

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 CPOC area well GW254S. 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 first quarter 2020 analytical results for the AOC-060 groundwater COCs. Figures 21 and 22 present trend plots for the COCs in selected source area and downgradient plume area wells. Trend charts are not shown for groundwater monitoring wells for which COCs are not commonly detected.

As shown in Table 21 and Figures 21 and 22, concentrations of *cis*-1,2-DCE and TCE exceeded the *current* CUL in groundwater from the source area and downgradient plume area wells; and concentrations of VC exceeded the *current* CUL in the groundwater from GW012S. The concentrations of COCs in the groundwater from source area well GW009S and downgradient plume area wells GW012S and GW014S are generally stable (Figures 21 and 22), while the concentrations of COCs in the groundwater from downgradient plume area well GW147S appear to vary seasonally (Figure 22).

While select COCs exceed the *current* 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 *proposed* CULs.

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 *current* CUL in the groundwater collected from CPOC area wells GW253I. TCE was detected in the groundwater from CPOC area well GW253I at a concentration slightly above the *current* CUL (at 0.021 µg/L); TCE concentrations in the remaining CPOC area wells were below the detection limit. VC was detected in the groundwater from all the CPOC area wells except GW252S, but the concentrations were below the *current* CUL. Figures 23 and 24 present trends for the COCs in the CPOC area wells. As shown in Figures 23 and 24, 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 *current* CUL. VC has not been detected in the groundwater from the CPOC area at concentrations above the *current* CUL since February 2016.

While *cis*-1,2-DCE and TCE concentrations exceed the *current* CULs in the groundwater from CPOC area well GW253I, COC concentrations are below the *proposed* CULs in all CPOC area wells.

As shown in Table D-7 in Appendix D, COCs have been below the *current* CULs in the groundwater from CPOC wells GW149S and GW252S for the last eight consecutive quarters.

3.9 AOC-090

This section describes corrective action activities conducted at AOC-090 during the first quarter of 2020. The cleanup remedy for this AOC is bioremediation and MA. Figure 25 shows the locations of the groundwater monitoring wells and the bioremediation injection system at AOC-090, as well as the groundwater elevations measured during the first quarter.

3.9.1 Cleanup action activities

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

3.9.2 Compliance monitoring plan deviations

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

3.9.3 Water levels

Table 22 presents the groundwater elevations measured during the first quarter 2020 groundwater monitoring event at AOC-090. Figure 25 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; and COC results for the last eight consecutive quarters are presented in Appendix D.

3.9.4.1 Monitored attenuation/geochemical indicators

The geochemical indicator results are presented in Table 23. The pH was around 6 standard units in all wells. As shown in Figure 26, TOC in source area well GW189S decreased significantly during the first quarter of 2020. The other geochemical indicators show that groundwater conditions are generally uniform in AOC-090. 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 first quarter 2020 analytical results for the AOC-090 groundwater COCs. No COCs above current CULs were detected in groundwater at the source area well GW189S this quarter. Only VC was detected in the groundwater collected from downgradient plume area well GW176S at a concentration of 0.207 µg/L, above the *current* CUL. No other COCs were detected at concentrations above the *current* CULs in the groundwater samples collected from source area or downgradient plume area wells.

Figure 26 presents trends for selected COCs in source area well GW189S. As shown in Figure 26; concentrations of *cis*-1,2-DCE, TCE, and VC decreased during the first quarter sampling event. COC concentrations in the groundwater sample from this source area well have been declining over the past several years and have continued this trend for this monitoring event.

As discussed above, VC exceeds the *current* CUL in groundwater from one downgradient area well; however, concentrations of all COCs are below the *proposed* CULs in source area and downgradient area wells for the first quarter monitoring event.

As shown in Table D-8 in Appendix D, COCs have been below the *current* CULs in the groundwater from downgradient plume area well GW175I, and all COCs except VC have been below the *current* CULs in downgradient plume area well GW176S for the last eight consecutive quarters.

3.9.4.3 COC Results for conditional point of compliance area

VC was detected at concentrations above the *current* CUL in the shallow zone CPOC area wells GW178S and GW208S (both detections were below 0.5 µg/L). The VC concentration in GW208S also exceeds the *proposed* CUL. No other COCs were detected above the *current* or *proposed* CULs in groundwater from either the shallow or intermediate zone CPOC area wells.

This is the thirteenth 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 *current* CULs in any of the CPOC area wells.

As shown in Table D-8 in Appendix D, VC is the only COC that has been detected at concentrations above the *current* CULS in the groundwater collected from all CPOC wells for the last eight consecutive quarters.

3.10 Building 4-70 area

This section describes corrective action activities conducted at this area during the first quarter of 2020. The cleanup remedy for the Building 4-70 Area is bioremediation and MA. Figure 27 shows the locations of the groundwater monitoring and bioremediation injection wells for this area.

3.10.1 Cleanup action activities

No installation/construction activities were conducted for this cleanup action area during the first 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 first quarter 2020 monitoring event at Building 4-70. Figure 27 shows the groundwater elevations in the two monitoring wells for this area. These groundwater elevation data (only two wells) do not support development of elevation contours. However, the flow direction is expected to be similar to the flow observed at the Building 4 78/79 Area: 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 27). Groundwater monitoring results for the CPOC area wells are shown in Table 27. VC was the only COC detected in the groundwater from CPOC monitoring wells at a concentration above the *current* CUL, at 0.21 µg/L in the groundwater from GW260S. This concentration is below the *proposed* CUL for VC.

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 first quarter of 2020.

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 first quarter of 2020.

4.0 References

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

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

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

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

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

CALIBRE Systems, Inc. (CALIBRE), 2019a, Cleanup Levels in Groundwater at the Boeing Renton Plant, December 17.

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

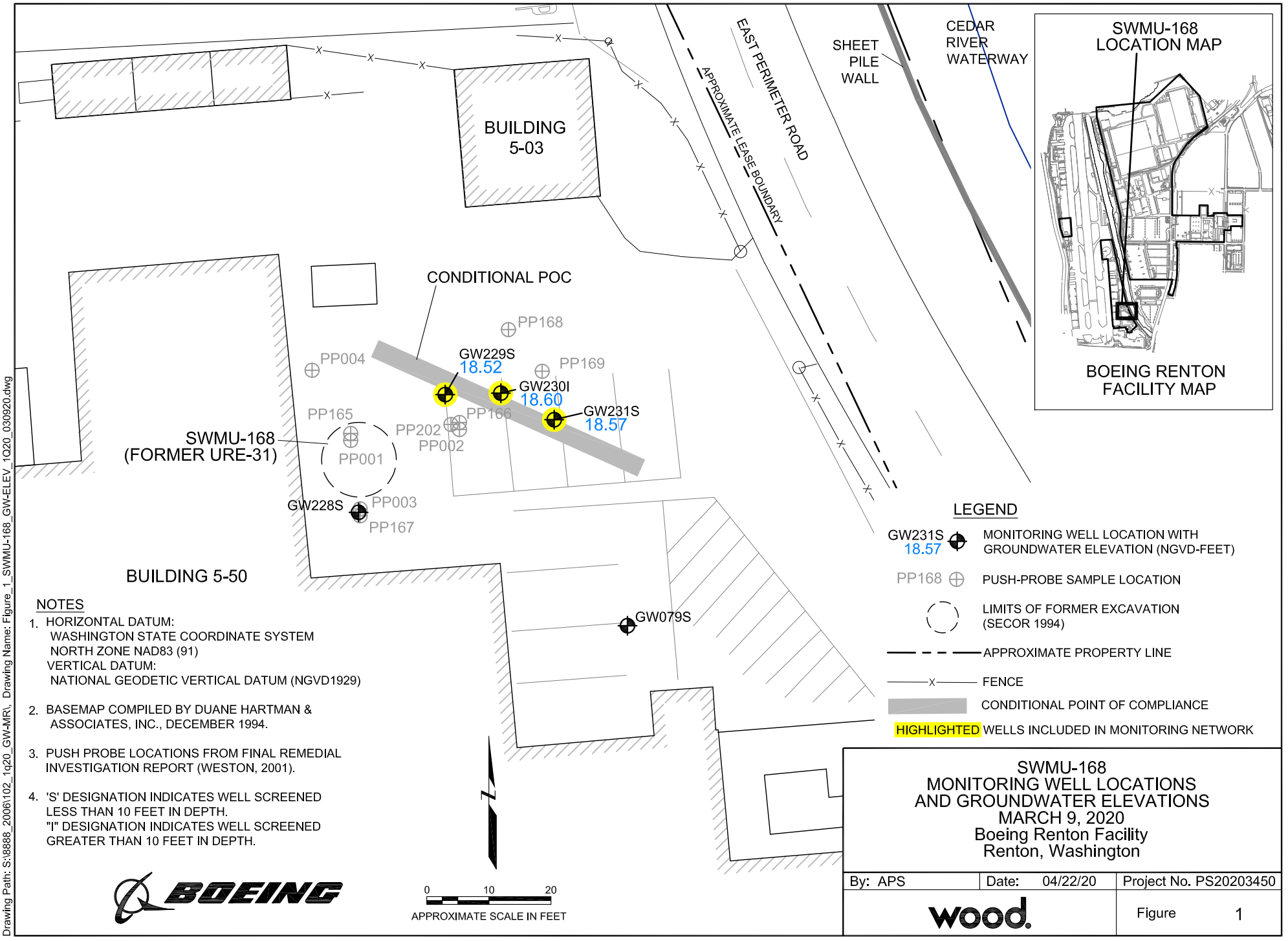
CALIBRE, 2019c, Soils Probes at Building 4-78/4-79 SWMU/AOC Group; Boeing Renton Site, November 21.

Washington State Department of Ecology (Ecology), 2018, Natural Background Groundwater Arsenic Concentrations in Washington State, Review Draft, Publication No. 14-09-044, May.

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

Wood, 2019, Addendum to the Compliance Monitoring Plan, Boeing Renton Facility, Renton, Washington: Prepared for the Boeing Company, April.

Figures



SWMU-168 LOCATION MAP

BOEING RENTON FACILITY MAP

NOTES

1. HORIZONTAL DATUM:
   WASHINGTON STATE COORDINATE SYSTEM
   NORTH ZONE NAD83 (91)
   VERTICAL DATUM:
   NATIONAL GEODETIC VERTICAL DATUM (NGVD1929)
2. BASEMAP COMPILED BY DUANE HARTMAN & ASSOCIATES, INC., DECEMBER 1994.
3. 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.

LEGEND

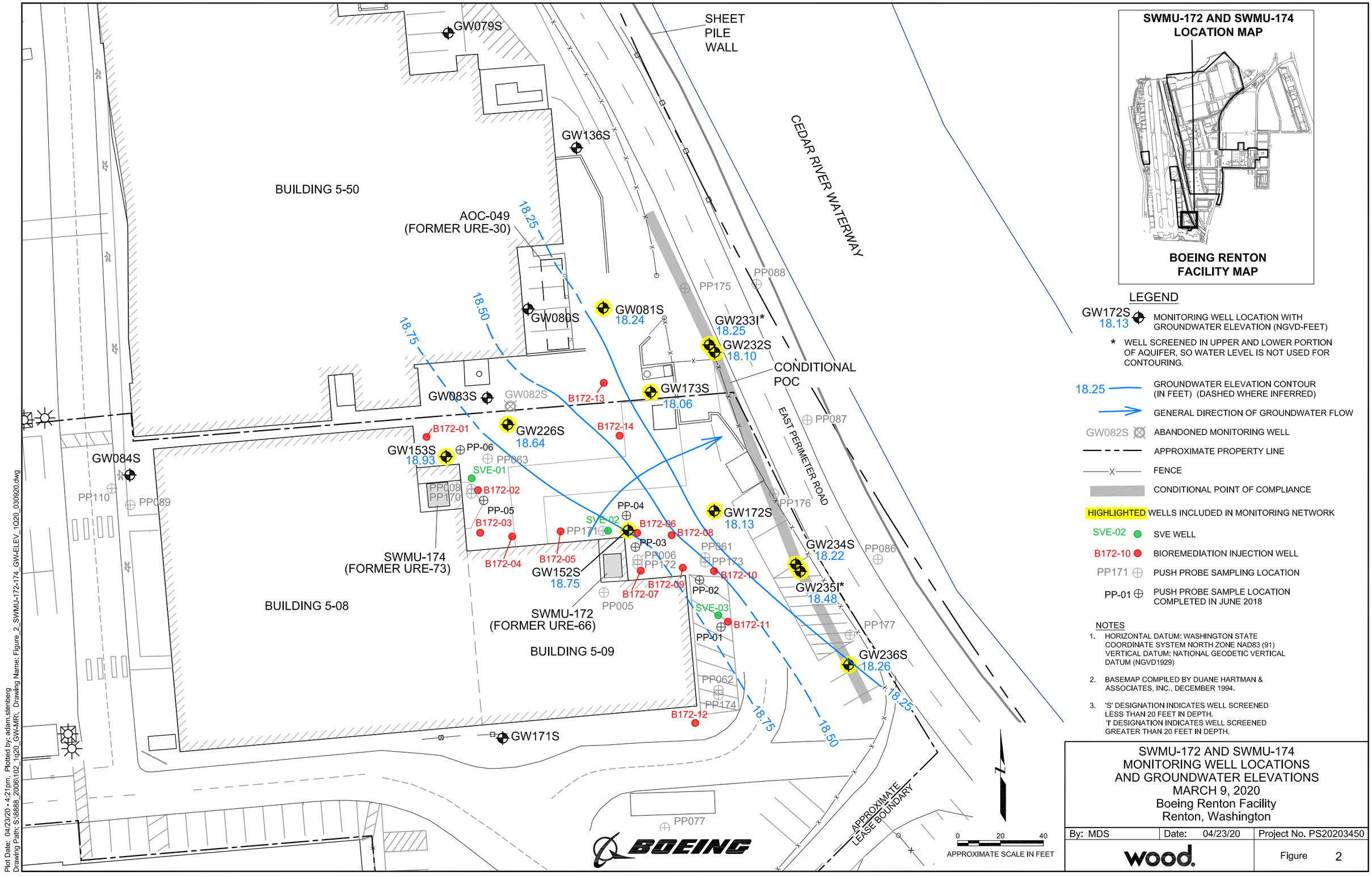
- GW231S 18.57 — MONITORING WELL LOCATION WITH GROUNDWATER ELEVATION (NGVD-FEET)
- PP168 — PUSH-PROBE SAMPLE LOCATION
- LIMITS OF FORMER EXCAVATION (SECOR 1994)
- APPROXIMATE PROPERTY LINE
- FENCE
- CONDITIONAL POINT OF COMPLIANCE
- HIGHLIGHTED WELLS INCLUDED IN MONITORING NETWORK

SWMU-168
MONITORING WELL LOCATIONS AND GROUNDWATER ELEVATIONS
MARCH 9, 2020
Boeing Renton Facility
Renton, Washington

By: APS	Date: 04/22/20	Project No. PS20203450
wood.		Figure 1

BOEING

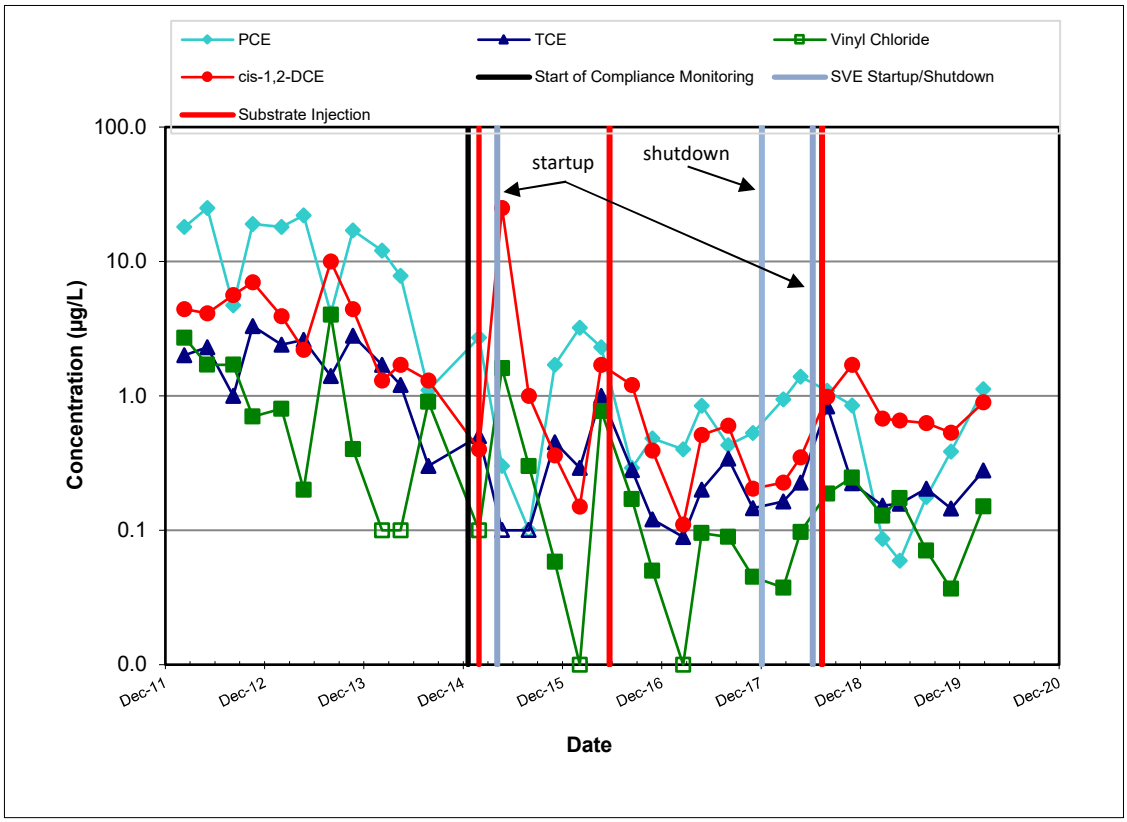
Plot Date: 04/22/20 - 3:30pm, Plotted by: adam.stenberg
Drawing Path: S:\8888_2006\102_1q20_GW-MR\, Drawing Name: Figure_1_SWMU-168_GW-ELEV_1Q20_030920.dwg



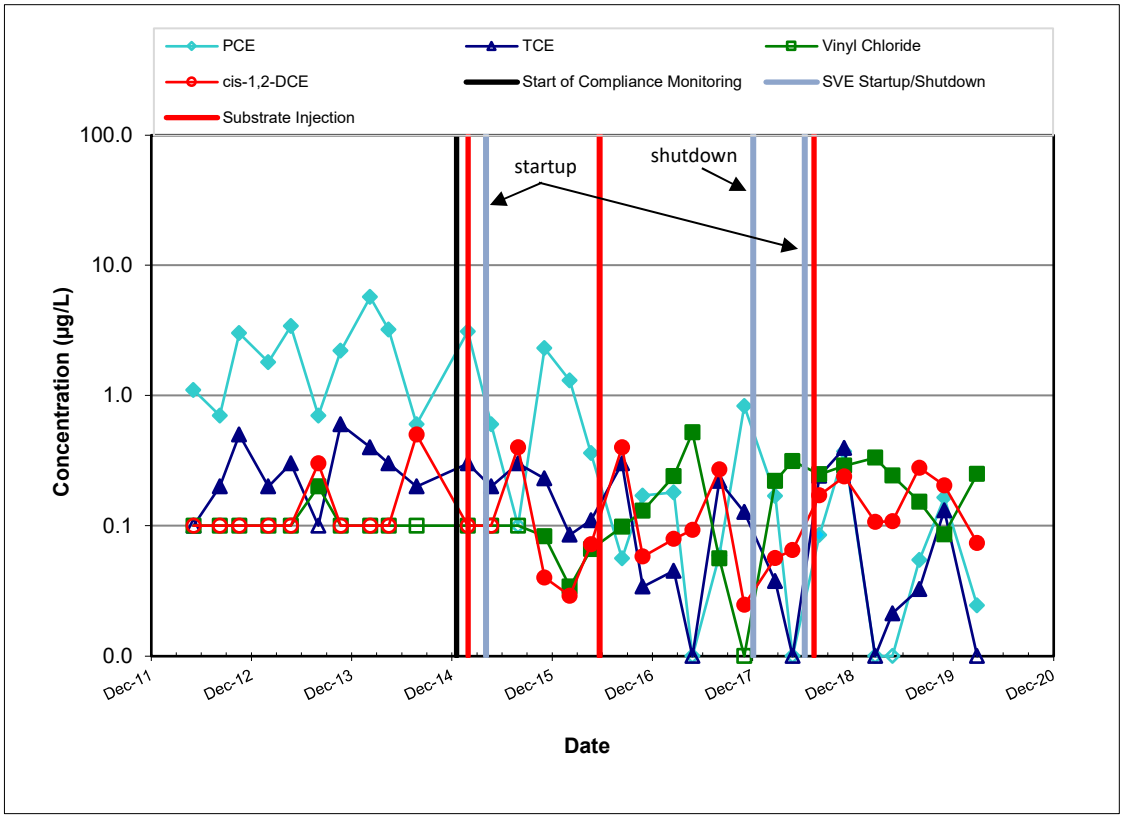
SWMU-172 AND SWMU-174 MONITORING WELL LOCATIONS AND GROUNDWATER ELEVATIONS MARCH 9, 2020 Boeing Renton Facility Renton, Washington

By: MDS	Date: 04/23/20	Project No. PS20203450
wood.		Figure 2

Plot Date: 04/23/20 - 4:21pm, Plotted by: adam.stenberg
Drawing Path: S:\8888_2006\102_1q20_GW-MR\, Drawing Name: Figure_2_SWMU-172-174_GW-ELEV_1Q20_030920.dwg



SOURCE AREA WELL GW152S

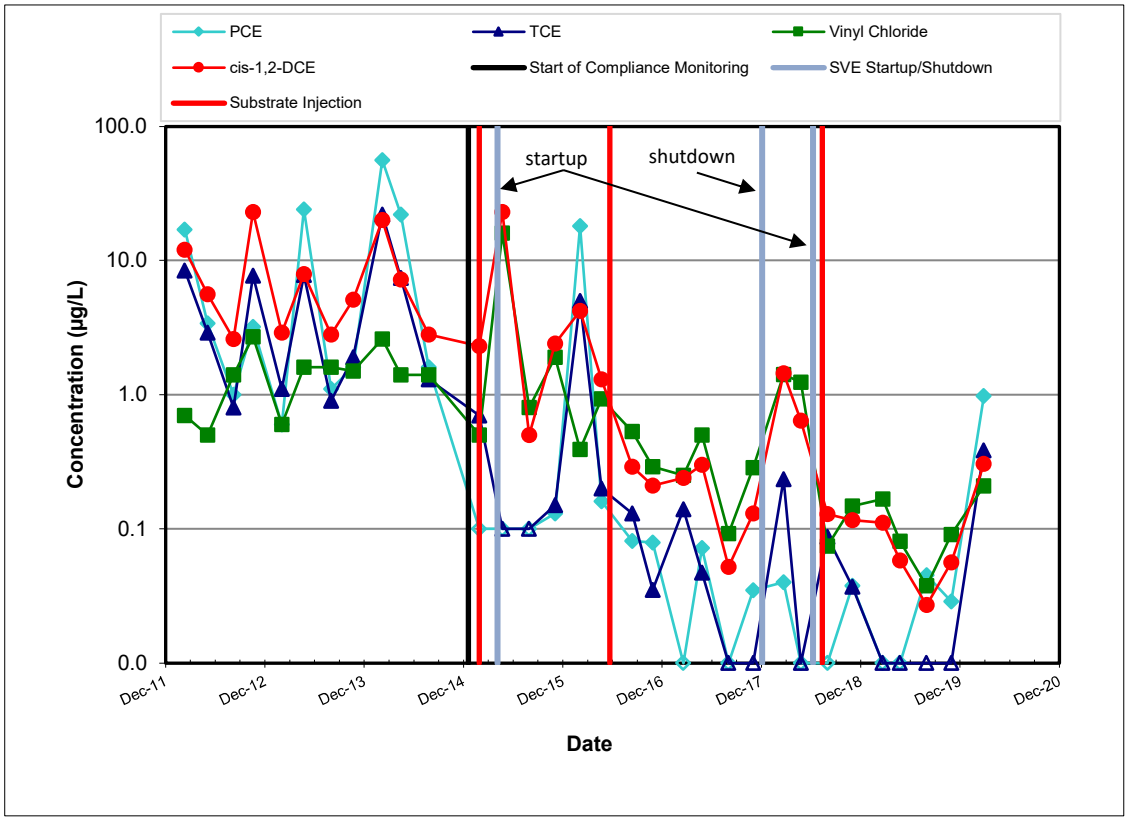


SOURCE AREA WELL GW153S

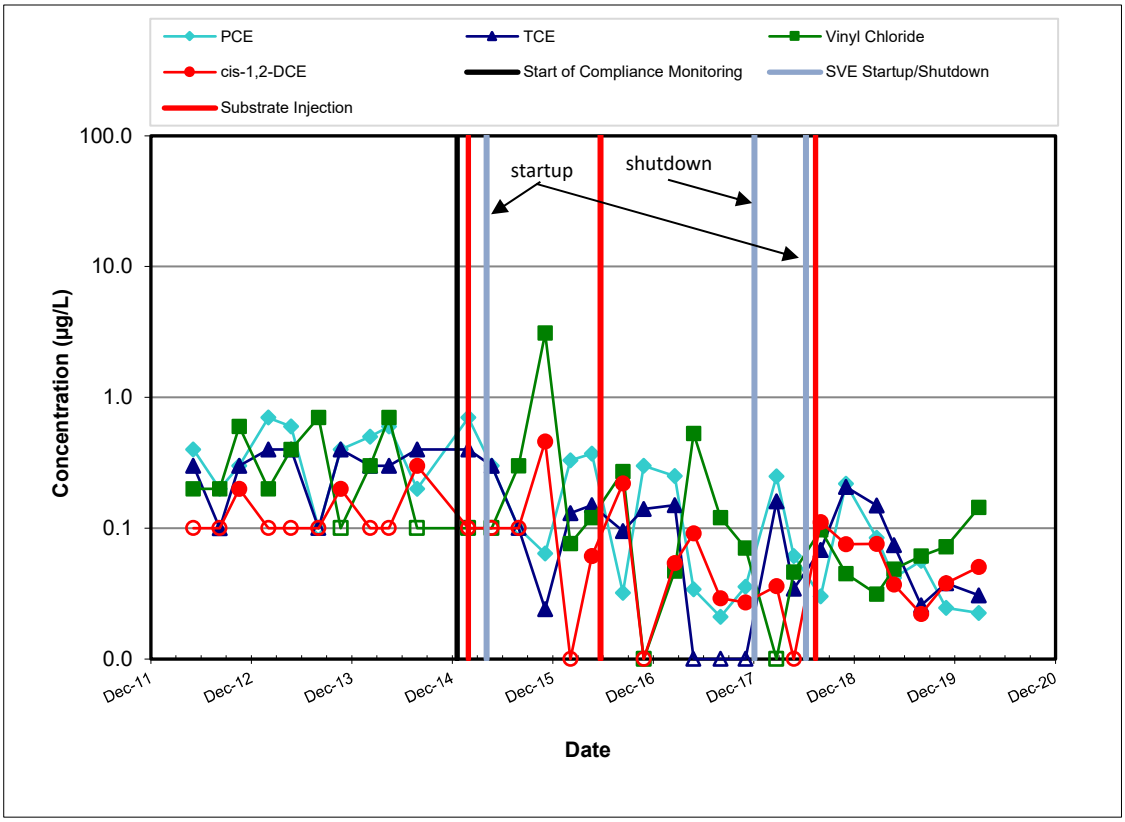
Note: non-detected values shown at one-half the reporting limit and graphed with an open symbol.

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

\\sea2-fs1\project$\8888 - Boeing Renton\02 Data Management\Grapher and Excel Figure Files\excel\Figures 2 to 6_SWMU_172-174 Trend Plots.xlsx



DOWNGRADIENT PLUME AREA WELL GW172S

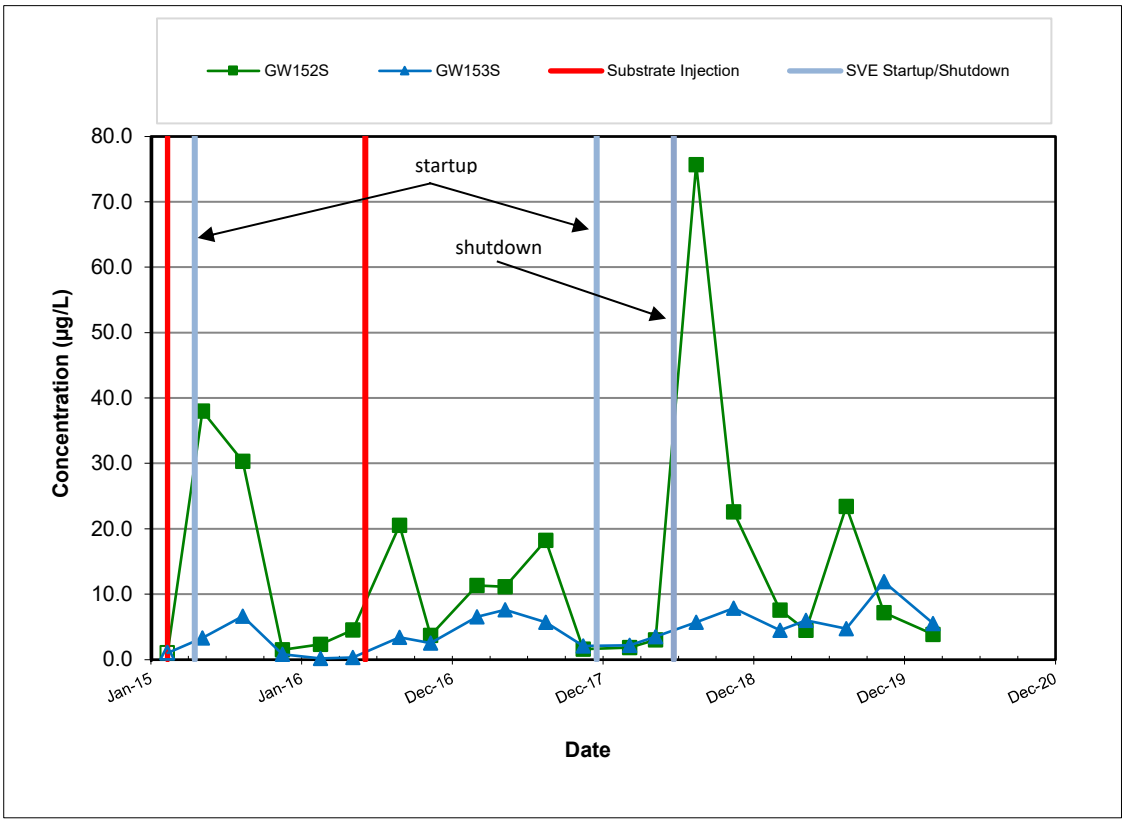


DOWNGRADIENT PLUME AREA WELL GW173S

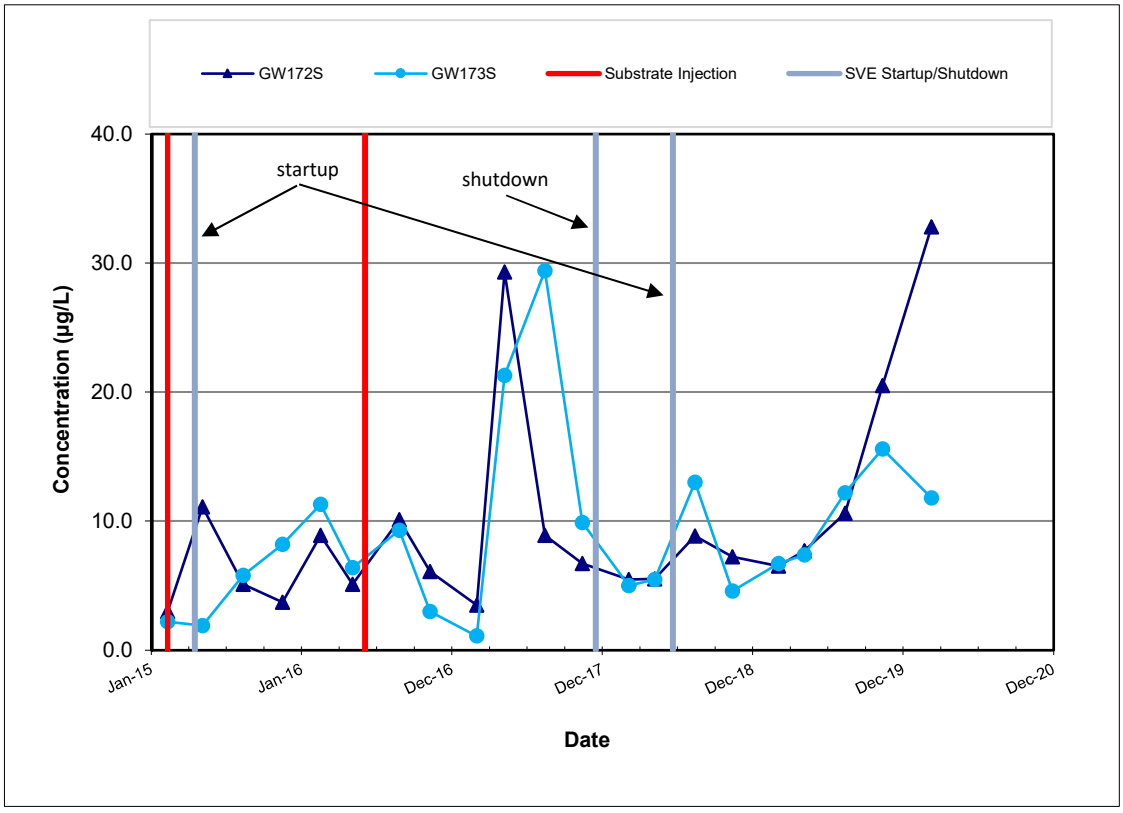
Note: non-detected values shown at one-half the reporting limit and graphed with an open symbol.

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

\\sea2-fs1\project$\8888 - Boeing Renton\02 Data Management\Grapher and Excel Figure Files\excel\Figures 2 to 6_ SWMU_172-174 Trend Plots.xlsx



TOTAL ARSENIC IN SOURCE AREA WELLS

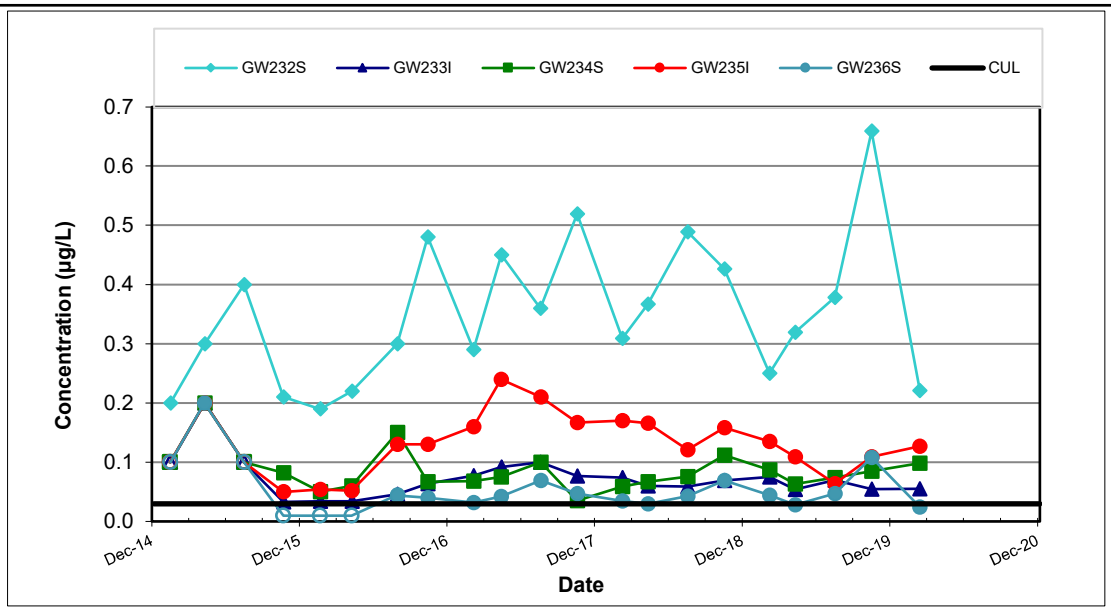


TOTAL ARSENIC IN DOWNGRADIENT PLUME AREA WELLS

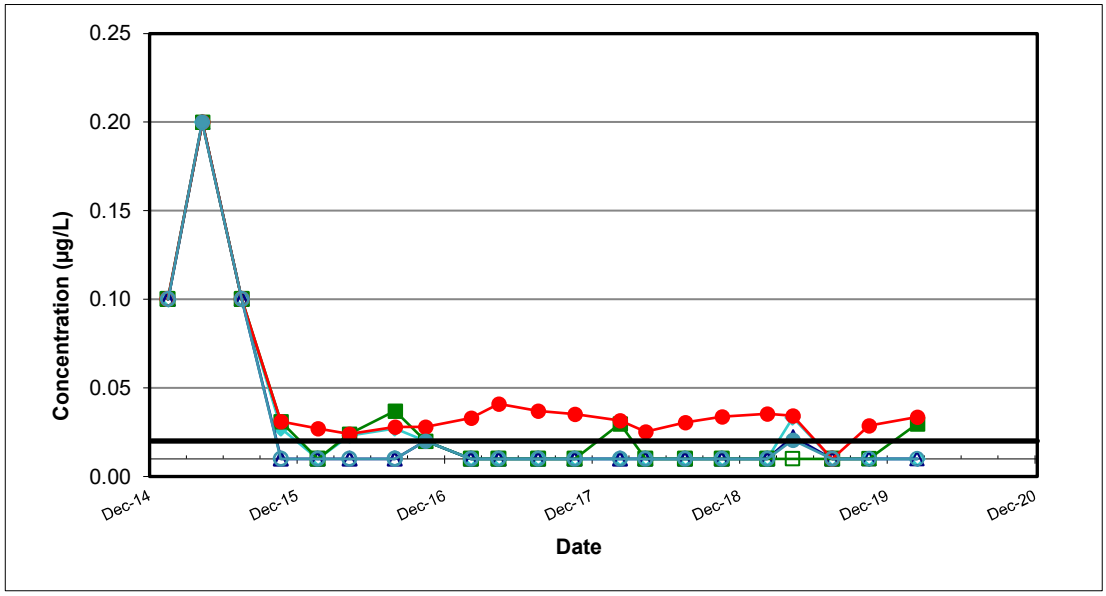
Note: non-detected values shown at one-half the reporting limit and graphed with an open symbol.

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

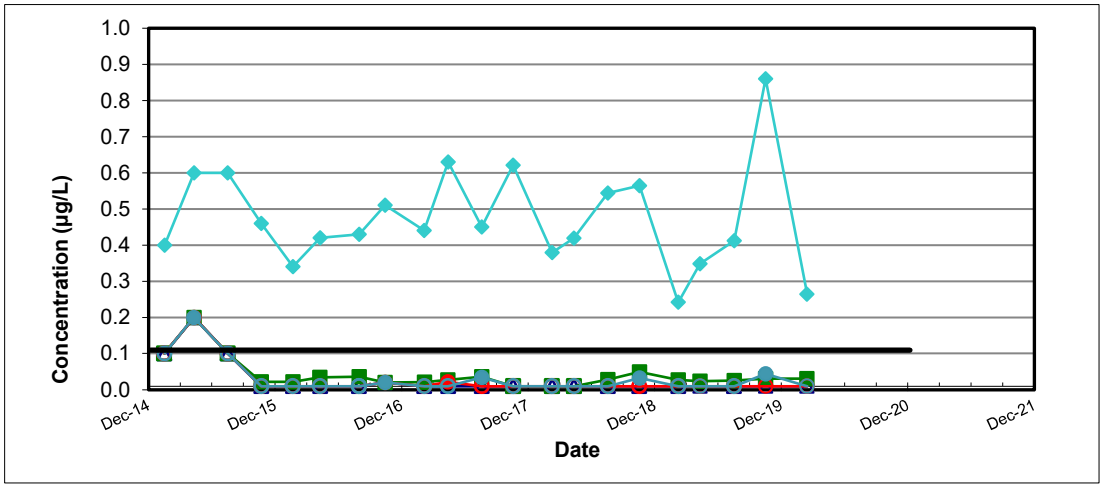
\\sea2-fs1\projectf$\8888 - Boeing Renton\02 Data Management\Grapher and Excel Figure Files\excel\Figures 2 to 6_ SWMU_172-174 Trend Plots.xlsx



cis-1,2-Dichloroethene



Trichloroethene

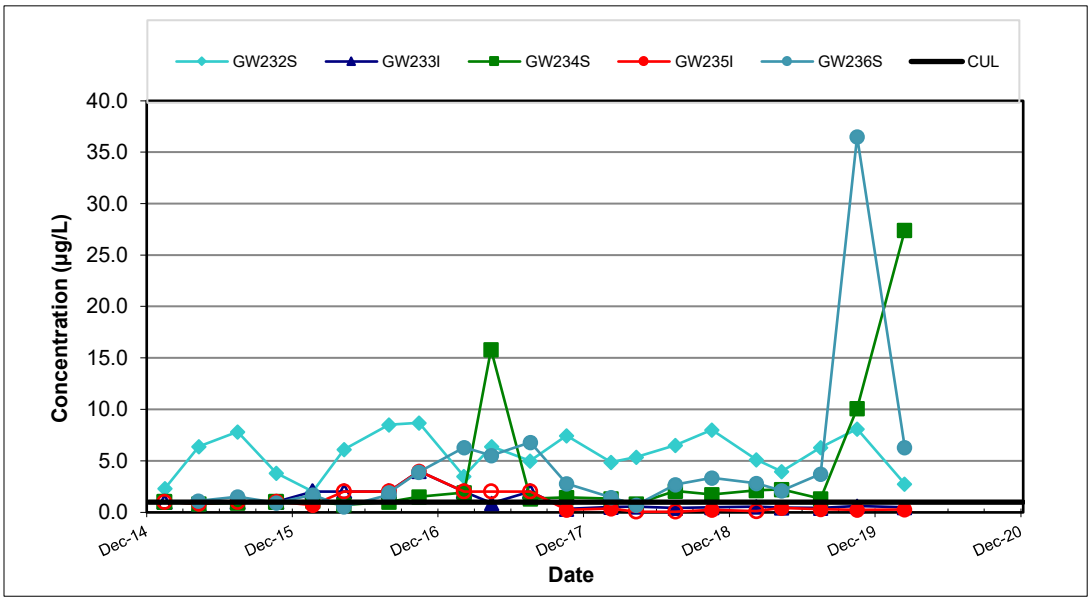


Vinyl Chloride

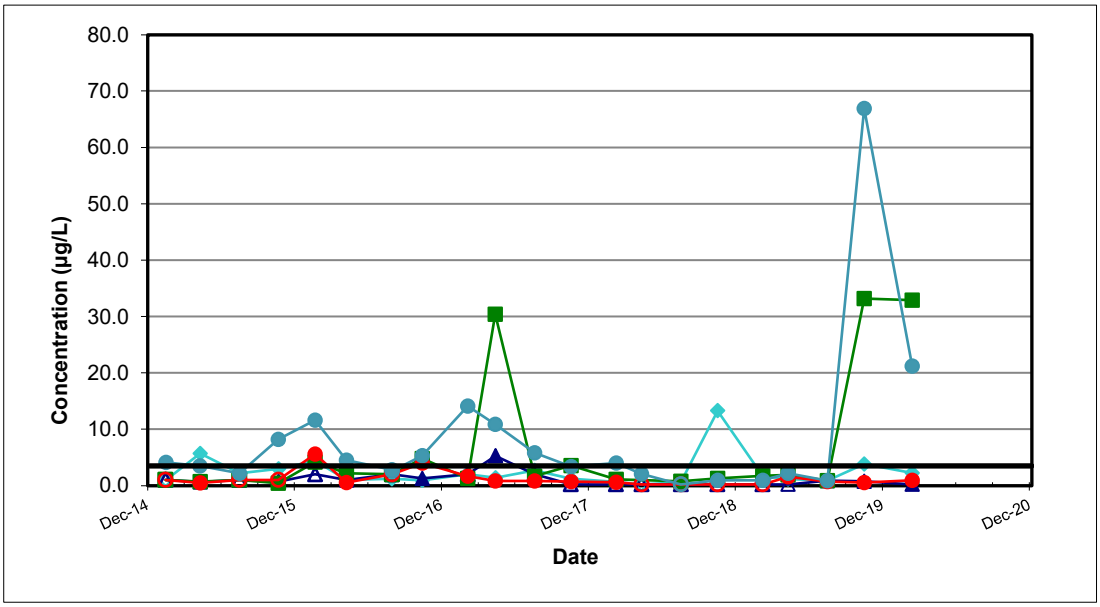
Note: non-detected values shown at one-half the reporting limit and graphed with an open symbol.

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

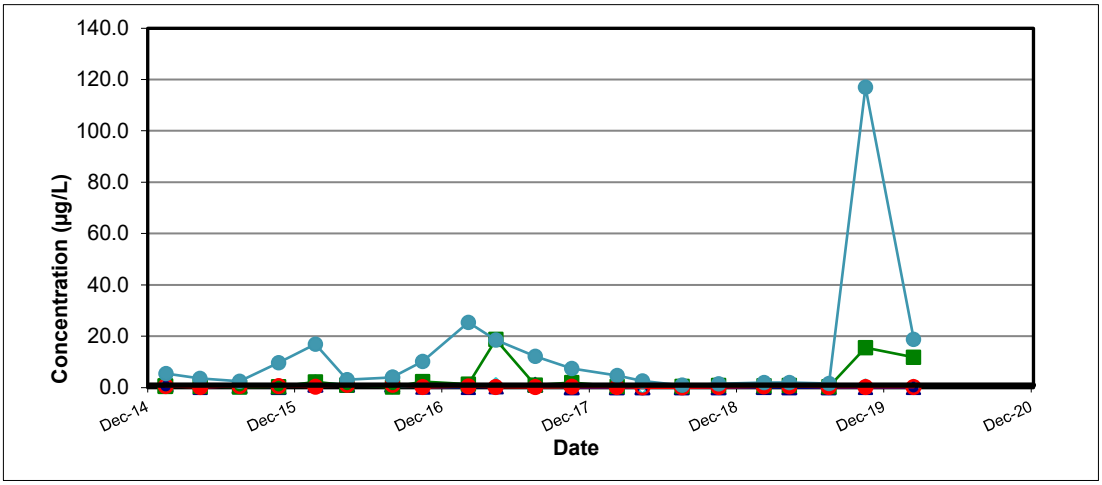
\\sea2-fs1\project$\8888 - Boeing Renton\02 Data Management\Grapher and Excel Figure Files\excel\Figures 2 to 6_ SWMU_172-174 Trend Plots.xlsx



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

\\sea2-fs1\projectF$\8888 - Boeing Renton\02 Data Management\Grapher and Excel Figure Files\excel\Figures 2 to 6_ SWMU_172-174 Trend Plots.xlsx

CEDAR RIVER TRAIL PARK

NISHIWAKI LANE

APPROXIMATE PROPERTY LINE

BUILDING 4-45

BUILDING 4-79

BUILDING 4-78

BUILDING 4-77

SWMU-181

CONDITIONAL POC

CEDAR RIVER WATERWAY

APPROXIMATE PROPERTY LINE

DISPENSER ISLAND (REMOVED)

AOC-013 (URE-17)

AOC-014 (URE-18)

AOC-015 (URE-24)

AOC-026 (URE-54)

AOC-037 (URE-25)

AOC-054 (URE-23)

GW022S

GW023S

GW024D

GW026I

GW027D

GW132S

GW133S

GW237S 14.14

GW238I* 14.13

GW209S 14.19

GW210S 14.34

GW031S 14.29

GW244S 14.35

GW042D

GW041S

GW243I 14.27

GW239I* 14.17

GW240D* 13.52

GW143S 14.18

GW039S 14.32

GW040S

GW242I 14.21*

GW241S 14.17

GW038S 14.24

GW035S

GW036S

GW037S

GW151D

GW033S 14.21

GW034S 14.42

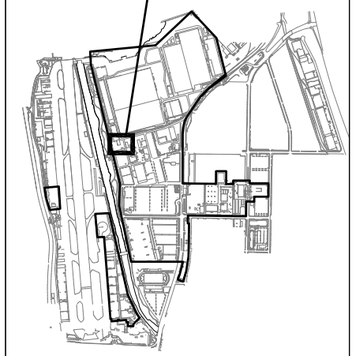
GW030S

PP083 PP084 PP085 PP086 PP087 PP088 PP089 PP178 PP179 PP180 PP181 PP182 PP183 PP185 PP186 PP188 PP189 PP201

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

4-78/79 SWMU/AOC GROUP LOCATION MAP



BOEING RENTON FACILITY MAP

LEGEND

GW033S 14.21 — 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.

GW042D — EXTRACTION WELL

GW032D — ABANDONED MONITORING WELL

SVE-15 — HORIZONTAL SVE WELL

B78-12 — BIOREMEDIATION INJECTION WELL

EXTRACTION WELL CONVERTED TO INJECTION WELL

PP083 — PUSH-PROBE SAMPLE LOCATION

FENCE

APPROXIMATE FUEL AND NON-CHLORINATED VOC SOURCE AREAS

REMOVED UST (WESTON, 2001)

CONDITIONAL POINT OF COMPLIANCE

HIGHLIGHTED WELLS INCLUDED IN MONITORING NETWORK

NOTES

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

N

0 25 50

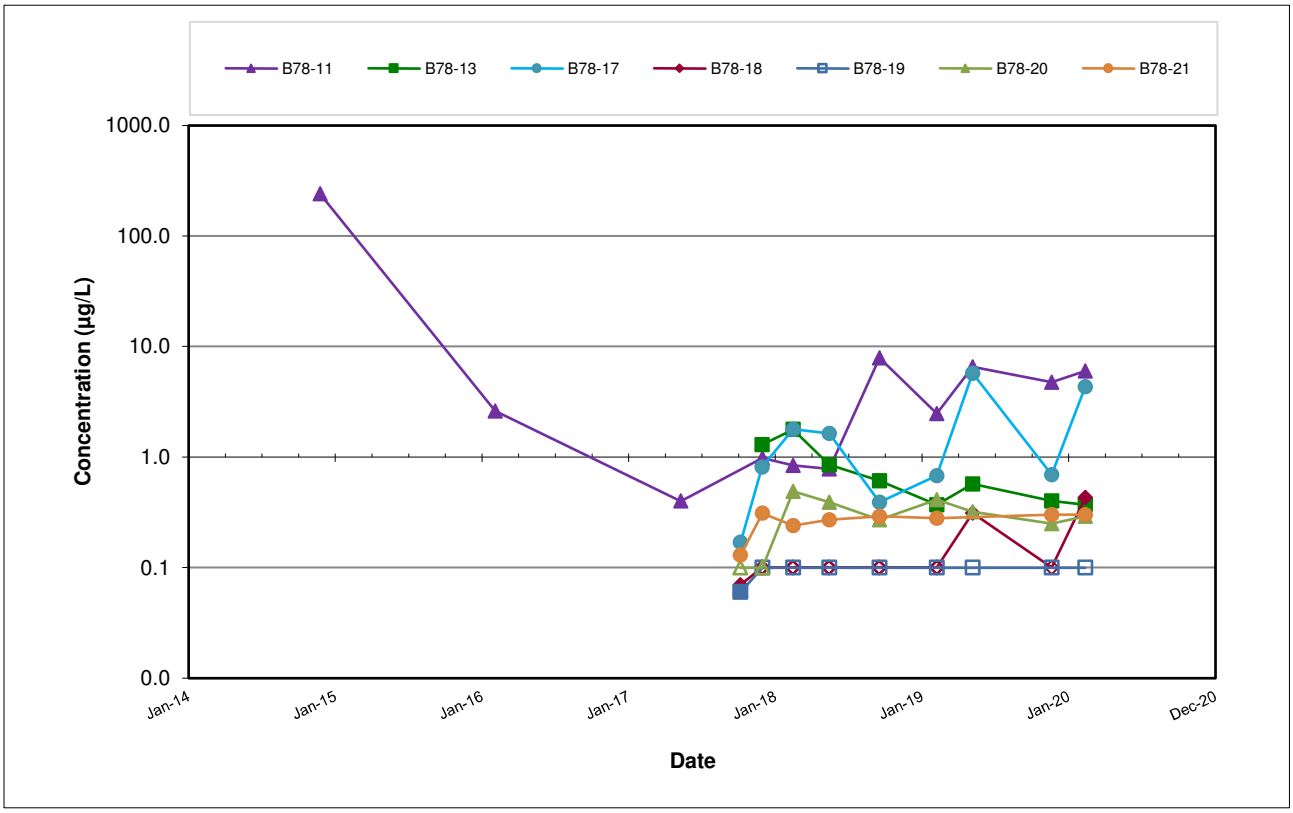
APPROXIMATE SCALE IN FEET

BOEING

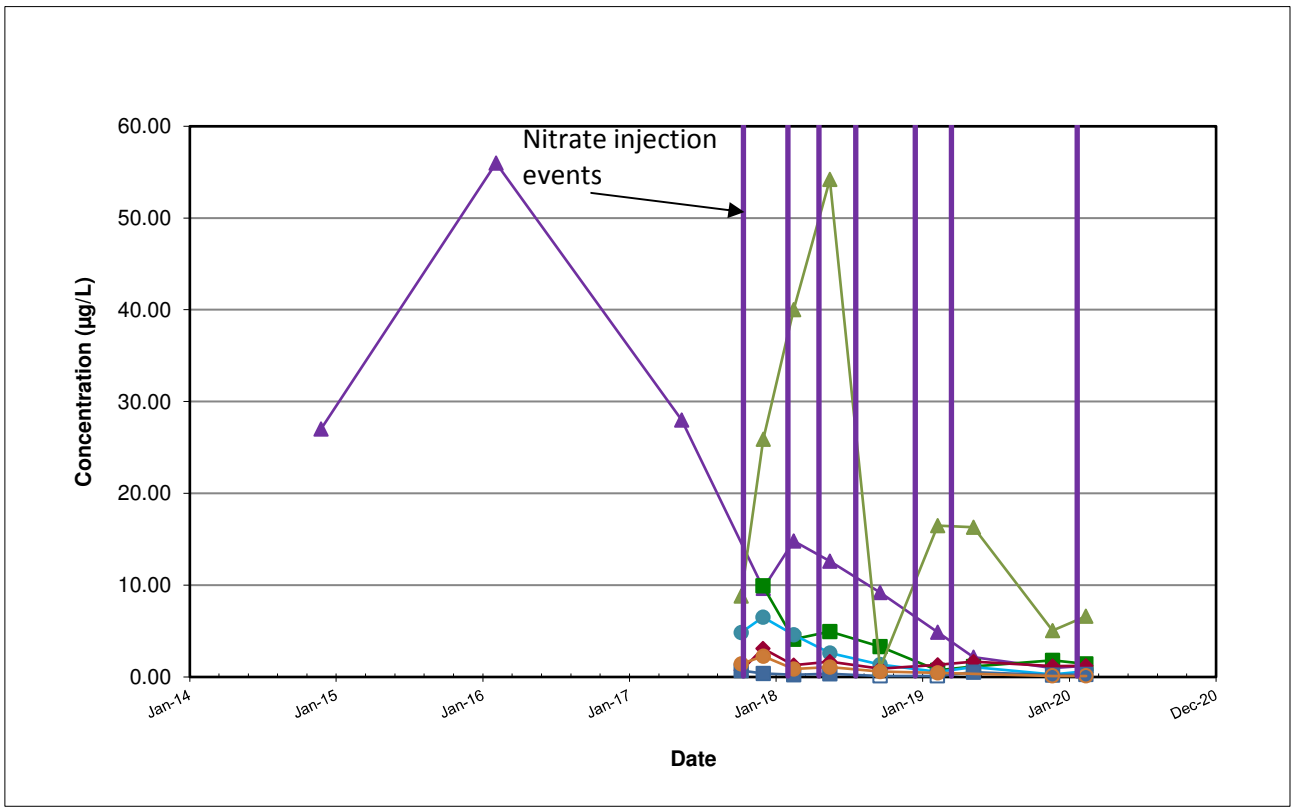
BUILDING 4-78/79 SWMU/AOC GROUP MONITORING WELL LOCATIONS AND GROUNDWATER ELEVATIONS MARCH 10 and 11, 2020 Boeing Renton Facility Renton, Washington

By: MDS	Date: 05/13/20	Project No. PS20203450
wood.		Figure 8

Plot Date: 05/13/20 - 12:09pm, Plotted by: adam.stenberg
Drawing Path: S:\8888_2006\102_1q20_GW-MR\, Drawing Name: Figure8_Building 4-78-79_GW-ELEV_1Q20_031120.dwg



cis-1,2-Dichloroethene

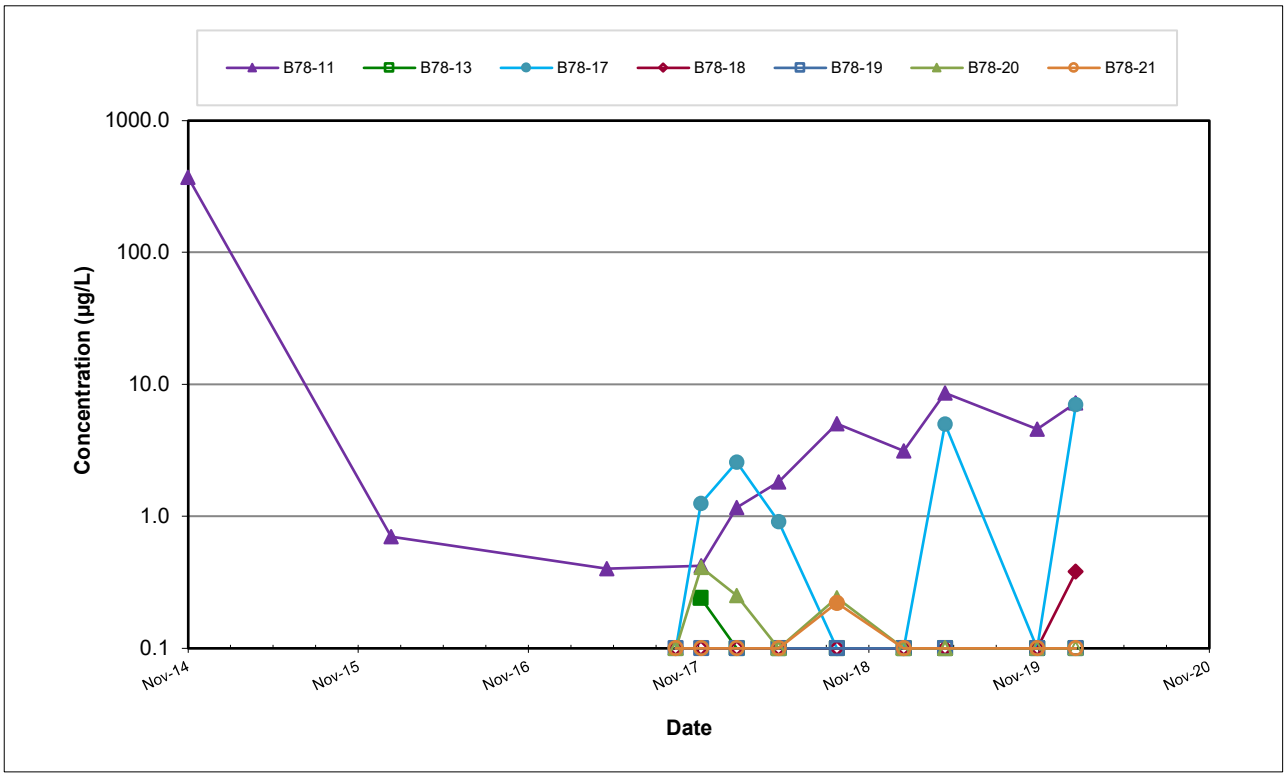


Benzene

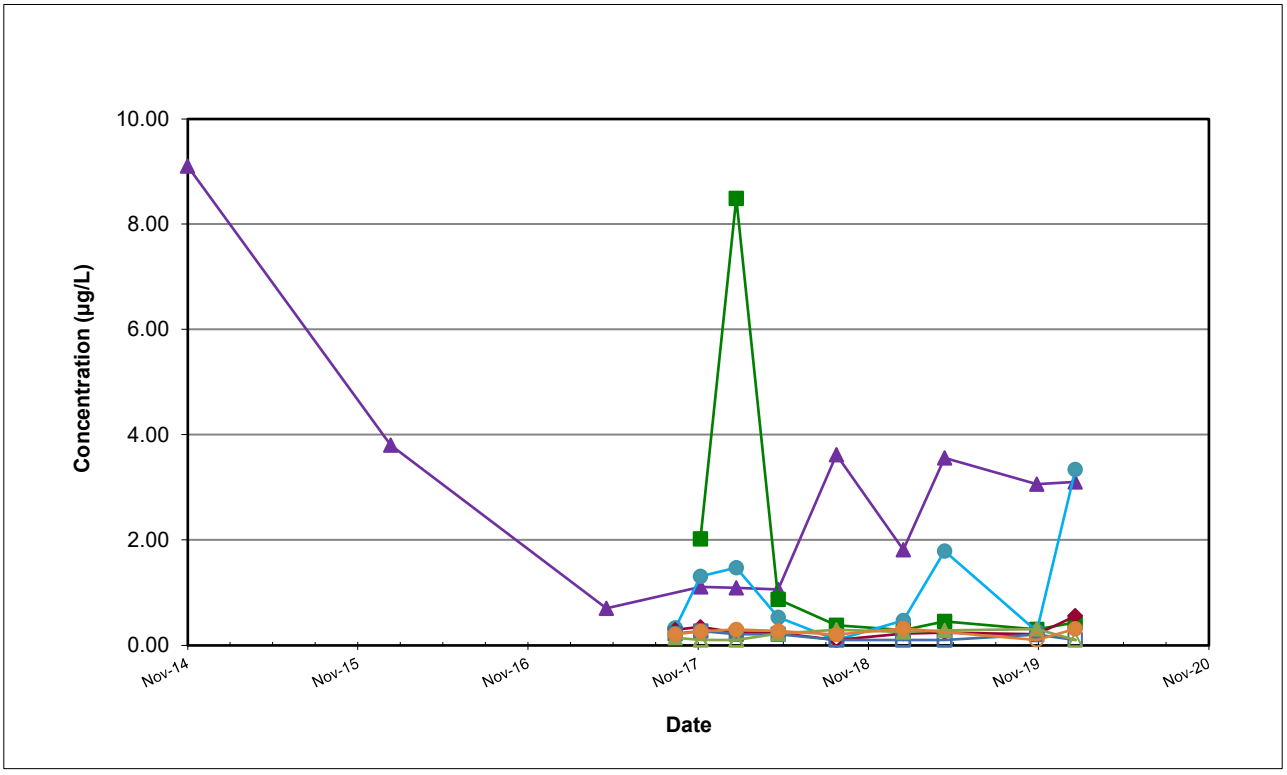
Note: non-detected values shown at one-half the reporting limit and graphed with an open symbol.

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 8 to 14_ Bldg 4-78-79 Trend Plots.xlsx



Trichloroethene

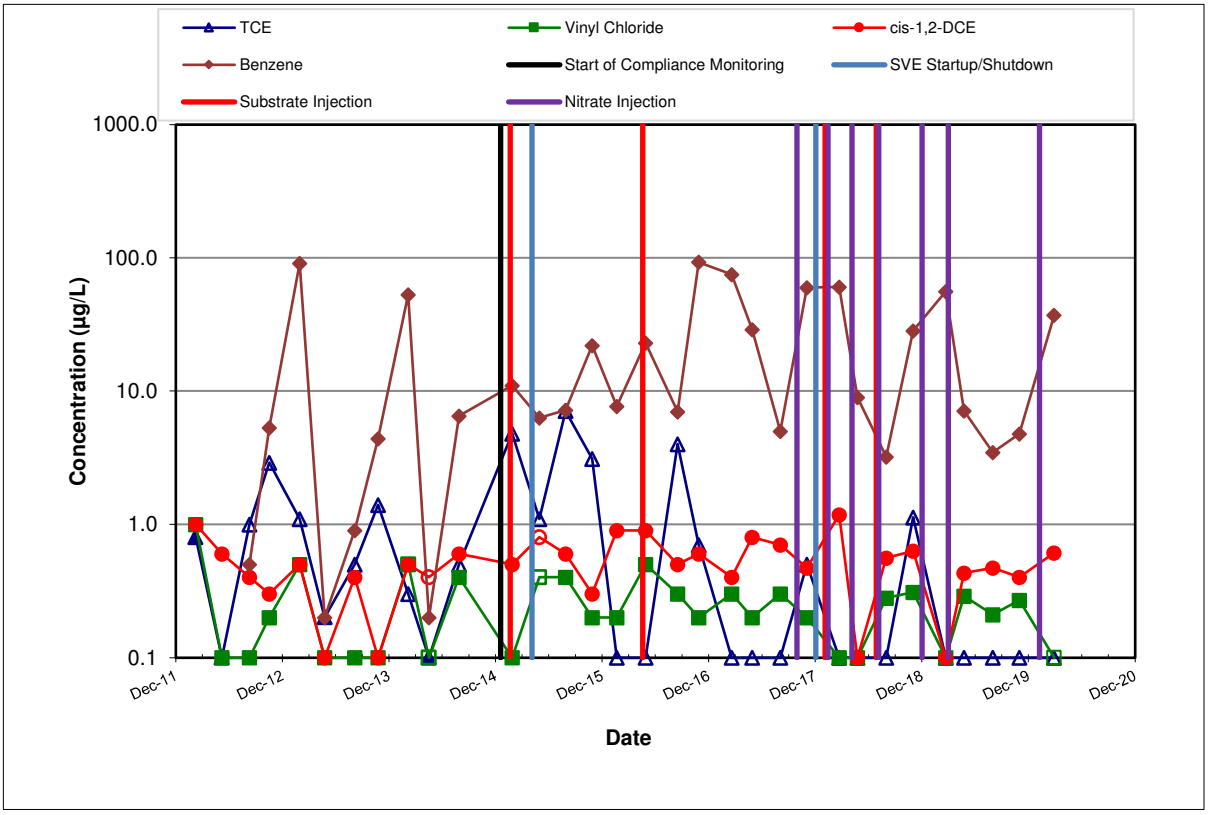


Vinyl Chloride

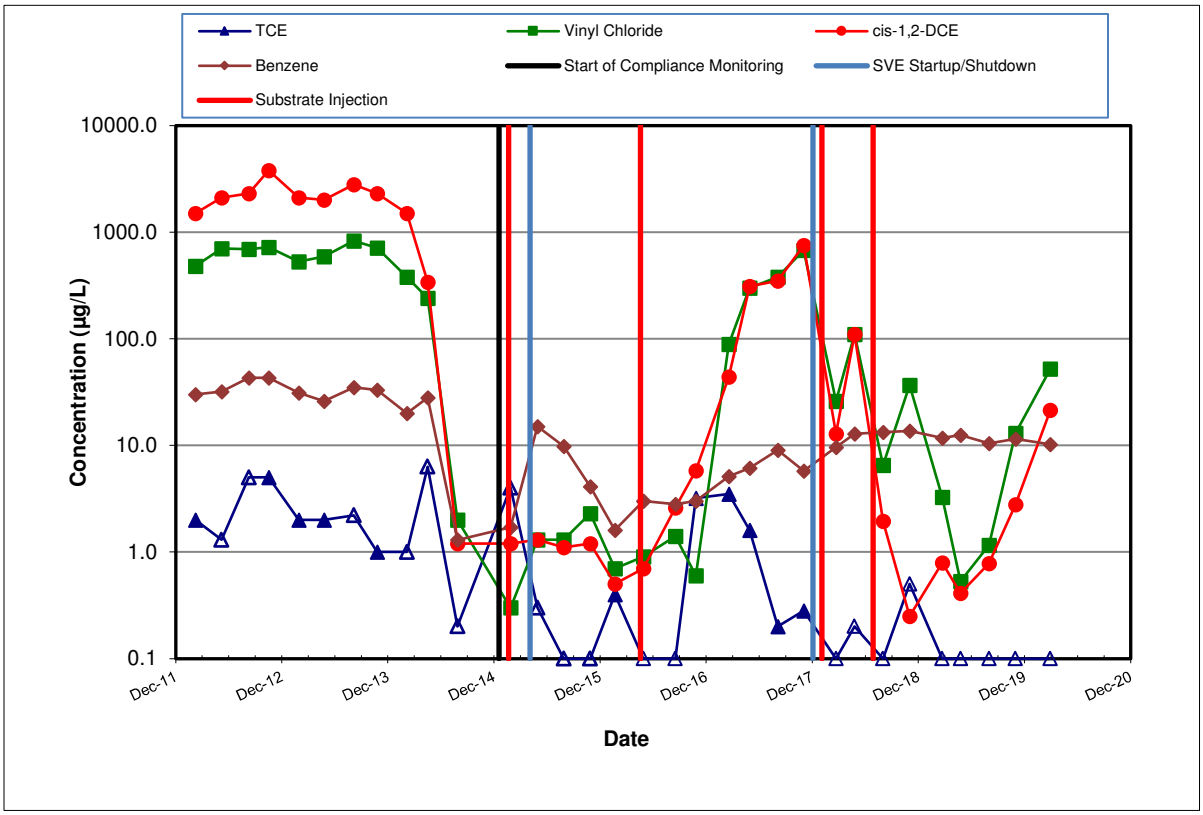
Note: non-detected values shown at one-half the reporting limit and graphed with an open symbol.

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

\\sea2-fs1\projectF$\8888 - Boeing Renton\02 Data Management\Grapher and Excel Figure Files\excel\Figures 8 to 14_ Bldg 4-78-79 Trend Plots.xlsx



SOURCE AREA WELL GW031S

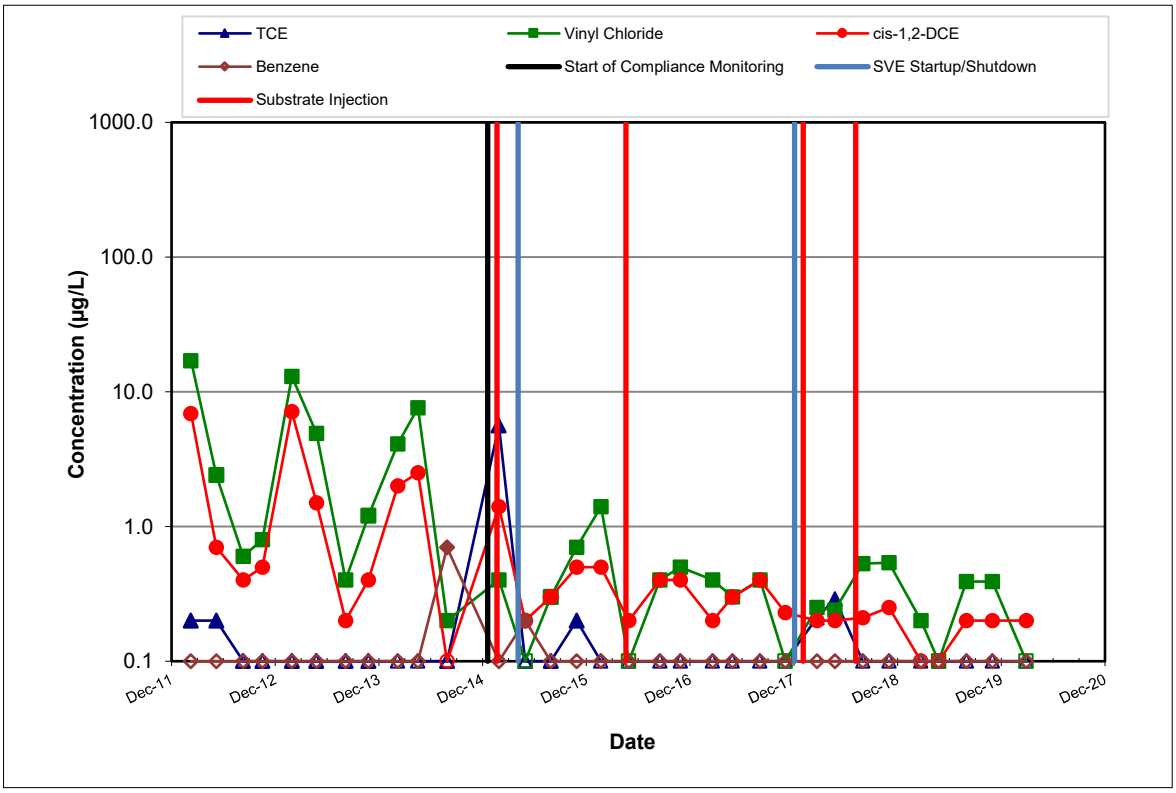


SOURCE AREA WELL GW033S

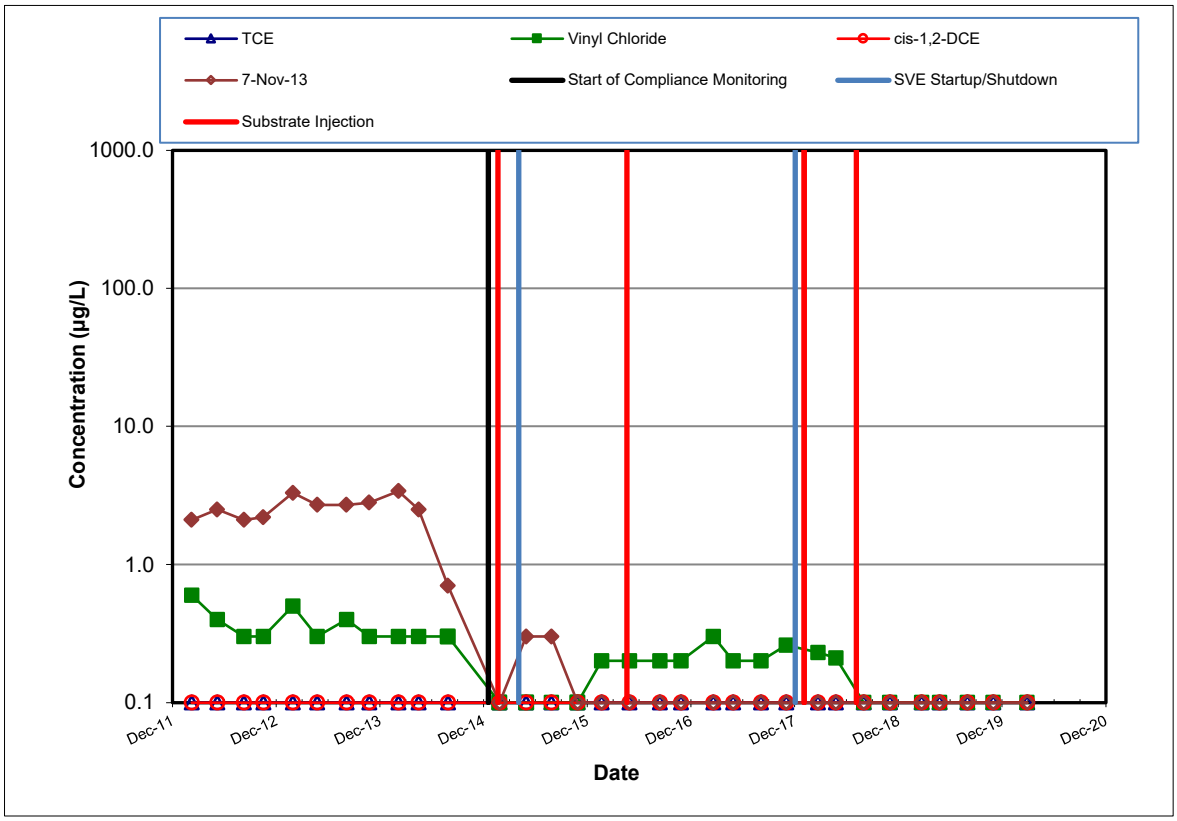
Note: non-detected values shown at one-half the reporting limit and graphed with an open symbol.

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 8 to 14_ Bldg 4-78-79 Trend Plots.xlsx



SOURCE AREA WELL GW034S

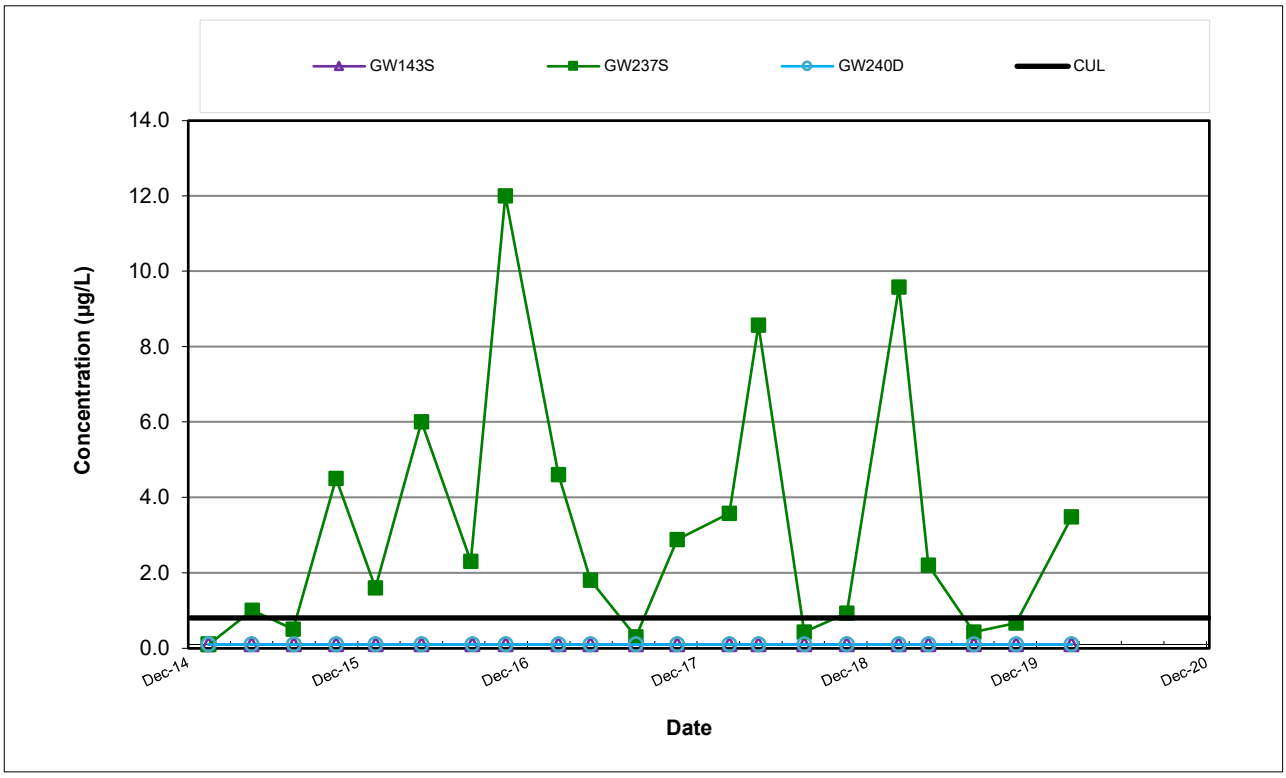


DOWNGRADIENT PLUME AREA WELL GW209S

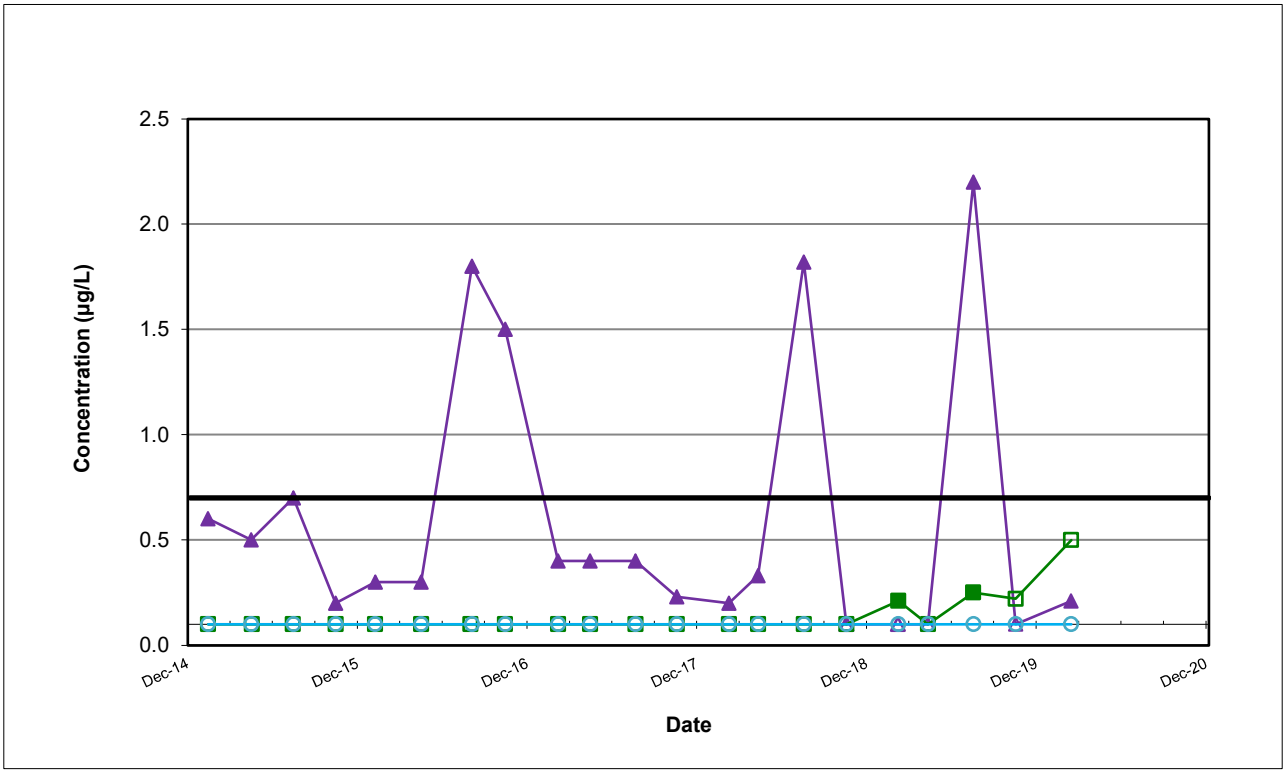
Note: non-detected values shown at one-half the reporting limit and graphed with an open symbol.

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

\\sea2-fs1\projectF$\8888 - Boeing Renton\02 Data Management\Grapher and Excel Figure Files\excel\Figures 8 to 14_ Bldg 4-78-79 Trend Plots.xlsx



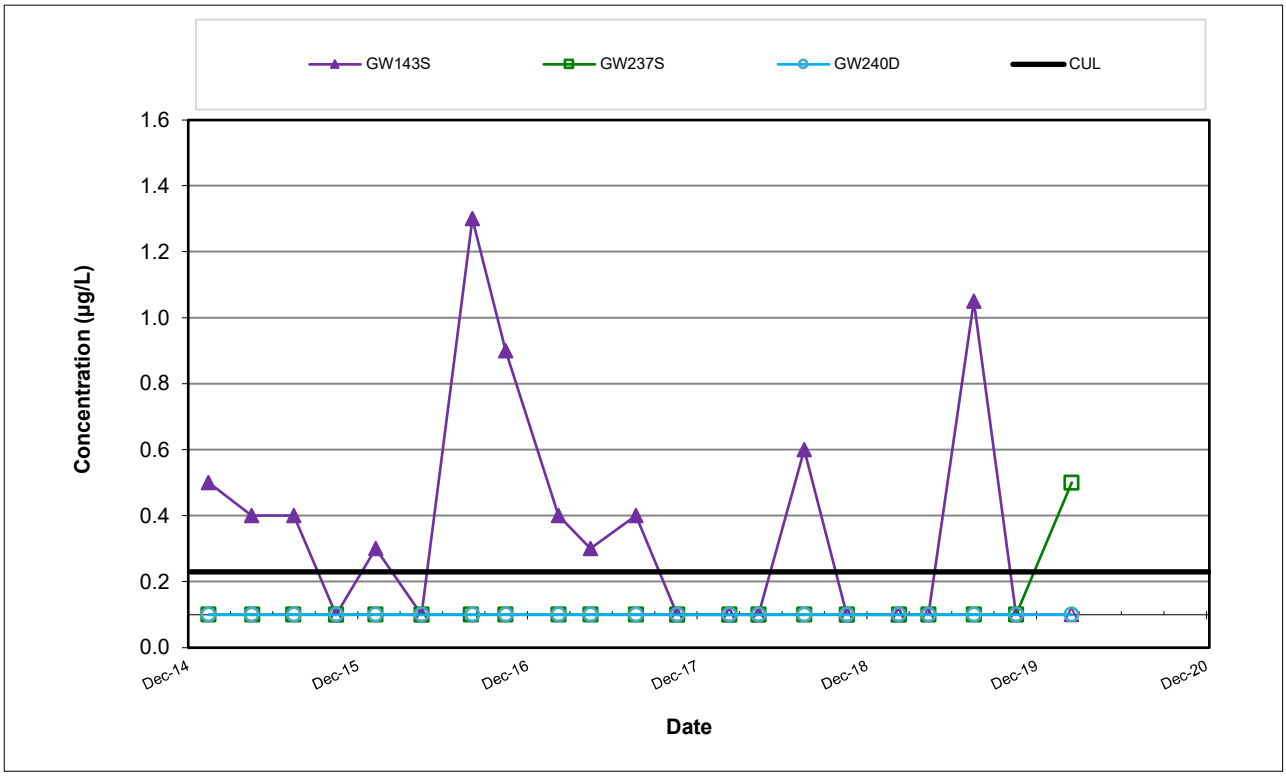
Benzene



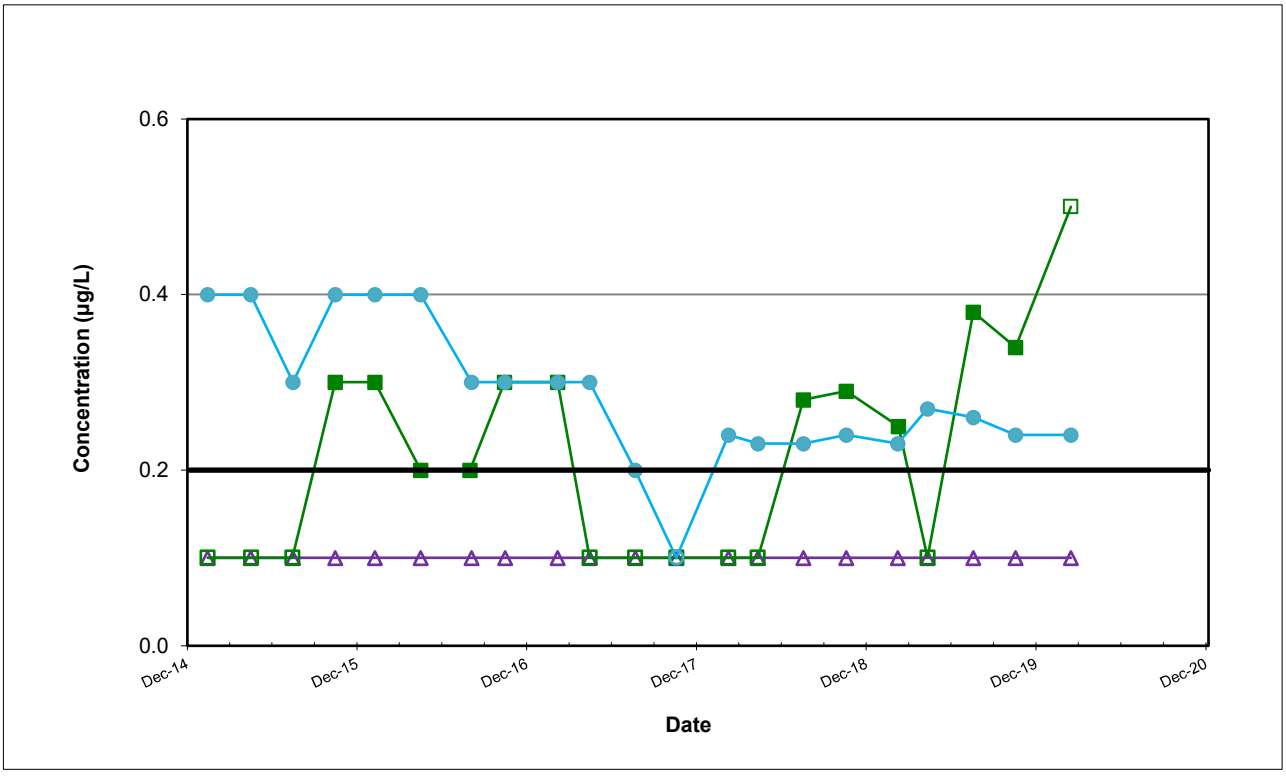
cis-1,2-Dichloroethene

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



Trichloroethene

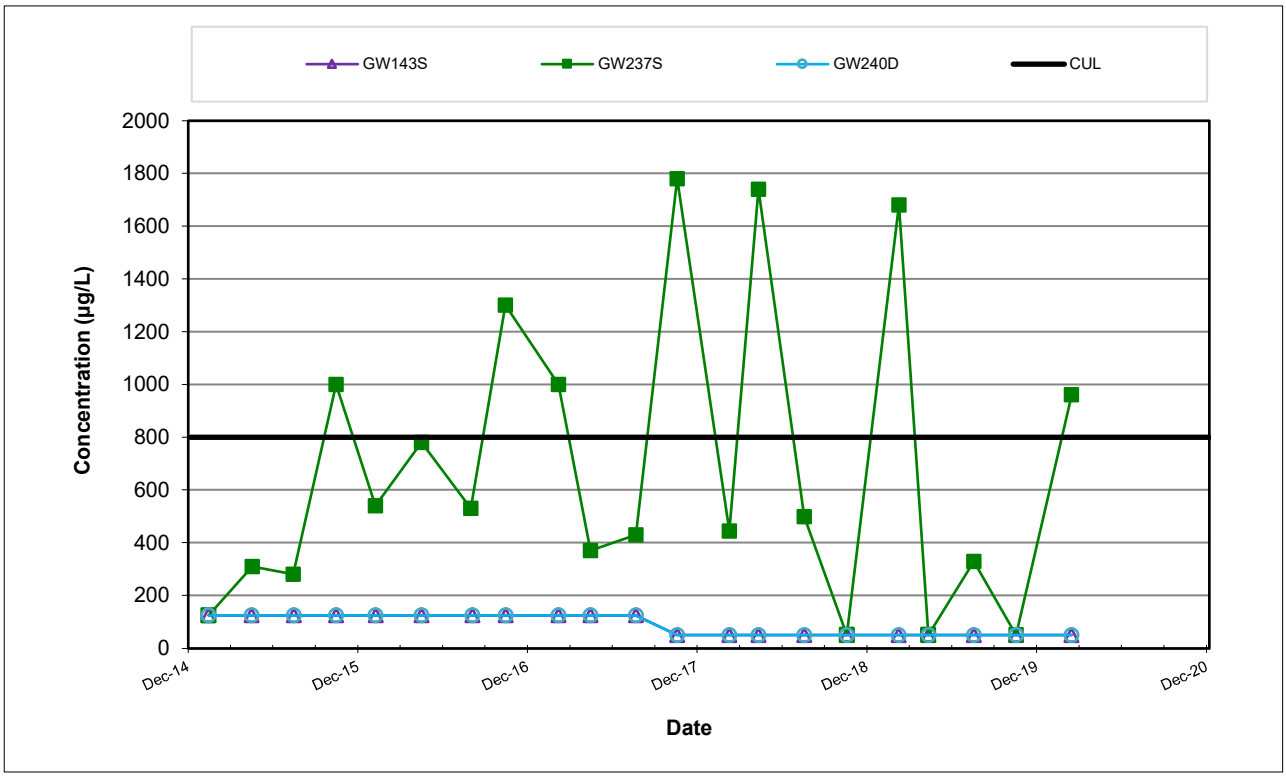


Vinyl Chloride

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

\\sea2-fs1\project$\8888 - Boeing Renton\02 Data Management\Grapher and Excel Figure Files\excel\Figures 8 to 14_ Bldg 4-78-79 Trend Plots.xlsx

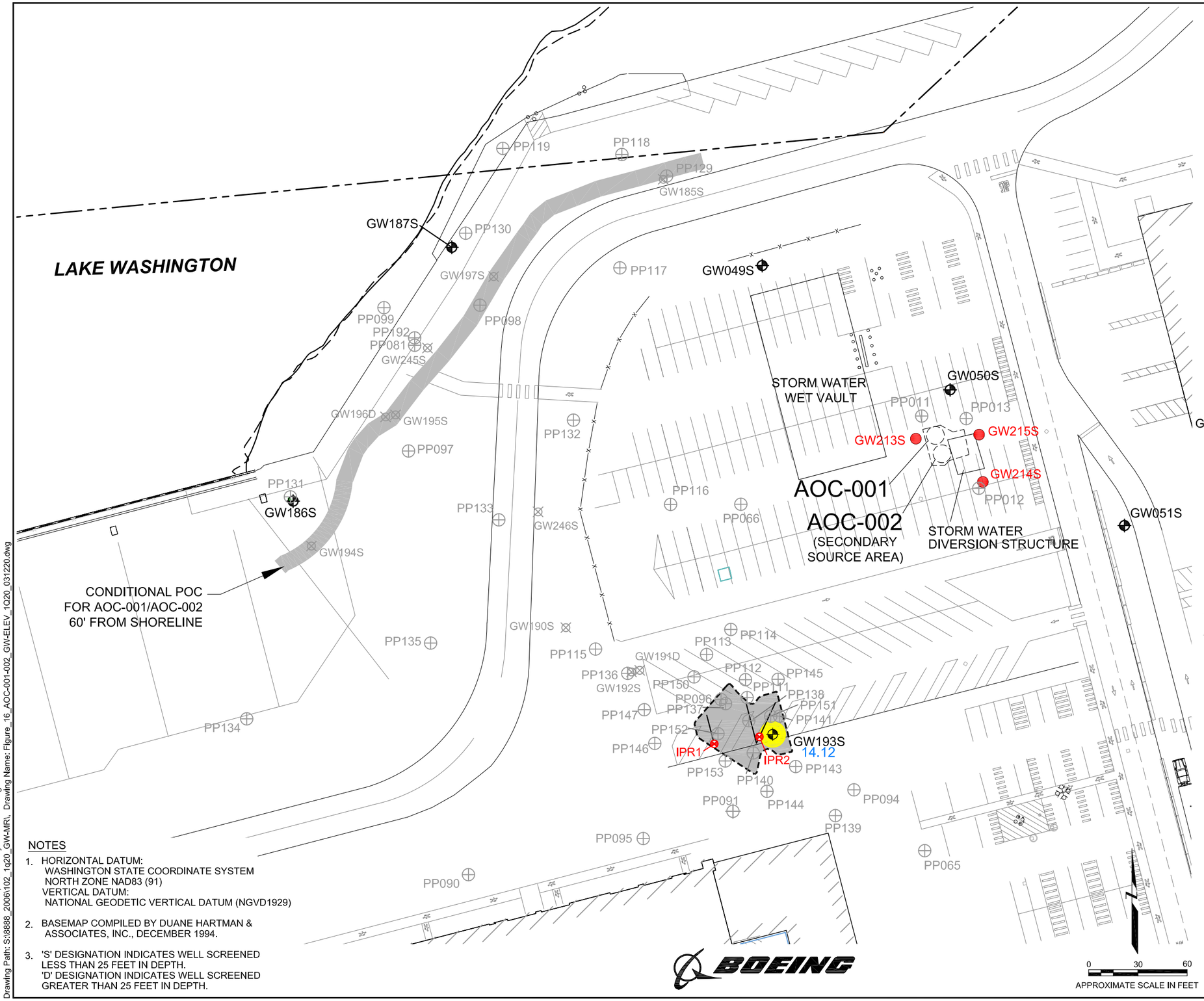


TPH as Gasoline

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

\\sea2-fs1\project$\8888 - Boeing Renton\02 Data Management\Grapher and Excel Figure Files\excel\Figures 8 to 14_ Bldg 4-78-79 Trend Plots.xlsx



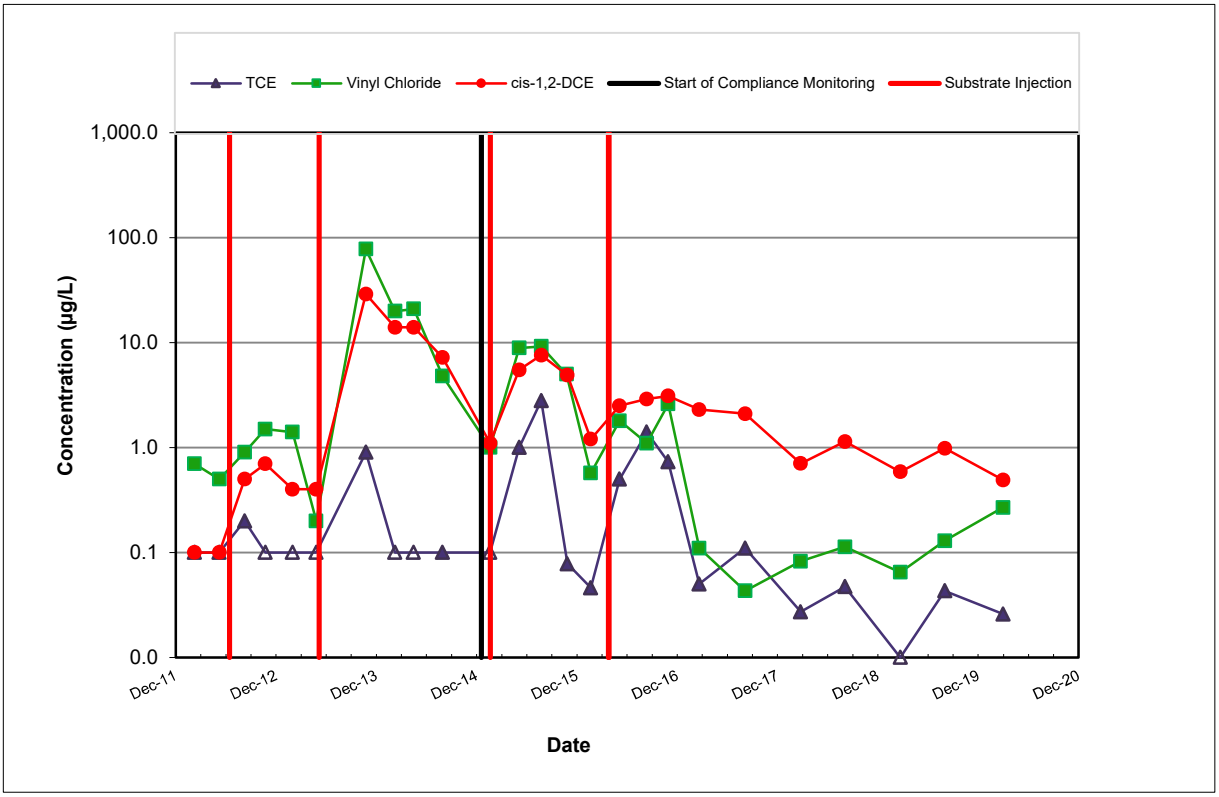
NOTES

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

AOC-001 AND AOC-002 MONITORING WELL LOCATIONS AND GROUNDWATER ELEVATIONS MARCH 12, 2020 Boeing Renton Facility Renton, Washington

By: MDS	Date: 04/28/20	Project No. PS20203450
wood.		Figure 16

Plot Date: 04/28/20 - 9:48am, Plotted by: adam.stenberg
Drawing Path: S:\8888_2006\102_1q20_GW-MR\, Drawing Name: Figure_16_AOC-001-002_GW-ELEV_1Q20_031220.dwg

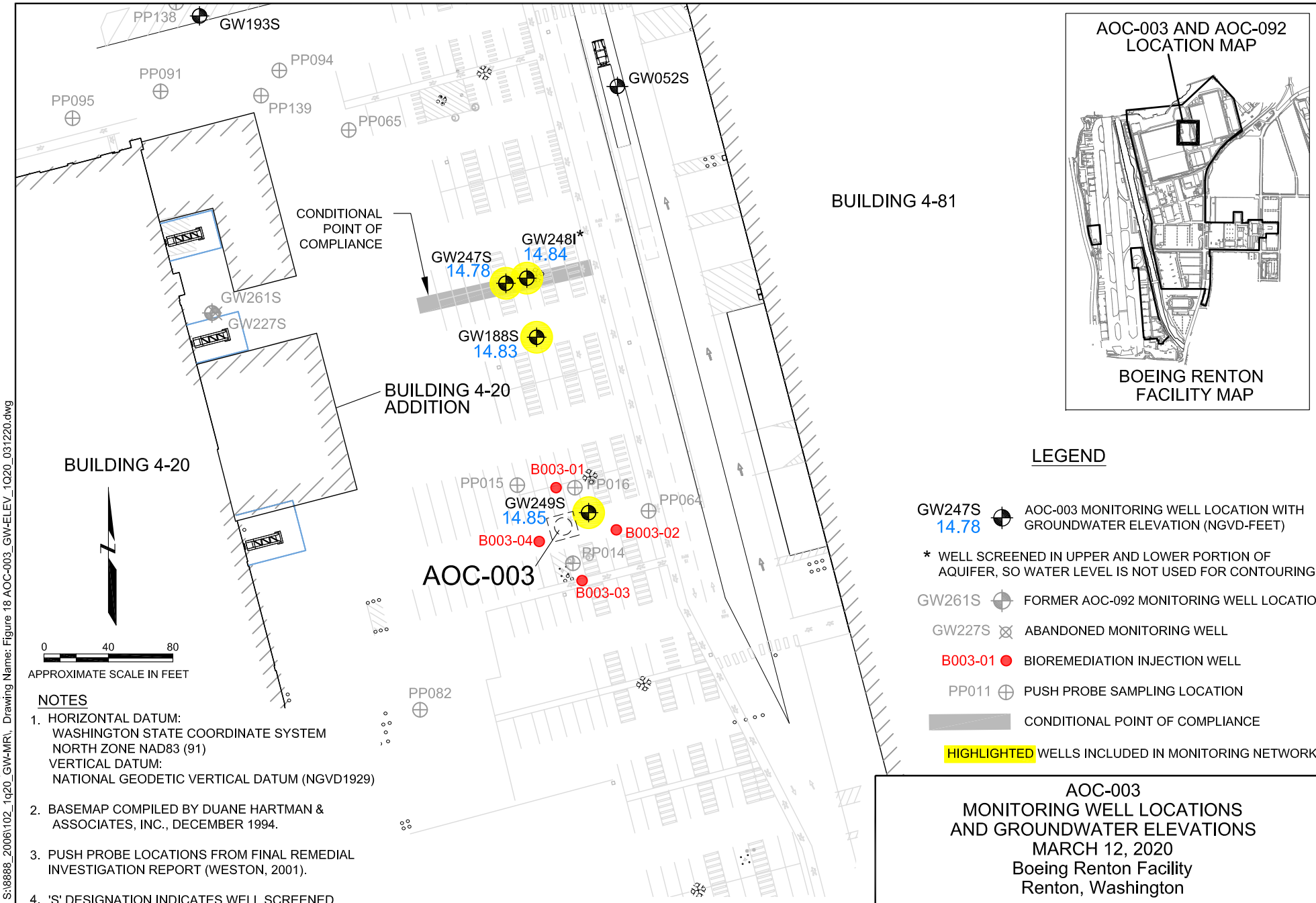


SOURCE AREA WELL GW193S

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 Boeing Renton Facility Renton, Washington	Project No. 8888 Figure 17

\\sea2-fs1\project$\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 14.78 — AOC-003 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.

GW261S — FORMER AOC-092 MONITORING WELL LOCATION

GW227S — ABANDONED MONITORING WELL

B003-01 — BIOREMEDIATION INJECTION WELL

PP011 — PUSH PROBE SAMPLING LOCATION

CONDITIONAL POINT OF COMPLIANCE

HIGHLIGHTED WELLS INCLUDED IN MONITORING NETWORK

NOTES

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

BOEING

AOC-003
MONITORING WELL LOCATIONS AND GROUNDWATER ELEVATIONS
MARCH 12, 2020
Boeing Renton Facility
Renton, Washington

By: MDS	Date: 04/23/20	Project No. PS20203450
wood.		Figure 18

Plot Date: 04/23/20 - 4:30pm, Plotted by: adam.stenberg
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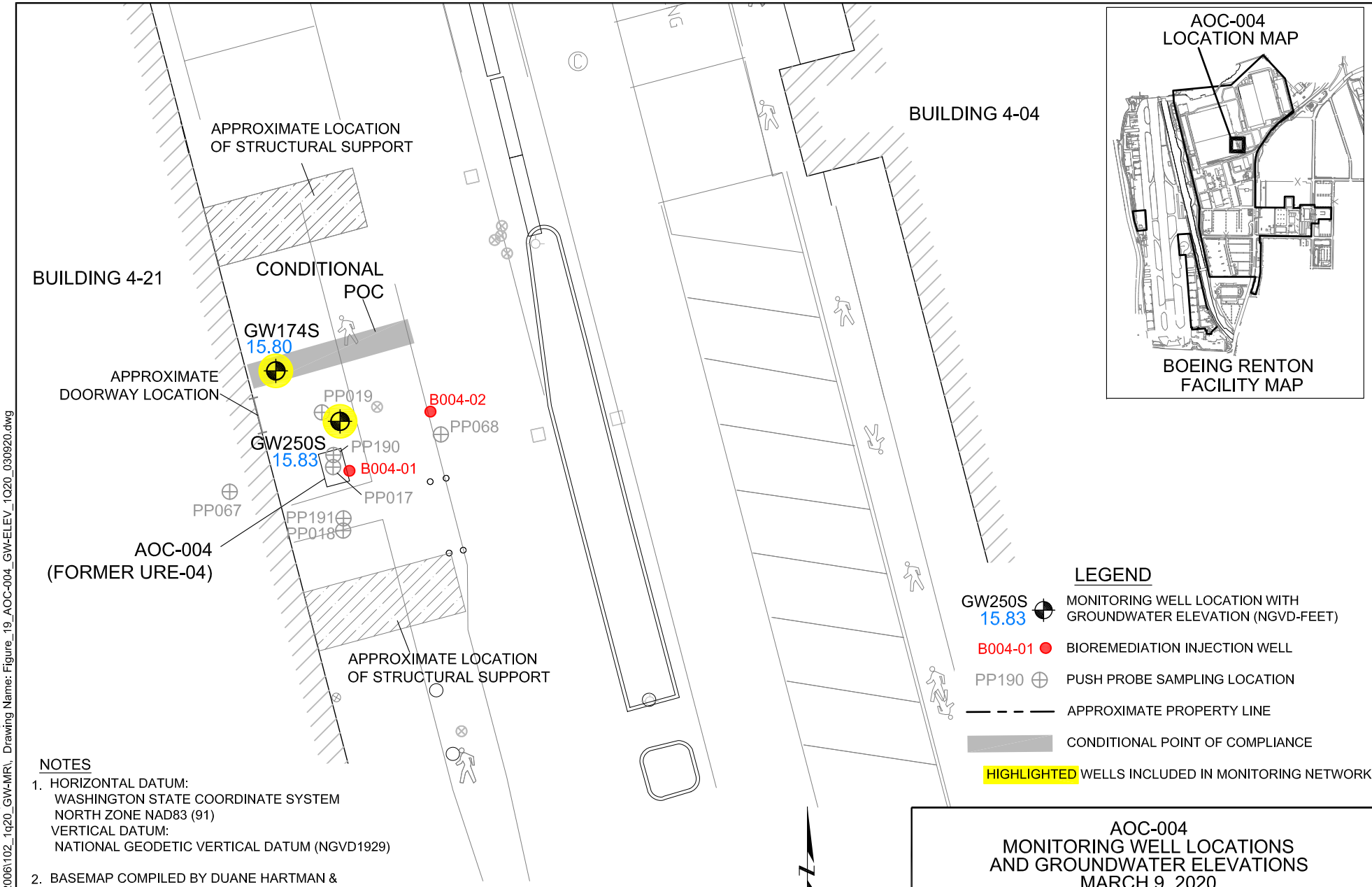


LEGEND

- GW250S 15.83 — 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

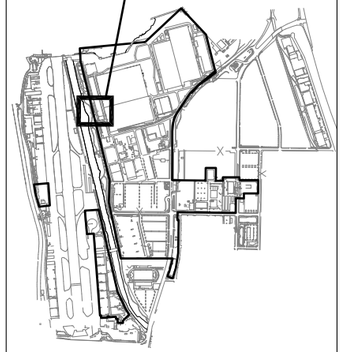
1. HORIZONTAL DATUM:
   WASHINGTON STATE COORDINATE SYSTEM
   NORTH ZONE NAD83 (91)
   VERTICAL DATUM:
   NATIONAL GEODETIC VERTICAL DATUM (NGVD1929)
2. BASEMAP COMPILED BY DUANE HARTMAN & ASSOCIATES, INC., DECEMBER 1994.
3. PUSH PROBE LOCATIONS FROM FINAL REMEDIAL INVESTIGATION REPORT (WESTON, 2001).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

0 10 20
APPROXIMATE SCALE IN FEET

AOC-004
MONITORING WELL LOCATIONS AND GROUNDWATER ELEVATIONS
MARCH 9, 2020
Boeing Renton Facility
Renton, Washington

By: MDS	Date: 04/23/20	Project No. PS20203450
wood.		Figure 19

AOC-060
LOCATION MAP



BOEING RENTON
FACILITY MAP

NOTES

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

LEGEND

- GW252S 14.08 — 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

AOC-060
MONITORING WELL LOCATIONS AND GROUNDWATER ELEVATIONS
MARCH 10, 2020
Boeing Renton Facility
Renton, Washington

By: MDS	Date: 04/23/20	Project No. PS20203450
wood.		Figure 20

Plot Date: 04/23/20 - 4:33pm, Plotted by: adam.stenberg
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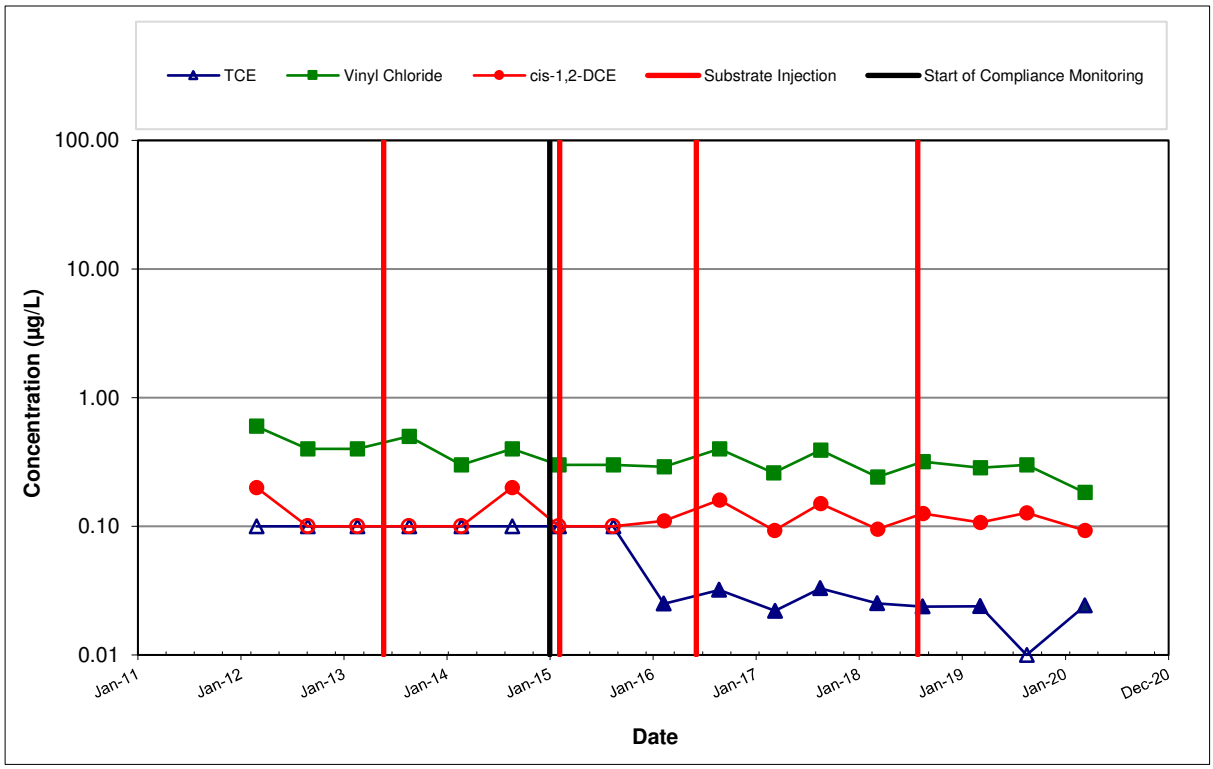
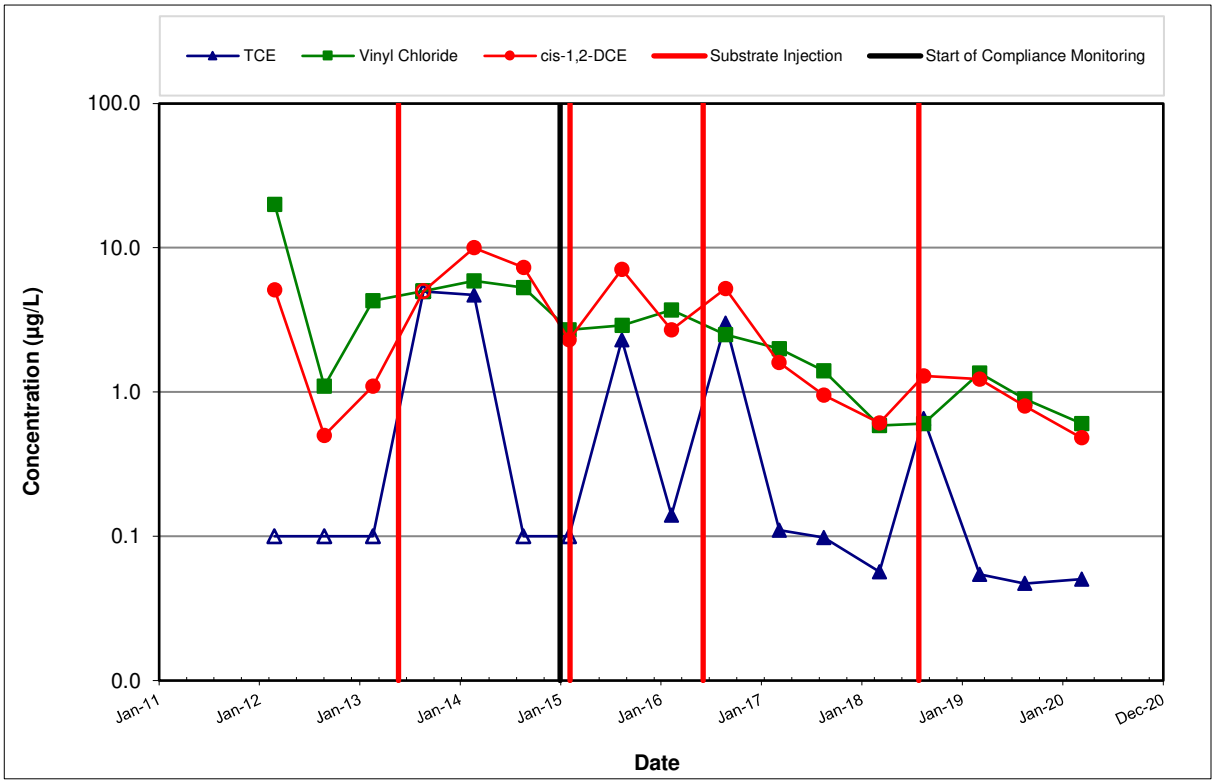


SOURCE AREA WELL GW009S

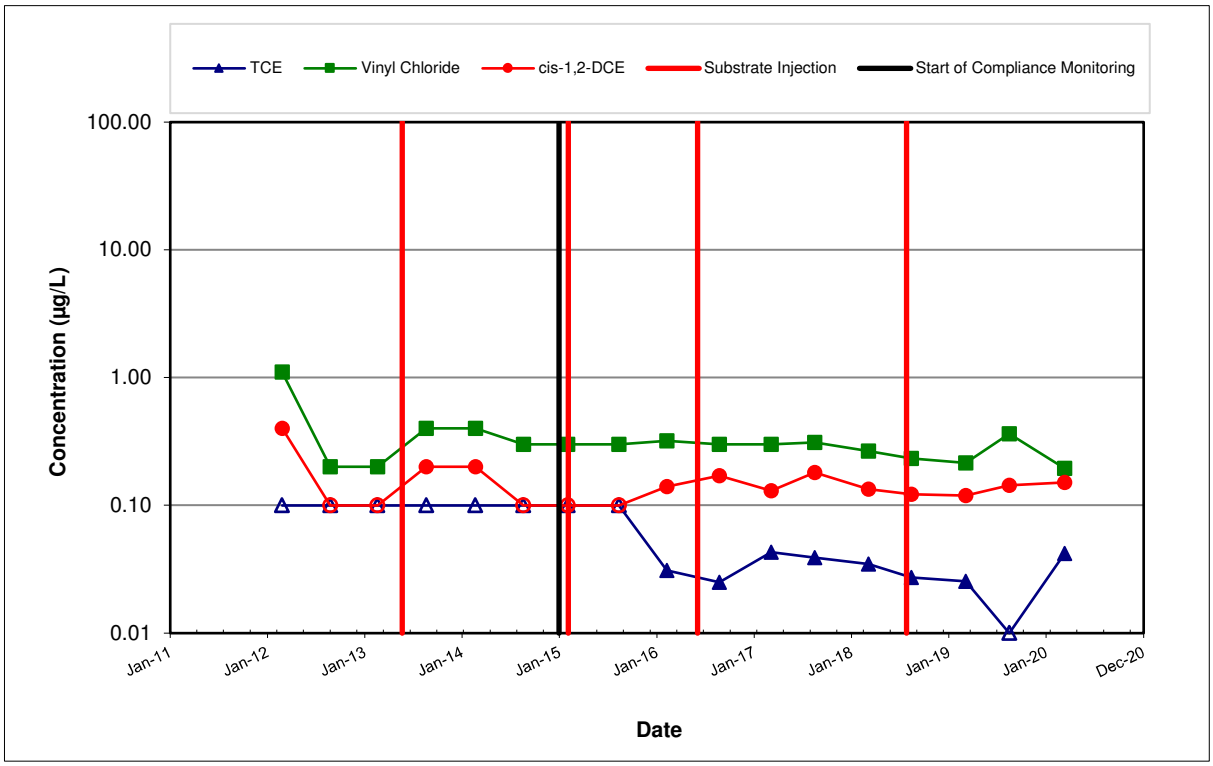


DOWNGRADIENT PLUME AREA WELL GW012S

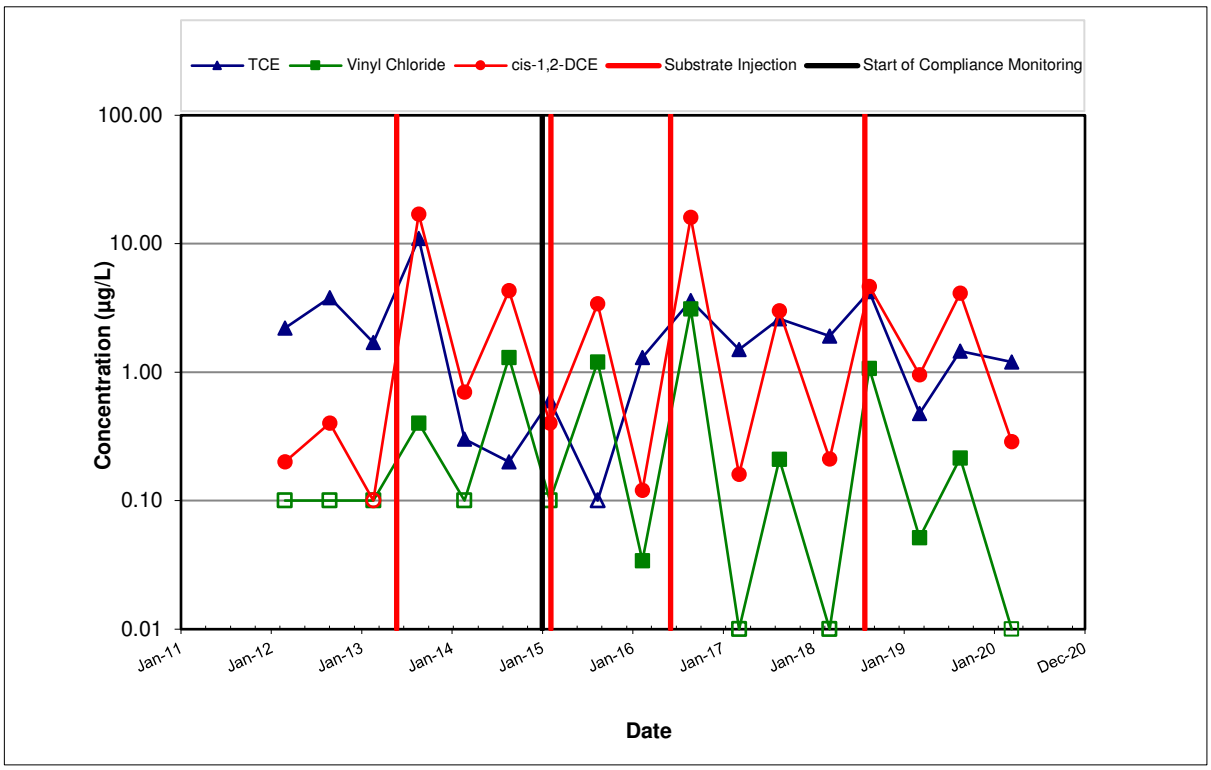
Note: non-detected values shown at one-half the reporting limit and graphed with an open symbol. August 2013 reporting limits elevated.

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 21

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

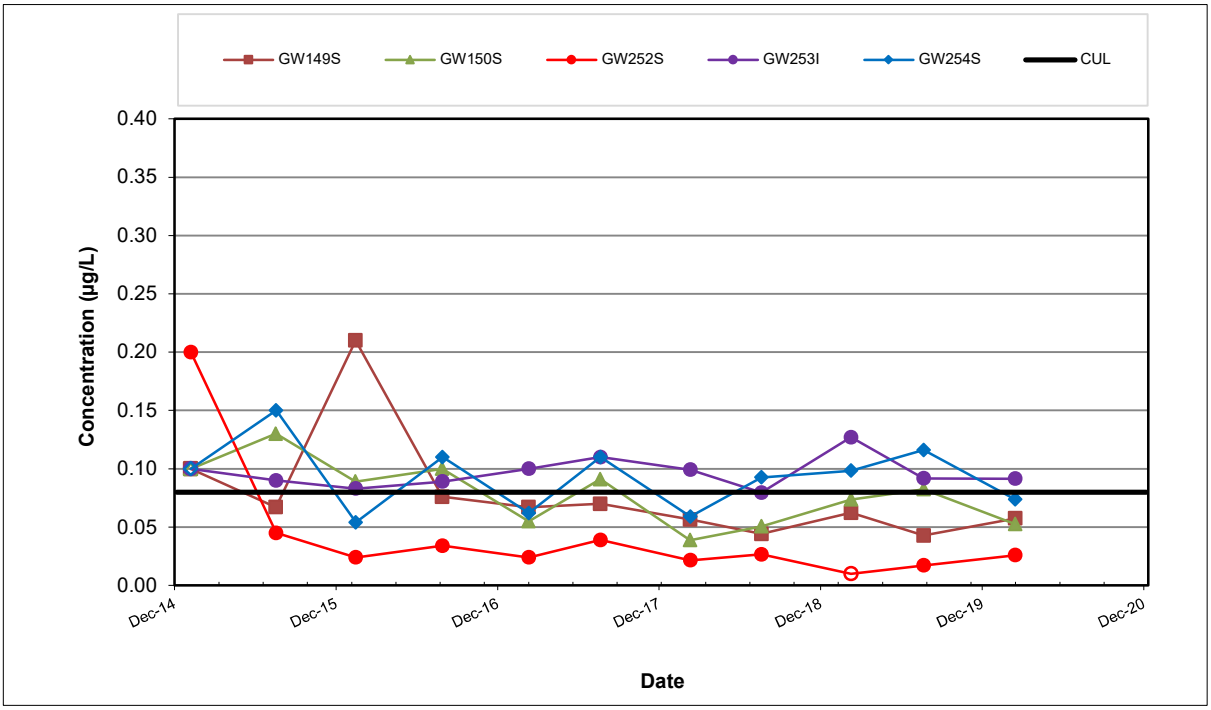


DOWNGRADIENT PLUME AREA WELL GW147S

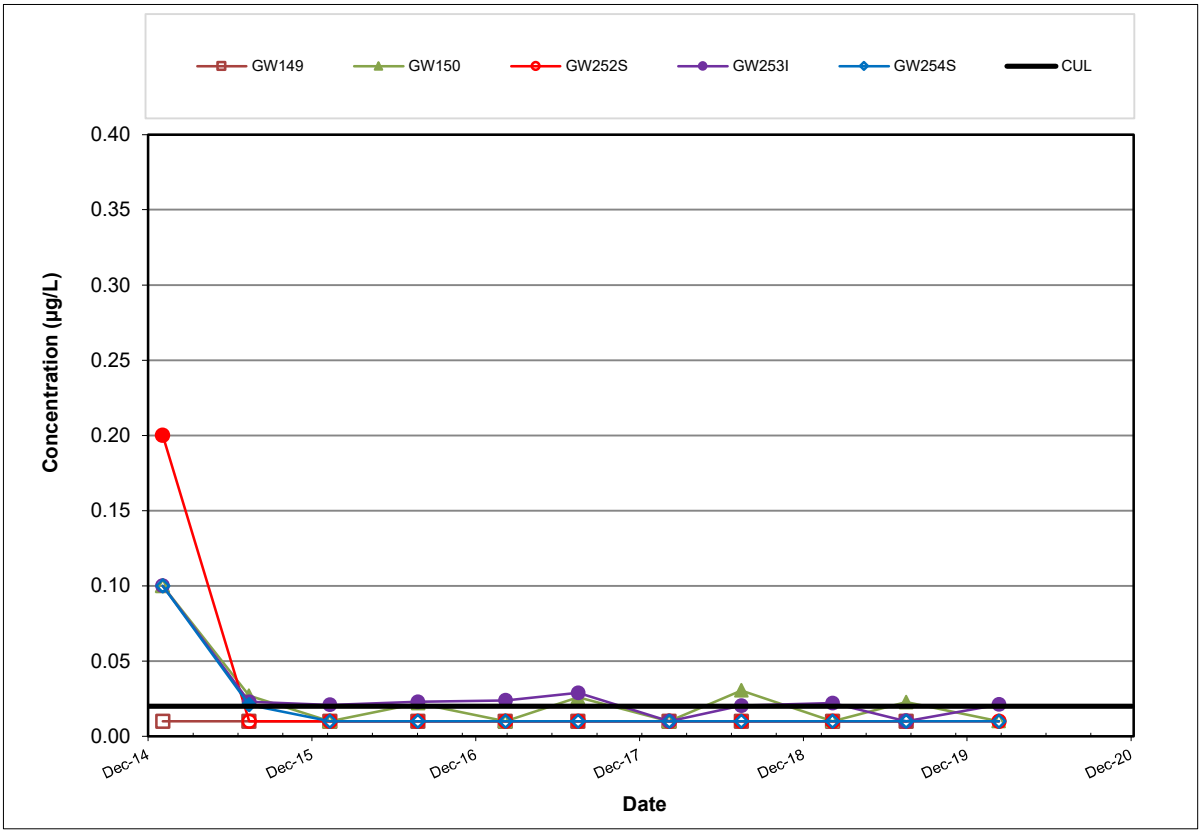
Note: non-detected values shown at one-half the reporting limit and graphed with an open symbol.

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

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



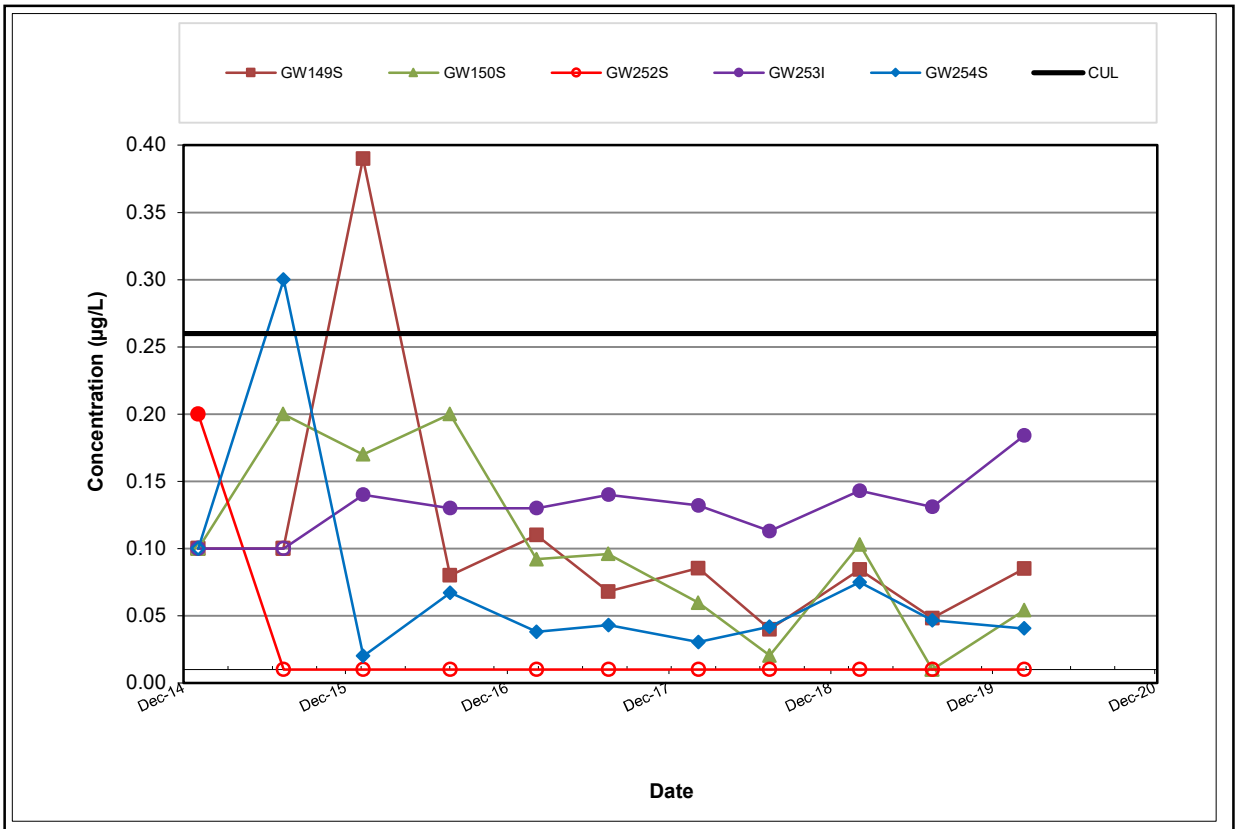
cis-1,2-Dichloroethene



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 23

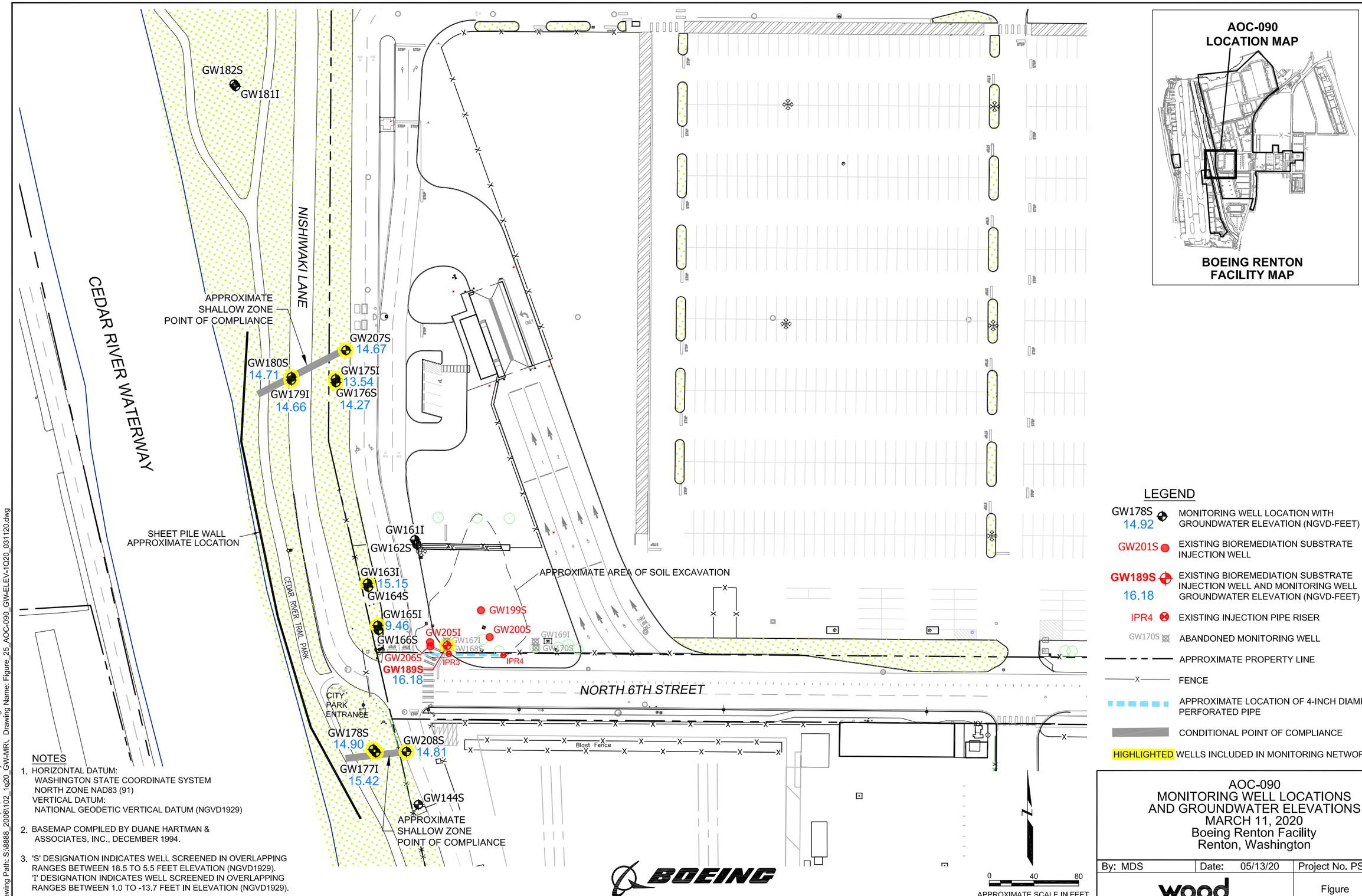
\\sea2-fs1\project$\8888 - Boeing Renton\02 Data Management\Grapher and Excel Figure Files\excel\Figures 23 to 26 AOC 60.xlsx



Vinyl Chloride

\\sea2-fs1\project$\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 24



LEGEND

- GW178S 14.92 — MONITORING WELL LOCATION WITH GROUNDWATER ELEVATION (NGVD-FEET)
- GW201S — EXISTING BIOREMEDIATION SUBSTRATE INJECTION WELL
- GW189S 16.18 — EXISTING BIOREMEDIATION SUBSTRATE INJECTION WELL AND MONITORING WELL GROUNDWATER ELEVATION (NGVD-FEET)
- IPR4 — EXISTING INJECTION PIPE RISER
- GW170S — ABANDONED MONITORING WELL
- APPROXIMATE PROPERTY LINE
- FENCE
- APPROXIMATE LOCATION OF 4-INCH DIAMETER PERFORATED PIPE
- CONDITIONAL POINT OF COMPLIANCE
- HIGHLIGHTED WELLS INCLUDED IN MONITORING NETWORK

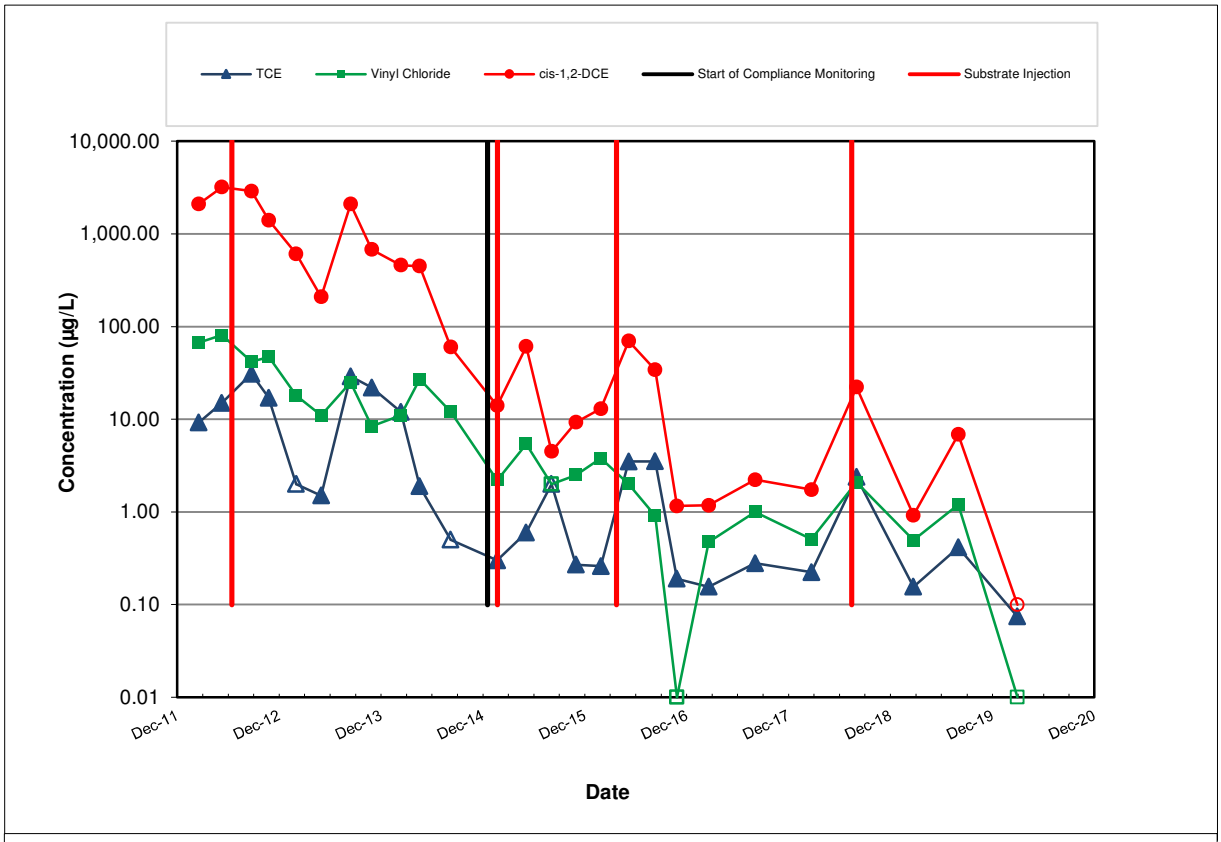
NOTES

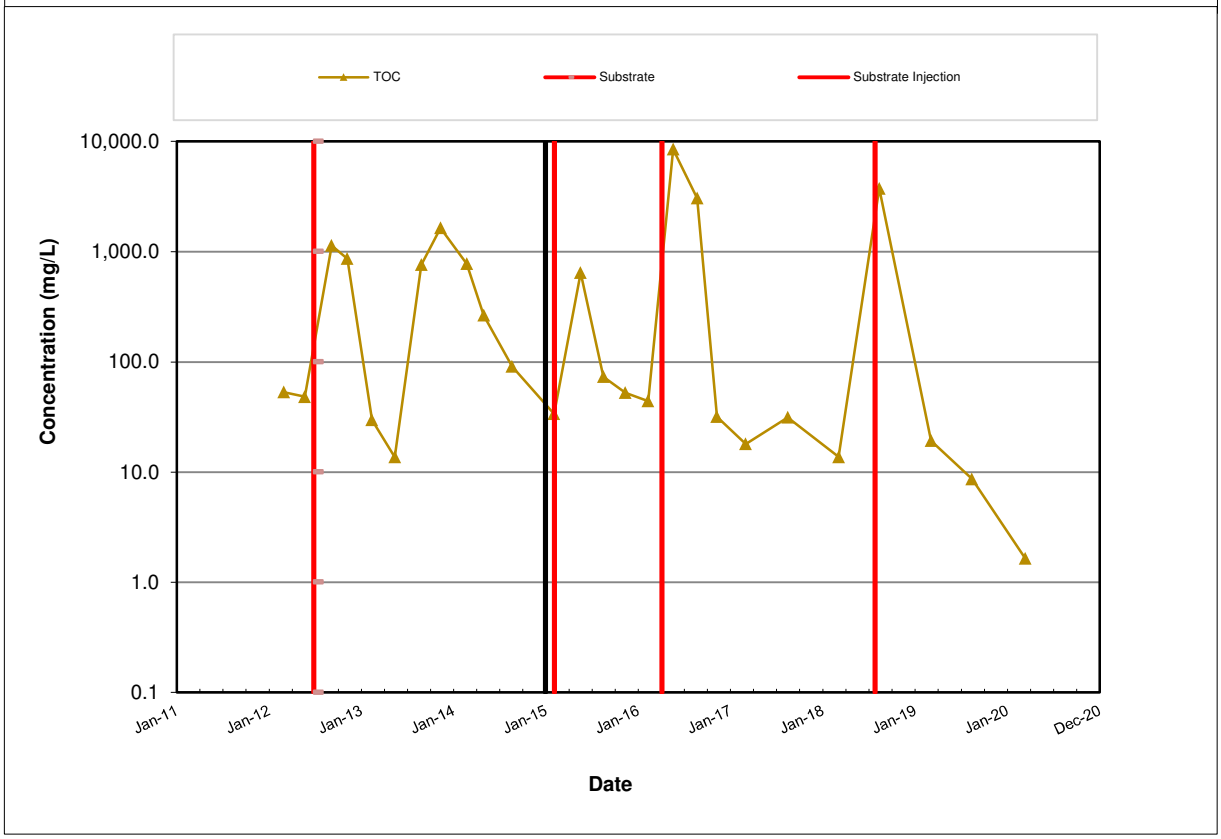
1. HORIZONTAL DATUM:
   WASHINGTON STATE COORDINATE SYSTEM
   NORTH ZONE NAD83 (91)
   VERTICAL DATUM:
   NATIONAL GEODETIC VERTICAL DATUM (NGVD1929)
2. BASEMAP COMPILED BY DUANE HARTMAN & ASSOCIATES, INC., DECEMBER 1994.
3. 'S' DESIGNATION INDICATES WELL SCREENED IN OVERLAPPING RANGES BETWEEN 18.5 TO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

AOC-090
MONITORING WELL LOCATIONS AND GROUNDWATER ELEVATIONS
MARCH 11, 2020
Boeing Renton Facility
Renton, Washington

By: MDS	Date: 05/13/20	Project No. PS20203450
wood.		Figure 25

Plot Date: 05/13/20 - 12:14pm Plotted by: adam.stenberg
Drawing Path: S:\6888_2006\102_1q20_GW-MR\ Drawing Name: Figure_25_AOC-090_GW-ELEV-1Q20_031120.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 26

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

GW038S

GW035S

GW036S

GW259S
14.41

GW260S
14.49

B70-1

B70-2

B70-3

B70-4

B70-5

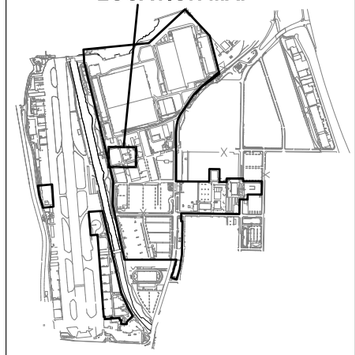
BUILDING 4-70

BUILDING 4-68

STOP

15 MPH

BUILDING 4-70 LOCATION MAP



BOEING RENTON FACILITY MAP

LEGEND

GW259S 14.41 — 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

BUILDING 4-70 MONITORING WELL LOCATIONS AND GROUNDWATER ELEVATIONS MARCH 11, 2020

Boeing Renton Facility
Renton, Washington

By: MDS	Date: 04/23/20	Project No. PS20203450
wood.		Figure 27

Plot Date: 04/23/20 - 4:41pm, Plotted by: adam.stenberg
Drawing Path: S:\8888_2006\102_1q20_GW-MR\, Drawing Name: Figure_27_Building 4-70_GW-ELEV_1Q20_031120.dwg

Tables

TABLE 1: SWMU-168 GROUNDWATER ELEVATION DATA
March 9, 2020
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	6.90	18.52
GW230I	4 to 14	24.86	6.26	18.60
GW231S	5 to 10	24.65	6.08	18.57

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]
March 9, 2020
Boeing Renton Facility, Renton, Washington

Parameter	Well ID [2]		
	CPOC Area		
	GW229S	GW230I	GW231S
Temperature (degrees C)	10.2	8.8	9.3
Specific Conductivity (µS/cm)	232.5	270.1	235.5
Dissolved Oxygen (mg/L)	2.37	1.48	2.58
pH (standard units)	6.10	6.29	6.34
Oxidation/Reduction Potential (mV)	39.6	-17.0	14.3

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

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

TABLE 3: SWMU-168 CONCENTRATIONS OF CONSTITUENTS OF CONCERN[1]
March 9, 2020
Boeing Renton Facility, Renton, Washington

Analyte		Current Cleanup Levels [3]	Well ID [2] CPOC Area GW229S	GW230I	GW231S
Volatile Organic Compounds (µg/L)					
Vinyl Chloride		0.11	0.02 U	0.0869	0.020 U

Notes:
1. **Bolded** values exceed the cleanup levels.
2. S = shallow well; I = intermediate well.
4. Current cleanup levels obtained from Table 2 of the Cleanup Action Plan and are based on each individual SWMU or AOC.

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

TABLE 4: SWMU-172 AND SWMU-174 GROUP GROUNDWATER ELEVATION DATA
March 9, 2020
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	7.67	18.24
GW152S	5 to 20[2]	26.98	8.23	18.75
GW153S	5 to 20[2]	27.47	8.54	18.93
GW172S	8 to 18[2]	26.44	8.31	18.13
GW173S	8 to 18[2]	26.51	8.45	18.06
GW226S	5 to 20[2]	26.86	8.22	18.64
GW232S	4 to 14	24.45	6.35	18.10
GW233I	15 to 25	24.35	6.1	18.25
GW234S	3 to 13	24.95	6.73	18.22
GW235I	15 to 25	24.9	6.42	18.48
GW236S	5 to 15	24.36	6.1	18.26

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]
March 9, 2020
Boeing Renton Facility, Renton, Washington

	Well ID [2]											
	Source Area			Downgradient Plume Area				CPOC Area				
Parameter	GW152S	GW152S (field dup.)	GW153S	GW081S	GW172S	GW173S	GW226S	GW232S	GW233I	GW234S	GW235I	GW236S
Temperature (degrees C)	10.7	10.7	8.1	11.0	9.4	6.3	10.9	5.5	5.6	5.5	4.1	3.6
Specific Conductivity (µS/cm)	165.2	165.2	191.5	186.8	249.8	319.5	256.9	286.7	155.8	174.9	114.7	235.9
Dissolved Oxygen (mg/L)	4.03	4.03	2.54	0.93	1.68	0.78	1.86	4.26	0.94	3.19	3.87	6.47
pH (standard units)	6.16	6.16	6.32	6.45	6.48	6.64	6.44	6.17	6.46	6.36	6.31	6.12
Oxidation/Reduction Potential (mV)	9.6	9.6	-10.1	-21.9	0.8	-91.7	-24.8	26.2	-13.4	16.0	34.1	44.7
Total Organic Carbon (mg/L)	8.70	5.68	10.24	4.69	45.66	6.76	8.35	5.02	4.21	10.55	1.25	3.85

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]
March 9, 2020
Boeing Renton Facility, Renton, Washington

Analyte	Current Cleanup Levels [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	**0.892**	**0.808**	**0.0736**	**0.0357**	**0.305**	**0.0504**	**0.0396**	**0.221**	**0.0552**	**0.0984**	**0.127**	0.0241
Tetrachloroethene	0.02	**1.120**	**1.200**	**0.0244**	0.020 U	**0.976**	**0.0224**	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Trichloroethene	0.02	**0.278**	**0.269**	0.020 U	0.020 U	**0.384**	**0.0305**	0.020 U	0.020 U	0.020 U	**0.0297**	**0.0336**	0.020 U
Vinyl Chloride	0.11	**0.150**	**0.138**	**0.249**	0.020 U	**0.209**	**0.144**	0.0380	**0.264**	0.020 U	0.0302	0.020 U	0.020 U
Total Metals (µg/L)													
Arsenic	1.0	**3.84**	**2.73**	**5.48**	**1.87**	**32.8**	**11.8**	**4.88**	**2.73**	0.467	**27.4**	0.251	**6.29**
Copper	3.5	**8.03**	**5.74**	3.09	0.791	**27.6**	1.51	**5.00**	2.22	0.500 U	**32.9**	0.935	**21.2**
Lead	1.0	**6.13**	**3.57**	0.712	0.100 U	**15.1**	0.442	0.500	0.354	0.100 U	**11.8**	0.235	**18.7**

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. Current cleanup levels obtained from Table 2 of the Cleanup Action Plan and are based on each individual SWMU or AOC.

Abbreviations:
µg/L = micrograms per liter
AOC = area of concern
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
March 10 and 11, 2020
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	5.15	14.29
GW033S	5 to 25	19.49	5.28	14.21
GW034S	5 to 25	19.65	5.36	14.42
GW038S	5 to 25	19.68	5.44	14.24
GW039S	3.5 to 13.5	19.3	4.98	14.32
GW143S	10 to 15	19.81	5.63	14.18
GW209S	3.5 to 13.3	19.37	5.18	14.19
GW210S	3.5 to 13.3	19.19	4.85	14.34
GW237S	5 to 15	18.85	4.71	14.14
GW238I	5 to 20	18.94	4.81	14.13
GW239I	15 to 20	19.69	5.52	14.17
GW240D	22 to 27	19.81	6.29	13.52
GW241S	4 to 14	20.28	6.11	14.17
GW242I	15 to 20	20.44	6.23	14.21
GW243I	5 to 20	19.49	5.22	14.27
GW244S	5 to 15	19.53	5.18	14.35

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]
March 10 and 11, 2020
Boeing Renton Facility, Renton, Washington

Parameter	Well ID [2]						
	Source Area						
	GW031S	GW031S (field dup.)	GW033S	GW034S	GW039S	GW243I	GW244S
Temperature (degrees C)	13.1	13.1	10.8	9.0	9.1	11.5	10.9
Specific Conductivity (µS/cm)	373.9	373.9	321.1	254.4	179.4	303.9	319.4
Dissolved Oxygen (mg/L)	1.13	1.13	1.48	1.55	2.03	0.99	1.47
pH (standard units)	6.36	6.36	6.22	6.27	5.80	6.28	6.23
Oxidation/Reduction Potential (mV)	-22.5	-22.5	-15.5	-13.9	33.6	-19.1	-2.8
Total Organic Carbon (mg/L)	13.13	13.07	14.31	8.97	6.06	8.70	14.88

Parameter	Well ID [2]		
	Downgradient Plume Area		
	GW038S	GW209S	GW210S
Temperature (degrees C)	11.3	11.2	10.8
Specific Conductivity (µS/cm)	228.0	326.1	260.9
Dissolved Oxygen (mg/L)	0.73	0.99	3.91
pH (standard units)	6.28	6.37	6.51
Oxidation/Reduction Potential (mV)	-11.0	-23.6	19.3
Total Organic Carbon (mg/L)	10.12	9.65	219.9

Parameter	Well ID [2]						
	CPOC Area						
	GW143S	GW237S	GW238I	GW239I	GW240D	GW241S	GW242I
Temperature (degrees C)	7.1	10.3	8.8	7.6	6.9	7.4	6.3
Specific Conductivity (µS/cm)	238.8	182.0	366.7	267.0	284.0	260.7	282.1
Dissolved Oxygen (mg/L)	1.51	0.95	1.10	1.26	1.34	1.23	1.94
pH (standard units)	6.33	6.47	6.35	6.30	6.32	5.95	5.93
Oxidation/Reduction Potential (mV)	-27.4	-4.6	-30.8	-22.9	-24.7	1.6	-8.6
Total Organic Carbon (mg/L)	10.97	8.95	19.06	10.28	7.10	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]
March 10 and 11, 2020
Boeing Renton Facility, Renton, Washington

Analyte	Current Cleanup Level[4]	Well ID [3]									
		Source Area							Downgradient Plume Area		
		GW031S	GW031S (field dup.)	GW033S	GW034S	GW039S	GW243I	GW244S	GW038S	GW209S	GW210S
Volatile Organic Compounds (µg/L)											
Benzene	0.80	**37.1**	**38.5**	**10.2**	0.20 U	0.20 U	0.20 U	0.52	0.20 U	0.20 U	0.20 U
cis -1,2-Dichloroethene	0.70	0.61	0.56	**21.4**	0.20 U	0.20 U	0.20 U	0.68	0.20 U	0.20 U	0.20 U
Trichloroethene	0.23	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.23	0.20 U	0.20 U	0.20 U
Vinyl Chloride	0.20	0.20 U	0.20 U	**52.2**	0.20 U	0.20 U	0.20 U	**0.70**	0.20 U	0.20 U	0.20 U
Total Petroleum Hydrocarbons (µg/L)											
TPH-G (C7-C12)	800	**2,980**	**3,060**	296	100 U	100 U	100 U	100 U	100 U	100 U	100 U

Analyte	Current Cleanup Levels [4]	Well ID [3]						
		CPOC Area						
		GW143S	GW237S	GW238I	GW239I	GW240D	GW241S	GW242I
Volatile Organic Compounds (µg/L)								
Benzene	0.80	0.20 U	**3.48**	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
cis -1,2-Dichloroethene	0.70	0.21	1.00 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Trichloroethene	0.23	0.20 U	1.00 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Vinyl Chloride	0.20	0.20 U	1.00 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Total Petroleum Hydrocarbons (µg/L)								
TPH-G (C7-C12)	800	100 U	**961**	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. Current cleanup levels obtained from Table 2 of the Cleanup Action Plan and are based on each individual SWMU or AOC.

Abbreviations:
µg/L = micrograms per liter
AOC = area of concern
CPOC = conditional point of compliance
field dup. = field duplicate
SWMU = solid waste management unit
TPH-G = total petroleum hydrocarbons as gasoline

TABLE 10: AOC-001 AND AOC-002 GROUNDWATER ELEVATION DATA
March 12, 2020
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]
GW193S	3.0 to 12.8	18.67	4.55	14.12

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

March 12, 2020

Boeing Renton Facility, Renton, Washington

Parameter	Well ID [2]											
	Source Area	Downgradient Plume Area				CPOC Area						
	GW193S	GW190S	GW191D[3]	GW192S	GW246S[4]	GW185S[4]	GW185S (field dup.)[4]	GW194S[4]	GW195S[4]	GW196D[4, 5]	GW197S[4]	GW245S
Temperature (degrees C)	8.1	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Specific Conductivity (µS/cm)	905	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Dissolved Oxygen (mg/L)	2.56	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
pH (standard units)	6.25	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Oxidation/Reduction Potential (mV)	9.4	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Total Organic Carbon (mg/L)	48.20	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM

Notes:

1. Primary geochemical indicators are measured in the field, with the exception of total organic carbon, which is measured in the laboratory.
2. S = shallow well; D = deep well.
3. GW191D is installed in a cluster with GW192S, and GW191D is screened below a silt layer at 26.5 to 36 feet in depth
4. Wells GW246S and GW185S through GW197S are associated with the AOC-001 and AOC-002 cleanup action area
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
NM = not measured

TABLE 12: AOC-001 AND AOC-002 CONCENTRATIONS OF CONSTITUENTS OF CONCERN [1, 2]

March 12, 2020

Boeing Renton Facility, Renton, Washington

Analyte	Current Cleanup Levels [4]	Well ID [3] / Source Area / GW193S
Volatile Organic Compounds (µg/L)		
1,1-Dichloroethene	0.057	0.020 U
Benzene	0.8	0.20 U
cis -1,2-Dichloroethene	0.02	**0.490**
Trichloroethene	0.02	**0.0258**
Vinyl Chloride	0.05	**0.268**

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. Current cleanup levels obtained from Table 2 of the Cleanup Action Plan and are based on each individual SWMU or AOC.

Abbreviations:

µg/L = micrograms per liter
AOC = area of concern
SWMU = solid waste management unit

TABLE 13: AOC-003 GROUNDWATER ELEVATION DATA
March 12, 2020
Boeing Renton Facility, Renton, Washington

Well ID[1]	Screen Interval Depth (feet bgs)	TOC Elevation (feet)[2]	Depth to Groundwater (feet below TOC)	Groundwater Elevation (feet)[2]
GW188S	3.5 to 13.5	18.78	3.95	14.83
GW247S	4 to 14	18.91	4.13	14.78
GW248I	10 to 20	18.78	3.94	14.84
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]
March 12, 2020
Boeing Renton Facility, Renton, Washington

Parameter	Well ID [2]			
	Source Area	Downgradient Plume Area	CPOC Area	
	GW249S	GW188S	GW247S	GW248I
Temperature (degrees C)	7.7	8.2	7.2	7.4
Specific Conductivity (µS/cm)	290	373	313.4	380.7
Dissolved Oxygen (mg/L)	4.53	5.91	1.75	1.79
pH (standard units)	6.13	6.14	6.29	6.33
Oxidation/Reduction Potential (mV)	-37.9	-30.4	21.3	12.2
Total Organic Carbon (mg/L)	18.06	11.22	10.21	15.07

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]
March 12, 2020
Boeing Renton Facility, Renton, Washington

Analyte	Current Cleanup Levels [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	0.0604	0.0362	0.0394	0.020 U
Tetrachloroethene	0.02	0.020 U	**0.0244**	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	**0.334**	0.235	**0.305**	**0.499**

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. Current cleanup levels obtained from Table 2 of the Cleanup Action Plan and are based on each individual SWMU or AOC.

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

TABLE 16: AOC-004 GROUNDWATER ELEVATION DATA
March 9, 2020
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	3.76	15.80
GW250S	4 to 14	19.31	3.48	15.83

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

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

TABLE 17: AOC-004 CONCENTRATIONS OF PRIMARY GEOCHEMICAL INDICATORS [1]
March 9, 2020
Boeing Renton Facility, Renton, Washington

Parameter	Well ID [2]	
	Source Area	CPOC Area
	GW250S	GW174S
Temperature (degrees C)	8.5	11.2
Specific Conductivity (µS/cm)	100.6	135.3
Dissolved Oxygen (mg/L)	1.46	0.19
pH (standard units)	6.52	6.85
Oxidation/Reduction Potential (mV)	-19.0	-130.8

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]
March 9, 2020
Boeing Renton Facility, Renton, Washington

Analyte	Current Cleanup Levels [3]	Well ID [2]	
		Source Area	CPOC Area
		GW250S	GW174S
Metals (mg/L)			
Lead	0.001	**0.00119**	0.000974

Notes:
1. **Bolded** values exceed the cleanup levels.
2. S = shallow well.
3. Current cleanup levels obtained from Table 2 of the Cleanup Action Plan and are based on each individual SWMU or AOC.

Abbreviations:
AOC = area of concern
CPOC = conditional point of compliance
mg/L = milligrams per liter
SWMU = solid waste management unit

TABLE 19: AOC-060 GROUNDWATER ELEVATION DATA
March 10, 2020
Boeing Renton Facility, Renton, Washington

Well ID[1]	Screen Interval Depth (feet bgs)	TOC Elevation (feet)[2]	Depth to Groundwater (feet below TOC)	Groundwater Elevation (feet)[2]
GW009S	4.5 to 14.5	19.36	5.22	14.14
GW010S	4.5 to 14.5	19.47	5.37	14.10
GW011D	29 to 39	19.49	5.34	14.15
GW012S	4.5 to 14.5	19.11	4.99	14.12
GW014S	4.5 to 14.5	19.24	5.07	14.17
GW147S	5 to 15	18.73	4.67	14.06
GW149S	5 to 15	19.19	5.13	14.06
GW150S	5 to 15	19.1	5.07	14.03
GW252S	4 to 14	19.01	4.93	14.08
GW253I	10 to 20	19.02	4.96	14.06
GW254S	4 to 14	19.16	5.11	14.05

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
TOC = top of casing

TABLE 20: AOC-060 CONCENTRATIONS OF PRIMARY GEOCHEMICAL INDICATORS [1]
March 10, 2020
Boeing Renton Facility, Renton, Washington

Parameter	Well ID [2]									
	Source Area	Downgradient Plume Area				CPOC Area				
	GW009S	GW012S	GW014S	GW014S (field dup.)	GW147S	GW149S	GW150S	GW252S	GW253I	GW254S
Temperature (degrees C)	19.5	19.7	15.9	15.9	8.5	11.2	11.1	11.0	12.1	10.5
Specific Conductivity (µS/cm)	376	655	375.2	375.2	31.1	265.4	286.9	464.2	310.5	442.4
Dissolved Oxygen (mg/L)	2.37	5.07	2.92	2.92	2.87	1.05	1.31	1.24	1.09	0.82
pH (standard units)	6.40	6.15	6.34	6.34	5.72	6.46	6.50	6.68	6.53	6.69
Oxidation/Reduction Potential (mV)	-73.9	-99.0	-27.6	-27.6	126.9	-68.3	-47.4	-96.2	-82.1	-106.5
Total Organic Carbon (mg/L)	6.51	9.88	3.08	3.00	4.56	5.07	7.19	7.22	5.53	10.03

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

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

TABLE 21: AOC-060 CONCENTRATIONS OF CONSTITUENTS OF CONCERN [1, 2]
March 10, 2020
Boeing Renton Facility, Renton, Washington

Analyte	Current 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	**0.093**	**0.482**	**0.151**	**0.146**	**0.287**	0.0574	0.0525	0.0259	**0.0915**	0.0736
Trichloroethene	0.02	**0.0242**	**0.0505**	**0.0419**	**0.0324**	**1.200**	0.020 U	0.020 U	0.020 U	**0.0212**	0.020 U
Vinyl Chloride	0.26	0.183	**0.603**	0.195	0.233	0.020 U	0.0850	0.0541	0.020 U	0.184	0.0405

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. Current cleanup levels obtained from Table 2 of the Cleanup Action Plan and are based on each individual SWMU or AOC.

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

TABLE 22: AOC-090 GROUNDWATER ELEVATION DATA
March 11, 2020
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	6.12	15.15
GW165I	25 to 35	21.14	11.68	9.46
GW175I	21.2 to 26.1	20.57	7.03	13.54
GW176S	10 to 14.3	20.15	5.88	14.27
GW177I	21.7 to 26	22.51	7.09	15.42
GW178S	11.2 to 15.5	22.73	7.83	14.90
GW179I	21.5 to 26	20.47	5.81	14.66
GW180S	10.5 to 15	20.56	5.85	14.71
GW189S	4 to 14	22.01	5.83	16.18
GW207S	7.3 to 12	21.12	6.45	14.67
GW208S	6.3 to 11	22.45	7.64	14.81

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

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

TABLE 23: AOC-090 CONCENTRATIONS OF PRIMARY GEOCHEMICAL INDICATORS [1]

March 11, 2020

Boeing Renton Facility, Renton, Washington

Parameter	Well ID [2]											
	Source Area	Downgradient Plume Area		Shallow Zone CPOC Area					Intermediate Zone CPOC Area			
	GW189S [3]	GW175I	GW176S	GW178S	GW180S	GW180s (field dup.)	GW207S	GW208S	GW163I	GW165I	GW177I	GW179I
Temperature (degrees C)	10.3	11.2	11.1	10.2	11.1	11.1	10.9	10.0	10.2	10.6	10.7	11.8
Specific Conductivity (µS/cm)	107.6	400.9	472.4	367.4	207.7	207.7	238.4	430.5	321.6	285.1	443.6	380.4
Dissolved Oxygen (mg/L)	1.23	1.64	1.18	4.12	0.92	0.92	1.00	5.32	3.48	2.39	4.08	2.58
pH (standard units)	6.57	6.28	6.27	6.20	6.36	6.36	6.79	6.14	6.24	6.27	6.23	6.35
Oxidation/Reduction Potential (mV)	-40.4	-10.7	-9.2	-57.9	-26.1	-26.1	-39.4	-87.3	-39.5	-30.2	-63.6	-55.4
Total Organic Carbon (mg/L)	1.65	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]
March 11, 2020
Boeing Renton Facility, Renton, Washington

Analyte	Current 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	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U
Benzene	0.8	0.20 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
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	0.20 U	0.20 U	0.25	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	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
Tetrachloroethene	0.05	0.0263	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	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
trans-1,2-Dichloroethene	53.9	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
Trichloroethene	0.08	0.0745	0.020 U	0.020 U	0.021	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	0.13	0.020 U	0.020 U	**0.207**	**0.184**	0.020 U	0.020 U	0.020 U	**0.419**	0.020 U	0.020 U	0.020 U	0.020 U
Total Petroleum Hydrocarbons (µg/L)													
TPH-G (C7-C12)	800	189	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U
TPH-D (C12-C24)	500	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U
TPH-O (C24-C40)	500	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U

Notes:
1. Data qualifiers are as follows:
   U = The analyte was not detected at the reporting limit indicated.
2. **Bolded** values exceed the cleanup levels.
3. S = shallow well; I = intermediate well.
4. Current cleanup levels obtained from Table 2 of the Cleanup Action Plan and are based on each individual SWMU or AOC.
5. GW189S is the replacement well for GW168S.

Abbreviations:
µg/L = micrograms per liter
AOC = area of concern
CPOC = conditional point of compliance
field dup. = field duplicate
SWMU = solid waste management unit
TPH-D = total petroleum hydrocarbons as diesel
TPH-G = total petroleum hydrocarbons as gasoline
TPH-O = total petroleum hydrocarbons as oil

TABLE 25: BUILDING 4-70 GROUNDWATER ELEVATION DATA
March 11, 2020
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	5.31	14.41
GW260S	5 to 15	19.83	5.34	14.49

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

Abbreviations:
bgs = below ground surface
TOC = top of casing

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

March 11, 2020

Boeing Renton Facility, Renton, Washington

Parameter	Well ID [2]	
	CPOC Area	
	GW259S	GW260S
Temperature (degrees C)	11.7	10.4
Specific Conductivity (µS/cm)	211.1	243.5
Dissolved Oxygen (mg/L)	1.76	0.79
pH (standard units)	6.59	6.39
Oxidation/Reduction Potential (mV)	1.3	-7.5
Total Organic Carbon (mg/L)	9.90	10.36

Notes:

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

Abbreviations:

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

TABLE 27: BUILDING 4-70 CONCENTRATIONS OF CONSTITUENTS OF CONCERN [1, 2]
March 11, 2020
Boeing Renton Facility, Renton, Washington

		Current Cleanup Levels [4]	Well ID [3]	
			CPOC Area	
			GW259S	GW260S
Volatile Organic Compounds (µg/L)				
cis-1,2-Dichloroethene		16	0.26	0.2 U
Trichloroethene		0.54	0.37	0.2 U
Vinyl Chloride		0.2	0.2 U	**0.21**

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.
   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[9]	X (CPOC wells)	X (1,3) (all other wells)	NA	GW193S[9]	GW190S[8,9], GW191D[8,9], GW192S[8,9], and GW246S[8,9]	GW185S[8,9], GW195S[8,9], GW196D[8,9], GW197S[8,9], and GW245S[8,9]		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.
8. Monitoring wells were abandoned on 11/25/2019 prior to Apron R construction and will be replaced upon completion of construction.
9. Groundwater monitoring and sampling will be suspended until completion of construction.

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[7]	NA	GW193S[7]	GW190S[6,7], GW191D[6,7], GW192S[6,7], and GW246S[6,7]	GW185S[6,7], GW195S[6,7], GW196D[6,7], GW197S[6,7], and GW245S[6,7]	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).
6. Monitoring wells were abandoned on 11/25/2019 prior to Apron R construction and will be replaced upon completion of construction.
7. Groundwater monitoring and sampling will be suspended until completion of construction.

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 March 2020 | Date/Time: 3/ 9 /2020@ 1340

Sample Number: RGW229S- 200309 | Weather: SUNNY, COLD

Landau Representative: BXM/SRB/JAN

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 6.90 | Time: 1308 | Flow through cell vol. | GW Meter No.(s slope-8

Begin Purge: Date/Time: 3/ 9 /2020 @ 1311 | End Purge: Date/Time: 3/ 9 /2020 @ 1334 | 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		
1314	11.7	232.2	0.33	5.99	111.3		6.92		
1317	11.8	236.2	0.33	6.00	94.1		6.96		
1320	11.8	238.3	0.71	6.04	76.2		6.92		
1323	11.5	239.9	1.37	6.07	57.4				
1326	11.0	237.8	1.82	6.09	48.9				
1329	10.7	235.5	2.06	6.09	45.1				
1332	10.2	232.5	2.37	6.10	39.6				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DEDICATED 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 CLOUDY, WHITE TINT, NO SHEEN, NO ODOR, SOME SOLIDS FLOATING

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	10.2	232.4	2.41	6.10	39.0				
2	10.1	231.9	2.44	6.10	38.8				
3	10.1	231.9	2.46	6.10	38.4				
4	10.1	231.9	2.48	6.10	38.0				
Average:	10.1	232.0	2.45	6.10	38.6	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: BXM | Date: 3.9.20

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly March 2020 | Date/Time: 3/ 9/2020@ 1406

Sample Number: RGW230I- 200309 | Weather: SUNNY

Landau Representative: BXM/SRB/JAN

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft): 6.26 | Time: 1338 | Flow through cell vol. | GW Meter No.(s: 1

Begin Purge: Date/Time: 3/9 /2020 @ 1340 | End Purge: Date/Time: 3/9 /2020 @ 1353 | 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	10.4	269.2	1.13	6.26	-7.7		6.27		
1346	9.9	274.5	1.39	6.25	-16.0		6.27		
1349	9.2	272.8	1.48	6.30	-17.9		6.27		
1352	8.8	270.1	1.48	6.29	-17.0		6.27		
1355									
1358									
1400									

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 CLOUDY, COLORLESS, LOTS OF FINES FLOATING, NO SHEEN, NO ODOR

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	8.9	269.7	1.46	6.29	-16.9				
2	8.8	269.6	1.47	6.29	-16.8				
3	8.8	269.5	1.47	6.28	-15.9				
4	8.8	269.3	1.47	6.29	-16.6				
Average:	8.8	269.5	1.47	6.29	-16.6	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: JAN | Date: 3/9/2020

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly March 2020 | Date/Time: 3/ 9/2020@ 1336

Sample Number: RGW231S- 200309 | Weather: SUNNY

Landau Representative: BXM/SRB/JAN

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 6.08 | Time: 1305 | Flow through cell vol. | GW Meter No.(s 1

Begin Purge: Date/Time: 3/9 /2020 @ 1309 | End Purge: Date/Time: 3/9 /2020 @ 1330 | 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		
1312	10.1	192.4	3.75	6.33	34.5		6.09		
1315	9.7	200.1	3.61	6.28	33.3		6.09		
1318	9.4	213.5	3.14	6.27	31.5		6.09		
1321	9.3	226.9	2.73	6.29	27.9		6.09		
1324	9.3	233.1	2.70	6.32	19.4				
1327	9.3	234.8	2.62	6.33	15.4				
1329	9.3	235.5	2.58	6.34	14.3				

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): LIGHT BROWN, MED-HIGH 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	9.3	235.7	2.56	6.34	14.2				
2	9.3	235.8	2.56	6.34	14.2				
3	9.2	235.9	2.58	6.34	14.0				
4	9.2	236.0	2.55	6.34	13.8				
Average:	9.3	235.9	2.56	6.34	14.1	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: JAN | Date: 3/9/2020

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly March 2020 | Date/Time: 3/ 9 /2020@ 1230

Sample Number: RGW081S- 200309 | Weather: sunny, cold

Landau Representative: BXM/SRB/JAN

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 7.67 | Time: 1147 | Flow through cell vol. | GW Meter No.(s slope -8

Begin Purge: Date/Time: 3/ 9 /2020 @ 1156 | End Purge: Date/Time: 3/ 9 /2020 @ 1219 | 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		
1159	11.4	193.4	1.73	6.45	-8.3		7.64		
1202	11.3	191.9	1.60	6.43	-10.2		7.61		
1205	10.9	187.1	1.18	6.37	1.4		7.61		
1208	10.6	184.0	1.02	6.36	3.7				
1211	10.6	183.7	0.83	6.39	-2.1				
1214	10.7	184.7	0.78	6.41	-11.8				
1217	10.9	186.0	0.84	6.44	-19.1				
1220	11.0	186.8	0.93	6.45	-21.9				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type dedicated 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 sheen, no odor, some 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	10.9	186.9	0.98	6.45	-22.6				
2	11.0	186.8	1.00	6.46	-22.8				
3	11.0	187.1	1.01	6.46	-23.2				
4	10.9	187.0	1.03	6.45	-24.4				
Average:	11.0	187.0	1.01	6.46	-23.3	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: BXM | Date: 3.9.20

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly March 2020 | Date/Time: 3/ 9/2020@ 1111

Sample Number: RGW152S- 200309 | Weather: SUNNY

Landau Representative: BXM/SRB/JAN

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 8.23 | Time: 1039 | Flow through cell vol. | GW Meter No.(s 1

Begin Purge: Date/Time: 3/9 /2020 @ 1042 | End Purge: Date/Time: 3/9 /2020 @ 1056 | 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		
1045	12.7	164.4	3.99	6.24	7.8		8.23		
1048	12.1	163.5	4.16	6.19	8.5		8.23		
1051	11.3	162.5	4.15	6.17	9.2		8.23		
1054	10.7	165.2	4.03	6.16	9.6				
1057									
1100									
1102									

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, MED TURB, SLIGHT ODOR, NS.

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	10.6	165.6	3.93	6.16	9.6				
2	10.7	166.9	3.91	6.15	11.2				
3	10.5	170.1	4.00	6.15	10.9				
4	10.4	170.7	3.98	6.16	9.8				
Average:	10.6	168.3	3.96	6.16	10.4	#DIV/0!			

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

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

Comments:

Signature: JAN | Date: 3/9/2020

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly March 2020 | Date/Time: 3/ 9/2020@ 800

Sample Number: RGWDUP1 200309 | Weather: SUNNY

Landau Representative: BXM/SRB/JAN

WATER LEVEL/WELL/PURGE DATA

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

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

Begin Purge: Date/Time: 3/9 /2020 @ | End Purge: Date/Time: 3/9 /2020 @ | Gallons Purged: 0.25

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

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits								**>/= 1 flow through cell**	
	+/- 3%	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**		
		DUPLICATE TO RGW152S							

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): GRAY, MED TURB, SLIGHT ODOR, NS.

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	10.3	171.2	3.80	6.15	9.9				
2	10.1	173.2	3.60	6.15	9.8				
3	10.1	175.0	3.37	6.16	9.5				
4	10.1	175.5	3.30	6.17	9.0				
Average:	10.2	173.7	3.52	6.16	9.6	#DIV/0!			

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

Duplicate Sample No(s): Duplicate to RGW152S

Comments:

Signature: JAN | Date: 3/9/2020

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly March 2020 | Date/Time: 3/ 9/2020@ 1141

Sample Number: RGW153S- 200309 | Weather: SUNNY

Landau Representative: BXM/SRB/JAN

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft): 8.54 | Time: 1116 | Flow through cell vol. | GW Meter No.(s: 1

Begin Purge: Date/Time: 3/9 /2020 @ 1117 | End Purge: Date/Time: 3/9 /2020 @ 1137 | 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		
1120	11.6	132.1	4.29	6.23	11.5		8.54		
1123	11.0	137.5	4.19	6.18	8.6		8.54		
1126	10.0	155.6	4.07	6.18	7.8		8.54		
1129	9.2	176.7	3.68	6.22	5.4				
1132	8.6	188.4	3.05	6.27	-3.7				
1135	8.2	191.4	2.64	6.31	-8.5				
1137	8.1	191.5	2.54	6.32	-10.1				

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.): LIGHT TAN, 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	8.0	191.2	2.52	6.33	-10.4				
2	8.0	191.1	2.50	6.33	-10.6				
3	8.0	191.1	2.48	6.33	-10.8				
4	8.0	191.1	2.45	6.33	10.9				
Average:	8.0	191.1	2.49	6.33	-5.2	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: JAN | Date: 3/9/2020

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly March 2020 | Date/Time: 3/ 9/2020@ 1036

Sample Number: RGW172S- 200309 | Weather: SUNNY

Landau Representative: BXM/SRB/JAN

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft): 8.31 | Time: 1009 | Flow through cell vol. | GW Meter No.(s: 1

Begin Purge: Date/Time: 3/9 /2020 @ 1011 | End Purge: Date/Time: 3/9 /2020 @ 1025 | 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	
1014	10.5	226.9	1.59	6.52	11.3		8.31		
1017	10.1	243.7	1.69	6.50	6.2		8.31		
1020	9.7	252.3	1.59	6.49	4.1		8.31		
1023	9.4	249.8	1.68	6.48	0.8				
1026									
1029									
1031									

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): DARK YELLOW-ORANGE, 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	9.2	248.1	1.73	6.47	0.1				
2	9.3	247.9	1.73	6.47	-0.1				
3	9.3	247.9	1.73	6.46	-0.3				
4	9.3	247.3	1.74	6.46	-0.4				
Average:	9.3	247.8	1.73	6.47	-0.2	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: JAN | Date: 3/9/2020

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly March 2020 | Date/Time: 3/ 9 /2020@ 1055

Sample Number: RGW173S- 200309 | Weather: suunny, cold

Landau Representative: BXM/SRB/JAN

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft): 8.45 | Time: 1021 | Flow through cell vol. | GW Meter No.(s slope -8

Begin Purge: Date/Time: 3/ 9 /2020 @ 1024 | End Purge: Date/Time: 3/ 9 /2020 @ 1047 | 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		
1027	9.1	351.3	0.93	6.61	-96.4		8.45		
1030	7.7	342.5	0.61	6.63	-99.6		8.45		
1033	6.9	331.8	0.52	6.64	-95.6		8.45		
1036	6.7	327.4	0.49	6.64	-92.9				
1039	6.5	323.0	0.50	6.65	-89.4				
1042	6.3	320.7	0.66	6.65	-91.8				
1045	6.3	319.5	0.78	6.64	-91.7				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type dedicated 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 to slightly cloudy, colorless, no sheen, no odor, some light colored solids floating

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	6.3	319.5	0.79	6.64	-92.2				
2	6.3	319.2	0.82	6.64	-92.3				
3	6.3	319.1	0.85	6.64	-91.2				
4	6.3	319.1	0.88	6.64	-89.8				
Average:	6.3	319.2	0.84	6.64	-91.4	#DIV/0!			

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

Duplicate Sample No(s): MSMSD Location

Comments:

Signature: BXM | Date: 3.9.20

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly March 2020 | Date/Time: 3/ 9/2020@ 1221

Sample Number: RGW226S- 200309 | Weather: SUNNY

Landau Representative: BXM/SRB/JAN

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft): 8.22 | Time: 1153 | Flow through cell vol. | GW Meter No.(s: 1

Begin Purge: Date/Time: 3/9 /2020 @ 1155 | End Purge: Date/Time: 3/9 /2020 @ 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	
	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft	through cell	
1158	12.0	197.5	2.35	6.38	-5.2		8.22		
1201	11.7	207.3	2.37	6.37	-12.2		8.22		
1204	11.5	223.9	2.41	6.36	-15.4		8.22		
1207	11.2	243.3	2.27	6.37	-16.6				
1210	11.0	255.9	2.16	6.38	-17.4				
1213	10.9	258.0	1.96	6.42	-22.8				
1215	10.9	256.9	1.86	6.44	-24.8				

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): SLIGHT TINT, LOW TURB, SLIGHT ODOR, NO SHEEN.

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	10.9	256.7	1.85	6.44	-25.4				
2	10.9	256.7	1.84	6.44	-25.8				
3	10.9	256.6	1.83	6.44	-26.4				
4	11.0	256.2	1.82	6.45	-26.7				
Average:	10.9	256.6	1.84	6.44	-26.1	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: JAN | Date: 3/9/2020

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly March 2020 | Date/Time: 3/ 09 /2020@ 930

Sample Number: RGW232S- 200309 | Weather: FOGGY, COLD

Landau Representative: BXM/SRB/JAN

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 6.35 | Time: 901 | Flow through cell vol. | GW Meter No.(s SLOPE-8

Begin Purge: Date/Time: 3/ 9 /2020 @ 903 | End Purge: Date/Time: 3/ 9 /2020 @ 926 | Gallons Purged: < 1

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

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
906	8.5	324.9	1.47	6.14	11.9		6.79		CYCLING 1/MIN F
909	8.0	319.3	1.71	6.14	11.7		6.82		
912	6.4	301.6	2.90	6.16	14.9		6.84		
915	5.9	294.7	3.48	6.17	19.1		6.87		
918	5.7	291.3	3.84	6.17	21.6		6.91		
921	5.5	287.6	4.18	6.17	24.7		6.96		
924	5.5	286.7	4.26	6.17	26.2		6.99		

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type dedicated baldder

Made of: ☐ Stainless Steel ☐ PVC ☐ 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, COLORESS, NO SHEEN, NO ODOR, SOME LIGHT COLORED SOLIDS FLOATING

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	5.6	286.4	4.29	6.16	27.1				
2	5.6	286.1	4.31	6.15	27.7				
3	5.6	286.2	4.32	6.15	27.9				
4	5.6	286.3	4.34	6.15	28.0				
Average:	5.6	286.3	4.32	6.15	27.7	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: BXM | Date: 3.9.20

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly March 2020 | Date/Time: 3/ 9 /2020@ 845

Sample Number: RGW233I- 200309 | Weather: SUNNY, COLD

Landau Representative: BXM/SRB/JAN

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 6.1 | Time: 806 | Flow through cell vol. | GW Meter No.(s SLOPE -8

Begin Purge: Date/Time: 3/ 09 /2020 @ 817 | End Purge: Date/Time: 3/ 09 /2020 @ 840 | 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		
820	5.3	152.2	1.12	6.46	8.6		6.09		
823	6.2	160.0	1.06	6.42	-7.5		6.09		
826	5.9	159.9	1.03	6.44	-11.1		6.09		
829	5.7	158.1	0.92	6.46	-13.3				
832	5.7	156.7	0.91	6.46	-14.3				
835	5.6	155.8	0.94	6.46	-13.4				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DEDICATED 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 ODOR, NO SHEEN

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	5.6	155.5	0.92	6.46	-13.4				
2	5.6	155.7	0.91	6.46	-13.1				
3	5.6	155.8	0.92	6.46	-13.0				
4	5.6	155.1	0.92	6.46	-13.0				
Average:	5.6	155.5	0.92	6.46	-13.1	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: BXM | Date: 3.09.20

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly March 2020 | Date/Time: 3/ 9/2020@ 1001

Sample Number: RGW234S- 200309 | Weather: PARTLY CLOUDY

Landau Representative: BXM/SRB/JAN

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 6.73 Time: 930 Flow through cell vol. GW Meter No.(s 1

Begin Purge: Date/Time: 3/9 /2020 @ 932 End Purge: Date/Time: 3/9 /2020 @ 951 Gallons Purged: 0.25

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

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
	Purge Goals: Stablization of Parameters for three consecutive readings within the following limits							>/= 1 flow through cell	
	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft		
935	9.3	233.3	3.79	6.41	26.6		6.73		
938	8.4	222.1	3.56	6.39	21.8		6.73		
941	7.6	205.1	3.47	6.39	18.8		6.73		
944	6.8	192.1	3.15	6.38	18.4				
947	6.2	182.9	3.05	6.38	15.5				
950	5.5	174.9	3.19	6.36	16.0				
952									

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.): LIGHT BROWN/TAN, 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	5.4	173.7	3.18	6.36	16.1				
2	5.3	172.1	3.20	6.36	15.9				
3	5.3	171.2	3.20	6.36	15.9				
4	5.3	170.4	3.20	6.36	15.6				
Average:	5.3	171.9	3.20	6.36	15.9	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: JAN Date: 3/9/2020

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly March 2020 | Date/Time: 3/ 9/2020@ 921

Sample Number: RGW235I- 200309 | Weather: CLOUDY

Landau Representative: BXM/SRB/JAN

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 6.42 | Time: 850 | Flow through cell vol. | GW Meter No.(s 1

Begin Purge: Date/Time: 3/9 /2020 @ 854 | End Purge: Date/Time: 3/9 /2020 @ 915 | 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**	
857	8.1	122.3	3.51	6.85	12.1		6.42		
900	7.3	119.9	3.41	6.75	16.0		6.42		
903	6.6	117.0	3.45	6.69	19.2		6.42		
906	5.9	115.5	3.63	6.56	23.2				
909	4.9	114.9	3.85	6.45	27.8				
912	4.3	114.3	3.97	6.36	31.5				
914	4.1	114.7	3.87	6.31	34.1				

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.): 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	4.2	114.6	3.80	6.29	35.7				
2	3.9	114.7	3.92	6.25	37.7				
3	4.0	114.7	3.89	6.21	40.2				
4	4.0	114.7	3.84	6.16	42.7				
Average:	4.0	114.7	3.86	6.23	39.1	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: JAN | Date: 3/9/2020

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly March 2020 | Date/Time: 3/ 9/2020@ 846

Sample Number: RGW236S- 200309 | Weather: PARTLY CLOUDY

Landau Representative: BXM/SRB/JAN

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 6.10 | Time: 814 | Flow through cell vol. | GW Meter No.(s 1

Begin Purge: Date/Time: 3/9 /2020 @ 817 | End Purge: Date/Time: 3/9 /2020 @ 838 | 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**	
820	8.1	281.7	8.75	6.07	32.3		6.10		
823	6.9	279.7	8.50	6.04	36.3		6.10		
826	6.4	271.4	8.09	6.05	39.4		6.10		
829	5.3	258.3	7.52	6.08	42.4				
832	4.8	250.3	6.83	6.10	43.9				
835	4.1	239.8	6.56	6.11	44.8				
837	3.6	235.9	6.47	6.12	44.7				

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.): DARK ORANGE, MED-HIGH TURB, SLIGHT ODOR, NO SHEEN.

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	3.6	235.7	6.40	6.12	44.8				
2	3.6	235.6	6.31	6.12	44.5				
3	3.4	233.3	6.37	6.12	44.6				
4	3.5	233.2	6.38	6.12	44.8				
Average:	3.5	234.5	6.37	6.12	44.7	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: JAN | Date: 3/9/2020

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly March 2020 | Date/Time: 3/11 /2020@ 1126

Sample Number: RGW031S- 200311 | Weather: PARTLY CLOUDY

Landau Representative: BXM/SRB/JAN

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 5.15 | Time: 1056 | Flow through cell vol. | GW Meter No.(s 1

Begin Purge: Date/Time: 3/11 /2020 @ 1100 | End Purge: Date/Time: 3/11 /2020 @ 1121 | 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	
1103	13.7	345.3	0.73	6.31	8.6		5.16		
1106	13.6	353.3	0.82	6.31	-0.3		5.16		
1109	13.4	361.1	0.92	6.31	-6.5		5.16		
1112	13.3	368.2	0.96	6.33	-13.3				
1115	13.3	370.7	1.08	6.34	-17.5				
1118	13.2	372.9	1.06	6.36	-20.8				
1120	13.1	373.9	1.13	6.36	-22.5				

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): NO COLOR, LOW TURB, SLIGHT PETROLEUM ODOR, NO SHEEN.

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	13.1	374.2	1.11	6.36	-22.7				
2	13.1	374.0	1.10	6.37	-22.9				
3	13.1	374.1	1.10	6.37	-23.1				
4	13.1	374.1	1.09	6.37	-23.4				
Average:	13.1	374.1	1.10	6.37	-23.0	#DIV/0!			

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

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

Comments:

Signature: JAN | Date: 3/11/2020

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly March 2020 | Date/Time: 3/11 /2020@ 800

Sample Number: RGWDUP2 200311 | Weather: PARTLY CLOUDY

Landau Representative: BXM/SRB/JAN

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 1

Begin Purge: Date/Time: 3/11 /2020 @ | End Purge: Date/Time: 3/11 /2020 @ | Gallons Purged:

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

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

DUPLICATE TO RGW031S

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): NO COLOR, LOW TURB, SLIGHT PETROLEUM ODOR, NO SHEEN.

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	13.0	374.3	1.10	6.37	-23.5				
2	13.0	374.2	1.08	6.37	-23.9				
3	13.0	374.3	1.08	6.37	-24.1				
4	13.0	374.4	1.07	6.37	-24.3				
Average:	13.0	374.3	1.08	6.37	-24.0	#DIV/0!			

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

Duplicate Sample No(s): Duplicate to RGW031S

Comments:

Signature: JAN | Date: 3/11/2020

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly March 2020 | Date/Time: 3/11 /2020@ 936

Sample Number: RGW033S- 200311 | Weather: SLIGHT RAIN

Landau Representative: BXM/SRB/JAN

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 5.28 | Time: 910 | Flow through cell vol. | GW Meter No.(s 1

Begin Purge: Date/Time: 3/11 /2020 @ 911 | End Purge: Date/Time: 3/11 /2020 @ 925 | 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	
914	11.9	351.1	1.01	6.21	-0.8		5.28		
917	11.4	341.3	1.57	6.22	-7.3		5.28		
920	11.0	332.8	1.53	6.22	-10.8		5.28		
923	10.8	321.1	1.48	6.22	-15.5				

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.): 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	10.7	323.4	1.53	6.22	-15.9				
2	10.7	322.8	1.54	6.22	-16.4				
3	10.7	322.7	1.63	6.22	-16.6				
4	10.7	322.4	1.60	6.22	-16.8				
Average:	10.7	322.8	1.58	6.22	-16.4	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: JAN | Date: 3/11/2020

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly March 2020 | Date/Time: 3/11 /2020@ 906

Sample Number: RGW034S- 200311 | Weather: CLOUDY

Landau Representative: BXM/SRB/JAN

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 5.36 | Time: 835 | Flow through cell vol. | GW Meter No.(s 1

Begin Purge: Date/Time: 3/11 /2020 @ 838 | End Purge: Date/Time: 3/11 /2020 @ 859 | 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		
841	10.8	255.9	0.87	6.18	22.9		5.37		
844	10.3	257.0	0.92	6.25	10.8		5.37		
847	9.9	256.4	1.07	6.26	4.1		5.37		
850	9.5	255.8	1.47	6.26	-2.1				
853	9.2	255.3	1.68	6.27	-7.5				
856	9.0	254.8	1.72	6.27	-11.1				
858	9.0	254.4	1.55	6.27	-13.9				

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.): 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	9.0	254.4	1.53	6.27	-14.2				
2	9.0	254.3	1.53	6.27	-14.8				
3	8.9	254.4	1.55	6.27	-15.0				
4	8.9	254.4	1.62	6.27	-15.2				
Average:	9.0	254.4	1.56	6.27	-14.8	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: JAN | Date: 3/11/2020

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly March 2020 | Date/Time: 3/10 /2020@ 1606

Sample Number: RGW038S- 200310 | Weather: CLOUDY

Landau Representative: BXM/SRB/JAN

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft): 5.44 | Time: 1538 | Flow through cell vol. | GW Meter No.(s: 1

Begin Purge: Date/Time: 3/ 10/2020 @ 1540 | End Purge: Date/Time: 3/ 10/2020 @ 1556 | 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		
1543	12.3	209.4	0.58	6.23	5.8		5.45		
1546	12.0	217.2	0.61	6.23	3.1		5.45		
1549	11.7	223.0	0.67	6.24	-1.9		5.45		
1552	11.5	226.1	0.74	6.26	-7.1				
1555	11.3	228.0	0.73	6.28	-11.0				
1558									
1600									

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.): NO COLOR, LOW TURB, SLIGHT ODOR, NO SHEEN.

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	11.3	228.3	0.75	6.29	-13.2				
2	11.3	228.5	0.75	6.29	-13.6				
3	11.3	228.8	0.74	6.29	-13.9				
4	11.3	228.8	0.77	6.29	-14.4				
Average:	11.3	228.6	0.75	6.29	-13.8	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: JAN | Date: 3/10/2020

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly March 2020 | Date/Time: 3/11 /2020@ 826

Sample Number: RGW177I- 200311 | Weather: RAIN

Landau Representative: BXM/SRB/JAN

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 4.98 Time: 757 Flow through cell vol. GW Meter No.(s 1

Begin Purge: Date/Time: 3/ 11/2020 (` 800 End Purge: Date/Time: 3/11 /2020 @ 816 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	
803	12.0	190.3	2.74	6.38	8.8		5.01		
806	10.9	186.3	2.47	5.94	23.1		5.01		
809	10.4	184.6	1.98	5.82	28.4		5.01		
912	9.7	181.9	2.01	5.80	30.5				
815	9.1	179.4	2.03	5.80	33.6				
818									
820									

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): SLIGHT TAN, 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	9.1	179.5	2.00	5.80	34.3				
2	9.1	179.8	2.02	5.80	33.8				
3	9.1	179.2	2.05	5.80	34.4				
4	9.1	178.8	2.03	5.80	34.8				
Average:	9.1	179.3	2.03	5.80	34.3	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: JAN Date: 3/11/2020

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly March 2020 | Date/Time: 3/10 /2020@ 936

Sample Number: RGW143S- 200310 | Weather: CLOUDY

Landau Representative: BXM/SRB/JAN

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 5.63 | Time: 909 | Flow through cell vol. | GW Meter No.(s 1

Begin Purge: Date/Time: 3/ 10/2020 @ 911 | End Purge: Date/Time: 3/ 10/2020 @ 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		
914	10.6	237.8	0.69	6.35	-10.5		5.64		
917	9.7	239.3	1.24	6.35	-16.2		5.64		
920	8.8	238.8	1.19	6.33	-19.9		5.64		
923	8.2	239.4	1.31	6.34	-22.8		5.64		
926	7.6	239.5	1.37	6.33	-25.3				
929	7.3	239.1	1.44	6.33	-26.7				
931	7.1	238.8	1.51	6.33	-27.4				

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.): 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	7.0	238.8	1.53	6.33	-27.6				
2	7.0	238.7	1.51	6.33	-27.7				
3	7.0	238.7	1.50	6.34	-27.9				
4	7.0	238.7	1.51	6.34	-27.9				
Average:	7.0	238.7	1.51	6.34	-27.8	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: JAN | Date: 3/10/2020

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly March 2020 | Date/Time: 3/10 /2020@ 1501

Sample Number: RGW209S- 200310 | Weather: CLOUDY

Landau Representative: BXM/SRB/JAN

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 5.18 Time: 1435 Flow through cell vol. GW Meter No.(s 1

Begin Purge: Date/Time: 3/ 10/2020 @ 1437 End Purge: Date/Time: 3/ 10/2020 @ 1458 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	
1440	12.7	328.1	0.62	6.33	18.5		5.18		
1443	12.3	329.4	0.59	6.34	4.5		5.18		
1446	11.9	328.9	0.64	6.35	-7.4		5.18		
1449	11.6	327.8	0.72	6.36	-14.1				
1452	11.4	327.0	0.92	6.36	-19.0				
1455	11.2	326.3	0.97	6.37	-22.5				
1457	11.2	326.1	0.99	6.37	-23.6				

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.): 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	11.2	326.0	0.94	6.37	-23.9				
2	11.2	326.0	0.99	6.37	-24.1				
3	11.2	326.0	0.93	6.37	-24.3				
4	11.1	326.0	0.98	6.37	-24.5				
Average:	11.2	326.0	0.96	6.37	-24.2	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: JAN Date: 3/10/2020

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly March 2020 | Date/Time: 3/11 /2020@ 1046

Sample Number: RGW210S- 200311 | Weather: PARTLY CLOUDY

Landau Representative: BXM/SRB/JAN

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 4.85 | Time: 1017 | Flow through cell vol. | GW Meter No.(s 1

Begin Purge: Date/Time: 3/11 /2020 @ 1019 | End Purge: Date/Time: 3/11 /2020 @ 1029 | 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		
1022	10.8	262.8	4.10	6.53	21.4		4.94		
1025	10.7	261.2	4.05	6.52	20.1		4.94		
1028	10.8	260.9	3.91	6.51	19.3		4.94		
1031									
1034									
1037									
1039									

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.): BROWN, MED-HIGH TURB, NO/NS, LOTS OF 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	10.8	260.9	3.89	6.51	18.9				
2	10.8	260.8	3.88	6.51	18.8				
3	10.8	260.8	3.87	6.51	18.7				
4	10.8	260.8	3.86	6.51	18.5				
Average:	10.8	260.8	3.88	6.51	18.7	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: JAN | Date: 3/11/2020

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly March 2020 | Date/Time: 3/10 /2020@ 1216

Sample Number: RGW237S- 200310 | Weather: CLOUDY

Landau Representative: BXM/SRB/JAN

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 4.71 | Time: 1148 | Flow through cell vol. | GW Meter No.(s 1

Begin Purge: Date/Time: 3/ 10/2020 @ 1151 | End Purge: Date/Time: 3/ 10/2020 @ 1212 | 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	
1154	10.3	172.6	3.63	6.45	18.0		4.72		
1157	9.9	177.9	2.80	6.33	21.6		4.72		
1200	9.9	194.4	2.25	6.32	21.1		4.72		
1203	10.0	204.7	1.69	6.36	13.7		4.72		
1206	10.2	194.2	1.22	6.43	3.6				
1209	10.2	186.4	0.99	6.47	-1.6				
1211	10.3	182.0	0.95	6.47	-4.6				

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.): 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	10.3	180.2	0.90	6.48	-5.5				
2	10.3	179.2	0.96	6.48	-6.5				
3	10.3	178.2	0.95	6.48	-6.8				
4	10.3	177.9	0.93	6.48	-7.1				
Average:	10.3	178.9	0.94	6.48	-6.5	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: JAN | Date: 3/10/2020

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly March 2020 | Date/Time: 3/10 /2020@ 1126

Sample Number: RGW238I- 200310 | Weather: CLOUDY

Landau Representative: BXM/SRB/JAN

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft): 4.81 | Time: 1049 | Flow through cell vol. | GW Meter No.(s: 1

Begin Purge: Date/Time: 3/ 10/2020 @ 1052 | End Purge: Date/Time: 3/ 10/2020 @ 1113 | 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		
1055	10.9	321.1	0.64	6.30	3.7		4.82		
1058	10.2	332.8	0.76	6.30	-5.3		4.82		
1101	9.7	347.7	0.75	6.30	-13.1		4.82		
1104	9.1	371.6	0.93	6.32	-21.0				
1107	9.0	373.7	0.98	6.33	-26.1				
1110	8.9	370.5	0.98	6.34	-29.2				
1112	8.8	366.7	1.10	6.35	-30.8				

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.): LIGHT ORANGE, LOW TURB, SLIGHT ODOR, NO SHEEN.

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	8.8	366.2	1.18	6.35	-31.0				
2	8.8	366.0	1.43	6.35	-31.2				
3	8.8	365.2	1.13	6.36	-31.4				
4	8.8	364.7	1.15	6.36	-31.6				
Average:	8.8	365.5	1.22	6.36	-31.3	#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) (Silica	
	VOC (Boeing short list)	
	Methane Ethane Ethene Acetylene	
	others	

Duplicate Sample No(s): MSMSD Location

Comments:

Signature: JAN | Date: 3/10/2020

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly March 2020 | Date/Time: 3/10 /2020@ 1036

Sample Number: RGW239I- 200310 | Weather: CLOUDY

Landau Representative: BXM/SRB/JAN

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 5.52 Time: 1008 Flow through cell vol. GW Meter No.(s 1

Begin Purge: Date/Time: 3/ 10/2020 @ 1011 End Purge: Date/Time: 3/ 10/2020 @ 1027 Gallons Purged: 0.25

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

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
	Purge Goals: Stablization of Parameters for three consecutive readings within the following limits							>/= 1 flow	
	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft	through cell	
1014	10.4	272.5	0.83	6.33	0.1		5.53		
1017	9.4	274.3	1.02	6.31	-9.5		5.53		
1020	8.4	272.4	1.16	6.30	-16.1		5.53		
1023	8.0	270.1	1.22	6.30	-19.5				
1026	7.6	267.0	1.26	6.30	-22.9				
1029									
1031									

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.): 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	7.5	266.4	1.27	6.30	-23.3				
2	7.5	266.2	1.28	6.30	-23.5				
3	7.5	265.9	1.29	6.30	-23.7				
4	7.5	265.8	1.30	6.30	-24.0				
Average:	7.5	266.1	1.29	6.30	-23.6	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: JAN Date: 3/10/2020

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly March 2020 | Date/Time: 3/10 /2020@ 1006

Sample Number: RGW240D· 200310 | Weather: CLOUDY

Landau Representative: BXM/SRB/JAN

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 6.29 | Time: 924 | Flow through cell vol. | GW Meter No.(s 1

Begin Purge: Date/Time: 3/ 10/2020 @ 942 | End Purge: Date/Time: 3/ 10/2020 @ 1001 | 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**	
945	9.7	307.2	0.97	6.44	-13.1		5.89		
948	8.9	304.5	1.07	6.41	-18.3		5.85		
951	8.3	300.8	1.15	6.36	-21.2		5.79		
954	7.7	295.7	1.24	6.33	-22.5		5.76		
957	7.2	289.2	1.30	6.32	-23.8		5.73		
1000	6.9	284.0	1.34	6.32	-24.7				

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, 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	6.9	282.5	1.34	6.32	-24.9				
2	6.9	282.2	1.39	6.32	-25.0				
3	6.8	281.8	1.37	6.32	-25.0				
4	6.8	281.4	1.37	6.32	-25.1				
Average:	6.9	282.0	1.37	6.32	-25.0	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: JAN | Date: 3/10/2020

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly March 2020 | Date/Time: 3/10 /2020@ 831

Sample Number: RGW-241S 200310 | Weather: CLOUDY

Landau Representative: BXM/SRB/JAN

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 6.11 | Time: 805 | Flow through cell vol. | GW Meter No.(s 1

Begin Purge: Date/Time: 3/ 10/2020 @ 808 | End Purge: Date/Time: 3/ 10/2020 @ 821 | 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	
811	10.3	279.9	1.27	6.09	3.6		6.12		
814	9.2	273.2	1.15	5.99	2.0		6.12		
817	8.2	266.1	1.16	5.96	2.7		6.12		
820	7.4	260.7	1.23	5.95	1.6				
823									
826									
828									

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.): 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	7.2	259.3	1.33	5.96	2.0				
2	7.2	258.8	1.34	5.95	2.1				
3	7.2	258.6	1.33	5.95	1.4				
4	7.1	258.7	1.34	5.95	1.3				
Average:	7.2	258.9	1.34	5.95	1.7	#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) (Silica
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):

Comments:

Signature: JAN | Date: 3/10/2020

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly March 2020 | Date/Time: 3/10 /2020@ 856

Sample Number: RGW-242I- 200310 | Weather: CLOUDY

Landau Representative: BXM/SRB/JAN

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 6.23 Time: 818 Flow through cell vol. GW Meter No.(s 1

Begin Purge: Date/Time: 3/ 10/2020 @ 830 End Purge: Date/Time: 3/ 10/2020 @ 851 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**	
833	9.1	270.5	1.63	5.98	6.4		6.24		
836	8.3	294.0	1.96	5.98	5.3		6.24		
839	7.5	295.6	1.88	5.95	1.6		6.24		
842	6.9	291.6	1.84	5.96	-2.2				
845	6.7	288.2	1.72	5.93	-4.3				
848	6.5	285.3	1.73	5.93	-6.9				
850	6.3	282.1	1.94	5.93	-8.6				

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): 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	6.3	281.7	1.88	5.93	-8.7				
2	6.3	281.4	1.87	5.93	-8.9				
3	6.3	281.0	1.86	5.92	-9.3				
4	6.3	280.1	1.88	5.93	-9.4				
Average:	6.3	281.1	1.87	5.93	-9.1	#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) (Silica		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):

Comments:

Signature: JAN Date: 3/10/2020

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly March 2020 | Date/Time: 3/10 /2020@ 1536

Sample Number: RGW-243I- 200310 | Weather: CLOUDY

Landau Representative: BXM/SRB/JAN

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 5.22 | Time: 1511 | Flow through cell vol. | GW Meter No.(s 1

Begin Purge: Date/Time: 3/ 10/2020 @ 1512 | End Purge: Date/Time: 3/ 10/2020 @ 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		
1515	12.8	333.9	0.55	6.33	-4.0		5.23		
1518	12.3	325.3	0.79	6.32	-11.3		5.23		
1521	12.0	316.5	0.97	6.30	-16.1		5.23		
1524	11.8	309.4	0.98	6.29	-17.9				
1527	11.5	303.9	0.99	6.28	-19.1				
1530									
1532									

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.): 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	11.4	303.1	0.99	6.28	-19.2				
2	11.4	302.6	1.00	6.28	-19.3				
3	11.4	302.2	1.01	6.28	-19.4				
4	11.4	301.8	1.00	6.28	-19.4				
Average:	11.4	302.4	1.00	6.28	-19.3	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: JAN | Date:

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly March 2020 | Date/Time: 3/11 /2020@ 1206

Sample Number: RGW-244S 200311 | Weather: CLOUDY

Landau Representative: BXM/SRB/JAN

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 5.18 | Time: 1137 | Flow through cell vol. | GW Meter No.(s 1

Begin Purge: Date/Time: 3/11 /2020 @ 1139 | End Purge: Date/Time: 3/11 /2020 @ 1200 | Gallons Purged: 0.25

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

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
	Purge Goals: Stablization of Parameters for three consecutive readings within the following limits							>/= 1 flow	
	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft	through cell	
1142	12.7	315.4	0.90	6.26	15.1		5.24		
1145	12.3	320.1	0.89	6.23	11.1		5.26		
1148	11.9	321.5	1.09	6.22	7.2		5.27		
1151	11.5	321.4	1.20	6.22	4.5		5.27		
1154	11.1	320.5	1.25	6.22	1.5		5.27		
1157	10.9	319.4	1.39	6.22	-1.6				
1159	10.9	319.4	1.47	6.23	-2.8				

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.): 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	10.9	319.4	1.44	6.23	-3.1				
2	11.0	319.5	1.42	6.23	-3.3				
3	11.0	319.5	1.40	6.23	-3.5				
4	11.0	319.5	1.40	6.23	-3.7				
Average:	11.0	319.5	1.42	6.23	-3.4	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: JAN | Date: 3/11/2020

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly March 2020 | Date/Time: 3/ 12/2020@ 901

Sample Number: RGW193S- 200312 | Weather: CLOUDY

Landau Representative: BXM/SRB/JAN

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 4.55 Time: 830 Flow through cell vol. GW Meter No.(s 1

Begin Purge: Date/Time: 3/ 12/2020 @ 832 End Purge: Date/Time: 3/ 12/2020 @ 853 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		
835	9.6	825.0	2.61	6.15	34.9		4.58		
838	8.9	855.0	2.23	6.16	31.3		4.57		
841	8.6	878.0	3.11	6.18	26.2		4.57		
844	8.4	891.0	2.83	6.20	20.8		4.57		
847	8.2	899.0	2.75	6.23	15.6				
850	8.1	903.0	2.58	6.24	12.3				
852	8.1	905.0	2.56	6.25	9.4				

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.): NO COLOR, LOW TURB, SLIGHT ODOR, NO SHEEN.

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	8.1	906.0	2.63	6.25	9.0				
2	8.1	906.0	2.54	6.25	8.6				
3	8.1	907.0	2.52	6.25	8.2				
4	8.1	906.0	2.57	6.26	7.8				
Average:	8.1	906.3	2.57	6.25	8.4	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: JAN Date: 3/12/2020

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly March 2020 | Date/Time: 3/ 12 /2020@ 950

Sample Number: RGW188S- 200312 | Weather: OVERCAST, RAIN, COLD

Landau Representative: BXM/SRB/JAN

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft): 3.95 | Time: 919 | Flow through cell vol. | GW Meter No.(s SLOPE-8

Begin Purge: Date/Time: 3/ 12 /2020 @ 921 | End Purge: Date/Time: 3/ 12 /2020 @ 944 | Gallons Purged: <1

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

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
924	10.4	387.9	1.01	5.95	14.1		3.97		
927	9.5	386.1	3.50	5.99	-0.2		3.97		
930	9.2	383.5	4.47	6.02	-6.7		3.97		
933	8.9	379.7	5.25	6.07	-14.1				
936	8.6	377.1	5.66	6.09	-20.2				
939	8.4	375.3	5.85	6.11	-25.4				
942	8.2	373.3	5.91	6.14	-30.4				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DEDICATED 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, COLORESS, NO ODOR, NO SHEEN, LIGHT FINES FLOATING IN SAMPLE

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	8.1	372.7	5.91	6.14	-31.0				
2	8.1	372.6	5.90	6.14	-31.5				
3	8.1	372.3	5.90	6.15	-32.1				
4	8.1	372.2	5.87	6.15	-32.6				
Average:	8.1	372.5	5.90	6.15	-31.8	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: BXM | Date: 3.12.2020

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly March 2020 | Date/Time: 3/ 12/2020@ 936

Sample Number: RGW247S- 200312 | Weather: SLIGHT RAIN

Landau Representative: BXM/SRB/JAN

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 4.13 | Time: 906 | Flow through cell vol. | GW Meter No.(s 1

Begin Purge: Date/Time: 3/ 12/2020 @ 908 | End Purge: Date/Time: 3/ 12/2020 @ 924 | 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	
911	10.2	339.1	1.27	6.46	16.7		4.17		
914	8.9	330.6	1.51	6.36	19.0		4.17		
917	7.9	321.3	1.83	6.31	21.0		4.17		
920	7.5	316.7	1.76	6.29	21.7				
923	7.2	313.4	1.75	6.29	21.3				
926									
928									

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.): NO COLOR, LOW TURB, NO/NS, SLIGHT PARTICLES.

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	7.2	313.1	1.74	6.28	21.2				
2	7.2	312.9	1.72	6.28	21.2				
3	7.2	312.8	1.72	6.28	21.2				
4	7.2	312.7	1.74	6.28	21.1				
Average:	7.2	312.9	1.73	6.28	21.2	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: JAN | Date: 3/12/2020

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly March 2020 | Date/Time: 3/ 12/2020@ 1001

Sample Number: RGW248I- 200312 | Weather: SLIGHT RAIN

Landau Representative: BXM/SRB/JAN

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 3.94 | Time: 933 | Flow through cell vol. | GW Meter No.(s 1

Begin Purge: Date/Time: 3/ 12/2020 @ 935 | End Purge: Date/Time: 3/ 12/2020 @ 955 | Gallons Purged: 0.25

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

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
	Purge Goals: Stablization of Parameters for three consecutive readings within the following limits							>/= 1 flow	
	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft	through cell	
938	10.7	413.5	1.15	6.34	27.4		3.96		
941	9.8	411.8	1.38	6.34	24.2		3.96		
944	8.8	403.8	1.48	6.33	21.3		3.96		
947	8.0	394.7	2.12	6.33	19.1				
950	7.6	386.3	1.67	6.33	16.3				
953	7.4	382.7	1.76	6.33	13.7				
955	7.4	380.7	1.79	6.33	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.): 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	7.4	380.5	1.77	6.33	12.0				
2	7.3	380.4	1.78	6.33	11.8				
3	7.4	380.2	1.80	6.33	11.6				
4	7.4	380.1	1.77	6.33	11.4				
Average:	7.4	380.3	1.78	6.33	11.7	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: JAN | Date: 3/12/2020

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly March 2020 | Date/Time: 3/ 12 /2020@ 905

Sample Number: RGW249S- 200312 | Weather: PARTLY CLOUDY, COLD

Landau Representative: BXM/SRB/JAN

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft): 3.89 | Time: 839 | Flow through cell vol. | GW Meter No.(s SLOPE-8

Begin Purge: Date/Time: 3/ 12 /2020 @ 840 | End Purge: Date/Time: 3/ 12 /2020 @ 903 | Gallons Purged: <1

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

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
843	9.5	348.3	0.54	6.20	-1.5		3.89		
846	8.6	320.4	1.83	6.20	-25.0		3.89		
849	8.0	305.9	3.50	6.16	-31.2		3.89		
852	7.8	297.5	4.18	6.14	-35.0				
855	7.7	293.1	4.41	6.13	-36.5				
858	7.7	290.0	4.53	6.13	-37.9				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DEDICATED 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 ODOR, NO SHEEN

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	7.7	288.5	4.57	6.13	-38.3				
2	7.6	288.9	4.58	6.13	-38.5				
3	7.6	288.9	4.59	6.13	-38.6				
4	7.6	288.6	4.59	6.13	-38.9				
Average:	7.6	288.7	4.58	6.13	-38.6	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: BXM | Date: 3.12.2020

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly March 2020 | Date/Time: 3/ 9 /2020@ 1500

Sample Number: RGW174S- 200309 | Weather: SUNNY, COOL

Landau Representative: BXM/SRB/JAN

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 3.76 | Time: 1430 | Flow through cell vol. | GW Meter No.(s SLOPE-8

Begin Purge: Date/Time: 3/ 9 /2020 @ 1434 | End Purge: Date/Time: 3/ 9 /2020 @ 1457 | Gallons Purged: <1

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

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
1437	12.1	149.3	0.19	6.85	-134.3		3.87		
1440	11.7	144.6	0.20	6.85	-139.2		3.85		
1443	11.4	138.6	0.19	6.85	-134.8		3.87		
1446	11.3	136.4	0.18	6.85	-132.8		3.85		
1449	11.2	135.3	0.19	6.85	-130.8				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DEDICATED 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 SHEEN, NO ODOR

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	11.2	135.1	0.18	6.85	-129.1				
2	11.2	135.0	0.17	6.85	-129.2				
3	11.2	134.9	0.17	6.85	-128.4				
4	11.2	134.7	0.17	6.85	-128.4				
Average:	11.2	134.9	0.17	6.85	-128.8	#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) (Silica	
	VOC (Boeing short list)	
	Methane Ethane Ethene Acetylene	
	others	

Duplicate Sample No(s):

Comments:

Signature: BXM | Date: 3.9.20

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly March 2020 | Date/Time: 3/ 9/2020@ 1451

Sample Number: RGW250S- 200309 | Weather: SUNNY

Landau Representative: BXM/SRB/JAN

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 3.48 | Time: 1425 | Flow through cell vol. | GW Meter No.(s 1

Begin Purge: Date/Time: 3/9 /2020 @ 1427 | End Purge: Date/Time: 3/9 /2020 @ 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	10.8	99.2	2.41	6.76	4.4		3.63		
1433	9.8	103.7	2.32	6.72	-2.3		3.61		
1436	9.0	104.1	2.32	6.68	-8.1		3.60		
1439	8.7	103.0	2.05	6.67	-15.3		3.59		
1442	8.6	101.8	1.70	6.67	-20.5		3.59		
1445	8.5	100.9	1.57	6.60	-21.3		3.59		
1447	8.5	100.6	1.46	6.52	-19.0				

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.):

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	8.5	100.5	1.46	6.51	-18.9				
2	8.5	100.5	1.46	6.50	-18.9				
3	8.5	100.5	1.45	6.50	-19.1				
4	8.5	100.4	1.44	6.50	-19.4				
Average:	8.5	100.5	1.45	6.50	-19.1	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: JAN | Date: 3/9/2020

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly March 2020 | Date/Time: 3/ 10 /2020@ 805

Sample Number: RGWDUP4 200310 | Weather: INDOORS

Landau Representative: BXM/SRB/JAN

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 5.07 | Time: 915 | Flow through cell vol. | GW Meter No.(s SLOPE-8

Begin Purge: Date/Time: 3/ 10 /2020 918 | End Purge: Date/Time: 3/ 10 /2020 @ 941 | 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		

DUPLICATE TO RGW014S

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): CLEAR, COLORLESS, SOME MATERIAL FLAOTING, SULFER OR ROTTEN EGG SMELL, NO SH

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	15.9	377.0	3.05	6.34	-27.5				
2	15.9	377.8	3.07	6.34	-27.2				
3	16.0	379.3	3.07	6.35	-26.9				
4	16.0	380.5	3.04	6.35	-27.3				
Average:	16.0	378.7	3.06	6.35	-27.2	#DIV/0!			

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

Duplicate Sample No(s): Duplicate to RGW014S

Comments:

Signature: BXM | Date: 3/10/2020

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly March 2020 | Date/Time: 3/ 10 /2020@ 1125

Sample Number: RGW009S- 200310 | Weather: INSIDE AN OFFICE

Landau Representative: BXM/SRB/JAN

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft): 5.22 | Time: 1057 | Flow through cell vol. | GW Meter No.(s SLOPE-8

Begin Purge: Date/Time: 3/ 10 /2020 @ 1059 | End Purge: Date/Time: 3/ 10 /2020 @1122 | 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		
1102	19.6	380.9	0.2	6.40	-61.9		5.21		
1105	19.5	379.5	0.45	6.40	-69.1		5.21		
1108	19.5	378.4	0.89	6.39	-72.1		5.21		
1111	19.5	377.5	1.40	6.39	-73.4				
1114	19.5	376.8	1.86	6.40	-73.8				
1117	19.5	376.4	2.12	6.40	-73.6				
1120	19.5	376.0	2.37	6.40	-73.9				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DEDICATED 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 ODOR, NO SHEEN

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	19.5	375.8	2.38	6.4	-73.9				
2	19.5	375.9	2.40	6.4	-74.0				
3	19.5	375.8	2.46	6.4	-74.2				
4	19.5	375.8	2.46	6.4	-74.2				
Average:	19.5	375.8	2.43	6.4	-74.1	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: BXM | Date: 3/10/2020

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly March 2020 | Date/Time: 3/ 10 /2020@ NA

Sample Number: RGW010S- 2003 | Weather: INSIDE

Landau Representative: BXM/SRB/JAN

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 5.37 Time: 1040 Flow through cell vol. GW Meter No.(s SLOPE-8

Begin Purge: Date/Time: 3/ /2020 @ NA End Purge: Date/Time: 3/ /2020 @ NA Gallons Purged: NA

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

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

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ☐ Pump/Pump Type

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

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

(By Numerical Order) ☐ Other

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

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

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

Duplicate Sample No(s):

Comments:

Signature: BXM Date: 3/10/2020

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly March 2020 | Date/Time: 3/ /2020@ NA

Sample Number: RGW011D· 2003 | Weather: INSIDE

Landau Representative: BXM/SRB/JAN

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 5.34 Time: 1045 Flow through cell vol. GW Meter No.(s SLOPE-8

Begin Purge: Date/Time: 3/ /2020 @ NA End Purge: Date/Time: 3/ /2020 @ NA 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		
	WATER LEVEL ONLY								

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ☐ Pump/Pump Type

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

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

(By Numerical Order) ☐ Other

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

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

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

Duplicate Sample No(s):

Comments:

Signature: BXM Date: 3/10/2020

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly March 2020 | Date/Time: 3/ 10 /2020@ 1030

Sample Number: RGW012S- 200310 | Weather: INDOORS

Landau Representative: BXM/SRB/JAN

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 4.99 | Time: 1004 | Flow through cell vol. | GW Meter No.(s SLOPE-8

Begin Purge: Date/Time: 3/ 10 /2020 @ 1005 | End Purge: Date/Time: 3/ 10 /2020 @ 1028 | Gallons Purged: < 1

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

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
1008	19.5	633	0.88	6.14	-88.2		5.00		
1011	19.4	643	3.15	6.14	-93.6		5.00		
1014	19.5	646	3.95	6.14	-95.0		5.00		
1017	19.6	650	4.63	6.15	-96.7				
1020	19.6	655	5.00	6.15	-98.3				
1023	19.7	655	5.07	6.15	-99.0				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DEDICATED 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 SHEEN, NO ODOR, SOME VERY FINE MATERIAL FLAOTING

Replicate	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	655	5.12	6.15	-99.3				
2	19.7	655	5.11	6.15	-99.3				
3	19.8	655	5.13	6.15	-99.5				
4	19.7	655	5.12	6.15	-99.3				
Average:	19.7	655	5.12	6.15	-99.4	#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) (Silica		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):

Comments:

Signature: BXM | Date: 3/10/2020

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly March 2020 | Date/Time: 3/ 10 /2020@ 945

Sample Number: RGW014S- 200310 | Weather: INDOORS

Landau Representative: BXM/SRB/JAN

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 5.07 Time: 915 Flow through cell vol. GW Meter No.(s SLOPE-8

Begin Purge: Date/Time: 3/ 10 /2020 @ 918 End Purge: Date/Time: 3/ 10 /2020 @ 941 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		
921	16.4	350.1	1.82	6.21	-15.1		5.14		
924	15.9	356.9	1.92	6.25	-16.6		5.14		
927	15.8	361.9	2.18	6.29	-21.1		5.14		
930	15.8	363.7	2.27	6.31	-25.1				
933	15.8	366.4	2.51	6.32	-25.3				
936	15.9	371.6	2.93	6.33	-26.6				
939	15.9	375.2	2.92	6.34	-27.6				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type Dedicated bladder

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

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

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): CLEAR, COLORLESS, SOME MATERIAL FLAOTING, SULFER OR ROTTEN EGG SMELL, NO SH

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	16.0	375.4	2.92	6.34	-27.9				
2	15.9	376.1	3.00	6.34	-27.8				
3	15.9	378.5	3.02	6.34	-27.1				
4	16.0	380.0	3.03	6.35	-26.8				
Average:	16.0	377.5	2.99	6.34	-27.4	#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) (Silica		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

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

Comments:

Signature: BXM Date: 3/10/2020

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly March 2020 | Date/Time: 3/ 10 /2020@ 855

Sample Number: RGW147S- 200310 | Weather: OVERCAST, COLD

Landau Representative: BXM/SRB/JAN

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 4.67 Time: 827 Flow through cell vol. GW Meter No.(s SLOPE-8

Begin Purge: Date/Time: 3/ 10 /2020 @ 829 End Purge: Date/Time: 3/ 10 /2020 @ 852 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	
	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft	through cell	
832	9.8	62.8	1.89	6.21	92.3		4.67		
835	8.6	46.3	2.05	5.98	83.2		4.67		
838	8.6	38.2	2.63	5.84	96.1		4.65		
841	8.7	33.5	2.75	5.78	108.0				
844	8.6	33.9	2.81	5.75	114.4				
847	8.5	31.9	2.92	5.73	120.9				
850	8.5	31.1	2.87	5.72	126.9				

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 SHEEN, NO ODOR, LOTS OF FINES FLOATING

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	8.5	31.2	2.80	5.71	127.3				
2	8.5	30.8	2.91	5.71	128.1				
3	8.5	30.8	2.88	5.71	128.5				
4	8.5	30.9	2.83	5.71	129.1				
Average:	8.5	30.9	2.86	5.7	128.3	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: BXM Date: 3/10/2020

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly March 2020 | Date/Time: 3/ 10 /2020@ 1555

Sample Number: RGW149S- 200310 | Weather: overcast, cold

Landau Representative: BXM/SRB/JAN

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 5.13 Time: 1527 Flow through cell vol. GW Meter No.(s slope-8

Begin Purge: Date/Time: 3/ 10 /2020 @ 1528 End Purge: Date/Time: 3/ /2020 @ 1551 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		
1531	11.9	233.9	0.31	6.48	-0.2		5.13		
1534	11.6	244.7	0.27	6.45	-26.2		5.14		
1537	11.5	248.9	0.25	6.45	-40.9		5.14		
1540	11.4	254.1	0.30	6.45	-54.0				
1543	11.3	258.6	0.43	6.45	-58.1				
1546	11.3	261.6	0.75	6.45	-63.9				
1549	11.2	265.4	1.05	6.46	-68.3				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DEDICATED 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 ODOR, NO SHEEN, 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	11.3	266.0	1.07	6.46	-68.7				
2	11.2	266.2	1.11	6.46	-68.8				
3	11.2	266.5	1.14	6.46	-69.1				
4	11.2	266.7	1.16	6.46	-69.4				
Average:	11.2	266.4	1.12	6.46	-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) (Silica	
	VOC (Boeing short list)	
	Methane Ethane Ethene Acetylene	
	others	

Duplicate Sample No(s):

Comments:

Signature: BXM Date: 3.10.2020

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly March 2020 | Date/Time: 3/ 10 /2020@ 1315

Sample Number: RGW150S- 200310 | Weather: OVERCAST, COLD

Landau Representative: BXM/SRB/JAN

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 5.07 Time: 1248 Flow through cell vol. GW Meter No.(s SLOPE-8

Begin Purge: Date/Time: 3/ 10 /2020 @ 1250 End Purge: Date/Time: 3/ 10 /2020 @ 1313 Gallons Purged: <1

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

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
1253	11.3	279.0	0.32	6.54	-6.4		5.06		
1256	11.1	278.5	0.37	6.51	-19.9		5.07		
1259	11.0	279.2	0.51	6.50	-29.3		5.07		
1302	10.9	280.1	0.65	6.50	-35.2				
1305	11.0	283.5	0.93	6.50	-41.2				
1308	11.0	285.7	1.14	6.50	-45.3				
1311	11.1	286.9	1.31	6.50	-47.4				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type Dedicated 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 SHEEN, NO ODOR

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	11.1	287.4	1.36	6.5	-48.1				
2	11.1	288.6	1.37	6.5	-48.6				
3	11.2	288.2	1.41	6.5	-49.1				
4	11.2	288.5	1.44	6.5	-49.4				
Average:	11.2	288.2	1.40	6.5	-48.8	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: BXM Date: 3/10/2020

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly March 2020 | Date/Time: 3/ 10 /2020@ 1500

Sample Number: RGW252S- 200310 | Weather: OVERCAST, COOL

Landau Representative: BXM/SRB/JAN

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft): 4.93 | Time: 1425 | Flow through cell vol. | GW Meter No.(s SLOPE-8

Begin Purge: Date/Time: 3/ 10 /2020 @ 1426 | End Purge: Date/Time: 3/ 10 /2020 @ 1449 | Gallons Purged: <1

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

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
1429	11.7	472.9	0.22	6.66	-73.9		4.93		
1432	11.6	473.0	0.21	6.67	-85.2		4.93		
1435	11.5	471.7	0.38	6.68	-91.4		4.93		
1438	11.4	470.6	0.51	6.68	-93.6				
1441	11.2	468.5	0.81	6.68	-95.2				
1444	11.1	465.3	1.11	6.68	-95.7				
1447	11.0	464.2	1.24	6.68	-96.2				

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 TO SLIGHTLY CLOUDY, COLORLESS, LOTS OF GRAY FINES, NO SHEEN, NO ODOR

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	11.0	464.1	1.28	6.69	-96.3				
2	10.9	463.5	1.31	6.68	-96.4				
3	10.9	463.5	1.33	6.68	-96.4				
4	10.9	463.5	1.35	6.68	-96.5				
Average:	10.9	463.7	1.32	6.68	-96.4	#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) (Silica		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s): MSMSD Location

Comments: WELL SMELLED BAD WHEN I OPENED IT AND WATER LEVEL WAS ACTIVELY DROPPING. WAITED ~10 MIN BEFORE GETTING

Signature: BXM | Date: 3/10/2020

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly March 2020 | Date/Time: 3/ 10 /2020@ 1410

Sample Number: RGW253I- 200310 | Weather: OVERCAST, COLD

Landau Representative: BXM/SRB/JAN

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 4.96 Time: 1338 Flow through cell vol. GW Meter No.(s SLOPE-8

Begin Purge: Date/Time: 3/ 10 /2020 @ 1341 End Purge: Date/Time: 3/ 10 /2020 @ 1404 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	
	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft	through cell	
1344	12.2	301.2	0.16	6.48	-2.4		4.99		
1347	12.0	308.7	0.19	6.50	-57.5		4.99		
1350	11.9	309.0	0.21	6.52	-63.9		4.99		
1353	11.9	309.3	0.37	6.52	-72.0				
1356	11.9	309.1	0.61	6.53	-77.4				
1359	12.0	309.7	0.86	6.54	-80.2				
1402	12.1	310.5	1.09	6.53	-82.1				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type Dedicated 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 ODOR, NO SHEEN

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	12.1	310.5	1.10	6.54	-82.4				
2	12.1	310.6	1.12	6.54	-82.4				
3	12.1	310.6	1.14	6.54	-82.6				
4	12.1	310.6	1.16	6.54	-82.9				
Average:	12.1	310.6	1.13	6.54	-82.6	#DIV/0!			

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

Duplicate Sample No(s):

Comments: WELL WAS UNDER A LOT OF PRESSURE AND SMELLED BAD WHEN THE PRESSURE WAS RELEASED

Signature: BXM Date: 3/10/2020

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly March 2020 | Date/Time: 3/ 10 /2020@ 1240

Sample Number: RGW254S- 200310 | Weather: OVERCAST, COOL

Landau Representative: BXM/SRB/JAN

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 5.11 | Time: 1207 | Flow through cell vol. | GW Meter No.(s SLOPE-8

Begin Purge: Date/Time: 3/ 10 /2020 @ 1213 | End Purge: Date/Time: 3/ 10 /2020 @ 1236 | 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		
1216	11.2	434.2	0.22	6.69	-78.3		5.13		
1219	11.1	440.7	0.24	6.70	-92.9		5.15		
1222	10.9	444.0	0.24	6.70	-100.8		5.14		
1225	10.6	443.9	0.30	6.70	-103.0				
1228	10.6	443.5	0.43	6.70	-104.0				
1231	10.5	443.2	0.58	6.70	-106.4				
1234	10.5	442.4	0.82	6.69	-106.5				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DEDICATED 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 SHEEN, NO ODOR

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	10.5	442.6	0.86	6.69	-106.6				
2	10.5	442.3	0.87	6.69	-106.6				
3	10.5	442.3	0.88	6.69	-106.6				
4	10.5	442.5	0.89	6.69	-106.6				
Average:	10.5	442.4	0.88	6.69	-106.6	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: BXM | Date: 3/10/2020

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly March 2020 | Date/Time: 3/ 11 /2020@ 830

Sample Number: RGWDUP5 200311 | Weather: CLOUDY, COOL

Landau Representative: BXM/SRB/JAN

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 5.85 | Time: 1511 | Flow through cell vol. | GW Meter No.(s SLOPE-8

Begin Purge: Date/Time: 3/11 /2020 @ 1512 | End Purge: Date/Time: 3/ 11 /2020 @01535 | 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		

Duplicate to RGW180S

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DEDICATED 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 ODOR, NO SHEEN, DARK AND LIGHT 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	11.1	207.6	1.06	6.36	-27.3				
2	11.1	207.6	1.08	6.36	-27.6				
3	11.1	207.6	1.11	6.36	-27.8				
4	11.1	207.6	1.18	6.36	-28.2				
Average:	11.1	207.6	1.11	6.36	-27.7	#DIV/0!			

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

Duplicate Sample No(s): Duplicate to RGW180S

Comments:

Signature: BXM | Date: 3.11.2020

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly March 2020 | Date/Time: 3/ 11 /2020@ 1415

Sample Number: RGW163I- 200311 | Weather: CLOUDY, COOL

Landau Representative: BXM/SRB/JAN

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 6.12 | Time: 1343 | Flow through cell vol. | GW Meter No.(s SLOPE-8

Begin Purge: Date/Time: 3/11 /2020 @ 1345 | End Purge: Date/Time: 3/ 11 /2020 @ 1408 | Gallons Purged: <1

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

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
1348	12.6	336.1	0.21	6.23	22.7		5.98		
1351	12.2	335.9	0.62	6.23	-2.4		5.95		
1354	11.8	334.2	1.28	6.23	-17.7		5.93		
1357	11.0	329.5	2.35	6.23	-31.2		5.92		
1400	10.7	326.4	2.86	6.24	-36.0		5.92		
1403	10.4	323.6	3.23	6.24	-38.2				
1406	10.2	321.6	3.48	6.24	-39.5				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DEDICATED 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 ODOR, NO SHEEN

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	10.2	321.1	3.52	6.24	-39.7				
2	10.2	321.1	3.54	6.24	-39.8				
3	10.2	321.1	3.55	6.24	-40.0				
4	10.2	320.7	3.54	6.24	-40.0				
Average:	10.2	321.0	3.54	6.24	-39.9	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: BXM | Date: 3.11.2020

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly March 2020 | Date/Time: 3/ 11 /2020@ 1330

Sample Number: RGW165I- 200311 | Weather: OVERCAST, COOL

Landau Representative: BXM/SRB/JAN

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft): 11.68 | Time: 1256 | Flow through cell vol. | GW Meter No.(s SLOPE-8

Begin Purge: Date/Time: 3/ 11 /2020 @ 1301 | End Purge: Date/Time: 3/ 11 /2020 @ 1324 | 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		
1304	11.8	287.9	0.31	6.24	87.4		10.25		
1307	11.6	288.3	0.34	6.25	49.7		9.94		
1310	11.3	287.7	0.39	6.26	13.5		9.53		
1313	10.8	286.4	1.27	6.26	-15.0		8.95		
1316	10.6	285.6	1.57	6.27	-19.5		8.80		
1319	10.6	285.1	2.02	6.27	-25.7		8.55		
1322	10.6	285.1	2.39	6.27	-30.2		8.34		

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DEDICATED 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 ODOR, NO SHEEN, 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	10.6	285.1	2.47	6.27	-31.2				
2	10.6	285.1	2.50	6.27	-31.7				
3	10.6	285.2	2.53	6.28	-32.1				
4	10.6	285.3	2.56	6.28	-32.5		8.24		
Average:	10.6	285.2	2.52	6.28	-31.9	#DIV/0!			

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

Duplicate Sample No(s):

Comments: WELL WAS UNDER PRESSURE WHEN REMOVING j-PLUG. WATER LEVEL WAS COMING UP

Signature: BXM | Date: 3.11.2020

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly March 2020 | Date/Time: 3/11 /2020@ 1601

Sample Number: RGW175I- 200311 | Weather: CLOUDY

Landau Representative: BXM/SRB/JAN

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 7.03 Time: 1531 Flow through cell vol. GW Meter No.(s 1

Begin Purge: Date/Time: 3/11 /2020 @ 1532 End Purge: Date/Time: 3/11 /2020 @ 1553 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		
1535	12.3	403.9	0.91	6.32	6.8		7.08		
1538	12.2	406.0	1.03	6.29	4.0		6.96		
1541	11.9	406.3	1.21	6.29	-1.3		6.81		
1544	11.7	405.4	1.32	6.29	-4.4		6.72		
1547	11.5	404.0	1.42	6.29	-7.5		6.61		
1550	11.3	402.2	1.55	6.28	-9.9		6.53		
1552	11.2	400.9	1.64	6.28	-10.7				

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.): 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	11.2	401.0	1.69	6.28	-10.9				
2	11.2	401.0	1.73	6.28	-11.1				
3	11.2	400.9	1.74	6.28	-11.2				
4	11.2	400.8	1.75	6.28	-11.3				
Average:	11.2	400.9	1.73	6.28	-11.1	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: JAN Date: 3/11/2020

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly March 2020 | Date/Time: 3/11 /2020@ 1526

Sample Number: RGW176S- 200311 | Weather: CLOUDY

Landau Representative: BXM/SRB/JAN

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 5.88 Time: 1458 Flow through cell vol. GW Meter No.(s 1

Begin Purge: Date/Time: 3/11 /2020 @ 1500 End Purge: Date/Time: 3/11 /2020 @ 1521 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		
1503	12.0	442.4	0.79	6.28	34.9		5.53		
1506	11.7	462.7	0.67	6.27	21.2		5.42		
1509	11.5	467.7	0.83	6.27	14.0		5.39		
1512	11.2	469.8	0.97	6.27	6.3		5.36		
1515	11.1	470.3	1.20	6.27	-0.2		5.34		
1518	11.1	471.5	1.11	6.27	-5.8		5.33		
1520	11.1	472.4	1.18	6.27	-9.2				

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.): VERY LIGHT YELLOW TINT, 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	11.1	472.8	1.08	6.27	-9.5				
2	11.1	472.5	1.13	6.27	-9.9				
3	11.1	472.7	1.14	6.27	-10.3				
4	11.1	472.8	1.13	6.27	-10.6				
Average:	11.1	472.7	1.12	6.27	-10.1	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: JAN Date: 3/11/2020

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly March 2020 | Date/Time: 3/ 11 /2020@ 1040

Sample Number: RGW177I- 200311 | Weather: OVERCAST, COLD

Landau Representative: BXM/SRB/JAN

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft): 7.09 | Time: 1006 | Flow through cell vol. | GW Meter No.(s SLOPE-8

Begin Purge: Date/Time: 3/ 11 /2020 @ 1010 | End Purge: Date/Time: 3/ 11 /2020 @ 1033 | 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		
1013	11.1	449.1	0.42	6.20	-3.5		7.09		
1016	10.9	447.2	1.22	6.21	-36.8		7.09		
1019	10.8	446.5	1.78	6.21	-44.9		7.09		
1022	10.6	444.0	2.92	6.22	-57.4				
1025	10.7	443.9	3.61	6.22	-62.2				
1028	10.7	443.5	3.82	6.23	-62.8				
1031	10.7	443.6	4.08	6.23	-63.6				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DEDICATED 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 ODOR, NO SHEEN, SOME LIGHT 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	10.6	443.4	4.13	6.23	-63.7				
2	10.6	443.4	4.16	6.23	-63.8				
3	10.6	443.6	4.15	6.23	-63.9				
4	10.7	443.3	4.17	6.23	-63.9				
Average:	10.6	443.4	4.15	6.23	-63.8	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: BXM | Date: 3.11.2020

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly March 2020 | Date/Time: 3/ 11 /2020@ 950

Sample Number: RGW178S- 200311 | Weather: RAIN, OVERCAST, COOL

Landau Representative: BXM/SRB/JAN

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 7.83 | Time: 918 | Flow through cell vol. | GW Meter No.(s SLOPE-8

Begin Purge: Date/Time: 3/ 11 /2020 @ 920 | End Purge: Date/Time: 3/ 11 /2020 @ 943 | 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		
923	11.4	372.7	0.17	6.13	-0.3		7.82		
926	10.4	371.5	2.04	6.18	-40.9		7.78		
929	10.3	370.6	2.4	6.18	-44.7		7.80		
932	10.2	368.6	3.1	6.19	-50.4		7.80		
935	10.2	367.8	3.64	6.19	-54.4				
938	10.1	367.4	3.96	6.19	-56.4				
941	10.2	367.4	4.12	6.2	-57.9				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DEDICATED 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 SHEEN, NO ODORLIGHT 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	10.2	367.6	4.17	6.19	-58.1				
2	10.2	367.7	4.19	6.20	-58.3				
3	10.2	367.6	4.21	6.20	-58.6				
4	10.2	367.7	4.23	6.20	-58.8				
Average:	10.2	367.7	4.20	6.20	-58.5	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: BXM | Date: 3.11.2020

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly March 2020 | Date/Time: 3/ 11 /2020@ 1625

Sample Number: RGW179I- 200311 | Weather: OVERCAST, COOL

Landau Representative: BXM/SRB/JAN

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 5.81 | Time: 1533 | Flow through cell vol. | GW Meter No.(s SLOPE-8

Begin Purge: Date/Time: 3/ 11 /2020 @ 1556 | End Purge: Date/Time: 3/ 11 /2020 @ 1619 | 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		
1559	12.2	395.2	0.25	6.36	7.3		5.82		
1602	12.4	396.3	0.41	6.37	-17.9		5.82		
1605	12.2	395.0	1.04	6.38	-38.7		5.81		
1608	12.0	389.5	1.60	6.37	-46.5				
1611	11.8	385.5	2.13	6.36	-51.5				
1614	11.8	382.7	2.39	6.36	-53.8				
1617	11.8	380.4	2.58	6.35	-55.4				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DEDICATED 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 ODOR, NO SHEEN

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	11.8	380.3	2.61	6.35	-55.7				
2	11.7	379.6	2.66	6.35	-55.8				
3	11.7	379.4	2.68	6.35	-56.0				
4	11.7	379.4	2.71	6.35	-56.1				
Average:	11.7	379.7	2.67	6.35	-55.9	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: BXM | Date: 3.11.2020

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly March 2020 | Date/Time: 3/ 11 /2020@ 1540

Sample Number: RGW180S- 200311 | Weather: OVERCAST, COOL

Landau Representative: BXM/SRB/JAN

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft): 5.85 | Time: 1511 | Flow through cell vol. | GW Meter No.(s SLOPE-8

Begin Purge: Date/Time: 3/ 11 /2020 @ 1512 | End Purge: Date/Time: 3/ 11 /2020 @ 1535 | Gallons Purged: <1

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

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
1515	11.6	226.6	0.13	6.40	17.1		5.85		
1518	11.3	217.8	0.19	6.37	-0.1		5.84		
1521	11.2	213.2	0.20	6.37	-10.2		5.83		
1524	11.1	209.9	0.24	6.37	-16.4				
1527	11.1	208.3	0.40	6.37	-20.2				
1530	11.1	208.3	0.52	6.37	-21.7				
1533	11.1	207.7	0.92	6.36	-26.1				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DEDICATED 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 ODOR, NO SHEEN, DARK AND LIGHT 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	11.1	207.7	0.96	6.36	-26.4				
2	11.1	207.7	0.99	6.37	-26.8				
3	11.1	207.5	1.02	6.36	-27.0				
4	11.1	207.6	1.16	6.36	-28.1				
Average:	11.1	207.6	1.03	6.36	-27.1	#DIV/0!			

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

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

Comments:

Signature: BXM | Date: 3.11.2020

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly March 2020 | Date/Time: 3/ 11 /2020@ 1155

Sample Number: RGW189S- 200311 | Weather: OVERCAST, COOL

Landau Representative: BXM/SRB/JAN

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 5.83 | Time: 1122 | Flow through cell vol. | GW Meter No.(s SOLNST INTERFA

Begin Purge: Date/Time: 3/ 11 /2020 @ 1123 | End Purge: Date/Time: 3/ 11 /2020 @ 1146 | 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		
1126	10.5	114.2	1.26	6.13	-26.8		5.86		
1129	10.5	112.0	1.26	6.45	-29.4		5.92		
1132	10.4	109.4	1.24	6.52	-35.8		5.97		
1135	10.4	108.4	1.25	6.55	-38.3		6.00		
1138	10.3	107.6	1.23	6.57	-40.4		6.02		

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DEDICATED 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 ODOR, NO SHEEN

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	10.3	107.1	1.21	6.58	-41.5				
2	10.3	106.9	1.21	6.58	-41.9				
3	10.3	106.7	1.22	6.58	-42.2				
4	10.3	106.6	1.21	6.58	-42.6				
Average:	10.3	106.8	1.21	6.58	-42.1	#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)	
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)	
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)	
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)	
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica	
	VOC (Boeing short list)	
	Methane Ethane Ethene Acetylene	
	others	

Duplicate Sample No(s): MSMSD Location

Comments:

Signature: BXM | Date: 3.11.2020

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly March 2020 | Date/Time: 3/11 /2020@ 1636

Sample Number: RGW207S- 200311 | Weather: CLOUDY

Landau Representative: BXM/SRB/JAN

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft): 6.45 | Time: 1608 | Flow through cell vol. | GW Meter No.(s: 1

Begin Purge: Date/Time: 3/11 /2020 @ 1609 | End Purge: Date/Time: 3/11 /2020 @ 1630 | 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	
1612	12.0	271.4	0.81	6.77	-13.8		6.26		
1615	11.6	263.4	0.92	6.77	-22.3		6.22		
1618	11.3	256.1	1.11	6.77	-27.6		6.20		
1621	11.1	249.8	0.93	6.78	-33.2		6.20		
1624	11.1	246.2	0.97	6.79	-35.6		6.20		
1627	10.9	240.5	1.07	6.79	-38.2				
1629	10.9	238.4	1.00	6.79	-39.4				

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.): 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	10.9	237.8	0.98	6.80	-39.7				
2	10.8	236.9	0.99	6.79	-39.9				
3	10.8	236.8	0.97	6.79	-40.0				
4	10.8	236.5	0.97	6.80	-40.2				
Average:	10.8	237.0	0.98	6.80	-40.0	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: JAN | Date: 3/11/2020

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly March 2020 | Date/Time: 3/ 11 /2020@ 855

Sample Number: RGW208S- 200311 | Weather: RAIN, OVERCAST, COOL

Landau Representative: BXM/SRB/JAN

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 7.64 Time: 824 Flow through cell vol. GW Meter No.(s SLOPE-8

Begin Purge: Date/Time: 3/ 11 /2020 @ 826 End Purge: Date/Time: 3/ 11 /2020 @ 849 Gallons Purged: <1

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

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
829	11.2	449.1	1.45	6.24	-70.6		7.66		
832	10.6	450.6	1.37	6.19	-85.5		7.67		
835	10.3	444.6	1.88	6.17	-86.1		7.67		
838	10.0	439.6	4.14	6.14	-86.0				
841	10.0	436.5	4.82	6.14	-86.4				
844	10.0	434.7	5.05	6.14	-86.7				
847	10.0	430.5	5.32	6.14	-87.3				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type DEDICATED 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 SHEEN, NO ODOR, 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	10.0	429.1	5.33	6.15	-87.4				
2	10.0	429.0	5.33	6.15	-87.5				
3	10.0	429.0	5.34	6.15	-87.6				
4	10.0	428.3	5.35	6.15	-87.7				
Average:	10.0	428.9	5.34	6.15	-87.6	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: BXM Date: 3.11.2020

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly March 2020 | Date/Time: 3/11 /2020@ 1416

Sample Number: RGW259S- 200311 | Weather: CLOUDY

Landau Representative: BXM/SRB/JAN

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 5.31 Time: 1347 Flow through cell vol. GW Meter No.(s 1

Begin Purge: Date/Time: 3/11 /2020 @ 1351 End Purge: Date/Time: 3/11 /2020 @ 1411 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		
1354	11.4	212.9	4.49	6.68	-1.1		5.55		
1357	11.3	211.7	3.91	6.66	0.1		5.54		
1400	11.4	210.8	3.10	6.64	0.0		5.54		
1403	11.5	210.9	2.51	6.61	1.2		5.54		
1406	11.7	211.2	2.22	6.60	1.6				
1409	11.7	211.1	2.03	6.59	1.6				
1411	11.7	211.1	1.76	6.59	1.3				

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.): SLIGHT TAN, 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	11.7	211.1	1.73	6.59	1.3				
2	11.7	211.1	1.70	6.59	1.3				
3	11.7	211.1	1.69	6.58	1.3				
4	11.7	211.1	1.65	6.58	1.2				
Average:	11.7	211.1	1.69	6.59	1.3	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: JAN Date: 3/11/2020

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Quarterly March 2020 | Date/Time: 3/11 /2020@ 1341

Sample Number: RGW260S- 200311 | Weather: CLOUDY

Landau Representative: BXM/SRB/JAN

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 5.34 Time: 1316 Flow through cell vol. GW Meter No.(s 1

Begin Purge: Date/Time: 3/11 /2020 @ 1317 End Purge: Date/Time: 3/11 /2020 @ 1337 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		
1320	12.0	252.8	0.75	6.53	25.5		5.38		
1323	11.6	251.3	0.71	6.47	17.3		5.36		
1326	10.9	248.3	0.80	6.43	8.7		5.34		
1329	10.7	246.2	0.76	6.41	3.6		5.34		
1332	10.5	244.6	0.72	6.40	-1.5		5.34		
1335	10.4	243.8	0.81	6.39	-5.2				
1337	10.4	243.5	0.79	6.39	-7.5				

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.): 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	10.4	243.4	0.78	6.38	-7.8				
2	10.4	243.5	0.79	6.38	-8.0				
3	10.3	243.4	0.82	6.38	-8.3				
4	10.3	243.4	0.79	6.38	-8.6				
Average:	10.4	243.4	0.80	6.38	-8.2	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: JAN Date: 3/11/2020

Appendix C

Memo

To:	Kathleen Goodman, Project Manager	Project:	PS20203450.2020
From:	Chelsea Foster	c:	Project File
Tel:	(206) 342-1760		
Fax:	(206) 342-1761		
Date:	April 10, 2020		

Subject: Summary Data Quality Review
March 2020 Boeing Renton Groundwater Sampling
SWMU-168
ARI Work Order Number: 20C0121

This memo presents the summary data quality review of three primary groundwater samples and one trip blank sample collected on March 9, 2020. 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
Trip Blank	20C0121-01	vinyl chloride
RGW231S-200309	20C0121-02	vinyl chloride
RGW229S-200309	20C0121-03	vinyl chloride
RGW230I-200309	20C0121-04	vinyl chloride

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

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

ARI received the samples on March 10, 2020. 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 20C0121 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
Trip Blank	none
RGW231S-200309	none
RGW229S-200309	none
RGW230I-200309	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:	Kathleen Goodman, Project Manager	Project:	PS20203450.2020
From:	Chelsea Foster	cc:	Project File
Tel:	(206) 342-1760		
Fax:	(206) 342-1761		
Date:	April 10, 2020		

Subject: Summary Data Quality Review
March 2020 Boeing Renton Groundwater Sampling
SWMU-172/174
ARI Work Order Number: 20C0123

This memo presents the summary data quality review of 11 primary groundwater samples, one groundwater field duplicate, and one trip blank sample collected on March 9, 2020. 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
Trip Blank	20C0123-01	all
RGW233I-200309	20C0123-02	all
RGW236S-200309	20C0123-03	all
RGW235I-200309	20C0123-04	all
RGW232S-200309	20C0123-05	all
RGW234S-200309	20C0123-06	all
RGW173S-200309	20C0123-07	all
RGW172S-200309	20C0123-08	all
RGW152S-200309	20C0123-09	all
RGW153S-200309	20C0123-10	all
RGW081S-200309	20C0123-11	all
RGW226S-200309	20C0123-12	all
RGWDUP1-200309	20C0123-13	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 the EPA guidance documents (EPA, 2014a and b).

ARI received the samples on March 10, 2020. 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 field duplicate RPDs were within the control limits.

Sample ID/ Field Duplicate ID	Analyte	Primary Result (ng/L)	Duplicate Result (ng/L)	Reporting Limit (ng/L)	RPD (%)
RGW152-200309/ RGWDUP1-200309	vinyl chloride	150	138	20	8
	cis-1,2-dichloroethene	892	808	20	10
	trichloroethene	278	269	20	3
	tetrachloroethene	1,120	1,200	20	7

Notes
ng/L = nanograms 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 for TOC, total arsenic, total copper, and total lead were outside of the control limit of 30 percent and are therefore qualified as estimated and flagged with a "J."

Sample ID/ Field Duplicate ID	Analyte	Primary Result	Duplicate Result	Reporting Limit	Units	RPD (%)
RGW152-200309/ RGWDUP1-200309	TOC	8.70	5.68	0.50	mg/L	42
	total arsenic	3.84	2.73	0.400	µg/L	34
	total copper	8.03	5.74	1.00	µg/L	33
	total lead	6.13	3.57	0.200	µg/L	53

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 20C0123 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
Trip Blank	none	NA	NA	NA
RGW233I-200309	none	NA	NA	NA
RGW236S-200309	none	NA	NA	NA
RGW235I-200309	none	NA	NA	NA
RGW232S-200309	none	NA	NA	NA
RGW234S-200309	none	NA	NA	NA
RGW173S-200309	none	NA	NA	NA
RGW172S-200309	none	NA	NA	NA
RGW152S-200309	TOC total arsenic total copper total lead	8.70 J 3.84 J 8.03 J 6.13 J	mg/L µg/L µg/L µg/L	field duplicate RPD
RGW153S-200309	none	NA	NA	NA
RGW081S-200309	none	NA	NA	NA
RGW226S-200309	none	NA	NA	NA
RGWDUP1-200309	TOC total arsenic total copper total lead	5.68 J 2.73 J 5.74 J 3.57 J	mg/L µg/L µg/L µg/L	field duplicate RPD

Notes
µg/L = micrograms per liter
NA = not applicable
mg/L = milligrams per liter
RPD= relative percent difference
TOC = total organic carbon

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:	Kathleen Goodman, Project Manager	Project:	PS20203450.2020
From:	Chelsea Foster	c:	Project File
Tel:	(206) 342-1760		
Fax:	(206) 342-1761		
Date:	April 10, 2020		

Subject: Summary Data Quality Review
March 2020 Boeing Renton Groundwater Sampling
Building 4-78/79 SWMU/AOC Group
ARI Work Order Number: 20C0136 and 20C0158

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 March 10 and 11, 2020. 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
RGW241S-200310	20C0136-01	VOCs and TPH-G
RGW242I-200310	20C0136-02	VOCs and TPH-G
RGW143S-200310	20C0136-03	all
RGW240D-200310	20C0136-04	all
RGW239I-200310	20C0136-05	all
RGW238I-200310	20C0136-06	all
RGW237S-200310	20C0136-07	all
RGW209S-200310	20C0136-08	all
RGW243I-200310	20C0136-09	all
RGW038S-200310	20C0136-10	all
TripBlanks-200310	20C0136-11	VOCs and TPH-G
RGW039S-200311	20C0158-01	all
RGW034S-200311	20C0158-02	all

Sample ID	Laboratory Sample ID	Requested Analyses
RGW033S-200311	20C0158-03	all
RGW210S-200311	20C0158-04	all
RGW031S-200311	20C0158-05	all
RGW244S-200311	20C0158-06	all
RGWDUP2-200311	20C0158-07	all
TripBlanks-200311	20C0158-08	VOCs and TPH-G

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

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

ARI received the samples on March 11 and 12, 2020. 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 – The surrogate percent recoveries were within control limits, with the exception of 1,2-dichloroethane-d4 in samples RGW031S-200311 and RGWDUP2-200311. The samples were reanalyzed at a dilution for which all surrogates were within control limits.
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-200311/ RGWDUP2-200311	vinyl chloride	ND	ND	0.20	NC
	cis-1,2-dichloroethene	0.61	0.56	0.20	NC
	benzene	34.8	35.5	0.20	2
	trichloroethene	ND	ND	0.20	NC
	TPH-G	2,980	3,060	100	3

Abbreviations
µg/L = micrograms per liter
NC = not calculated
ND = not detected
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 RPD is acceptable.

Sample ID/ Field Duplicate ID	Analyte	Primary Result (mg/L)	Duplicate Result (mg/L)	Reporting Limit (mg/L)	RPD (%)
RGW031S-200311/ RGWDUP2-200311	TOC	13.13	13.07	0.5	<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 numbers 20C0136 and 20C0158 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
RGW241S-200310	none
RGW242I-200310	none
RGW143S-200310	none
RGW240D-200310	none
RGW239I-200310	none
RGW238I-200310	none
RGW237S-200310	none
RGW209S-200310	none
RGW243I-200310	none
RGW038S-200310	none
TripBlanks-200310	none
RGW039S-200311	none
RGW034S-200311	none
RGW033S-200311	none
RGW210S-200311	none
RGW031S-200311	none
RGW244S-200311	none
RGWDUP2-200311	none
TripBlanks-200311	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:	Kathleen Goodman, Project Manager	Project:	PS20203450.2020
From:	Chelsea Foster	c:	Project File
Tel:	(206) 342-1760		
Fax:	(206) 342-1761		
Date:	April 10, 2020		

Subject: Summary Data Quality Review
March 2020 Boeing Renton Groundwater Sampling
AOC-001 and -002 and AOC-003
ARI Work Order Number: 20C0180

This memo presents the summary data quality review of five primary groundwater samples and one trip blank sample collected on March 12, 2020. 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) 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
TripBlanks-200312	20C0180-01	VOCs
RGW193S-200312	20C0180-02	all AOC-001 and -002 analyses
RGW249S-200312	20C0180-03	all AOC-003 analyses
RGW247S-200312	20C0180-04	all AOC-003 analyses
RGW248I-200312	20C0180-05	all AOC-003 analyses
RGW188S-200312	20C0180-06	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 March 13, 2020. 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

   Field duplicates were not collected at this site during this sampling event due to construction causing abandonement of the wells that were previously used to collect duplicate samples. The project frequency requirement of one field duplicate for every 20 samples was achieved with field duplicate samples collected at other sites included in this sampling event.
7. Reporting Limits and Laboratory Flags – Acceptable

Inorganic analyses

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

1. Preservation and Holding Times – Acceptable
2. Blanks – Acceptable
3. LCS – Acceptable
4. MS – Acceptable
5. Laboratory Duplicates – Acceptable
6. Field Duplicates – Acceptable

   Field duplicates were not collected at this site during this sampling event due to construction causing abandonement of wells that were previously used to collect duplicate samples. 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 20C0180 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
TripBlanks-200312	none
RGW193S-200312	none
RGW249S-200312	none
RGW247S-200312	none
RGW248I-200312	none
RGW188S-200312	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:	Kathleen Goodman, Project Manager	Project:	PS20203450.2020
From:	Chelsea Foster	c:	Project File
Tel:	(206) 342-1760		
Fax:	(206) 342-1761		
Date:	April 10, 2020		

Subject: Summary Data Quality Review
March 2020 Boeing Renton Groundwater Sampling
AOC-004
ARI Work Order Number: 20C0119

This memo presents the summary data quality review of two primary groundwater samples collected on March 9, 2020. The samples were submitted to Analytical Resources, Inc. (ARI), located in Tukwila, Washington, a laboratory accredited by the Washington State Department of Ecology. The samples were analyzed for total lead by U.S. Environmental Protection Agency (EPA) Method 6020A.

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

Sample ID	Laboratory Sample ID	Requested Analyses
RGW174S-200309	20C0119-01	total lead
RGW250S-200309	20C0119-02	total lead

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

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

ARI received the samples on March 10, 2020. 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 for MS/MSD analyses was not submitted 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 20C0119 is 100 percent. The usefulness of these data was evaluated based on EPA guidance documents listed in the introduction to this report. Few problems were identified, and analytical performance was generally within specified limits.

Sample ID	Qualified Analyte
RGW174S-200309	none
RGW250S-200309	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:	Kathleen Goodman, Project Manager	Project:	PS20203450.2020
From:	Chelsea Foster	c:	Project File
Tel:	(206) 342-1760		
Fax:	(206) 342-1761		
Date:	April 10, 2020		

Subject: Summary Data Quality Review
March 2020 Boeing Renton Groundwater Sampling
AOC-060
ARI Work Order Numbers: 20C0137

This memo presents the summary data quality review of nine primary groundwater samples, one field duplicate, and one trip blank sample collected on March 10, 2020. 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
TripBlanks-200310	20C0137-01	all
RGW147S-200310	20C0137-02	all
RGW014S-200310	20C0137-03	all
RGW012S-200310	20C0137-04	all
RGW009S-200310	20C0137-05	all
RGW254S-200310	20C0137-06	all
RGW150S-200310	20C0137-07	all
RGW253I-200310	20C0137-08	all
RGW252S-200310	20C0137-09	all
RGW149S-200310	20C0137-10	all
RGWDUP4-200310	20C0137-11	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.

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

Samples were received by ARI on March 11, 2020. 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 project-specific control limit for field duplicate RPDs is 30 percent for concentrations greater than five times the reporting limit. The RPD is not calculated for results that are less than five times the reporting limit, as indicated on the table below by "NC." In these cases, the absolute value of the difference between the primary and duplicate result should not exceed the value of the reporting limit. The field duplicate RPDs were within the control limits.

Sample ID/ Field Duplicate ID	Analyte	Primary Result (ng/L)	Duplicate Result (ng/L)	Reporting Limit (ng/L)	RPD (%)
RGW014S-200310/ RGWDUP4-200310	vinyl chloride	195	233	20.0	18
	cis-1,2-dichloroethene	151	146	20.0	3
	trichloroethene	41.9	32.4	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 – 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 (%)
RGW014S-200310/ RGWDUP4-200310	TOC	3.08	3.00	0.50	3

Abbreviations
mg/L = milligrams per liter
RPD= relative percent difference
TOC = total organic carbon

7. Reporting Limits – Acceptable

Overall assessment of data

A summary of the data assessment is presented in the table below. The completeness of work order number 20C0137 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
TripBlanks-200310	none
RGW147S-200310	none
RGW014S-200310	none
RGW012S-200310	none
RGW009S-200310	none
RGW254S-200310	none
RGW150S-200310	none
RGW253I-200310	none
RGW252S-200310	none
RGW149S-200310	none
RGWDUP4-200310	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:	Kathleen Goodman, Project Manager	Project:	PS20203450.2020
From:	Chelsea Foster	c:	Project File
Tel:	(206) 342-1760		
Fax:	(206) 342-1761		
Date:	April 10, 2020		

Subject: Summary Data Quality Review
March 2020 Boeing Renton Groundwater Sampling
AOC-090
ARI Work Order Number: 20C0159

This memo summarizes the data quality review of 11 primary groundwater samples, one duplicate sample, and a trip blank sample collected on March 11, 2020. 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, and 1,1,2-trichloroethane) by U.S. Environmental Protection Agency (EPA) Method 8260C;
- VOCs (vinyl chloride, 1,1-dichloroethene, trichloroethene, tetrachloroethene, and 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
RGW208S-200311	20C0159-01	VOCs and TPH
RGW178S-200311	20C0159-02	VOCs and TPH
RGW177I-200311	20C0159-03	VOCs and TPH
RGW189S-200311	20C0159-04	All
RGW165I-200311	20C0159-05	VOCs and TPH
RGW163I-200311	20C0159-06	VOCs and TPH
RGW180S-200311	20C0159-07	VOCs and TPH
RGW207S-200311	20C0159-08	VOCs and TPH
RGW175I-200311	20C0159-09	VOCs and TPH

Sample ID	Laboratory Sample ID	Requested Analyses
RGW176S-200311	20C0159-10	VOCs and TPH
RGW179I-200311	20C0159-11	VOCs and TPH
RGWDUP5-200311	20C0159-12	VOCs and TPH
TripBlanks-200311	20C0159-13	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 March 12, 2020. The temperatures of the coolers were recorded upon receipt and were less than the maximum acceptable temperature of 6 degrees Celsius (ºC).

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
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 (%)
RGW180S-200311/ RGWDUP5-200311	acetone	ND	ND	5.00	NC
	methylene chloride	ND	ND	1.00	NC
	trans-1,2-dichloroethene	ND	ND	0.20	NC
	cis-1,2-dichloroethene	ND	ND	0.20	NC
	chloroform	ND	ND	0.20	NC
	carbon tetrachloride	ND	ND	0.20	NC
	benzene	ND	ND	0.20	NC
	toluene	ND	ND	0.20	NC
	1,1,2-trichloroethane	ND	ND	0.20	NC
	vinyl chloride	ND	ND	0.02	NC
	1,1-dichloroethene	ND	ND	0.02	NC
	trichloroethene	ND	ND	0.02	NC
	tetrachloroethene	ND	ND	0.02	NC
	1,1,2,2-tetrachloroethane	ND	ND	0.02	NC
	TPH-G	ND	ND	100	NC

Abbreviations
µg/L = micrograms per liter
NC = not calculated
ND = not detected
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 20C0159 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
RGW208S-200311	none
RGW178S-200311	none
RGW177I-200311	none
RGW189S-200311	none
RGW165I-200311	none
RGW163I-200311	none
RGW180S-200311	none
RGW207S-200311	none
RGW175I-200311	none
RGW176S-200311	none
RGW179I-200311	none
RGWDUP5-200311	none
TripBlanks-200311	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:	Kathleen Goodman, Project Manager	Project:	PS20203450.2020
From:	Chelsea Foster	c:	Project File
Tel:	(206) 342-1760		
Fax:	(206) 342-1761		
Date:	April 10, 2020		

Subject: Summary Data Quality Review
March 2020 Boeing Renton Groundwater Sampling
Bldg. 4-70
ARI Work Order Number: 20C0157

This memo summarizes the data quality review of two primary groundwater samples and one trip blank sample collected on March 11, 2020. 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-200311	20C0157-01	all
RGW260S-200311	20C0157-02	all
TripBlanks-200311	20C0157-03	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 March 12, 2020. 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 20C0157 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-200311	none
RGW260S-200311	none
TripBlanks-200311	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

TABLE D-1: SWMU-168 HISTORICAL CONCENTRATIONS OF CONSTITUENTS OF CONCERN[1]

Boeing Renton Facility, Renton, Washington

Analyte	Current Cleanup Level [3]	Well ID [2]																							
		CPOC Area																							
		GW229S								GW230I								GW231S							
		11/7/2016	3/1/2017	8/14/2017	3/5/2018	8/13/2018	3/4/2019	8/12/2019	3/9/2020	11/7/2016	3/1/2017	8/14/2017	3/5/2018	8/13/2018	3/4/2019	8/12/2019	3/9/2020	11/7/2016	3/1/2017	8/14/2017	3/5/2018	8/13/2018	3/4/2019	8/12/2019	3/9/2020
Volatile Organic Compounds (µg/L)																									
Vinyl Chloride	0.11	0.020 U	0.020 U	0.021	0.0273	0.020 U	0.0211	0.020 U	0.020 U	0.032	0.020 U	**0.20**	0.0873	**0.14**	0.0566	**0.336**	0.087	0.020 U	0.020 U	0.020 U	0.0393	0.0326	0.0327	0.026	0.020 U

Notes:

1. **Bolded** values exceed the cleanup levels.
2. S = shallow well; I = intermediate well.
3. Current cleanup levels obtained from Table 2 of the Cleanup Action Plan and are based on each individual SWMU or AOC.

Abbreviations:

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

TABLE D-2: SWMU-172 AND SWMU-174 GROUP HISTORICAL CONCENTRATIONS OF CONSTITUENTS OF CONCERN[1, 2]

Boeing Renton Facility, Renton, Washington

Analyte	Current Cleanup Level[4]	Well ID[3]															
		Source Area															
		GW152S								GW153S							
		5/7/2018	8/13/2018	11/12/2018	3/4/2019	5/6/2019	8/12/2019	11/11/2019	3/9/2020	5/7/2018	8/13/2018	11/12/2018	3/4/2019	5/6/2019	8/12/2019	11/11/2019	3/9/2020
Volatile Organic Compounds (µg/L)																	
cis-1,2-Dichloroethene	0.03	**0.348**	**0.981**	**1.7**	**0.678**	**0.655**	**0.627**	**0.530**	**0.892**	**0.0649**	**0.171**	**0.238**	**0.107**	**0.108**	**0.278**	**0.204**	**0.0736**
Tetrachloroethene	0.02	**1.39**	**1.09**	**0.846**	**0.086**	**0.0594**	**0.176**	**0.384**	**1.12**	0.020 U	**0.0845**	**0.370**	0.020 U	0.020 U	**0.0544**	**0.164**	**0.024**
Trichloroethene	0.02	**0.226**	**0.833**	**0.223**	**0.152**	**0.157**	**0.203**	**0.145**	**0.278**	0.020 U	**0.241**	**0.394**	0.020 U	**0.0212**	**0.0326**	**0.131**	0.02 U
Vinyl Chloride	0.11	0.0972	**0.187 J**	**0.246**	**0.128**	**0.173**	0.0705	0.0366	**0.15**	**0.313 J**	**0.248**	**0.289**	**0.333**	**0.242**	**0.153**	0.0859	**0.249**
Total Metals (µg/L)																	
Arsenic	1.0	**2.99 J**	**75.7**	**22.6**	**7.54**	**4.49**	**23.4**	**7.48**	**3.84**	**3.51**	**5.67**	**7.84**	**4.49**	**5.97**	**4.72**	**11.9**	**5.48**
Copper	3.5	2.86	**24.1**	**4.76**	**5.12**	2.35	**21.8**	**16.6**	**8.03**	1.01	2.55	**16.2**	2.00	1.25	1.58	**10.2**	3.09
Lead	1.0	**1.52 J**	**12.7**	**2.48 J**	**3.33**	**1.26**	**14.8**	**12.1**	**6.13**	0.207	**3.06**	0.381	0.352	0.198	0.351	**2.76**	0.712

Analyte	Current Cleanup Level[4]	Well ID[3]															
		Downgradient Plume Area															
		GW081S								GW172S							
		5/7/2018	8/13/2018	11/12/2018	3/4/2019	5/6/2019	8/12/2019	11/11/2019	3/9/2020	5/7/2018	8/13/2018	11/12/2018	3/4/2019	5/6/2019	8/12/2019	11/11/2019	3/9/2020
Volatile Organic Compounds (µg/L)																	
cis-1,2-Dichloroethene	0.03	**0.0311**	0.0243	**0.0327**	**0.0355**	0.025	0.0282	**0.0311**	**0.0357**	**0.641**	**0.129**	**0.116**	**0.111**	**0.0581**	0.027	**0.0561**	**0.305**
Tetrachloroethene	0.02	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	**0.0663**	0.020 U	0.020 U	0.020 U	**0.0376**	0.020 U	0.020 U	**0.0451**	**0.0287**	**0.976**
Trichloroethene	0.02	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	**0.0872**	**0.0370**	0.020 U	0.020 U	0.020 U	0.020 U	**0.384**
Vinyl Chloride	0.11	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	**1.41**	**1.24**	0.0742	**0.167**	0.0808	0.0376	0.0905	**0.209**
Total Metals (µg/L)																	
Arsenic	1.0	**1.63**	**2.30**	**2.20**	**2.33**	**2.49**	**2.49**	**2.69**	**1.87**	**5.52**	**8.84**	**7.24**	**6.52**	**7.71**	**10.6**	**20.5**	**32.8**
Copper	3.5	0.534	0.811	0.561	0.536	0.546	1.38	1.96	0.791	0.989	2.50 U	1.77	2.07	2.13	**3.86**	**9.25**	**27.6**
Lead	1.0	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.116	0.210	0.100 U	0.772	**1.02**	**1.13**	0.774	0.991	**1.02**	**7.44**	**15.1**

Analyte	Current Cleanup Level[4]	Well ID[3]															
		Downgradient Plume Area															
		GW173S								GW226S							
		5/7/2018	8/13/2018	11/12/2018	3/4/2019	5/6/2019	8/12/2019	11/11/2019	3/9/2020	3/5/2018	5/7/2018	8/13/2018	11/12/2018	3/4/2019	5/6/2019	8/12/2019	11/11/2019	3/9/2020
Volatile Organic Compounds (µg/L)																		
cis-1,2-Dichloroethene	0.03	0.020 U	**0.111**	**0.0753**	**0.0756**	**0.037**	0.022	**0.0378**	**0.0504**	**0.0408**	**0.0401**	0.0262	0.020 U	**0.0387**	0.0223	0.0259	0.0235	**0.0396**
Tetrachloroethene	0.02	**0.061**	**0.0301**	**0.218**	**0.0842**	**0.0416**	**0.0561**	**0.0246**	**0.0224**	0.020 U	0.020 U	**0.0733**	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Trichloroethene	0.02	**0.0344**	**0.0681**	**0.206**	**0.149**	**0.0742**	**0.0256**	**0.0379**	**0.0305**	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Vinyl Chloride	0.11	0.046	0.0969 J	0.0448 J	0.0312	0.0486	0.0613	0.072	0.144	0.0428	0.026	0.0409 J	0.0655	0.0432	0.0459	0.029	0.0615	0.038
Total Metals (µg/L)																		
Arsenic	1.0	**1.80**	**13.0**	**4.59**	**6.72**	**7.38**	**12.2**	**15.6**	**11.8**	**4.14**	**3.27**	**2.78**	**3.44**	**5.07**	**2.97**	**2.85**	**12.0**	**4.88**
Copper	3.5	3.48	**6.95**	**3.85**	**4.38**	1.11	1.39	**4.68**	1.51	2.60	1.05	1.19	2.28	**4.55**	0.500 U	0.626	**15.6**	**5.00**
Lead	1.0	0.314	**2.88**	0.706	0.712	0.251	0.290	**1.36**	0.442	0.297	0.129	0.141	0.422	0.413	0.100 U	0.100 U	**2.43**	0.500

TABLE D-2: SWMU-172 AND SWMU-174 GROUP HISTORICAL CONCENTRATIONS OF CONSTITUENTS OF CONCERN[1, 2]

Boeing Renton Facility, Renton, Washington

Analyte	Current Cleanup Level[4]	Well ID[3]															
		CPOC Area															
		GW232S								GW233I							
		5/7/2018	8/13/2018	11/12/2018	3/4/2019	5/6/2019	8/12/2019	11/11/2019	3/9/2020	5/7/2018	8/13/2018	11/12/2018	3/4/2019	5/6/2019	8/12/2019	11/11/2019	3/9/2020
Volatile Organic Compounds (µg/L)																	
cis-1,2-Dichloroethene	0.03	**0.367**	**0.489**	**0.426**	**0.250**	**0.319**	**0.378**	**0.659**	**0.221**	**0.0598**	**0.0587**	**0.0692**	**0.075**	**0.054**	**0.0697**	**0.0546**	**0.0552**
Tetrachloroethene	0.02	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Trichloroethene	0.02	0.020 U	0.020 U	0.020 U	0.020 U	**0.0331**	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	**0.0225**	0.020 U	0.020 U	0.020 U
Vinyl Chloride	0.11	**0.419**	**0.544 J**	**0.564**	**0.242**	**0.348**	**0.412**	**0.860**	**0.264**	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Total Metals (µg/L)																	
Arsenic	1.0	**5.36**	**6.52**	**8.01**	**5.12**	**3.96**	**6.29**	**8.09**	**2.73**	0.532	0.421	0.481	0.529	0.428	0.397	0.594	0.467
Copper	3.5	0.500 U	0.628	**13.3**	1.70	1.15	0.878	**3.85**	2.22	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.774	0.500 U
Lead	1.0	0.100 U	0.275	0.338	0.167	0.167	0.102	0.378	0.354	0.100 U	0.100 U	0.100 U	0.102	0.100 U	0.100 U	0.100 U	0.100 U

Analyte	Current Cleanup Level[4]	Well ID[3]															
		CPOC Area															
		GW234S								GW235I							
		5/7/2018	8/13/2018	11/12/2018	3/4/2019	5/6/2019	8/12/2019	11/11/2019	3/9/2020	5/7/2018	8/13/2018	11/12/2018	3/4/2019	5/6/2019	8/12/2019	11/11/2019	3/9/2020
Volatile Organic Compounds (µg/L)																	
cis-1,2-Dichloroethene	0.03	**0.0672**	**0.0758**	**0.112**	**0.0869**	**0.0630**	**0.0738**	**0.0850**	**0.0984**	**0.166**	**0.121**	**0.158**	**0.135**	**0.109**	**0.0638**	**0.109**	**0.127**
Tetrachloroethene	0.02	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Trichloroethene	0.02	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	**0.0297**	**0.0253**	**0.0305**	**0.0338**	**0.0353**	**0.0342**	0.020 U	**0.0287**	**0.0336**
Vinyl Chloride	0.11	0.020 U	0.0282 J	0.0488	0.0273	0.0235	0.0252	0.0309	0.0302	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Total Metals (µg/L)																	
Arsenic	1.0	0.820	**2.07**	**1.72**	**2.11**	**2.22**	**1.31**	**10.1**	**27.4**	0.200 U	0.200 U	0.230	0.200 U	0.403	0.292	0.237	0.251
Copper	3.5	NA	0.748	1.27	1.75	1.93	0.869	**33.2**	**32.9**	0.500 U	0.500 U	0.500 U	0.500 U	1.58	0.714	0.573	0.935
Lead	1.0	NA	0.425	0.781	0.701	0.843	0.280	**15.5**	**11.8**	0.100 U	0.100 U	0.104	0.322	0.405	0.182	0.127	0.235

Analyte	Current Cleanup Level[4]	Well ID[3]							
		CPOC Area							
		GW236S							
		5/7/2018	8/13/2018	11/12/2018	3/4/2019	5/6/2019	8/12/2019	11/11/2019	3/9/2020
Volatile Organic Compounds (µg/L)									
cis-1,2-Dichloroethene	0.03	0.0297	**0.0427**	**0.0690**	**0.0443**	0.0281	**0.0468**	**0.108**	0.0241
Tetrachloroethene	0.02	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Trichloroethene	0.02	0.020 U	0.020 U	0.020 U	0.020 U	**0.0206**	0.020 U	0.020 U	0.020 U
Vinyl Chloride	0.11	0.020 U	0.020 U	0.0323	0.020 U	0.020 U	0.020 U	0.0437	0.020 U
Total Metals (µg/L)									
Arsenic	1.0	**1.80**	**2.69**	**3.35**	**2.81**	**2.10**	**3.70**	**36.5**	**6.29**
Copper	3.5	2.05	0.500 U	0.924	0.919	2.17	0.893	**66.9**	**21.2**
Lead	1.0	**2.49**	0.874	**1.48**	**1.94**	**1.90**	**1.53**	**117**	**18.7**

Notes

1. Data qualifiers are as follows:
   U = The analyte was not detected at the reporting limit indicated.
   J = The value is an estimate.
2. **Bolded** values exceed the cleanup levels.
3. S = shallow well; I = intermediate well.
4. Current cleanup levels obtained from Table 2 of the Cleanup Action Plan and are based on each individual SWMU or AOC.

Abbreviations

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

TABLE D-3: BUILDING 4-78/79 SWMU/AOC GROUP HISTORICAL CONCENTRATIONS OF CONSTITUENTS OF CONCERN [1, 2]
Boeing Renton Facility, Renton, Washington

Analyte	Current Cleanup Level[4]	Well ID[3]																							
		Source Area																							
		GW031S								GW033S								GW034S							
		5/7/2018	8/14/2018	11/13/2018	3/5/2019	5/7/2019	8/13/2019	11/12/2019	3/11/2020	5/7/2018	8/14/2018	11/13/2018	3/5/2019	5/7/2019	8/13/2019	11/12/2019	3/11/2020	5/7/2018	8/14/2018	11/13/2018	3/5/2019	5/7/2019	8/13/2019	11/12/2019	3/11/2020
Volatile Organic Compounds (µg/L)																									
Benzene	0.80	**8.95**	**3.21**	**28.3 J**	**55.9**	**7.13**	**3.47**	**4.77**	**37.1**	**12.8**	**13.3**	**13.6**	**11.7**	**12.5**	**10.4**	**11.5**	**10.2**	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
cis-1,2-Dichloroethene	0.70	0.20 U	0.56 J	0.63 J	0.20 U	0.43	0.47	0.40	0.61	**40.7**	**1.94**	**9.35**	**0.79**	0.41	**0.78**	**2.78**	**21.4**	0.20 U	0.21	0.25	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Trichloroethene	0.23	**1.13**	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	**0.40 U**	0.20 U	**1.00 U**	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	**0.29**	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Vinyl Chloride	0.20	0.20 U	**0.28**	**0.31 J**	0.20 U	**0.29**	**0.21**	**0.25**	0.20 U	**110**	**6.46**	**36.7**	**3.26**	**0.53**	**1.16**	**13.0**	**52.2**	**0.24**	**0.53**	**0.54**	0.20	0.20 U	**0.39**	**0.39**	0.20 U
Total Petroleum Hydrocarbons (µg/L)																									
TPH-G (C7-C12)	800	**917**	**1,640**	**2,010**	**4200**	**1020**	**1390**	**1540**	**2,980**	239	258	500 U	395	297	277	347	296	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U

Analyte	Current Cleanup Level[4]	Well ID[3]																							
		Source Area																							
		GW039S								GW243I								GW244S							
		5/7/2018	8/14/2018	11/13/2018	3/5/2019	5/7/2019	8/13/2019	11/12/2019	3/11/202	5/7/2018	8/14/2018	11/13/2018	3/5/2019	5/7/2019	8/13/2019	11/12/2019	3/10/2020	5/7/2018	8/14/2018	11/13/2018	3/5/2019	5/7/2019	8/13/2019	11/12/2019	3/11/2020
Volatile Organic Compounds (µg/L)																									
Benzene	0.80	0.20 U	0.20 U	0.20 U	0.20 U	0.21	0.20 U	0.20 U	0.20 U	**1.66**	0.34	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	**3.63**	**4.64**	**2.95**	**1.73**	**1.47**	**1.77**	**0.87**	0.52
cis-1,2-Dichloroethene	0.70	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	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	**1.80**	0.44	0.26	0.82	**2.03**	0.37	0.20 U	0.68
Trichloroethene	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	0.20 U	0.20 U	0.20 U	0.20 U	**0.92**	0.20 U	0.20 U	0.22	0.20 U	0.20 U	0.20 U	0.23
Vinyl Chloride	0.20	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	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	**1.06**	**0.62**	**0.55**	**0.86**	**1.45**	**0.71**	**0.35**	**0.7**
Total Petroleum Hydrocarbons (µg/L)																									
TPH-G (C7-C12)	800	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	132	100 U	106	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U

Analyte	Current Cleanup Level[4]	Well ID[3]																							
		Downgradient Plume Area																							
		GW038S								GW209S								GW210S							
		5/7/2018	8/14/2018	11/13/2018	3/5/2019	5/7/2019	8/13/2019	11/12/2019	3/10/2020	5/7/2018	8/14/2018	11/13/2018	3/5/2019	5/7/2019	8/13/2019	11/12/2019	3/10/2020	5/7/2018	8/14/2018	11/13/2018	3/5/2019	5/7/2019	8/13/2019	11/12/2019	3/11/2020
Volatile Organic Compounds (µg/L)																									
Benzene	0.80	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	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.28	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
cis-1,2-Dichloroethene	0.70	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	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	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Trichloroethene	0.23	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	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	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Vinyl Chloride	0.20	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	**0.21**	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	0.20 U	0.20 U	0.20 U
Total Petroleum Hydrocarbons (µg/L)																									
TPH-G (C7-C12)	800	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U

Analyte	Current Cleanup Level[4]	Well ID[3]																							
		CPOC Area																							
		GW143S								GW237S								GW238I							
		5/7/2018	8/14/2018	11/13/2018	3/5/2019	5/7/2019	8/13/2019	11/12/2019	3/10/2020	5/7/2018	8/14/2018	11/13/2018	3/5/2019	5/7/2019	8/13/2019	11/12/2019	3/10/2020	5/7/2018	8/14/2018	11/13/2018	3/5/2019	5/7/2019	8/13/2019	11/12/2019	3/10/2020
Volatile Organic Compounds (µg/L)																									
Benzene	0.80	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	**8.57**	0.43	**0.93**	**9.58**	**2.20**	0.43	0.66	**3.48**	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
cis-1,2-Dichloroethene	0.70	0.33	**1.82**	0.20 U	0.20 U	0.20 U	**2.20**	0.20 U	0.21	0.20 U	0.20 U	0.20 U	0.21	0.20 U	0.25	0.22	**1.00 U**	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Trichloroethene	0.23	0.20 U	**0.60**	0.20 U	0.20 U	0.20 U	**1.05**	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	**1.00 U**	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Vinyl Chloride	0.20	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	**0.28**	**0.29**	**0.25**	0.20 U	**0.38**	**0.34**	**1.00 U**	0.20 U	0.20 U	**0.21**	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Total Petroleum Hydrocarbons (µg/L)																									
TPH-G (C7-C12)	800	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	**1,740**	499	100 U	**1,680**	100 U	329	100 U	**961**	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U

TABLE D-3: BUILDING 4-78/79 SWMU/AOC GROUP HISTORICAL CONCENTRATIONS OF CONSTITUENTS OF CONCERN [1, 2]

Boeing Renton Facility, Renton, Washington

Analyte	Current Cleanup Level[4]	Well ID[3]																							
		CPOC Area																							
		GW239I								GW240D								GW241S							
		5/7/2018	8/14/2018	11/13/2018	3/5/2019	5/7/2019	8/13/2019	11/12/2019	3/10/2020	5/7/2018	8/14/2018	11/13/2018	3/5/2019	5/7/2019	8/13/2019	11/12/2019	3/10/2020	5/7/2018	8/13/2018	11/13/2018	3/5/2019	5/7/2019	8/13/2019	11/12/2019	3/10/2020
Volatile Organic Compounds (µg/L)																									
Benzene	0.80	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	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	0.70	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	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
Trichloroethene	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	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
Vinyl Chloride	0.20	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	**0.23**	**0.23**	**0.24**	**0.23**	**0.27**	**0.26**	**0.24**	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
Total Petroleum Hydrocarbons (µg/L)																									
TPH-G (C7-C12)	800	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U

Analyte	Current Cleanup Level[4]	Well ID[3]							
		CPOC Area							
		GW242I							
		5/7/2018	8/13/2018	11/13/2018	3/5/2019	5/7/2019	8/13/2019	11/12/2019	3/10/2020
Volatile Organic Compounds (µg/L)									
Benzene	0.80	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	0.70	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	0.23	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Vinyl Chloride	0.20	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Total Petroleum Hydrocarbons (µg/L)									
TPH-G (C7-C12)	800	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U

Notes

1. Data qualifiers are as follows:
   U = The analyte was not detected at the reporting limit indicated.
   J = The value is an estimate.
2. **Bolded** values exceed the cleanup levels.
3. S = shallow well; I = intermediate well; D = deep well.
4. Current cleanup levels obtained from Table 2 of the Cleanup Action Plan and are based on each individual SWMU or AOC.

Abbreviations

µg/L = micrograms per liter
AOC = area of concern
CPOC = conditional point of compliance
SWMU = solid waste management unit
TPH-G = total petroleum hydrocarbons as gasoline

TABLE D-4: FORMER FUEL FARM HISTORICAL CONCENTRATIONS OF CONSTITUENTS OF CONCERN [1, 2]

Boeing Renton Facility, Renton, Washington

Analyte	Current Cleanup Level[4]	Well ID[3]																							
		Source Area								CPOC Area															
		GW255S								GW183S								GW184S							
		5/5/2016	11/7/2016	5/10/2017	11/14/2017	5/7/2018	11/12/2018	5/7/2019	11/11/2019	5/5/2016	11/7/2016	5/10/2017	11/14/2017	5/7/2018	11/12/2018	5/7/2019	11/11/2019	5/5/2016	11/7/2016	5/10/2017	11/14/2017	5/7/2018	11/12/2018	5/7/2019	11/11/2019
Total Petroleum Hydrocarbons (mg/L)																									
TPH-D (C12-C24)	0.5	0.094 U	0.095 U	0.095 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.095 U	0.096 U	0.095 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.095 U	0.096 U	0.095 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U
Jet A	0.5	0.094 U	0.095 U	0.095 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.095 U	0.096 U	0.095 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.095 U	0.096 U	0.095 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U

Analyte	Current Cleanup Level[4]	Well ID[3]																							
		CPOC Area																							
		GW211S								GW212S								GW221S							
		5/5/2016	11/7/2016	5/10/2017	11/14/2017	5/7/2018	11/12/2018	5/7/2019	11/11/2019	5/5/2016	11/7/2016	5/10/2017	11/14/2017	5/7/2018	11/12/2018	5/7/2019	11/11/2019	5/5/2016	11/7/2016	5/10/2017	11/14/2017	5/7/2018	11/12/2018	5/7/2019	11/11/2019
Total Petroleum Hydrocarbons (mg/L)																									
TPH-D (C12-C24)	0.5	0.32	**0.75**	0.22	**0.903**	0.272	0.341	0.124	0.120	0.12 U	0.095 U	0.094 U	0.100 U	0.100 U	0.109	0.100 U	0.100 U	**0.64**	**0.63**	**0.55**	**3.63**	**0.746**	**1.50**	**0.630**	**1.65**
Jet A	0.5	0.37	**0.58**	0.24	0.245	0.214	0.191	0.117	0.117	0.12 U	0.095 U	0.094 U	0.100 U	0.100 U	0.108 U	0.100 U	0.100 U	**0.58**	**0.52**	0.48	**2.12**	**0.635**	**0.863**	**0.397**	**1.09**

Analyte	Current Cleanup Level[4]	Well ID[3]																							
		CPOC Area																							
		GW224S								GW256S								GW257S							
		5/5/2016	11/7/2016	5/10/2017	11/14/2017	5/7/2018	11/12/2018	5/7/2019	11/11/2019	5/5/2016	11/7/2016	5/10/2017	11/14/2017	5/7/2018	11/12/2018	5/7/2019	11/11/2019	5/5/2016	11/7/2016	5/10/2017	11/14/2017	5/7/2018	11/12/2018	5/7/2019	11/11/2019
Total Petroleum Hydrocarbons (mg/L)																									
TPH-D (C12-C24)	0.5	**1.2**	**1.4**	**0.73**	**1.84**	**0.560**	**1.56**	**0.256**	**1.46**	0.094 U	0.095 U	0.096 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.095 U	0.095 U	0.095 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U
Jet A	0.5	**2.3**	**2.2**	**1.4**	**1.97**	**0.933**	**1.64**	**0.388**	**1.80**	0.11	0.095 U	0.096 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.095 U	0.095 U	0.095 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U

Analyte	Current Cleanup Level[4]	Well ID[3]							
		CPOC Area							
		GW258S							
		5/5/2016	11/7/2016	5/10/2017	11/14/2017	5/7/2018	11/12/2018	5/7/2019	11/11/2019
Total Petroleum Hydrocarbons (mg/L)									
TPH-D (C12-C24)	0.5	0.095 U	0.095 U	0.095 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U
Jet A	0.5	0.095 U	0.095 U	0.095 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U

Notes

1. Data qualifiers are as follows:
   U = The analyte was not detected at the reporting limit indicated.
2. **Bolded** values exceed the cleanup levels.
3. S = shallow well; I = intermediate well.
4. Current cleanup levels obtained from Table 2 of the Cleanup Action Plan and are based on each individual SWMU or AOC.

Abbreviations

AOC = area of concern
CPOC = conditional point of compliance
mg/L = milligrams per liter
SWMU = solid waste management unit
TPH-D = total petroleum hydrocarbons as diesel

TABLE D-5: AOC-003 HISTORICAL CONCENTRATIONS OF CONSTITUENTS OF CONCERN [1, 2]

Boeing Renton Facility, Renton, Washington

Analyte	Current Cleanup Level[4]	Well ID [3]															
		Source Area								Downgradient Plume Area							
		GW249S								GW188S							
		11/14/2017	3/7/2018	5/8/2018	8/15/2018	11/13/2018	3/5/2019	8/14/2019	3/12/2020	11/14/2017	3/7/2018	5/8/2018	8/15/2018	11/13/2018	3/5/2019	8/14/2019	3/12/2020
Volatile Organic Compounds (µg/L)																	
cis-1,2-Dichloroethene	0.78	NS	0.102	0.0757	0.0524	0.0829	0.079	0.0526	0.0604	NS	0.0606	0.0531	0.0386	0.0636	0.0493	0.0361	0.0362
Tetrachloroethene	0.02	NS	0.0496	0.020 U	0.020 U	0.020 U	0.0105	0.020 U	0.020 U	NS	0.020 U	0.020 U	0.020 U	0.020 U	0.0107	0.020 U	0.0244
Trichloroethene	0.16	NS	0.0475	0.0211	0.020 U	0.020 U	0.0157	0.020 U	0.020 U	NS	0.020 U	0.020 U	0.020 U	0.020 U	0.0125	0.020 U	0.020 U
Vinyl Chloride	0.24	NS	0.114	**0.428**	**0.413**	**0.629**	**0.424**	**0.367**	**0.334**	**NS**	**0.443**	**0.505**	**0.404**	**0.813**	**0.537**	**0.545**	**0.235**

Analyte	Current Cleanup Level[4]	Well ID [3]															
		CPOC Area															
		GW247S								GW248I							
		5/8/2018	8/15/2018	11/13/2018	3/5/2019	5/8/2019	8/14/2019	11/12/2019	3/12/2020	5/8/2018	8/15/2018	11/13/2018	3/5/2019	5/8/2019	8/14/2019	11/12/2019	3/12/2020
Volatile Organic Compounds (µg/L)																	
cis-1,2-Dichloroethene	0.78	0.0949	0.081	0.102	0.0728	0.0584	0.065	0.0635	0.039	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.02 U
Tetrachloroethene	0.02	0.020 U	0.020 U	0.020 U	0.126	0.020 U	0.020 U	0.020 U	0.02 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
Trichloroethene	0.16	0.0257	0.0291	0.0208	0.018	0.020 U	0.020 U	0.148	0.02 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.0514	0.020 U
Vinyl Chloride	0.24	**0.46**	**0.453**	**0.679**	**0.392**	**0.497**	**0.613**	**0.504**	**0.305**	**0.573**	**0.526**	**0.987**	**0.707**	**0.551**	**0.541**	**0.62**	**0.499**

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. Current cleanup levels obtained from Table 2 of the Cleanup Action Plan and are based on each individual SWMU or AOC

Abbreviations

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

TABLE D-6: AOC-004 HISTORICAL CONCENTRATIONS OF CONSTITUENTS OF CONCERN [1, 2]

Boeing Renton Facility, Renton, Washington

Analyte	Current Cleanup Level[3]	Well ID [3]							
		Source Area							
		GW250S							
		11/10/2016	3/1/2017	8/17/2017	3/6/2018	8/15/2018	3/5/2019	8/14/2019	3/9/2020
Metals (mg/L)									
Lead	0.001	**0.0020**	**0.0030**	0.00026	0.000941	**0.00107**	**0.00154**	0.000714	**0.00119**

Analyte	Current Cleanup Level[3]	Well ID [3]							
		CPOC Area							
		GW174S							
		11/10/2016	3/1/2017	8/17/2017	3/6/2018	8/15/2018	3/5/2019	8/14/2019	3/9/2020
Metals (mg/L)									
Lead	0.001	**0.0013 J**	**0.0016 J**	0.0010	0.000449	0.000762	0.000815	0.000549	0.000974

Notes

1. Data qualifiers are as follows:
   J = The value is an estimate.
2. S = shallow well
4. Current cleanup levels obtained from Table 2 of the Cleanup Action Plan and are based on each individual SWMU or AOC.

Abbreviations

mg/L = milligrams per liter
AOC = area of concern
CPOC = conditional point of compliance
SWMU = solid waste management unit

TABLE D-7: AOC-060 HISTORICAL CONCENTRATIONS OF CONSTITUENTS OF CONCERN [1, 2]
Boeing Renton Facility, Renton, Washington

Analyte	Current Cleanup Levels [4]	Well ID [3]							
		Source Area							
		GW009S							
		8/23/2016	3/6/2017	8/16/2017	3/6/2018	8/14/2018	3/5/2019	8/14/2019	3/10/2020
Volatile Organic Compounds (µg/L)									
cis -1,2-Dichloroethene	0.08	**0.16**	**0.093**	**0.15**	**0.0948**	**0.126**	**0.107**	**0.127**	**0.093**
Trichloroethene	0.02	**0.032**	**0.022**	**0.033**	**0.0252**	**0.0238**	**0.0239**	0.020 U	**0.0242**
Vinyl Chloride	0.26	**0.40**	0.26	**0.39**	0.241 J	**0.318**	**0.285**	**0.300**	0.183

Analyte	Current Cleanup Levels [4]	Well ID [3]																							
		Downgradient Plume Area																							
		GW012S								GW014S								GW147S							
		8/23/2016	3/6/2017	8/16/2017	3/6/2018	8/14/2018	3/5/2019	8/14/2019	3/10/2020	8/23/2016	3/6/2017	8/16/2017	3/6/2018	8/14/2018	3/5/2019	8/14/2019	3/10/2020	8/23/2016	3/6/2017	8/16/2017	3/6/2018	8/14/2018	3/5/2019	8/14/2019	3/10/2020
Volatile Organic Compounds (µg/L)																									
cis -1,2-Dichloroethene	0.08	**5.2**	**1.6**	**0.95**	**0.609**	**1.29**	**1.23**	**0.798**	**0.482**	**0.17**	**0.13**	**0.18**	**0.134**	**0.122**	**0.119**	**0.143**	**0.151**	**16**	**0.16**	**3.0**	**0.211**	**4.63**	**0.955**	**4.11**	**0.287**
Trichloroethene	0.02	**3.0**	**0.11**	**0.098**	**0.0568**	**0.656**	**0.0546**	**0.0471**	**0.0505**	**0.025**	**0.043**	**0.039**	**0.0347**	**0.0273**	**0.0254**	0.020 U	**0.0419**	**3.6**	**1.5**	**2.6**	**1.91**	**4.23**	**0.475**	**1.46**	**1.20**
Vinyl Chloride	0.26	**2.5**	**2.0**	**1.4**	**0.586**	**0.605**	**1.35**	**0.893**	**0.603**	**0.30**	**0.30**	**0.31**	**0.266**	0.232 J	0.214	**0.365**	0.195	**3.1**	0.020 U	0.21	0.020 U	**1.07 J**	0.0514	0.215	0.020 U

Analyte	Current Cleanup Levels [4]	Well ID [3]																							
		CPOC Area																							
		GW149S								GW150S								GW252S							
		8/23/2016	3/6/2017	8/16/2017	3/6/2018	8/14/2018	3/5/2019	8/14/2019	3/10/2020	8/23/2016	3/6/2017	8/16/2017	3/6/2018	8/14/2018	3/5/2019	8/14/2019	3/10/2020	8/23/2016	3/6/2017	8/16/2017	3/6/2018	8/14/2018	3/5/2019	8/14/2019	3/10/2020
Volatile Organic Compounds (µg/L)																									
cis -1,2-Dichloroethene	0.08	0.076	0.067	0.070	0.0565	0.0441	0.0623	0.0427	0.0574	**0.10**	0.055	**0.091**	0.0388	0.0506	0.0737	**0.0824**	0.0525	0.034	0.024	0.039	0.0215	0.0266	0.020 U	0.0342	0.0259
Trichloroethene	0.02	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	**0.022**	0.020 U	**0.026**	0.020 U	**0.0305**	0.020 U	**0.0228**	0.02 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Vinyl Chloride	0.26	0.080	0.11	0.068	0.0854	0.0399	0.0843	0.0482	0.085	0.20	0.092	0.096	0.0596	0.0203	0.103	0.020 U	0.0541	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U

Analyte	Current Cleanup Levels [4]	Well ID [3]															
		CPOC Area															
		GW253I								GW254S							
		8/23/2016	3/6/2017	8/16/2017	3/6/2018	8/14/2018	3/5/2019	8/14/2019	3/10/2020	8/23/2016	3/6/2017	8/16/2017	3/6/2018	8/14/2018	3/5/2019	8/14/2019	3/10/2020
Volatile Organic Compounds (µg/L)																	
cis -1,2-Dichloroethene	0.08	**0.089**	**0.10**	**0.11**	**0.0991**	0.0796	**0.127**	**0.0917**	**0.0915**	**0.11**	0.062	**0.11**	0.0589	**0.0926**	**0.0983**	**0.116**	0.0736
Trichloroethene	0.02	**0.023**	**0.024**	**0.029**	0.020 U	**0.0204**	**0.0221**	0.020 U	**0.0212**	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	0.26	0.13	0.13	0.14	0.132	0.113	0.143	0.131	0.184	0.067	0.038	0.043	0.0303	0.0418	0.0749	0.0465	0.0405

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. Current cleanup levels obtained from Table 2 of the Cleanup Action Plan and are based on each individual SWMU or AOC.

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

TABLE D-8: AOC-090 HISTORICAL CONCENTRATIONS OF CONSTITUENTS OF CONCERN[1, 2]

Boeing Renton Facility, Renton, Washington

Analyte	Current Cleanup Levels [4]	Well ID [3]																							
		Source Area								Downgradient Plume Area															
		GW189S [5]								GW175I								GW176S							
		11/8/2016	3/2/2017	8/15/2017	3/5/2018	8/13/2018	3/5/2019	8/12/2019	3/11/2020	11/8/2016	3/2/2017	8/15/2017	3/5/2018	8/13/2018	3/5/2019	8/12/2019	3/11/2020	11/8/2016	3/2/2017	8/15/2017	3/5/2018	8/13/2018	3/5/2019	8/12/2019	3/11/2020
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	NA	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	NA	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	**1.00 U**	**0.40 U**	0.20 U	0.20 U	**2.00 U**	0.20 U	0.20 U	0.20 U	NA	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	NA	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	NA	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	NA	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Acetone	300	25.1	10.0 U	5.0 U	5.00 U	70	5.00 U	5.0 U	5.0 U	NA	5.00 U	5.0 U	5.00 U	5.00 U	5.00 U	5.0 U	5.0 U	NA	5.00 U	5.38	5.00 U	5.00 U	5.00 U	5.0 U	5.0 U
Benzene	0.8	**1.00 U**	0.41	**1.69**	0.55	**2.42**	0.20	0.49	0.20 U	NA	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	NA	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	**1.00 U**	**0.40 U**	0.20 U	0.20 U	**2.00 U**	0.20 U	0.20 U	0.20 U	NA	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	NA	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Chloroform	2	1.00 U	0.40 U	0.20 U	0.20 U	**2.23**	0.20 U	0.20 U	0.20 U	NA	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	NA	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
cis-1,2-Dichloroethene	2.4	1.16	1.18	2.23	1.74	**22.3**	0.92	**6.87**	0.20 U	NA	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	NA	0.25	0.34	0.26	0.27	0.25	0.27	0.25
Methylene Chloride	2	**5.00 U**	2.00 U	1.0 U	1.00 U	**10.9 UJ**	1.00 U	1.0 U	1.0 U	NA	1.00 U	1.0 U	1.00 U	1.00 U	1.00 U	1.0 U	1.0 U	NA	1.00 U	1.0 U	1.00 U	1.00 U	1.00 U	1.0 U	1.0 U
Tetrachloroethene	0.05	**0.0549**	0.020 U	0.020 U	0.020 U	**0.20 U**	0.028	0.020 U	0.0263	NA	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	NA	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Toluene	75	13.1	18.7	2.84	6.34	21.7	4.96	3.11	0.20 U	NA	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	NA	0.20 U	0.20 U	0.42	0.20 U	0.20 U	0.20 U	0.20 U
trans-1,2-Dichloroethene	53.9	1.00 U	0.56	0.40	0.48	2.00 U	0.20 U	0.39	0.20 U	NA	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	NA	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Trichloroethene	0.08	**0.19**	**0.156**	**0.279**	**0.224**	**2.38**	**0.156**	**0.414**	0.0745	NA	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	NA	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Vinyl Chloride	0.13	0.020 U	**0.48**	**1.00**	**0.508 J**	**2.09 J**	**0.50**	**1.20**	0.020 U	NA	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	NA	**0.260**	**0.286**	**0.208**	**0.230**	**0.294**	**0.301**	**0.207**
Total Petroleum Hydrocarbons (µg/L)																									
TPH-G (C7-C12)	800	**2,290**	**2,260**	**2,010**	**1,860**	**9,440**	**1,070**	**943**	189	NA	100 U	100 U	100 U	100 U	100 U	100 U	100 U	NA	100 U	100 U	100 U	100 U	100 U	100 U	100 U
TPH-D (C12-C24)	500	146	398	**689**	200	**4,120**	362	432	100 U	NA	100 U	100 U	100 U	100 U	100 UJ	100 U	100 U	NA	100 U	100 U	100 U	100 U	100 UJ	100 U	100 U
TPH-O (C24-C40)	500	200 U	**582**	**949**	298	**2,000 U**	**522**	**853**	200 U	NA	200 U	200 U	200 U	200 U	200 UJ	200 U	200 U	NA	200 U	200 U	200 U	200 U	200 UJ	200 U	200 U

Analyte	Current Cleanup Levels [4]	Well ID [3]																							
		Shallow Zone CPOC Area																							
		GW178S								GW180S								GW207S							
		11/8/2016	3/2/2017	8/15/2017	3/5/2018	8/13/2018	3/5/2019	8/12/2019	3/11/2020	11/8/2016	3/2/2017	8/15/2017	3/5/2018	8/13/2018	3/5/2019	8/12/2019	3/11/2020	11/8/2016	3/2/2017	8/15/2017	3/5/2018	8/13/2018	3/5/2019	8/12/2019	3/11/2020
Volatile Organic Compounds (µg/L)																									
1,1,2,2-Tetrachloroethane	0.17	NA	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	NA	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	NA	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	NA	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	NA	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	NA	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	NA	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	NA	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	NA	0.020 U	0.020 U	0.020 U	0.023	0.020 U	0.020 U	0.020 U
Acetone	300	NA	5.00 U	5.0 U	5.00 U	5.00 U	5.54	5.0 U	5.0 U	NA	5.00 U	5.0 U	5.00 U	5.00 U	5.00 U	5.0 U	5.0 U	NA	5.00 U	5.0 U	5.00 U	5.00 U	5.00 U	5.0 U	5.0 U
Benzene	0.8	NA	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	NA	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	NA	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	NA	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	NA	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	NA	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Chloroform	2	NA	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	NA	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	NA	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	NA	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	NA	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	NA	0.20 U	0.29	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Methylene Chloride	2	NA	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	NA	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	NA	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
Tetrachloroethene	0.05	NA	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	NA	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	NA	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Toluene	75	NA	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	NA	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	NA	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	NA	0.20 U	0.26	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	NA	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	NA	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Trichloroethene	0.08	NA	0.020 U	0.0277	0.0214	0.0213	0.0213	0.020 U	0.021	NA	0.020 U	0.026	0.020 U	0.020 U	0.020 U	0.020 U	0.0239	NA	0.020 U	0.0412	0.020 U	0.0388	0.020 U	0.0305	0.020 U
Vinyl Chloride	0.13	NA	**0.699**	**0.191**	**0.409**	**0.378**	**0.392**	**0.3840**	**0.1840**	NA	0.020 U	0.0395	0.020 U	0.020 U	0.020 U	0.020 U	0.0485	NA	0.0758	**0.2380**	0.0300	**0.311 J**	0.0692	0.020 U	0.020 U
Total Petroleum Hydrocarbons (µg/L)																									
TPH-G (C7-C12)	800	NA	100 U	100 U	100 U	100 U	100 U	100 U	100 U	NA	100 U	100 U	100 U	100 U	100 U	100 U	100 U	NA	100 U	100 U	100 U	100 U	100 U	100 U	100 U
TPH-D (C12-C24)	500	NA	100 U	100 U	100 U	100 U	100 UJ	100 U	100 U	NA	100 U	100 U	100 U	100 U	100 U	100 UJ	100 U	NA	100 U	100 U	100 U	100 U	100 UJ	100 U	100 U
TPH-O (C24-C40)	500	NA	200 U	200 U	200 U	200 U	200 UJ	200 U	200 U	NA	200 U	200 U	200 U	200 U	200 UJ	200 U	200 U	NA	200 U	200 U	200 U	200 U	200 UJ	200 U	200 U

TABLE D-8: AOC-090 HISTORICAL CONCENTRATIONS OF CONSTITUENTS OF CONCERN[1, 2]

Boeing Renton Facility, Renton, Washington

Analyte	Current Cleanup Levels [4]	Well ID [3]																							
		Shallow Zone CPOC Area								Intermediate Zone CPOC Area															
		GW208S								GW163I								GW165I							
		11/8/2016	3/2/2017	8/15/2017	3/5/2018	8/13/2018	3/5/2019	8/12/2019	3/11/2020	11/8/2016	3/2/2017	8/15/2017	3/5/2018	8/13/2018	3/5/2019	8/12/2019	3/11/2020	11/8/2016	3/2/2017	8/15/2017	3/5/2018	8/13/2018	3/5/2019	8/12/2019	3/11/2020
Volatile Organic Compounds (µg/L)																									
1,1,2,2-Tetrachloroethane	0.17	NA	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	NA	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	NA	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	NA	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	NA	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	NA	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	NA	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	NA	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	NA	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Acetone	300	NA	5.00 U	5.0 U	5.00 U	5.00 U	5.00 U	5.0 U	5.0 U	NA	5.00 U	5.0 U	5.00 U	5.00 U	6.90	5.0 U	5.0 U	NA	5.00 U	5.0 U	5.00 U	5.00 U	5.00 U	5.0 U	5.0 U
Benzene	0.8	NA	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	NA	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	NA	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	NA	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	NA	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	NA	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Chloroform	2	NA	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	NA	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	NA	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	NA	0.20 U	0.23	0.20	0.20 U	0.21	0.20 U	0.20 U	NA	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	NA	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Methylene Chloride	2	NA	1.00 U	1.0 U	1.00 U	1.00 U	1.00 U	1.0 U	1.0 U	NA	1.00 U	1.0 U	1.00 U	1.00 U	1.00 U	1.0 U	1.0 U	NA	1.00 U	1.0 U	1.00 U	1.00 U	1.00 U	1.0 U	1.0 U
Tetrachloroethene	0.05	NA	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	NA	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	NA	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Toluene	75	NA	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	NA	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	NA	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	NA	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	NA	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	NA	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Trichloroethene	0.08	NA	0.020 U	0.0281	0.020 U	0.0234	0.020 U	0.0293	0.020 U	NA	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	NA	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Vinyl Chloride	0.13	NA	**0.565**	**0.330**	**0.388**	0.097	**0.437**	**0.245**	**0.419**	NA	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	NA	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Total Petroleum Hydrocarbons (µg/L)																									
TPH-G (C7-C12)	800	NA	100 U	100 U	100 U	100 U	100 U	100 U	100 U	NA	100 U	100 U	100 U	100 U	100 U	100 U	100 U	NA	100 U	100 U	100 U	100 U	100 U	100 U	100 U
TPH-D (C12-C24)	500	NA	100 U	100 U	100 U	100 U	100 UJ	100 U	100 U	NA	100 U	100 U	100 U	100 U	100 UJ	100 U	100 U	NA	100 U	100 U	100 U	100 U	100 UJ	100 U	100 U
TPH-O (C24-C40)	500	NA	200 U	200 U	200 U	200 U	200 UJ	200 U	200 U	NA	200 U	200 U	200 U	200 U	200 UJ	200 U	200 U	NA	200 U	200 U	200 U	200 U	200 UJ	200 U	200 U

Analyte	Current Cleanup Levels [4]	Well ID [3]															
		Intermediate Zone CPOC Area															
		GW177I								GW179I							
		11/8/2016	3/2/2017	8/15/2017	3/5/2018	8/13/2018	3/5/2019	8/12/2019	3/11/2020	11/8/2016	3/2/2017	8/15/2017	3/5/2018	8/13/2018	3/5/2019	8/12/2019	3/11/2020
Volatile Organic Compounds (µg/L)																	
1,1,2,2-Tetrachloroethane	0.17	NA	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	NA	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	NA	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	NA	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	NA	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	NA	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Acetone	300	NA	5.00 U	7.08	5.00 U	5.00 U	5.00 U	5.0 U	5.0 U	NA	5.00 U	5.0 U	5.00 U	5.00 U	7.16	5.0 U	5.0 U
Benzene	0.8	NA	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	NA	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	NA	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	NA	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Chloroform	2	NA	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	NA	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	NA	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	NA	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Methylene Chloride	2	NA	1.00 U	1.0 U	1.00 U	1.00 U	1.00 U	1.0 U	1.0 U	NA	1.00 U	1.0 U	1.00 U	1.00 U	1.00 U	1.0 U	1.0 U
Tetrachloroethene	0.05	NA	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	NA	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Toluene	75	NA	0.20 U	0.20 U	0.25	0.20 U	0.20 U	0.20 U	0.20 U	NA	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	NA	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	NA	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Trichloroethene	0.08	NA	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	NA	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Vinyl Chloride	0.13	NA	**0.1820**	0.0871	0.0454	0.0303	0.0573	0.0339	0.020 U	NA	0.0632	0.020 U	0.0332	0.020 U	**0.1330**	0.0368	0.020 U
Total Petroleum Hydrocarbons (µg/L)																	
TPH-G (C7-C12)	800	NA	100 U	100 U	100 U	100 U	100 U	100 U	100 U	NA	100 U	100 U	100 U	100 U	100 U	100 U	100 U
TPH-D (C12-C24)	500	NA	100 U	100 U	100 U	100 U	100 UJ	100 U	100 U	NA	100 U	100 U	100 U	100 U	100 UJ	100 U	100 U
TPH-O (C24-C40)	500	NA	200 U	200 U	200 U	200 U	200 UJ	200 U	200 U	NA	200 U	200 U	200 U	200 U	200 UJ	200 U	200 U

Notes:

1. Data qualifiers are as follows:
   U = The analyte was not detected at the reporting limit indicated.
   J = The value is an estimate.
   UJ = The analyte was not detected at the estimated reporting limit indicated.
2. **Bolded** values exceed the cleanup levels.
3. S = shallow well; I = intermediate well.
4. Current cleanup levels obtained from Table 2 of the Cleanup Action Plan and are based on each individual SWMU or AOC.
5. GW189S is the replacement well for GW168S.

Abbreviations:

µg/L = micrograms per liter
AOC = area of concern
CPOC = conditional point of compliance
NA = well not available for sampling
SWMU = solid waste management unit
TPH-D = total petroleum hydrocarbons as diesel
TPH-G = total petroleum hydrocarbons as gasoline
TPH-O = total petroleum hydrocarbons as oil

Appendix E

APPENDIX E

Summary of Remedial Actions at the Boeing Renton Facility January – March 2020

Boeing Renton Site
Renton, Washington

Prepared for:
The Boeing Company
EHS Remediation

Prepared by:
CALIBRE Systems, Inc.
Project No. T0014323

May 15, 2020

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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	micrograms 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 first quarter of 2020 (between January 1 and March 31, 2020). 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 Tech Memo describing the remedial approach for *in situ* biodegradation treatment of benzene in groundwater near the 4-78/79 Building (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 first quarter of 2020. 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 January to March 2020.

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. The lag permanganate drum became plugged during the fourth quarter 2019 and was taken offline. The lead permanganate drum is still operating within the treatment system. Permanganate treatment was originally included in the design to treat potential vinyl chloride that would not be captured in GAC. Monitoring data has demonstrated that vinyl chloride is not present in the inlet air streams and permanganate treatment is not providing any benefit and may be discontinued in the future (Table 2-1).

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). All condensate water was contained in Department of Transportation (DOT)-approved drums and labeled in accordance with applicable waste management requirements. IDW storage, transport, and disposal were coordinated by Boeing personnel. System monitoring includes regular monitoring of total organic vapor concentrations with a calibrated 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

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 second quarter 2019 PID readings showed reduced VOC levels at SVE-2 while SVE-1 remained near 0 ppbv. System operational 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 first quarter 2020. 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 Attachment A.

- On February 11, 2020 approximately 9 gallons of condensate water was drained from the moisture separator and the blower oil was changed. Upon inspection of the system, water was noticed dripping from the influent air filter which is after the moisture separator. Upon further inspection water was identified in the lead carbon vessel. No water was observed in the zeolite drum or the lag carbon vessel. After the water was removed, the system was reconfigured to blow hot air into the lead carbon vessel to allow it to dry out. The extraction wells and inlet valve were closed and the air dilution valve opened to allow ambient air into the system. The outlet valves were restricted to force the blower to generate hotter air.

[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 initial plan for this site visit was to adjust flows by opening SVE-3 to vent and starting extraction at SVE-1 again. If those readings did not show significant changes in influent concentrations the system would have been turned off for a period of time in order to check for rebound. This current drying period will be used as a rebound test/rest period. Upon system startup, samples will be collected for TO-15 analysis.

- The system was turned off on March 13, 2020 in response to health and safety concerns related to COVID-19 and the need to regularly inspect the site and system. The system will be restarted after the Washington State Stay-at-Home Order is lifted, tentatively planned after the week of May 4, 2020.

2.1.3 Mass Removal Estimate

Between April 17, 2015 and March 31, 2020 the SWMU-172/174 SVE system has recovered an estimated 19.9 pounds of VOCs (primarily PCE), as shown in Table 2-3. Approximately 0.53 pounds of VOCs were removed during the current reporting period (first quarter 2020) based on the PID measurements collected while the system was operating. 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

Modifying the SVE system flow at the SWMU-172/174 area at the end of the second quarter 2019 showed small increases in VOC mass removal from the system influent. Subsequent monitoring during fourth quarter 2019 showed variable vapor concentrations from SVE-3. Some rebound was observed at this well when the system was shutdown (with the moisture separator malfunction) and then again following the shutdown period for the holiday break. However, the subsequent site visits and monitoring showed these elevated levels declined in less than two weeks.

During the first few weeks of the first quarter 2020, concentrations had reduced back to low levels at the system (see Table 2-2 and 2-3). In early February 2020, condensate water was identified in the line to the lead carbon vessel and therefore the system was reconfigured to stop extracting soil vapor and to blow hot air through the vessel in order to dry out the carbon. During this process the system was shut down in response to the Governors Stay-at-Home Order and the system remains turned off. Plans for system modification during this reporting period included adjusting operating wells (i.e. SVE-3 was extracting and would be changed to an inlet vent and vice versa for SVE-1) however due to the system shut down these changes were not made. Because the system shut down is acting as a rebound test period, samples for TO-15 analysis will be collected for the system restart. Samples are planned at the SVE-influent, SVE-2 and SVE-3 (as these wells have historically shown higher VOC detections). Samples will be collected after approximately 1 hour of operation and then again after approximately 3 hours of operation in order to monitor rebound at the site.

After evaluation of the TO-15 results, additional modifications to the operation of this system will 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 starting in late 2014.

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. Boeing has continued additional nitrate/sulfate injections in the area. These injections were completed in January 2020 (seventh event) with a target concentration of 1,600 mg/L for nitrate and 800 mg/L for sulfate per well (double what was injected in Dec 2018 and Mar 2019) to provide additional nitrate and sulfate to the impacted area. Injections were performed at B78-11, B78-13, B78-17, B78-18, B78-19, B78-20, and B78-21 and the injection volumes and mass of nitrate/sulfate are included in Table 3-1.

Performance monitoring data was collected at this area in early February 2020 and included the same list of wells sampled in the previous performance monitoring events, results are presented in Table 3-2. The February 2020 monitoring results show a number of wells with marginal increases in benzene from the prior monitoring event in November 2019. Six of the seven injection wells and both of the monitoring wells in this area continue to show benzene concentrations reduced from baseline sampling prior to when treatment started in October 2017. The one injection well above baseline results is well B-78-18 with baseline benzene at 0.72 ug/L in October 2017 and current benzene concentrations of 1.20 ug/L in February 2020; both the baseline level and current concentrations are low with both values below the MCL for benzene. Current benzene concentrations at these wells range from non-detect to 6.6 ug/L with concentration reductions at approximately 25 to 97 percent of the baseline results. These performance monitoring data indicate biodegradation of benzene is occurring. The monitoring results for nitrate show detections in two wells, monitoring well GW-244S and injection well B78-19, with concentrations of 0.145 and 0.395 mg/L, respectfully. Sulfate detections ranged from 2.69 mg/L to 118 mg/L.

Site wide groundwater sampling was conducted as part of the quarterly monitoring program during this reporting period and the results are discussed in the main text of the quarterly report. Table 3-3 presents a summary of those groundwater monitoring results, by area, related to groundwater treatment/ERD implementation, with recommendations for additional substrate injections at selected areas.

4.0 Conclusions and Recommendations

SVE operations were modified at the SWMU-172/174 during this reporting period after observing condensate in the system in February 2020. The system was shut down in response to the on-going COVID-19 virus and the Governor's Stay-at-Home Order. The system down time is equivalent to a rebound rest period and it is recommended that, upon system restart, samples for TO-15 analysis be collected from the SVE system. After evaluation of those results, additional modifications 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 second quarter of 2018, may be considered.

Groundwater monitoring will continue in accordance with the EDR and approved updates to the monitoring, with supplemental VOC and TOC sampling at selected wells. Performance monitoring data related to benzene treatment at the Building 4-78/79 area collected in the first quarter 2020 show a majority of the wells in this treatment area are at benzene concentrations below baseline results, with many wells at or above 90% reduction from baseline (see Table 3-2). The seventh round of nitrate/sulfate injections were completed in the first quarter 2020 and additional nitrate/sulfate injections are recommended for the benzene treatment area at this site. Substrate injections for ERD treatment are also recommended at selected wells at the 4-78/79 Building area around well GW033S which has shown an increase in CVOCs from November 2019.

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, third quarter 2019. RCRA Corrective Action Program Boeing Renton Facility. Prepared by Wood and CALIBRE Systems, Inc. for the Boeing Company, EHS Remediation. November 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
1/9/2020	1,565	Vent	204	960	1,082		0	~ 1.5 gal condensate drained from moisture separator.
1/17/2020	1,573	Vent			51		0	~ 7.5 gal condensate drained from moisture separator.
1/24/2020	1,580	Vent					0	System check, drained ~1 gal condensate from moisture seperator.
2/7/2020	1,594	Vent	10	75	44		0	Drained ~ 8 gal condensate from moisture seperator.
2/11/2020	1,598	Vent			1,265		0	Changed blower oil. ~ 9 gal drained from moisture seperator. Noticed water at airfilter and lead GAC vessel. Adjusted system to generate/blow hot ambient air into vessel to dry carbon, no extraction of soil vapor.
3/13/2020	1,629	Vent					0	System shut down in response to COVID-19 and Boeing limited access.

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)
1/9/2020[3]	1,082	623	105	30,489	0.343	19.75
1/17/2020	51	29	105	30,681	0.014	19.76
1/24/2020[4]	51	29	105	30,849	0.013	19.78
2/7/2020	44	25	90	31,185	0.019	19.80
2/11/2020[3]	1,265	728	84	31,281	0.143	19.94

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 prior TO-15 analyses 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] These PID readings and mass estimates may be an error based on prior TO-15 analysis showing low levels of PCE.

[4] Previous weeks influent PID reading used to calculate mass removal if that reading was not collected during the site visit.

Table 3-1 - January 2020 Injection Volumes at Benzene Treatment Wells

Area	Injection Well	Volume Total (gal)	NaNO3 (lbs)	MgSO4 (lbs)	DAP (lbs)	Concentration NO3 Injected (mg/L)	Concentration SO4 Injected (mg/L)
Building 4-78/79	B78-11	500	9.12	4.16	2.75	1,599	799
	B78-13	531	9.12	4.16	2.75	1,506	753
	B78-17	524	9.12	4.16	2.75	1,526	763
	B78-18	531	9.12	4.16	2.75	1,506	753
	B78-19	539	9.12	4.16	2.75	1,484	742
	B78-20	520	9.12	4.16	2.75	1,538	769
	B78-21	510	9.12	4.16	2.75	1,568	784

Notes:
NaNO3 - Sodium Nitrate
MgSO4 - Magnesium Sulfate
DAP - Diammonium Phosphate

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

Sample ID	Date	Sample Depth (ft bgs)	TCE (ug/L)		cis-1,2-DCE (ug/L)		VC (ug/L)		Benzene (ug/L)		Nitrate (mg-N/L)		Nitrite (mg-N/L)		Sulfate (mg/L)	
B78-11-8-113017	11/30/2017	8	0.42		0.98		1.11		9.66		<0.100	U	<0.100	U	1.94	
B78-11-021418	2/14/2018	8	1.16		0.84		1.09		14.8		<0.100	U	<0.100	U	9.22	D
B78-11-051518	5/15/2018	8	1.86		0.78		1.06		12.6		<0.100	U	<0.100	U	34.1	D
B78-11-180917	9/17/2018	8	5.01		7.90		3.62		9.20		<0.100	U	<0.100	U	23.4	D
B78-11-020719	2/7/2019	8	3.13		2.47		1.81		4.88		<0.100	U	<0.100	U	25.0	D
B78-11-050719	5/7/2019	8	8.60		6.55		3.56		2.15		<0.100	U	<0.100	U	47.0	D
B78-11-112019	11/20/2019	8	4.56		4.75		3.06		0.97		<0.100	U	<0.100	U	5.65	D
B78-11-021120	2/11/2020	8	7.21		6.00		3.10		1.20		<0.100	U	<0.100	U	118	D
B78-13-15-112917	11/29/2017	15	0.24		1.29		2.02		9.92		0.135		<0.100	U	0.652	
B78-13-021418	2/14/2018	15	<0.2	U	1.78		8.49		4.11		<0.100	U	<0.100	U	1.31	
B78-13-051518	5/15/2018	15	<0.2	U	0.85		0.87		4.94		0.182		<0.100	U	4.32	D
B78-13-180917	9/17/2018	15	<0.2	U	0.61		0.38		3.29		<0.100	U	<0.100	U	0.812	
B78-13-020719	2/7/2019	15	<0.2	U	0.37		0.29		0.74		<0.100	U	<0.100	U	0.189	
B78-13-050719	5/7/2019	15	<0.2	U	0.57		0.45		1.16		<0.100	U	<0.100	U	<0.100	U
B78-13-112019	11/20/2019	15	<0.2	U	0.40		0.30	M	1.81		<0.100	U	<0.100	U	0.354	
B78-13-021120	2/11/2020	15	<0.2	U	0.37		0.43		1.42		<0.100	U	<0.100	U	2.87	D
B78-17-9-100617	10/6/2017	9	<0.2	U	0.17	J	0.33		4.84		-		-		-	
B78-17-15-112917	11/29/2017	15	1.25		0.81		1.31		6.52		<0.100	U	<0.100	U	17.1	D
B78-17-021418	2/14/2018	15	2.57		1.78		1.47		4.61		<0.100	U	<0.100	U	7.35	D
B78-17-051518	5/15/2018	15	0.91		1.63		0.53		2.60		<0.100	U	<0.100	U	8.66	D
B78-17-180917	9/17/2018	15	<0.2	U	0.39		<0.2	U	1.37		<0.100	U	<0.100	U	9.63	D
B78-17-020719	2/7/2019	15	<0.2	U	0.68		0.47		0.56		0.101		<0.100	U	2.32	
B78-17-050719	5/7/2019	15	5.00		5.72		1.79		1.07		0.101		<0.100	U	4.92	D
B78-17-112019	11/20/2019	15	<0.2	U	0.69		0.26	M	0.28		<0.100	U	<0.100	U	1.32	
B78-17-021120	2/11/2020	15	7.03		4.33		3.34		0.61		<0.100	U	<0.100	U	17.5	D
B78-18-8-100617	10/6/2017	8	<0.2	U	0.07	J	0.29		0.72		-		-		-	
B78-18-15-112917	11/29/2017	15	<0.2	U	<0.2	U	0.35	M	3.10		<0.100	U	<0.100	U	0.343	
DUP-01-112917	11/29/2017	15	<0.2	U	<0.2	U	0.36		2.96		<0.100	U	<0.100	U	1.68	
B78-18-021418	2/14/2018	15	<0.2	U	<0.2	U	0.24		1.28		<0.100	U	<0.100	U	1.47	
B78-18-051518	5/15/2018	15	<0.2	U	<0.2	U	0.23		1.68		<0.100	U	<0.100	U	27.6	D
B78-18-180917	9/17/2018	15	<0.2	U	<0.2	U	<0.2	U	0.89		<0.100	U	<0.100	U	7.28	D
B78-18-020719	2/7/2019	15	<0.2	U	<0.2	U	0.22		1.32		<0.100	U	<0.100	U	2.41	D
B78-18-050719	5/7/2019	15	<0.2	U	0.31		0.24		1.66		<0.100	U	<0.100	U	2.44	D
B78-18-112019	11/20/2019	15	<0.2	U	<0.2	U	0.21	M	1.18		<0.100	U	<0.100	U	2.64	D
B78-18-021120	2/11/2020	15	0.38		0.43		0.56		1.20		<0.100	U	<0.100	U	23.7	D
B78-19-9-100617	10/6/2017	9	<0.2	U	0.06	J	0.22		0.69		-		-		-	
B78-19-15-112917	11/29/2017	15	<0.2	U	<0.2	U	0.27	M	0.36		<0.100	U	<0.100	U	0.255	
B78-19-021418	2/14/2018	15	<0.2	U	<0.2	U	0.21		0.23		<0.100	U	<0.100	U	1.22	
B78-19-051518	5/15/2018	15	<0.2	U	<0.2	U	0.21		0.34		<0.100	U	<0.100	U	22.4	D
B78-19-180917	9/17/2018	15	<0.2	U	<0.2	U	<0.2	U	<0.2	U	<0.100	U	<0.100	U	1.91	
B78-19-020719	2/7/2019	15	<0.2	U	<0.2	U	<0.2	U	<0.2	U	<0.100	U	<0.100	U	2.16	
B78-19-050719	5/7/2019	15	<0.2	U	<0.2	U	<0.2	U	0.50		<0.100	U	<0.100	U	14.2	D
B78-19-112019	11/20/2019	15	<0.2	U	<0.2	U	0.2	M	0.21		<0.100	U	<0.100	U	0.454	
B78-19-021120	2/11/2020	15	<0.2	U	<0.2	U	<0.2	U	0.26		0.395		<0.100	U	28.3	D
B78-20-8-100617	10/6/2017	8	<0.2	U	<0.2	U	0.14	J	8.81		-		-		-	
B78-20-15-113017	11/30/2017	15	0.41		<0.2	U	<0.2	U	25.9		2.93	D	<0.100	U	53.9	D
B78-20-021418	2/14/2018	15	0.25		0.49	M	<0.2	U	40.0		<0.100	U	<0.100	U	21.1	D
B78-20-051518	5/15/2018	15	<0.2	U	0.39		0.22		54.2		<0.100	U	<0.100	U	15.5	D
B78-20-180917	9/17/2018	15	0.24		0.27		0.29		0.98		<0.100	U	<0.100	U	2.39	
B78-20-020719	2/7/2019	15	<0.2	U	0.41	M	0.25		16.5		<0.100	U	<0.100	U	1.89	
B78-20-050719	5/7/2019	15	<0.2	U	0.32		0.28		16.3		<0.100	U	<0.100	U	4.93	D
B78-20-112019	11/20/2019	15	<0.2	U	0.25		0.31	M	5.04		0.129		<0.100	U	2.47	
B78-20-021120	2/11/2020	15	<0.2	U	0.29		<0.2	U	6.62		<0.100	U	<0.100	U	11.1	D

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

Sample ID	Date	Sample Depth (ft bgs)	TCE (ug/L)		cis-1,2-DCE (ug/L)		VC (ug/L)		Benzene (ug/L)		Nitrate (mg-N/L)		Nitrite (mg-N/L)		Sulfate (mg/L)	
B78-21-8-100617	10/6/2017	8	<0.2	U	0.13	J	0.21		1.42		-		-		-	
Dup01-100617	10/6/2017	15	<0.2	U	0.15	J	0.20	J	2.01		-		-		-	
B78-21-15-112917	11/29/2017	15	<0.2	U	0.31	M	0.26		2.27		0.101		<0.100	U	4.43	D
B78-21-021418	2/14/2018	15	<0.2	U	0.24		0.30		0.86		<0.100	U	<0.100	U	1.60	
B78-21-051518	5/15/2018	15	<0.2	U	0.27		0.27		1.08		<0.100	U	<0.100	U	4.59	D
B78-21-180917	9/17/2018	15	0.22		0.29		<0.2	U	0.59		<0.100	U	<0.100	U	3.62	D
B78-21-020719	2/7/2019	15	<0.2	U	0.28		0.32		0.43		0.170		0.161		3.78	D
B78-21-050719	5/7/2019	15	<0.2	U	0.42		<0.2	U	0.80		<0.100	U	<0.100	U	5.73	D
B78-21-112019	11/20/2019	15	<0.2	U	0.30		<0.2	U	<0.2	U	<0.100	U	<0.100	U	5.92	D
B78-21-021120	2/11/2020	15	<0.2	U	0.30		0.31		<0.2	U	<0.100	U	<0.100	U	20.4	D
GW-244S-13-112917	11/29/2017	13	3.48		8.06		5.68		7.97		<0.100	U	<0.100	U	0.753	
GW-244S-021418	2/14/2018	13	1.01		1.25		1.22		5.34		<0.100	U	<0.100	U	1.25	
GW-244S	3/6/2018	13	1.26		2.00		1.56		6.86		-		-		-	
GW-244S-051518	5/15/2018	13	<0.2	U	0.30		0.41		3.89		<0.100	U	<0.100	U	<0.100	U
GW-244S-180917	9/17/2018	13	<0.2	U	0.25		0.38		3.74		<0.100	U	<0.100	U	0.113	
GW-244S	*11/13/2018*	*13*	*<0.2*	*U*	*0.26*		*0.55*		*2.95*		-		-		-	
GW-244S-020719	2/7/2019	13	<0.2	U	0.26		0.47		1.14		0.101		<0.100	U	0.337	
GW-244S	*3/4/2019*	*13*	*0.22*		*0.82*		*0.86*		*1.73*		-		-		-	
GW-244S-050719	5/7/2019	13	<0.2	U	1.22		1.18		1.13		<0.100	U	<0.100	U	1.45	
GW-244S	*5/7/2019*	*13*	*<0.2*	*U*	*2.03*		*1.45*		*1.47*		-		-		-	
GW-244S	*8/13/2019*	*13*	*<0.2*	*U*	*0.37*		*0.71*		*1.77*		-		-		-	
GW-244S	*11/11/2019*	*13*	*<0.2*	*U*	*<0.2*	*U*	*0.35*		*0.87*		-		-		-	
GW-244S-112019	11/20/2019	13	<0.2	U	<0.2	U	0.50	M	0.41		<0.100	U	<0.100	U	0.160	
GW-244S-021120	2/11/2020	13	0.22		0.56		0.67		0.25		0.145		<0.100	U	2.69	D
GW-244S	*3/10/2020*	*13*	*0.23*		*0.68*		*0.70*		*0.52*		-		-		-	
GW-031S-23-113017	11/30/2017	23	<0.2	U	<0.2	U	<0.2	U	17.6		<0.100	U	<0.100	U	2.54	D
GW-031S-021418	2/14/2018	23	<0.2	U	0.45	M	0.49		21.9		<0.100	U	<0.100	U	3.67	D
DUP-01-021418	2/14/2018	23	<0.2	U	0.46		0.42		21.4		-		-		-	
GW-031S	3/6/2018	23	<0.2	U	1.18		<0.2	U	60.3		-		-		-	
GW-031S-051518	5/15/2018	23	0.36		0.40		0.21		2.68		<0.100	U	<0.100	U	2.95	D
Dup-01-051518	5/15/2018	23	0.32		0.34		0.20		2.64		<0.100	U	<0.100	U	2.87	D
GW-031S-180917	9/17/2018	23	<0.2	U	<0.2	U	0.28		<0.2	U	<0.100	U	<0.100	U	0.499	
Dup-01-180917	9/17/2018	23	<0.2	U	0.21		0.30		<0.2	U	<0.100	U	<0.100	U	0.441	
GW-031S	*11/13/2018*	*23*	*<0.2*	*U*	*0.63*		*0.31*		*28.3*		-		-		-	
Dup-01	*11/13/2018*	*23*	*<0.2*	*U*	*0.58*		*0.30*		*23.8*		-		-		-	
GW-031S-020719	2/7/2019	23	<0.2	U	0.51	M	<0.2	U	21.6		<0.100	U	<0.100	U	0.170	
Dup-01-020719	2/7/2019	23	<0.2	U	0.57	M	0.24		22.7		<0.100	U	<0.100	U	0.202	
GW-031S	*3/4/2019*	*23*	*<0.2*	*U*	*<0.2*	*U*	*<0.2*	*U*	*55.9*		-		-		-	
Dup-01	*3/4/2019*	*23*	*<0.2*	*U*	*<0.2*	*U*	*<0.2*	*U*	*58.6*		-		-		-	
GW-031S-050719	5/7/2019	23	<0.2	U	0.22		0.30		1.90		<0.100	U	<0.100	U	1.86	
Dup-01-050719	5/7/2019	23	<0.2	U	0.27		<0.2	U	2.16		<0.100	U	<0.100	U	0.689	
GW-031S	*5/7/2019*	*23*	*<0.2*	*U*	*0.43*		*0.29*		*7.13*		-		-		-	
Dup-01	*5/7/2019*	*23*	*<0.2*	*U*	*0.38*		*0.27*		*6.69*		-		-		-	
GW-031S	*8/13/2019*	*23*	*<0.2*	*U*	*0.47*		*0.21*		*3.47*		-		-		-	
Dup-01	*8/13/2019*	*23*	*<0.2*	*U*	*0.48*		*0.22*		*4.37*		-		-		-	
GW-031S	*11/11/2019*	*23*	*<0.2*	*U*	*0.40*		*0.25*		*4.77*		-		-		-	
Dup-01	*11/11/2019*	*23*	*<0.2*	*U*	*0.39*		*0.27*		*4.75*		-		-		-	
GW-031S-112019	11/20/2019	23	<0.2	U	<0.2	U	<0.2	U	1.90		<0.100	U	<0.100	U	1.26	
Dup-01-112019	11/20/2019	23	<0.2	U	<0.2	U	0.27	M	2.31		<0.100	U	<0.100	U	1.16	
GW-031S-021120	2/11/2020	23	<0.2	U	<0.2	U	0.25		3.47		<0.100	U	<0.100	U	3.29	D
Dup-01-021120	2/11/2020	23	<0.2	U	<0.2	U	0.27		3.69		<0.100	U	<0.100	U	3.11	D
GW-031S	*3/10/2020*	*23*	*<0.2*	*U*	*0.61*		*<0.2*	*U*	*37.1*		-		-		-	
Dup-01	*3/10/2020*	*23*	*<0.2*	*U*	*0.56*		*<0.2*	*U*	*38.5*		-		-		-	

Notes:

U = non-detect

D = dilution

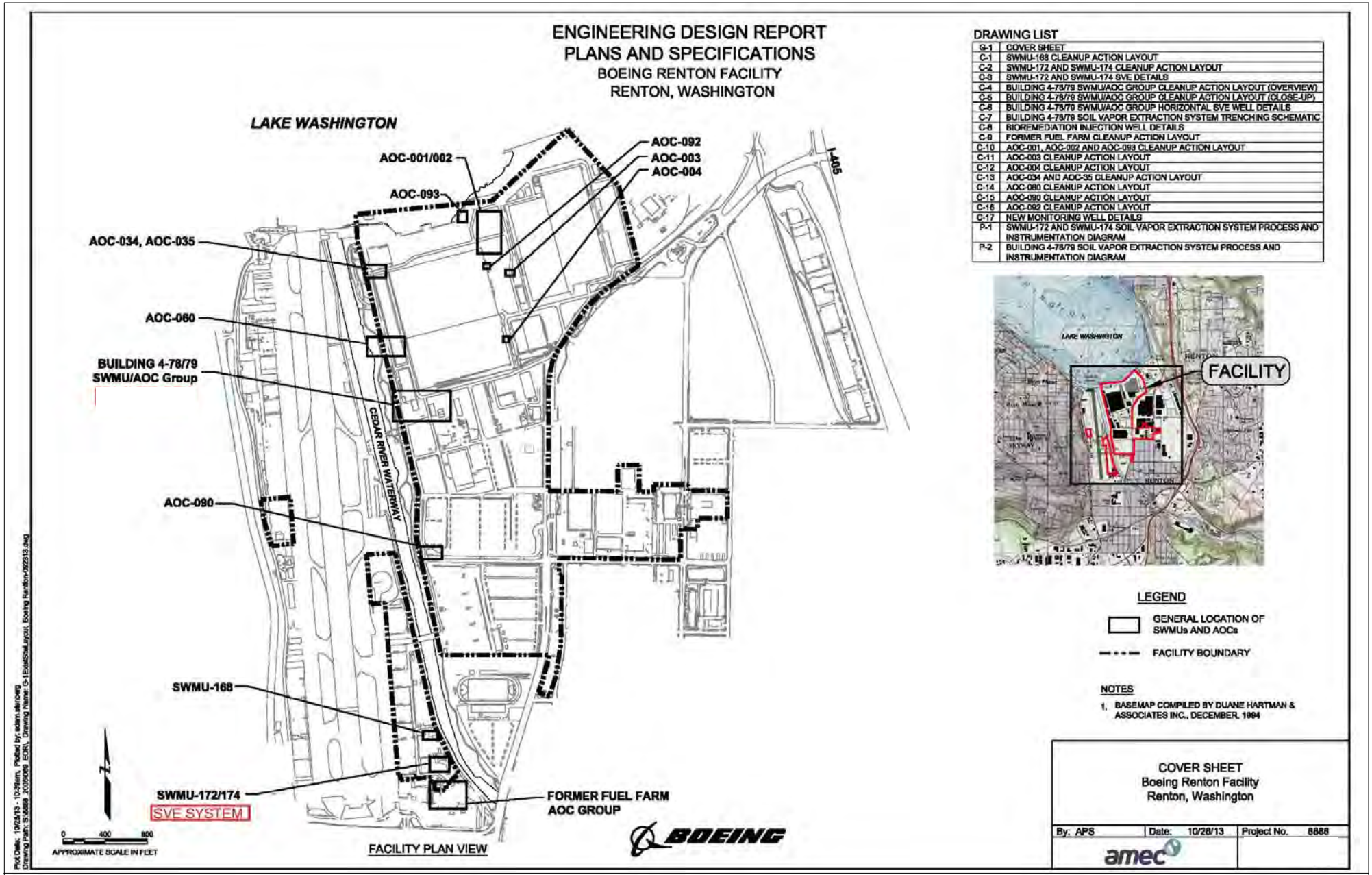
M = Estimated value for a GC/MS analyte detected and confirmed by an analyst but with low spectral match parameters.

Samples in italics collected as part of the Renton quarterly groundwater monitoring program.

Table 3-3 Groundwater Monitoring Results Summary March 2020 and Recommended ERD Treatment

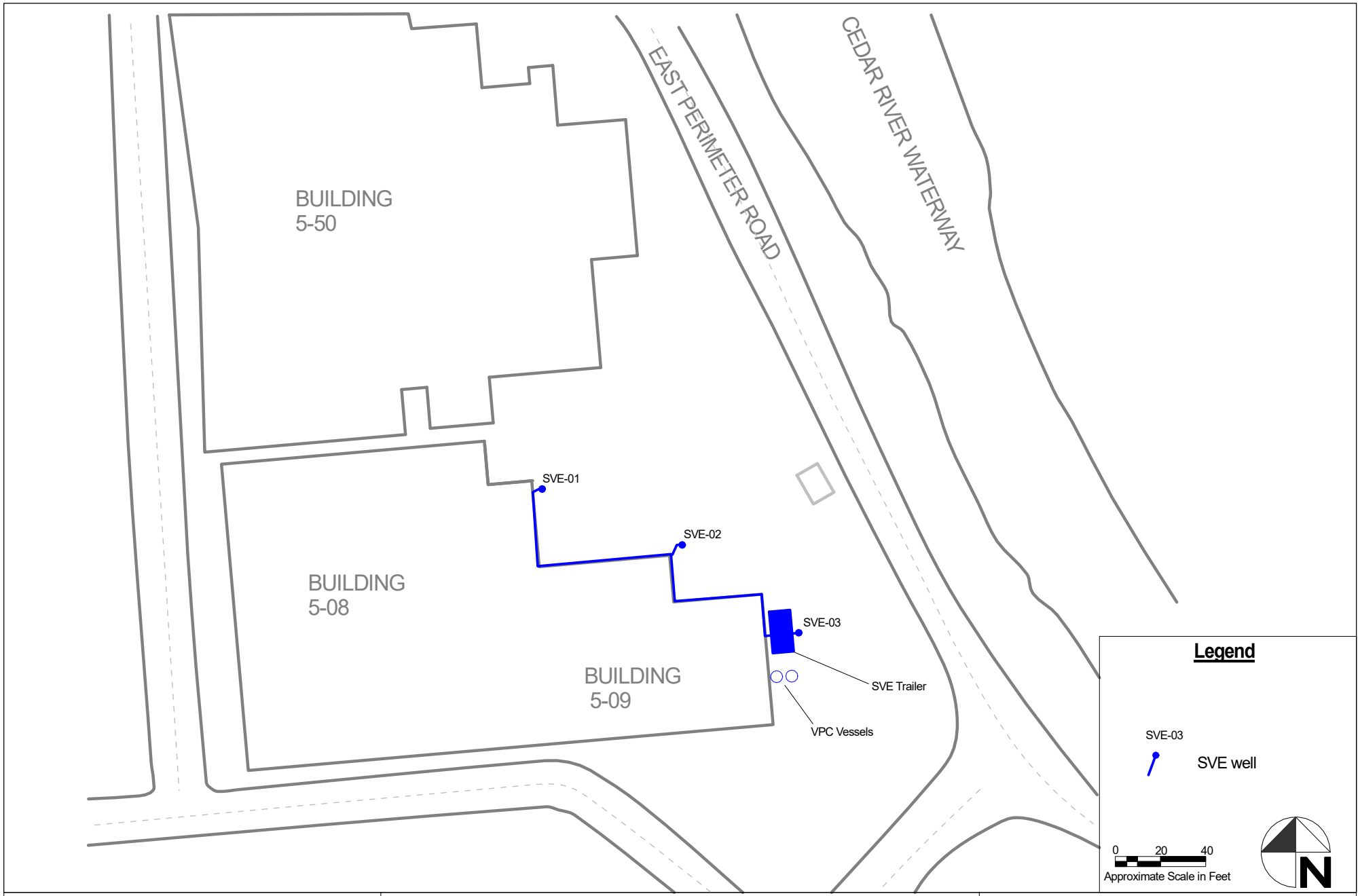
GW Treatment Area	Source and down gradient MWs	CPOC wells	Treatment IWs	ERD Treatment Recommendation
SWMU-172/174	PCE and TCE at or less than 1.2 ug/L; cisDCE less than 0.90 ug/L and VC less than 0.25 ug/L.	All detections are at 0.26 ug/L or less.	*Prior data Mar 2018, North and South IWS showed total CVOCs range from 0.03 ug/L to 6.90 ug/L. TOC near background.*	**Detections are very low throughout the site. Will consider additional injections if beneficial.**
Building 4-78/4-79 SWMU/AOC Group	One detection of TCE at 0.23 ug/L; cisDCE and VC are less than 1.0 ug/L at all but GW033S with cisDCE at 21.4 ug/L and VC at 52.2 ug/L. One central well (GW033S) continues to show total CVOCs remain reduced from Nov 2017 results of 1,430 ug/L but have increased from prior quarter. Recent data show 15.8 ug/L in Nov 2019 and 73.4 ug/L in Mar 2020. Substrate was applied to this area after Mar 2019 sampling. Benzene increased at source well GW031S (4.77 ug/L in Nov 2019 to 38.5 ug/L in Mar 2020). Nitrate/sulfate injections were completed in January 2020.	Majority of detections are ND; well GW143S with cisDCE detection at 0.21 ug/L. Northern well GW237S showed benzene increase from 0.66 ug/L to 3.48 ug/L.	*Prior data May 2017, 4 of 5 wells with low detections where sum of CVOCs are less than 3 ug/L*	**CVOC detections have increased at source well GW033S. Recommend substrate injection in selected IWs/areas around GW033S.** **Addtional nitrate/sulfate injections recommended for the area around GW-031S.**
AOC-001/002	Source MW: TCE is 0.03 ug/L, cisDCE is 0.49 ug/L and VC is 0.27 ug/L.	*Prior data Aug 2019: All detections below 0.30 ug/L.*	*Prior data Mar 2018, detections at or below 0.30 ug/L.*	**Detections are very low throughout the site. Will consider additional injections if beneficial.**
AOC-003	All detections are less than 0.33 ug/L.	All detections are less than 0.49 ug/L.	*Prior data May 2017 one of four IWs sampled – VC detection less than 0.30 ug/L*	**Detections are very low throughout the site. Will consider additional injections if beneficial.**
Lot 20 / former 10-71	*Prior Data Nov 2019: All wells are ND.*	-	-	**No action at this time.**
AOC-60	MW's with total CVOCS less than 0.41 ug/L; treatment MWs with total CVOCs less than 1.5 ug/L.	MW's with total CVOCs less than 0.30 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 0.10 ug/L; down gradient wells less than 0.46 ug/L total CVOCs.	Detections less than 0.42 ug/L.	-	**Detections are very low throughout the site. Will consider additional injections if beneficial.**
Apron A	Two of three wells ND; GW264S with VC at 0.38 ug/L.	-	-	**Detections are very low throughout the site. Will consider additional injections if beneficial.**
Building 4-70	-	Total CVOCs less than 0.63 ug/L.	-	**Detections are very low throughout the site. Will consider additional injections if beneficial.**

FIGURES



CALIBRE Systems, Inc.

Figure 1-1 Site Location/ AOC Outlines



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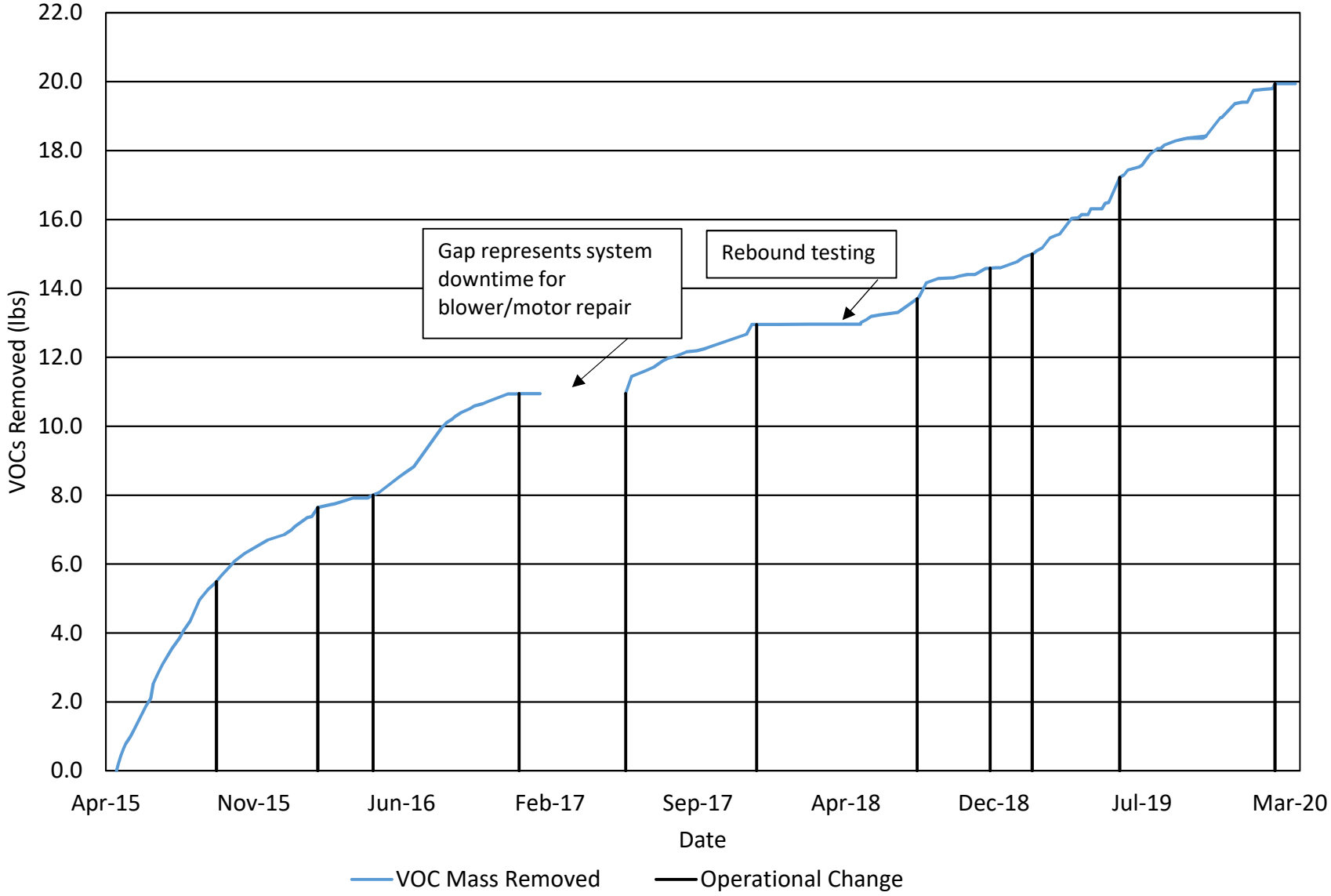
Boeing Renton
Spring 2017 SVE Quarterly Summary Report

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: 1/9/20 Date of last inspection: 12/31/19

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: 1500		Motor Hours:
Blower	**Current Value**	**Other Notes**
Vacuum gauge	42" H2O	1.5 gal water drained from separator tank.
Pressure gauge	10" H2O	
System flow rate	105 SCFM	
Blower Temperature	92°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: 1/9/20 1520	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		202 ppb	204 ppb				
SVE-03		881 ppb	960 ppb				
VPC Inlet		1,082 ppb	1,025 ppb				
VPC Midpoint							
VPC Outlet		0 ppb	0 ppb				
Other vapor point _____							

1. Flow rate calculated from the equation $Flow\ Rate\ (cfm) = 12.24 \times \sqrt{differential\ pressure}$.

Questions? Call Justin Neste @ (360) 981-5606
At the Completion of a monitoring event scan monitoring forms and email to Justin Neste: Justin.Neste@calibresys.com

Signature Justin Neste (Printed Name) [signature] (Signature) 1/9/20 (Date)

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

Inspection Date: 1/17/20 Date of last inspection: 1/9/20

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:
Blower	**Current Value**	**Other Notes**
Vacuum gauge	41 "H2O	~7.5 gal drained from separator tank
Pressure gauge	10 "H2O	
System flow rate	105 SCFM	
Blower Temperature	90°F	
Temp.at lag VPC discharge		
Other notes: check oil level, drive belts, TEFC motor fan, any unusual noise/vibration		

PID Model: PBB RAE 3000	Details: 0 ppb / 10.01 ppm
Calibration time/ date: 1/17/20	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		51 ppb	50 ppb				
VPC Midpoint							
VPC Outlet							
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: 1/24/20 Date of last inspection: 1/17/20

Periodic systems check:
1) Check flowrate, vacuum, pressure, moisture separator, water storage drums
2) Check each SVE well, VPC inlet, and VPC outlet with PID.

Operational Parameters - Monitoring interval is variable.		
Inspection Time: 0930		Motor Hours:
Blower	**Current Value**	**Other Notes**
Vacuum gauge	41" H20	System check / Drain Condensate System running on arrival Drained ~ 1gal from moisture separator.
Pressure gauge	10" H20	
System flow rate	105 scfm	
Blower Temperature	96°F	
Temp.at lag VPC discharge		
Other notes: check oil level, drive belts, TEFC motor fan, any unusual noise/vibration		

PID Model:	Details:
Calibration time/ date:	PID check after monitoring:

Sampling Point	Time	PID Reading (1)	PID Reading (2)	Vacuum	Flow Rate (gauge)	Differential Pressure	Flow Rate Calculated[1]
SVE-01							
SVE-02							
SVE-03							
VPC Inlet							
VPC Midpoint							
VPC Outlet							
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] (Signature) 1/24/20 (Date)

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

Inspection Date: 2/7/20 Date of last inspection: 1/24/20

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: 0545		Motor Hours:
Blower	**Current Value**	**Other Notes**
Vacuum gauge	75" H20	System on @ arrival Drained ~8 gal from moisture separator
Pressure gauge	20 PSI	
System flow rate	90 SCFM	
Blower Temperature	76 °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: 10.01 ppm / 0 ppb
Calibration time/ date: 2/7/20	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		10 ppb	9 ppb				
SVE-03		74 ppb	75 ppb				
VPC Inlet		44 ppb	0 ppb				
VPC Midpoint							
VPC Outlet							
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: 2/11/20 Date of last inspection: 2/7/20

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: 1400 Motor Hours:

Blower	Current Value
Vacuum gauge	74 "H20
Pressure gauge	24 "H20
System flow rate	84 scfm
Blower Temperature	77°F
Temp.at lag VPC discharge	

Other Notes

Changed Blower oil
Drained 9 gal condensat in moisture seperator. Noticed water @ airfilter & Lead carbon vessel. ~ 45 gal water drained from lead GAC vessel. Adjusted system to close inlet valve, open bleed valve, close recycle valve & restrict 2 outlet valves to generate heat to dry carbon. Disconnected carbon vessel #2 & zeolite drum & connected lead carbon vessel to exhaust stack. will allow system to run ms is to dry carbon.

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

PID Model: 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							
SVE-02							
SVE-03							
VPC Inlet		1,200 ppb	1,265 ppb				
VPC Midpoint							
VPC Outlet							
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) 2/11/20 (Date)